



ROTTERDAM
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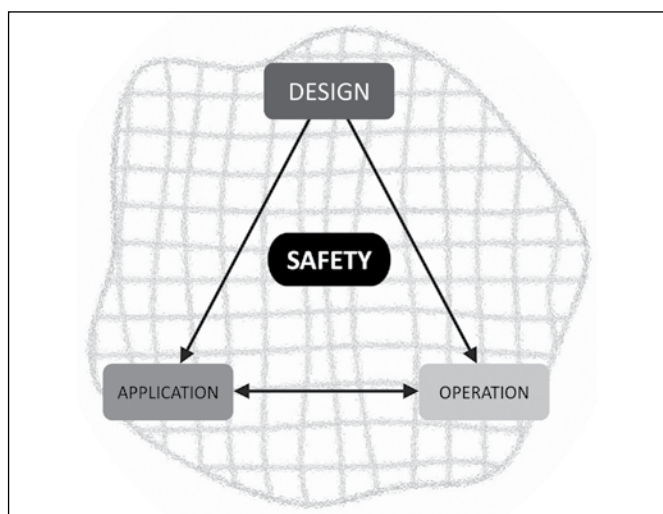
The Challenges of Tug Safety

Robert Allan, Robert Allan Ltd, Canada
Dirk Degroote, Damen Shipyards, The Netherlands
Capt Carsten Nygaard, Svitzer, Denmark
Capt Arie Nygh, SeaWays Consultants, Australia

There have been a number of very dramatic accidents involving tugs in recent years, and with the growth in typical tug power/size ratios the issue of tug safety is as pressing now as it has ever been. A review of typical accident data indicates that towing gear failure is the major cause of serious incidents, and that in many girting incidents the incorrect operation or the failure to operate of towline release systems was a contributing factor. In this panel, we'll consider the issue of safety under four key headings: *Design*, *Application*, *Operations* and *Crew*. Questions are encouraged from the floor. The following considerations are offered as starting points.

INTRODUCTION

In Robert Allan's paper *The State of Tug Safety Today* presented at *ITS 2016* in Boston, it was argued that an understanding of tug safety incorporates three key elements: design, application and operation:



At the apex of the triangle is **design**. Without a proper design the other two factors cannot be realised, nor overall safety achieved. The base of the triangle comprises the sister elements of **application** and **operation**. Before selecting any tug for a job the owner/operator must first know if it is a tug which has actually been designed for the intended application (ship-assist, escort, towing or whatever) and if so, will the intended operation be consistent with the boundaries imposed by the design and the application. The key constituents (among many) of each of these are shown below:

DESIGN	Hull Form Stability Towing Gear Configuration Propulsion Configuration Structural Adequacy
APPLICATION	Ship-Handling Escort Towing Salvage/Rescue
OPERATIONS	Sea Conditions Weather Positional Relationship to Attended Vessel Crew Training Crew Familiarity

Design constitutes all that is required to define a safe tug in engineering terms, but has it been executed with a clear understanding of what the tug is meant to do... or even may do in its lifetime? **Applications** are the 'what' of the equation; what single or multiple specific tasks are expected of the tug and in what range of conditions? Has the **design** fully addressed the demands of each intended use? **Operations** are the 'how'; encompassing the methods of application; where in relation to the attended ship or tow will the tug be deployed, the weather and sea conditions prevailing. In addition, we should also consider the training and experience of the **crew** (and especially the master) for each specific task.

The discussion headings overleaf are organised around these four principles.

DESIGN

A good design is key to almost every other aspect of tug safety, but who/what establishes the thresholds of what is a 'good', or even a 'safe' tug? Is it enough to rely on Class or other regulatory standards and rules as the standard of acceptability?

- If a design only satisfies basic regulatory/Class requirements, is it considered safe?
- What are the most significant weaknesses in current regulations as they affect tug safety?
- How should we make designers more familiar with the daily operations aboard tugs?

APPLICATION

Choosing the right tool for the job is a fundamental to safe operations in the workshop, in the kitchen, and of course on board ship. But who makes the fundamental decision about which tug is the right one for any specific job?

What qualifications or experience does that person have?

- How familiar are owners with the design differences required for different tug applications?
- Who determines if a tug is fit for purpose for any specific application?
- Are there often economic and time pressures to get any tug in place for a job?
- Are owners aware of the compromises associated with 'multi-purpose' tugs?

OPERATIONS

Once a tug has been nominated/selected for a specific type of task, it remains the case that the tug must be operated safely and sensibly in consideration of the tow, the conditions and the operating environment.

- How familiar are owners with the design differences required for different tug applications?
- Who determines if a tug is fit for purpose for any specific application?
- How to deal with economic and time pressures to get any tug in place for a job?
- Are owners aware of the compromises associated with 'multi-purpose' tugs?
- Who determines that the assigned crew are suitably trained / familiarised with the intended operation?

CREW

Ultimately the safe operation of a tug is in the hands of those aboard. Are the crew familiar with the tug? Are they aware of any safe operating limits assigned to the craft (maximum sea-state, maximum tow size etc.?) Are they aware of any equipment deficiencies?

- Safety Management Systems: are they the right answer?
- What additional training/procedures should be considered?
- How could we define safe operating limits for any operation?
- What safety margins are required due to changing weather conditions?
- How should we define the safety/risks of tug-ship connections and relative positions of tug?
- Tug and system maintenance: who is responsible?
- Voyage planning/contingencies: is this done for most operations? Should it be?