

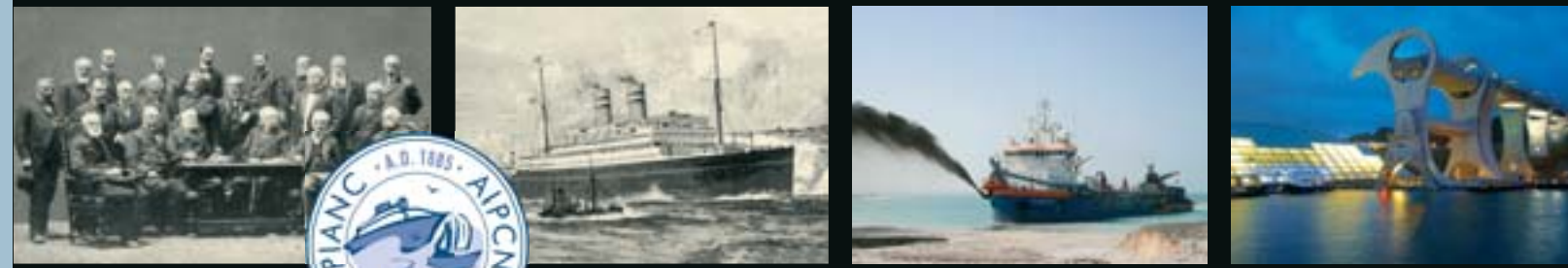


On 25 May 1885, the first Inland Navigation Congress was held in Brussels, providing a forum for an international debate on these questions. After some years, the Inland Navigation Congress merged with the Ocean Navigation Congress and the International Navigation Congress was born. During the Congress in Paris, 1900, a Permanent International Commission for the Navigation Congresses was set up. Two years later Statutes were adopted. PIANC was a fact.

PIANC changed considerably over the years, from an Association organising a Congress every four years, to an Association setting technical standards and publishing high ranking reports. The story of the probably oldest technical Association deserved to be recorded. This history book is the result.

This book, prepared by a commission of distinguished members, will take you along the early years of the Association, the difficult war and postwar years, the rapid changes of the last quarter of the 20th century and will elaborate on the challenges of the 21st century: sustainable development, climate change, sea level rise and the need for working with nature. Throughout the book are descriptions of technical highlights, major engineering developments and achievements, which were built during the 125 years of PIANC's existence.

PIANC The World Association for Waterborne Transport Infrastructure 1885-2010



1885-2010

PIANC

The World Association for Waterborne Transport Infrastructure





PIANC,
The World Association for
Waterborne Transport Infrastructure
'An association in a changing world, 1885-2010'

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1. Introduction

At the end of the 19th century, international trade and the consequent demand for waterborne transport infrastructure increased considerably. The introduction of steamships and major projects such as the construction of the Panama Canal created an additional need for exchange of know-how.

On 25 May 1885, the first Inland Navigation Congress was held in Brussels, providing a forum for an international debate on these questions. After some years, the Inland Navigation Congress merged with the Ocean Navigation Congress and the International Navigation Congress was born.

During these first years, there was no permanent organisation to guarantee continuity but only local organising committees for the consecutive Congresses. In 1890, at the occasion of the fourth Congress, it was decided to establish a permanent body. During the Congress in Paris, 1900, a Permanent International Commission for the Navigation Congresses was set up. Two years later statutes were adopted. During its 125 years lifespan, PIANC managed to survive two World Wars and several economic crises. The Association was flexible enough to adapt to changing times and new needs of its membership. PIANC changed considerably over the years, from an Association organising a Congress every four years, to an Association setting technical standards and publishing high ranking reports. The story of the probably oldest technical Association deserves to be recorded, hence this history book that is lying before you.

This book, prepared by a commission of distinguished members, will take you along the early years of the Association, the difficult war and post-war years, the rapid changes of the last quarter of the 20th century and will elaborate on the challenges of the 21st century: sustainable development, climate change, sea level rise and the need for working with nature. Throughout the book are technical highlights, short descriptions of major engineering developments and achievements, which were built during the 125 years of PIANC's existence.

2010 may well become a turning point in our long history, as PIANC is aiming at widening its scope and broadening its membership in order to be able to deal with the many challenges waterborne transport and the related infrastructure are facing.

I thank the 'History Commission' and other authors, who really did a splendid job and demonstrated the dedication they had for PIANC during – in some cases – over half a century. I also thank the sponsors who, by their support, made it possible to publish such a richly illustrated book. Finally, I would like to dedicate this history book to the many PIANC-members of the past and the present, that through their voluntary contributions ensured the recognition of the Association as a source of solid technical guidance.

Eng. Eric Van den Eede
President



2. Establishment of PIANC (before 1885)

It was 1885, a time of full prosperity and at the zenith of an outstanding industrial expansion, which was due to the perfection of the steam engine and the development of heavy industry. During the 19th century, international organisations were considered as the new approach to creating stable and peaceful relations between nations. The Congress and Treaty of Vienna of 1815 had confirmed the principle of free navigation for ships of all nations on international rivers such as the Rhine and Danube, leading to the Act of Mannheim of 1868, the basis for the international Central Commission for Navigation on the Rhine and in 1857 to a treaty for the creation of the Danube Commission.

International Congresses

Among the new international organisations was the Congrès International d'Études du Canal Interocéanique (International Congress for the Study of the Interocean Canal) convened in Paris on 15 May 1871 at the headquarters of the Société de Géographie where 136 delegates represented 22 countries. During the Congress its President, Ferdinand de Lesseps, who completed the Suez Canal one and a half year before, read aloud the crucial resolution: 'The Congress believes that the excavation of an interoceanic canal at sea level, so desirable in

the interests of commerce and navigation, is feasible and that, in order to take advantage of the indispensable facilities for access and operation which a canal of this kind must offer above all, the canal should extend from the Gulf of Limon to the Bay of Panama'. This resolution decided on the location of the interoceanic canal in the Isthmus of Panama. At the same time, a passionate debate was going on in the United Kingdom with regard to the construction of the Manchester Ship Canal. The canal with its unique swing aqueduct bridge was eventually opened in 1894. Another important



The Suez Canal, opened in 1869, was a major driving force for the development of steam navigation, because sailing was not allowed on the canal. The waterway was enlarged several times as ships grew bigger and bigger, but it needed continual maintenance dredging.

international meeting at that time was the Berlin Conference that ended in February 1885 with the signature of an agreement to create the state of Congo with King Leopold II of Belgium as its sovereign. This result convinced the Belgian king of the profit of international Conferences and stimulated him to support the organisation of the International Inland Navigation Congress in Brussels.

The 19th century was the era of the large exhibitions too, the first World Exhibition being organised in London in 1851. In 1885, there was the Antwerp International Exhibition, which attracted many thousands of visitors, and the first International Railway Congress was held the same year. In the course of the preceding decades Belgium, like other industrial countries, had above all devoted its efforts to the constructing and equipping the railway network. The navigable waterways, although of prime importance for the increasing transport of bulk cargo, were more or less neglected in favour of the railways. But the steam engine also stimulated strong development of transport via inland waterways. The increase of the size of vessels and in the number of vessels called for an urgent improvement of the existing waterways. This question became in many countries a matter of national

importance that would in the course of time gain support from national governments. The question of linking towns like Brussels, Brugge, Louvain and Malines to the sea started a sway of public opinion in Belgium.

First Navigation Congress

It was in early 1885, that a few individuals joined forces in an attempt to organise the first Navigation Congress in Brussels. Mr. A. Gobert, a mining engineer and councillor of St. Gilles near Brussels, played a leading role. These men had formed Associations known as:

- Cercle des Installations Maritime de Bruxelles
- Chambre Libre de Commerce de Louvain
- Cercle de Bruges-Port de Mer
- Cercle Industriel et Commercial de Malines

The leading members of these four organisations met in Brussels, numbering fifty in all, each of them donating the sum of 100 BFR and they decided to establish the Organisation Committee of the First Inland Navigation Congress. The idea of such a Congress had already been acclaimed at Bremen in October 1884, when numerous



Initially steamships on inland waterways were mainly used for passenger transport. Paddle wheelers were especially suitable for shallow waters. In the second half of the 19th century, steamships became more common and were employed also as cargo vessels.

German, Dutch and Belgian engineers met, after they had undertaken a tour together to study the inland waterways and ports of Germany. Some members of the Cercle des Installations Maritime de Bruxelles had taken part in the excursion and it was from their ranks that the idea of the Navigation Congress originated. Through the efforts of Baron Moreau d'Andoy, Minister of Agriculture, Industry and Public Works, the Belgian government granted support and an International Inland Navigation Congress, the fore-runner of PIANC, was instituted in Brussels, which held there its first Congress in 1885. The first session of the Congress was held on Monday 25 May 1885 in the historic hall of the Palais des Académies. There were four hundred participants from thirteen countries. The Organising Committee had prepared eighteen technical and economic questions to be examined and discussed such as:

- What are the necessary conditions for a maritime canal to be useful?
- Is it desirable that maritime canals belong to the state and should they be toll free?
- What are the best engines for digging canals?

- What are the best means for consolidating banks?
- What are the advantages of the different lock systems?

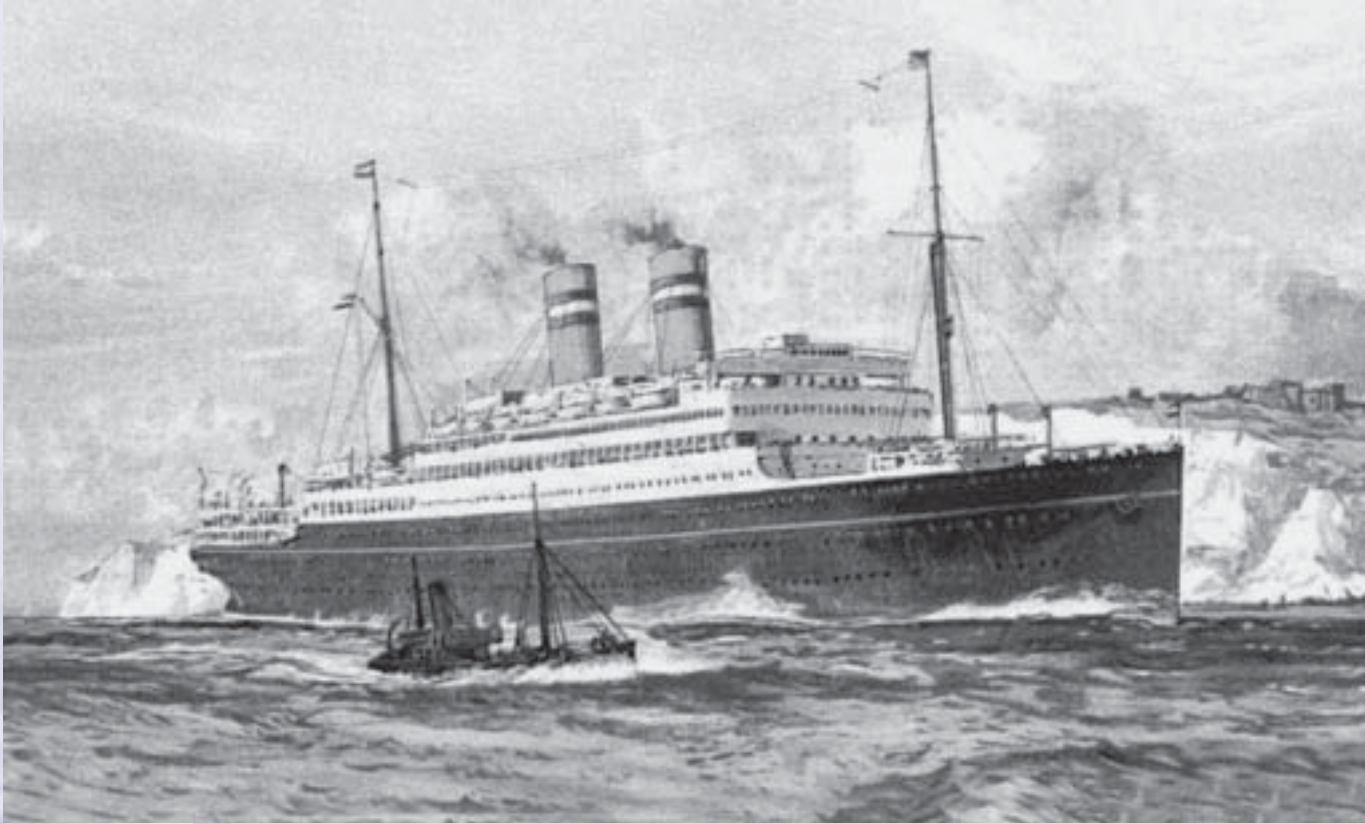
Thirteen reports were presented to the audience. All the questions gave rise to conclusions, which were voted on by the participants. Following the Congress were excursions to Heyst on the Belgian coast, where a deep-water port was planned, to the Brussels Canal near Rupelmonde, to the Ghent-Terneuzen Canal and to the canal from Louvain to the river Dyle. One of the most important conclusions of the Congress was to continue and it was decided to hold the second Congress in Vienna in 1886.

The success achieved by the first Navigation Congress was not solely due to the favourable circumstances of the time, nor to a natural evolution of past events. It was above all thanks to the energy and the far-sightedness of a handful of men, who were fully aware of the possibilities of scientific and technical discoveries, that were about to revolutionise life and create a whole range of technical questions and problems which only a vast international organisation was capable of coming to grips.



On narrow waterways, sailing was not possible and one had to rely on horse- or even manpower. In 1895, a so-called double header is pulling a barge through the Erie Canal.


The steamship



The steamship Rotterdam, launched in 1908, passes the white cliffs of Dover. The need to discuss questions related to the ever larger steamships was a driving force in establishing PIANC. At the same time the steamship, through its speed and reliability, made the world smaller and made it easier to travel to Congresses around the world.

The 19th century was the age of steam and, as far as PIANC is concerned, the age of the steamship. During previous centuries, navigation had to rely on wind and sails. But wind is not a very reliable source of power, sailing ships needed a large crew to handle their sails and the size of the wooden ship was limited by the properties of the construction material.

James Watt invented the steam engine in 1782 or at least a practical and usable steam engine. After several small scale experiments, the American Robert Fulton constructed in 1807 the steamship North River to start a regular service on the Hudson River between New York and Albany. He equipped his ship with Boulton & Watt steam engines. In 1812, Henry Bell was the first in Europe to start a steamboat service on the river Clyde and in 1816 the first (British) steamship sailed on the river Rhine. So far, the examples concerned inland navigation only.



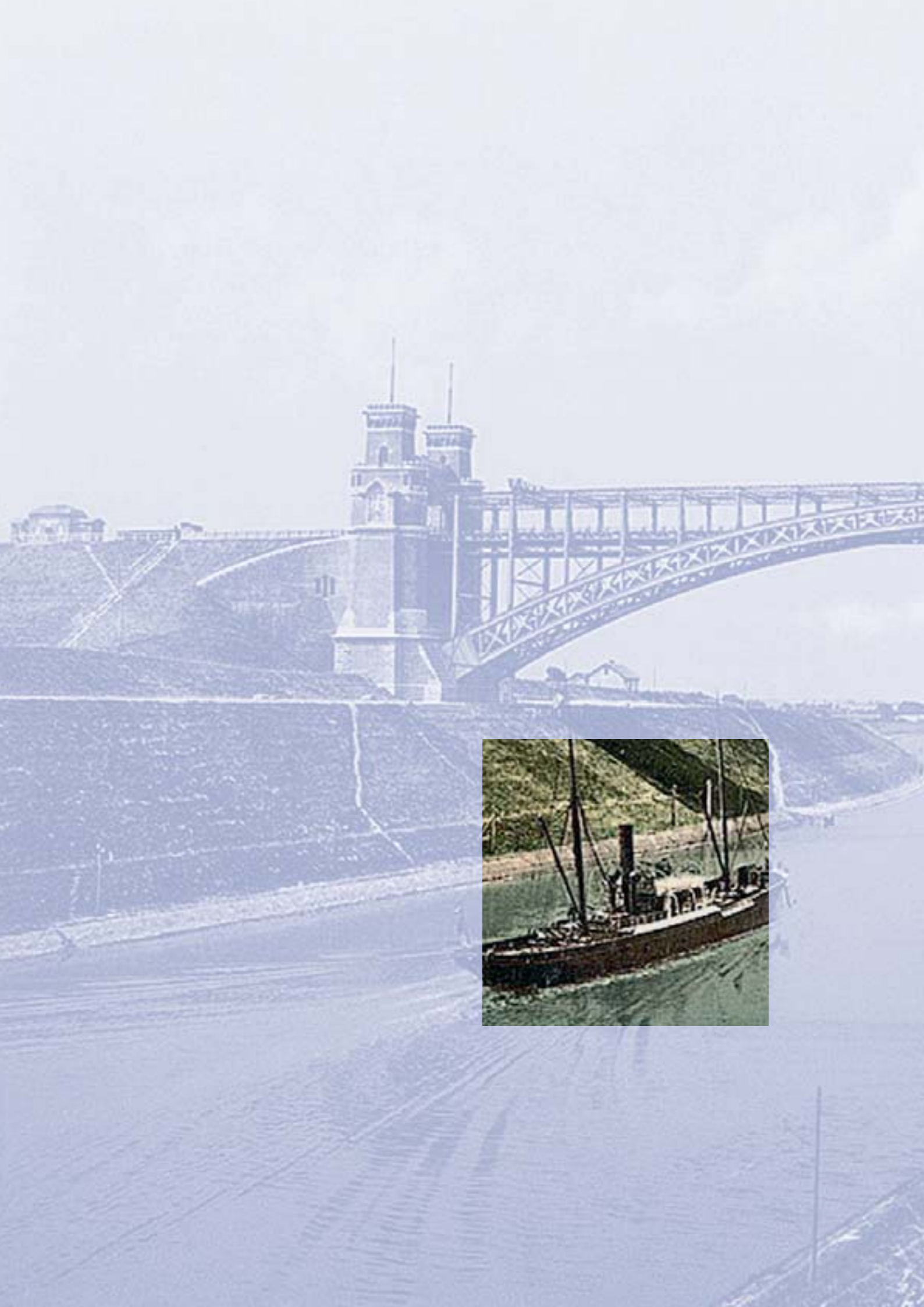
The first sea-going steamship was the Savannah, built in 1818 for a service along the American coast. The Savannah was equipped with a 90 hp one-cylinder steam engine, giving the ship a speed of 6 knots. A 5 m diameter paddle wheel was fitted on both sides of the ship. The ship was not the commercial success her owners hoped for and was sold to a European company. She made the trip to Liverpool under her own power, thus becoming the first ship to cross the Atlantic Ocean by steam propulsion. However, the steam engine was in operation for 85 hours only. The rest of the time, the crossing was made in the old-fashioned way by sail, mainly to save coal.

The first, real transatlantic steamship and recognized as forerunner of modern shipping is the Great Britain, designed by the legendary Isambard Brunel. He combined three major innovations in his ship: steam power, steel hull and a propeller instead of the vulnerable paddle wheel. The ship was launched on 19 July 1843 and made her maiden voyage to New York two years later in an astounding fourteen days. The Great Britain still exists! In 1970 the hull was recovered and towed back to her homeport Bristol, where she docked as a museum ship now.

In the second half of the 19th century, famous steamship companies emerged: the Peninsular & Orient Steam Navigation Company (P&O) in 1835, the Cunard Line in 1840, the Hamburg-Amerika Packetfahrt in 1847, the Compagnie Générale Transatlantique in 1855 and the Holland-America Line in 1873, to mention only a few. A major impulse for steam navigation was the opening of the Suez Canal in 1869. Sailing ships were not allowed to pass through the canal, so steamships were the only option and the famous clipper Cutty Sark, launched in 1869, came too late.

The steamships, ocean going as well as inland, quickly grew in size and number, creating a demand for larger ports, quays, locks and canals. This was a challenge to engineers, because many aspects were new and unfamiliar. The state-of-the-art of civil engineering was lagging behind. The need to discuss the questions with colleagues was the driving force to establish PIANC. Steamships not only became bigger, they became faster: the greyhounds of the sea. Competition to win the Blue Ribbon for the fastest crossing of the Atlantic became a matter of national prestige.

By its speed, the steamship made the world smaller. Overseas travelling took less time and was more reliable than ever before. For instance, visiting a Congress in Europe would be too time consuming for an American engineer in the age of sail. Now, the trip was a matter of days and could be planned exactly. Without exaggeration, one might say that an Association like PIANC would not have been feasible without the steamship. In that respect, the steamship deserved to be shown on the PIANC-logo, that first appeared in 1904.



3. The early years, 1885-1914

The first Navigation Congress of 1885 was a success and it was obvious that another one should be planned. The next Congress was held one year later and was followed by many others. Yet, there was no standing organisation. That decision was taken in 1898 to prepare statutes for a permanent Association, which were accepted in 1902. Meanwhile, the Inland Navigation Congress had merged with the Ocean Navigation Congress. Before the Great War twelve Congresses were organised and the attendance increased to over 1,000 delegates. PIANC apparently fulfilled the need for exchange of technical information in the field of inland and maritime navigation by its biennial meetings.

Inland Navigation Congresses

During the Brussels Congress, the Austrian delegate proposed that the second Congress should be held the following year, 1886, in Vienna. This proposal was accepted by acclamation. The invitation also coincided with a current of opinion similar to that which had given rise to the idea of the Brussels meeting. In Austria, attention was focused on the establishment of canals connecting the Danube with the major German rivers. The Congress lasted from 15 to 19 June 1886, but it was preceded by a steamship excursion from Ratisbon to Vienna, passing via Passau. The Congress was opened on 15 June by the Archduke Rudolf, acting as patron. There were 307 participants from 12 countries. The programme including the examination of four questions, worded as follows:

1. The study of navigable waterways from the economic point of view
2. The normal profiles of canals and the dimensions of the constructional works relating to artificial navigable waterways
3. Operation of navigable waterways
4. Construction of maritime canals and their utility

Seven reports were submitted. The first three questions gave rise to conclusions; the last question was adjourned until the next Congress. The proposal to institute an international office of Inland Navigation Congresses was referred back to the Organising Committee of the next Congress. The members of the Congress were able to travel



The archive of PIANC, in the basement of the Brussels Headquarters, contains the proceedings and papers of all Congresses. All reports were printed in the three official languages of the Association: English, French and German. The archive was a primary source for the research needed to write this book.

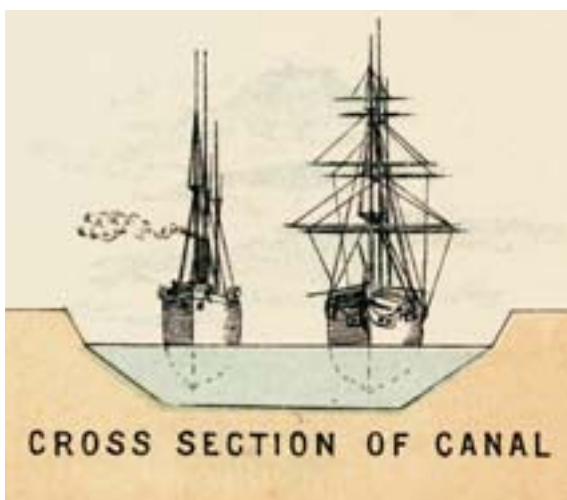
down the Danube on the boats of the Danube Navigation Company between Vienna and Turn-Severin with, at that time, the redoubtable passage of the Iron Gate.

The invitation of the city of Frankfurt-am-Main to hold the third meeting of the Congress in that city in 1888 was unanimously accepted. The canalisation of the Main between Mainz and Frankfurt and the creation of a vast river port with the most advanced equipment were the reason of holding the Congress at Frankfurt. It was an excellent way of letting people know the aim to be followed and the work that had been achieved. Emperor Frederick III bestowed his patronage on the Congress. The Congress opened on 20 August 1888. There were 710 participants from 12 countries, or as many as had attended the Congress of Brussels (400) and

Vienna (307) together. The fourteen reports dealt with six questions, which were worded as follows:

1. Reform of inland navigation statistics
2. Improvement of river navigation
3. Which vehicles and modes of traction are most appropriate for the conditions of the large navigable waterways
4. What are the economic advantages of maritime canals penetrating inland
5. The utility from the agricultural point of view of the navigability of rivers and the construction of navigable canals
6. River estuaries, their navigability and their maintenance

In its conclusions, the Congress underlined the necessity of regulating and canalising navigable rivers. For the first time the Congress insisted upon the necessity of hydro-technical research, hydraulic tests and the perfecting of structures concerned with navigation. This pushed the creation of the first hydraulic laboratory world-wide, which was opened 1898 at the Technical University of Dresden by Mr. H. Engels. Also for the first time, an International Commission of Inland Navigation Statistics was set up, with the aim of submitting a report to the next Congress. The last two days of the Congress were devoted to visits to the Rhine ports of the region: Gustavsburg, Mainz, Mannheim and Ludwigshafen. As yet, no organisation had been created to ensure the continuity of the institution.



The 1890, the fourth Congress was held in Manchester. At that time, there was great activity in progress on the Manchester Ship Canal worksites – which made it worthwhile to visit. The cross section shows that the canal was designed for a mix of sailing and steam ships.

The Manchester Ship Canal Company and the municipality of Manchester invited PIANC to hold the fourth Congress at Manchester in 1890. The holding of an International Navigation Congress in Manchester at a time when great activity was in progress on the Manchester Canal worksites with a view to ensuring the industrial independence of the city seemed a suitable way of making known throughout the world the goal which was being pursued and the means being utilised for this purpose.

The Congress was placed under the patronage of HRH the Prince of Wales and presided by Sir Michael Hicks-Beach, President of the Board of Trade. The total number of participants was 490. The thirty-seven reports dealt with four questions, which were worded as follows:

1. Rivers and inland canals. Description of different navigable waterways; means of traction and propulsion on canals; methods of protecting the banks of navigable waterways
 - a) Tidal rivers: improvement of estuaries and mouths
 - b) Maritime canals
2. Inland navigation statistics: study of the report from the commission appointed at Frankfurt
3. State, operation and cost of canals

Among the conclusions, the Congress adopted the principle of statistics related to inland navigation as contained in the report from the Commission, and recommended the application of the report. The works of the Ship Canal were visited during the Congress, and the excursions after the Congress included a trip to Scotland to visit the Firth of Forth Bridge. Yet again, the question of the formation of a Permanent Commission was raised and formed the subject of a more thorough examination, but still a decision was not taken. Action was however taken on the wish expressed that in each country a local and national committee should be set up with which the Executive Committee of each Congress could correspond.

The invitation to hold the fifth, 1892 Congress in Paris was extended by the Paris Chamber of Commerce. The Congress was placed under the patronage of the President of the Republic and the Ministers of Public Works, the Navy, the Colonies, Agriculture and Trade and Industry. The total number of participants was 1,042, including 423 from abroad. Ten precise questions had been fixed beforehand, which were divided in four sections and worded as follows:

1. Construction and maintenance of navigable waterways
2. Technical operation such as traction of barges
3. Commercial operation and economic questions, including taxes and tolls
4. Improvement of rivers in their maritime part, including the estuary

Fifty-four reports were submitted on these questions. In its conclusions, the Congress proposed a series of new technical measures intended to increase the profitability and safety of navigation. It stressed the importance of navigation for the economy of a country. The excursion after the Congress was a kind of marathon, covering the Centre, Southeast and South of France and included a trip down the Rhone from Lyon to Marseilles.

The Congress had its sixth meeting in the Netherlands, at The Hague, in 1894. The initiative for the meeting originated in the Royal Institute of Engineers, and the Organising Committee was formed by members of the Institute chaired by Mr. J.F.W. Conrad, former inspector-general of Rijkswaterstaat. Queen Emma of the Netherlands had graciously consented to be the patron of the Congress. The number of participants was 1,048, including 766 from abroad distributed among 18 nationalities. Four sections subdivided into

seven questions had been fixed in advance to be discussed, and thirty-three reports had been submitted concerning:

1. Construction and maintenance of navigable waterways
2. Technical operation
3. Commercial operation and economic questions
4. Improvement of navigable rivers

In its conclusions, the Congress stressed the necessity of increasing the speed of river traffic, of perfecting the equipment of internal ports, of preventing waterways being closed by ice, and of studying the monopolisation of the traction service. There was a painful incident during one of the excursions. After a boat trip on the Delta waters, the participants returned by train to The Hague. The train broke down and as a result, the guests did not arrive at dinnertime in The Hague, but long after midnight. But the other excursions to Amsterdam, Haarlem, the new locks at IJmuiden and the Zuiderzee did not suffer from such misfortune. It was also at this Congress that the Assembly was called upon to deal with a proposal aimed at the merger of the Inland Navigation Congress with the Ocean Navigation Congress.



Around the turn of the century steamships dominated the harbour view, like here in the Rotterdam Maashaven. Few sailing ships were still in use. After the 1914-1918 war, the sailing ship had practically disappeared.

Ocean Navigation Congress

On the occasion of the Paris World Exhibition in 1889, famous for the construction of the Eiffel Tower, a series of Congresses was organised. One of them was the *Congrès des Travaux Maritimes*. The correct translation is: Maritime Constructions Congress, but usually it was called Ocean Navigation Congress. The Congress consisted of five sessions, lasting from 20 until 25 September 1889, dealing with among others hydraulic equipment, port construction, access channels and dredging. The 243 participants visited those parts of the World Exhibition that were of particular interest to them. After the Congress, visits were arranged to several French ports. At once, the idea of a Permanent Commission was proposed and accepted. The Permanent Commission settled in Paris and had its first meeting on 25 October 1890. Mr. M.E. Bernard was elected President. It was decided to hold a second Congress, but due to financial problems, no action was taken.

In 1892 nearly all the members of the Permanent Commission were present at the fifth Inland Navigation Congress, offering an opportunity for a

meeting. It was decided to hold the second Ocean Navigation Congress in London next July. The Congress was a success: 526 participants, many more than the 243 participants of the first Ocean Navigation Congress. During the eight days after the closing of the Congress, excursions were made to several British ports.

Nevertheless, this meeting would be the last of its kind. In the first place, it was difficult to draw a line between the scope of the Ocean and the Inland Navigation Congress. Most subjects were overlapping. After all, the first Inland Navigation Congress was to a great extent devoted to maritime canals connecting Belgian cities to the sea. The subject of maritime canals and port equipment had been on the agenda of the Inland Navigation Congress ever since. Secondly, the audience of the two Congresses overlapped as well and it would be difficult for the people concerned to be present at two, similar Congresses. At the closing session of the 1894 Inland Navigation Congress, after quite a lively discussion, the merger proposal was voted on, and it was stated that in future the Congress would assume the title of International Navigation



Cunard's 1914 four-funnel steamer Aquitania was a fine example of a transatlantic liner. A steamship like this one appeared on the first PIANC logo. However the diesel engine, patented in 1892, had already been applied to ship propulsion and overtook the dominant position of steam in the first half of the 20th century.



Shortly after 1890 electric cranes made their appearance. They had many advantages over the steam and hydraulic cranes of those days : less heavy machinery, flexible positioning along the quayside, efficient with regard to energy and much cheaper per hour to operate.

Congress and would be called upon to deal with questions both of ocean navigation and of inland navigation.

The Geographic Society of Lisbon invited the Navigation Congress to have its meeting in Lisbon in 1897 on the occasion of the fourth centennial of the departure of Vasco da Gama's expedition. The invitation was not accepted, because the next Congress should be held in 1896. Instead it was decided to have this reunion in Italy, but certain problems arose and under those circumstances it was not possible to organise the next Congress until 1898.

International Navigation Congresses

The seventh Congress, held in Brussels in the year 1898, opened a new series of meetings, which would at the same time embrace inland as well as ocean navigation. Belgium had had the honour of inaugurating the first series of Congresses; hence it would be natural for Belgium to inaugurate the second. The argument was perhaps somewhat subtle, but in any case Belgium was only too happy to let it be convinced. The organisers of this Congress

did not fail to observe the traditional forms which had been established: high patronage accorded by King Leopold II of Belgium, honorary presidency accepted by both Prince Albert and by the Ministers of Agriculture and Public Works, of Finance and of Foreign Affairs. The President of the Congress was Mr. G. Helleputte.


The Congress lasted five days and ended by a visit to the Castle of Laeken in the afternoon and festivities at the Palais Royal de Bruxelles in the evening. A final excursion was organised to visit Liege and Seraing. The success of the meeting was far greater than that of the previous Congresses. There were 1,374 participants including 865 from 32 foreign countries. 71 reports were submitted on the given 18 questions as well as 24 miscellaneous communications, the latter being less important questions that would only be discussed if time permitted. The programme of work was divided into five sections: canalised rivers, inland navigable canals, tidal rivers and maritime canals, maritime ports and taxes, tolls and lighterage. Conclusions were voted on for each of the questions and the Congress expressed the wish that the Central and

London Docks



The West India Dock, one of the many docks in the Port of London, was opened in 1802. In the 19th century, the London Docks were an example for ports all over the world. The dock was originally equipped with hydraulic cranes. The peak year for the London Docks was 1960, then a rapid decline started. Now, the London Docklands are the example of urban redevelopment.

In the 18th century, London had become a major port for trade worldwide, but particularly from the lucrative West and East Indies. At that time, ships berthed at or alongside the river bank and discharged their cargoes into lighters. A fleet of lighters crowded the river to ferry the goods from ships in midstream to the river wharves. At low tide, ships would rest on the mud. All transshipment was done by hand, the productivity was low and there were easy pickings from lightermen and crews. There was every opportunity for piracy and smuggling. Moreover, lightermen had a powerful monopoly and were able to charge extremely high rates.



In 1795, a committee of West India merchants declared that their trade was threatened unless proper provisions were to be made for discharging and warehousing goods. There was much debate about provision of docks for London. The merchants proposed that a dock be built for their ships and an act passed Parliament to authorise construction. There was opposition to construction of a private dock, but no acceptable solution for funding docks for general use was found. Work on the West India Dock began in 1800 and it was opened in 1802, followed by the London Dock in 1805. The East India Company opened its dock in 1806, the Surrey Commercial Docks on the south bank, which specialised in trade with the Baltic and North America, followed from 1807 on. In 1828 the first phase of dock building ended with the completion of St. Katherine Dock, supervised by the famous engineer Thomas Telford. The Royal Victoria Dock, which was opened in 1855, was much further away from the City and was the first to be linked up by a railway system. In 1886, the West India Dock Company built the Tilbury Dock and Passenger Landing Stage, 40 km downstream from London Bridge. Tilbury turned out to be a strong competitor for the City docks. The last London dock to be built was the King George V Dock, which was opened in 1921. Of course, the participants of the 1923 PIANC Congress in London visited this new maritime dock.

An important feature of the London Docks was that they were enclosed within 6 m high walls. The docks had extensive six story high warehouses adjacent to the berths to limit the efforts needed to discharge cargo and store it in the warehouses. Thus, loss of quality, theft and smuggling were prevented. There were variations between docks. Some had transit sheds, where goods were stored for short periods or sorted into batches before going to the warehouses. In 1840 hydraulic cranes were introduced. Such cranes worked on water pressure, provided by a steam pump. Sometimes, water pressure was used too to open and close lock gates and bridges. The enclosed docks were connected to the river by locks. Inside the dock, the water level was kept at a constant level, thus enabling transshipment at any time. Via the Regent's Canal and the Grand Union Canal, the docks were connected to the inland waterway network.

By the end of the 19th century, there was a fierce competition between dock companies. Sailing ships had been replaced by steam ships and the size of the ships had increased enormously. The main river channel was no longer deep enough, but the necessary improvements could not be realised. In 1909 the Port of London Authority (PLA), a public trust, took over the private companies. It did not acquire the wharves, which were left in private hands. The peak year was 1960: over 60 million tonnes of goods passed through the Port of London. Then the descent started, because of new cargo handling techniques. In 1967 the East India Dock was the first to close and the last upstream docks, the Royal Docks, stopped operation in 1981. The London Docks, once *the* example for other ports around the world, now became *the* example of urban redevelopment: the London Docklands.



An inland steamship passes the ship-bridge across the River Rhine near Düsseldorf, the venue of the 1902 Congress. This Congress was of great importance to PIANC, because draft Statutes were approved, which governed in detail the working of the Association. This was the formal start of the Permanent International Association of Navigation Congresses.

Eastern European States should agree on the basics of a uniform system for measuring the tonnage of inland boats. The report of the American delegates stated: ‘...what we get as the result of the Congress is of great utility, because it shows the consensus of opinion on many important matters affecting navigation, construction, maintenance and operation.’

The eighth International Navigation Congress in Paris formed part of the series of Congresses of the 1900 Universal Exhibition and was thus subject to the uniform discipline applicable to all the meetings grouped around the Universal Exhibition. The work of the Congress lasted for seven days. Visits were arranged to Douai to see the electric traction on the canals and to the Lower Seine and the Maritime Seine at Rouen and Le Havre. The number of delegates remained more or less the same, as at the previous Congress, 1,322 of whom 761 were from 27 foreign countries. 41 reports on the given 10 questions were submitted there for the 4 sections of the Congress, as well as 15 miscellaneous communications. The paper of Mr. E. Corthell from the U.S.A. stated that in the future enormous steamers would appear on the oceans. He predicted vessels of 10,000 tonnes at a draught of 9.4 m in 1923 and 10.0 in 1948. Corthell was not believed

at that time. His ideas were considered to be hypothetical and were called a dreamer and a poet. But in later years, his prophecies proved to be right: the passenger ship Titanic of 1912 already had a draught of 34.5 feet or 10.5 m.

Conclusions were voted on for all the questions, with the exception of the last two, concerning the adaptation and operation in trading ports. The Congress recommended the study of the various types of river vessels, the use of steam turbines in cases of shallow draught, and the use of multiple screws and the perfecting of mechanical traction procedures.

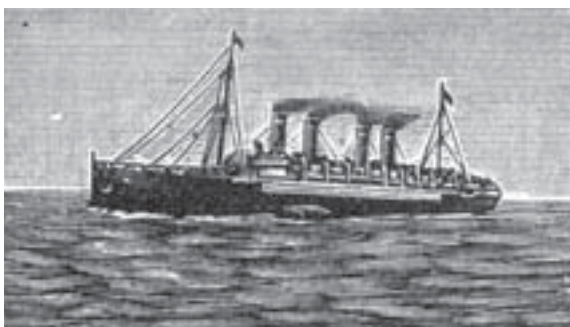
The creation of PIANC

The Inland Navigation Congress started as a private initiative. During the first years, there was no permanent organisation, in fact only a local organising committee for the Congress itself. In 1890, at the Manchester Congress, the members decided to ensure continuity by the formation of a permanent organisation. This led in 1898 to the establishment of a Study Committee, which was to draw up a plan for a permanent organisation. This commission was instructed to submit a report on its work to the next Congress in Paris, 1900. The report was submitted there simultaneously with a preliminary

draft of Statutes for the Permanent International Association of Navigation Congresses. The question of the resources and viability of the Association, however, still remained to be solved. After several meetings, the following conclusions were proposed:

1. The present study vommission, set up in Brussels forms the Permanent Commission of the Navigation Congresses
2. A Permanent Bureau shall be constituted from among its members. It shall comprise Messrs. G. Helleputte, L. de Rote and A. Dufourny, Presidents and Secretary-General of the commission. This bureau shall be seated in Brussels, birthplace of the Navigation Congresses, where the idea of the organisation of these Congresses was proposed for the first time. Each country shall appoint a titular member and, if it seems useful, a substitute member.
3. The Permanent Commission and its bureau are responsible for the action to be taken to determine the site of the meeting of the next Congress within a period as near as possible to three years.

The conclusions of the final meeting 3 August 1900 were adopted unanimously and were greeted with enthusiastic and prolonged applause. The Permanent International Commission of Navigation Congresses, meeting the first time in Brussels on 24 June 1901, accepted a new method of work for the deliberations of the Congress. Henceforth, there would be only two sections: one for ocean navigation and the other for inland navigation. The number of questions was reduced to six, three for each section, and only these six questions could form the object of discussions at the Congress. In order to widen the field covered by the reports, the possibility was



On the cover of the 1904 Annual Report of the Executive Bureau appeared a logo: a four funnel steamship, resembling the biggest liners of those days. The steamship was an icon of technical progress and therefore suitable as PIANC's logo.

admitted that communications might be submitted in specific subjects, the list of which would be published beforehand. Moreover, it was decided to designate a reporter-general for each question; the work would then be condensed and summarised in advance, which would make it very easy to arrive at conclusions in as short time as possible. As from the beginning in 1885, there were three official languages at the Congress: English, French and German. All publications had to be published simultaneously in these languages until the Second World War.

