

GENERAL SPECIFICATION

LOGISTICS AND OPERATIONAL SUPPORT

GS EP LSO 205

Tanker loading and offloading marine procedures

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1. Scope

The purpose of this document is to define the basic principles to be applied when preparing Loading/Offloading Marine Procedures, thus providing the safest and most efficient configuration to reach the objectives.

2. Reference documents

The reference documents listed below form an integral part of this General Specification.

External Documents

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the effective date of this document.

Reference	Title
ISGOTT	International Safety Guide for Oil Tankers and Terminals.

Total General Specifications

Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published in the applicable yearly collection.

Reference	Title
GS EP LSO 203	Terminal pilots - Terminal tug master: qualification, certification and training
GS EP LSO 204	Marine berthing and navigation aids for coastal and offshore terminals

3. Definitions and acronyms

Item	Definition
AFRAMAX	Oil tanker smaller than 120,000 metric tons deadweight and with a breadth above 32.31 m. Vessels cargo capacity is approx. 600,000 and 900,000 Bbls
AHT	Anchor Handling Tug
AHTSV	Anchor Handling Tug Supply Vessel
CALM	Catenary Anchor Leg Mooring
EPIRB	Emergency Position Indicating Radio Beacon
FPSO	Floating Production Storage Offloading
FSO	Floating Storage Offloading

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Item	Definition
<i>F(P)SU</i>	Floating (Production) Storage Unit
<i>LNG</i>	Liquefied Natural Gas
<i>LPG</i>	Liquefied Petroleum Gas
<i>MEDEVAC</i>	Medical Evacuation
<i>MPV</i>	Multi Purpose Vessel
<i>OCIMF</i>	Oil Companies International Marine Forum
<i>OVID</i>	Offshore Vetting Inspection Database
<i>SBM</i>	Single Buoy Mooring
<i>SIMOPS</i>	Simultaneous Operations
<i>SPM</i>	Single Point Mooring
<i>SUEZMAX</i>	Naval architecture term for the largest ships capable of transiting the Suez Canal fully loaded, and is almost exclusively used in reference to tankers. Vessels cargo capacity is approx. 1 mill Bbls.
<i>SWL</i>	Safety Working Load
<i>Terminal Pilot</i>	The competent person, who uses specialized local knowledge, employed by the Company (and approved by the National competent authority as required) responsible for the berthing and un-berthing of tankers (oil and/or LNG) at the loading/ off-loading facilities.
<i>t</i>	Metric tonne
<i>VLCC</i>	Very Large Crude Carrier. Vessel cargo capacity is approx.2 mill. Bbls.

4. Field of Application

This document represents Total E&P policy, and should be part of the standing instructions established by Total affiliates for loading/offloading marine operations.

The provisions of this document apply in all operated Exploration-Production affiliates, whenever national rules and regulations either fail to cover the subject or are less stringent for both shore terminals, offshore terminals and to tanker's operations related to :

- The supply of methanol, bunkers or chemicals ;
- The loading or discharging liquid petroleum cargoes such as crude oil, condensate, liquefied natural gas, liquefied petroleum gas.

Each marine terminal either directly managed by an affiliate or through a Contractor on behalf of an affiliate shall edit specific marine procedures and a comprehensive and up to date "Terminal Operating Manual" including, but not limited to, the information developed in section 5 of this General Specification.

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In this document the word “tanker” covers all vessels designed for shipping hydrocarbons, liquefied gases or chemicals in bulk and their operations, including mooring to jetties, buoys and F(P)SU’s for the purpose of loading or discharging liquid petroleum cargoes, such as, crude oil, Liquefied Natural Gas, Liquefied Petroleum Gas, methanol and bunkers (gasoil or other) or chemicals as the case may be.

In case of shore terminals, the oil and/or liquefied gases are stored in tanks and are transferred to the export vessel at a jetty or wharf, e.g. Cap Lopez terminal in Gabon or Balhaf terminal in Yemen.

In case of offshore terminals, the oil and/or gas is stored in a F(P)SU or onshore and is transferred to the export vessel through an Offloading Buoy, in side by side or on tandem mode, e.g. Offloading buoy at Djeno terminal in Congo, Offloading buoy and tandem mode at spread moored FPSO Girassol in Angola, Offloading buoy and tandem at turret moored FPSO Unity in Nigeria, side by side at turret moored FSO LPG Nkossa II in Congo.

In any case, Loading and Offloading operations shall be performed in strict accordance with all applicable national and international regulations and following [ISGOTT](#) recommendations.

