



Oil Companies International Marine Forum

# ***Recommendations for Alternatives to Traditional Emergency Tow-off Pennants— Report of the Working Group***

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*The OCIMF mission is to be the foremost authority on the safe and environmentally responsible operation of oil tankers and terminals, promoting continuous improvement in standards of design and operation*

*Issued by the*

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is a voluntary association of oil companies having an interest in the shipment and terminalling of crude oil and oil products. OCIMF is organised to represent its membership before, and consult with, the International Maritime Organization (IMO) and other government bodies on matters relating to the shipment and terminalling of crude oil and oil products, including marine pollution and safety.

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## 1 Introduction

Emergency tow-off pennants, or “fire wires” as they are commonly referred to, have been in existence since World War II and possibly before. Starting in the mid-1960s, they became a required fixture on tank vessels during loading and discharge operations. Over time, emergency tow-off pennants have grown in size from 12.5 mm diameter for all tank vessels to a range of diameters up to 42 mm for modern ULCCs.

The OCIMF *Working Group to Develop Acceptance Criteria for Emergency Towing Off Pennants Performance on Vessels* under the direction of the Ports and Terminals Committee (PTC) was tasked, following discussion at the 58<sup>th</sup> Meeting of the PTC (PTC 58) in 2003, to look at the possibility of using synthetic rope as an equivalent to steel fire wires for emergency tow-off pennants. This effort was driven by increased awareness of personnel safety and the occurrence of injuries associated with handling emergency tow-off pennants (large steel wire rope pennants).

The Working Group began looking for alternatives to steel wire based on fire resistance characteristics. Finding a solution proved to be difficult in that there was no clear definition or standard for the strength of steel wire when exposed to fire or a comparable fire-resistance criteria for synthetic rope.

In *International Safety Guide for Oil Tankers and Terminals* (ISGOTT) 5<sup>th</sup> Edition 2006 written by International Chamber of Shipping, OCIMF and International Association of Ports and Harbours, the possibility of using a risk assessment to assess the need for and dangers of using steel fire wires was introduced for the first time since fire wires were first recommended in the mid-1960s. *ISGOTT 26.5.5.2 Handling* states:

Attention is drawn to the hazards associated with the ship’s crew handling heavy wires that are hung over the ship’s side, in particular the risk of strain injuries. Handling of towing-off pennants is increasingly being cited as a cause of personal injury, particularly for spinal and muscular back complaints.

It is recommended that terminals review their requirement for emergency towing-off pennants by considering the following:

- Are they really necessary? What is the real risk of them having to be used?
- Do the emergency procedures require the ship to be removed from the berth if it is immobilized by fire?
- Is it possible to release the ship’s moorings to allow it to be removed from the berth?
- How long will it take for tugs to be mobilized?
- Could the deployment of emergency towing-off pennants compromise security arrangements at the terminal?

To avoid any unnecessary handling of large wires on ships, it is suggested that a risk assessment is carried out at the terminal to determine whether or not there should be a routine requirement for ships to rig emergency towing-off pennants.

The Working Group noted that there was an inconsistency in expecting that marine terminals would conduct risk assessments. Their personnel are not actively involved in handling emergency tow-off pennants. Likewise, there was no evidence that a marine terminal has any record of a reportable injury as the result of handling emergency tow-off pennants. The personnel safety issue resides strictly with the vessel, but is driven by marine terminal and port authority requirements.

In early 2008, OCIMF engaged Lloyd’s Register North America (LRNA) to carry out investigations and conduct a risk assessment as recommended in *ISGOTT 26.5.5.2*. This followed the Working Group’s recommendations to PTC, and the OCIMF Executive Committee’s approval, to commission a study including a third-party risk assessment. In conjunction with the recommendation for a third-party risk assessment, the Working Group asked PTC and the OCIMF General Purposes Committee (GPC) to delay further development of synthetic emergency tow-off pennants pending completion of a risk assessment.

These investigations were expected to evaluate the effectiveness of emergency tow-off pennants under various scenarios and inherent risks posed. The study was to cover questions such as “Are they used?”,

“How often are they used?”, “When are they used?”, “What is the risk of fire shore-side and onboard?”, and, if needed, “Will they work?” Additionally, LRNA was to carry out a review of the functional requirements of an emergency tow-off system and evaluate five potential alternative systems.

