10th Chemical Process Safety Sharing (CPSS)

Safety & Fire Protection Design for Oil & Gas Marine Loading Terminal (Jetty)

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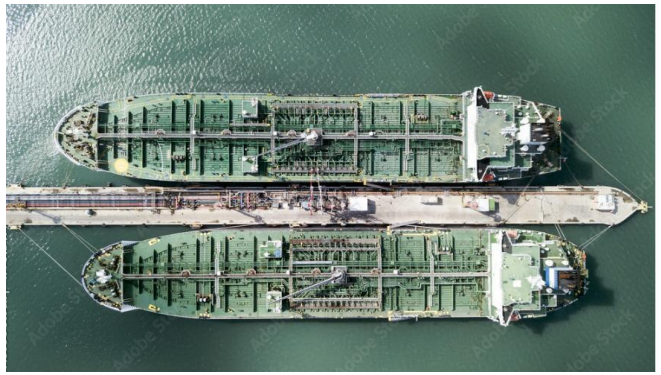
Contents

Marine Loading Terminal (Jetty) Engineering Design Background

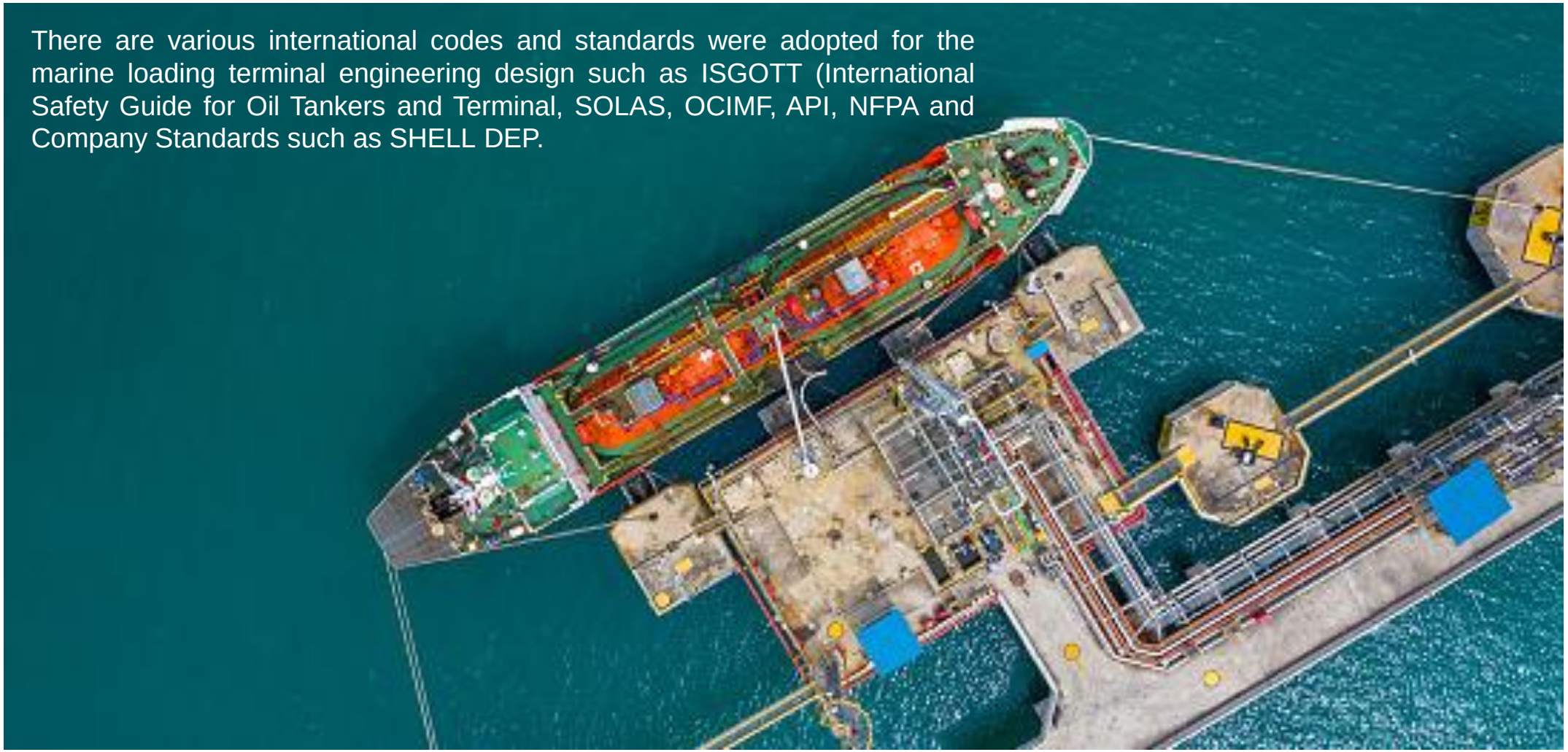
Regarding to few details and requirements of the engineering design focus on Marine Loading Terminal (Jetty) mentioned in Thai Regulations at current.

The standardize of the engineering design for Marine Loading Terminal (Jetty) for both of modification of the exiting Jetty or develop the new asset are recommended.



Process Safety in Design

There are various international codes and standards were adopted for the marine loading terminal engineering design such as ISGOTT (International Safety Guide for Oil Tankers and Terminal, SOLAS, OCIMF, API, NFPA and Company Standards such as SHELL DEP.