In the course of the Düsseldorf Congress, a meeting of the Permanent Commission was held on 2 July 1902. The Study Commission had drafted regulations, which governed in detail the working of the Association. After discussions, they were approved. These rules or statutes consisted of twenty-one articles. The first article concerned the goal of the Association: to improve inland and ocean navigation. The Association would be directed by a Permanent International Commission (PIC), comparable with the present day Annual General Assembly, and have its seat in Brussels. Following the decisions from the eighth Congress in 1900, the PIC would be assisted by a Permanent Bureau, to be compared with the present Council, and a Executive Bureau, now Headquarters, consisting of the two Presidents and the Secretary-General and if needed assistant secretaries. Important tasks for the Executive Bureau managing the financial resources, the library, the archive and the publications of the Association. Article 7 recorded the responsibilities of the local Organisation Commission for the Congress, which was to a great extent left to the local organisation. One of its tasks was to translate the documents in the three official languages. The second part of the rules, the articles 11 through 19, was devoted to the arrangements for the Congress sessions in conformity with the decisions of 1901. Not surprisingly, the main and almost only activity of PIANC was the organisation of Congresses. The rules did not provide for an audit of the financial report. Nevertheless, President Helleputte asked for persons willing to verify the accounts and from then on there was an Auditing Committee. The American Delegate Mr. Corthell referred to the start of the Association in a rather poetic way saying: 'We have today launched the finest and greatest ship of all, the Permanent International Association of Navigation Congresses, her name is "Navigare necesse"; her two commodores are Helleputte and De Rote, her captain is

Dufourny, over two thousand of us are aboard. Let us all remain on board and help our commanding officers to navigate the ship and carry forward this beneficent work of promoting the interests of our common humanity by improving the methods of navigation and reducing the cost of world's interchangeable products.' A few days before, the United States Congress had at last provided for the construction of a large ship canal between the Atlantic and Pacific Ocean, later named Panama Canal.

With the upcoming of a new transport system, the automobile, the administrations of the industrial nations had to face new technical questions and problems concerning roads. Due to the success of the Navigation Congresses, several countries decided to create a similar institution, copied to a great extent the Statutes of PIANC and started in 1908 with a sister organisation called Permanent International Association for Road Congresses (PIARC).



The Kaiser Wilhelm or Kiel Canal connects the North Sea and the Baltic Sea and shortens the voyage between the two seas by almost 500 km. Construction started in 1887. Large steam excavators and small steam trains were used to dig the canal. After eight years, on 21 June 1895, Emperor Wilhelm II was able to inaugurate the canal.

PIANC at work

The work of the ninth Congress in Düsseldorf, 1902, lasted for five days. Various excursions in the Rhine Province and Westphalia were foreseen. The Congress closed with a major excursion to the Kaiser Wilhelm Canal and the Hanseatic towns. The Congress was under the patronage and opened by HH Crown Prince Wilhelm. The number of delegates considerably exceeded the maximum figure recorded for previous Congresses: there were 1,756 delegates, 787 of whom were from 27 foreign countries. The Congress was also attended by

299 ladies, thus bringing the total to more than 2,000. The programme of work was divided into two sections: one for Inland Navigation and one for Ocean Navigation with each three questions and sixteen communications. 40 reports were submitted for the questions, and 43 on the communications. The reports on the questions were published before the Congress in the three official languages. After the Congress a 780-page book was issued, giving in detail the discussions and conclusions. After the following Congresses such proceedings were published as well.

There was a further peculiarity. Under the Congress-hall was the famous wine store of the city of Düsseldorf. About 350,000 litres of wine in barrels and 70,000 bottles were deposited in these large cellars. Maybe it inspired the thoughts of the delegates during the sessions. As far as it is known, never again a Navigation Congress had its meetings on top of a wine store.

The Congress suggested that a competition be opened to seek improvements, which could reduce the costs of transporting coal and coke by boat. The same Congress recommended the use of ocean lighters in canals and ports. The question of the place and date for the next Congress was also examined during the meeting of the Commission. Some members preferred a meeting in the United States because of the interesting works going on there. The General Assembly expressed the opinion that the next Congress could be organised after two or three years.

At the meeting of the Permanent International Commission held at Brussels in 1903, the Italian delegate, on behalf of his government, extended an official invitation for the tenth Congress to be held in Milan, where there was to be an International Exhibition of land and water transport. There was also an invitation from the city of Liège, but the PIC decided in favour of Milan. The work of the Congress

lasted for five days. Technical excursions to the Lake Como and to the Vittorio Emanuele III Canal, and to the Vizzola power stations were provided during these five days. Two excursions, one devoted to inland navigation, on the Po up to Chioggia, and the other to ocean navigation visiting the ports of Genoa, Naples and La Spezia, concluded the tenth Congress. Once again the Congress was a considerable success and the number of delegates significantly exceeded that of previous Congresses: it reached 2,119 including 1,745 from 33 different foreign countries. There were also 855 ladies bringing the total to almost 3,000. The programme of work for the Congress was again divided into two sections: one for Inland Navigation, with four questions and six communications and one for Ocean Navigation with four questions and seven communications. Fifty-nine reports were submitted for the eight questions and fifty-eight on the thirteen communications.

At the meeting of the Permanent International Commission in 1906, Mr. M. Ghercevanoff, the Russian delegate, confirmed the decision of his government to hold the eleventh Congress at St. Petersburg in May 1908. The PIC immediately accepted the invitation with gratitude. The patronage of the Congress was provided by Emperor Nicolas II. Mr. Ghercevanoff was intended to be the President




Participants of the 1902 Congress in Düsseldorf, Germany, pose for the official photo. There were over 2,000 participants, including almost 300 ladies. The fashion of those days prescribed enormous hats, blocking the view of those standing behind!

Kiel Canal



A steamship passes underneath the bridge of Levensnau, 42 m above the Kiel Canal. The Kiel Canal is one of the busiest artificial inland waterways. In 2008 excluding recreational craft 42,811 ships passed through the canal. The total cargo movement was above 100 million tonnes. Further enlargement of the canal and locks has been planned.

In 1878 a ship owner and businessman of the city of Hamburg, Hermann Dahlström, presented to the German Government the concept of a canal connecting the North Sea with the Baltic Sea. In 1886 the route from the estuary of the River Elbe via Rendsburg to the Kiel Fjord was decided upon. The German navy was the decisive factor in the choice of this route. Eight years after Kaiser Wilhelm I had laid the foundation stone, Kaiser Wilhelm II was able to inaugurate the canal on 21 June 1895, called, until 1948, the Kaiser-Wilhelm-Kanal or internationally the Kiel Canal. In 1923 the canal was made international by the Treaty of Versailles. Germany revoked this special regulation in 1938. In 1986 the Council of the European Economic Community declared in general the principle of free service applicable to the maritime shipping which then was summarised by the EU-service-directive. Because of liberal regulations for EU member countries and for third countries, previous different schools of thought of the legal position of the canal can be left open.



The voyage through the 98.6 km canal results in an average advantage of almost 500 km between the ports of the Baltic Sea and the North Sea compared to the seaway around the Skagerrak. At the mouth of the canal to the tidal River Elbe, the maximum range of tide is 9 m, the normal tidal difference is 2.8 m. At the mouth of the canal to the Baltic Sea, the water level of the canal corresponds to the normal water level of the Baltic Sea with maximum wind surge of 3 m. At both ends there are two locks with two chambers each. The 'old' locks (125 × 22 × 9.8 m) from 1895 have mitring gates, two ebb tide and two flood tide doors per chamber. The lock transit time is about thirty minutes. The 'new' locks (310 × 42 × 14.0 m) constructed in 1914 have three sliding gates per chamber. The transit time is about forty-five minutes. Because of fundamental reconditioning of the two 'new' locks it is necessary to build a new great lock in Brunsbüttel, in order to keep the increasing navigation continuing during the time of reconstruction. In Kiel-Holtenau the 'old' locks first are to be renovated.

The sight of the vessels transiting through the canal is spectacular as is the silhouette of the 10 high bridges with headroom of 42 m above the water-level. The most spectacular high bridge is the nearly hundred years old railway bridge at Rendsburg, constructed within two years, and in operation since 1913. Including the ramps it has a total length of 5.5 km, because the steam locomotives only could manage a gradient of 1 in 150. The riveted steel-girder construction of 17,740 tonnes of steel has a length of 2.486 m. Below the bridge an aerial ferry is suspending on steel ropes. The system of bridge and ferry is classified as a technical monument. On account of the lower dimension of the canal in the eastern section, currently the maximum dimension of vessels is limited to 235 × 32.5 × 7.0 m; for vessels of less than 160 m length the maximum draught is 9.5 m. Because of the limited dimensions of the canal there are stringent regulations for oncoming and overtaking traffic and for this purpose twelve widened passing places (sidings) equipped with mooring dolphins, are used for waiting.

The Kiel Canal is the busiest artificial inland waterway in the world. In 2008 – excluding sport and pleasure boats – 42,811 vessels, on average 117 per day, passed the canal. The sum of the gross tonnes was 175,159,970. The total cargo amounted to 105,869,136 tonnes. Further growing of the volume of traffic especially of container feeder shipping is prognosticated, underlining the attractiveness of the canal.

Against this background the bottleneck of the eastern part of the canal shall become enlarged as a first step from now 44 m to 70 m width at bottom (width in the western 80 km today 90 m). Then vessels with maximum dimensions of 280 × 32.5 × 9.5 m can pass through the canal. An additional planning objective is deepening of the canal to 12 m for the purpose of 10.5 m maximum draught. All necessary decisions will be based on a benefit-cost analysis and an environmental impact assessment.



The Permanent International Commission of Navigation, the fore-runner of the present day Annual General Assembly, met for the first time in 1901. This photo shows the participants of the 1906 meeting. Behind the table, with a white beard, is President G. Helleputte.

of the Congress and Mr .V .E. de Timonoff the Secretary-General. But Mr. Ghercevanoff tragically died just before the opening of the Congress, so Mr. De Timonoff had to take over and assumed at the same time the function of President and Secretary-General of the Congress. The work of the Congress lasted from 31 May to 7 June and during the Congress there were excursions to the canals, to Lake Ladoga, the Imatra Falls, the Norova Falls and to plants using the motive power produced. The actual Congress sessions were followed by two simultaneous excursions. One of these was devoted to inland navigation and included a trip down the Volga from Rybinsk to Nijni-Novgorod, and the other, devoted to ocean navigation, included visits to the Baltic ports. The number of delegates was 1,250 and 21 states were represented. The programme of work was divided into two sections one for Inland Navigation with five questions and three communications and one for Ocean Navigation with five questions and four communications. Fifty-nine reports were submitted for the ten questions and thirty-six reports on the seven communications. The reports on the questions

and the general reports were published before the Congress in the three official languages of PIANC.

The tenth and eleventh Congress were separated by three years, so it would be logical to have the next event in 1911. The government of the United States was prepared to host the twelfth Congress. The US Congress reserved a budget of 50,000 USD for the expenses, including the costs of publication of the proceedings. However, in 1909 the PIC was informed that 1911 would be too early. The US was implementing an extensive programme to elaborate their waterway network. Delaying the Congress would offer better possibilities to see the results. Because of problems at the Executive Bureau itself, the delay was in fact quite convenient. Eventually, the twelfth Congress was held at Philadelphia from 23 to 28 May 1912, under the patronage of President William Howard Taft, who also indicated his readiness to open the Congress in person. At the PIC meeting preceding the Congress, the two PIANC Presidents were not present and the President of the previous Congress, Mr. De Timonoff, took the chair.

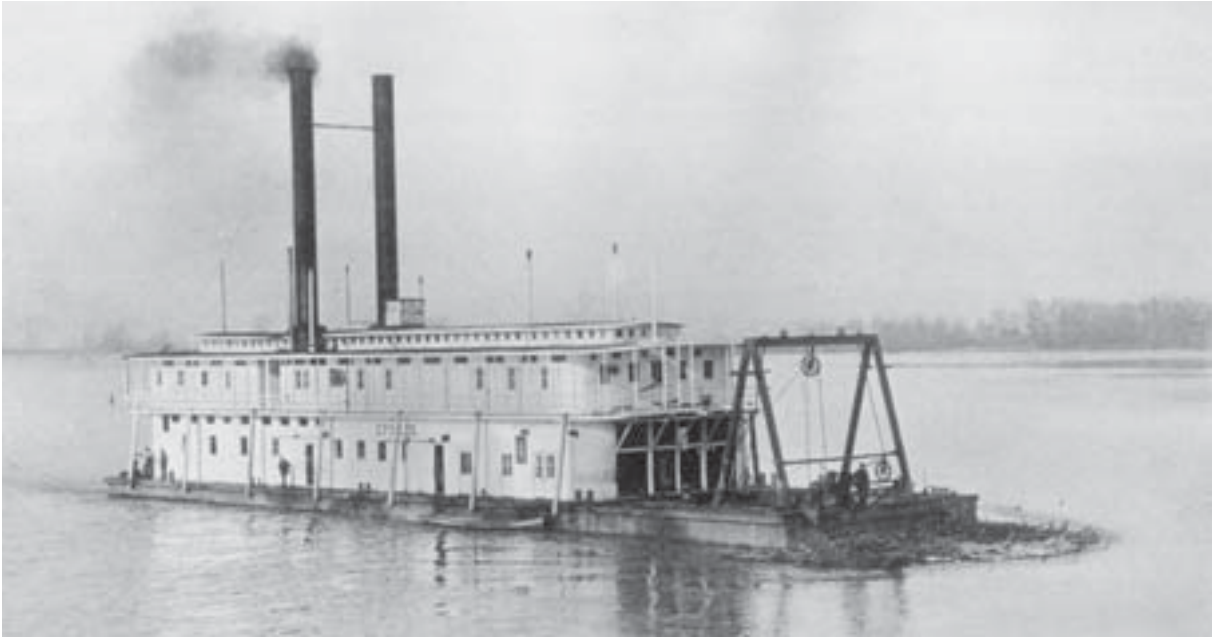
There were some 750 participants and 20 governments were officially represented. Once again the work for the Congress was divided in two sections, one for Inland Navigation with three questions and three communications and one for Ocean Navigation with three questions and four communications. Fifty-two reports were submitted on the six questions and sixty for the seven communications. The Congress noted in its conclusions the absence of a general method for the improvement of rivers and recommended that the different procedures should be perfected by studies and researches on reduced-scale models. The Congress recommended also that for each network of canals typical dimensions should be adopted, that trains of towed boats or self-propelled boats should be used, that the traffic should be regulated, and that the operation of locks should be mechanised. During the Congress, there were

excursions in the surroundings of Philadelphia. After the Congress the participants left on a lengthy excursion through the States of Pennsylvania and New Jersey, the cities of Boston, Albany, Buffalo, the Niagara Falls, Detroit, Lake Superior, Lake Huron and Milwaukee. A visit to Canada was also provided by the Canadian government. The excursions were exceptionally long, but to give delegates an excellent overall view of the engineering works and waterways of the United States and Canada, it was indispensable to have such a lengthy itinerary.

At the meeting of the Permanent International Commission held at Willebroek, Belgium, on 19 June 1913, it was decided to accept the invitation of the Swedish government to hold the thirteenth Congress at Stockholm in 1915. A sudden declaration of war in the summer of 1914 prevented further preparation and the Congress had to be cancelled.



The Erie Canal connects Albany on the Hudson River to Lake Erie. The opening of the 580 km artificial waterway in 1825 caused a dramatic decrease in over-land transport costs. Originally barges were towed by mules. This photo of lock 3, taken in 1918, shows a steamboat. The canal's peak year was in 1885 with 33,000 ship movements. Today the canal is mainly used for recreational purposes.



Steam dredger Epsilon at work on the Mississippi River in 1912, the year of the Philadelphia Congress, the first Congress outside Europe. Keeping the Mississippi River open for navigation was one of the main responsibilities of the United States Army Corps of Engineers.

Executive Bureau

After the formal establishment of the Executive Bureau in 1902, Mr. G. Helleputte and L. de Rote became Presidents of PIANC and Mr. A. Dufourny Secretary-General. Mr. Helleputte was at that time Honorary Engineer of the Ponts et Chaussées, the Belgian department for bridges and roads and Professor at the University of Louvain. Mr. De Rote was Director-General of Ponts et Chaussées and Mr. Dufourny Chief Engineer at the same department. Thus started the tradition of two Presidents, one technical and one more politically oriented, and the heavy involvement of the Belgian Ponts et Chaussées. Mr. A. Debeil, Director-General of Ponts et Chaussées as well, took over the presidency from Mr. De Rote in 1904.

Georges Helleputte had chaired the 1898 Congress in Brussels and following the Chairman of the Study Commission, which prepared the statutes for PIANC. He chaired the first meeting of the Permanent Bureau in 1901 as well and was elected President in 1902. In 1907, Mr. Helleputte became Minister of Railways, Post and Telegraph. It was a reason to congratulate him, but at the same time a cause for worries: he was so occupied with this new assignment that little time was left for PIANC. Mr. Debeil's ill health led to death in 1909 and the

Bureau was without leadership. The matter was discussed during the PIC meeting of 1908 in absence of the two Presidents. The temporary solution was to appoint Mr. J. Richald, Chief Engineer of Ponts et Chaussées and Professor at the University of Ghent, to the position of Deputy-Secretary.

One year after the death of President Debeil, Mr. Dufourny was appointed President, a job that he would keep until his death in 1923, and Mr. Richald was promoted to Secretary-General. Alexis Dufourny joined the Ponts et Chaussées in 1874. He was involved with many large projects, such as the construction of a maritime canal between Brussels and the river Rupel. But he also was on an extraordinary mission to China for the construction of a railway between Beijing and Hankow. After the Congress of 1898 in Brussels, he worked out the idea of the International Association and in 1902 he became the first official Secretary-General of PIANC. One of his jobs was the preparation of a technical dictionary. The idea came up at the 1905 Congress in Milan. It was envisaged that the dictionary would describe waterways, navigation and administrative terms in six or seven languages. The printing and distribution would be contracted to a private publisher. A commission of four members, chaired by Mr. Dufourny, would be charged



Mr. G. Helleputte was President of the seventh Congress in 1898. He chaired the first meeting of the Permanent Bureau and was elected President of PIANC in 1902. Mr. Helleputte became Minister of Railways, Post and Telegraph in 1907, but remained President of PIANC until 1925.



Mr. A. Dufourny was Secretary-General from the start of the Permanent Bureau in 1901. After the death of President Debeil, he was appointed as second President. He would keep this position until his death in 1923. One of his jobs was the preparation of a technical dictionary.

with preparation of the dictionary. The troubles at the Executive Bureau delayed the work and before 1932 there was no further discussion of the technical dictionary. However, the publication of a 'Bibliographic Notes on Rivers, Canals and Ports', a review of publications world-wide in the field of operation of the Association, which had started in 1908, and reviews of the acquisitions of the library continued until 1932.

First logos

On the cover of the 1904 Annual Report of the Executive Bureau appeared a logo: a four funnel steamship within a rectangular box, left the word 'navigare' and right of the box the word 'necesse'. Then, on the 1909 report of the Executive Bureau the steamer had lost two funnels and its appearance had changed from an ocean liner to a cross-Channel ferry. The bow wave and the enormous plume of smoke suggested high speed. One year later, the report was decorated with again a new, this time circular logo. Only one funnel of the steamer was left and in the foreground was an

old-fashioned sailing ship. According to the experts this is an Egyptian felucca, a wooden sailing ship with a short bowsprit, rigged with two lateen sails. There is no particular reason for the Egyptian sailing ship, nor is there an explanation in the few documents left from that time. Anyhow, this logo would be used until 1993!



The logo of 1910 showed besides a steamship, a sailing boat, a Egyptian felucca according to experts. There is no explanation for including the felucca. Artistic reasons perhaps. The enormous plume of smoke and bow wave of the steamer suggests high speed.

Panama Canal



Construction of the Panama Canal started in 1881 by a French company. They encountered serious problems, such as landslides and diseases killing the labour force. In 1904 the Americans took over. The first idea of a sea-level canal had to be abandoned in 1906 and it was decided to construct locks. The 77 km long canal was completed 1914. Because of the outbreak of war in Europe the opening was without celebrations.

On 15 August 1914, the Panama Canal was opened without celebration. However, the massive construction project was completed two years ahead of schedule and under budget at a total cost of 336,650,000 USD. The official ceremony to observe completion of this great engineering achievement, which was delayed because of the outbreak of war in Europe, was not held until 12 July 1920. Although the canal was built by the United States between 1904 and 1914, it had been preceded by several earlier efforts to construct a waterway between the Atlantic and Pacific Oceans.



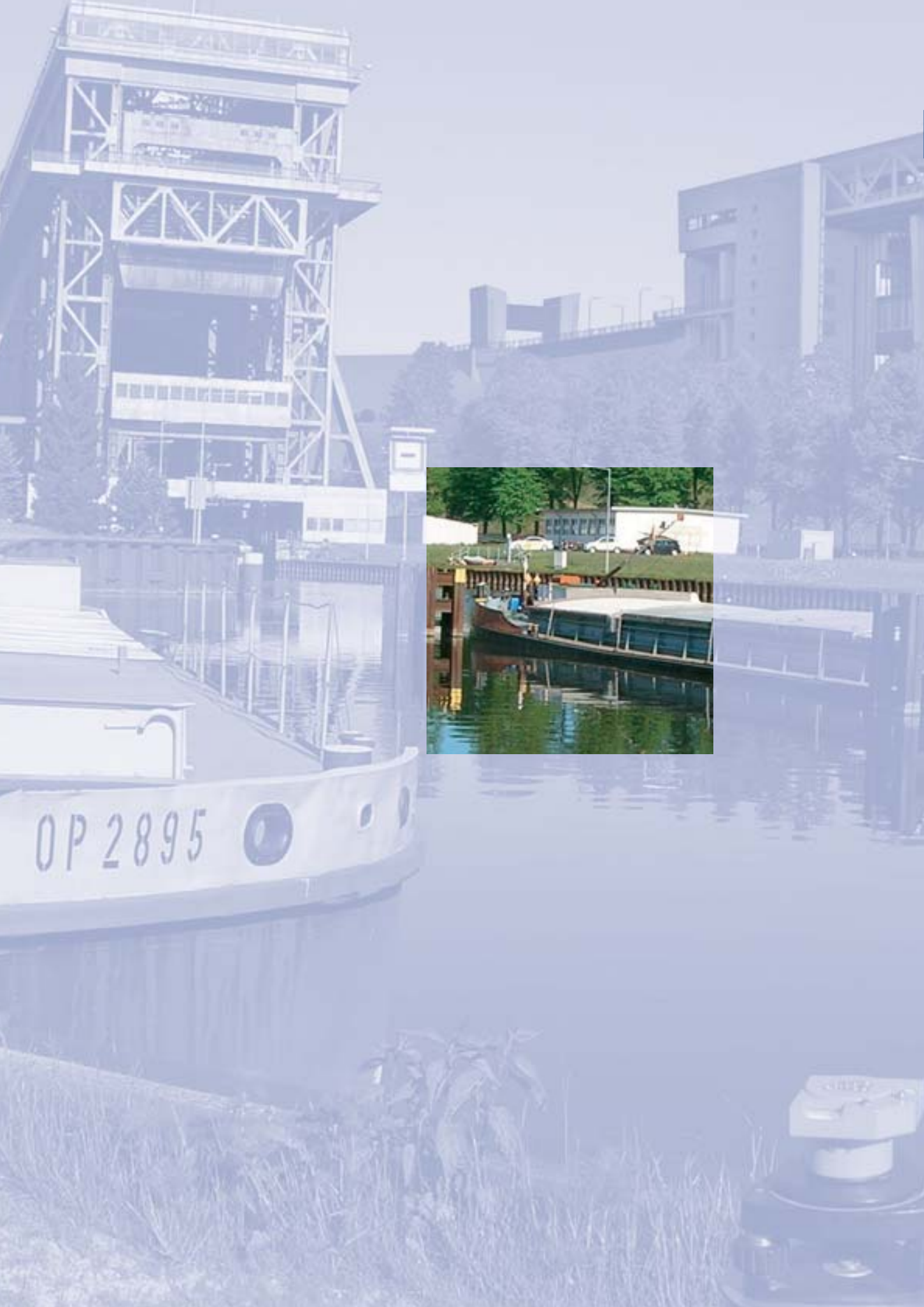
Under various corporate structures French involvement lasted from 1881, when the first engineers arrived, to 1904 when the United States purchased the assets of the New French Panama Canal Company for 40 million USD. With the enthusiastic support from President Theodore Roosevelt, funds from the U.S. Treasury and an agreement for perpetual control over the Canal Zone, the United States established the Isthmian Canal Commission. Under the terms of the original agreement, the United States paid the Republic of Panama 10 million USD and 250,000 USD annually. Initially using old French equipment, and learning nothing from the mistakes of the French, the United States continued construction of a sea-level waterway.

By 1906 the idea of a sea-level canal had been abandoned, and Congress voted to approve a lock canal. President Roosevelt, faced with selection of a new Chief Engineer, was determined to find someone who would see the project through to completion. Engineer officer Lieutenant Colonel George Washington Goethals took charge in April 1907, as Chief Engineer and Commission Chairman. Among those working on the project was Colonel William Crawford Gorgas, who by combating malaria, eradicating yellow fever in the Canal Zone, and generally improving health conditions, made it possible to construct the canal.

The canal, which is 77 km (48 miles) long, reduced the ocean travel distance from New York to San Francisco by about 12,875 km (8,000 miles). The canal consists of three sets of locks and a series of lakes. The Gatún Dam on the Chagres River forms the largest, Gatún Lake. Built of rock taken from the Culebra Cut, the dam is 2.4 km (1.5 miles) long. The locks, which are built in pairs to permit simultaneous transit in the same or opposite directions, are uniform in size. Each lock is a massive, concrete box measuring 300 m (1000 feet) long, 33 m (110 feet) wide and 12 m (40 feet) deep. Steel gates composed of two leaves close each end of the locks. Each of the hollow structures is 20 m (65 feet) wide and 2 m (6.5 feet) thick. The height of the gates varies from 14 m (46 feet) to 25 m (82 feet). They are operated by electric motors.

The Culebra (renamed Gaillard) Cut extends for 14.8 km (8.75 miles) through the Continental Divide at a depth of 13 m (43 feet). Construction of the cut, which is 90 m (300 feet) wide at its base and 240 m (800 feet) wide at its upper rim, required the removal of an estimated 76,455,486 m³ (100 million cubic yards) of rock and soil.

A vessel entering the canal near Colon at the Atlantic Ocean end is raised 25.5 m (85 feet) by the three Gatún Locks to Gatún Lake. After crossing the lake for 24 km (15 miles), the vessel passes through the Gaillard Cut for approximately 15 km (8.75 miles) to the Pedro Miguel Locks, which lower it 9.5 m (31 feet) and the two Miraflores Locks, which lowers the ship 16.5 m (54 feet) to sea level near Balboa. It takes from eight to ten hours for a ship to pass through the canal from ocean to ocean.



4. Interwar years (1919 – 1939)

The interwar years were a period of recovery, short economic prosperity and depression after the collapse of the stock exchanges in October 1929. Trade and shipping slowed down, many ships were laid up. Nevertheless the first motorships came into service, announcing the end of the steam era. After World War I, it took several years before PIANC was able to recommence its activities. The first postwar meeting of the Permanent International Commission was in 1919, but it was not before 1923 that the thirteenth Congress took place. The outbreak of World War II in 1939 prevented the seventeenth Congress from being held. So, during the interwar period, there were only four Navigation Congresses. To keep in touch with the members during the years between the Congresses, the PIC decided in 1926 to start a half-yearly Bulletin. In addition, the first parts of the Technical Dictionary were published before the war. During the interwar period, the first international study commissions were created.

Recommencement

The last meeting of the PIC before the Great War was in May 1914. A few months later, guns growled over Europe. After the cease-fire of 11 November 1918, Europe and especially Belgium, the battlefield of Europe, was in ruins. It was not before 22 December 1919 that the Executive Committee of PIANC called an extraordinary meeting in Brussels to restart the activities of the Association. Thirteen countries and institutions were present, amongst which were representatives of China, Persia and the Suez Canal Company. The Executive Committee was the same as before the war: Mr. G. Helleputte and Mr. A. Dufourny, Presidents, and Mr. J. Richald, Secretary-General.

There were two questions to be answered: how to deal with the former enemies and how to organise the next Congress? And of course there were some practical points to solve, like the sequestration of payments from these countries. On the other hand, there were opportunities for PIANC because of the (re)appearance of countries on the map of Europe, like Czechoslovakia and Poland. The solution for the first question was – after long discussion – very practical: as soon as those countries would be accepted in the League of Nations, which happened in 1926, they would be welcomed in PIANC as well. Eventually, Germany rejoined the Association in 1927. Remarkably, during all these years, Germany remained one of the



On the occasion of the PIC-meeting of 1926, Mr. D. Boukaert became President of PIANC. When he suddenly died shortly after the 1939 PIC-meeting, the outbreak of World War II prevented the appointment of a successor.



The 1926 Congress in Cairo was the first Congress held in Africa. King Fuad was patron of the Congress and invited the participants for a reception in the Royal Palace. The illuminations, the Egyptian aristocracy and the whole setting looked like a fairy tale from 1001 nights and did not fail to impress the guests.

official languages of the Association. The answer to the second question, a next Congress, was also difficult. Finally the President concluded that the situation still was too confused and the possibilities for international communication and travelling too inadequate to take a decision.

Congresses

One year later there was a regular PIC meeting. Sweden had suspended its prewar invitation, so the door was open for other options. The PIC expressed a preference for London. The next year, 1921, would be too soon and the same held for the year after. Eventually the thirteenth Congress was held in 1923, ten years after the year originally intended. King George V was patron of the Congress. The Duke of York, who later became King George VI, opened the Congress in the Great Hall of the Institution of Civil Engineers. Some 550 delegates from 29 countries and institutions attended. As usual, there were two sections, one on Inland

Navigation and one on Ocean Navigation. Questions like utilisation of waterways for the production of electric power and larger dimensions of ships were dealt with in the submitted reports. The Great Western Railway provided a special train to bring the delegates to Windsor, where they had lunch in the Royal Castle. During the week, an excursion by steamboat was made to the Royal Docks, east of London, where several of the new warehouses were visited. After the Congress, excursions were made to the ports of Southampton, Manchester, Bristol and Liverpool.

The venue for the 14th Congress was Cairo, the capital of Egypt. The idea of having a Congress in Cairo had been suggested in 1913, but at that time it was not favourably received. Now PIANC would have its first Congress in Africa! Mr. Quellennec of the Universal Suez Canal Company approached the Egyptian Government and in June 1924 a governmental telegram confirmed the invitation. Attending a Congress was not an easy job those

days. Mr. J.P. Josephus Jitta, who would eventually be PIANC-member for seventy-two years, remembered he had to travel six days from the Netherlands to Cairo: two days by train to Genoa, four days by ship to Alexandria and finally by train to Cairo. His heavy suitcases were checked extensively at all borders. King Fuad I accepted the patronage of the Congress, which was held from 9 to 14 December 1926, and he received the delegates personally at his Royal Palace. Egyptian officials from government, as well as diplomats and members of the aristocracy were invited to attend. The illumination of the halls was marvellous and the whole setting looked like a fairy tale from 1001 nights. Of course the 400 delegates from 36 nations made excursions on the Nile, to the Delta dams in Upper Egypt and sailed on the Suez Canal from Ismalia to Port Said. Mr. Josephus Jitta remembered the treasures of Farao Toetanchamon, discovered just four years before, standing on the floor of the Egyptian Museum.

There were three proposals, from Brazil, Spain, and Italy, for the next Congress that was originally envisaged for 1930. Avoiding a difficult choice, the

PIC adjourned, deferring the decision until the PIC meeting of 1928. Most (European) members considered a trip to Brazil too time consuming and Spain did not want to press its claim, so the PIC decided in favour of Italy. Of course, the organisers needed some time for preparations and 1930 would not be a good choice because the Road Congress was already planned for that year. As a result the 15th Congress was in September 1931 in Venice, in the impressive, historic Palace of the Doges. King Victor Emmanuel honoured the opening session with his presence. Right after the opening ceremony, a traditional regatta was held on the Grand Canal of Venice. The 915 delegates from 45 countries and international institutions discussed questions like infiltration of water under foundations and through embankments, regularisation of rivers, railway access to ports and coastal defences. Following the Congress, there was one week dedicated to excursions and post-Congress tours to works on the River Po, on the creation of a navigable waterway between Venice and Milan, to the hydro-electric power plants in the Piave River and to the ports of Marghera, Trieste, Genoa, Rome,




The 15th Congress was held in the historic Venetian Palace of the Doges in 1931. Immediately after the opening, the delegates observed a traditional regatta on the Grand Canal. The Congress was expensive for PIANC, mainly because of the printing costs of the many, lengthy papers.

Zuiderzee Dam



In 1928, the last gap of the Zuiderzee Dam was closed. A storm surge, flooding large areas near Amsterdam stimulated the decision to close the salt water lake. The dam is 32 km long, reaching 7 m above mean sea level. The closure of the final gap was a great achievement, taking into account the high currents in the final stage of the operation.

During the 11th century, a series of severe storms created the Zuiderzee in the centre of the Netherlands, a 6,700 km² salt-water estuary. At that time and in the following centuries, there were no technical means to reclaim the lost land. During the 19th century however, steam-pumps came into use and reclamation of the Zuiderzee seemed to be feasible. Many plans were drafted, but the government was reluctant to start a project of this size. In 1886 a group of well-to-do people established the Zuiderzee Association to investigate the possibility of building a solid dam across the mouth of the Zuiderzee, the so-called Afsluitdijk. The Association appointed the Civil Engineer Cornelis Lely to develop a Master Plan.



Mr. Lely presented his plan in 1891. Because of the huge size of the Zuiderzee, he split up his plan in several parts which could be realised independently of each other, but in the end would form a consistent entity. The most difficult part of the plan was the 32 km closure dam that would change the Zuiderzee into a sweet water basin and prevent further salinisation of the polders in Holland. Four new polders were envisaged to create additional agricultural land. The remaining 1,200 km² area would be needed for temporarily storage of rain and river water. By coincidence, this area was situated above a less fertile sandy bottom. The government appointed an official commission to review the plan and their report, published in 1894, was in favour of Lely's proposals. Also in 1894, at the occasion of the 6th Congress of PIANC in The Netherlands, the report of Lely was discussed into depth. After the Congress, a cruise was organised on the Zuiderzee to see the future building sites. PIANC returned in 1935 following the 16th Congress in Brussels.

Realisation would last several decades. When Mr. Lely became Minister of Public Works in 1913, he insisted on approval of a law on the closure of the Zuiderzee. But it took a storm surge, flooding large areas near Amsterdam, to get a positive decision. In 1918, at last, Lely could commence his job. The first part of the closure dam, between the mainland and the island of Wieringen, was completed in 1924, but due to the economic depression the start of the main dam was postponed once more. In 1925, after a change of government, the work was restarted. The dam was eventually closed in 1932, almost forty years after publication of the Lely's first plan.

There were many uncertainties: bottom conditions, tides, currents and in particular: where to plan the discharge sluices and how to perform the final closure-operation. The first hydraulic experiments were carried out in a laboratory in Karlsruhe, Germany. As from 1927, Thijsses's new Hydraulic Laboratory in Delft was available. The construction of the Afsluitdijk initiated the scientific approach of hydraulic engineering in the Netherlands. The 32 km long dam is 60 m wide at the waterline and reaches 7 m above mean sea level. Crane barges dumped boulder clay in the water to form a first dam. Behind this dam, a body of sand was washed. Wooden mattresses protected the bottom and the slopes. Layers of stone were dumped on the vulnerable outside of the dam. On the top and inner side, a layer of clay was sufficient. The final closure was a very critical operation. Hydraulic models helped to determine the most desirable location, the time of the closure and the work schedule. In fact, the successful closure was no less than a miracle.

The closure dam proved to be a reliable defence against storm surges. Even in 1953, when the southwest of the Netherlands suffered from enormous flooding, the Afsluitdijk could withstand the storm attack without problems. Three of the four envisaged polders were completed. The fourth was no longer needed for agriculture. Meanwhile nature and recreation were considered more valuable.

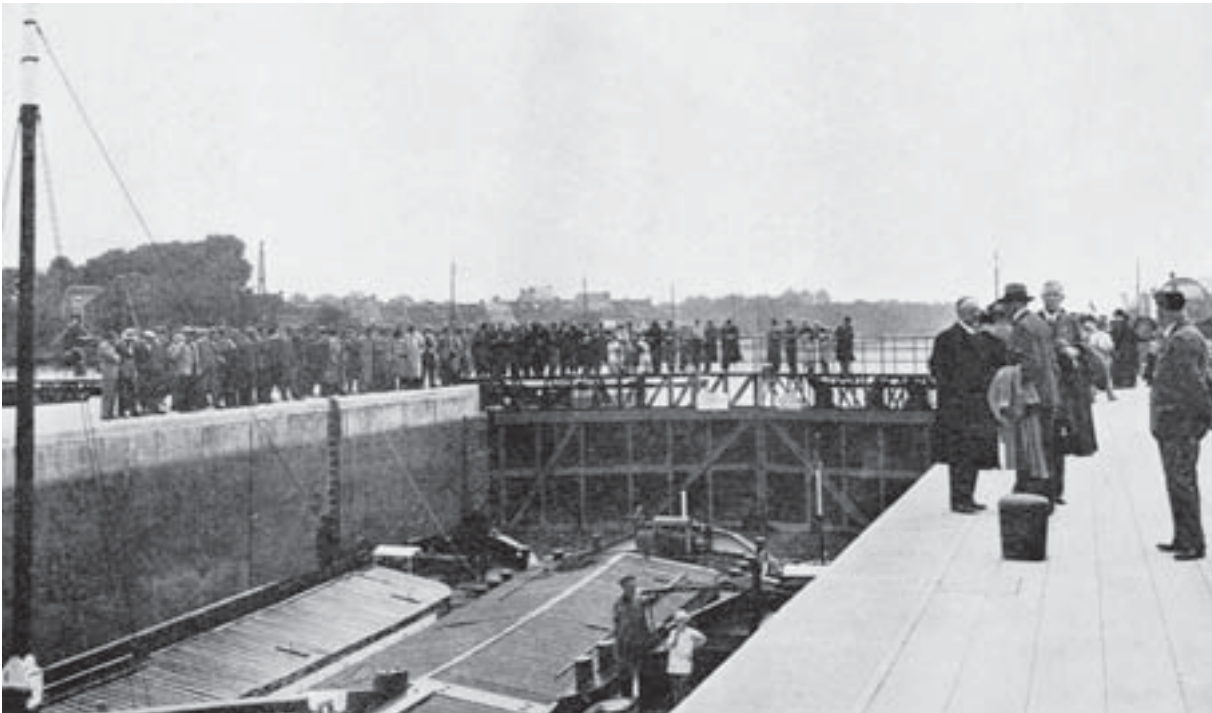
and Naples. The Congress was a success; however, the financial outcome was less favourable. Mainly because of the many and lengthy papers, the Congress was twice as expensive as the previous one!

Mainly because of the difficult economic situation, it was decided to extend the interval between Congresses from the statutorily required three to four years. So, the 16th Congress was not held until 1935. The Congress occurred for the third time in Brussels. Belgium applied for the Congress because of the International and Universal Exhibition and the centennial in 1935 of the first railway built in Belgium. Moreover it was the 50th anniversary of the Association. This time, there were applications from Russia and Argentina as well, but the Russian representative did not show up and the representative of Argentina became unwell, so Belgium was the choice. The event was overshadowed because of the fatal traffic accident of Queen Astrid, five days before the opening of the 16th Congress. All receptions and festivities were cancelled.

Apparently, the number of participants, about 700 from 43 different countries, did not suffer too

much from the economic depression. The 108 papers concerned bottom and bank erosion, regulation of currents and water level, maintenance of water depth and breakwater design. The delegates were invited to visit the construction of the Albert Canal. Other visits were paid to several ports in Belgium and the Netherlands. A trip was made on the Canal Ghent-Terneuzen on board the packet-boat 'Prince Baudouin'. Other technical excursions enabled the delegates to see the Afsluitdijk (Closure Dam) of the Zuiderzee, a technical highlight.

Probably due to the economic depression, there were no immediate candidates for the organisation of the 17th Congress. During the 1937 meeting of the Permanent International Commission, there was only the invitation of the German Section to hold the Congress in Berlin, which was accepted. With reference to the preparation time needed the German Section requested to postpone the Congress year until 1940, which seemed reasonable. In the PIC meeting of 23 May 1939, Mr. E. Leopold explained the programme in detail. The international relations were already somewhat strained, but nobody expected that four months later war would rage over Europe again.



In 1935, PIANC, in existence for fifty years and returned to the city of the first Congress: Brussels. The event was overshadowed by the tragic death of Queen Astrid of Belgium. All receptions and festivities were cancelled. The delegates visited the construction site of the Albert Canal and can be seen here at the Wijnechem Lock.



A special moment, watched by many spectators: a bucket dredger ploughs its way through a dike in order to construct a new harbour basin, in this case the Rotterdam Walhaven.

Study commissions

In principle PIANC only organised Navigation Congresses and the annual meetings of the PIC. But sometimes questions could not be answered during the Congress. For instance: several times it was concluded that there were contradictions between statistics used by European countries to report shipping and transport. Every country used a classification of its own. Eventually, in 1924 the PIC decided to study this matter, and it established a commission to write recommendations for the unification of inland navigation statistics. The four man commission had its first meeting in mid 1925 and delivered its report two years later, proposing principles on which statistics should be based. This commission, which would not remain the only study commission, could be considered as the forerunner of the present system of Working Groups.

As a result of the 14th Congress in 1926, PIANC decided to start another study commission: the International Commission for the Study of Stresses Due to Waves. The commission had its first meeting in Paris in 1928. It took many years of deliberations before the commission came to conclusions. The final reports were not published by the

commission itself, but by its successor, that was established in 1970.

An additional result of the 14th Congress was the establishment of the International Commission on Large Dams (ICOLD). The purpose of the Commission was 'to centralize and coordinate the studies started in the various countries on this subject'. The commission started its work in July 1928 in connection with the Congress of the International Union of Producers and Suppliers of Electric Power in Paris, a logical combination, because most large dams were built for generating electric power and not for navigation. From 1928 on ICOLD worked independently and outgrew PIANC in membership.