In order to fully assess the human aspects of current emergency tow-off pennant operations, LRNA used a risk analysis tool called REBA (Rapid Entire Body Assessment) to determine to what extent crew members are put at risk in deploying fire wires. Extrapolations of data collected during the LRNA Study indicate that approximately 1700 crewmen have been injured handling emergency tow-off pennants over the past 42 years. Except for anecdotal information, there is no documented evidence that emergency tow-off pennants have ever been utilized in an emergency, or otherwise.

## **2 Risk Assessment Study**

Refer to OCIMF Information Paper *Lloyd's Register Risk Assessment of Emergency Tow-off Pennant Systems (ETOPS) Onboard Tank Vessel* for a full description of the study, including investigation risk assessment and OCIMF position.

### **2.1 Quantitative versus Qualitative Risk Assessment**

The level of confidence in a given choice or choices may come in the numbers from a quantitative analysis or they can come from the extremes presented in a case. The latter is the situation with emergency tow-off pennants where, for the last 42 years, documented evidence of their use in an emergency for which they are intended is non-existent. For the purpose of this risk assessment, LRNA, with the Working Group's concurrence, determined that a qualitative risk assessment was the proper methodology to assess emergency tow-off pennants.

When risk assessments are discussed, the first tendency is to think of the likelihood of something happening. People speak in terms of “one in a million”. But what exactly does “one in a million” mean? In simple terms, this is a single event occurring in one million years or a 1% chance of an event occurring in 10,000 years. The U.S. Coast Guard defines this as “incredible”. In the case of emergency tow-off pennants, there is no documented evidence of their use in an estimated 33 million deployments. These numbers are so low that it is very difficult, if not impossible, to perform a quantitative risk assessment where number values are assigned and outcomes are predicted numerically.

Risk assessments are generally divided into two types, quantitative and qualitative. A quantitative risk assessment is one in which risk is expressed in terms of frequency (e.g., one in 1,000 or one in 10,000) or in risk impact per unit time (e.g. \$1,000 per year). A qualitative risk assessment is one in which risk is expressed in terms of quality or kind (e.g., unlikely, highly unlikely, extremely unlikely). Whether quantitative or qualitative analyses are used, different alternatives can be compared on a relative basis and choices can be made.

## **3 Recommendations**

The Working Group, in addition to delivering the OCIMF Information Paper *Lloyd's Register Risk Assessment of Emergency Tow-off Pennant Systems (ETOPS) Onboard Tank Vessel* to PTC including the OCIMF position on ETOPS (“...ETOPS are not required and have not provided benefit in the past. If, however, individual marine terminal risk assessments or port authorities still require the use of ETOPS, it is recommended that options other than wire rope be considered.”), made the following recommendations:

### **3.1 Primary Recommendation**

The use of emergency tow-off pennants as recommended in *ISGOTT*, specifically 26.3.3 *The Ship/Shore Safety Check-List* and 26.4 *Guidelines for Completing the Ship/Shore Safety Check-List*, should be revised in line with 26.5.5.2 *Handling* as emergency tow-off pennants are not essential equipment for vessel safety. There is a significant potential for injuries associated with handling emergency tow-off pennants. This coupled with the unlikely occurrence of a fire or other scenario necessitating the need for emergency tow-off further diminishes the need for emergency tow-off pennants. There are safer alternatives for moving vessels from a berth in an emergency.

### **3.2 Secondary Recommendations**

If individual marine terminal risk assessments or port authorities still require the use of emergency tow-off pennants, actions should be considered to reduce the weight of the pennants and increase their flexibility in order to improve ergonomics and safe handling. There may also be other methods available

to improve ergonomics and reduce physical strain while improving safety such as improved design of fittings.

When handling emergency tow-off pennants, there is a high potential for complacency. Though a simple task, the size and weight of emergency tow-off pennants and the potential for injury require attentiveness of personnel at all times. Other considerations to minimize the risk of injury may include increasing the number of crew performing the task, and increased levels of training and supervision.

### **3.3 *Accompanying Recommendations for Tankers and Terminals, as recommended and agreed by the PTC (April, 2010)***

Terminals are encouraged to refer to OCIMF Information Paper *Lloyd's Register Risk Assessment of Emergency Tow-off Pennant Systems (ETOPS) Onboard Tank Vessel* and/or the Working Group recommendations in place of a stand-alone facility risk assessment. If questions are raised, they may seek clarification from the Secretariat of OCIMF.

Regarding the Ship Shore Safety Check List, ISGOTT 26.3.3 (item 4) and 26.5.5, we recommend that this be modified to "The method of removing the vessel from the berth in an emergency has been discussed and agreed, as appropriate?" This allows for flexibility and options between terminals and vessels.