

## **Human error and tanker accidents**

### **What are the causes of most tanker accidents and how can they be prevented? Tanker Operator asked the UK P+I Club, the world's largest tanker insurer**

With around 1,000 large tanker claims costing the UK P&I Club around \$800 million over the past 16 years, managers Thomas Miller are keen to cut down both the numbers and the settlement costs.

The UK Club now has over 900 tankers on its books, both the oil majors and independent operators being well represented. About two thirds are crude or oil product vessels and the remainder gas and chemical carriers. Around half the product carriers are single hull.

The average age of the product carrying fleet is just over 15 years, compared with a world average of 20 years. At around 23 per cent of the market, the UK Club is the world's largest insurer of protection & indemnity risks for tankers.

#### **Claims analysis**

The Club's Major Claims Analysis, ongoing since 1987, provides telling feedback about trends in tanker accidents and areas where they could be reduced.

Across the Club's whole entry of ocean going ships, large third party liability claims (over \$100,000 each) have accounted for just two per cent of those processed but a staggering 72 per cent of the costs.

Personal mistakes have consistently been the main contributor in 54 per cent of all large claims.

About one quarter of major tanker claims relate to cargo and slightly more to personal injury.

Pollution and collision with fixed and floating objects have been in the 10-15 per cent bracket.

However, tanker pollution claims cost around 40 per cent of settlements and fixed and floating objects around half that.

Six out of ten tanker cargo claims have been caused by contamination, due mainly to inadequate tank cleaning, bad handling and valve and pipe failure.

Fire and shell plate failure have been much less frequent but far more expensive.

These shortcomings have been greatest among 15 to 19 year old vessels and those of 10,000 to 30,000 tons.

Around 37 per cent of cargo claims concern oil products, followed by crude oil (25 per cent) and bulk chemicals and vegetable and animal oils (14 per cent each).

Slips and falls have been easily the most frequent and most expensive accidents, accounting for around one-quarter.

Explosions, being struck by falling objects, strains through lifting, burns, chemical exposure and falls from ladders contributed significantly to the total.

Around half of personal injury accidents on tankers occur on the weather deck or in the engine room. There have been significantly more on 10 to 20 year old vessels and those over 30,000 tons.

Crude oil spillage has accounted for 40 per cent of pollution claims but 70 per cent of the cost. Fuel oil has been responsible for 30 per cent, followed by bunkers, clean products and dirty ballast. Valve problems, cracks in plating and pipe failure have accounted for the rest.

Half of all oil spills were of less than 10 tons but even spills of less than one ton sometimes cost over \$100,000.

## **Loss prevention**

Accordingly, the Club's managers have introduced a number of loss prevention measures and advice to help prevent incidents occurring. They include the video 'Tanker Matters' and the Tanker Risk Profile CD-Rom.

The former concentrates on the most frequent cause of cargo claims and how to avoid them; the latter provides a wealth of statistics from tanker claims.

However, the Club's Major Claims Analysis has indicated the need to look more deeply into why incidents occur.

The immediate reason or active failure is often clear. Yet the persistence of some active failures indicates underlying factors creating conditions likely to produce incidents. These are areas of latent failure.

In a series of workshops held recently for members in Asia Pacific and Europe, the UK Club has drawn attention to eleven latent failure categories: procedures, hardware, design, maintenance management, error enforcing conditions, housekeeping, incompatible goals, communication, organisation, training and defences.

These are exemplified in the recently launched DVD/video 'No Room for Error.' The opening sequence concerns a collision, with a tanker's inexperienced third officer misjudging his ship's manoeuvring characteristics so that it hits an oilrig support vessel.

However, this active failure was supplemented by latent ones. Senior officers' workloads meant they were too busy to question the third officer's experience or to brief him properly, such that he could not find the night orders.

These "error enforcing conditions" were supplemented by an "organisational" failure in not correcting or replacing charts and the "incompatible goals" of commercial pressure and cutting corners on the third officer's induction.

Similarly, 'No Room for Error' features a shoreline being ruptured during cargo discharge by a chemical tanker because an engineer inadvertently knocks a pump lever fully on before leaving the control room.

The incident would not have happened if the chief officer had not left his radio in the control room while dealing with another problem and the seaman normally monitoring the manifold pressure gauges had not also been called away to another task. The active failure was again clearly reinforced by latent ones.

The DVD's conclusion, also reflected in scenarios for personal injury and general cargo and property damage, is that shortcomings in procedures, practices and equipment across the whole spectrum of shipping operations create the conditions in which incidents occur.

The result: financial loss, commercial disruption and personal injury. The alternative: lower insurance claims, smaller settlements, reduced disruption and less personal suffering.

If this direction is to be achieved, there's no doubt where the greatest dividends are to be obtained: cutting down on the human error that creates maritime incidents.

Nearly one quarter of tanker pollution incidents stem from deck officer error and a further 10 per cent from crew mistakes. This compares with around 30 per cent attributable to structural and equipment failure combined.

The UK Club believes that some shipowners need to take a more structured approach to their management of safety and incident prevention if they are to reduce the volume of human error and, therefore, claims causing incidents.

Most incidents involve breaches of existing hazard controls and defences set up to protect people, assets and the environment; intended or unintended acts by humans; and a chain of events.

Intended actions lead to violations and mistakes and unintended ones to slips and falls. People fail to relate rules to circumstances and exercise poor judgement in the absence of rules. Some violate or deliberately break the rules in striving to achieve a particular goal, sometimes exceptionally but sometimes routinely.

Slips and falls emanate from not paying attention, being distracted, memory oversight or forgetting a planned action. Even highly experienced people are culprits.

Further, human error can be magnified by systems and procedures becoming outdated (creeping entropy), performing tasks automatically and carelessly (routinisation) and forgetting to be afraid of possible consequences (normalisation).

Karl Lumbers, the UK Club's Loss Prevention Director, explains: "To err may be human but errant behaviour must be minimised as the consequences of unsafe behaviours are often severe.

"Everyone in an organisation, from board members to those on the weather deck and in the engine room, bears some responsibility for the commission of violations. It follows that all employees have a part to play in minimising their occurrence.

"If individuals are not provided with the training needed to perform their tasks, you have plenty of incidents just waiting to happen," concludes Mr. Lumbers.

"We believe ship owners should focus on latent failures not active ones. We should think of errors as consequences rather than causes and always aim to prevent the next error not the last one."