Also during the 14th Congress, there was a special meeting of heads of Lighting and Buoying Services, to deal with the unification of maritime signalling. The representatives thought it desirable to have more frequent meetings than were allowed by the Congresses. So, in 1929, there was a separate International Maritime Signalling Conference in London that could be considered as a predecessor of the International Association of Lighthouse Authorities (IALA), an organisation that was not founded until 1957.

The Mississippi River System



The United States Rivers and Harbors Act of 1930 authorised the construction of twenty-six locks and dams in the Mississippi River System. Most of them were built between 1930 and 1940 and their useful lifetime is running out. Near the McAlpine Locks and Dam in the Ohio River, a tributary of the Mississippi, a 1,200 feet long second lock is being constructed.

The Mississippi River rises in Lake Itasca, Minnesota, and flows for 3,781 km to the Gulf of Mexico. With major rivers such as the Missouri and Ohio Rivers and numerous other tributaries, the Mississippi drains 3.1 million km² that are parts of thirty-one states and two provinces in Canada. The Upper Mississippi handles over 100 million tonnes of cargo annually, while the Lower Mississippi handles nearly 500 million, including 170 million in foreign trade. Other aspects and purposes of the system include wildlife habitat, recreational boating, fishing and swimming, sources of public and industrial water supply, hydropower, and emergency and national defense.



Although congressional legislation over the years expanded the responsibility for navigation of the Corps of Engineers, the Rivers and Harbors Act of 1930 authorised twenty-six locks and dams and a 2.7 m (9 ft) channel 120 m (400 ft) in width on the entire Upper Mississippi River.

The Upper Mississippi extends for more than 950 km from near Cairo, Illinois, where the Ohio River joins the Mississippi, northward to beyond St. Anthony Falls Lock and Dam at Minneapolis, Minnesota. To improve navigation on this stretch of the river, engineers determined that a series of locks and dams would be needed. These improvements overcame impediments to navigation such as rapids, shallow water, sand and gravel bars, and meandering channels. Following Congressional authorisation of a 2.7 m (9 ft) channel on the Ohio River (1910) and on the Illinois River (1914), pressure was brought to authorise a 2.7 m channel for the Upper Mississippi. Since then a series of locks and dams that lift vessels 120 m in elevation and facilitate commercial barge traffic on the river between St. Louis and Minneapolis have been constructed. Most of the locks and dams were built between 1930 and 1940. The dimensions of the locks authorised by the 1930 legislation are 33.5 m (110 ft) by 182.8 m (600 ft). Legislation in recent years has authorised construction of several larger locks, 366 m (1,200 ft) in length.

The Lower Mississippi River flows about 1,600 km from the confluence of the Ohio and Upper Mississippi Rivers at Cairo, Illinois, southward to the Gulf of Mexico. In contrast to the upper portion of the river, the lower portion is free flowing. Levees and wing dams direct water flow forcing it to accelerate toward the centre of the channel and to reduce sediment accumulation. Among notable features of the Lower portion of the river are: a system of levees, bank protection, inland deep water ports at Baton Rouge and New Orleans, Louisiana, and the Old River Control project. Levees are designed to provide aides to improved navigation and to protect land adjacent to the river from flooding. There are 2,445 km of levees and 24 km of flood walls. Bank protection techniques that U.S. engineers learned from European and Japanese engineers led to the present, modern concrete mattress design.

Baton Rouge, Louisiana, is an inland deep water port that is located 370 km from the Gulf of Mexico and accommodates ocean-going vessels with a 13.7 m (45 ft) channel. There are several locks in the vicinity of Baton Rouge that are designed to provide barge access to the Gulf Intracoastal Waterway. The Old River Control Project is designed to prevent the Mississippi River from shifting its channel, taking a new route to the Gulf of Mexico. In addition the project includes a navigation lock that enables barges to move from the Mississippi River to the Red or Atchafalaya Rivers.

During the 16th PIANC Congress in 1935 the International Association of Hydraulic Structures Research was founded. Today it is named the International Association of Hydraulic Engineering and Research (IAHR) and it operates independently from PIANC.

Publications

Between Congresses, there was little contact with the membership. They received the Congress Papers and Proceedings, and once per year the minutes of the meetings of the Permanent International Commission were distributed. In 1908, PIANC started the publication of 'Bibliographic Notes on Rivers, Canals and Ports', a review of publications in the field of operation of the Association. The last edition was published in 1932.

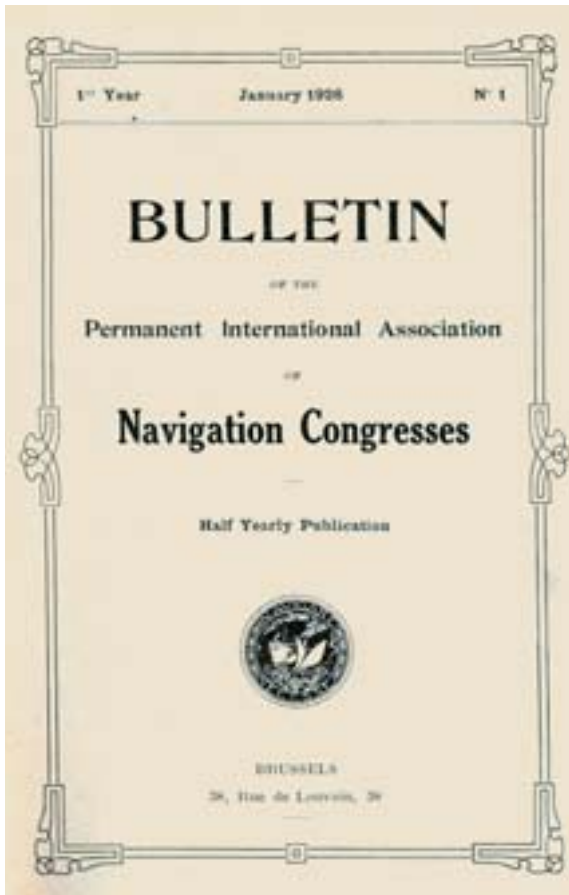
When the period between the Congresses grew from two to four years, this situation was no longer satisfactory. In the 1924 report of the Auditing Committee, Mr. A. de Rouville and Mr. H. Wortman suggested: 'Would it not be advisable to study the

idea of a different organisation of publications in the interval of the Congresses, so that they can revive more efficaciously the zeal of our adherents and facilitate the collection of their annual subscriptions whilst avoiding too frequent defections, consideration being taken of the financial possibilities and of an eventual revision of certain categories of subscriptions'. A long discussion during the 1925 PIC meeting resulted in the decision to give the Bulletin a trial. Its purpose would be to establish a closer connection between the members, to inform them about the events occurring in the Association and of progress made in all countries on matters concerning navigation. Each issue of the Bulletin should comprise:

1. Documents relating to the Association, such as annual reports, minutes, preparation of the Congress, and related material
2. Original memoirs or technical notes
3. Chronicle
4. Bibliography



On the River Rhine, powerful steam paddle tugs towed barges up and down stream. The dimensions of such barges formed the basis for the 1954 European classification of inland waterways.



After long discussion the PIC decided to start a Bulletin to keep in touch with the membership in the period between Congresses. This is the front page of the first Bulletin, issued in 1926. Between 1926 and 1939, 28 Bulletins were published.

Bulletin number 1 was published in January 1926 in three languages: French, English and German. It was a small booklet (15 × 23.5 cm) and had 80 pages. The table of contents recorded: the minutes of the PIC meeting, the Statutes of the Association and technical articles on the extension of the Port of Antwerp, mechanical traction in the French canals, hydro-power and navigation in Switzerland, works in the Port of Le Havre and on the Dutch waterways. From the beginning, there was a possibility to advertise in the Bulletin. Nevertheless to cover the cost of the Bulletin, the contribution for Individual Members had to be raised from 20 to 25 Belgian Francs per year. Between 1926 and the outbreak of World War II 28 Bulletins were published.

The PIC decided at its 1932 Annual Meeting to start 'the creation by our Association of a Technical Dictionary giving, for the most important languages, terms referring to the technical



After his retirement, President Helleputte was succeeded by Viscount S.E. Van de Vyvere who had a long political career, eventually becoming Prime Minister of Belgium. In 1956 it was his turn to retire.

branches of interest to the Association'. A commission, chaired by Secretary-General J.M. Millecam, started work on 28 July 1932 and agreed to produce fourteen chapters. Each commission member would be responsible for some chapters. Chapters would be published as soon as they were ready, in random order. The terms relating to the various technical fields relevant for PIANC would be reproduced in several languages, starting with French, English (if necessary the American expression too), German, Spanish, Italian and Dutch. Plans of work for constituent construction elements would be included. Such chapters could easily contain over 1,000 plans. The Secretary-General would make revisions, verify the translations and prepare parts of the hundreds of sketches. It was an enormous job indeed. The first chapter on River Weirs was published in 1934, and three more chapters would follow before 1940.

Ship lifts in Germany



The Niederfinow ship lift, northeast of Berlin, connects the rivers Oder and Havel. After being in service for over seventy-five years without breakdown, there is a need for a new ship lift able to accommodate modern inland vessels with dimensions of 110×11.5 m. In this case a lock was out of the question because of the weak subsoil. The lift height is 36 m.

PIANC dealt since its beginning with the structures of locks and ship lifts. In the centenary book the article 'From low lift locks to structures for dealing with large differences in head' describes in detail the history of the ship lifts. The table gives the main data of the six ship lifts built or under construction in Germany.

The ship lift Henrichenburg (1a) is the oldest one and with its five caissons also today an engineering highlight. It surmounts the height from the waterways cross of the Rhine-Herne Canal and the Wesel-Datteln Canal to the highest reach of the Dortmund-Ems Canal. To meet the increasing demand for transport capacity a lock ($95 \times 10 \times 2.65$ m) with 70 % saving of process water by 2×5 recuperation basins next to the ship lift came into operation in 1917. In 1962 a second ship lift (1b) was inaugurated for fulfilling the increasing demand for transports with modern 1,350 tonne vessels. This gave way to take the first one (1a) – 1989 classified as a technical monument – out of operation. To reduce the costs of transports by push tows in 1989 a new lock ($190 \times 12 \times 4.0$ m) was completed. In 2006 the second ship lift (1b) and the first lock – also classified as technical monument – were taken out of operation.



no	location	year	type	height [m]	velocity of rise [m/min]	dimensions of trough [m]			total weight of trough [t]	design vessel [t]
						length	width	depth of water		
1a	Henrichenburg Dortmund-Ems Canal	1899	1 trough 5 floats	14 - 16	6.0	68.0	8.6	2.5	2340	800
1b	Henrichenburg Dortmund-Ems Canal	1962	1 trough 2 floats	13.7	7.8	90.0	12.0	3.0	5000	1350
2a	Niederfinow Oder-Havel Canal	1934	1 trough counterweights	36.0	7.2	85.0	12.0	2.5	4300	1000
2b	Niederfinow Oder-Havel Canal	2013 expd.	1 trough counterweights	36.0	12.0	115.0	12.5	4.0	9000	2100
3	Rothensee Mittelland Canal	1938	1 trough 2 floats	16.0 - 18.7	7.8	85.0	12.2	2.5	4000	1000
4	Lüneburg Elbe Lateral Canal	1975	2 troughs counterweights	34.0 - 38.0	12.6	100.0	12.0	3.4*	5800*	1350

* after reconstruction measures 1979/81

Next to the River Oder the ship lift Niederfinow (2a) is the junction between the German inland waterways and the Polish inland waterways and the Baltic Sea. After being in service for more than seventy-five years without any breakdown there was the need for a new construction to accommodate modern ships. A lock was out of the question because of the subsoil, which is sensitive to dynamic loads and therefore inadequate for its foundation. The water yield of the upper River Havel with a low water flow volume of 2.2 m³/s is too low for supplying a lock. Furthermore the transport capacity of a ship lift is higher in comparison with a lock of such a lifting height. These reasons are valid for the decision to build a new ship lift (2b) with dimensions fulfilling the demand of adequate navigation.

Decisive factors to build the ship lift Rothensee (3) were the volume and the structure of traffic and the height. From 1938 to 2001, when the new 190 m lock Rothensee was opened, the ship lift was the only link between the Mittelland Canal and the River Elbe.

The 115 km long Elbe Lateral Canal was built from 1969 to 1976 connecting the port of Hamburg and the industry regions of Rhine-Ruhr. To surmount the difference of water levels between the River Elbe and the Elbe Lateral Canal of about 38 m there was chosen a ship lift near Lüneburg (4) with two separate operating troughs (100 × 12 × 3.5 m), having regard to the costs of construction and operation. As the water level in the Elbe can vary about 4 m an additional special gate was constructed at the lower gates. Also special measures had to be taken against the coincidence of surge waves from the emptying operation of the upstream situated lock Uelzen and of manoeuvring ships causing belts of water level of +/- 40 cm within the trough. After more than thirty years in operation first considerations are now made for constructing an additional 190 m lock or a second ship lift with 115 m length fulfilling the conditions of increasing push-towing.

Management

After the Great War, the prewar Executive Committee initially continued its job. Secretary-General Richald was the first to retire. In 1921 his role was taken over by Mr. A. Lambin, who was succeeded after seven years by Mr. J.M. Millecam, deputy of the Directeur Général des Voies hydrauliques. Being a construction engineer, he had served during the war 1914-1918 in the Engineering Corps of the British Army in France, which gave him the opportunity to improve his knowledge of the English language considerably. Eventually he would serve as Secretary-General of PIANC for twenty-eight years.

Of the two prewar Presidents, Mr. Dufourny passed away in 1923. However, his successor Mr. E Gevaert, according to tradition Directeur Générale des Ponts et Chaussées, served for only three years. He then handed over the presidency, at the occasion of the PIC meeting of 1926, to Mr. D. Bouckaert. During his career at the Ministry, Mr. Bouckaert was involved with improvement of waterways which included the rivers Lys, Meuse and Scheldt and the Canal Ghent-Terneuzen. He was appointed Directeur Générale des Voies hydrauliques in 1921 and Directeur Général des Ponts et Chaussées in 1925.



During the whole presidency of Mr. De Vyvere, Mr. J. Millecam was the Secretary-General of PIANC. He had to deal with the financial and organisational difficulties of the depression and World War II. After his retirement in 1956 he continued working on the technical dictionary.

When long-time President Helleputte retired in 1925, he was succeeded by Viscount S.E. Van de Vyvere. Viscount Van de Vyvere, originally a Doctor of Laws from the University of Louvain, had a long political career, eventually becoming Prime Minister of Belgium. After his retirement King Albert bestowed upon him the honour of a Viscountcy, and he was appointed Minister of State. In 1956, he had to retire as President of PIANC because of ill-health.

PIANC was shocked by the sudden death in 1939 of Mr. Bouckaert, one month after that year's PIC meeting. The outbreak of World War II prevented the appointment of a successor, and during these difficult years, Mr. De Vyvere had to carry the presidential responsibilities alone.

Finances and membership

Originally PIANC paid the costs of the Congress to a great extent with funds from its own resources. This meant that during the interval between Congresses PIANC had to save. The financial situation of PIANC was not unfavourable during the interwar period. Every year, there was a surplus, which could be invested in stocks and bonds. But there were few funds for new initiatives. A proposal in 1922 to adopt Italian and Spanish as additional official languages was rejected because of the costs involved. The length of papers and general reports for the 1926 Congress was restricted to avoid extreme printing costs. The publication of a Bulletin could not be continued without raising the contribution.

The Secretary-General reported to the Permanent International Commission every year about the financial condition of the Association. His speech was published integrally in the Bulletin, accompanied by a report of the Auditing Committee. This ad-hoc committee, which consisted of two or three persons, met once a year, shortly before the PIC meeting, to check the books. The committee had the liberty to make suggestions. For instance, the publication of a Bulletin resulted from a proposal by the Auditing Committee.

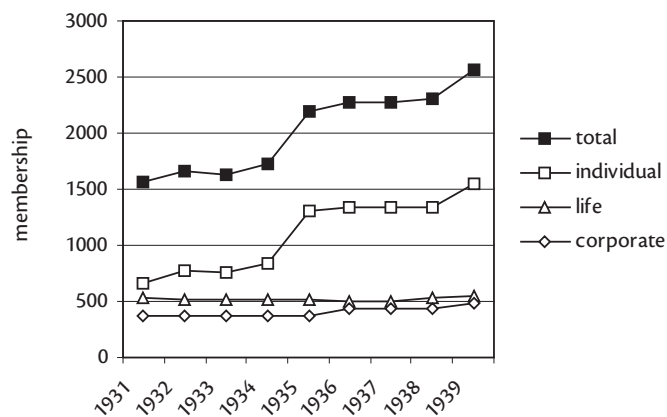
During the 1920s, national economies flourished world-wide and so did the finances of PIANC. Over sixty countries and governmental bodies were paying subventions and/or contributions. By 1930, the portfolio had gradually grown to 1.3 million Belgian Francs, about four times the annual receipts. But PIANC could not avoid the consequences of the economic depression. In 1931 a decrease of the value of the portfolio was reported.



Barges of the peniche-type sail on the French Canal du Nord. Construction of this canal started in 1913, but due to two wars and the economic depression, it was not completed until 1961. A remarkable feature is the canal tunnel at Ruyaulcourt. A new connection between the Seine and Scheldt estuary has been designed and will eventually replace the canal du Nord.

By 1938 the loss had become 11%, about the same amount as the total expenses. Several times the Auditing Committee proposed raising the contribution. The Executive Committee was reluctant to follow the advice, because the Association had lost some members in the early 1930s and several countries had failed to pay their subventions. After 1934

in the years prior to the next Congress, the membership increased again. The threat had not continued, although the Auditing Committee stated in 1939: 'Nevertheless, the (financial) situation remains very serious and we feel that nothing should be done to make it worse'.



PIANC membership figures 1931-1939 showed a remarkable increase of Individual Members after 1934. During this period, there were approximately 500 Life Members, 20 to 30% of the total membership.



5. War and postwar period (1940 – 1970)

PIANC survived World War II without too many problems. The offices, the archives and even the finances were safeguarded. After the war, it took several years to restart again and the first postwar Congress could not be organised until 1949. After a decade the membership figure was back to the prewar level. The Executive Committee retired more or less en bloc in 1956. One of the new Presidents was Mr. G. Willems, who would serve for the next twenty-six years. A series of successful Congresses was organised. New study commissions were established. But in the beginning of the 1970s, an uncomfortable feeling developed that some significant changes were needed.

Trade and navigation had to recover too from the war and soon surpassed prewar levels. After the Suez-crisis of 1956, the size of oil tankers increased rapidly, forcing ports to adapt fairways and quays. On the European inland waterways, push-towing was introduced, increasing inland navigation in an unprecedented way. And last but not least, growing prosperity led to increasing numbers of recreational boats. All these factors caused technical problems with which PIANC had to deal.

Surviving the war

At the break-out of war, Bulletin no. 29 was ready for printing, but its dispatch was suspended until 1947. At the time of printing the Bulletin, the preparatory work for the Congress was well advanced and thirty-two papers had been received by Headquarters. In view of the international situation, the Executive Committee decided in the course of 1939 that the Congress had to be postponed.

During the early days of the occupation of Brussels, the German Army wanted to take possession of the premises of the Association. Because of protests of the Secretary-General they relinquished their intentions, but only for some months and eventually the two clerks, Mr. Hofman and Mr. Delobel, found themselves without work. Secretary-General Millecam, who was at that time the sole representative of the Executive Committee in Brussels, consented to grant them an allowance of half their monthly pay. He was faced with problems soon after, because payment of subventions and subscriptions from other countries was impossible and the Belgian State no longer paid dividends on its state bonds, which constituted the last income source. Thus, PIANC's resources threatened to be exhausted.

Mr. Millecam decided to turn to the prewar First Delegate of Germany, Mr. J. Gähns, asking him for a solution. Mr. Gähns consulted the First Delegates from France, Italy and the Netherlands and

announced that the German delegation would pay the other half of the peacetime salary of the two clerks from the funds the delegation had already in possession for the 1940 Congress. At the same time he sent Mr. E. Leopold to Brussels to discuss matters with the Secretary-General, in particular the thorny question of appointment of a military *Reichskommissar* to PIANC. Eventually Mr. Leopold, a civil servant and prewar member of the PIC, was appointed *Reichskommissar*. Thus the danger of military supervision was avoided. He left the Secretary-General complete liberty and independence and he did not even come to the offices of the Association. In this way, the German delegation helped to safeguard the financial situation of the two employees during the war. The premises, documentation and archives of PIANC survived the war absolutely intact.

Resumption of activities

After the liberation of Brussels in 1944, the Secretary General tried to resume peacetime activities, but for the moment the circumstances were too difficult to organise a regular meeting of the Permanent International Commission. Instead a restricted committee, consisting of delegates from Belgium, the United States, France, UK and the Netherlands, met in Brussels on 11 December 1946. The delegates were unanimously of the opinion that PIANC's



In 1948, Mr. R. De Naeyer, First Delegate of the Belgian Section, was appointed as President, succeeding Mr. Bouckaert who died just before World War II. Mr. De Naeyer retired in 1956, but volunteered to replace the Secretary-General because of a lack of suitable candidates.

activities should be resumed and the first step should be a call upon all member countries except, for the time being, Germany and Japan. So the first postwar PIC meeting was held on 7 October 1947 in the new office in the Residence Palace, Rue de la Loi 155 in Brussels. Eighteen countries and the Central Commission for Navigation on the Rhine were represented. First, a new second President was elected to succeed Mr. Bouckaert, who died shortly before the war. Article 6 of the Statutes prescribed that the Executive Committee should consist of two Presidents and a Secretary-General, to be chosen by the Permanent International Commission and belonging to the nationality of the country (Belgium) where the PIC was seated. By tradition, the First Delegate of the Belgian Section was proposed: Mr. Robert de Naeyer, a hydraulic and electrotechnical engineer and at the time Secretary-General of the Ministry of Public Works, the highest civil servant at the Ministry. He was well-known because of his work on the Ghent Circular Canal and the extension of the Canal Ghent-Terneuzen. Mr. De Naeyer was elected unanimously.



The entrance of the Jugendstil Residence Palace, 155 Rue de la Loi, was the postwar office of PIANC. In 1991, PIANC Headquarter moved with the Belgian Ministry to the World Trade Centre near Brussels North Station.

President De Vyvere explained the financial situation of the Association. As stated before, the income from subventions and contributions had declined to almost zero during the course of the war. On the other hand, no Bulletins had been printed and mailed, personnel and other costs had been reduced to a strict minimum, and there was the contribution from the German delegation for the salaries of the clerks. At the end of July 1947, PIANC had at its disposal a capital of 2.65 million BFR. Compared to the situation of 31 December 1938, the credit-balance showed an increase of 1.18 million BFR. This included the portfolio investments of 1.25 million BFR, which was just below the prewar level. PIANC, classified among scientific organisations, was exempted from the Belgium tax on capital of 5%. Taking all these factors together in 1947, PIANC's financial condition was not too bad.

This and the promise of several countries to pay their annual subvention again, cleared the way for a restart. The budget for 1947 showed receipts of 310,000 BFR and expenses of 230,000 BFR among

which 110,000 BFR for staff. For this purpose Mrs. Marie-Madeleine Daneels was appointed to the HQ staff. Her English was very good, because she had served in the British Royal Air Force during the war years. The rent of the premises was again paid by the Belgian government. Part of the budget was dedicated to the Illustrated Technical Dictionary and the preparation of the 17th Congress. The report of the Executive Committee lacked the usual table recording the membership. There still was too much uncertainty. It was in 1950 that the membership list could be published again. The total had dropped from 2,570 in 1,939 to 1,786 and it would take another decade to come back to the prewar level.

At the PIC meeting of 1950, the Austrian First Delegate, Mr. J. Huber, proposed to invite Germany to participate again. There were no objections, so Western-Germany rejoined PIANC in 1951 to be followed by Japan the next year. The PIANC family was complete again!

The matter of the 17th Congress was discussed during the meeting of the Restricted Committee in December 1946. The committee came to the

conclusion that the earliest year for which the Congress could be arranged, would be 1949. Berlin was of course out of the question. In July 1947, the Portuguese government handed an official invitation to the Executive Committee. The Restricted Executive Committee decided a fortnight later to accept the invitation and drew up a provisional programme of questions and communications. The subjects chosen for the 1940 Berlin Congress were still current topics and thirty-two reports had been received at Headquarters before the war. It was decided that the 1940 programme could be maintained, but would be adapted to current circumstances. In fact only the words 'Experience from the war' were inserted in several topics. The thirty-two existing reports could be presented in either English or French. The German language was banned as an official language.

The 1949 Congress clearly illustrated the precarious financial situation of PIANC. The printing costs of the Congress papers were very expensive and few resources were left for the publication of new chapters of the Technical Dictionary. The PIC decided to ask UNESCO to support the dictionary.



The general cargo ship was the work horse of the fifties and sixties. Then the container emerged and almost completely replaced general cargo. The many slim quay-side cranes were replaced by huge portal cranes to tranship containers.

St. Lawrence Seaway



The 3,770 km St. Lawrence Seaway connects the Atlantic Ocean with the Great Lakes. Vessels have to be lifted 75 m to reach Lake Superior. The Seaway was completed in 1959. The participants of the Ottawa Congress were present at the inauguration of the new Welland Canal By-Pass in 1973. Special ships have been built for navigation on the St. Lawrence Seaway, such as this self-unloader Calcite.

The St. Lawrence Seaway is a 3,770 km (2,342 mile) marine transportation artery connecting the Atlantic Ocean at the Gulf of St. Lawrence with the interior of North America. In addition to the transportation system, the project includes hydro-electric power generating facilities. The project, which costed over 1 billion USD, was completed on schedule five years after the first earth was moved. At the opening ceremony in June 1959, Queen Elizabeth II and President Dwight D. Eisenhower recognised the diplomatic and engineering accomplishment that was represented by the seaway. Never in history had two nations cooperated to build a navigation and power project of such size. The system of canals,



locks, and dams was designed to permit ocean going vessels to reach inland ports such as Buffalo, Cleveland, Detroit and Chicago in the United States and Toronto, Canada, and fourteen other Canadian ports. It is the world's longest deep-draft inland waterway. Construction was authorised by the Canadian Parliament in 1951, and by the United States Congress in 1954. In Canada, the St. Lawrence Seaway Authority was responsible for construction and maintenance. The St. Lawrence Seaway Development Corporation, a public corporation created by Congress, was responsible for construction of facilities in the United States. The U. S. Army Corps of Engineers served as construction agent for the American corporation.

Over 20,000 people were employed during construction. The project involved technical, political, financial and environmental issues. In Canada eight communities of 6,500 residents were relocated to three new towns in Ontario. In addition, 64.4 km (40 miles) of mainline railroad and 56.3 km (35 miles) of highways were moved and rebuilt. In the United States power lines, roads and bridges and railroad track were relocated.

Engineering improvements included dredging channels, and constructing new canals to a depth of 27 feet (8 m), building locks as well as constructing hydro-electric facilities. The completed project includes nineteen locks: seven locks between Lake Ontario and Montreal, eight locks on the Welland Canal opened in 1932, and four Soo locks built at various times between 1914 and 1968. The project includes: the Wiley-Dondero Canal, 16 km (10 miles) in length, with the Snell and Eisenhower Locks; the South Shore Canal, 22.5 km (14 miles) in length from the Port of Montreal to Lake St. Louis, with the Ste. Catherine and St. Lambert Locks; the Beauharnais Canal, 17.7 km (11 miles) in length, which connects Lake St. Louis and Lake St. Francis, has two locks; the Iroquois Canal, which has one lock and a water control facility; the St. Mary's Falls Canal, which connects Lakes Huron and Superior, and has four parallel locks; and the Welland Canal, which links Lakes Ontario and Erie, and has eight locks. The seven locks between Montreal and Lake Ontario lift vessels 75 m (246 feet) above sea-level, and the eight locks in the Welland Canal lift vessels 100 m (326 feet) over the Niagara Escarpment. Each lock is 233.5 m (766 feet) long, 24.4 m (80 feet) wide, and 9.1 m (30 feet) deep over the sill. Approximately 91 million litres (24 million gallons) of water are used to fill a lock. Lockages take about 45 minutes.

The navigation and hydro-electric power projects cost: 131 million USD for the U. S. navigation facilities, 340 million USD for the Canadian navigation facilities and 300 million USD each for the power facilities in New York State and the Province of Ontario.

In 1951 UNESCO, with a subsidy that was received for several years, granted BFR 85,000 to enable printing of chapter 5 of the Dictionary. Additional subsidy was received from the UATI, the Union of International Engineering Organisations. Nevertheless, an increase of the membership fees could not be avoided. The fee for Individual Members was raised from 75.00 BFR to 100.00 BFR, the governmental subventions were increased by 50% and the prewar Life Members were requested to make a voluntary donation. These measures resulted in a positive budget for the year 1951 and following years. Establishing a fund to finance the Congress still was an absolute must for the Association.

First postwar Congresses

The first postwar Congress was held from 10 to 19 September 1949, in Lisbon. The Congress was a success. Despite the difficult economic situation, approximately 500 persons and corporate bodies registered and 24 governments and official bodies were represented. Following the pattern established before the war, there was a section on inland

navigation and a section on maritime navigation. During the Congress, technical questions were discussed. Beforehand subjects for questions and communications were formalised. The section on inland navigation comprised three questions (acceleration of transport, large differences in head, function of storage reservoirs) and three communications (design of locks, protection of embankments, economical value of inland navigation). Maritime navigation was dealt with in two questions (regularisation of estuaries, oil depots) and four communications (coastal erosion, concrete in sea-water, headroom of bridges, penetration of waves in harbours). The number of papers amounted to 110.

Four countries proposed to organise the 18th Congress which would be held in 1953: Brasil, Spain, Great Britain, and Italy. The deliberations of the PIC in June 1950 did not result in a clear result. The question was put to a vote and Rome, Italy, was chosen. Again, there were the two sections, questions and communications. The two sections comprised 94 papers discussing 13 topics, resulting



Rome was the host city for the 1953 Congress. For many, the highlight of the programme was a meeting with Pope Pius XII at Castle Gandolfo. One of the Communications of the Congress concerned pollution in ports, long before this was generally recognised as a major problem.

in 2,740 pages of text, assembled in 13 volumes. New rules, proposed by the American Section and accepted by the PIC assured distribution of the papers in advance of the opening of the Congress. The opening session was in the Capitol of Rome. Remarkable was the subject of one of the communications: pollution in harbours, long before this problem was generally recognised. The number of participants was 686. For many, the highlight of the programme was a meeting with Pope Pius XII at Castel Gandolfo.

Study commissions

During Congresses, technical questions were discussed. But sometimes the problem was too large or complicated to solve during the Congress. In that case the establishment of a study commission was an option. For instance at the 1951 PIC meeting, it was decided to start an international study commission on the depth of ports. The size of ocean going vessels was growing and traditional rules were no longer satisfactory. Before actually starting the study commission, National Sections

were requested to compile a paper on the situation in their country. Several papers were received indeed and published in the Bulletin, but the response was too little to effect the study commission.

More successful were the commissions following from the 1953 Congress. One was called the International Commission for the Study of the Unification of Signalling along Inland Waterways. The Chief-Engineer of the Central Commission for Rhine Navigation, Mr. J. Verhey, was appointed Chairman. This Commission was recognised by the Committee for Inland Transport of the UN Economic Commission for Europe as the technical body, most appropriate for the job. In 1957, the scope of work was extended with police regulations. Eventually, in 1962, the work of the PIANC commission was published by the ECE under the name of CEVNI: Code Européen des Voies de Navigation Intérieure or, in English: European Code for Inland Navigable Waterways. The code, which is still in force, has been updated several times.



The closure of the Suez Canal initiated the rapid development of very large crude oil tankers. Ports and waterways had to be adapted to take these vessels. PIANC quickly responded on the technical problems resulting from the new phenomena by establishing a study commission called the Oil Tankers Commission.

The second study commission was the International Commission on the Force of Wave. Chaired by Mr. A. de Rouville, it was the successor to the prewar commission handling the same subject. Obviously this was a difficult subject and only a summary of the activities could be published in the Bulletin in 1967. After restarting the commission in 1970 under the new chairmanship of Mr. J. Larras, the first part of the report was published in 1973, twenty years after the original establishment of the commission. In 1980, after putting severe pressure on the commission, PIANC was able to issue the final report. The work, although the progress was agonisingly slow, was worthwhile, because it represented the technical state-of-the-art.

Despite the slow progress, two more study commissions were proposed during the 1957 Congress. The subjects were: improvement of handling of general cargo and berthage of large oil tankers, the latter simply called the Oil Tankers Commission. The need for such a commission followed from the

rapid growth of the dimensions of tankers after the Suez-crisis of 1956. PIANC quickly responded on the technical problems resulting from this phenomena. The matter was first dealt with by national sub-committees. Because of this approach, the preparations and circulation of technical papers took a long time. In 1961, four years after they were initiated, the two commissions had their first meeting. The commission on general cargo never delivered a final report, but the Oil Tanker Commission chaired by Mr. C.N. McGowan published its results in the Bulletin 1967. Among these were recommendations for the disposition of manifolds on board of tankers. In 1973, the commission now chaired by Mr. J. Leite, completed its final report.

Because of the continuing enlargement of vessels, one year later the International Commission for the Reception of Large Ships (ICORELS) was started as a successor of the Oil Tankers Commission. Under its ambitious chairman, Mr. C. van der Burgt, the commission succeeded in delivering its first report after three years, so far an unparalleled success!



The rapid growth of the dimensions of tankers and bulkcarriers after the Suez-crisis caused problems with mooring and fendering. In response PIANC set up an international study commission on fender systems.



On 5 June 1956 two new Presidents were elected, one of them being Mr. G. Willems. Gustave Willems, a charismatic leader and excellent speaker, served as President of PIANC until his death in 1982. His most famous technical achievement was the inclined plane at Ronquières.



The second President to be appointed in 1956 was Mr. O. Vanaudenhove. He was the political President alongside the technical President Mr. G. Willems. In 1956, Omer Vanaudenhove was Minister of Public Works and Reconstruction in Belgium. He stepped down in 1975.

By 1980 all five Working Groups of ICORELS had finished and published their reports.

In 1968, a fifth study commission was added to the existing four: the International Commission for the Classification of Soils to be Dredged, chaired by Mr. J. Volkers. The report was published in 1972. Also in 1968, the International Commission for the Standardisation of roll-on/roll-off Ships and Berths was created. Mr. D. McGarey was appointed Chairman. The first recommendations were issued in 1971. Another commission, under the chairmanship of Mr. M. Gurnee, studied the effects of dredging on the environment. The report, which was ready in 1977, reflected the growing involvement of PIANC in matters related to dredging and the environment.

Two more international study commissions were formed in the following years: on locks, Chairman Mr. G. Willems, and on fender systems, Chairman Mr. J. Langeveld. Both reports were issued in the 1980s. By that time, PIANC had replaced the idea of large study commissions in favour of smaller Working Groups with more restricted Terms of Reference.

No Regional Section

At the 1954 PIC meeting Mr. T. Oag from Pakistan suggested to set up a Regional Section for Far Eastern countries bordering the Indian and Pacific Oceans. In those days it was often difficult and very costly for delegates from these countries to travel to the meetings and Congresses in Europe. As a result, there was a special meeting preceding the next PIC. Nine countries were present, among them Japan, Vietnam, Cambodia and Indonesia. Meanwhile there was another important incentive to consider a Regional Section. The Japanese had started an initiative to form an International Association of Ports and Harbours (IAPH). Although the IAPH mainly aimed at port management, the initiative was felt as a threat to PIANC which had to be addressed. Obviously a Regional Section was something to consider.

The Secretariat drafted regulations, which were published in the Bulletin of 1956. Article 1 stated the objective of the proposed Regional Section: to consider questions of common interest for countries bordering the Pacific and Indian Oceans. One of the options was to organise regional Congresses,

The container



The container caused a revolution in sea transport. In 1956 the first shipload of fifty-eight containers sailed from Newark to Houston. Today, a ship like the Estelle Maersk can load approximately 14,400 TEU, units of 20 feet length.

The transport of general cargo totally changed after the sixties with the emergence of the container. Before that time, general cargo was handled piece by piece. A labour intensive and costly job. It was the American truckdriver Malcolm McLean who, while waiting to be served at the quayside, had the inspiration to put general cargo in a box and load the box on the ship instead of every piece of cargo. He sold his truck company and bought a shipping line to put his idea into practise. In April 1956 the first shipload of fifty-eight containers sailed from Newark to Houston. The benefits were clear: containerised cargo cost less than one tenth of regular general cargo. Nevertheless, McLean had to face an enormous problem: the trade unions. The container required considerably less labour. Six workers were needed, compared to twenty-one for a



normal shift. The unions in the port of New York went on strike in 1958 and it took one month to come to the agreement that the same twenty-one people had to be hired to tranship containers. Only in 1965 a more realistic agreement was signed. New York was certainly not the only port to be faced with labour problems. But the container could not be stopped.

Crucial developments for the success of the container were the twist-lock, the system to connect containers to a frame or to each other, and even more important the standardisation of the dimensions of the container. McLean started with 33 feet long containers and eventually built a fleet of 35 feet containers. The International Organisation for Standardisation (ISO) chose in 1965 a standard container of 20 or 40 feet long, 8 feet wide and 8.5 feet high. Now containers fitted world-wide between cell guides, on chassis and rail cars and under the spreaders of container cranes.

The development started in the United States. In 1966 the first transatlantic container was put ashore in Europe and soon the Far East and other parts of the world followed. The design of ships grew with the amount of containerised cargo. The first generation container ship was a converted conventional cargo ship with limited space for containers. The second generation was purpose built and had a capacity of maximum 1,500 TEU. The third generation was designed for the trade between America, Europe and the Far East and doubled the capacity per ship to 3,000. Today, container vessels of 10,000 TEU and over exist and nobody knows where this rapid development will end. At the same time container transport by inland barge developed, in Europe mainly in the rivers Rhine and Seine. A standard barge of 110×11.4 m has a capacity of 200 TEU, but there are already barges of 135×15 m carrying 400 TEU. Again, the end of the development world-wide is not yet in sight.

Most containers still fit in the standard dimensions. But there are also containers of 45 or even 48 feet long. There are so-called high-cube containers, that exceed the 8.5 feet by a half or by one foot. There are pallet-wide containers, that are a few centimetres wider and are more efficient with regard to European standard pallet dimensions. And there are tankcontainers, reefercontainers, etc. The container proved to be a good instrument against theft in ports. But at the same time, it is rather easy to smuggle goods or drugs or even people in containers. Therefore costly inspections or detection gates are required in ports, diminishing the economic advantage of the container.

The containership, container handling equipment and container logistics introduced new problems for ports and the hinterland transport and meant new areas to be dealt with by PIANC.



HRH Prince Philip opened the 1957 Congress. During this Congress it was concluded that there was the need for an international commission to set standards for the safety of berthing of large oil tankers and transshipment operations to prevent pollution of harbours. This commission was called the Oil Tankers Commission.



Gradually, the trailing suction dredger took over the dominant position from the bucket dredger. Suction dredgers were more flexible, had less down time at sea and were much more efficient and cheaper as their size increased.



After the retirement of Secretary-General Millecam, Mr. H. Vandervelde was appointed for a three-year period in 1959, but eventually stayed in office until 1991. He was the editor of the book issued on the occasion of the Centennial Congress.

which would be held every four years, but not in the year of the Navigation Congress. Participants could be PIANC members from the area of the Section. According to article 3, there would be a Permanent Regional Commission and a Regional Secretariat. In total the regulations consisted of thirteen articles, even covering the possibility of dissolution of the Regional Section. These regulations could not be changed without the approval of the PIC, but the Regional Section could operate quite independently. The PIC in principle approved the draft regulations in its 1956 meeting. A letter to the National Sections resulted in little, if any a response. So the PIC decided in 1957 to postpone a final decision until the following year. Again, a questionnaire was circulated among the countries concerned containing three questions:

- 1) are you prepared to join the Regional Section?
- 2) are you in favour of confining the region to the East of longitude 60° East?
- 3) do you wish to make a proposal regarding the seat of this Section?

The result of the questionnaire was presented in the PIC meeting of 1958 in Brussels. In drawing conclusions from the answers, one would take into account the number of votes to which the country was entitled. The President concluded that the

results of the questionnaire were inconclusive, so another vote would be necessary. Mr. Masood Husain again argued in favour of the Regional Section. In his opinion, an Association that claimed to be a global organisation should not neglect the Asian and African countries. He pointed at the conclusions of the 19th Congress that in some cases only referred to the European situation and were not valid world-wide. Pooling of technical knowledge and resources could, in his opinion, best be done through a Regional Section with a regional office. The Pakistani government was prepared to finance the required offices and staff. The parent body only had to grant an initial subsidy. Mr. Husain was convinced that a Regional Section would stimulate more Eastern countries to join PIANC and he ended his plea by: 'I appeal to you to reconsider the proposal before voting on this crucial issue. We assure you that, given the opportunity, we will "deliver the goods". By voting for a Regional Organisation you will be giving a demonstration of your desire to help us'.