Process Safety in Design

- Hydrocarbon Inventory Limitation
- Site Plot & Safety Distance
- Fire and Gas Detection
- Active - Fire Protection
- Passive - Fire Protection

Limitation of Hydrocarbon Inventory

Isolate and minimize the inventory of hazardous materials (which may contribute to escalation) in the affected area;

Site Plot & Safety Distance

The required segregation between all new, or between new and existing process and utility plants, tankage areas, buildings and supporting/connecting infrastructure shall either be obtained by providing adequate separation distance or by providing a physical barrier.

Defined minimum separation distances ensure the risk of escalation from a fire and/or explosion event(s) on an adjacent area are tolerable. These distances include allowance for safe SIMOPs during normal operations, construction and maintenance.

Safety Distance:

- Code & Standards
- Consequence Modelling with Principal Approval

Best Practice:
The Marine Loading Terminal, the Safety Distance by confirmation from Consequence Modelling is adopted to minimize the safety distance with ALARP concept for control building and Foam Pump Station.

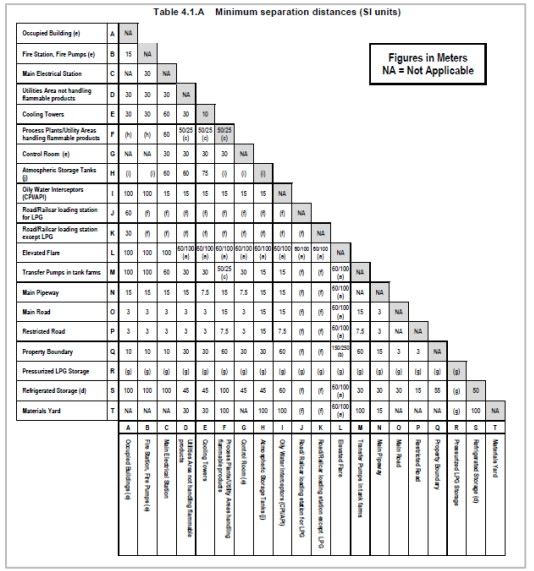


Figure 1: Minimum separation distances (DEP 80.00.10.11-Gen)

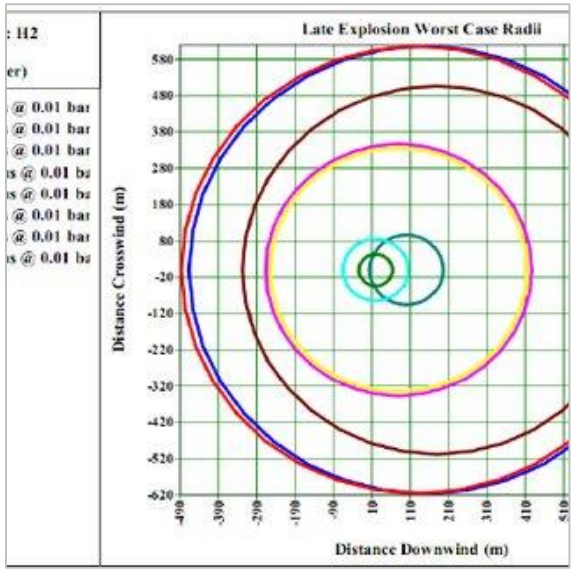
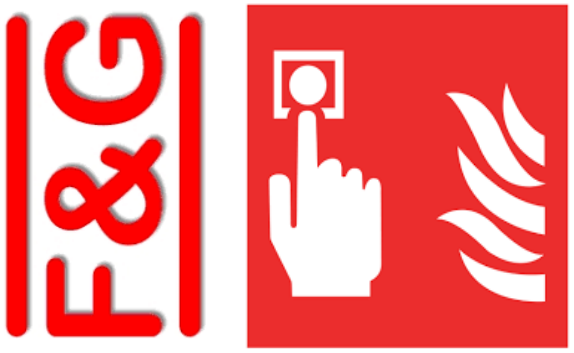


Figure 2:Example of Overpressure Simulation

Fire and Gas Detection System



The fire detection system shall be designed to detect a fire as early as possible, and initiate preventive actions at an early stage in order to reduce the consequence of the fire.

For the Loading Terminal the Fire and Gas System shall be provided at:

- **Flammable Gas and Smoke Detection** for Control Building or Jetty Crew Building (type and function of F&G systems would depend on the building functions.
- **Heat detection or polytube** for automatic water spray system (depended on the company design concept of manual, semi-automatic and automatic system)
- **Associate Fire & Gas System Equipment** such as Alarm horn and Beacon, Manual Call Point and Fire Siren (if required)

Active – Fire Protection Design

Active Fire Protection carries out the firefighting working guideline of prevention, protection and national criterion of fire protection. The term Fire Protection System used in this report are measures to be taken as to minimize, control and extinguish fire that is already burning for the purpose of life safety and property protection.

The proposed fire protection system shall be served as:

- Fire exposure protection
- Fire extinguishing

Marine Loading Terminal (Jetty) – Active Fire Protection System;

- Fixed water spray systems
- Fixed water / foam monitors
- Fire hydrants and their associate equipment
- Fixed foam system
- Portable and wheeled fire extinguishers
- International shore connections

Passive - Fire Protection Design

The passive fire protection such as fire proofing is performed in order to reduce the temperature increasing rate without relying on activation. The prime function of passive fire protection via fireproofing is to retard the rate of temperature increase of a given substrate. Selection of fireproofing shall take into account fire type (e.g. pool/ jet), fire size, and likely duration.

The protection time is based on the following assumption;

- structures can be cooled by water or plant operating staff will have been evacuated.
- Where effective water cooling is not feasible
- the required duration of the fire resistance depends on the estimated time for the fire to burn out or be extinguished.

Normally the fire proofing is provided for Marine Loading Arm.*

***depend on the HC inventory**

Chemical Process Safety Sharing

Q & A

Thank you for your attention