



PIANC

The World Association for Waterborne
Transport Infrastructure



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Recommendations for the Design and Assessment of Marine Oil, Gas and Petrochemical Terminals.

MarCom Working Group 153B
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In September 2016, PIANC WG 153 published the document 'Recommendations for the Design and Assessment of Marine Oil & Petrochemical Terminals'. This document explicitly excluded LNG terminals from the scope since it was believed to add unnecessary complexity to an already-ambitious undertaking. Now that the document is published there is a desire to add LNG terminals to the scope of the document and to make other updates as well.

Most of the content of the 2016 document has commonality with LNG terminals, with appropriate language added to address the unique nature of LNG as the cargo. For this reason, it was recommended to add LNG terminals to the 2016 edition rather than publish a separate document solely for LNG terminals. In addition, the vast majority of the WG members also have extensive experience with LNG terminals in addition to oil & petrochemical terminals, so it was efficient to maintain the earlier WG, supplemented by additional expertise as required.

Background: Marine Oil, Gas, and Petrochemical Terminals (MOGPTs), by the nature of materials being handled, may pose risks to the marine and coastal environment, as well as affect health and safety. Risks include spills, damage to marine life, toxic fumes or vapour clouds, and the possibility of fires and/or explosions. And, in many cases, these risks are exacerbated by aging infrastructure and components, as well as an inadequate design for the current operations at the terminal. This document provides a set of guidelines and recommendations for the design and assessment of MOGPTs to the global community.

Purpose and Objectives: A principal objective in this document is to provide guidance as to recommended 'best practice'. It is recommended that any departure from the best practices provided herein be justified and documented, such as through a quantitative risk assessment. On certain topics, a 'higher standard' (HS) of practice is described to clarify and add context to the recommendations, using the nomenclature 'HS' in parentheses. The HS designation is used to describe a level of practice that exceeds 'best practice'.

Applicability: These guidelines are applicable to at-shore and nearshore MOGPTs. Quays (wharves), jetties (piers), sea islands, and nearshore single-point and multi-point moorings are examples of the types of terminals that are covered in this document. Terminals and marine facilities for the following types of terminals are included: Oil terminals Petrochemical terminals, Liquefied natural gas (LNG) terminals, Liquefied petroleum gas (LPG), terminals, Floating LNG terminals (FSRU/FSU/FRU/FPSO LNG), Liquefied green fuels terminals, Liquefied CO₂ terminals and Compressed natural gas (CNG) terminals.

Submarine and floating pipelines from sea island or nearshore mooring terminals to shore are also included, where such pipelines convey oil products or high-pressure gas. However, detailed guidance on subsea cryogenic pipelines and floating cryogenic hoses are excluded from the scope of the document.

Nearshore MOGPTs that are connected to shore via subsea pipeline or trestle are included in the scope of this document. Such nearshore MOGPTs may consist of sea islands (including gravity-based structures), single point moorings, multi-point moorings, and spread moorings. Offshore deepwater platforms and floating facilities such as floating production storage and offloading vessels (FPSOs), where there is no shore connection, are beyond the scope of this document.

It is important to note that for LNG terminals this document is intended to focus on mid to large-scale terminals. Small-scale terminals such as LNG Bunkering Terminals are covered in detail in PIANC Report No. 172-2016, which also references this document such that the two documents provide consistent guidelines. PIANC Report No. 172-2016 also covers other small-scale LNG terminals handling vessels of approximately 20,000 m³ storage capacity or less, but only when conventionally moored.

All nearshore and at-shore Floating LNG terminals are covered by this document, whether import or export, as long as the terminal is connected to shore via subsea pipeline, floating pipeline or trestle.

Nearshore terminals using single point moorings (SPM), multi-point moorings (MPM) and spread moorings of various types are included in the scope of this document. This document is limited to providing guidance leading to the decision of the type of SPM or MPM mooring to consider for a particular installation. PIANC Report 200-2022 provides guidance on the design of such terminals, once the type selection has been made.

Scope of Document: The guidelines provided in this document focus primarily on the marine terminal infrastructure. Site selection and concept selection are included in the scope of the document. The marine terminal infrastructure includes everything from the ship/shore interface to the foreshore area of the terminal. The ship/shore interface includes both jetties and nearshore floating vessels and their connection to the foreshore area. The foreshore area often includes the control room, electrical power supply and distribution, lighting, pig launcher/receiver, parking, security infrastructure, and related facilities. In addition, the scope of the document includes subsea pipelines, navigation and approach channel, turning basin and manoeuvring and operational areas, which are covered primarily by reference to other established guidance documents on these topics.

Excluded from the scope of this document are the onshore facilities beyond the foreshore, such as the tank farm, onshore pipeline, pumping equipment, and process-related facilities.

The battery limits included in the scope will vary by project and it is recommended that a responsibility matrix be developed for each project to define the responsibilities of each party involved in the design, as well as all the interface points.

Notes to Editor

PIANC is the global organisation providing guidance and technical advice for a sustainable waterborne transport infrastructure to ports and waterways. Established in 1885, PIANC unites the international experts for technical, economic, and environmental topics related to waterborne transport. Our members include national governments and public authorities, corporations, industry and academic experts and young and experienced professionals.

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