In principle, the Executive Committee was in favour of a Regional Section but, at the same time, had some fear of a division between East and West in the Association. Anyhow, a decision like this had to be taken by all members of the Permanent International Commission. At this point of the discussion, ballot papers were distributed and the delegates made their votes. When the votes were counted: 57 were in favour, 81 against, and there were 11 abstentions. So the Regional Section was rejected. Despite this result, President Willem's promised to pay extra attention to the problems of the Asian and African countries during the next Congress and suggested holding one of the next Congresses in Asia or Africa. In fact, it would take another 32 years when the 27th Congress in Osaka was the first Navigation Congress in Asia. Afterwards, one could say that Mr. Husain was far ahead of his time.

To console him, the President also promised to contact the UN Economic Commission for Asia and the Far East (ESCAFE) in Bangkok and ask it for suggestions for subjects for the 20th Congress regarding the technical problems of countries in the Far East. Indeed, PIANC sent a letter that was discussed in the Inland Waterway Sub-Committee of ESCAFE. The answer did not only suggest subjects for the next Congress, but it also requested practical matters, such as a dredging expert to serve on a team of ESCAFE, translation of reference books and carrying out of studies. The letter was discussed in the 1963 PIC meeting. Carrying out



In 1956 a young lady joined PIANC Headquarters: Mrs. C. De Craen. She would stay for forty years! To many, members as well as outsiders, Claire De Craen was the face of PIANC. She and her colleague Mrs. M. Daneels worked with great initiative.

studies was possible, at least in principle, but ESCAFE would have to pay for the work. Obviously ESCAFE was disappointed by this result and did not answer further letters from PIANC.

In 1966 PIANC decided to ask for a consultative status at the London based Intergovernmental Maritime Consultative Organisation (IMCO), the governmental organisation aiming at safe, secure and efficient shipping. The next year the requested status was granted. For practical reasons, a member of the British Section represented PIANC in IMCO.

Headquarters

In 1956, PIANC had recovered from the war. The membership figure was almost back to the prewar level and two Congresses had been successfully organised. It was the right time for the Executive Committee to step down. Moreover, Mr. Van de Vyvere had been President for over thirty years and Secretary-General Millecam almost had the same record. Compared to them Mr. De Naeyer, appointed in 1948, held office for a relatively short time, when his age forced him to retire as well.

On 5 June 1956 two new Presidents were elected: Mr. Omer Vanaudenhove and Mr. Gustave Willems. Mr. Vanaudenhove, the 'political' President, was at that time Minister of Public Works and Reconstruction. He would fulfill his presidency until 1975. The other, the 'technical' President, Gustave Willems, would eventually be PIANC President until 1982. In 1956 he was appointed chef de cabinet of the Minister of Public Works, to become Secretary-General of the Ministry two years later. In 1952 he had been appointed First Delegate of the Belgian Section. From 1935 to 1972, he was Professor at the Université Libre de Bruxelles. His most famous technical achievement was the Inclined Plane at Ronquières. Gustave Willems served as President of PIANC until his death in 1982.

In 1956, there was a lack of suitable candidates for the function of Secretary-General. Mr. De Naeyer offered to replace the Secretary-General on a temporarily basis. After his retirement he would have more time at his disposal and he volunteered to devote this time partly to PIANC. This solution lasted for two years only, because Mr. De Naeyer died in December 1958. At the occasion of the PIC meeting in 1959 Mr. Henry Vandervelde, who was the Chief Engineer of the Ponts et Chaussées, was appointed as acting Secretary-General. This rank was not considered at the appropriate level, so his appointment was valid for only three years. But eventually, he was satisfactory in every respect and would serve as Secretary-General until 1991. Outgoing Secretary-General Mr. Millecam remained to work on the publication of the Technical Dictionary, a project that he had initiated. He continued to work on the dictionary until he died in 1960 but, after his death, only two more chapters were published.

A young woman entered PIANC Headquarter in 1956: Mrs. Claire De Craen. Eventually she would stay until her retirement in 1996. She explained in the Bulletin: 'I liked it and decided to keep this fascinating job, as I realised the potential of the Association. I soon was comforted in this decision by the international contacts I made, the friendliness of the members, the kindness of everyone with whom I came in contact as well as the prospects of further Congresses in such remote locations as Baltimore.' For many members and for many years Claire was the face of PIANC Headquarters to the members as well as to the outside world. Every two weeks Mrs. De Craen and Mrs. M. Daneels, the other secretary, had a meeting with the President and the Secretary-General, but in practice worked very independently.



One of the high lights of the 20th Baltimore Congress, was a boat excursion across Chesapeake Bay and a visit to the Naval Academy of Annapolis, where 3,600 cadets marched past President Willems and thirteen gunshots were fired.

19th – 22nd Congress

Under the new Presidents a successful series of four-yearly Congresses started: London (1957), Baltimore (1961), Stockholm (1965), Paris (1969) and Ottawa (1973). The preparations for the 19th Congress in London were well under way when Mr. Willems and Mr. Vanaudenhove took up the presidency, so questions and communications were already formulated. A decision of the 1954 PIC strictly limited the scope of the Congress to three questions and three communications per section. The number of papers was fixed to one per country per subject, generally written by several authors. In this way it was possible to confine the number of printed pages to 2,500. Again, the number of participants increased: 960 participants from 44 nations. The Congress was opened by HRH Prince Philip. In his opinion the subject 'Measures to be taken for improvement of the handling of general cargo' was the most interesting, stating: 'I believe this is the very crux of the matter. Inland waterways, roads, railways, ports and ships are all involved in the process of trade, and trade is the exchange of goods, and it is in everybody's interest

that the flow of trade should be as smooth and as efficient as possible'. Continuing by: 'It is the oldest problem and, for that reason, the most awkward to tackle. But it is also a problem that can only be tackled successfully by a body, such as yours, because it occurs at the ends of all international shipping routes'. But another subject was perhaps even more important: large oil tankers. One of the conclusions was the need for an international commission to set standards on this matter to improve the safety of berthing and transhipment operations and to prevent pollution of harbour waters.

The Congresses following London were organised somewhat differently. Again two parallel sections: one for inland and one for ocean navigation. Within each section five or six subjects, would be discussed during half a day. For each subject, National Sections were allowed to submit one paper that could be written by several authors. A general reporter would give his conclusions at the beginning of the session. After that, there was time for short additions or explanations by the authors and for discussion. At the end of

Delta Plan



The Oosterschelde Barrier, completed in 1986, was the keystone of the Delta Plan, the plan to protect the southwest of the Netherlands from flooding such as the national disaster of 1953. For ecological reasons it became a semi-permeable dam that enables a tidal movement in the estuary, but can be closed in case of a storm surge.

In the night of the 1 February 1953, the countries around the North Sea were surprised by an extremely heavy storm, resulting in severe floodings. In the Netherlands, at over 150 locations the dikes collapsed and an area of 175,000 ha disappeared under (salt) water. In that night, 1,836 people drowned in the Netherlands and elsewhere several hundreds. Over 75,000 people had to be evacuated. It was a disaster without an equal! The repair of the dikes started at once and on 6 November 1953 the last gap was closed with help of caissons left-over from World War II.

The bad condition of the dikes was known to insiders, but in the post-war period there was no priority for maintenance, let alone strengthening of the sea-defences. Now it was the first priority. Three weeks after the



catastrophe the Delta Commission was established, chaired by the Director-General of Rijkswaterstaat. In two years time, the Commission drafted the Delta Plan aiming at flood prevention and at the same time pushing back salinisation. The core of the plan was the closure of the main sea branches, thus shortening the coast line by 700 km. Secondary dams would divide the remaining water area in smaller compartments and create sweet water reservoirs in this way.

The works started in 1958 by constructing a barrier in the Hollandsche IJssel, just east of Rotterdam. This barrier protects the low level heart of Holland, that barely escaped the disaster of 1953. At first the secondary dams were constructed, working from small to large and offering the engineers the possibility to experiment and learn from experience. Moreover, the secondary dams reduced the tidal influence in the sea branches and made the construction of the primary dams easier. Two methods were applied: the gradual closure and the sudden closure by caissons. A gradual closure is possible by pumping sand in the gap or, in case the current is too high, by dumping stones. It turned out that a funicular was very usefull. The cable cars had a pay-load of 15 tonnes. Another method to close a sea branch is the use of caissons. The biggest units had dimensions 68×18 m. The sides were initially open to avoid water pressure. When all caissons were sunk in position and secured, the slides were closed and at once the dam was impermeable.

The longest closure dam would be in the Oosterschelde (Eastern-Scheldt): a gap of 3 km in total. Works had already commenced in 1967, but gradually opposition developed. The Oosterschelde was a unique environment and people and eventually the government realised that it had to be preserved. After a passionate debate, parliament accepted in 1979 a proposal to construct a semi-permeable dam that would enable a tidal movement, though reduced in volume. It was an expensive and from a technical point of view extremely difficult solution. In a construction dock, 65 piles of 30 to 39 m long were constructed. A special ship had to be built to float the piles out of the dock and put them precisely in position. Between the piles, 40 m wide steel slides were fitted. Normally the slides are open to enable the water to flow in and out. Only in case of high storm surges the slides are closed. The Delta Plan was completed in 1986.

The waterways to the ports of Rotterdam and Antwerp could not be closed and in those cases dikes had to be raised. It was decided to construct a large barrier to protect Rotterdam, the Maeslantkering, consisting of two floating doors of 23.5 m height. Each door is supported by two lattice girders of 246 m length. In case of a very high storm surge, the doors are floated out of their onshore docks and sunk to close the 360 m wide, 17 m deep fairway. The barrier was completed in 1997. Every year the closure operation is tested once. If the dikes were to have been raised in this heavily populated area, the construction would have taken at least ten more years.



President Willems and Major General C.G. Holle in lively conversation. Finally, they agreed!

the session, the general reporter would read his preliminary conclusions, to be finalised after the closure of the session. In the end, the final conclusions of all sessions would be published in the next Bulletin. The confusing distinction between questions and communications was dropped. Sometimes the conclusions of a Congress resulted in a study commission, like the Oil Tanker Commission.

Baltimore (1961) was the first Congress to be organised in this way. The host of the 20th Congress was the United States Army Corps of Engineers, taking care of most of the organisational work. The President of the United States, John F. Kennedy, acted as patron. The Congress was officially opened in the Shriver Hall of the Johns Hopkins University by Secretary of State Dean Rusk, who was welcomed by the trumpeters of the U.S. Army Band. A delegate recalled an amusing anecdote. The weather on that September day was very hot and humid and there was no air conditioning in the Shriver Hall. After many lengthy speeches to an audience, who was becoming increasingly uncomfortable, Mr. George A. Wilson, British First Delegate and Chief Engineer of the Port of London Authority, rose and said 'I will cut my remarks short' and

then said something like 'It's hot. I think we've heard enough. Let's adjourn.' The cheering audience did so at once.

During the Congress a boat excursion across Chesapeake Bay was made to the Naval Academy of Annapolis, where 3,600 cadets marched past President Willems and the other 750 participants and thirteen gunshots were fired. Mr. Willems must have felt like a real President! After the Congress tours were made to among other places the St. Lawrence Seaway and the Ohio, Tennessee and Lower Mississippi rivers.

The 21st Congress in 1965 was at the invitation of the five Nordic countries: Denmark, Finland, Iceland, Norway and Sweden. The venue chosen was Stockholm, Sweden. It attracted 1,100 participants and 130 papers on twelve topics were submitted. Special subjects were the influence of new vessels like push-tows, hovercrafts and hydrofoils and the problems arising from the use of yachts and small boats for sport and recreation. Other remarkable subjects were: the use of mathematical models, remotely operated craft, minimum depth required by tankers and ore carriers, and construction in soft ground, taking into account the need for increased



In the sixties, prosperity in the industrialised world grew rapidly. People had more leisure time and more money to spend, on a boat of their own for instance. As a result the number of recreational craft increased and so did the related technical problems. PIANC responded by establishing the International Commission for Sport and Pleasure Navigation.

depths. Post-Congress tours were possible to all five countries including the Norwegian fjords.

Paris had been the venue for the Congress in 1892 and 1900. After many years, PIANC returned in 1969 for the 22nd Congress, an event that would be attended by more than 950 participants from 35 countries. The 107 papers required twelve volumes and 2,258 printed pages. Among the subjects were the application of electronics to the operation of waterways, design of revetments, development of container transport and suction dredging in very deep waters. The farewell banquet in the Orangerie of the Versailles Palace did not fail to impress the participants! The Paris Congress was remarkable for two reasons. President De Gaulle had accepted the high patronage of the Congress, but he resigned just before the Congress started. His successor, Mr. G. Pompidou, was elected at the day of the formal opening of the Congress. Following a decision of PIANC Headquarters, for the first time participants had to pay a modest Congress fee.

Sport and Pleasure Navigation

In the sixties, prosperity in the industrialised world grew rapidly. As a result people had more leisure time and had more money to spend. Buying one's own boat was no longer an unattainable desire. The number of pleasure boats increased and so did the technical problems related to sport and pleasure navigation. PIANC became aware of the situation when deliberating the subjects for the 21st Congress in 1965. Recreational navigation was one of the subjects, and fourteen papers were submitted. One of the conclusions of the Congress was the recommendation to set up a working party on this subject. One year later, the International Commission for Sport and Recreation Navigation, chaired by Mr. J. Verhey was established. When Mr. Verhey unfortunately died in 1967, the chair was taken over by Mr. J. Couteaud. At the first meeting, attended by fifteen countries, a general work programme was discussed. From a long list of possible items, eleven subjects for study were selected

and subsequently Working Groups were established and work commenced on the following:

- Telecommunications and radio-guiding
- Preparation of a card index
- Economy of yacht harbours
- Advantages and disadvantages of the presence in a port of both fishing and pleasure craft
- Nuisances caused by pleasure craft
- Compulsory insurance
- International certificates
- Safety regulations
- Sailing and signaling regulations
- New principles for dike construction
- Reinforced concrete landing-stages from pre-fabricated elements

Every year, Mr. Couteaud reported the progress to the Permanent International Commission like the other Study Commissions. The study on sailing and signaling regulations was undertaken as a result of a request made by the Economic Commission for Europe (ECE) of the United Nations. In 1970, a first document was sent to the ECE to be inserted in the European Code for Inland Navigable Waterways (CEVNI).

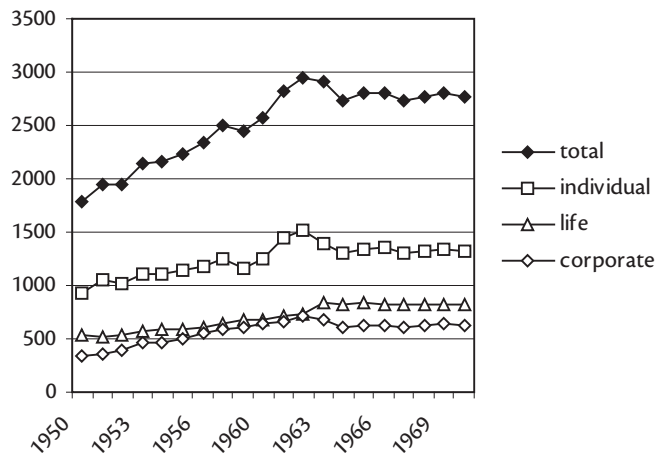
Finances and membership

After the war, the membership of PIANC increased rapidly from less than 2,000 to almost 3,000, but then stagnated. At the same time, the financial situation deteriorated because of increasing expenses. The reserves, which for instance represented in the period from 1954 to 1957, an amount that was four times the yearly expenses, by the period 1966 to 1969 represented only two times expenses. The Auditing Committee gave a first warning in its 1966 report: on the mid-term expenditures. No longer could expenditures be covered by the regular income, and there could be no possibility of saving funds for Congresses. There were several reasons for the financial problems. One was that in 1965 UNESCO stopped its subsidy for the publication of the Bulletin and the Technical Dictionary. Another reason was inflation that was not being compensated by an increase of subventions and contributions.

In response the Executive Committee proposed in 1967 to raise the minimum government subsidy. Sir T. Padmore stated that the British delegation was not opposed to an increase of the rate of subsidies, but preferred a solution for the long period. He felt that a more radical reform was desirable.



On the European inland waterways, push-towing was introduced in 1957 following the American example. It was an immediate success.



PIANC membership figures 1950 to 1970. During these two decades, the membership increased by more than 50%, but stagnated after 1965. At the same time the financial situation of the Association became critical and drastic measures were required.

The first delegate of The Netherlands, Mr. J. van de Kerk, suggested entrusting the problem to a small group of PIC delegates. The President Willems agreed and asked the assembly to approve the following proposal:

- 1) to increase the government subsidies by 25%, keeping the subscription rate for Individual and Corporate Members at the same level as before
- 2) to set up an Expanded Executive Committee (EEC) consisting of PIC delegates to assist ExCom
- 3) to entrust this body with the task of examining proposals to solve financial and other outstanding problems

In fact, the proposed EEC was possible according to article 13.3 of the Regulations: 'The Executive Committee may, on its own authority, co-opt additional members temporarily for the handling of special problems. In such a case not more than one temporary member shall be invited from any country'. The Expanded Executive Committee (EEC), which had its first meeting in Brussels on 16 October 1967, consisted of the First Delegates of member countries. It was to meet twice a year, and having no decisive power, it only advised the Executive Committee. Eventually the Expanded Executive Committee would not be temporary as it has continued in the form of the present-day Council.

End of the postwar era

The slight loss of members after 1960 showed that for PIANC the postwar period of steady prosperity had come to an end. This not only affected PIANC, but society generally, which was becoming aware of the negative impact of unlimited economical expansion. The problem was emphasised by the report 'The Limits of Growth' published by the Club of Rome, a group of eminent scientists, worried about the future of the world. Air and water pollution resulting from industrial activities ignited aversion against solely technical solutions and technical education became less popular in favour of social sciences. Navigation also became suspect because of major disasters culminating in the grounding of the tanker Torrey Canyon in 1976, resulting in a gigantic oil spill.

In general, people became more independent and critical. Inside PIANC, delegates and members were dissatisfied, especially because of the rigid structure of the Association, the slow progress of the study commissions and, despite the establishment of the Enlarged Executive Committee, the dominance of the Belgian management. In the beginning of the 1970s, there was a wide-spread uncomfortable feeling in PIANC: something had to change.


The development of the Rhône



The River Rhône has been equipped with locks and dams to generate hydropower and water for irrigation and to improve navigation. The photo shows a lock and dam in an agricultural area near Vallabrègues. At the left is the lock for navigation.

Between Lyon and the sea (330 km), the Rhône is a vital and ancient North-South communication corridor whose free flowing current has been used by boats since antiquity. The fertile valley and favourable climate have given rise to thriving agricultural production. Varying in width as it flows through plains and mountainous terrain, its banks accommodate ten large cities and towns. The flow rate of the Rhône varies from 300 m³/s to 12,000 m³/s and disastrous floods can occur. Previously, the steep slope and high current speed made navigation on its free flowing waters uneconomic, so the decision was taken to channel the river. Economically, it was not viable to build a large side canal due to the narrowness of certain sections of the valley. What is more, building a large dam in a rich and heavily populated valley was out of the question. Consequently, the river was divided into twelve bays each equipped with locks and a gate structure dam.

The essential characteristics of this development is that it is not solely used for navigation, since efforts are made to harness as much of the river's wealth as possible. Thus, besides providing a route for wide gauge river craft, it is also used to generate hydropower (12.5 Gwh), supply irrigation (120,000 ha), accommodate industrial and port facilities (1,000 ha), flood



protection structures, urban facilities (development of banks, drainage networks, control of groundwater levels, and so forth) and provide facilities for pleasure boats (marinas and mooring points). Lastly, it ensures the conservation of interesting natural areas for fauna and flora. This development was carried out by the Compagnie Nationale du Rhône (CNR), a company founded by the local authorities adjacent to the river (municipalities, departments, and chambers of commerce).

The first bay (Donzère-Mondragon) was commissioned in 1952, when it was one of the largest construction sites of the time (50 million m³ of earthworks and 700,000 m³ of concrete). The hydropower plant generates an average of 2.14 Gwh per year. The lock, which had the world record for having the highest head (26 m), saw the implementation of new major technological advances (fast filling without agitating surface water).

The forebay reservoirs are quite short (the longest stretches 27 km). Their width is about twice that of the low-water channel and they are confined by dikes made of silt and gravel extracted from the site, which increases the wetted cross-section and makes the cross-section of the reservoirs wide enough to absorb the biggest floods. The low-water channel is also protected against direct floods. All these precautions save a total of 41,000 ha from flooding. The efficient gauging of the reservoirs also ensures sediment transport and thus avoids erosion and deposits downstream of each bay.

Furthermore, the reservoir dikes are bordered by side channels that discharge the infiltrations they collect downstream of the dams, thereby regulating groundwater levels.

A succession of bays contained by dikes with crests providing a margin of as little as 0.50 to 1.00 m above the reservoir demands strict management of the levels controlled by the dams. It has to take into account the interactions between the bays, the sometimes very sudden inflows from the tributaries and incidents on the electricity grid that can abruptly change the flow rate of the plants. This management is fully automated by a number of models that regulate the distribution of the flow rates without human intervention on the basis of data supplied by level indicators on the Rhône and its tributaries, as well as by hydropower production programmes. Lastly, a meteorological flow rate forecasting model linked to an automatic management system makes it possible to inform boats of the available draughts and clearances and optimise their use of the navigable channel.

The last of the twelve bays was commissioned by the Compagnie Nationale du Rhône in 1980.

The development of the Rhône is fully integrated in the context of sustainable development, a concern that has now become a pressing obligation. It permits river transport, the least pollutant and energy consuming mode of locomotion. It produces abundant electricity without emitting greenhouse gases and without consuming limited natural resources. Lastly, it makes very large quantities of irrigation water available for agriculture, allowing it to overcome adverse climatic conditions.



6. Times are changing (1970 – 2000)

In the period 1970 to 2000, PIANC changed drastically: one President instead of two, appointment of Vice-Presidents, establishment of Permanent Technical Commissions and Working Groups, and the formation of the Permanent Commission for Developing Countries. The untimely death of President Willems prior to the Centennial Congress shocked PIANC. The President-elect, Mr. R. De Paepe, was suddenly forced to take over the presidency. Under his direction, the character of PIANC was altered from primarily a Congress organiser to a publisher of high-ranking technical reports. Symbolic of the new orientation was the moving of the Headquarters from the familiar Jugendstil Residence Palace to the steel-and-glass World Trade Center and eventually to the new Graaf de Ferraris Building.

During the years 1970-2000, the importance of the old-fashioned general cargo ship declined in favour of the new containership. Despite economic problems in the 1980s, container transport advanced strongly, and by the end of the century, containers and container cranes dominated the port skyline. The environmental aspects of engineering works became more and more important. The personal computer, e-mail and internet were introduced, drastically changing office work and human interaction.



Today, containers and container cranes dominate the port skyline. The old-fashioned general cargo ship almost disappeared in favour of container ships.

New rules

In October 1972, the Dutch Section mailed a letter to all First Delegates proposing radical changes to the rules of PIANC. The objective, as Mr. C. van der Burgt explained in the October meeting of the Expanded Executive Committee, was to secure the future of PIANC. The questions raised in the letter were: should the activities be expanded or restricted, should members be more involved in the work of PIANC, should other countries be involved in the management of the Association? Mr. Willems was strongly against such proposals and suggested various arguments to reject these impertinent thoughts. The Dutch proposal was removed from the agenda. However, in April 1973 the matter was discussed again. The conclusion was that there was no immediate need to implement the Dutch proposals. But once started the movement could not be stopped and severe pressure from several countries, probably also the critical financial situation and the decreasing membership of the Association, convinced Mr. Willems to change his mind. The text of a proposal was drafted, then discussed in the Expanded Executive Committee and in 1974 was presented in the PIC meeting. The four main principles of modification were:

1. only one Belgian President instead of two, as was the case from the beginning of PIANC; a procedure for election had to be worked out
2. a procedure to be laid down for the election of the Secretary-General, who also would be of Belgian nationality
3. expansion of the Executive Committee by four Vice-Presidents, who would not be Belgians
4. the Expanded Executive Committee, which had only a consultative status, to be replaced by a Council with executive power

No objections were raised and a small group was entrusted with the task of drafting the new Statutes. As a consequence of the changes, the second President Vanaudenhove stepped down, and he was appointed Honorary President. Mr. Willems stressed that the article on the President of the Association would not be applicable to the President in office, that is to say: himself. One of the new rules stipulated a maximum age of seventy-two for the person holding the office of President. Mr. Willems, born in 1901, intended to continue in office until the Centennial Congress. Although no objections were made, there was some uneasiness. On behalf of the American Section, Lieutenant General J.W. Morris



Mr. Robert De Paepe and his wife, Mrs. Marie-Thérèse De Paepe-Van Maercke. Mr. De Paepe was President-elect in 1982, when he suddenly had to take over the presidency of PIANC because of the unexpected the death of President Willems.

proposed inserting a sentence in the Statutes to deal with a situation where the President would be 'prevented from carrying out his duties'. This was not unlikely considering the advanced age of the President. Sir William Harris agreed on behalf of the British Section. The matter was discussed in the Council meeting of April 1979. At the occasion of the following PIC meeting Mr. Willems made the proposal to appoint Mr. R. De Paepe as the fifth Vice-President. After two year's probation, he was officially appointed President-elect.

Robert De Paepe, born 1927 in Ghent, graduated as a civil engineer with honours in 1951. After his 21-months military service, where he was commander of a squad of bridge builders, he started a career with the Ministry of Public Works. His first job concerned the Albert Canal, his second the highway network. After being advisor to the Cabinet of the Minister of Public Works for several years, Robert De Paepe became inspector-general of Bridges and Highways and in 1977 he was named Secretary-General of the Ministry of Public Works. The large Strépy-Thieu ship lift was constructed under his supervision. Besides his functions in PIANC, he was Belgium's First Delegate to PIARC and Vice-President of PIARC from 1991 until 1996.

During the PIC meeting of 1975 the third version of the text for the new Statutes was discussed. There were several amendements proposed by the American Section and counterproposals made by the British Section. Not surprisingly, the discussion took quite some time. According to the new Statutes, the Council would consist of the First Delegates and the members of the Executive Committee, including the Vice-Presidents. The duties of the Council would be:

- To assist the Executive Committee in the affairs of the Association
- To examine and submit to the PIC candidates for the nomination of President, Secretary-General and Vice-Presidents
- To prepare the working programmes of international study commissions and give suggestions to the PIC regarding the chairmanship of these commissions

- To draw up the programme of the Congress for approval by the PIC
- To approve the annual budget of the Association for submission to the PIC

The final approval of these matters was still reserved to the Permanent International Commission. So the Council would act as a kind of preparatory body for the PIC meetings, and in the end its executive powers were rather limited. The first official meeting of the Council was on 25 March 1976. Another innovation was the selection of Vice-Presidents who would be appointed for two years and would be eligible for reappointment for another consecutive period of two years, provided they had not reached the age of seventy-two. The principal task of the Vice-President as a member of the Executive Committee was to assist the President and the Secretary-General on all matters of the Association.



Five former Vice-Presidents, from left to right: Messrs. P. Savey (1991-1995), R. De Paepe (1979-1982), C. van der Burgt (1989-1993), Sir W. Harris (1976-1979) and LTG E.R. Heiberg III (1983-1987). Moreover, Mr. Savey was Chairman of PTC I (1983-2000), now InCom, and Mr. Van der Burgt of PTC II (1980-1985), now MarCom.

The new Statutes came into force on 1 January 1976. As a consequence, Vice-Presidents had to be elected at the PIC meeting of June 1976. Four candidates were proposed: Lieutenant General J.W. Morris (USA), Sir William Harris (UK), Mr. S. Kuchkin (USSR), and Mr. D. Laval (France). To ensure the continuity in ExCom, the rules were changed in 1985. From that year on, one Vice-President would be elected every year. Mr. J. Chapon and Mr. M. Hager agreed to limit their Vice-Presidencies to three years in order to enable the implementation of the new rule. From 1986, the Vice-Presidents were appointed for four years. A list of Vice-Presidents and their years in office is shown in Annex 3.

Finances

The Auditing Committee gave a warning in its 1970 report regarding the economic situation of PIANC. The year after stringent remedial measures were proposed. They were to: reduce the publication of the Bulletin from four to three issues per year, publish articles in the Bulletin only in the original language, either English or French, and

increase the fee for Individual Members by 50% and for Corporate Members by 100%. These measures were approved unanimously by the PIC in 1971. At the same time, the President made an appeal to the National Sections to increase the number of PIANC members. The campaign helped to reverse the downward trend for the time being. Nevertheless, the Auditing Committee concluded in its 1971 report that any appreciable increase of activities could not be allowed.

Two years later, there was again a financial crisis situation. The medium forecast for the period 1973-1976 projected receipts of 15.8 million BFR and expenditures of 18.7 million BFR. The Association still was in the difficult position of raising funds to finance the Congress. Even the introduction of moderate Congress fees in 1969 did not cover expenses, and had not prevented a considerable deficit. Again membership fees had to be raised and consideration was given to abolishing the status of Life Member. Because of inflation, Life Members had become a monetary burden for the Association. But the Executive Committee withdrew its proposal and the decision was taken



Lieutenant General J.W. Morris, First Delegate of the United States, speaking at the opening of the Leningrad Congress in 1977. Behind him is a tall statue of Lenin. Some participants were anxious to look behind the 'iron curtain', some felt a bit uncomfortable.



First day cover and stamp issued on the occasion of the Leningrad Congress

that resulted in increasing the fee for Life Members from fifteen to twenty times the annual fee for an Individual Member. By doing this interest on the fee would again be equal to the yearly contribution. The expenses for the Congress would be reduced by limiting the number of subjects and the number of printed pages per paper, by using cheaper paper and smaller type. But the President was aware that: 'These economy measures alone would not suffice to redress the critical financial situation'. Other measures were adopted: printing the Bulletin in offset, which was almost 50% cheaper than the former way of printing and adopting the principle of the self-financed Congress. The latter was a significant change from the past, when PIANC had to save to pay for Congresses.

The Auditing Committee for many years met shortly or even the day before the PIC meeting to review the books. The members were appointed by the PIC annually, although members usually served for several years. The Committee could comment on the financial situation or advise on future policies. It in fact had no power and was not represented in the Executive Committee, a situation which eventually became unsatisfactory. During the 1981 PIC meeting, a Special Committee was appointed to consider the conversion from Auditing Committee into Finance Committee. Two years later the principle was accepted and Mr. William R. Murden was elected as Chairman. Auditing the books was outsourced to a professional bureau. The mission of the Finance Committee was

to survey the financial situation of the Association, to examine the portfolio, and to prepare the budget and the medium-term business plan. The Chairman of the Finance Committee, who reported yearly to the PIC, became a member of the Executive Committee.

Three Congresses

The venue for the 23rd Congress in 1973 was Ottawa, Canada. Probably because of high travel expenses, there were only approximately 700 participants. Nevertheless, there were 133 papers from authors coming from 26 countries. Interesting subjects on the agenda included: offshore structures in deep water, access channels for large vessels, waterways for power generation, effects of ice on structures, prevention of pollution, and preservation of the environment. The 12 subjects resulted in a record number of 2,624 printed pages, which were illustrated by 1,087 figures. As Mr. P. Camu, President of the St. Lawrence Seaway Authority explained, Canada is an interesting country for navigation: it takes up half a continent, has several thousands of miles of coastline, approximately 2,350 harbours, and borders three oceans. Part of the programme was a three-day tour by special train to the Niagara Falls, the St. Lawrence Seaway, and the old Peterborough hydraulic ship lift. In fact, this mid-Congress tour was highlighted by the official opening ceremony of the 13 km new Welland Canal By-Pass which replaced a canal section unaltered since 1833. The delegates were the guests of honour at the event. Included in the Post Congress Tours was a visit to the Port of Vancouver.

The 24th Congress was held in 1977 in Leningrad, USSR. There had been a Congress in the same city, at that time named St. Petersburg, in September 1908, before the communist regime and long before the cold war. Some members were anxious to have a look behind the 'iron curtain', others felt a bit uncomfortable, but the hosts did everything to make the Congress a success in the beautiful city of Leningrad. As a result, there were 764 participants from 32 nations. During ten sessions, 111 papers were discussed. Part of the Congress programme was a visit to the ports of Leningrad. Surprisingly there was no restriction on taking photos! There were excursions to the former palaces in and around St. Petersburg, including the famous Hermitage Museum. After the Congress, one could participate in five different excursions, such as a boat trip on the Wolga and Dnjepr Rivers, visit the Black Sea ports or the Lake Baikal in Siberia.


Thames Barrier



In the lower part of the Thames estuary, there is a serious threat of flooding. The Thames Barrier is the largest moveable gate structure that exists. The width between the river banks is 520 m. The four main openings have a clear navigation span of 61 m. The formal opening was in 1984.

In the lower part of the tidal Thames, the main threat of flooding comes from the sea and the defences include a number of moveable gate structures, the Thames Barrier being by far the largest of these. In 1953 there was disastrous flooding on the east coast of UK with a toll of over 300 lives. Following this devastating North Sea storm surge, some exploratory surge experiments were carried out on an existing physical hydraulic model of the Thames estuary. These demonstrated the potential benefits of constructing a surge barrier about 30 km above the estuary mouth.

A severe flood in London could paralyse the central part of the London Underground system, cause damage to fresh water supplies and sewer systems and disrupt power, gas, telephone and vital data services. Thousands of homes, shops, factories, businesses and buildings would be affected and it could take months to get London functioning again.



The financial cost of a major flood could be enormous, possibly topping 30,000 million GBP without counting the cost in human suffering and potential loss of life. Public concern was aroused over a smaller surge which occurred in 1967 and this initiated further action. The UK Government 1968 charged the Greater London Council with carrying out a flood prevention investigation. In order to predict river behaviour following any flow modifications, information on past and present behaviour were needed. These requirements were met by: field measurements made between 1968 and 1981, continuous silt monitoring for a period of twenty years, intermittent laboratory tests on silt over seven years, computer modelling for eighteen months, physical modelling during a decade, and associated desk studies, such as the analysis of wind data. Once an acceptable barrier location had been identified, the general closure operation determined, and the Barrier Act passed in 1972, the Greater London Council appointed consulting engineers to undertake the detailed design. Tests continued to be carried out on the five physical models and the two mathematical models as required during the course of design and construction. The design of the barrier which was finally adopted in the early 1970s consists of a series of ten separate movable gates positioned end-to-end across the river at Woolwich.

The width of the barrier from north bank to south bank is about 520 m with the four main openings each having a clear navigation span of 61 m. The four main gates are massive, constructed as a hollow steel-plated structure over 20 m high and weighing, with counterweights, about 3,700 tonnes each. Each gate is capable of withstanding an overall load of more than 9,000 tonnes. There are two smaller gates of similar concept, with 31 m wide navigation openings and the four falling radial gates have non-navigable openings adjacent to the riverbanks. Each gate is pivoted and supported between concrete piers that house the operating equipment. Closure of the barrier is achieved by lifting the six rising gates and four radial gates sealing off the upper Thames from the sea. When not in use, the six rising gates rest out of sight in curved recessed concrete cills in the riverbed, allowing the free passage of river traffic through the openings between the piers. If a dangerously high tidal surge threatens, the rising sector gates are moved up through 90° from the riverbed cills, and the four radial gates are brought down into the closed defence position. The gates thus form a continuous steel wall facing down river ready to stem the tide.

Construction of the barrier started in late 1974 and was operated for the first time in October 1982 with the formal opening by HM Queen Elizabeth II taking place on 8 May 1984. Construction of the barrier and associated works was a massive project and the final cost of the Thames flood defences was in excess of 500 million GBP on completion in 1982. The Thames Barrier is managed and operated by the UK Environment Agency.

The 25th Congress was held in Edinburgh, May 1981. It was the first Congress held in Scotland and was attended by 1,050 delegates from 56 countries. The Patron was HRH Prince Philip, Duke of Edinburgh, and the Chairman of the Organising Committee was Mr. J.H.H. Gillespie. In his message to the participants, Prince Philip stated his belief that since the previous occasion, when he was patron of the 1957 London Congress, there had been dramatic improvements particularly in cargo-handling techniques and that these had been achieved without major difficulties in management and human relations. With great foresight he went on to say: 'Today many other factors such as pollution, the conservation of nature and the special problems of less prosperous nations have to be taken into account as well'. The number of papers presented at the 25th Congress by members from 26 countries totalled 125. There were 60 for the section on Inland Waterways and Ports and 65 for the section on Maritime Ports and Seaways. The substance of the technical discussions of the papers is

given in the Proceedings of the Congress and the text of the prestigious lecture entitled 'Shipping and Port Futures' given by Mr.T.L. Beagley was published in Bulletin number 38 together with the report of the meetings of the Technical Commissions held during the Congress. The Edinburgh Congress was the first to be organised under the revised rules of procedure. Among the main changes was to limit the Congress to one week, and also to stress the international character of PIANC. This was accomplished by having each of the Vice-Chairmen of sessions and a number of the reporters-general nominated by a member country other than UK, the host country. The Congress was the first to be self-financing and indeed made a significant monetary surplus, half of which was given to PIANC Headquarters. Several post-Congress Tours were organised, the highlight being the tour of the Scottish Highlands and Waterways which included Balmoral Castle and a malt whiskey distillery! Other tours, which were more technical, included the ports of Tyne, Tees, Liverpool, Bristol, and London.



Mr. J.H.H. Gillespie, Chairman of the British Section, presenting a silver replica of the s.s. Berlin's Bell to the patron of the Congress, HRH the Duke of Edinburgh. The 1981 Congress was the first to be organised under the revised rules of procedure and was the first Congress to be self-financing. It even made a significant surplus!



President Willems speaking to the participants of the 1981 Congress in the Glasgow Town Hall. To his right Sir William Harris, former Vice-President.

Developing countries

During the seventies, ten highly industrialised, western countries paid 60% of all PIANC's subventions and 80% of all individual and corporate contributions. The contribution and membership from other countries was rather limited. Over the years PIANC reluctantly acquired the image of a high-tech Association. The desirability of intensifying collaboration with developing countries was first mentioned by Sir William Harris at the PIC meeting of 1976 in Washington. In his opinion it was essential that PIANC should contribute to the prosperity of developing countries, in particular with regard to their ports and waterways. He expressed his regrets that few of these countries participated in the work and studies of PIANC. A planned meeting with staff members of the UN Water Resources Board would offer a good opportunity to raise the matter. The PIC was not very enthusiastic, but agreed with the idea. In October 1976 the Council approved the formation of a restricted committee to prepare a proposal. The creation of the Permanent Committee for Developing Countries (PCDC) was approved at

the next Council meeting in March 1977. According to the Terms of Reference the objective of the PCDC was to examine the possibilities of applying the expertise available in PIANC to ocean and inland navigation in developing countries.

In the first stage, those countries having an aid programme for developing countries were invited to take part in the work of the PCDC. The intention was to extend the PCDC to other interested countries, especially developing countries, as soon as possible. The first official meeting was on 18 July 1977 and Mr. E. Loewy from the UK, the driving force behind the PCDC, was appointed as Chairman. Fairly soon, it became clear that the involvement of members from developing countries in PCDC activities which were held in Europe constituted a major problem. So, rather than continuing to have technical transfer take place in western countries, it was decided to organise Conferences or seminars in third-world target-countries in the period between two main PIANC Congresses. It was hoped that this would enable engineers from developing countries in the region to participate. Another activity initiated by the PCDC was to write a fifteenth chapter Port Maintenance Handbook to transfer knowledge about port operation and maintenance to developing countries. The task of writing chapters for the Handbook was delegated on a voluntary basis to National Sections, but ultimately only few chapters were delivered. Chapter 5 on mechanical equipment was published in 1985, Chapter 3 on roads and storage areas in 1986, and the first part of Chapter 4 on railways in 1991. No other chapters were written, and the Port Maintenance Handbook was never completed in its intended form.

Within the framework of its brief the PCDC also tried to obtain financial support to enable delegates from developing countries to attend the 1981 Congress in Edinburgh. This attempt was partially successful, and a dozen delegates from several countries participated in the Congress and particularly in the special PCDC session. At that occasion the first chapter of the Handbook was presented. Following the Edinburgh Congress, the Brussels Congress of 1985 included in its programme a subject with particular reference to developing countries.

When Mr. E. Loewy stepped down in 1985, the first overseas PCDC event still had not been organised. But, as Mr. H. Velsink, Chairman from 1996 through 2001, stated: 'It is virtually impossible to get such events off the ground without



Small scale, traditional inland water transport on the Chao Phraya River in Thailand. The desire for intensified collaboration with Countries in Transition resulted in 1977 in the establishment of the Permanent Committee for Developing Countries, now called Co-operation Commission.

an enthusiastic local organising committee'. At last, the first three-day PCDC seminar was held in Agadir, Morocco, in 1987, preceeding the PIC meeting. One day of the programme was devoted to an excursion to the new port of Agadir. The meeting was attended by approximately 250 people including most of the participants in the PIC meeting. An extensive report was published in Bulletin number 59.

The second PCDC-seminar followed in March 1992 in the Indonesian city of Surabaya. Organised in co-operation with the University of Surabaya, half of the 160 participants were from developing countries. The seminar, which was co-sponsored by the World Bank and the Asian Development Bank, included subjects such as port privatisation, port structures, environment, fisheries, inland waterway transport, and coastal regimes. During the seminar, the 200-page PIANC Guide to Inland Water Transport Development was presented by its editor Mr. D. de Bruin. The Chairman of PCDC at the time, Mr. R.J.A. Simoen, reported on the seminar in the Bulletin number 81.