5. Minimum information for loading/offloading marine procedure

5.1 Operational limits at offshore terminals.

The operation limits shall be fixed for each terminal and be defined after specific marine simulations/studies and according to naval means used in order to minimize the risk of collision between the tanker and F(P)SU/Shore installations.

The operational limits for the watercraft (tug and workboat) involved in loading/offloading operations shall also be fixed.

The operational limits include following aspects (see Table 1).

For Total Onshore operated terminals, there is no particular standard since the limitations highly depends of the local environment (terminal location, water depth, channels, jetties, etc...).

For Offshore Total operated sites, some example of standard limitations are summarized in Appendix 1, for reference only, and might be restricted or expanded upon results of dedicated marine simulations.

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Table 1 – Operational limits

<i>Oceano-meteorological</i>	The main meteocean criteria for berthing and un-berthing are not only dependent on the size of the tankers and tug power but also governed by the handling capabilities of the work boat, when used, and the staff involved in handling hawsers and hoses.	
<i>Approach, residence and departure sectors</i>	Green sector	Safe approach and residence area
	Orange sector	Tanker in orange zone for more than 15min during approach, mooring or offloading suspension of operation / Stand-by zone for disconnection.
	Red sector	Tanker in red zone during mooring and offloading or tanker in red zone at 500m from F(P)SU: suspension of operation.
<i>Distance</i>	Minimum and maximum distance between tanker and F(P)SU / buoy.	
<i>Tension</i>	Load on mooring hawser or mooring lines.	

5.2 Tugs

Number, type (propulsion) and capacity (bollard pull) of tugs used for each terminal and operations shall be decided by each affiliate after specific marines simulations and defined according to weather and sea conditions, size of tankers, and navigation restrictions.

If specific marine simulations are not performed, rules for tug number shall be applied as per chapter 6 (see recommendations).

If the stand-by function is included in the key functions to be performed by the tugs then this element needs to be taken into consideration in the assessment of the number of tugs required.

The tugs shall be inspected under OVID protocol.

5.3 Berthing Aids

Refer to **GS EP LSO 204**.

5.4 Marine Simulations and/or specific marine studies

The objectives of the real time navigational simulation studies are to, but not limited to:

- To determine the influence of the various environmental conditions (wind, waves, current and swell) for approach, residence and departure of the Export tanker at export terminal ;
- To determine the critical wind, current and wave thresholds for safe residence ;
- To determine the influence of particular local oceano-meteorological phenomenons ;
- To determine the requirements for tugs (type, quantity and required Bollard Pull / Push) ;
- To determine the operational limits during SIMOPS situations ;

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- To determine the maximum tension on the mooring hawser and mooring lines under local oceano-meteorological conditions ;
- To determine the location of anchorage area and Pilot Boarding Station ;
- To assess the navigability of the approach channel and maneuvering areas (dimensions and depth) ;
- To determine the approach channel design (alignment, width and depth, Aids to Navigation) ;
- To assess potential navigational problems when approaching and leaving the terminal and confirm or recommend modifications to the berth and manoeuvring basin layout.

The scope of marine simulations and specific marine studies shall be approved by DSO/LSO/MAR Marine Specialists and be carried out in DSO/LSO/MAR agreed centre.

Simulation for pilot and captain training projects will not be considered further in this general specification and reference shall be done to **GS EP LSO 203**.

Basically, simulation methods can be divided into three groups:

- Non-interactive simulation (often called fast time simulation) :

In this case the complete navigation process is mathematically modelled. There is no human interaction with the process. This type of simulation is acceptable as preliminary investigation, and for:

- Testing simple maneuvers such as residence at buoys and berths and studies on associated tension on mooring hawsers and lines ;
- Comparing different various harbour and navigational channel layouts ;
- Determining whether the ship is able to pass a channel under various depth and environmental conditions ;
- Estimating turn-around time for marine operation in port operation based on local constraints.

- Interactive simulation by physical models :

Physical models are the so-called manned models. Interaction with the physical model takes place by the human operator(s). It is a kind of fast time simulation where the time factor depends on the scale of the model. The system is used mainly for training of pilots and ship's captains and is not considered in this General Specification.

- Interactive simulation by simulators (often called real-time simulation) :

In this case interaction with a simulator device takes place by a human operator. Full mission ship bridge simulators, and comparable simulators, are often used for research and training of pilots, ship captains and tug masters.

Real time marine simulations shall be carried out when operations are related to approach, berthing, departure of terminal involving complex manoeuvres studies, as well as port and terminal design studies. A pilot having the knowledge of the vessels used and the simulator's performance shall be involved in the simulations. Tug's masters might also be involved, design of the simulator permitting.