Design of small and medium LNG terminals including bunkering facilities

1. Historical Background (definition of the problem)

The potential of using Liquefied Natural Gas (LNG) as an alternative fuel for ships is fast gaining momentum due to the recent IMO regulations (especially for the designated Emission Control Areas - ECAs) and as part of the whole debate of improving the environmental performance of shipping. Within this framework the use of LNG as fuel for maritime and inland shipping is being investigated.
Recent analysis demonstrates that in terms of operational performance LNG can be considered as a viable alternative to marine fuel while it clearly leads to zero SOx and significant reductions of other emissions (NOx, CO2). One of the outstanding issues that the broad application of LNG faces are the required investments relating to adequate infrastructure for bunkering as well as the rules (safety) to be applied for bunkering.
The European Maritime Safety Agency (EMSA) initiated some time ago a study on the potential of LNG where ESPO and ECSA were asked to contribute. Their part was primarily to investigate the current situation regarding the availability of LNG bunkering facilities and infrastructure in Europe. IAPH has established an “LNG fuelled vessels working group” dealing with LNG Bunkering, LNG Risk Perimeters and LNG Public Awareness.
The current regime around dedicated LNG terminals are very strict and if one should increase the number of LNG terminals, small and medium, one has to consider the risks and design in a new way also consider integrating these new LNG terminals in existing terminals, such as multipurpose terminals.

2. Objectives of the Working Group

Today's LNG terminals consist almost exclusively of large dedicated terminals. LNG has a "reputation" of being extremely hazard which has resulted in the safety and design of existing terminals. As it is expected that by 2015 a number of shipping lines will have LNG-powered maritime and inland vessels in there fleet, it is necessary to establish new terminals in far more places than the dedicated terminals. These terminals will in many cases be considered as small and medium-sized and must also be established near other terminals. Examples of this are from Norway, where the newly established LNG terminals are integrated into a multipurpose terminal after careful studies and risk assessments.
There are also several small and medium LNG terminals in Japan.

The WG should provide guidance to owners and designers of marine LNG terminals and infrastructures worldwide, in order to provide a safe, efficient and cost-effective operation of the terminals. This document should be considered as an additional document to existing standards, but on this topic very few standards exist and this document will be very useful for design and operations.

Bunkering facilities is a new topic and looking to this together with LNG terminals will be one of the main objectives for the WG.

Climate Change challenges and implications will be considered by the Working Group.

3. Existing Reports

In 1985 PIANC published the report "Dangerous goods in ports" with recommendations for port designers and port operators. Appendix 6 of the report dealt with safety aspects of LNG, LPG and liquefied gases. Furthermore there are many rules and regulations concerning design of LNG terminals especially for large LNG terminals within different organizations such as National Governments, SIGTTO, OCIMF, IAPH, ESPO, TEN-T, CCNR and others. An overview of most of the existing documents should be very welcomed. It should be an information exchange to the WG 158 Masterplans for the development for Existing Ports.

4. Matters to be Investigated

The matters to be investigated are: Jetty, land installations, marine transfer arms for loading and unloading both fixed and flexible, technical requirements and design, safety aspects around berthing and terminal operations, risk assessment etc.

5. Suggested Final Product of the Working Group

The final product will be recommendations and guidelines for design and operation of small and medium LNG terminals including bunkering facilities.

6. Desirable Disciplines of the Members of the Working Group

In addition to the owners and operators of marine LNG terminals, the Working Group members should represent all parties involved such as consulting engineers, contractors, organizations like SIGTTO, IAPH and public authorities. Members with a research background should also be welcomed.

7. Relevance for Countries in Transition

The recommendations and guidelines would help countries in transition with increased need of energy taking advantage of the collective knowledge.