The third seminar, which was held in Goa, India, in November 1995, was attended by approximately 150 participants. UNESCO granted a dozen fellowships for engineers from developing countries in Asia. The organisation was facilitated in an outstanding way by the Indian Section of PIANC. The focus of the fifty papers, half of them from developing countries, was on navigation around the Indian peninsula. Shortly before the seminar, navigation companies had been privatised and the expectations for further economic development, and associated port and shipping activities were rather optimistic. After the seminar, the proceedings were published in book form.

The fourth and final PCDC-seminar took place at the Centro de Ingenieros in Buenos Aires, Argentina, in November 2000. The Spanish Section with the support of the Puertos de Estado acted as Organising Committee on behalf of PCDC, which had been re-named Co-operation Commission (CoCom) by the time. There were nearly 200 participants, about half originating from the Mercosur countries.



Mr. M. Hager, Vice-President 1985-1988, and President De Paepe overlooking a lock on the River Main during a technical excursion at the occasion of the PIC-meeting of 1983.

Technical Commissions

At the end of the seventies the first significant changes in the PIANC organisation had occurred: the creation and election of Vice-Presidents and the establishment of the Permanent Committee for Developing Countries. But other changes were needed. As Headquarters secretary Mrs. Claire De Craen phrased it in a retrospective, published on the occasion of her retirement: 'In between Congresses, the workload was rather limited. In order to survive, the Association would have to undergo changes, develop on a global scale, reorganise its structure, modernise itself and adjust to evolving technical requirements and modern structures'. These ideas had been raised by Individual Members, who were dissatisfied by the slow pace and the lack of productivity of the existing study commissions. One of those individuals was Mr. C. van der Burgt who, as President of the International Commission for the Reception of Large Ships (ICORELS), had encountered these problems. He concluded in his report to the PIC in 1978 that the structure of the study commissions had to be abandoned and their

organisation changed. The Council supported the idea in its meeting of October 1978. As a result, the Dutch Section proposed a set of Rules of Procedure that was sent to the National Sections for examination. Agreement by the General Assembly in June 1979 resulted in establishing two Permanent Technical Committees (PTCs):

- PTC I: Inland Waterways and Ports
- PTC II: Maritime Ports and Seaways

The rules specified that the PTCs should meet twice a year and would have the following tasks:

- to follow developments in the allotted field and identify current problems
- to prepare proposals for long and short term studies by international study commissions or Working Groups
- to recommend subjects for Congresses
- to guide and evaluate studies, prepare tentative conclusions and provide material for dissemination to members through the PIANC Bulletin



King Baudouin is welcomed at the Brussels Parc des Exposition, venue for the opening of the Centennial Congress, by Mr. L. De Meyer, Chairman of the Belgium Section. To the left: Mr. L. Olivier, President of the Congress, and PIANC President De Paepe.

- to co-ordinate work with other PTCs and Committees of other international organisations in related fields
- to report regularly to the Council and to the Permanent International Commission on all aspects of their work

The first preparatory meetings took place in Brussels in March 1980 under the chairmanship of Mr. J.C. Ailleret for PTC I and Mr. C. van der Burgt for PTC II. As a consequence of the formation of the PTCs, the International study commissions were pressed to complete their reports following which they would be dissolved. By the end of 1981, two Working Groups of PTC I and five Working Groups of PTC II had been organised. The first PTC II Working Group report 'Navigation in Muddy Areas' was published in 1983, within two years after the initial meeting of the group. Its Chairman Mr. J.U. Brolsma was invited to present the results to the 1983 PIC meeting in Wiesbaden, Germany.

More Working Group reports would follow: fifty-four were published between 1983 and 2000 (see Annex 5). Some were adopted as standards. The classification of inland waterways proposed by Working Group PTC I was taken over by the United Nations Economic Commission for Europe (ECE). The report of the joint PIANC-IAPH Working Group on approach channels is a best seller and is applied world-wide and the guidelines for River Navigation Services were adopted as a standard by the EU. Now, Working Groups are considered to be the very core business of PIANC.

Recreational Navigation

Between 1972 and 1982 several approaches were considered for re-organising the International Commission for Sport and Pleasure Navigation. In the October 1972 meeting of the Expanded Executive Committee, the Dutch delegation proposed 'to suspend this Commission in its present form'. The main reasons given were the lack of progress and too

much emphasis on Mediterranean countries. As a result, the PIC decided in 1973 to restructure the Commission. Mr. J. Couteaud remained Chairman. Two years later, the Chairman had to admit again that no report had been produced, apart from the document concerning signaling and several progress reports published in the Bulletin. The PIC decided to redraft the Terms of Reference, which came into use in November 1977.

Obviously this intervention helped, because between 1979 and 1981 the Commission published reports on standards for yacht harbours, dry berthing of pleasure boats, and the design of breakwaters for yacht harbours. The report on standards for the construction, equipment and operation of yacht harbours and marinas, published in 1979, was particularly successful. It even became part of Italian legislation on marina design.

The Commission concluded its assigned programme in 1981 by publishing the last of its four reports. However, the rapid growth of the recreational sector posed new problems and there were

numerous matters to be studied. It was generally accepted that the subject should not be discarded by PIANC. The two PTC-Chairmen were in favour of a Working Group on pleasure navigation, but the Executive Committee suggested after lengthy internal discussions the formation of a Sub-Committee for Sport and Pleasure Navigation under the sponsorship of both the PTCs. Finally in 1982 the Joint Subcommittee for Advice on Sport and Pleasure Navigation was established, with Mr. P. Hofmann Frisch as its first Chairman.

Centennial Congress

Mr. Willems intended to celebrate his resignation at the Centennial Congress in June 1985, but he suddenly died three years before. Unexpectedly President-elect De Paepe had to take over the responsibilities of President. Under these circumstances, he was ably assisted by Secretary-General Vandervelden who had lengthy and successful experience since being named to the position in 1959. The 26th Congress in Brussels was as usual organised around the working sessions of the two



President De Paepe addresses the participants of the Centennial Congress. Also shown are the Vice-Presidents K. Valken, E.R. Heiberg and J. Chapon.


Main-Danube Canal



The final 34 km section of the Main-Danube Canal passes through the beautiful Altmühltal, seen here near Riedenburg. A comprehensive ecological plan was drawn and many nature conservation measures were taken during and after the construction of the canal. The complete canal was opened for navigation in 1992.

The final section of the Main-Danube Canal was festively opened on 25 September 1992. That was the day a long cherished vision became reality. Since then, the nearly 2,900 km of the Rhine-Main-Danube Shipping Thoroughfare has been navigable all the way between the North Sea and the Black Sea.

On 13 June 1921 the German Central government and the Free State of Bavaria concluded a Treaty on the “execution of the Main-Donau-Waterway between the City of Aschaffenburg ... and the German border downstream from the City of Passau” for ships with a load capacity of up to 1,500 tonnes. The canalisation of the Lower River Main in the Land of Hessen had already been undertaken from 1883 to 1921. A company named Rhein-Main-Donau AG (RMD) was founded in 1921 to carry out all related construction work. The company was also commissioned to



build a number of hydro-electric power plants along the canal and along the upper reach of the River Danube. Since then a total of sixty power plants with a capacity of almost 3,200 GWh have been built and their revenues financed partly the construction work of the canal.

The RMD started their engineering works in 1922. By 1962 a total of twenty-seven locks and weirs had been built between the cities of Aschaffenburg and Bamberg. The northern stretch of the Main-Danube Canal, extending over 72 km from the City of Bamberg to the Port of Nürnberg, was opened in 1972. The sensation conferred upon an onlooker on the northern stretch of the Main-Danube Canal is rather one of technology encroaching upon nature and landscape. In 1973, RMD was doing trailblazing work in European waterway engineering as regards the interests of environmental protection: for the first time, a Landscape Management and Preservation Plan was commissioned to be drawn up for those 34 km of the southern ramp of the Main-Danube Canal where the Canal is embedded in the River Altmühl, which had to be conditioned with a number of locks and weirs. This plan contains a comprehensive ecological inventory and a catalogue of thereupon based nature conservation measures including the potential of natural succession. A major engineering project in the greater context of the Main-Danube Canal is also worth being mentioned: two reservoirs, Brombach and Kleine Roth, have been built to enable with help of the Canal the annual transfer of up to 125 million m³ of Danube water into the Regnitz and Main area, which is less rich in water. For this purpose a number of pump stations were built along the southern ramp of the Main-Danube Canal, each having a throughput capacity of 21 m³ per second.

The standard of extension of the River Main from its mouth upstream to the City of Bamberg, the Main-Danube Canal and the River Danube from its junction with the Canal downstream to the City of Regensburg is class V(b) for pushed convoys with a length of up to 190 m, a width of up to 11.45 m and a draught of up to 2.70 m. The Danube is a category VI(a) waterway between the cities of Regensburg and Vilshofen, while downstream from Vilshofen it is in category VI(b). For a long time a political decision continues to be pending on the extension of the last 70 km of the River Danube from Straubing to Vilshofen, which is a notorious shipping bottleneck for transit shipping. On one hand it is the decision about the technical solution: lock and weir for full navigability or only river improvement with minor effects. On the other hand there are the adversaries not willing to tolerate any engagement in the river area.

The fact that over 7 million tonnes of transit cargo per year are being carried on the Main-Danube Canal goes to show the wisdom of completing the Canal. The average carriage distance for goods carried on the Canal is some 1,000 km, which amounts to three times the median value of carriage distances in long-distance goods transport in Germany. Passenger and cruise shipping on the Canal and tourism along the Canal are also quite considerable.

sections: Section I dealing with Inland Waterways and Ports and Section II dealing with Maritime Ports and Seaways. The two sections met separately, but some joint sessions were also held. In addition, there was a special meeting of the Permanent Committee for Developing Countries, and a session on 'Consideration of risk in determining bank protection' by Working Group 3 of PTC I. On two afternoons seven different technical visits to some of Belgium's achievements in inland and ocean navigation were arranged. The technical visits in general, by their number and variety, confronted delegates with a difficult choice, since it was obviously impossible for anyone to attend all of them.

A special lecture, in the presence of King Baudouin of Belgium, was given by Mr. D. Vandepitte, professor at the State University of Ghent, on the subject of 'Reflections on the interplay of science, technology, civil engineering and society'. In the Parc des Expositions in Brussels an International Navigation Exhibition was organised parallel to and on the same site as the Congress. Between or after the Congress activities it was possible to obtain from exhibitors additional information on different technical navigation topics.

At the Opening Ceremony, Mr. L. Olivier, Minister of Public Works of Belgium and President of the 26th Congress, declared the meetings officially open and extended a cordial welcome to the 721 delegates and 130 accompanying persons from 62 countries. He continued, alluding to the centenary of the Association: 'As you all know, this official opening ceremony coincides with the

100th anniversary of the creation of the Association. It gives me the pleasure to recall that the origin of the International Navigation Congresses can be traced back to a Belgian private initiative, backed by a current of opinion in favour of the improvement of inland waterways. It was indeed in 1885 that the first International Waterways Congress was held, already comprising the principal components of the present organisation'. In addressing his welcome to the participants Mr. De Paepe remarked: 'Each of our International Navigation Congresses has enjoyed the patronage of the highest authority of the country where it was held. This is a tradition of which we are extremely proud. The official support granted to us over the past 100 years by the sovereigns and Presidents of the countries where our meetings took place has had the beneficial effect of greatly enhancing the value of our work and conferring weightier authority on the solutions we proposed for the problems facing us and this year, in 1985, our 26th Congress has as patron His Majesty King Baudouin of Belgium'. Mrs. M. De Paepe-Van Maercke, Chairwoman of the Ladies Committee, succeeded her husband at the rostrum. She welcomed all the ladies accompanying their husbands at the Congress and suggested that they take part in the visits organised for their benefit. She concluded by thanking all those who had cooperated with her in preparing the programme.

In addition to the Congress, an unique post-Congress tour was arranged thanks to the idea of Mr. Louis de Meyer, President of the Belgian Section: a five day voyage on board the cruise ship Europa.



Two stamps issued on the occasion of the Centennial Congress. One shows the new lay-out of the Port of Zeebrugge, the other the ship lift of Strepv-Thieu. Both were major projects in Belgium and under construction at the time of the Congress.



Sir William Harris, Chairman of the jury, presents the first Gustave Willems Award to Mr. J.D. Simm. His paper described rapid harbour construction at Ras Lanuf, Libya. All prize-winning papers of the Gustave Willems Award and De Paepe-Willems Award have been recorded in Annex 4.

The journey started in the port of Zeebrugge, sailing the North Sea and around the Ekofisk platforms, included visits to the ports of Rotterdam and Amsterdam and ended in the port of Antwerp. Every day a special newspaper called 'the Pianchor' was issued. Over 500 enthusiast participants enjoyed this trip.

Gustave Willems Award

The death of its long time Chairman Gustave Willems shocked PIANC. His involvement with PIANC dated back to 1935, when he was Chairman of the Ladies Committee for the 16th Congress. His obituary in the Bulletin ended with the sentence: 'PIANC has lost a great and loved President, an enlightened leader, a man of great human qualities, whose memory will long remain with all those who knew him'.

Soon the idea to start a trust fund in his memory was announced. The goal of the Gustave Willems Fund would be to encourage Young Professionals to present outstanding technical articles in the

fields of interest of PIANC. Every year a jury would review the articles submitted and select a prize-winner. The prize was a considerable amount of money, free membership in PIANC for five years, an invitation to present the winning article at the next PIC, and publication of the winning article in the Bulletin. The idea was embraced by the 1983 PIC and although the regulations had not been written, and fundraising was not yet completed, the recruitment started in the course of 1984. The first winner in 1985 was Mr. J.D. Simm from the UK with an article called 'Rapid harbour construction at Ras Lanuf, Libya'. Consequently he was invited to present his paper at the Centennial Congress in Brussels.

When the successor of Mr. Willems, Mr. R. De Paepe retired in 2000, a fund was created in his memory. In 2002, it was decided to merge the Foundation Robert De Paepe with the Gustave Willems Award. From 2003, the Award is known as the PIANC De Paepe-Willems Award. A list of winners is recorded in Annex 4.

COPEDEC

In 1982, the International Conference on Coastal Engineering (ICCE) was held in South Africa. It was the time of the Apartheid-laws in the country, and many governments boycotted. As a protest a Conference on Coastal and Port Engineering in Developing Countries (COPEDEC) was organised in Colombo, Sri Lanka, in March 1983. With 232 participants, the Conference was an immediate success and resulted in the creation of a Permanent Secretariat to organise a similar Conference once every four years. The mission of COPEDEC was and is:

- a) to provide an international forum where coastal and port engineers from developing countries can exchange know-how and experience amongst themselves and with their colleagues from industrialised countries
- b) to enable the developing countries to have a sustainable human resource pool of coastal and port development professionals

The founder of COPEDEC was Mr. Summa Amarasinghe. He initiated the original Conference in Colombo and, as Chairman of the Permanent



Mr. Summa Amarasinghe was the founder and President of the Conference on Coastal and Port Engineering in Developing Countries (COPEDEC). In 2003, COPEDEC and PIANC merged after signing a letter of intent in 2000. So far, there have been seven COPEDEC-Conferences.

Secretariat, found resources for five more Conferences. The first Director of the Department Coast Conservation of Sri Lanka, he was the father of modern coastal engineering practice and coastal zone management in the country. Moreover, he founded Lanka Hydraulic Institute as a necessary institution for supporting coast and port engineering in Sri Lanka. Subsequent Conferences were held in Beijing, China (1987), Mombassa, Kenya (1991), Rio de Janeiro, Brasil (1995), and Cape Town, South Africa (1999). Meanwhile, the South African government had changed its policy radically and rejected the Apartheid-laws. It was with great satisfaction that COPEDEC was welcomed in the country that once was boycotted by the international community.

Eventually fundraising for its Conferences became too heavy a burden for COPEDEC. There had always been good co-operation between COPEDEC and the PCDC. The broadly felt need for co-operation rather than competition between sister organisations and their specialised committees was already reflected in a first meeting between the PCDC and COPEDEC representatives in Colombo in 1998. Deliberations between the two bodies resulted in a letter of intent, signed in 2000 which implied a full merger of PIANC and COPEDEC in 2003 after the final COPEDEC Conference in Colombo.

Care for the environment

The United States National Environmental Policy Act was enacted in 1969. This was for Lieutenant General J.W. Morris, First Delegate of the US, the immediate cause to propose formation of a committee to study the effects of navigation on the environment. The motion was approved by the Expanded Executive Committee in October 1972. A study commission with the long name, the International Commission for the Study of Environmental Effects of Dredging and the Disposal of Dredging Spoils, was established. Although the commission had already started work, it was at the 1973 PIC meeting that the appointment of Mr. M. Gurnee as Chairman was ratified. The final report was published in 1977. In the following years, Working Groups of PTC II reported on the treatment and disposal of dredged material at sea (see Annex 5). As a result PIANC became in 1986 an official technical observer to the Convention on the Prevention of Marine Pollution by Dumping of Waste and Other Matter 1972, known by the short title of the London Convention (LC). The LC is an international treaty that established policy for

global disposal at sea. Sir William Harris was the first PIANC representative to the London Convention.

By 1991 it had become imperative that PIANC should undertake an organisational change to meet the environmental challenges. The United States delegation to the PIC recommended the adoption of a proactive approach to environmental issues. In November 1991, the Council approved Terms of Reference for an international study commission to support the work of the Scientific Group of the LC. Eventually this resulted in the formation of the International Study Commission on the Environment, which had its first meeting in the offices of the International Maritime Organisation (IMO) in May 1993. The report of the study commission made numerous recommendations that included: a broad scope for an environmental technical group, membership in international regulatory bodies, co-operation with global environmental groups, partnering with other international groups concerned with navigation, and the initiation of appropriate PIANC Working Groups to resolve specific environmental issues.

As a result of these recommendations, and despite fierce opposition from several members of PTC I and II, at the 1994 PIC meeting establishment of the Permanent Environmental Commission (PEC) on the same level as the two other international commissions was approved. The opponents wanted to avoid a third Permanent Technical Commission that might duplicate the work of the other two and also wanted a PEC that reported to both PTCs. According to its rules, the PEC was a standing commission pursuing developments in the environmental aspects of waterways, ports, coastal areas, and the use of ocean resources. As a compromise the Chairman of PEC became an ex-officio member of both PTCs. Mr. R.W. Engler, who at the time served as the delegate of the USA to the London Convention, was appointed First Chairman of the PEC. The Commission had its first meeting in September 1994 in Brussels.

The PEC, now known as the EnviCom, was and is responsible for dealing with general environmental issues of interest to PIANC, including representation in international organisations. EnviCom has also initiated communications and networking



During the seventies care for the environment became more and more important for port and waterway management. In 1972 PIANC established the International Commission for the Study of Environmental Effects of Dredging and the Disposal of Dredging Spoils. The final report was published in 1977. Eventually this commission was followed by the Permanent Environmental Commission in 1994.



Special activities for young engineers started in the late eighties. Several exchange programmes and visits took place, for instance a combined Dutch-German excursion to the Port of Rotterdam in 1998. But continuation of such exchange programmes became difficult because of the work load of Young Professionals. Other initiatives had to be developed.

with other organisations dealing in environmental affairs and made efforts to enhance PIANC membership with environmental specialists. Like the other Technical Commissions, EnviCom started a series of Working Groups.

Attracting Young Professionals

The first special activities for young engineers were started in the late eighties. The initial exchanges took place in 1989 between the Belgian and the British Sections. Since that time, exchanges of small groups of members who are under the age of thirty-five have been organised. Successful exchanges have taken place in Britain, Belgium, Germany, the Netherlands, Finland, and other countries. Usually the programme consisted of two weeks, one week in each participating country. Sometimes, two counterparts were coupled for the time of the exchange, other times there was a programme for the group as a whole, depending on the practical possibilities. For the British young professionals, the exchange was an opportunity to earn points in their programme to become chartered engineer.

Generally, the young engineers responded enthusiastically. As Mr. Neil Harvey, participant of the British-Dutch exchange wrote: 'All members of the exchange agreed that the week had been a success. The varied programme of the visits allowed everyone to experience new areas of navigation engineering as well as different perspectives of their own field'. Despite the positive experiences, the continuation of the exchange programme became more and more difficult. Employers were reluctant to send their workforce abroad. But as a result of the exchanges, new initiatives have occurred. For instance, in the Netherlands, a group of four decided after the exchange with the UK to start activities on their own initiative, such as excursions to share technical knowledge and social get-togethers. The successors of this foursome still organise the young engineer's activities in Holland. The exchanges may also be considered as the forerunners of the Young Professionals Commission, that is dealt with in the next chapter.

The Congresses of the 1990s

During the first 100 years of PIANC, Congresses were usually held in Europe; however, there were three held in North America and one, in 1926, in Africa at Cairo, Egypt. A Congress was never held in Asia until 1990 in Osaka, Japan. This Congress, presided by Mr. K. Mikanagi, was a striking success with 1,139 participants from 46 countries. HIH Crown Prince Naruhito was the patron, and uniquely, after declaring the 27th Congress open, he proceeded to deliver the first technical paper. His subject was 'The Thames as Highway', the subject of his thesis when studying at Oxford University. He proved the importance of inland waterways by describing the function of the Thames River as the canal in 18th century and for stressing its large impact on the transport system in England.

As a part of the programme, the Permanent Committee for Developing Countries (PCDC) organised a session focussing on 'Port development in Asia'. Speakers were high-ranking officials from Asian port authorities as well as experts from the Asian Development Bank, the World Bank and the Japan International Cooperation Agency. The Japan Technical Session was held to understand the history and future direction of the port-related technology of Japan and the country's approach to developing ports, fishing ports, seaways, and coastal areas. The technical visits enabled participants to observe the ongoing, large-scale



projects in the Osaka Bay area such as the huge man-made island for the Kansai International Airport, the world's longest suspension bridge, the Akashi Kaikyo Bridge, the Port of Kobe and the Port of Osaka. The Japanese Night offered the possibility to enjoy the traditional Japanese performing arts of Noh and Kyogen, which have a history of over 600 years and belong to the most refined classical arts in Japan. In parallel with the Congress the exhibition 'Tomorrow's Ports and Waterfront' was held; there were no less than 178 companies. The exhibition was visited by 31,200 people including a large number of visitors from the general public.

It was agreed to have the 28th Congress in Poland, but the changes in the political situation in the early 1990s made this impossible. On short notice, the Spanish Section managed to organise the Congress in the historic city of Sevilla, Spain, the only river port in the country, hosted by the Puertos del Estado. The programme consisted of the usual ten sessions, five for inland and five for maritime navigation, plus a special Spanish session devoted to port development in the host country.



After opening the 1990 Congress in Osaka, Japan, HIH Crown Prince Naruhito delivered a key-note speech titled 'The Thames as a Highway', the subject of his thesis at Oxford University. The Osaka Congress was PIANC's first visit to Asia. The Congress and the concurrent exhibition 'Tomorrow's Ports and Waterfront' were a striking success.

Kansai offshore airport




Aerial view of Kansai Airport in the Bay of Osaka with the first phase island on the right and the second phase island on the left. Construction was extremely difficult because of a 20 m thick weak surface soil layer. Settlements have been over 10 m.

Kansai International Airport is the world's first large-scale offshore airport built in 1994 on a 510 ha reclaimed man-made island located 5 km off the coast. In 1974, the government's Council for Civil Aviation suggested that it is the best to build a new airport on the island, from the perspective of noise reduction, as well as air traffic control, flight operations and environmental issues. The first phase of construction of the airport island was started in 1987 and completed in 1994. The key factors that made this project possible were various soil improvement technologies, such as:

1) Large-scale and rapid construction technologies

For the Phase-1 airport island, a revetment with a total length of 11 km was built at a location with an average water depth of 18 m, 5 km off the coast, and 180 million m³ of mountain soil was dumped in the revetment to create 510 ha of reclaimed land over about six-year period. This was made possible by the development of a soil delivery system to accurately control the amount of soil loaded into soil-carrying vessels and a radio wave-based vessel positioning system.



2) Improvement of soft seabed soil

The geotechnical condition of the airport island was such that there was about a 20 m thick surface soil layer of Holocene clay and, underneath it, about a 100 m thick Pleistocene formation. It was decided to improve the surface soil layer under the whole area of the airport island, promote settlement and increase soil strength in order to completely end the settlement of the surface layer during the construction period. In the sand-drain method used as the main method of soil improvement, about 1 million, 25 m long sand piles were driven into the soil of the Holocene formation.

3) Prediction of settlement of the thick Pleistocene formation

What troubled the engineers most was the Pleistocene formation under the Holocene clay layer. This is an alternate layer of sandy soil and clayey soil. Medium- to long-term predictions of settlement required a good understanding of the thickness and area of each layer, the compression characteristics of the clay layer and the drain characteristics of the sand layer. Therefore, a large depth boring survey was conducted at sixty-five points, including unprecedented 400 m deep borings. In addition, prior to full-scale reclamation work, about 6 ha testing area was set up on the airport island to investigate the settlement characteristics of the soil layers. This led to a prediction of an average settlement of 11.5 m for fifty years after the start of reclamation.

4) Jack-up system as countermeasure against uneven settlement

Buildings such as the terminal building were constructed taking into account uneven settlement. To accommodate the uneven settlement, it was decided to incorporate a jack-up system into the building to level it by hydraulically jacking up about 900 columns and placing a few steel plates under columns. The settlement was approximately 10 m before the opening of the airport in 1994, 11.4 m at the end of 2001 and is virtually stabilised now.

5) Ensured navigation safety of vessels

To ensure safety of vessels traveling in the Osaka Bay, a 24-hour-operating Navigation Safety Center was established and significantly helped efficiently carry out offshore construction work in terms of providing navigation information and instruction for construction work.

6) Reclamation work for the Phase-2 airport island

In 1999, land reclamation for the Phase-2 project for the 545 ha airport island began. A revetment with a total length of 13 km was built at an average water depth of 19.5 m. 250 million m³ of soil was dumped in the revetment. In 2007, 250 ha of land became available, including a 4,000 m runway.



The 28th Congress in Sevilla, the only river port in Spain, concluded with a open air dinner at the Plaza España, the site of the 1929 Ibero-American Exhibition. During this Congress, agreement was reached about the establishment of the Permanent Environmental Commission, today's Environmental Commission.

Moreover, the two PTCs held sessions, and PCDC had an Ibero-American session devoted to Spanish speaking countries in Latin America. The Congress, attended by 607 delegates, emphasised compatibility between environmental preservation and waterways and contaminated dredged material. It was concluded that 'PIANC should prepare decision-making guidelines to assist all parties involved in the management of dredged material to reach acceptable solutions'. Not surprisingly, agreement was reached on the establishment of the previously mentioned Permanent Environmental Commission (PEC) on the occasion of this Congress. Within the context of the Congress, the international exhibition, Portuaria '94, was held, covering of 13,500 m² with 160 participating exhibitors.

The opening reception was in the famous gardens of the Alcazares Palace. Suddenly, it started to rain, an occurrence one would hardly expect in Sevilla in May. Participants had to run for shelter in doors. Another reception was held in the Navigation Pavilion, which was built in the shape of a ship's

hull, for the 1992 Universal Exposition. Technical excursions were to the ports of Sevilla, Cádiz and Algeciras. After an introduction on the Port of Algeciras and its expansion plans, the participants boarded the ferry 'Ibn Batouta II' for lunch and a trip on the Bay of Algeciras and the Straits of Gibraltar, with a view on North Africa. Returning to Sevilla, a stop was made for a Spanish evening in Jerez: which included sherry tasting, an Andalusian equestrian exercise, and traditional Spanish songs and dances. The most impressive event to the participants was the open air, farewell dinner served on the Plaza de España, the site of the 1929 Ibero-American Exhibition.

A change in political situation in the anticipated host country forced PIANC to look for another venue two years before the starting of the 29th Congress. Eventually it was held in The Hague in September 1998. The reason for the invitation of the Dutch Section was the bicentennial anniversary of Rijkswaterstaat, the agency responsible for flood control, water quality and



Crown Prince Willem-Alexander of the Netherlands was present at the opening of the 29th Congress in The Hague. He opened and visited the exhibition. At the opening session, the PIANC Polka was played for the first time, a present from the Dutch Section, composed by Stephen Westra.

the management of main roads and waterways in the Netherlands. The Navigation Congress was one of many activities held to observe this important anniversary. The Congress was opened by the Minister of Transport, Public Works and Water Management, Mrs. T. Netelenbos in the presence of Crown Prince Willem-Alexander, who has a special interest in water management. At the occasion of the opening, the PIANC Polka, composed by Mr. Stephen Westra, was played in public for the first time. The musical composition was a present of the Dutch Section to PIANC. The Congress, attended by 432 participants from 43 countries, had the traditional format, but anticipated changes that would be made later in the 21st century. There were 85 national papers, to be discussed in 10 sessions, half on inland navigation and half on maritime navigation, but there were also special sessions organised by the Permanent Technical Commissions and one session for the presentation of individual papers. Eight individual papers were submitted and presented. Obviously it was not yet clear to the membership that this new possibility existed. During the Congress, excursions were made to the Ports of Rotterdam and Amsterdam, the two main seaports of the Netherlands.

Changes in location, image and administration

Symbolic of the new orientation of PIANC was moving the Headquarters in 1991 from the familiar Jugendstil Residence Palace to the steel-and-glass World Trade Center in the Boulevard Simon Bolivar. In fact PIANC was obliged to move, because the hosting Flemish Ministry did so. For the same reason, Headquarters moved again in 1997, this time to the Graaf de Ferraris Building in the Brussels Boulevard Roi Albert II. The old-fashioned typewriters were replaced by modern computers bringing the office up-to-date.

The staff of Headquarters changed too. Mr. H. Vandervelden, Secretary-General since 1959, retired in 1991. His position was taken over by Mr. B. Faes, who was succeeded by Mr. C. Van Begin in 1993. In 1996, after devoting her energy for forty years to PIANC, Mrs. Claire de Craen retired. Subsequently, several secretaries worked at Headquarters, but stayed only for a few years. No one had played the vital role or created an image for PIANC like Claire. When editing officer Mr. J. Depoortere unexpectedly died and his successor left after a few years, it was decided to outsource the work.

Although the steamship was becoming obsolete, the logo depicting a steamship which has



The Graaf de Ferraris Building, Boulevard Roi Albert II, Brussels, PIANC's Headquarter since 1997, hosted by the Flemish government.

been adopted in 1910 was still in use in 1990. When Mr. J. Sargent became Vice-President in 1992, he insisted on a more up to date image for PIANC starting with the logo. In the new design the steamship was transferred into a large bulk ship, shown in front of a coast line that resembles the white cliffs of Dover. The felucca from the older logo, although one will rarely see this kind of sailing ship in the English Channel, was retained. So, the logo was modernised, but in a way it remained out of date and not very satisfying. In 2001 it was to be replaced by a completely new design.

More than the logo was changed. In 1997, it was decided to rename the Association as the International Navigation Association followed by the abbreviation, PIANC between parentheses. The reason to maintain the abbreviation was the fact that most people were acquainted with the name PIANC without knowing what the abbreviation meant. The concise new name was accepted by the PIC without lengthy discussions. Because of the new name the Statutes had to be adapted, but more than the name was changed. After animated discussion it was decided to drop the compulsory

Belgian citizenship of the President. The person holding the position should be a highly qualified professional, familiar with and committed to the



Mug presented to the participants of the 1995 PIC-meeting in New Orleans, showing the logo used from 1993 until 2001. The felucca is still there!

aim of the Association and be fluent in one of the official languages. The President and Secretary-General were to be appointed for an initial term of four years and eligible for reappointment for two further terms of four years, if not older than sixty-eight years at the time of reappointment. Because the seat of the Association remained statutorily in Brussels, the Secretary-General had to be a Belgian. The revised Statutes were adopted by the PIC in 1999 and published the year after.

National Sections

Not only the character of Headquarters changed, but the National Sections changed as well. One could say that along with democratisation of society, PIANC became more democratic and member-friendly. Until the seventies most National Sections were only involved in the appointment of the official Delegates, co-ordination of national Congress papers and collection of contributions. Now the sections looked for closer contact with their membership.

Since 1952 till today the German Section published a printed version of all German papers in the German language too, for after 1945 German was no longer an official PIANC language. Nowadays,

these papers are also available in PDF-format on the website of the German Section, adding a list with all bibliographical data and key words. The section also printed a large number of Working Group reports in the German language, thus underlining once more the usefulness of PIANC's recommendations. Based on the experience gained in PIANC Congresses, German professionals felt very early the need for a corresponding national Association. This led to the foundation of the *Hafenbautechnische Gesellschaft* (HTG) in 1914. At the 1993 PIC meeting in Rotterdam a co-operation agreement between PIANC and HTG was signed for intensified co-operation, which resulted not only in combined lectures but also to a so-called mutual membership with reduced fees when becoming member of both Associations, thus stimulating PIANC membership.

Starting as early as 1954, the American Section issued its own newsletter at irregular intervals to the Corps of Engineers and Individual Members. Beginning in 1983, the American Section organised national and regional meetings, often a two-day meeting in combination with a technical session.

The section from the Netherlands first published a newsletter in 1970. In The Netherlands,



Care for the environment became more and more important. Navigation accidents can have disastrous effects on the environment in vulnerable areas, such as the Turunmaa Archipelago in Finland.

there was a national Conference organised in co-operation with the Royal Institute of Engineers in 1982, and soon after the section started a tradition of two national meetings per year. The format was and still is: assemble in the afternoon and have drinks and dinner followed by lectures and discussion on a stimulating subject. But a legal basis with statutes and regulations was not laid before 1992 in preparation the 1993 PIC meeting in Rotterdam.

The Nordic Sections decided to improve their co-operation by creating a joint unofficial organ called Nord-PIANC. Nord-PIANC was established 28 September 1970 in Oslo by a joint agreement with the National Sections of Denmark, Finland, Faeroe Islands, Iceland and Norway. Estonia joined the Nord-PIANC in 2003 first as an invited observer and later on as a full member of the group. Together the National Sections created rules for their joint organ. According to these rules the Nord-PIANC has a biannual meeting of the sections and a Council. There is also possibility for Working

Groups under the Nord-PIANC umbrella. The responsibility of organising the biannual meetings rotates between these countries. The roles of the Nord-PIANC are numerous. The problems within the navigation section in Nordic countries are often of a similar nature, which may differ considerably from the rest of the Europe. The results of solving these problems within Nord-PIANC are often far better than an individual country could reach. The Nordic countries are also relatively small countries, but together their importance is considerably enhanced. Nord-PIANC is a vital source of information in between the countries and also a place for networking, which has developed co-operation in between the Nordic maritime administrations. It offers an information source, which can be utilised in everyday work. Nord-PIANC meetings always have a social programme too. Visiting interesting sites and cultural programs are a vital part of the networking as well as fun. Nord-PIANC members have had many unforgettable moments together.



Throughout PIANC's existence, spouses and partners of members have attended meetings and Congresses. Their involvement greatly enhances international friendship and often contacts between the ladies stimulates, at the end of the day, contact between the delegates. Left Mrs T. Brolsma and right Mrs. E. Mikanagi.

Other countries followed. Japan established a National Section in 1977 to prepare for the 1978 PIC in Tokyo. Belgium started in view of the centennial Congress of 1984 under the presidency of Mr. L.R. De Meijer. The activities of the National Sections vary from one country to the other: organisation of national or regional Congresses, seminars, workshops, technical excursions, social events such as a formal dinner (e.g. Sir William Harris Lecture) or a barbecue weekend, etc. Sometimes these events are only meant for the national membership, but more and more they are open to all PIANC members. Several National Sections translate PIANC publications in their national languages, for instance Spain, Germany and Japan.

Social aspects

PIANC's National Sections are microcosms of the international community. They provide a meeting-place for professionals with common interests, through which trust and friendships develop. Many sections make an effort to include members' partners in the community through social, as well as technical, activities which may include national



In the programme for annual meetings and Congresses an afternoon is set aside for the golf tournament. It exists over twenty-five years now! This gentleman is preparing for the golf tournament in Estoril, 2006.

seminars, social weekends, excursions or banquets. Inherent in the Congress programs is the accompanying persons events or partner programme, formerly called the ladies programme. It is usual for the host section to form a committee to organise the accompanying person's programme. The Chairperson of such committee is normally a member of the Congress Organising Committee. Throughout PIANC's existence, spouses and partners of members have attended annual meetings and Congresses. Their involvement greatly enhances international friendships and often, contacts made by the ladies are at the end of the day of great help for informal contact between the delegates. Accompanying persons take part in technical visits to ports and canals – one lady boasts she has dredged most harbours of the world! Another elderly lady, on being offered a helping hand when walking across a plank on a site visit, declined the help saying: 'I'm alright, I have been walking across planks on these visits all my life'. A certain lady doctor was looked upon as the semi-official medic. Unobtrusively she bandaged one lady's damaged nose as a result of a fall, another delegate had to have daily injections administered.

PIANC members are always interested in the cultural and social history, as well as the technical achievements, of the countries they visit. Understanding a country's culture and social history is important in understanding its technical viewpoint and the way in which it works and trades. PIANC understands this and seeks to include it in its international activities. Such events include visits to museums and the theatre, featuring for example performances of Fado in Portugal and Noh plays in Japan. At the banquet at the 1977 Leningrad Congress, the members were entertained by the Kirov Ballet and the State Circus. On many occasions, there will be music and folk dancing to entertain the participants of meetings. There is a saying 'All work and no play makes Jack a dull boy'. For that reason, there is in the program for annual meetings and Congresses an afternoon set aside for a golf match and the opportunity to go sailing as part of the PIANC Regatta. The tradition of the golf tournament has existed for over twenty-five years now! The latest social offspring is the special party for young professionals in conjunction with a seminar or Congress, often sponsored by one or more of the Corporate Members. Networking at its best.

The importance of the social side of PIANC can be illustrated by this quote by senior member



A modern lock and weir in the River Seine near Jaulnes, a village in the department of the Seine et Marne, just east of Paris. The Seine and the Marne are both important waterways for inland navigation.

Mr. M. Thorn: 'I can say that when I went to my first Congress, which was in Leningrad in 1977, I knew nothing about PIANC, except that I had a paper accepted for the Congress. I knew no one but travelled to Leningrad in the company of other members of my National Section. I was immediately made to feel welcome and part of the family. People of all nations talked to me and sat with me on the bus trips and I was included in the group events. This made a big impression on me as a Young Professional. Similarly, when my wife first came to PIANC events, she was made to feel welcome by the other partners, and has since forged many international friendships of her own in PIANC'.

At the end of the century

The period 1970-2000 was a rather hectic one for PIANC. Until 1970 the Association mainly organised Congresses, published Bulletins and sponsored several international study commissions. By 2000 there were Vice-Presidents, Permanent Technical

Commissions and many Working Groups, publishing highly regarded technical reports. PIANC showed concern for the environment and for assisting developing countries. There was a new logo, and there were revised and more democratic rules, limiting the period in office and imposing a maximum age for functionaries.

One of the consequences of these rules was the departure of President De Paepe, when he reached the age limit of seventy-two. In principle there was no longer a need for a Belgian successor, but Mr. R. De Paepe and at last the Belgian Section proposed the young, convincing team of Mr. Eric Van den Eede for President and Mr. Louis Van Schel for Secretary-General. Those two gentlemen had successfully worked together on other occasions and were keen to do this job together as well. They were engaged by the PIC in 1999. At time of Mr. De Paepe's retirement, Secretary-General Van Begin resigned too. And so PIANC started the new millennium with a new management team.

Two ship lifts in Belgium




In the south of Belgium are two extraordinary ship lifts: the inclined plane of Ronquières (left), overcoming a difference in head of 67.73 m and completed in 1968, and the ship lift of Strépy-Thieu (right), lifting ships 73.5 m, operational since 2002.

In the south of Belgium, in the province of Hainaut, exists a large number of extraordinary hydraulic constructions. In particular the ship lifts of Ronquières and Strépy-Thieu belong to the largest in the world and the applied principles allow for saving of water and gaining of travel time for the vessels. These two constructions were built under the supervision of the Direction générales des Voies hydrauliques of the Walloon ministère de l'Équipement et des Transports.

Inclined plane of Ronquières

This construction is located in the Charleroi-Bruxelles Canal, connecting the coal fields of Charleroi with the ports of Brussels and Antwerpen. The plane overcomes a difference in head of 67.73 m. The 1,432 m long



plane, completed in 1968, exists in principle of two rectangular caissons filled with water, big enough to carry a 1,350 tonnes barge. The two caissons roll on separate rail roads on a 5% slope. Each caisson is pulled by eight cables wound by a winch with a 5,200 tonne capacity, giving it a speed of 1.2 m/s. The transfer time is about 20 minutes, the total cycle time is about 45 minutes. The dimensions of the trunk are 91 m long and 12 m wide. The water level may be 3.0 to 3.7 m. Each trunk is supported by 236 wheels of 70 cm diameter. The total weight is 5,000 to 5,700 tonnes per caisson. Both caissons operate independently from each other. The inclined plane was built under the direction of PIANC's President, Mr. G. Willems.

Ship lift of Strépy-Thieu

Located in the Canal du Centre, this 2002 completed construction overcomes a height difference of 73.15 m. Until the completion of the Three Gorges Dam in China this was the tallest ship lift in the world. The construction was designed during the modernisation programme of the Canal du Centre in order to replace four 16 m ship lifts from the period 1888 to 1919, now on the UNESCO World Heritage List and still in use for recreational navigation.

Construction commenced in 1982. The lift consists of two independent counterweighted caissons, that travel vertically. Each of the caissons can take a barge of 2,000 tonnes (class Va) and measures 112 m length and 12 m width. They will be filled with water until 3.35 to 4.15 m height. Their weight ranges between 7,200 and 8,400 tonnes apart from the 2,200 tonnes weight of the steel of the caisson itself. Caissons and counterweights are connected by 112 suspension cables and 32 telecommunication cables. The cables pass over idler pulleys with a diameter of 4.8 m. Four electric motors power eight winches per caisson. The lifting of the trunk takes no more than six minutes. The structure of the ship lift is massively reinforced to withstand torsion during operation of the caissons, the total weight of the construction is approximately 200,000 tonnes.

Both the inclined plane of Ronquières and the ship lift of Strépy-Thieu did not only improve the capacity of the canals in the south of Belgium and attracted additional navigation, they also turned out to be a major tourist attraction for the Hainaut region.



7. Twenty-first century

During the first decade of the 21st century, the size and number of cruise and container vessels increased significantly, causing specific technical problems in ports. The same holds for inland navigation. Information technology plays an important role in shipping and port operation nowadays. Working with nature becomes more and more important. The consequences of climate change became obvious for the public and PIANC consequently put the subject on its agenda.

The new management team Mr. Eric Van den Eede, President, and Mr. Louis Van Schel, Secretary-General, started ambitiously: they wanted to reform PIANC into a modern Association, able to attract new members and to play a prominent role in the digital era. First, the Statutes, Rules & Regulations and the Congress Rules had to be rewritten. At the same time, the presentation of PIANC to the outside world was improved by developing a new housestyle and a new logo and by launching a website to enter the digital age. A third important step was the introduction of strategic planning, forcing the Executive Commission to look several years ahead. The strategic plan included emphasis on Young Professionals, which eventually resulted in the establishment of a Young Professionals Commission (YP-Com) and the development of a promotion strategy.

International co-operation was strongly improved by agreements with several Sister Associations. The merger agreement between PIANC and COPEDEC led to joint Conferences for and in Countries in Transition. PIANC became involved in more Conferences like Smart Rivers and the Mediterranean Days. In the previous chapter was recorded how PIANC started to publish a series of technical reports, in this chapter the Association begins to organise new, specialised Conferences.



The bridges across the Kiel Canal once looked very high. Today, their height is hardly enough to allow passage of large passenger and container vessels.



A new management team started operating in 1999: President E. Van den Eede (left) and Secretary-General L. Van Schel. They emphatically presented themselves as a team having worked together successfully in another sphere and aiming to continue this way.

Under a new management

Mr. Van den Eede and Mr. Van Schel were elected at the meeting of the Permanent International Commission in May 1999 in Ghent as President and Secretary-General respectively. At the time of his election, Eric Van den Eede was head of the Division Boven-Schelde of the Flemish Ministry and managed 450 km of waterways. He was a member of the Permanent Environmental Commission of PIANC and a member of the board of the Central Dredging Association (CEDA). His associate Louis Van Schel was Managing Director of the Flanders International Technical Agency and was well-acquainted with working in an international environment.

The new management team started with the ambition to improve the position and image of PIANC in the technical world. For this purpose a new housestyle had to be developed, a Strategic

Plan had to be drafted and the Statutes and Rules & Regulations had to be revised. Moreover, familiar commission names were changed at the first PIC meeting in the new century. Only the Council remained in its original name.

- Executive Committee was abbreviated to ExCom
- PIC changed into AGA: Annual General Assembly
- PTC I into InCom: Inland Navigation Commission
- PTC II into MarCom: Maritime Navigation Commission
- SRN into RecCom: Recreational Navigation Commission
- PEC into EnviCom: Environmental Commission
- PCDC into CoCom: International Co-operation Commission
- Finance Commission became FinCom
- Editing Commission changed into EdCom

Strategic Plan 2006-2010

During the 2006-2010 timeframe, the PIANC navigation leadership will promote the development and improvement of global waterborne transportation and enhancement of its economic, environmental and social benefits. The membership will achieve success by 'Thinking Globally and Acting Locally'. The themes for the 2006-2010 Strategic Plan are:

- Strengthen our Capabilities and enhance our Reputation
- Promote Sustainable Navigation Systems Worldwide
- Further effective International and Internal Communications
- Enhance our Internal and External Relationships
- Expand Number of Qualifying Members and National Sections

Vision:

PIANC is the leading international source of engineering, economic, and environmental knowledge and technical guidance for the sustainable development and management of navigation, ports and waterways.

Mission:

To prepare and disseminate the global best practices that enlighten, educate and guide public and private organisations in maritime and inland navigation systems to achieve recognised public benefits.

External Goals:

- Achieve world-wide credibility and recognition of our engineering, economic and environmental contributions to the sustainability of navigation systems.
- Contribute our expertise to the successful development of waterborne transport and navigation policy.

Internal Goals:

- Enhance the vitality of Qualifying Members and National Sections
- Promote and expand members' benefits
- Expand membership with special attention to Young Professionals and Countries in Transition.
- Maintain the Association's financial integrity.



One of the first activities of the new management was to introduce the concept of strategic planning. Drafting a Strategic Plan forces the writer to think about his ideas for the years to come. Every Technical Commission had to contribute, not only by general intentions, but also by concrete actions. The first plan for the period 2000-2004, based on the Policy Statement of the new President presented at the PIC meeting of 17 May 2000, was agreed by the General Assembly of 2001. After including some modifications requested by the AGA, the final plan was adopted. Of course not all actions could be realised, but the concept of strategic plans was well received. So, after the expiration date of the first plan, a new plan was drafted. This time, the text of the main plan was much shorter and all actions were shifted to an annex, which is easier to update.

Another innovation of the new management was the concept of Platinum Partners: a special category of Corporate Members, that commit themselves to pay an annual fee of minimum 5,000 EUR during four years. In return, the Platinum Partners receive certain advantages and their names and logos is printed in every Magazine and displayed at every Congress, Council and AGA meeting. The proposal was accepted by the AGA and the first contracts were signed in the course of 2001.

New housestyle

In the opinion of the new management team, there was a strong need to improve the external communication and presentation of PIANC. A temporary Communication Commission (ComCom) was set up in 1999 to develop a new housestyle. Most

The logos of PIANC's Platinum Partners in 2010: Dredging International, Jan de Nul, Port of Rotterdam, Jaisu Shipping Company, Van Oord Dredging and Baggerwerken Decloedt & Zn.

striking was the new logo, 'that was restyled to better fit the dynamic image that PIANC wants to uphold' according to President Van den Eede. He continued: 'At first, we tried to improve the existing logo in which a number of errors were identified. The pleasure craft lacked a mast and the necessary rigging! Moreover, when reduced in size and/or copied, the logo lacked contrast'. A consultancy firm was hired to design a new logo, taking into account the following considerations:

- the design had to start from the existing logo
- the general idea behind the logo had to be respected
- the proposal had to be usable for sizes from 1 cm to 200 cm diameter

It came up with a design, that gave a 'modern vision on the old-fashioned logo'. It was a modern vision indeed, but the staff was not completely satisfied with it. PIANC's webmaster Mr. Jurgen Silence was asked to do some restyling. The final result was presented in ComCom and embraced with great enthusiasm. This enabled the President to propose the new logo to the AGA. He explained in the Magazine: 'It is impossible to represent all types of navigation and the other activities of PIANC in the logo, so the two vessels were redesigned in such a way that anyone would recognise vessels at first glance. No effort was undertaken to reproduce any particular type of vessel. The background was removed because it overloaded the logo and because most navigation is on an open waterway. The vessels sail to the right, in the same

direction as we read, which is the logic direction for the (western) eye. Strict boundaries are avoided: the big vessel cuts through the inner circle, which together with the broken line in the water suggests a certain dynamism.' The new housestyle and logo were presented and wholeheartedly accepted at the Annual General Assembly of 2001. The response was surprisingly positive, considering the conservative image of PIANC.

Starting with Bulletin 107 of April 2001, the new logo appeared in all PIANC publications and served as the focus point of the new housestyle. The reports and Bulletins became even more attractive, when it was decided in 2006 to print in full-colour. To emphasise the new housestyle, the name of the familiar Bulletin was changed into the Magazine 'On Course'. In the same year 2006, the AGA decided to drop the name International Navigation Association and to retain just the name PIANC in combination with the slogan 'Navigation, Ports, Waterways'. As the President explained: 'This decision was necessary in order to avoid confusion

about what PIANC is doing, taking into account that people generally no longer consider PIANC as an abbreviation, but as a brand name.' Another innovation in 2003 was the electronic newsletter 'Sailing Ahead', replacing the paper copy in the Magazine. Via the electronic newsletter, Headquarters could quickly inform the members about the latest developments. Moreover, 'Sailing Ahead' is a platform for communication between members and member countries. During the first year, four newsletters were issued.

To stress the fact that Working Group reports are products of PIANC and not primarily of one of the Technical Commissions, it was decided to apply consecutive numbering. In the past ninety-five reports had been published, so the next report 'Developments in the automation and remote operation of locks and bridges', issued in 2008, received the number 96. New Working Groups also were numbered consecutively, starting with number 125, the permanent Working Group on River Information Services.



In the opinion of the new management team there was a need to improve the external communication and presentation. Most striking was the new logo, including the elements of the old logo in a restyled way. Left was the first attempt, right the final design.

Website and electronic dictionary

The PIANC website went on-line in late 1998. More than 2,700 pages were eventually created by webmaster Mr. Jurgen Silence, including more than 4,800 graphic elements. The website was built in static html-coding with additional client side scripting. It started as a small site with little functionalities. Soon the PIANC community started to use the possibilities of internet and the website, stimulated by Mr. Van den Eede, who never forgot to mention www.pianc.org. In addition, several National Sections developed their own websites.


Because of the rapid developments in information technology, the website was outdated within a few years and it was felt desirable to develop a new site. On 30 May 2006, the new PIANC website was launched after almost one year of development and preparation. Many new features have been added, such as a publication database including more than 500 abstracts, improved data sharing options with more than 800 documents shared at the moment, updated content and structure, extra functionalities, improved membership subscription and possibilities to order

Monaco's floating breakwater



Monaco's floating breakwater is being towed into position. The 350 m long, 28 m wide prestressed pontoon was constructed in a dock in Algeciras, Spain, and travelled over open sea to Monaco. Inside the breakwater is parking for 400 cars.

Monaco is one of the smallest and most densely populated countries in the world. Its main problem is the lack of space. Out of the 2 km² of the country's area, 25% has been reclaimed from the sea. Monaco is certainly not the only country that enlarged its surface by reclamation. Others like The Netherlands and Japan have reclaimed much larger areas, but they could do that without exceeding a water depth of about 20 m. Japan has reached for the Kansai Air Port construction. Monaco, forty years ago, realised the platform called Fontveille by expanding its territory up to a depth of 35 m. Nowadays, Fontveille is completely built up.

An aerial photograph of a large, rectangular floating breakwater structure in the sea. The structure is composed of several parallel concrete or steel beams, creating a grid-like pattern. It is surrounded by water, and the background shows a hazy coastline with buildings and a road.

Where to go now, in still greater water depths and without disturbing the maritime environment? The first project confronted with this dilemma was the extension of the historical port of the Condamine. Here the water depth reaches 55 m. Construction of a classical dike of a composite type would have meant a base of about 200 m wide. For economic and ecologic reasons another solution was developed: a floating breakwater implementing a new technology called fixed sea wall. Physical and mathematical model studies were executed to determine the optimum dimensions of the cross section for ensuring a quiet wave climate in the old port in spite of the free space existing beneath the caisson, and to estimate forces involved.

The floating breakwater consists of an enormous prestressed pontoon of 350 m long, 28 m wide with two aisles of 8 m wide each at the bottom, 19 m high with a draft of 16 m and a displacement of 163,000 tonnes. It has been designed for a lifetime of 100 years according to principles of offshore technique.

The eastern counter jetty is 145 m long, 30 m wide, 11 m high with a draft of 9 m. It is set on piles.

Inside the main caisson is parking for 400 cars at four levels and a warehouse for boat storage. On top of it is a passenger terminal building. The caisson is held in position by a gigantic linkage landward, and by several mooring lines seaward. The caisson was built in a dry dock at Algeciras, Spain, near the Rock of Gibraltar and, when completed, towed to Monaco. The other caissons, 8 in total, were also prefabricated and towed to Monaco in order to not disturb the quality of daily life in Monaco. The sea trip of 900 nautical miles between Gibraltar and Monaco took 12 days and the operation to bring the main caisson into position and fix it took another 32 days.

The construction started in 1999 and was completed in 2002. In this way, the capacity of old Port Hercule was expanded by 60%. The new outer harbour has a capacity of approximately twenty super yachts of 35 to 60 m, two of 100 m length, and can accommodate cruise vessels up to 310 m long. Before the breakwater was completed, cruise vessels had no other option than to anchor offshore Monaco, making the debarkation of passengers a complicated and often hazardous operation. Now these vessels can berth completely sheltered from wind and waves. Indeed, the presence of the floating breakwater has largely increased the number of calls and visitors.

reports on-line, a renewed look and feel. A total of 2,676 html-pages, 2,769 jpg-files and 1,983 gif-files had to be converted, using no less than 28 data-bases. Special attention went to the PIANC news topic on the index page, keeping the members up-to-date about recent facts, such as invitations to join new PIANC Working Groups. A limited number of topics was displayed though; older news shifted to the news archive. The launch of the website went smoothly and without incidents.

But there was more in the pipeline: the 'members only'-section of the website started working in 2007. Access to an on-line membership directory, replacing the printed membership directory that by its nature never was up to date, was one of the bonuses. Besides former initiatives such as the renewed e-newsletter and restyled PIANC publications, the new PIANC website improves services for PIANC members and stimulates interactivity with and among PIANC members. The redesign of the website was not without result. The number of visitors increased to well over 650 per day, checking at average nine webpages per visit. The electronic newsletter 'Sailing Ahead' attracts approximately 2,500 readers. In fact the website developed within a few years into a indispensable means of communication for PIANC.

In 1932 PIANC had taken the initiative to publish an illustrated technical dictionary in six languages. This was a very special product, because it did not only have an alphabetical entry, but it also had an option to find words in a systematic way. A second feature of the dictionary was the presence of very illustrative drawings. Unfortunately it proved to be very difficult and costly and attempts to replace this dictionary by an up-to-date version failed. However, modern technology makes it possible to produce and update such products in a much more efficient way and the internet makes dissemination and updating easy. On the basis of software developed by Delft University of Technology, PIANC has taken in 2006 the initiative to produce, in close co-operation with CEDA and the International Hydrographic Organization (IHO) a new web-based version of the illustrated dictionary. It is free and on-line available via the internet (vwww.waterdictionary.info). New features in the on-line dictionary are a built-in glossary, additional photos and in some cases also video-clips. In 2008 some 5,000 entries were already available from IHO (in three languages), some 4,000 from CEDA (in five languages) and some 10,000 from PIANC (in six languages). Because the system works by means of one central



The publications were restyled too. The three generations of report covers show the development to more professionalism. In 2006, it was decided to print the publications in full-colour throughout.



PIANC members were and still are: engineers, professionals, stakeholders.

server, additions are directly available for all users. Programme and the database are available via one of the servers of the Delft University of Technology. The package is sponsored by the Corporate Members of both PIANC and CEDA.

Revision of Statutes and Regulations

Because of the many organisational changes, it was felt desirable to update the Statutes. In 2001 Vice-President Henk Schroten, took the lead of a small Task Force. He was under pressure, because the Executive Committee wanted to ratify the new Statutes at the 2002 Congress, a time table which proved to be too ambitious. One reason for the delay was very basic: differences between the English and French versions due to translation problems.

Nevertheless, in 2003 the revised Statutes and Rules & Regulations were ready for presentation in the AGA and were accepted unanimously. But, to everyone's dismay, it turned out that the new documents did not fulfill the requirements of the Belgian legislation. Strictly speaking, PIANC had operated illegally for several years. Lawyers were hired this time to do the rewriting and to bring the Statutes into accord with the requirements of the Ministry of Justice. The Council meeting of 7 December 2004 was upgraded to an Extraordinary

General Assembly to discuss and accept the new Statutes and the Rules & Regulations. In fact, the text of the Statutes was shortened considerably and parts of it were included in the Rules & Regulations. This has the obvious advantage that changing the Rules & Regulations is much easier than changing the Statutes, for only Statutes have to be approved by the Belgian authorities.

Article 1 of the Statutes stipulates the international, non-profit status of the Association, in the juridical sense being a foundation, and Article 2 locates the seat, being Brussels. Article 3 lists the aim and the objectives of the Association: to advance, on a world-wide basis, the sustainable development of all kinds of waterborne navigation by:

- a. identifying and disseminating world best practice (guidelines, recommendations, standards) and providing access to international data, in order to bring about improved decision making based on professionally sound and impartial information;
- b. being the international forum for analysis and discussion of all aspects of waterborne transport including policy, management, design, economics, integration with other transport modes, technology, safety and environment;

- c. contributing to the integrated management of navigable water systems;
- d. recognising the special needs of countries in transition and providing appropriate assistance and advice;
- e. promoting a comprehensive network of international navigation and port professionals and other stakeholders;
- f. co-operating closely with other Associations in the field of ports, waterways, coastal zone management and related subjects.

Initially, there was a proposal to eliminate the Council. However, the Belgian law requires a three level decision structure, so the Council was retained. PIANC remained in the new Statutes bilingual: English and French. The Rules & Regulations prescribe the nationality of the President (any nationality) and the Secretary-General (Belgian) and give an age limit for the two, as well as for Vice-Presidents and Commission Chairpersons. Moreover, the Rules & Regulations define the scope of work of the permanent Technical Commissions

and contain rules for Working Groups and the organisation of the Congress. After 2004, the Rules & Regulations have been adapted several times to keep PIANC up to date. The Statutes are included as Annex 6.

Young Professionals

The first activities for Young Professionals were started in the late 1980s. Several countries organised an exchange of members under thirty-five years. But these were isolated initiatives and apart from the De Paepe-Willems Award, there were no PIANC wide actions aiming at Young Professionals. Eventually, the Executive Committee recognised that PIANC had to become more attractive to Young Professionals. ExCom decided in October 2001 to start a Task Group, chaired and facilitated by Mrs. Jan Brooke, considering:

- the high average age of the PIANC membership
- the existence of a generation gap in some countries



To stress the importance of Young Professionals in the work of the Association, a YP Paper Award was established. The first winner was Mr. W. Bijman, who received the prize at the Estoril Congress in 2006 from Vice-President H. Brühl and President Van den Eede.

- the need to attract *tomorrow's* members, individual as well as corporate
- the dependence on the involvement of young members for PIANC's survival

Highly motivated, she started mainly corresponding by email. Then the group had a face-to-face meeting in February 2003 in Brussels to complete a paper with findings and recommendations and a draft action plan. At that time only Belgium, the Netherlands and Spain had established Young Professional (YP) Groups. The Task Group discussed the level of activities for Young Professionals in different countries, potential improvements to the services and opportunities PIANC provided to younger professionals and students. The most important recommendation, to set up an Implementation Group, was approved by the AGA in May 2003. The inaugural meeting of the Implementation Group was held in Brussels on 13 November of the same year. The group prepared a report including a list of actions to improve the appeal of PIANC to Young Professionals. Actions were identified to attract new members to PIANC and to retain existing members. All actions were classified into four

categories and given a priority designation of high or medium. The categories were as follows:

- E-communication (newsletter, webpage, magazine, question and answer forum, etc.)
- representation of Young Professionals (in Working Groups, Technical Commissions, National Sections, a permanent YP-Com, etc.)
- promotion of PIANC (publicity for the De Paepe-Willems Award, YP Paper Award, professional development, awareness of PIANC among students, etc.)
- knowledge transfer (national YP events, electronic membership directory, YP exchange programme, etc.)

The actions were approved at the Council Meeting in December 2003 together with the official formation of a temporary Young Professional Implementation Group. The newly established group met for the first time in Brussels on 6 February 2004. Mr. Holger Schüttrumpf was elected Chairman and Ms. Kirsty McConnell as co-Chair. Mr. Hartmut Brühl, Vice-President of PIANC, was to become the mentor of the group. The most important tasks




In 1995, the new Young Professionals Commission (YP-Com) held a meeting in London and subsequently visited the Thames Barrier.

Falkirk Wheel



The Falkirk Wheel was a project undertaken on the Forth and Clyde Canal to celebrate the new millennium. The wheel actually is a ship lift replacing a flight of locks. Boats are lifted approximately 25 m by rotating the wheel. Connected to the wheel is an aqueduct on piers. The wheel came into operation in 2002 and is now one of Scotland's main tourist attractions.

To celebrate the Millennium in the UK, a series of projects funded by the National Lottery were undertaken. One such project was the restoration of the Forth and Clyde Canal linking the North Sea to the Irish Sea across the lowlands of Scotland. A major part of this project was the linking of the Union Canal to the Forth and Clyde at Falkirk thereby restoring the link between Edinburgh and Glasgow. To achieve this reconnection, the replacement of an eleven lock flight lifting the canal approximately 25 m had to be constructed. Unfortunately the original route of the flight was no longer available and an alternative solution had to be found. Various solutions were considered but it became obvious very early on that some form of boat lift would be required and that a rotating structure would be the most effective. As the design and build process developed,



ideas on the rotational theme were put forward until the current design evolved using a tubular shaft with two rotating arms created as 'solid' units carrying only two gondolas between them. The tubular shaft has an outside diameter of 3.5 m hollow tube. Each of the two arms forming the Wheel is 1.4 m wide. Each gondola contains some 300 m³ of water and is 25 m long. The total load of each gondola when operating is 600 tonnes and it can be operated in winds up to Force 6. The gondola when in the highest position would be connected to the Union Canal via a 100 m long aqueduct built on piers out from the adjacent hillside. The canal is then carried through the hillside via 100 m tunnel and then lifted via two traditional locks and a new 1.5 km long channel to the original canal. The tunnel had to be driven under the St. Antonine Wall which is a Roman structure and forms part of a World Heritage site.

The idea of using the gondolas in this condition did cause some technical issues in that they had to always be level and could not be allowed to rotate on their own axis independent of the movement of the main structure and how could the gates at each end provide a watertight seal but also a positive connection to the aqueduct at the higher level. The interlocking of the rotation of the gondolas was solved by making a feature of interlocking gears that would deliberately turn the gondolas as the main wheel rotated. This was further backed up by electronic interlocks and sensors which sense any over turning and stop further movement of the Wheel until the fault has been rectified. The problem of the gates was solved by using doors that fold down into the gondolas and the approach section of the aqueduct. These are fitted with a collapsible bellows forming a seal between the end of the aqueduct and the corresponding end of the gondola. The Wheel whilst weighing 1800 tonnes is very finely balanced and water levels vary at the most by 75 mm. As a consequence it only requires 18 kW to rotate the Wheel using ten epicyclic hydraulic motors centred around the hollow central shaft. The 'locking time' for a vessel is approximately 15 minutes. The reliability of the Wheel has been of a very high standard and reflects the thought that went into the design process. The approximate cost of constructing the Wheel and connecting canals was 17.5 million GBP at 2002 prices.

The Wheel came into operation in 2002. Whilst the volume of through traffic is lower than anticipated, the demand for passengers ferry trips up and down the Wheel and run in conjunction with the adjacent visitor centre, coffee shop and country park, has been far in excess of what was predicted now making the Wheel one of Scotland's major tourist attractions. Whilst some would argue that the Wheel is not a true navigational structure, the opposite is true. The Wheel does overcome the need for a flight of locks and lifts craft some 25 m in a very timely and energy efficient manner whilst at the same time providing a major regeneration feature that is financially self sufficient and has already become an industrial icon of the 21st century.

identified were to create a YP-website (communication), to increase and encourage participation of YPs in PIANC Working Groups (international participation) and to form national YP-groups (national participation). Creation of an YP-website was regarded as the primary avenue to communicate and to highlight the effort of PIANC to develop its future through Young Professionals.

Participation of Young Professionals in PIANC Working Groups was identified as the most tangible activity for the involvement of Young Professionals on an international level. The inclusion of Young Professionals in these technical committees would provide a benefit to both the Young Professionals and PIANC within its existing infrastructure. Interested Young Professionals would be provided an opportunity to actively contribute to the PIANC community. In turn, the Young Professionals would bring their new scientific and professional knowledge and ideas to the table thereby improving the quality of the main product of PIANC. National Sections were encouraged to nominate Young Professionals for Working Groups and Commissions. Many countries used this opportunity to nominate two members for Working Groups, a younger professional and a senior professional, having both the same rights and responsibilities. In addition, observers were nominated for PIANC's commissions to contribute and to exchange information.



The Jack Nichol Award for Outstanding Marina Design was established in memory of Jack Nichol, a long time and active member of RecCom and well known American marina designer. The winner receives this plaque, showing Jack Nichol, the PIANC logo and yachts.

The Implementation Group prepared a proposal to form a permanent Young Professionals Commission (YP-Com) which was approved at the AGA in Estoril in May 2006. A remarkable achievement: PIANC was the first professional organisation to give its Young Professionals autonomy through their own Commission and encouraging its Young Professionals by giving the responsibility of bringing science, profession and practice forward in PIANC. The Chair of YP-Com, Mr. Holger Schüttrumpf, became a permanent member of the Executive Committee. A member of YP-Com will have a permanent seat on each Technical Commission as an observer. The inaugural meeting of YP-Com was held in Palermo on 29 September 2006. The newly formed commission consisted of fifteen members from eleven countries.

Jack Nichol Award

In 2001, Mr. Jack Nichol, a long time and active member of RecCom and well known marina designer, unexpectedly died. The United States Section of PIANC in conjunction with Moffatt and Nichol Engineers proposed to establish an award in his memory. The Jack Nichol Award for Outstanding Marina Design consists of a bronze plaque, showing Jack Nichol, the PIANC logo and two yachts. The purpose of the Award is to recognise excellence in the design of recreational boating facilities around the world. Applicants have fulfill the following criteria:

- a. Provide berthing for recreational boaters
- b. Have been constructed (or reconstructed) within the last twenty-five years
- c. Have operated successfully for the last five years
- d. Be accessible to the boating public
- e. Be located in a PIANC member country

Annually, marina owners and designers may submit an application. The Recreational Navigation Commission evaluates the applications on the basis of functionality, aesthetics, environmental sustainability and technical innovations. The first winner was the Cabrillo Marina in Los Angeles. In a ceremony on 26 February 2003, Mr. N. Tonsich, President of Los Angeles Board of Harbor Commissioners, accepted the award on behalf of the Los Angeles Board of Harbor Commissioners. Jack Nichol Award winners are mentioned in the Annex 4.



Dry stack storage of the Marina Punta Gabbiani in Murano, near Venice. This marina won the Jack Nichol Award in 2004.

Navigation Congresses

In the first decade of the 21st century two Congresses were organised: in Sydney, Australia, and in Estoril, Portugal. The 2002 Congress was the first Congress in Australia and at the same time, it was the first Congress held in accordance with the new rules. The strict separation between maritime and inland navigation was abandoned. There were no longer national papers, but only individual papers, 127 of them. This necessitated four parallel sessions, which turned out to be difficult to keep on schedule. Delegates were spotted running from one meeting room to the other. The last day of the 30th Congress was reserved for special sessions of the technical commissions, an innovation that was very satisfying. Only the abstracts were printed and distributed before the Congress, thus enabling the participants to select the presentations they wanted to hear. After the Congress, a CD with all papers was sent to the participants. In the conclusions, a first warning against negative effects of climate change was made and a network of monitoring systems was considered necessary. The mild September sun tempted the participants to relax at the quays of Darling Harbour, next to the Sydney

Convention Centre. The harbour cruise offered magnificent views of the Harbour Bridge and the Opera House. For many, Sydney was a long way from home, but it was certainly worthwhile.



At the opening ceremony of Congresses, there usually is reference to the culture of the host country. In Sydney, 2002, an aboriginal didgeridoo player gave a demonstration of traditional Australian music. At this Congress there were individual papers only.



A group of folk dancers performs in the passenger terminal of Lisbon, while the participants of the 2006 Congress watch attentively. A record number of 238 papers was presented, resulting in complaints about an overloaded programme.

The Sydney Congress was followed in 2006 by the 31st Congress in Estoril, Portugal. Estoril is close to Lisbon but less crowded and less expensive compared to the Portuguese capital, which hosted the Congress in 1949. The same formula was applied as in Sydney, so 238 individual papers were presented in 47 sessions. Some days, there were five parallel sessions. The scheduling made delegates complain about an overloaded programme, which left too little time for networking. The Congress was attended by approximately 550 delegates. One of the subjects of the key-note speeches was the 5.25 billion USD upgrading programme of the Panama Canal, a true technical highlight. A few months later, the population of Panama decided in a referendum in favour of the new canal. The importance of inland waterway transport and its environmental and safety benefits were again stressed in the conclusions of the Congress. In view of the large reclamation and port extension works that are foreseen, care for the environment was emphasized in the conclusions. Sediment management was proclaimed a key word. A new feature of the 31st Congress was the Young Professionals Paper Award, intended to encourage writing and presenting papers by YPs. At the banquet, Mr. Wouter

Bijman was proclaimed winner and received a cheque of 1,000 EUR. His paper concerned the revitalisation of the waterways in Serbia.

COPEDEC

The purpose of PIANC's Permanent Commission for Developing Countries (PCDC), now International Co-operation Commission (CoCom), was and still is to involve persons from developing countries in the work of PIANC. This makes the PIANC know-how available to Countries in Transition, which is in the interest of the entire waterways, port and shipping world. One of the ways to achieve this goal is the organisation of seminars. From 20 to 24 November 2001, the fourth PCDC seminar was held in Buenos Aires, Argentina. The Spanish Section and a local committee took care of the organisation. In total 72 papers were given for an attendance of nearly 200 people, about half of them from the primary target group, countries in South America. The discussions were lively and the overall response was very positive. The papers were reproduced on CD-ROM and made available to the navigation community.

At the Annual General Assembly in Paris, 2001, a letter of intent between PIANC and COPEDEC,

the International Conference on Coastal and Port Engineering in Developing Countries, was ratified. Mr. S. Amarasinghe, founder and Chairman of the Permanent Secretariat of COPEDEC, signed the letter as well as Mr. E. Van den Eede and Mr. F. Kapp, the Chairman of the PIANC Co-operation Commission. In 1998, Mr. H. Velsink, at that time Chairman of PIANC's PCDC and Mr. S. Amarasinghe had made the first contacts, which resulted in a mutual statement of intent of co-operation and selection of the dates, subjects and venues of the joint COPEDEC Conferences and PCDC-seminars. During the sixth COPEDEC Conference in Colombo in 2003, the final merger agreement between PIANC and COPEDEC was signed and consequently a joint International Organising Committee (IOC) was formed.

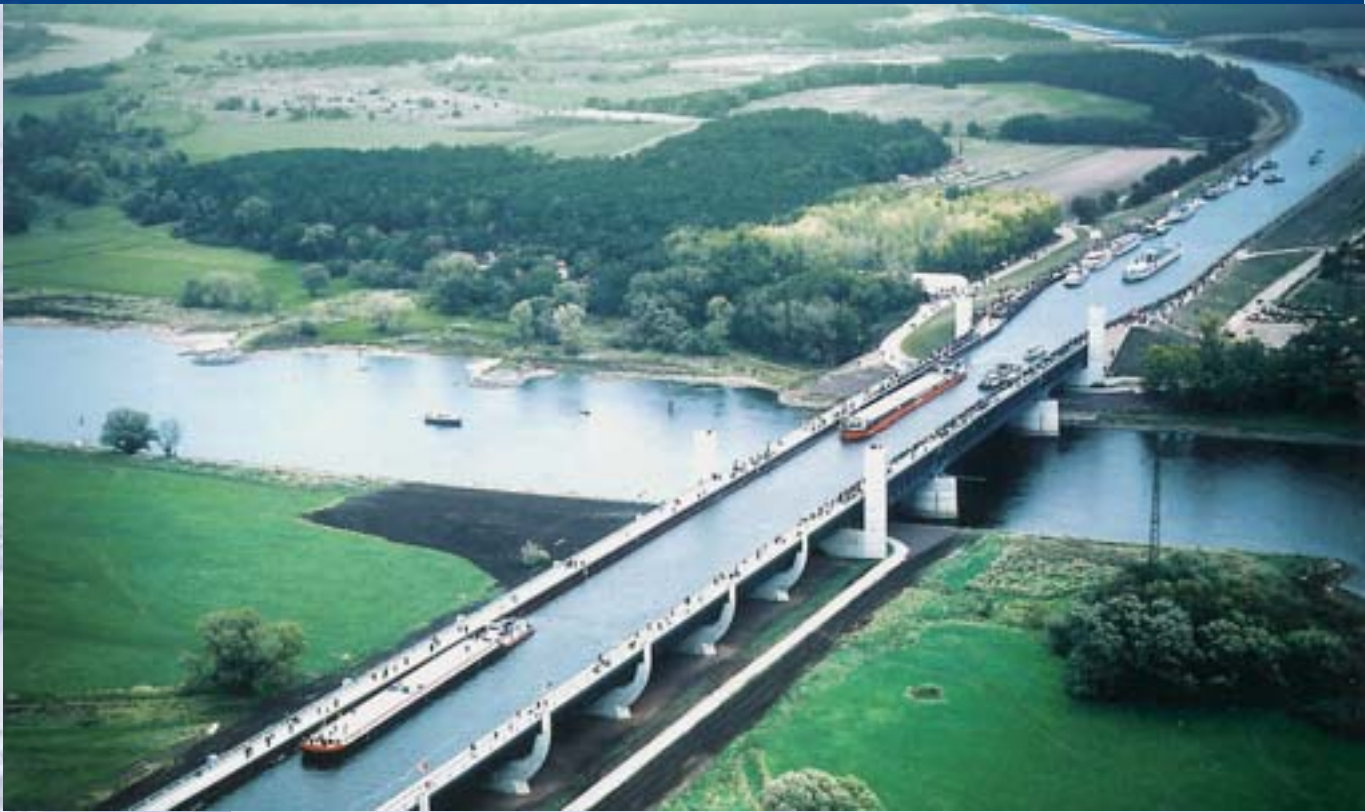
The seventh COPEDEC Conference was held in Dubai, United Arab Emirates, from 24 to 28 February 2008. It was the first COPEDEC Conference under the aegis of PIANC, Mr. R. Galappatti acted as Chairman of the International Organising Committee. The Conference attracted 543 participants and

76 accompanying persons, the biggest COPEDEC Conference so far. This had without doubt to do with the spectacular Palm and World Islands offshore the Dubai coast. The Dubai municipality generously granted 79 fellowships to people from 22 countries. The overall theme of the Conference was 'Best Practices in the Coastal Environment'. There were 217 papers from 44 countries, to a large extent written by Asian authors and among them many from students participating in co-operation programmes between universities in a Country in Transition and an European or American university. In this way the original goal of the Conference was satisfied: bringing together and disseminating knowledge on coastal engineering. The prize for the best paper written by a Young Professional was won by Mr. A. Dastgheib from Iran. In conjunction with the Conference was a boat trip along one of the reclaimed islands. Two of PIANC's Corporate Members sponsored an event for the Young Professionals. At the closing ceremony, Secretary-General Van Schel formulated the final conclusions and he especially thanked Mr. Ranjit Galappatti,



The skyline of Dubai, host city for the COPEDEC 2008 Conference. It was the first COPEDEC Conference under the aegis of PIANC. The overall theme was 'Best Practices in the Coastal Environment', which attracted the largest number of participants so far.


Waterway-cross at Magdeburg



At Magdeburg, the Mittelelbe Canal crosses the River Elbe over a distance of 918 m. Of this length, 228 m consists of the aqueduct itself. Locks on both sides enable navigation from the canal to the River Elbe and the Port of Magdeburg. The photo shows the festivities on the occasion of the opening of the canal bridge.

After the reunification of Germany October 1990 there have been approved seventeen German Unity Transport Projects by the Federal Government in April 1991. Amongst them is one waterway project: the upgrading of the Mittelland Canal east of Hanover, the Elbe-Havel Canal, the Lower Havel Waterway and some waterways in and around Berlin to the modern standard for 3,300 t-push-tow units with dimensions of $185 \times 11.45 \times 2.80$ m.

The most spectacular part of the project is the canal-bridge near the city of Magdeburg. Two alternatives were examined for feasibility: first a canal-bridge across the River Elbe, second a weir in the River Elbe below Magdeburg and new locks between the Mittelland Canal and the River Elbe and between the Elbe-Havel Canal and the River Elbe so that vessels carrying full load cargo would be able to cross the River Elbe, though by a 12 km circuitous route on the river. A comparative Benefit-Cost Analysis and an Environmental Risk Assessment were carried out for both alternatives. The results gave definite reasons for the decision to favour the first alternative.



The waterway-cross contains four elements:

- 1) The Canal-bridge crossing the River Elbe is the central element of this waterway link. In June 1997 the work began, and it was finished in October 2003. The steel construction has a total length of 918 m. Of this length, 690 m are crossing the flood plains and 228 m are crossing the river itself with a maximum span of 106 m. The usable width of the trough is 32 m. The depth of the water is normally 4.25 m. This dimension is chosen because of a negative surge of more than 80 cm that can occur in case of long lasting eastern wind. It was possible to plan the canal bridge with a single through for an alternating one-way-traffic instead of a double through for two way traffic because the canal bridge is very close to the lock Hohenwarthe. In other words: the bridge has the same effect as a long forebay of the lock Hohenwarthe. Furthermore in this combination the transportation capacity of the bridge is greater than the capacity of the double-lock Hohenwarthe. The expansion joints of the steel construction are dimensioned for differences in temperature of $+75^{\circ}\text{C}/-50^{\circ}\text{C}$. This reveals a greatest tension between the bridge across the river and the bridge across the flood plain of 724 mm. Every river pile bears a vertical load of 135 MN. The design loads take into account earthquakes. The trough is equipped with fenders and air sputterers. The complete steel weight is 23,800 tonnes.
- 2) The Lock Hohenwarthe is situated at the eastern end of the Mittelland Canal. Its water level is 18.55 m higher than the water level of the Elbe-Havel Canal. First considerations to plan a twin-lock were rejected in favour of two water recuperation locks with 60% saving of process water for the reason of greater transportation capacity. Each lock has a useful length of 190 m and a width of 12.5 m. The upper gates are rotary segment gates, the lower gates are lifting gates.
- 3) The Lock Rothensee (190 × 12.5 m) replaces the existing seventy years old two-floats ship lift and makes the port of Magdeburg reachable for push-tow units with a maximum draught of 2.80 m via the Mittelland Canal. Like the lock Hohenwarthe it is a water recuperation lock. The lift of lock varies between 11 m and 18 m depending on the water level of the River Elbe. The upper gate is a rotary segment gate; the lower gate is a mitring gate.
- 4) With the Port-lock the ports of Magdeburg can be separated from the water level of the River Elbe. To reach the ports of Magdeburg after passing through the lock Rothensee the ships follow the Rothensee-link-canal. The Port-lock Magdeburg is planned in the southern part of the canal and near its mouth to the River Elbe with sheet pilings and with vertical lift gates in order to make it possible for fully loaded vessels to reach the ports of Magdeburg independently of low water in the River Elbe. In cases of higher water-levels in the River Elbe the gates of the 25 m wide lock are open for free passage. Otherwise the lock operates in normal function. The construction takes from 2008 to 2011.

Chairman of the International Organising Committee, for the technical aspects concerning the content of the Conference, as well as the opportunity for networking, both very much appreciated by the many participants. The next PIANC COPEDEC Conference is planned in Chennai, India, in 2012.

Mediterranean Days

In 1993 PIANC Italy decided to start with the organisation of a national Conference, in order to establish a more fruitful contact with its members and to attract new members. The first meeting of *Giornate Italiane di Ingegneria Costiera* (Italian Days of Coastal Engineering) was held in October 1993 in Genoa and it was a great success with some 250 participants, thus showing that the adopted strategy was worthwhile being pursued. Seven other Conferences were held. On 15 September 2005, MarCom held its meeting in Le Havre. During that meeting, three members, Mr. A. Ferrante from Italy, Mr. G. Caude from France and Mr. R. Escutia from Spain started to think about the possibility of enlarging the Italian national initiative into

a regional Conference of the Countries of the Mediterranean Sea, open to all the other National Sections of PIANC. Quite soon Portugal joined the group of the leading National Sections. During AGA 2007 in Kochi, India, a Memorandum of Understanding was signed by the four National Sections, thus assuring a common approach to the initiative. The main goal of the Conference is to enhance the development of a common technical culture in the area of the Mediterranean Sea in the field of coastal and port engineering, taking into account the necessity of elaborating new strategies to face properly the new challenges of the global market without neglecting environmental and social issues, in the light of sustainable development. The evolution of maritime transport and of tourism in the Mediterranean Sea and the strong tendency to globalisation, required a common awareness in order to identify scenarios and related solutions for the future, possibly shared among the countries bordering this sea. In order to achieve its goals, the Conference strongly aimed at bringing together experts, who are able to exchange



The Mediterranean Days is an initiative of four National Sections: Portugal, Spain, France and Italy. The first Mediterranean Days were held in Palermo in 2008. It is the intention to organise similar events every two years in one of the countries of the initiators.

valuable information, state-of-the-art and wide know-how in the field of interest.

Previously, the Italian Section had organised a yearly meeting but on Italian matters only. The Mediterranean Days may be considered as a further evolution. The first Mediterranean Days of Coastal and Port Engineering was held in Palermo, Italy, on 7-9 October 2008, with some three hundred participants, mainly coming from Western Europe. According to the Memorandum, these events should be organised every two years in the country of one of the initiators.

Smart Rivers

Strategic Maritime Asset Research and Transformation for the 21st Century River Systems, in short Smart Rivers, started in 2001 when representatives from Europe presented the topic of River Information Services (RIS) development at the annual Transportation Research Board (TRB) Conference. More discussions followed with Mr. J. McCarville and Mr. S. Herczig in order to establish formal cooperation between the Port of Pittsburgh Authority,

Apalachian Region Commission, TINA Vienna, the European Federation of Inland Ports (EFIP), and via donau, an organisation to promote navigation on the Danube River. The formal agreement was signed during the TRB Conference 2003.

The first Conference, called Smart Rivers 21, was organised September 2005 in Pittsburgh, Pennsylvania, by Mr. J. McCarville, Mr. O. Schwetz and Mr. R. Pfliegl. About eighty people attended this Conference, which was held within the framework of the TRB Joint Summer Committee meeting. There it was agreed to organise a follow-up Conference in Brussels in 2006, organised by EFIP with support of TINA and via donau. Mr. E. Van den Eede was invited to represent PIANC. The programme started with visits to the Ports of Brussels and Antwerp, followed by a day of lectures, a round table session and discussions. The four sessions were devoted to:

- contribution of inland waterways to the development of a sustainable transport system



The Conference, Strategic Maritime Asset Research and Transformation for the 21st Century River Systems or Smart Rivers, deals with transport on inland waterways, such as this container transport on the Austrian part of the Danube River. Four Conferences have so far been organised.

- understanding the social and environmental benefits of IWT
- changing infrastructural framework for infrastructure management
- developing strategies for an efficient water system in Europe and the US

The Conference had wide visibility and a number of representatives from the European Union attended including Mr. J. Barrot, the member of the European Commission responsible for transport. More than 150 participants joined the two days Conference.

A third Conference followed in September 2007 in Louisville, Kentucky. Under the leadership of Mr. Jim McCarville, US Commissioner, the Conference was organised by the US Section of PIANC, so the involvement of PIANC increased every time. The Conference was the biggest so far with over 220 participants from all over the world. The theme was 'Positioning Inland Navigation as a Powerful Link in the Global Supply Chain'. During a pre-Conference workshop, the future of the 12,000 miles of the US Inland Navigation System was discussed. During two days of the Conference 27 presentations were made. The program was concluded by a technical tour to the McAlpine Locks and Dam, the Jeffboat Shipyard and the Falls of the Ohio River.

Discussion on the future of the Smart Rivers Conference stressed the need for a strong partner to support the organisation of future Conferences. PIANC's Inland Navigation Commission had a meeting after the Conference and submitted a proposal for intensive co-operation between Smart Rivers and PIANC. ExCom accepted the proposal in October 2007, suggesting that the Smart Rivers Conference be extended to Asia.

The fourth Conference was held in Vienna in September 2009 and again, it was a very successful event. 300 participants from most of the continents joined the Conference. The topics varied from; RIS, to success stories, to innovations in infrastructure and to the economic aspects of inland waterways. The fact that there were four sets of four parallel sessions each, proved that there are many interesting topics related to Inland Waterborne Transport. Dialogue between the representatives of the continents was possible in the parallel sessions, in the plenary discussion and also during the formal and informal social sessions organised by via donau, the hosts of the event.

International co-operation

Working together toward a common purpose with colleagues from other countries, on the frontiers of knowledge engenders international trust, friendship and goodwill across national boundaries. Knowing one another as colleagues and eventually as friends means, that when a fellow member has a problem to resolve, he or she can pick up the phone or send an e-mail and exchange views on the problem in hand with an international colleague recognised for being an authority on the subject. Examples of this co-operation include national disasters such as earthquakes, hurricanes and tsunamis. For example, the Japanese Section of PIANC readily helped the Indian State of Gujarat with advice on the occasion of the 2001 earthquake. Similarly discussions took place on how to solve the problem of flooding of Venice with experts in the design of the Thames Barrage built to prevent the flooding of London. This kind of support is given without expectation of payment of fees or award of commissions. Apart from such direct contact between Individual Members, there are many examples of international co-operation between National Sections or between PIANC and other technical, non-governmental organisations.

On 19 April 1600 the Dutch sailing ship 'De Liefde' stranded on the southern shores of the Japanese island Kyushu. Four hundred years later, the Japanese Section of PIANC organised a well attended Joint Forum to commemorate the maritime relations between the two countries. The venue was Nagasaki, where the Dutch had a trading post on the small island of Deshima. For over two hundred years, they were the only Europeans allowed to trade with Japan. During the forum, themes such as reclamation and physical distribution were discussed with reference to lectures by a Japanese and a Dutch speaker. The lively discussion proved the technical interest for these topics in both countries. It goes without saying, that the Japanese hosts organised a perfect technical and social programme for their Dutch colleagues.

International co-operation was always there, but under the Strategic Plan, extra attention was given in this respect. Existing co-ordination with other international organisations was formalised by signing a Memorandum of Understanding (MOU). The MOU with the International Association of Ports and Harbours (IAPH) was signed in 2001. The signatures of Mr. S. Inoue, Secretary-General of IAPH and Mr. L. Van Schel were put on the MOU at



The Joint Forum of the Japanese and Netherlands Sections in Nagasaki, 2000, is a good example of international co-operation between PIANC sections. The occasion was four hundred years of maritime relations between the two countries: four hundred years ago a Dutch ship stranded on the shores of the Japanese island Kyushu.

the occasion of the AGA in Paris and at a meeting of IAPH in Montreal, Mr. E. Van den Eede and Mr. D.J. Taddeo signed the document. IAPH strives to emphasize and promote the fact that ports form a vital link in waterborne transportation and play a vital role in today's global economy. The membership of IAPH consists of port authorities, there are no Individual Members. Many IAPH members are also member of PIANC, so a kind of overlap and co-operation already existed. Under the MOU, both Associations send observers to each others meetings and can be represented in Commissions and Working Groups.

PIANC co-operated on several occasions with the International Association of Lighthouse Authorities (IALA). Joint Working Group reports were produced. IALA is like PIANC, a non-profit making international, technical Association. Established in 1957, it gathers together marine aids to navigation authorities, manufacturers and consultants

from all parts of the world and offers them the opportunity to compare their experiences and achievements. IALA strives to harmonise aids to navigation world-wide and to ensure that the movements of vessels are safe, expeditious and cost effective and at the same time protect the environment. Among the participants of the 2000 PCDC seminar was a formal representative of IALA, who attended as a result of discussions regarding co-operation between PIANC and IAPH. The two organisations considered it appropriate to seal their historical relationship with a MOU, which was eventually signed in February 2006.

More agreements followed. The Recreational Navigation Commission for many years co-operated with the International Council of Marine Industries Associations (ICOMIA), in particular the ICOMIA Marina Committee (IMC). As frequently as possible RecCom sends a representative to the meetings of IMC and on its turn, a representative of ICOMIA is


Le Havre Port 2000



Le Havre Port 2000 is the name of the extension of the Port of Le Havre in the mouth of the River Seine and will ultimately comprise 4,200 m of quayside for the largest containerships. More than 50 million EUR were allocated to environmental measures, such as restoration of the mud flats and creation of resting places for birds. A 6 ha artificial island for birds was co-designed by the port engineers and ornithological and environmental experts.

Ten years of studies, works and especially dialogue (public debates, enquiries, working session, etc.) were necessary to create the new Le Havre Port 2000, and accompany the revival of an estuary, the birthplace of a large bio-diversity. The whole Port 2000 operation will ultimately comprise 4,200 m of quay (twelve quayside berths) to accommodate the largest container vessels in operation or being planned, thus bordering back-up areas 500 m wide reclaimed from the Seine estuary, south of the old breakwaters of the Port. 1,400 m of quayside have been in commercial operation since 2006 and 2,100 m of additional quays will come on stream in 2010-2011.

The construction of the port required the construction of 3,200 m of inner breakwaters and 6,000 m of outer breakwater. If the breakwater design is relatively standard, embankment dykes with rock-fill protection on the inner side and protection with concrete blocks on the side to the sea. The design of the body of these structures and their installation made it possible to meet an objective of maximum re-use of the dredged materials. Consequently, only half out of the 60 million m³ dredged was deposited

An aerial photograph of a coastal area, likely an estuary, showing a complex network of breakwaters and mudflats. The water is a deep blue, and the mudflats are a lighter, sandy color. The breakwaters are long, straight structures extending into the water, creating various sized bays and channels. The overall scene is a mix of natural and man-made elements.

at sea: 15 million m³ was re-used in the very body of the various breakwaters and another 15 million m³ in all back-fills of the future back-up areas in the rear of the inner breakwaters. The scheduling of maritime works was of prime importance for the possible changes in the estuary sedimentology during and even after the works. The inner enclosing breakwater was thus constructed first and then the main breakwater was built from West to East by previously placing the sub-base in sand and gravel materials over a long length, which made it possible to progressively redirect the currents and thus reduce the sedimentological impacts.

More than 50 million EUR were allocated to environmental measures, which constituted a premiere for a port work site. The measures initiated concerned the restoration of the mudflats and the creation of rest places for birds, but also, especially, measures in favour of the Nature Reserve, the development and ecological management of a preserved area, the creation of an ecological beach, a fish observatory and a related monitoring system, the environmental training and information, the transfer and safeguard of protected species as well as scientific follow-up surveys for more than ten years. The first environmental measure of Port 2000 was completed and devoted to birds accommodation as early as February 2002 that is before starting the major port works. This 45 ha rest place for birds is made up of a water surface and islets in non-hunted area, connected with the Seine estuary through a canal via a gate making it possible to manage the water levels independently from the estuary. The most significant operation of this vast environmental programme was the restoration of the mudflats situated on either sides of the Normandy Bridge at the cost of 23 million EUR. This work was an innovating for many reasons, especially the use of maritime engineering techniques, implementation of the principles of adaptive management for the downstream groin of mudflat creation, with the construction of the only groin sub-base as a first stage and after one year of observations confirming the studies, invitation to tender for companies in 2004 on the basis of a preliminary project drawn up by a specialised research bureau via a tender in design/build for the construction of the environmental channel, setting-up of a follow-up over a period of more than ten years for the whole work aiming at carrying out a thorough follow-up study of the depths and the settlement of the new mudflats thus created. Another very emblematic construction was the creation of a new island, 320 m long and 200 m wide, south of the Seine estuary only dedicated to the rest of marine birds. Its main characteristics were worked out through real co-design between the ornithology experts (Groupe Ornithologique Normand), the Environmental experts (Directions Régionales de l'Environnement de Haute et Basse Normandie), and the engineers of the Port of Le Havre. Its complex shape makes it possible to diversify the reception and rest sites for the various species. It accounts for 5 ha on a single part at low tide and three emerging islets of an overall surface of 1.5 ha at high tide. As soon as the construction works were over, this island was invaded by numerous species of birds, thus confirming the validity of its design.



During the 30th Congress in Sydney a Memorandum of Understanding was signed by Mr. S. Inoue, Secretary-General of IAPH and Mr. L. Van Schel, Secretary-General of PIANC. Mr. Inoue (left) and Mr. A. Someya, President of IAPH (right), are standing here between the PIANC Secretary-General and President.

present at the meetings of RecCom. When applicable, ICOMIA is represented in the Working Groups of RecCom. The text of a Memorandum of Understanding between the two bodies to formalise their co-operation was agreed by the AGA in May 2004. The official signing ceremony was in February 2005 at PIANC Headquarters. In 2005, PIANC and the Central Commission for Navigation on the Rhine (CCNR) confirmed their willingness to co-operate by signing a Joint Declaration.

Promotion Commission

One of the external goals of the Strategic Plan 2006-2010 was to achieve world-wide credibility and recognition. The analogous internal goal was to enhance the vitality of National Sections and to expand membership. The fact was that PIANC was not a very well-known technical organisation. On the occasion of the 2006 AGA in Estoril, Portugal, a Task Force was established to prepare the Terms of Reference for the new Promotion Commission (ProCom). The Task Force, chaired by Vice-President Tom Wakeman, first met in October and discussed the need, scope and composition of a Promotion

Commission. By the following February, Mr. Wakeman presented the first recommendations to ExCom:

- ProCom shall be responsible for the identification of stakeholders, the timely development and execution of a marketing plan
- ProCom shall increase educational and outreach activities regarding navigational guidance to navigation infrastructure stakeholders
- The marketing plan shall describe a strategy for creating and maintaining promotional media that describe PIANC and its outputs to target prospective membership, tabulate target sectors, their perceived needs and identify existing or new PIANC activities and/or publications that potentially meet these needs and identify stakeholders and delineate opportunities for partnering with other public and private organisations
- ProCom shall seek professional services to assist in the development and implementation of the marketing plan.

The presentation included draft Terms of Reference and a draft marketing plan. The AGA of 2007



The PIANC website went on-line late 1998. Following to the recommendations of the Promotion Commission it was restyled and extended in 2006.

accepted the proposals and the members of ProCom were appointed. The dual Chairmen were the Secretary-General Mr. L. Van Schel and Mr. H. Fiers. Ms. Alice Clijncke was appointed as Secretary. Members from ten countries, which included two representatives of the Platinum Partners, completed the commission. The commission drafted a call for proposals for reviewing the promotion and market strategy of PIANC, which was launched in the course of 2007.

The consultant conducted a survey of PIANC's communications and concluded that PIANC was not visible enough to the outside world, should go beyond serving just its members and should advocate waterborne transport and its infrastructure world-wide. International media should be used to position PIANC as *the* leader and increase its influence. Eventually, increased visibility and a higher profile should result in

increased membership. One of the measures to attain this object was a new brochure, stating seven reasons to join PIANC. ProCom recommended to improve the website, in particular the services to members, and in spring 2008 a tender was launched. At the end of the year, the renewed website came into operation. Another outcome of ProCom, after lengthy discussions, was a new slogan for PIANC:

***the World Association for
Waterborne Transport Infrastructure***

This sentence should explain the sphere of activity of PIANC for all outsiders. For this purpose, the word 'navigation', being the cause of confusion, was avoided. Other actions resulting from ProCom were thematic fact sheets, a media database, use of an event calendar for better planning

of PIANC's presence and activities, use of new promotional materials and tools to share with National Sections.

One of the first initiatives to raise the profile of PIANC was a special session on Inland Waterway Transport at the fifth World Water Forum in Istanbul, Turkey, on 17 March 2009. The session, which was organised by Mr. Ian White, Chairman of InCom, and Mrs. Anne Cann, Secretary of the US Section, was attended by approximately 150 people, including HIH Crown Prince Naruhito of Japan. President Van den Eede emphasised in his opening remarks how IWT contributed to the development of mature economies over many centuries and created bridges between nations. In his opinion IWT provides a safe, environmentally friendly form of transport, which is a key element of sustainable economic development and a possibility to assist in achieving the UN Millennium Development Goals. A similar message was sounded by

Mr. Narikuni Nakao, Deputy Minister of the Japanese Ministry of Land, Infrastructure, Transport and Tourism. Other speakers were Mr. Harald Köthe, Chairman of EnviCom and representatives of the Serbian National Navigation Authority, the Mekong River Commission, the International Commission of the Congo River, the Central Commission for Navigation on the Rhine, the US Corps of Engineers Institute for Water Resources, the India Centre for Built Environment and the Yokohama National University. In conclusion, a draft Ministerial Statement was proposed:

'The water and energy sectors are interrelated. Water contributes significantly to energy production through hydropower, and to energy conservation through inland waterborne transport. There is a lack of infrastructure in some parts of the world for inland waterborne transport and hydropower within the context of integrated water resources management.'



The two secretaries of PIANC Headquarters, Mrs. An Van Schel (left) and Mrs. Sabine Van de Velde (middle) with Mr. Bob Engler, first Chairman of the Environmental Commission and Mrs. Pat Engler.



At the fifth World Water Forum in Istanbul, March 2009, PIANC sponsored a special session on Inland Water Transport. Seen here are President Van der Eede and Professor Tatsuhiko of the Yokohama University, one of the speakers at the session.

National Sections

At the AGA 2007 in Kochi, India, it was decided to create an award for the Best Performing National Section of the previous year. Important selection criteria were: increase of membership, number of activities, number of Young Professionals in Working Groups, publication of a newsletter and gender friendliness. At the AGA, Mr. Eric Van den Eede gave an overview of the accomplishments of the nominees. After short presentations of each candidate, all First Delegates cast their votes. After having counted the votes, Vice-President Marcos Rita announced that the Netherlands was the first winners of the award. Mr. Wim Verhagen, who acted as First Delegate of the Netherlands in Beijing, received the Award and addressed the AGA expressing his gratitude for the distinction of his section. At the AGA 2009 in Helsinki, the section of the United States of America was chosen as Best Performing National Section.




In 2007, it was decided to establish an annual award for the Best Performing National Section. There are several criteria, such as increase of membership, participation of Young Professionals, having a newsletter, gender friendliness, etc. The first winner was the National Section of The Netherlands.

Three Gorges Dam



The Three Gorges Dam on the Yangtze River is a water project close to Yichang, China, serving flood control, power generation and improvement of the conditions for navigation. The whole project consists of a 2,335 m long and 101 m high dam, a two-way five step lock and a ship lift. The lock chambers have dimensions of $280 \times 34 \times 5$ m. The total capacity of the locks is estimated to reach 100 million tonnes per year.

The Three Gorges Dam is a water conservancy project in the Yangtze River, 40 km upstream of the existing Gezhouba dam and close to Yichang City, Peoples Republic of China. The whole project consist of a dam, a hydraulic power plant, a navigation lock and a ship lift. The Three Gorges Dam is a multi-purpose project serving three goals; flood control, power generation and improvement of the navigability of the dangerous to navigate Yangtse River. The construction works for



the project started in 1994 and it was put into operation on 16 June 2003. The dam wall is about 2,335 m long and 101 m high. The wall is maximum 175 m wide at the bottom and 40 m at the top. The project used 27.2 million m³ of concrete, 463,000 tonnes of steel and 102.6 million m³ of earth had to be moved. About 1.2 million people had to be relocated as a result of the dam.

For the first goal, flood control, water can be buffered behind the dam which makes it possible to control floods occurring about every 100 years. Until now, major flooding occurred every ten years, flooding vast areas and killing many people (over 33,000 people were killed in the 1954 flooding). For this purpose the water level is lowered from 175 m above sea level to 145 m above sea level to be able to store up to 22 billion m³. The dam is designed for a maximum water head of 113 m and creates a total storage capacity of 39 billion m³. The power generation comes from 34 turbines with a total installed power generation capacity of 22,400 MW. The average annual output is 84 trillion-watt-hours. The hydro-electric plant is expected to become fully operational in 2011. The improvement of the navigability will be reached both upstream and downstream of the dam. Upstream, the 660 km long waterway from Yichang City to Chongqing Municipality will be improved by the project due to the rising of the waterlevel in the basin. Downstream from the dam the navigability will be improved by raising the minimum discharge of the river in the dry season. Through the adjustment of the reservoir, the minimal flow downstream will increase from 3,000 m³/s to 5,000 m³/s.

The Three Gorges Ship lock is a two-way, five-step ship lock and is one of the two navigation structures. The other one is a ship lift for vessels up to 3,000 tonnes, allowing these vessels to pass the dam in half an hour. Construction of the lift started in 2007 and is expected to be completed by the year 2014. The ship lock is able to handle vessels up to 10,000 tonnes, the passage through all five steps takes about three hours in total. The entire structure consists of an upstream and downstream approach channel, the locks itself, the filling and emptying system in between the locks and a mountain drainage structure. The ten lock chambers (two times five) have dimensions of 280 m in length, 34 m width, and a depth on the sill of 5 m. The five-step lock can be operated at any combination of upper stream level and down stream level through different operation manners (using 3-step, 4-step and 5-step operation). The maximum water head of intermediate chambers is 45 m. The target filling time is twelve minutes for each chamber under the maximum water head. The locks are operated twenty-four hours a day. An increase of annual one-way navigation capacity up to Chongqing Municipality, from 10 million tonnes to 50 million tonnes is achieved with the project together with a decrease of 35% in navigation cost. The total capacity of the locks is expected to reach 100 million tonnes.



8. PIANC in the future

Although PIANC can rely on a very long-standing tradition, permanent efforts will be needed to safeguard the future of the Association. Even with the support of a future fulltime Secretary-General, the bulk of the activities will be borne by volunteers. In return, PIANC will have to deal with the changing needs of its membership, for instance on-line availability of technical reports. Important steps were made by the decisions of the 2009 Annual General Assembly. But there are global challenges to be faced too. The predicted climate change and resulting sea level rise will influence ports and navigation to a great extent. Sustainable development already was self-evident. But this is not enough. A proactive approach is necessary to keep port and waterway construction going: working with nature is needed more than ever.



Climate change creates new opportunities for navigation, such as new routes around the Arctic. When the winter period shortens and the polar ice disappears, no more ice-breakers will be needed to keep sea lanes open and ports accessible.

Climate change

Climate change is certainly one of the most important challenges of the 21st century. PIANC acknowledged the threat to navigation and established an expert group to review climate change drivers, impacts, responses and mitigation. Starting point was the 2007 assessment report of the

Intergovernmental Panel on Climate Change. The group reported in 2008 and concluded: 'Ideally, the navigation community will employ adaptive planning, operational and infrastructure decision-making that take into account natural and social system features and the impacts of incremental changes over time. A comprehensive systems



Due to climate change breakwaters will suffer from more frequent and stronger storms, thus influencing design conditions for breakwaters. PIANC will have to consider this matter, since the construction of breakwaters is a very costly matter.

approach that allows continuous upgrades as new knowledge emerges and new engineering practices are developed will support satisfactory system safety and performance under the dynamic conditions and in the face of non-linear processes associated with climate change.'

These findings were echoed in the resolution issued at the 2009 AGA. According to the resolution, the impact of climate change should be further considered in the context of navigation in terms of inland waterways, coastal and deep sea shipping. It is evident that major steps need to be taken to deal with the challenges created by climate change. From an inland navigation point of view, PIANC will actively consider how navigational infrastructure and operating criteria need to be modified to cope with more adverse conditions, ranging from sudden floods to ever more severe droughts. Within ports and their access channels, the implications of the sea level rise and also the possibility of increased sedimentation will be examined. More frequent and stronger storms are also challenges likely to be faced in the

future. In terms of deep sea navigation significant new opportunities are being created with the possibility of new routes around the Arctic, which may be beneficial in shortening journey times, reducing fuel consumption and greenhouse gas emissions. The use of new natural resources also generates opportunities. Equally, the window of waterway availability over the winter period may be extended for the benefit of inland waterborne transport. Without doubt PIANC will have to deal with such results of climate change, challenges if you like, in the future.

Working with Nature

From 1994 onwards the Environmental Commission has been dealing with sustainable development in the field of port and waterway construction. The conclusions of the 2006 Estoril Congress stated: 'The ever increasing concern for the environment in general and the potential for regional sediment management in particular are very important topics as well. Not only a very impressive number of land reclamation projects but also port extension



'Working with Nature' is the title of a position paper launched by PIANC in 2008, endorsed by its Sister Associations, CEDA and IADC. 'Working with Nature' sets out ways of achieving the project objectives by working with natural processes to deliver environmental protection, restoration or enhancement outcomes.

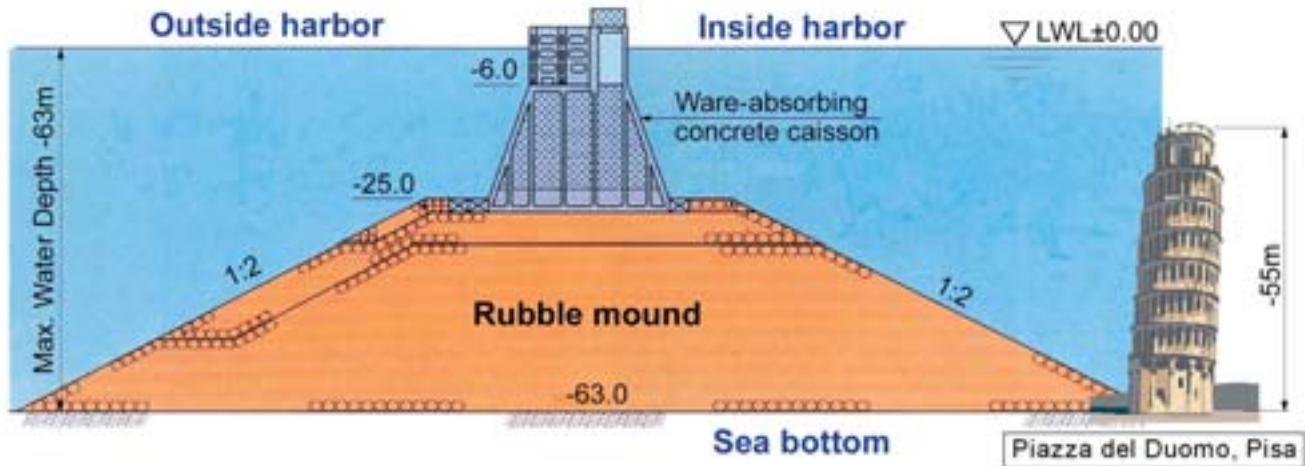
projects actually need the removal of millions of m³ of dredged material. These constructions will continue in the coming decade with a permanent control and attention for the environment related consequences. Again PIANC guidelines and recommendations and the contribution of a lot of PIANC experts/volunteers therefore will be highly appreciated by all parties concerned. Consequently this also will stress the necessity of drafting continuous updates. Balancing the environmental and economic aspects will be the formula to follow.' As a result of, among others, the efforts of PIANC dredged material is no longer considered as contaminated material but as a valuable resource. It is possible to assess and manage the environmental risks of dredging and disposal facilities and even to restore wetlands. But in the opinion of EnviCom another way of thinking is needed, a proactive and integrated approach to the design of ports and waterways: 'Working with Nature'.

In 2008 PIANC, supported and endorsed by its Sister Organisations CEDA and IADC, launched a position paper called 'Working with Nature'.

According to the paper 'Working with Nature' is an integrated process which involves working to identify and exploit win-win solutions, which respect nature and are acceptable to both project proponents and environmental stakeholders. It is an approach which needs to be applied early in a project when flexibility is still possible. Environmental issues have to be considered from the very beginning of the project. Thus the necessary Environmental Impact Assessment becomes an exercise in mitigation and damage limitation of the ecosystem. In fact 'Working with Nature' sets out ways of achieving the project objectives by working with natural processes to deliver environmental protection, restoration or enhancement outcome. Things should be done in a different order:

- Establish project need and objectives
- Understand the environment
- Use stakeholder engagement to identify win-win opportunities
- Design to benefit navigation *and* nature

Tsunami protection breakwater



The tsunami protection breakwater at the entrance of the Port of Kamaishi is an impressive structure. The maximum water depth is 63 m, which is more than the height of the Tower of Pisa. On top of a 30 m high foundation with crest width 100 m, stands a concrete wave-absorbing caisson.

The area off the Sanriku coast in Japan is coastline with narrow V-shaped bays. Because of this, tsunami height tends to rapidly increase as it moves deeper into the bay. Particularly, the 1897 Great Sanriku Tsunami caused unprecedented catastrophic damage in the city of Kamaishi, with casualties of 4,159 (approximately 60% of the city's population at the time) and 837 damaged homes (approximately 80% of all homes). In 1973, the Kamaishi Tsunami Countermeasures Committee with members from the Government, local municipalities, fishery and academic experts was established, and began to study permanent measures against tsunamis.

There are two types of tsunami protections: (1) to build a breakwater at the bay entrance to prevent tsunamis from entering the port and (2) to build a seawall along the waterfront line in the port. Breakwaters in (1) can protect the entire bay and requires no change to the existing facilities on the waterfront line. Seawalls in (2) are commonly constructed as a structure to protect against waves. In order to protect against tsunamis as high as the maximum run-up height of the past tsunami of over 7.9 m, a very high seawall is required along the waterfront line in the port, but it

would significantly interfere with activities on the waterfront. In 1978, the Ministry of Transport, initiated a project to construct a breakwater at the bay entrance area of the port of Kamaishi.

This tsunami breakwater consists of two parts: a 990 m north part and a 670 m south part with a 300 m wide opening in the middle as a waterway for large vessels. Furthermore, a submerged breakwater extending from the seabed to a water depth of 19 m was constructed beneath the waterway to increase the shielding effect of the bay against tsunamis. The water depth where the breakwater was featured with maximum of 63 m. The portion of the breakwater with a water depth below 50 m extends 1,200 m of the total length of 1,960 m, making it the world's deepest breakwater. Several new technologies were developed to construct this large and deep tsunami protection breakwater.

In waters deeper than 50 m, an accurate ground survey cannot be performed by a conventional boring derrick. Marine auto sampler survey equipment was installed on the seabed. Undisturbed samples were taken from the marine stratum by a remote control from the vessel and an N-value standard penetration test is carried out. The maximum work depth is 80 m and the maximum drilling length is 50 m. The system performs good on the seabed as well as on the ground.

The foundation mound of the tsunami protection breakwater is 30 m in height, 100 m crest width and 200 m bottom width. Rubble stones of 7,400,000 m³ were used to build the mound. A bottom-dump vessel equipped with position guidance systems was developed to accurately build the mound. An extensive area of dumped rubble stones at large depths cannot be leveled by divers. Therefore, a rubble leveling machine was developed, that can dump rubble stones to form the crown and flatten them at the same time.

As for the standard structure of the main part of the tsunami protection breakwater a wave-dissipating, horizontal double-slit caisson-composite breakwater structure was used for the first large caisson (30 m in length, 30 m in width, 30 m in height, 16,000 tonne trapezoidal caisson). A steel shell-concrete hybrid caisson was used for the opening (300 m wide) of the breakwater for the passage of vessels to reduce the duration of waterway closure and the weight of the caisson.

The entire tsunami protection breakwater was completed twenty-eight years after the construction began, with the completion of the south part in 2003 and the last caisson for the north part in 2006. The breakwater is expected not only to protect against damage from tsunamis, but also to utilise the calm sea protected by the breakwater for fisheries and other activities.



Port expansion projects like Rotterdam's Maasvlakte 2 have to deal with nature from the very beginning of the design process. After lengthy discussions with environmental groups, it was decided to compensate possible negative effects of the reclamation by establishing reserves in the North Sea and elsewhere.

So project objectives should be realised fitting in the ecosystem. The extension of the Rotterdam Maasvlakte is a good example. After lengthy discussions with environmental groups, it was decided to compensate possible negative effects of the reclamation by establishing reserves in the North Sea. In this way time consuming court cases were avoided or at least shortened. Le Havre Port 2000 in the river Seine estuary is another good example where possible negative environmental impacts have been prevented or compensated in order to improve the ecological conditions for the fauna and flora.

Despite PIANC's position paper and several good examples better understanding of the dynamic natural ecosystem is required. Research on cause and effect relationship is needed, as well as data collection and development of modelling tools. Here is the challenge for PIANC: stimulate the development and implementation of the 'Working with Nature' concept.

Publication policy

In 1926 the first PIANC Bulletin was published. In 2005, the Bulletin was transformed into the Magazine 'On Course' with four full-colour issues per year sent to all members. One of the issues used to be dedicated to the host country of the AGA or the Congress. The submissions for the De Paep-Willems Award formed another source for articles in the Magazine. Beside the usual technical articles, the Magazine contained a section 'News from the Navigation Community', short items on projects and developments in the field of interest of PIANC, provided by members acting as local correspondents. Moreover, the e-newsletter 'Sailing Ahead' was mailed six times per year for free to members and readable for non-members on the website. It contained news from the Association at national and international level, endeavouring to create a bond between the members. Apart from 'Sailing Ahead' there were several newsletters issued by National Sections, in most cases by e-mail. The

reports from Working Groups, considered as the most important product and reflecting the core-business of PIANC, were distributed free of charge to all members and for sale through the website. The English versions were printed and mailed and digitally published on the 'members only'-section of the website. The French versions were only published digitally.

The continuation of the Magazine depended to a great extent on the availability of high quality technical articles. The publication was supposed to attract a substantial number of advertisements, thus paying for itself. In reality too few articles were received and the network of correspondents for the section 'News from the Navigation Community' never met the expectations. Staff members of Headquarters had to collect interesting news items to fill this section of the Magazine. Income from advertisements was disappointing. On the other hand, the production and quality of Working Group reports was quite satisfying. But here was another problem: often the limitation to fifty pages turned out to be too few to publish the many interesting examples and case studies. And, worst of all, the knowledge of the outstanding technical work of PIANC, was limited to the membership of the Association.



The website www.pianc.org and the e-newsletter 'Sailing Ahead' have become more and more important for the contact between PIANC Headquarters and the membership. Webmaster and editor of 'Sailing Ahead' is Ms. Leen Weltens.

To deal with these problems, ExCom proposed a radical change of the publication policy to the 2009 AGA: Magazine and Working Group reports should be limited to digital publication on the website. Printed publications would still be possible, but as exceptions to the rule. The Magazine 'On Course' and the newsletter 'Sailing Ahead' would also be readable for non-members, Working Group reports only via the members only-section of the website. Non-members would be enabled to read part of the Working Group reports, just enough to stimulate them to purchase a downloadable version or, even better, to become members of PIANC.

This was a radical change indeed, but there was little discussion. The members of the General Assembly understood very well that a change like this was the only option to attain the badly needed increase of outreach of PIANC.

Safeguarding the future

The new policy resulted in considerable savings in printing and mailing costs. This enabled another major change: the employment of a fulltime Secretary-General. Such a fulltime employee was to the believe of the management team the only way to keep the Association running on the long term. In fact PIANC was one of the few international organisations without a professional Secretary General. Several adaptations of the Statutes and Rules & Regulations were necessary for this purpose. The AGA accepted the proposals without problems, although there was some discussion about the requirement of knowledge of the French language.


Many challenges have to be faced by the new Secretary-General. PIANC is forced to look for new audiences and new stakeholders. In order to be further recognised as a global player new Qualifying Members are needed, in particular in Africa, Asia and Latin-America. Even with the support of a fulltime Secretary-General, the bulk of the activities will be borne by volunteering experts from the large PIANC family. In that respect, President Van den Eede is concerned: 'The core business of PIANC is threatened by the availability of sufficient suitable experts, due to increasing workload both in the public and private sectors and budgetary matters such as limitation of expenses. If we add a certain decrease of interest by national authorities in membership in international Associations and the continuing privatisation trends in many countries in the ports and waterways sectors, PIANC will have to enhance its visibility in a very creative way'. Furthermore, the increase in the number of

Extension of the Panama Canal



The locks of the Panama Canal have become too small for the largest container vessels. In 2007 work commenced on the expansion of the canal. New locks will be 488 m long, 55 m wide and 18.3 m deep, which will allow the passage of container vessels of 12,500 TEU. This flight of locks has nine water reutilisation basins.

The increasing numbers of post-Panamax ships necessitated the Panama Canal Authority (PCA) to extend the capacity of the Panama Canal. It was anticipated that by 2011, 37% of the world's container ships would be too large for the existing canal. The maximum throughput of the canal would be reached before 2012. When the canal reaches this capacity it will no longer be able to handle demand growth, resulting in a reduction in the competitiveness of the Panama maritime route. The proposal of PCA states that strengthening its competitive position will allow the canal to accommodate future demand. An enlargement scheme to

An aerial photograph of the Panama Canal locks, showing the complex network of waterways, locks, and approach channels. The image is partially obscured by a vertical blue bar on the left side.

allow for a greater number of transits and the ability to handle larger ships, has been approved on a national referendum by approximately 80% on 22 October 2006.

Two new flights of locks are to be built: one to the east of the existing Gatún locks, and one south west of Miraflores locks, each supported by approach channels. Each flight will ascend from ocean level direct to the Gatún Lake level; the existing two-stage ascent at Miraflores / Pedro Miguel will not be replicated. The new lock chambers will feature sliding gates, doubled for safety, and will be 488 m long, 55 m wide, and 18.3 m deep; this will allow for the transit of vessels with a beam of up to 49 m, an overall length of up to 366 m and a draft of up to 15.2 m, equivalent to a container ship carrying around 12,500 TEU. The new locks will be supported by new approach channels, including a 6.2 km channel at Miraflores from the locks to the Gaillard Cut, skirting around Miraflores Lake. Each of these channels will be 218 m wide, which will require post-Panamax vessels to navigate the channels in one direction at a time. The Gaillard Cut and the channel through Gatún Lake will be widened to 280 m on the straight portions and no less than 366 m on the bends. The maximum level of Gatún Lake will be raised from reference height 26.7 m to 27.1 m.

Each flight of locks will be accompanied by nine water reutilisation basins (three per lock chamber), each basin being approximately 70 m wide, 430 m long and 5.50 m deep. These gravity-fed basins will allow 60% of the water used in each transit to be reused; the new locks will consequently use 7% less water per transit than each of the existing lock lanes. The deepening of Gatún Lake, and the raising of its maximum water level, will also provide significant extra water storage capacity. These measures are intended to allow the expanded canal to operate without the construction of new reservoirs. The new locks are expected to open for traffic in 2015. The present locks, which will be 100 years old by that time, will then have greater access for maintenance, and are projected to continue operating indefinitely.

On 3 September 2007, work commenced on the expansion of the canal, with thousands of Panamanians witnessing a huge explosion bite into a to mark the commencing of the earth works. The first phase of the project will be dry excavations of the 218 m wide trench connecting the Culebra Cut with the Pacific coast, removing 47 million m³ of earth and rock. The estimated cost of the project is 5.25 billion USD. The project is designed to allow for an anticipated growth in traffic from 280 million tonnes of cargo in 2005 to nearly 510 million tonnes in 2025; the expanded canal will have a maximum sustainable capacity of approximately 600 million tonnes per year. Tolls will continue to be calculated based on vessel tonnage, and will not depend on the locks used.

Associations, Congresses and Conferences concerning waterborne transport infrastructure and the availability of information on the internet are to be considered as threats as well. However, these threats can also be considered as a change for new ideas and ways to deal with in other ways with other subjects.

Only a sound financial capacity can guarantee the continuity of PIANC's future activities. The world-wide financial crisis of 2008-2010 did not hamper PIANC too much. The number of members decreased a little, but did not collapse. Of course the value of the portfolio showed a loss, up to 25%, but thanks to a conservative investment policy the decrease was much lesser than the losses of the stock exchange in general and recovery is to be expected. The Financial Commission draws budget and business plan in such a way that every cycle of four years results in a small profit. PIANC should not break into its reserves to cover the regular expenses and drastic increase of subventions and contributions should be avoided.

membres, total	
– Corporate Members	503
– Individual Members	2220
– Platinum Partners	6
active Working Groups	53
W.G. reports published	105

Status of PIANC, 1 January 2010

Does all this mean that the Association will have to adapt its vision and its mission and that even its mere existence is threatened? On the contrary, PIANC is convinced that impartial information will be even more recognised by the international and national bodies concerned. Therefore, of course, some boundary conditions are to be fulfilled:

- The continuing availability of a strong and inspiring management team supported by a well balanced and competent staff



The modern Liverpool Convention Centre alongside the Mersey River is the venue for the 2010 Congress and the celebration of 125 years of PIANC



Artist impression of inland navigation in future by the Das brothers: fast barges for the transport of liquid chemicals.

- A balanced budget only to be realised through increased membership, sufficient Platinum Partners, fair fees and responsible expenditure
- An enlarged visibility, supported by well-organised and targeted marketing, by high quality reports to all stakeholders, by the professional organisation of successful events on both national and international levels and by a selected outreach to the media with press releases on relevant matters. The possibilities of the internet should be fully exploited in this respect.
- Meeting the changing needs of its members by creating extra added value
- Continuing support to the Young Professionals and the Countries in Transition

The management team is aiming clearly to fulfill these conditions by paving the way for their successors before the end of its mandate. A particular point of attention in this respect is the hosting of the General Secretariat by the government of Flanders. Right from the start the Secretariat General was hosted by the Belgian and since 1990 by the Flemish government. The continuation of this situation will be a concern for the future management. Secretary-General Van Schel states:

‘We want to take this opportunity to express our gratitude towards the government of Flanders for hosting PIANC’s Headquarters at no cost for the Association, which contributes to a large extent to our healthy financial situation’.

Besides the current products, PIANC will increase the visibility and outcome of its activities by new initiatives, such as:

- Task Groups dealing with topics of importance such as climate change, safety, ‘Working with Nature’ in co-operation with non-traditional groups
- Co-operation with international bodies, such as IMO, UNESCO, etc.
- Being pro-actively involved in the elaboration of supra-national legislation related to its core business

With the help and enthusiastic input from all the members, PIANC’s future will be bright and successful. ‘*Navigare necesse*’, ‘Setting the Course’: PIANC will undoubtedly remain *the* World Association for Waterborne Transport Infrastructure in many years to come!


Palm Jebel Ali Island, Dubai



Dubai has a short coastline. The Palm Island adds 520 km of coastline, as well as a spectacular view from space. The reclamation and shaping of the island was a enormous dredging effort. Excavated material from the Port of Jebel Ali was used for reclamation and the work was carried out by a fleet of large sized suction hopper dredgers.

Dubai has only 40 km of coastline, which is rather short. The Palm Islands are adding 520 km of coastline, as well as offering a spectacular view on the Earth from space. The palm shape has been chosen not just for its aesthetic appeal but also for the fact that it affords the ideal geometry for creating maximum beach frontage. Each palm frond will have over 5,000 residents, 2,000 homes and a variety of shops, restaurants and entertainment attractions. Palm Island II will according to plan host a city of 300,000 inhabitants.

Dredging and reclamation works for the Palm Island in Dubai commenced in May 2002. After the successful story of the first island Palm Jumeirah largely completed at that time, the government decided to



call for the construction of a second even larger Palm Island at Jebel Ali. This artificial island has also the form of a palm tree. With a diameter of approximately 7.5 km counting 17 leaves up to 2.5 km each, and with as much beach as can possibly be realized, this island is 50% larger than the first palm island. The entire palm tree is protected from the tides and heavy seas by a 350 m wide and 17 km long breakwater built around the island. The construction works are scheduled to finish in 2009.

The winning contractor's offer was the most interesting, because it made the link between the dredging works for the widening and deepening project of the Jebel Ali Port Entrance and the Reclamation Works for Palm Island, thus using the suitable excavated material in the Port of Jebel Ali for the reclamation of the Palm and hence offering the best price. A separate contract in respect to the Jebel Ali Port was concluded with Dubai Ports, Customs & Free Zone Corporation.

The works involve the dredging and reclamation of some 210 million m³ of cap rock, sand, calcarenite and limestone. More than 10% of the material to be reclaimed is dredged from the nearby access channel of the Jebel Ali Port, which is deepened up to 17 m and widened up to 325 m.

The two contracts involve the use of large sized suction hopper dredgers, such as the Juan Sebastian de Elcano (16,500 m³), the Francis Beaufort (11,300 m³), and the Gerardus Mercator (18,000 m³). These twin screw vessels dredge suitable sand at a borrow area located 30 km offshore. On the other hand, this contract is primarily an important opportunity to utilize large cutter suction dredgers. For the Jebel Ali Port Entrance Channel, the heavy cutter suction dredges Marco Polo (16,116 kW), the Leonardo Da Vinci (20,260 kW) and the largest cutter suction dredge in the world, the JFJ De Nul (27,240 kW) are deployed for the dredging of the stiff caprock and stiff clay. These vessels also possess a unique barge loading system, which guarantee a higher productivity and larger flexibility in the working method.

Besides the dredging and reclamation works, slope protection works for the crescent have to be undertaken. This artificial peninsula is protected from the actions of the sea by approximately 10 million m³, equivalent to 20 million tonnes of rocks varying from 0.1 kg to 7,000 kg. All rock is being hauled by land from the Emirate Ras Al Khaimah to Jebel Ali Port, where it is being loaded into rock barges and placed into the breakwater revetment by a fleet of excavators, dumpers and bulldozers.

Annex 1: Congresses and annual meetings

Navigation Congresses

#	year	venue, country	delegates	partners ¹	countries	topics	papers
1	1885	Brussels, Belgium	400		13	9	13
2	1886	Vienna, Austria	307		12	4	7
3	1888	Frankfurt, Germany	710		12	6	14
4	1890	Manchester, UK	490		13	4	37
5	1892	Paris, France	1042		17	10	54
6	1894	The Hague, The Netherlands	1048		18	7	33
7	1898	Brussels, Belgium	1374		32	18	71
8	1900	Paris, France	1322		27	10	41
9	1902	Düsseldorf, Germany	1756	299	27	6	40
10	1905	Milan, Italy	2119	855	33	8	59
11	1908	St. Petersburg, Russia	1250		21	10	59
12	1912	Philadelphia, USA	750*		20	6	52
13	1923	London, UK	550*		29	5	41
14	1926	Cairo, Egypt	400*		36	9	77
15	1931	Venice, Italy	915		45	11	97
16	1935	Brussels, Belgium	700*		43	11	108
17	1949	Lisbon, Portugal	500		24	12	110
18	1953	Rome, Italy	686		36	13	94
19	1957	London, UK	960		44	11	105
20	1961	Baltimore, USA	750*		46	11	120
21	1965	Stockholm, Sweden	1100		36	12	130
22	1969	Paris, France	950*		35	12	107
23	1973	Ottawa, Canada	700*		26	12	133
24	1977	Leningrad, USSR	764		32	10	111
25	1981	Edinburgh, UK	1050*		56	10	125
26	1985	Brussels, Belgium	721	130	62	10	133
27	1990	Osaka, Japan	876	263	46	10	121
28	1994	Sevilla, Spain	607	322	47	10	163
29	1998	The Hague, The Netherlands	432	123	43	10	85
30	2002	Sydney, Australia	504	158	39	22	127 + 34P
31	2006	Estoril, Portugal	552	97	40	16	238 + 18P
32	2010	Liverpool, UK					

¹ = where recorded

* = approximately

P = poster presentation

Annual Meetings

As a rule, before the World War II the Annual Meetings of the Permanent International Commission were held in Brussels or at the location of the the Navigation Congress. The latter are marked with an *. The only exemption was Antwerpen in 1924. Only the postwar PIC meetings have been recorded here. After the turn of the century, the PIC meeting was called Annual General Assembly (AGA).

1948	Antwerpen, Belgium	1985	Brussels, Belgium *
1949	Lisbon, Portugal *	1986	Portland, Oregon, USA
1950	Brussels, Belgium	1987	Agadir, Morocco
1951	Brussels, Belgium	1988	Stettin, Poland
1952	Brussels, Belgium	1989	Munich, Germany
1953	Rome, Italy *	1990	Osaka, Japan *
1954	Brussels, Belgium	1991	Copenhagen, Denmark
1955	Paris, France	1992	Valencia, Spain
1956	Brussels, Belgium	1993	Rotterdam, The Netherlands
1957	London, UK *	1994	Sevilla, Spain *
1958	Brussels, Belgium	1995	New Orleans, Louisiana, USA
1959	Brussels, Belgium	1996	Durban, South Africa
1960	Paris, France	1997	Venice, Italy
1961	Baltimore, USA *	1998	The Hague, The Netherlands *
1962	Brussels, Belgium	1999	Ghent, Belgium
1963	Brussels, Belgium	2000	London, UK
1964	Basel, Switzerland	2001	Paris, France
1965	Stockholm, Sweden *	2002	Sydney, Australia *
1966	Brussels, Belgium	2003	Bergen, Norway
1967	London, UK	2004	Fukuoka, Japan
1968	Monte Carlo, Monaco	2005	Charleston, South Carolina, USA
1969	Paris, France *	2006	Estoril, Portugal *
1970	Lisbon, Portugal	2007	Kochi, India
1971	Madrid, Spain	2008	Beijing, China
1972	Palermo, Italy	2009	Helsinki, Finland
1973	Ottawa, Canada *	2010	Liverpool, UK *
1974	Rotterdam, The Netherlands		
1975	Hamburg, Germany		
1976	Washington, DC, USA		
1977	Leningrad, USSR *		
1978	Tokyo, Japan		
1979	Oslo, Norway		
1980	Naples, Italy		
1981	Edinburgh, UK *		
1982	Monte Carlo, Monaco		
1983	Wiesbaden, Germany		
1984	Helsinki, Finland		

COPEDEC Conferences

1.	1983	Colombo, Sri Lanka
2.	1987	Beijing, China
3.	1991	Mombassa, Kenya
4.	1995	Rio de Janeiro, Brasil
5.	1999	Cape Town, South Africa
6.	2003	Colombo, Sri Lanka
7.	2008	Dubai, United Arab Emirates

Annex 2: Member countries

Review of the countries and international bodies, which are or have been members of PIANC between 1885 and 2009. Member countries in 2010 are marked with *. Commissions with an observer status are marked by **.

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PIANC 1885-2010 AIPCN

Algeria	Liberia
Angola	Madagascar
Argentina *	Mexico
Australia *	Monaco *
Austria *	Morocco *
Bangladesh	Mozambique
Belgian Congo	Netherlands *
Belgium *	Netherlands East India
Brasil *	New Zealand
British India	Nigeria
Bulgaria	Norway *
Cambodia *	Pakistan
Cameroon	Persia
Canada *	Peru
Ceylon	Poland *
Chile	Portugal *
China *	Rumania *
Czechoslovakia	Russian Federation
Czech Republic *	Serbia *
Denmark *	Senegal
Egypt *	Slovakia
Estonia *	South Africa *
Finland *	Sovjet Union
France *	Spain *
French Equatorial Africa	Sweden *
French West Africa	Switzerland *
Gambia	Thailand
Germany *	Tunisia
Greece	Uganda
Hungary	United States of America
Iceland *	United Kingdom *
India *	Uruguay
Indonesia	Venezuela
Indochina	Vietnam *
Ireland	Yugoslavia
Israël	
Italy *	Danube Commission **
Ivory Coast	Elbe Commission
Japan *	Rhine Commission *
Korea *	Suez Canal Company
Laos *	League of Nations

Annex 3:

Office bearers

The Permanent International Commission of Navigation Congresses, comparable with the present Annual General Assembly, had its first meeting on 24 June 1901. From 1885 to 1901, there only was an ad hoc Congress organisation. The President of these Congresses acted as the President of PIANC until the formation of the Organising Committee for the next Congress. As a rule, he was assisted by several Vice-Presidents and Secretaries.

In 1894, the Inland Navigation Congress and the Ocean Navigation Congress decided to merge. As a result, the first joint International Navigation Congress was held in 1898.

Inland Navigation Congress

President:

M.L. Somzée (1885)
C. Kinsky (1886)
D. Miquel (1888)
M. Hicks Beach (1890)
M. Cousté (1892)
J.F.W. Conrad (1894)

A. Lambin (1921 - 1927)
M.J. Millecam (1928 - 1956)
R. De Naeyer (1956 - 1958)
H. Vandervelde (1959 - 1991)
B. Faes (1991 - 1993)
C. Van Begin (1993 - 1999)
L. Van Schel (1999...)

Vice-President:

W.G. Harris (1976 - 1979)
D. Laval (1976 - 1979)
J.W. Morris (1976 - 1980)
S. Kuchkin (1976 - 1980)
M. Martinez Catena (1979 - 1983)
K.I. Lasson (1979 - 1983)
R. De Paepe (1979 - 1982)
K.F. Valken (1980 - 1985)
F.M. Abecasis (1980 - 1985)
J. Chapon (1983 - 1986)
E.R. Heiberg III (1983 - 1987)
M. Hager (1985 - 1988)
E. Baratono (1985 - 1989)
J.H.H. Gillespie (1986 - 1990)
J.P. Abizanda (1987 - 1991)
K. Okubo (1988 - 1992)
C. van der Burgt (1989 - 1993)
J.A. Saisto (1990 - 1994)
P. Savey (1991 - 1995)
J.H. Sargent (1992 - 1996)
H. Hatch (1993 - 1996)
H. Cook (1996 - 1997)
J.J. Dalac (1994 - 1998)
K. Mikanagi (1995 - 1999)
N. Krause (1996 - 1997)
A. Fuglum (1997 - 2001)
A. Ferrante (1997 - 2000)
H.N. Schroten (1998 - 2002)
W.D. Ritchie (1999 - 2003)

Ocean Navigation Congress

President:

M.E. Bernard (1889)

International Navigation Congress

President(s):

G. Helleputte + L. de Rote (1898)
M. Couvreur + M. Holtz (1900)
G. Helleputte (1901 - 1925)
L. De Rote (1901 - 1903)
A. Debeil (1904 - 1909)
A. Dufourny (1910 - 1923)
E. Gevaert (1923 - 1926)
S.E. Van de Vyvere (1925 - 1956)
D. Bouckaert (1926 - 1939)
R. De Naeyer (1948 - 1956)
O. Vanaudenhove (1956 - 1975)
G. Willems (1956 - 1982)
R. De Paepe (1982 - 1999)
E. Van den Eede (1999...)

Secretary-General:

A. Dufourny (1901 - 1910)
J. Richald (1910 - 1921)

S. Ghosh (2000 - 2004)
 S. Noda (2001 - 2005)
 H. Brühl (2002 - 2006)
 T. Wakeman (2003 - 2007)
 G. Caude (2004 - 2008)
 R.K. Jain (2005 - 2008)
 M. Marcos Rita (2006 - 2010)
 S. Batra (2007 ...)
 R. Srivastava (2008 - 2009)
 Y. Kawashima (2008...)
 M. Fernández Alonso (2009...)

Chairman PTC I / InCom:

J.C. Ailleret (1980 - 1983)
 P. Savey (1983 - 2000)
 C. Jamet (2000 - 2004)
 Ms. S. Knight (2004 - 2007)
 I. White (2007 ...)

Chairman PTC II / MarCom:

C. van der Burgt (1980 - 1995)
 D. Tromp (1995 - 2007)
 G. Caude (2007 ...)

Chairman SPN / RecCom:

P. Hofman Frisch (1982 - 1994)
 C.D. van der Wildt (1994 - 2005)
 M. Conti (2005 - 2009)
 E. Ciralli (2009...)

Chairman PEC / EnviCom:

R. Engler (1994 - 2008)
 H. Köthe (2006...)

Chairman PCDC / CoCom:

E. Loewy (1977 - 1985)
 F.M. Abecasis (1985 - 1987)
 C. Warming (1987 - 1989)
 R.A.J. Simoen (1989 - 1996)
 H. Velsink (1996 - 2001)
 F. Kapp (2001 - 2005)
 H. Ligteringen (2005 - 2009)
 E.J. Smeltz (2009...)
 A.R. Rao (2009...)

Chairman FinCom:

W.R. Murden (1983 - 1991)
 R.P. Sybesma (1991 - 1994)
 E. Almagia (1994 - 2002)
 M. Japes (2002 - 2006)
 J.U. Brolsma (2006...)

Chairman YP-Com:

H. Schüttrumpf (2006 - 2009)
 V. Borges Nunes (2009...)

COPEDEC

President:

S. Amarasinghe (1983 - 2006)
 R. Galappatti (2006 - 2008)

Annex 4: Awards

Gustave Willems Award

The aim of the De Paepe-Willems Award is to encourage Young Professionals to submit for presentation outstanding technical articles in the fields of interest of PIANC. The annual Gustave Willems Award was established in honour of Professor Gustave Willems, President of PIANC from 1956 until his death in 1982.

1985	J.D. Simm: Rapid harbour construction at Ras Lanuf, Libya
1986	J.V. Smallman: The use of physical and computational models in the hydraulic design of coastal harbours L. Hamm: Analyse de l'évolution des fonds dans l'estuaire de la Seine
1987	M.A. Knott: Ship Collision with Bridges
1988	J.L. Jaeger: Rotary Valve – The New Way to Fill and Empty a Lock Chamber
1989	Ph. Rigo: LBR—3, the computation and design software for the stiffened hydraulic structures
1990	R.D. Davinroy: Bendway Weirs, a new structural solution to navigation problems experienced on the Mississippi River
1991	A. Lamrini: Le transport inter-urbain des marchandises par cabotage maritime
1992	G. Collilieux: Voies navigables et environnement – Mise en valeur biologique des milieux navigués
1994	Ms. E. Paipai: Environmental Enhancement using Dredged Material
1995	D. Reeve: Stochastic Methods for Maritime Resource Stewardship
1996	P.Ph.A.C. Savenije: Probabilistic Admittance Policy Deep Draught Vessels
1997	Ms. J.L. Irish: Sensitivity of Channel Sedimentation Prediction to Wave-field Characterization
1998	J.R. Iribarren: Determining the horizontal dimensions of ship manoeuvring areas – General recommendations and simulator studies
1999	F.L. Martin: Experimental study of waves forces on rubble mound breakwater crown walls
2001	P. Troch: Experimental study and numerical modelling of pore pressure attenuation inside a rubble mound breakwater.
2002	M. Clarke: The restoration of Anderton Boat Lift

PIANC De Paepe-Willems Award

When the successor of Mr. Willems, Mr. Robert De Paepe retired in 2000, a fund was created in his memory. In 2002, it was decided to merge the Foundation Robert De Paepe with the Gustave Willems Award. From 2003, the Award is known as the PIANC De Paepe-Willems Award.

2003	H. Schüttrumpf: Wave Overtopping Flow on Seadikes, Experimental and Theoretical Investigations
2004	E. Fananello: Hydraulic Modelling to Revise the Sluice Gate Control Logic at Cardiff Bay Barrage
2005	J.L. Lara: A Numerical Wave Flume to Study the Functionality and Stability of Coastal Structures
2006	M. Bleck: The Hydraulic Function of Artificial Reefs
2007	A.A. Roubos: Dealing with Uncertainties in the Design of Bottom Protection near Quay Walls
2008	W. Glamore: Managing and assessing boat wake waves
2009	Ms. Y. van Kruchten: A probabilistic analysis of the ecological effects of sand mining for Maasvlakte 2
2010	T. Gernay: Optimisation and analysis of lock gates in the framework of the "Seine - Escaut - Est" waterway upgrading

Jack Nichol Award

In 2001, Jack Nichol, a long time and active member of RecCom and well-known marina designer, suddenly passed away. The United States Section of PIANC proposed to establish an award in his memory. The purpose of the Jack Nichol Award for Outstanding Marina Design is to recognise excellence in the design of recreational boating facilities around the world.

2003	Cabrillo Marina, Los Angeles, USA
2004	Marina Punta Gabianni, Marano, Italy
2005	Hammond Marina, Indiana, USA
2006	Marina de Portimao, Algarve, Portugal
2009	Charleston City Marina, USA
2010	Bahia Mar Yachting Center, in Fort Lauderdale, Florida, USA

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Best Performing National Section

At the AGA 2006, it was decided to establish an Award for the Best Performing National Section. The Award was first presented at the AGA 2007.

2008	Netherlands
2009	United States of America

Annex 5:

Major publications of PIANC

In addition to papers, that were presented at Congresses and Congress proceedings, PIANC published:

- 1934 Illustrated Technical Dictionary, Chapter X: River Weirs
- 1936 Illustrated Technical Dictionary, Chapter VIII: Locks and Dry Docks
- 1938 Illustrated Technical Dictionary, Chapter VII: Ports
- 1939 Illustrated Technical Dictionary, Chapter II: Rivers, Streams, Canals
- 1951 Illustrated Technical Dictionary, Chapter V: Materials
- 1957 Illustrated Technical Dictionary, Chapter I: The Sea
- 1959 Illustrated Technical Dictionary, Chapter VI: Construction, Plant and Methods
- 1963 Illustrated Technical Dictionary, Chapter XII: Maritime Signals
- 1967 Illustrated Technical Dictionary, Chapter IV: Boats & Vessels
- 1968 International Oil Tankers Commission
- 1971 International Commission of the Standardisation of Roll-on/Roll-off Ships and Berths
- 1972 International Commission for the Classification of Soils to be Dredged
- 1973 International Commission for the Study of Waves, first part
Big Tankers and their Reception
- 1976 Yacht Harbours: General Dimensions and Design
- 1977 International Commission for the Study of Waves, second part
International Commission for the Reception of Large Ships (ICORELS)
International Commission for Sport and Pleasure Navigation
International Commission for the Study of the Environmental Effects of Dredging
- 1979 Standards for the construction, equipment and operation of yacht harbours and marinas with special reference to the environment
- 1980 International Commission for the Study of Waves, final report
Dry Berthing of Pleasure Boats
- 1981 Design of Breakwaters for Yacht Harbours
- 1982 Recommendations for Port Traffic Signals
- 1983 Navigation in Muddy Areas
- 1984 Classification of Soils and Rocks to be Dredged
Economic Implications of Inland Waterway Development
International Commission for Improving the Design of Fender Systems
- 1985 The Stability of Rubble Mound Breakwaters in Deeper Water
Dangerous Goods in Ports
Port Maintenance Handbook, Chapter 5: Mechanical equipment
Underkeel Clearance for Large Ships in Maritime Fairways with Hard Bottom
- 1986 List of Sea State Parameters
International Commission for the Study of Locks
Disposal of Dredged Material at Sea
Port Maintenance Handbook, Chapter 3: Roads and storage areas
- 1987 Risk Consideration when Determining Bank Protection Requirements
Guidelines for the Design and Construction of Flexible Revetments Incorporating Geo-textiles for Inland Waterways
Development of Modern Marine Terminals
- 1988 The Provision of Navigation Aids for Pleasure Craft
Commission for the Study of Dry Docks
- 1989 Ship Lifts
Economic Methods of Channel Maintenance

- 1990 Supervision and Control of Long Lateral Embankments
Automatic Management of Canalized Waterways and its Hydraulic Problems
Management of Dredged Material from Inland Waterways
Standardization of Inland Waterways Dimensions
The Damage Inflicted by Ships with Bulbous Bows on Underwater Structures
Inspection, Maintenance and Repair of Maritime Structures Exposed to Material Degradation Caused by a Salt Water Environment
- 1991 Analysis of Costs of Operating Vessels on Inland Waterways
Facility and Management Specification for Marine Yacht Harbours
Port Maintenance Handbook, Chapter 4: Railways
- 1992 Beneficial Uses of Dredged Material
Capability of Ship Manoeuvring Simulation Models for Approach Channels and Fairways in Harbours
Analysis of Rubble Mound Breakwaters
Guidelines for the Design and Construction of Flexible Revetments Incorporating Geotextiles in Marine Environment
Container Transport with Inland Vessels
- 1993 Problems created by Saltwater Infiltration
- 1994 Floating Breakwaters, a Practical Guide for Design and Construction
- 1995 Port Facilities for Ferries
Criteria for Movements of Moored Ships in Harbours
Guidelines for the Use of Certain Powered Craft, such as Waterscooters
Centenary of the Permanent International Association of Navigation Congresses 1885-1985
- 1996 Handling and Treatment of Contaminated Dredged Material from Ports and Inland Waterways
Pictograms for Pleasure Navigation
Advanced and Automated Operation of Locks and Bridges
Reinforced Vegetative Bank Protections Utilising Geotextiles
Standardization of Ships and Inland Waterways for River/Sea Navigation
Handling and Treatment of Contaminated Dredged Material from Ports and Inland Waterways, Volume 1
- 1997 Guidelines for the design of armoured slopes under open piled quay walls
Approach channels, a guide for design
Guidance on marine sanitation pumpouts
Review of selected standards for floating dock designs
Dredged Material Management Guide
- 1998 Management of Aquatic Disposal of Dredged Material
Life cycle management of port structures
Planning of fishing ports
Handling and Treatment of Contaminated Dredged Material from Ports and Inland Waterways
- 1999 Inland waterway vessels and pollution
Factors involved in standardising the dimensions of class Vb waterways
Environmental management framework for ports and related industries
- 2000 Glossary of environmental terms and terminology
Dangerous cargoes in ports
Site investigation requirements for dredging works
Standards for the use of inland waterways by recreational craft
- 2001 Ship Collisions due to the Presence of Bridges
Vessel Traffic and Transport Management in the Inland Waterways and Modern Information Systems
Marina Service Connections
Seismic design guidelines for port structures
Management of Contaminated Dredged Material (Technical Brief)
- 2002 Guidelines for the design of fender systems
Mooring Systems for Recreational Craft
Recreational Navigation and Nature
Environmental guidelines for aquatic, nearshore and upland confines disposal facilities for contaminated dredged material
River Information Services (Technical Brief)

- 2003 Guidelines for managing wake wash from high speed vessels
 State-of-the-art of designing and constructing berm breakwaters
 Breakwaters with vertical and inclined concrete walls
 Ecological and engineering guidelines for wetlands restoration
 Guidelines for Sustainable Inland Waterways and Navigation
 Robert De Paepe and Gustave Willems: two PIANC Presidents who set a path to follow
- 2004 Technical and economic problems of channel icing
 Guidelines and recommendations for River Information Services
 Inspection, maintenance and repair of maritime constructions exposed to damage and material degradation caused by a salt-water environment
 Disability access guidelines for recreational boating facilities
 Dredging of marinas
- 2005 Economic aspects of inland waterways
 Bird habitat management in ports and waterways
 Catalogue of prefabricated elements
 Accelerated low water corrosion
- 2006 Maintenance and renovation of navigation infrastructure
 Design of movable weirs and storm surge barriers
 Environmental risk assessment of dredging and disposal operations
 Biological assessment guidance for dredged material
- 2008 Protecting water quality in marinas
 Climate change and navigation
 Automation and remote operation of locks and bridges
 Ports located in small islands
 Considerations to reduce environmental impacts of vessels
 Minimising harbour siltation
 Life cycle management of port infrastructures
- 2009 Dredging management practices for the environment
 Dredged material as a resource
 The use of alternative materials in marine structure construction
 Sustainable waterways within the context of navigation and flood management
 Long term management of Confined Disposal Facilities for dredged material

Annex 6: Statutes

Part 1: Name, seat, aim and duration

Art. 1. The initial name of “Permanent International Association of Navigation Congresses” established in Brussels in 1885 will be changed to “PIANC”. It is an international scientific and technical non-political and non-profit making Association constituted in accordance with and governed by Belgian law, and particularly by the provisions of title III of the law of 27 June 1921 on non-profit associations, international non-profit associations and foundations (hereafter called “the law”). The Association is sponsored by national, federal and regional Governments or their representative bodies and is open to membership by corporate organizations and by individuals.

Art. 2. The seat of the Association is located in the Brussels region of Belgium. Its current seat is located in 1000 Brussels, Boulevard du Roi Albert II, 20, 11th floor, box 3. It can be transferred anywhere in the Brussels region by a decision of the Council. Any such transfer will be published in the Annexes to the Belgian Official Journal.

Art. 3a. The aim and the objectives of the Association are to advance, on a worldwide basis, the sustainable development of all kinds of waterborne navigation by:

- g. identifying and disseminating world best practice (guidelines, recommendations, standards) and providing access to international data, in order to bring about improved decision making based on professionally sound and impartial information;
- h. being the international forum for analysis and discussion of all aspects of waterborne transport including policy, management, design, economics, integration with other transport modes, technology, safety and environment;
- i. contributing to the integrated management of navigable water systems;
- j. recognizing the special needs of countries in transition and providing appropriate assistance and advice;
- k. promoting a comprehensive network of international navigation and port professionals and other stakeholders;
- l. co-operating closely with other associations in the field of ports, waterways, coastal zone management and related subjects.

The Association can undertake any other activity directly or indirectly related to its aim. To achieve its aim, the Association can create commissions and working groups.

Art. 3b. These statutes will be complemented by “rules and regulations” which will define, insofar as is necessary, the internal procedures to be followed to achieve this aim.

Art. 3c. The official languages of the Association are English and French. Other languages may be employed where appropriate for specific activities such as meetings, conferences and in local publications outside English or French speaking countries.

Art. 4. The Association is constituted for an unlimited duration.

Part 2: Membership

Art. 5. The number of members is unlimited; it shall however not be less than three.

Art. 6. The Association is composed of qualifying members, subscribing members and honorary members, who can be both legal and natural persons.

Art. 7a. The qualifying members of the Association, having the right to vote in the General Assembly, are:

- national governments;
- regional governments of a national state;
- national sections or national bodies from countries of which the governments are not (any more) a qualifying member; these national sections or national bodies shall obtain the same rights and duties as governmental members after approval of their membership by the General Assembly (GA);
- intergovernmental organizations.

Art. 7b. The subscribing members, with advisory status are: representatives of regional groups and members registered in a personal capacity, be they individual or corporate members who pay an annual subscription to the Association.

Art. 7c. The honorary members with advisory status are: all persons approved by the General Assembly who have given significant service or substantial support for the Association.

Art. 8. Any member is free to withdraw from the Association by submitting a written letter of resignation to the General Secretariat. Expulsion of members can only be decided by the General Assembly, after having invited the member in question to present its defense.

Art. 9. Resigning, expelled or deceased members, and their heirs or legal successors, have no rights to the assets of the Association. They cannot claim reimbursement of the partial or full amount of contributions.

Art. 10. The annual fees to be paid by members is set by the General Assembly. It can set different amounts for qualifying, subscribing and honorary members.

The annual subvention of qualifying members cannot be higher than € 50,000.

The annual subscription fee of subscribing members cannot be higher than € 20,000.

The annual subscription of honorary members cannot be higher than € 500.

Members who default on payment of their subventions or subscription fees for two years cease to be members of the association.

Art. 11. Under no circumstances are members personally liable for commitments of the Association.

Part 3: General Assembly

Art. 12. The General Assembly includes all members.

Only the qualifying members mentioned in art. 7a have the right to vote.

The General Assembly (GA) shall consist of delegations from countries having paid at least the minimum subvention for the previous year. The number of delegates to the GA which each country is entitled to send to a meeting of the GA shall be a Chief Delegate and a number of delegates determined by the formula:

$$\frac{A + B}{C}$$

where:

A = the actual subvention paid by the Government, national section or national body

B = the sum of corporate and individual subscriptions from that country

C = the minimum subvention

The maximum number of delegates who may attend a meeting of the GA shall be ten plus the Chief Delegate.

In determining the total number of delegates any fraction of ½ or less shall be ignored; any fraction over ½ shall count as one delegate.

Are also invited to the GA:

- all the members of the Executive Committee;
- as observers, representatives of the organizing committee of future GA's and Congresses;
- chairpersons of working groups when needed.

The Association recognizes only one national delegation at the meetings of the GA. Only the Chief Delegate of each national delegation, or his alternate, attending the meeting shall be entitled to participate in any formal vote and it shall be the responsibility of the Chief Delegate to determine in what way the total votes of his delegation shall be cast. The Chief Delegate of each national delegation shall dispose of one vote for each delegate that his country is entitled to send to the GA.

Each qualifying member has the right to be represented at the General Assembly by another qualifying member.

Each qualifying member can act as proxy for only one other qualifying member.

Art. 13. The General Assembly is competent for:

- a. amendments to the statutes;
- b. approval of the rules and regulations;
- c. appointment and dismissal of Council members on proposal of the national sections;
- d. appointment of the President, Secretary-General and 4 Vice-Presidents in accordance with the rules and regulations;
- e. approval of strategic plans;
- f. approval of budgets, accounts and management reports;
- g. approval of subventions and subscriptions;
- h. approval of new commissions;
- i. approval of congresses,
- j. approval of cooperation agreements;
- k. appointment and dismissal of auditors;
- l. discharge to be given to Council members and auditors;
- m. expulsion of members;
- n. voluntary dissolution of the Association;
- o. transformation of the Association into an organization with a social aim.

Art. 14. The General Assembly must be held at least once in the first half of every year. All qualifying members shall be invited. Subscribing members and honorary members can be invited, with advisory status, by the Council. The General Assembly can be convened extraordinarily at the request of the President or of two Council members. It shall also be convened when at least one-fifth of the qualifying members so request.

Art. 15. The General Assembly shall be held on the day, hour and place indicated in the invitation. The General Assembly is convened by the Council by an ordinary letter, signed by the President, at least thirty days before the meeting and mentioning the agenda. The agenda is set by the Council. The supporting documents are attached to the invitation.

Any proposal signed by at least one twentieth of the qualifying members shall be put on the agenda. The General Assembly can take valid decisions on items that are not on the agenda – except for decisions requiring special majorities as specified in Art. 17 – if one-third of the members present so request.

Art. 16. The General Assembly is presided over by the President and in the event that he is absent or unable to attend, by the senior Vice-President present, failing which the GA by simple majority decides who will preside.

Art. 17. Except in the special cases stipulated by the law and listed hereafter, the General Assembly may decide by a simple majority of votes, if half of the qualifying members are present or represented.

In the event of a tie, the vote of the President is decisive.

In the following special cases a simple majority is not sufficient:

- a. To review and change the statutes and the financial provisions covered in the Rules and Regulations, the General Assembly must consist of at least two thirds of the qualifying members, present or represented. The proposed changes must be explicitly mentioned in the invitation. Any change needs at least a majority of two thirds of the qualifying members present or represented. However, changes with respect to the aim and objectives of the Association can only be approved with a majority of four fifths of the qualifying members present or represented. In case the two thirds of the qualifying members are not present or represented at the first meeting, a second meeting shall be held that shall decide regardless the number of qualifying members present or represented. The modifications will than be approved with a majority of two thirds of the qualifying members present or represented and a majority of four fifths of the qualifying members present or represented for the modification of the aim of the Association. This second meeting shall be held at least thirty days after the first meeting.
- b. Amendments to the statutes will be submitted to the Federal Justice Public Service and published in the annexes of the Belgian official journal, pursuant to the law.
- c. Dissolution of the association requires the same conditions as the change of the aim of the Association.

- d. To expel a qualifying member for other reasons than mentioned in art. 10 a majority of two thirds of the qualifying members present or represented is necessary.

Art. 18. The decisions of the General Assembly are recorded in minutes, signed by the President and recorded in a special register. Any member can obtain a copy of the minutes. Extracts to be provided, in a court of law or elsewhere, are to be validly signed by the President.

Part 4: Council

Art. 19. The Association is directed by a Council consisting of at least 10 persons. Council membership is as follows:

- a. one representative per government, national section or national body: The governments, national sections or national bodies are represented by a Chief delegate or his/her substitute. The duration of his/her term and the maximum number of terms that he/she can fulfil are defined in the national statutes
- b. The President whom is elected for a term of 4 years and for a maximum of three terms. The president is elected by the General Assembly by a simple majority of votes of qualifying members present or represented. If no candidate does obtain such a majority, a second ballot will be held between the two candidates that received most votes. In the event of a tie another ballot will be held until a candidate achieves a majority. The term of office may also be terminated either by resignation or by a vote taken at an annual or extraordinary meeting of the GA convened in accordance with Article 14, the agenda of which shall contain a specific reference to the proposed termination and at which the President shall have been heard in person. The decision may also be taken in his absence if proof of his summons can be produced.
- c. The 4 Vice – Presidents whom are elected for a term of 4 years and can serve only one term. They shall be elected by a consensus agreement or by a simple majority of votes of the qualifying members present or represented at the General Assembly. One Vice-President will be replaced each year at the occasion of the GA. At any time there shall be at least one Vice-President representing each of the three regions North and South America, Europe and Africa, Asia and Oceania.
- d. The Secretary – General whom is elected for a term of eight years. He is elected by a consensus agreement or by a simple majority of votes of the qualifying members present or represented at the General Assembly. The appointment shall become effective

only after a probation period of two years. The Secretary-General shall be eligible for further terms of four years.

- e. The Commission Chairpersons whom are appointed by the Council for a four-year term of duty and can serve only three terms.

Other persons determined in the internal Rules & Regulations can be invited to take part in Council meetings as observers.

The Council is presided over by the President and in the event that he is absent or unable to attend by the Senior Vice-President present, failing which the Council by simple majority decides who will preside.

The individuals mentioned under a. are members with voting rights. The President is a member with voting rights only in the case of a tie. The individuals mentioned under c., d. and e. are members without voting rights.

At the end of their term of duty or in case of resignation, outgoing Council members remain on the Council until their effective replacement.

Art. 20. The Council meets when convened by the President or by two Council members. The letter of invitation signed by the President shall include with the agenda, the day, the hour and venue of the meeting.

Art. 21. The Council can take decisions only if a majority of its members are present or represented. The decisions are taken by a simple majority of votes, without taking account of abstentions. Each member present or represented has one vote. In the event of a tie, the vote of the President is decisive. Every Council member can be represented by another member. Every Council member can act as proxy for only an other Council member.

Art. 22. The decisions of the Council are recorded in minutes, signed by the President and recorded in a special register. Any member can obtain a copy of the minutes. Extracts to be provided, in court or elsewhere, are to be validly signed by the President.

Art. 23. The Council has the power to direct and manage the Association. It represents the Association in judicial and other acts. It represents the Association as plaintiff or defendant in any judicial proceedings. It decides on any action and any arguments to be presented in judicial proceedings. The mandate to represent the Association in court can be given to the Secretary-General.

It is competent for any act, of any kind, concerning both management and policy, and particularly for the disposal of all movable and immovable property, free of charge or for consideration, for constituting or striking any mortgage registration, for taking out or granting any loan and setting the term, for carrying out any commercial or banking act.

The Council reports to the General Assembly on its management.

Art. 24. The Council establishes the rules and regulations that it considers necessary to run the association and can amend them. It submits these rules to the General Assembly for approval.

Art. 25a. The Council can delegate daily and financial management of the Association, with the authorized signature that pertains thereto, to an Executive Committee. The Executive Committee consists of the President, the Secretary-General, the 4 Vice-Presidents and the Commission Chairpersons.

Art. 25b. The Executive Committee can delegate part of its powers to the President and to the Secretary General.

Art. 25c. The Council can also confer all special powers, described precisely and limited in time, to all proxies of its choice. The Council will set the remuneration that might be awarded to these proxies.

Art. 26. Acts binding the Association are signed by the President, unless otherwise specified by the Council.

The Council members have no personal obligation concerning the commitments of the Association.

Part 5: Assets – resources

Art. 27. The assets of the Association consist of all movable or immovable property that the Association purchases or receives as donations to ensure achievement of its aim. The income of the Association consist notably of:

- a. subventions awarded by the governments, national sections or national bodies;
- b. subscription fees of subscribing and of honorary members;
- c. bequests of members, private parties or any company that wishes to support the Association;
- d. interest on the capital of the Association;
- e. income of movable property that is managed by or belongs to the Association;
- f. income from all the activities of the Association.

Part 6: Budgets – Accounts

Art. 28. The financial year begins on 1 January and ends on 31 December every year; the books and records are closed on that date.

Every year, the Council presents to the General Assembly for approval a fiscal report of the accounts of income and expenditures together with a report on the activity and a statement on financial affairs of the Association for the previous financial year and a report of the budget for the following year.

Approval by the General Assembly of the accounts and the management report is equivalent to discharge of the Council, the Council members and the auditors.

The accounts will be transmitted to the Federal Justice Public Service and lodged in its file, pursuant to the terms of the law.

Part 7: Auditors

Art. 29. The accounts of the Association are audited by two auditors, appointed by the General Assembly. The auditors report the results of their audit to the General Assembly.

Part 8: Dissolution – liquidation

Art. 30. Other than in cases where dissolution is by right or by juridical decision, dissolution can only be decided by the General Assembly according to the terms of the law and in compliance with these Statutes.

The dissolution decision must contain the appointment of one or several liquidators, unless they have been appointed by the judicial authorities at the request of the most diligent party.

Art. 31.

a. Regardless of the reason for dissolution, the net assets of the dissolved association will be allocated to one or several non-profit associations having a similar social aim, to be designated by the General Assembly.

Under no circumstances can the assets be allocated to members or former members.

b. Everything that is not explicitly stipulated in these statutes is governed by the provisions of title III of the law of 27 June 1921 on non-profit associations, international non-profit associations and foundations.

Agreed in Estoril, Portugal on May 12, 2006

Annex 7:

Abbreviations

AGA	Annual General Assembly
AIPCN	Association Internationale Permanente des Congrès de Navigation
BFR	Belgian Franc
CCNR	Central Commission for Navigation on the Rhine (Commission Centrale pour la Navigation du Rhin)
CEDA	Central Dredging Association
CEVNI	European Code for Inland Navigable Waterways (Code Européen des Voies de Navigation Intérieure)
CIP	Commission Internationale Permanente
CoCom	International Co-operation Commission
ComCom	Communication Commission
COPEDEC	Conference on Coastal and Port Engineering in Developing Countries
ECE	United Nations Economic Commission for Europe
EdCom	Editing Commission
EEC	Enlarged Executive Committee
EFIP	European Federation of Inland Ports
EnviCom	Environmental Commission
ESCAFE	United Nations Economic Commission for Asia and the Far East
EUR	Euro
ExCom	Executive Committee
FinCom	Financial Commission
GBP	Pound Sterling
HQ	Headquarters
HTG	Hafenbautechnischen Gesellschaft
HisCom	History Commission
IADC	International Association of Dredging Companies
IAHR	International Association of Hydraulic Engineering and Research
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities (formerly: International Association of Lighthouse Authorities)
IAPH	International Association of Ports and Harbours
ICCE	International Conference on Coastal Engineering
ICOLD	International Commission on Large Dams
ICOMIA	International Council of Marine Industry Associations
ICORELS	International Commission for the Reception of Large Ships
IHO	International Hydrographic Organization
IMC	ICOMIA Marina Committee
IMCO	Intergovernmental Maritime Consultative Organization
IMO	International Maritime Organization (before 1982: IMCO)
InCom	Inland Navigation Commission
IOC	International Organizing Committee
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
IWT	Inland Waterway Transport
L(D)C	London (Dumping) Convention
MarCom	Maritime Navigation Commission
MOU	Memorandum of Understanding
PCDC	Permanent Committee for Developing Countries
PEC	Permanent Environmental Commission
PIANC	Permanent International Association of Navigation Congresses

PIARC	Permanent International Association of Road Congresses
PIC	Permanent International Commission
PTC	Permanent Technical Commission
RecCom	Recreational Navigation Commission
RIS	River Information Services
SPN	Joint Subcommittee for Advice on Sport and Pleasure Navigation
SRN	Permanent Commission for Sport and Recreational Navigation
TEU	Twenty feet Equivalent Unit
TINA	Transport Infrastructure Needs Assessment
TRB	Transportation Research Board
UATI	Union of International Engineering Organisations (Union des Associations Technique Internationale)
UNESCO	United Nations Educational Scientific and Cultural Organization
USD	American dollar
YP-Com	Young Professionals Commission

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