The London P&I Club

LP Focus

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The causes and prevention of container losses

Much recent industry focus has been given to the risks posed by ever bigger container ships carrying an increasingly large number of boxes. Certainly, the consequences of a high severity incident involving a 20,000 TEU ship do not make comfortable reading. However, with almost 1,700 containers lost on average each year across the fleet, and a more recent propensity for coastal states to issue container search and recovery orders for any boxes lost overboard, it is clear that the risks faced by all carriers are tangible and cannot be ignored.

The scale of the problem

With a view to dispel some of the more wild and unsubstantiated myths surrounding container losses, in 2011 and again in 2014, the World Shipping Council (WSC) surveyed its member organisations to obtain a more accurate estimate of the numbers of boxes lost at sea each year. By combining the results of the two surveys, the WSC estimated that on average 1,679 containers were lost each year, although if catastrophic incidents such as *MOL Comfort* were excluded, the number would drop to 546.

Whilst these figures may seem to represent a small percentage of the total volume of the approximate 120 million container TEUs (worth a combined US$4 trillion) that are shipped each year, it should be borne in mind that the WSC loss data related to the number of boxes lost overboard only, and the true scale of container damages is an inevitably larger problem.

Quite aside from the immediate loss of the value of the cargo and container shell, the consequence of losing containers overboard is becoming ever more exaggerated due to the demands of stakeholder coastal states. Recent evidence suggests that coastal states are increasingly unwilling to allow container wreckage to remain in-situ, and the frequency of search and recovery orders is growing.

In February 2014, the *Svendborg Maersk* was reported to have lost 517 boxes in the Bay of Biscay. With only 17 containers recovered, the French authorities ordered that an area of approximately 42 square miles be surveyed in order to locate as many of the sunken containers as possible.

With increased focus on environmental concerns and with public awareness focussed by incidents such as the loss of the *Rena*, navigational hazard may no longer be the defining factor and costly recovery operations could become more frequent.

The causes of container losses

The container revolution of the 1960s was deemed to be the solution to limiting cargo damage, but it is perhaps the case that experience has proved otherwise.

Whilst some stresses acting upon a containerised cargo cannot be avoided (for example the dynamic loads resulting from the ship's movements in a seaway) others attributable to human interaction or more properly, human shortcomings can be avoided. It is the entirely avoidable stresses that are most often the root cause of container claims.

A container stow collapse attributed to the use of Fully Automatic Twistlocks

LP FOCUS IS PRODUCED BY THE CLUB'S LOSS PREVENTION DEPARTMENT AND EXAMINES IN DETAIL TOPICAL ISSUES REQUESTED BY MEMBERS.

The aftermath of a container-related fire onboard a medium-sized container ship

1. Packing issues

Some experts believe that approximately 20% of containers at any given time are misdeclared, and that upwards of two-thirds of all cargo claims may be attributed to misdeclaration and poor container packing.

Whilst the risk of damage to an unrestrained cargo is easily visualised, the effects of temperature, moisture and other unavoidable stresses are often less well understood albeit no less damaging.

Incorrectly packaged or declared cargo may be stowed in a position where it is exposed to heat or moisture which can cause degradation or chemical reaction. The consequences are generally limited but can be catastrophic in extreme cases, an example being the fire onboard *MSC Flaminia*.

Container packed with heavy sawn hardwood timbers

2. Overweight containers

If packing issues are an upstream issue over which carriers have little control, for a long time the real 'elephant in the room' has been the overweight containers which, whilst also originating upstream, have a larger downstream impact on a more frequent basis.

Under-declared containers can lead to a variety of problems for the carrier, including but not limited to the overloading of lashings and container frames through heavy containers being stowed on light and/or stack loads being exceeded.

An essential part of the planning process is the confirmation that allowable stack weights are not exceeded. Clearly any plan is only as good as the information it is based upon, and masters relying on shipping documents alone may inadvertently trim their containerships improperly, resulting in serious accidents.

A crude check of the **'black weight'** by means of a draft survey only comes late in the day and does not ultimately tell a master where the additional weight is.

3. Inadequate planning

The basis of limiting container weights and combined stack loads is primarily not to overload the capacity of the lashing system and container frames.

The certification of container securing systems is not always a classification requirement. The stamp applied to the cover of most class reviewed Cargo Securing Manuals is for 'form and content' only.

In any event, guidance is generally in the form of outline instructions and standardised stowage patterns/securing plans. Although the use of other stowage patterns is not prohibited, caution should be exercised.

Shipboard loading computers also may not provide the capability to analyse lashing forces. However, in recent years one classification society has made the use of a lashing computer to check stack and lashing forces mandatory.

Charterers are keen to maximise cargo intake and do so generally within the limits of the maximum permissible stack weights only. Often there is no obligation incumbent upon the Charterers to check the lashing forces.

It may be that the sole means available to the crew to check that a proposed stowage is safe is a manual calculation routine which may be unachievable for many crews during a busy port call.

High cube boxes provide additional problems as they can present a larger windage area and higher centre of gravity.

Late changes in ballast or miscommunications as to the ship's condition can result in a larger metacentric height (GM) than the stowage plan envisages. A larger GM typically results in a stiffer ship motion i.e. one with higher accelerations.

All of these factors can result in additional loads being placed on the containers and lashing system.

4. Poor lashing performance

Improperly selected, improperly applied or poorly maintained lashing gear can significantly influence a stow collapse incident.

Conventional lashing systems incorporate a range of loose lashing gear such as twistlocks, lashing bars and turnbuckles combined with fixed sockets and lashing plates to restrain the containers against the loads imposed by the seaway.

Wasted ISO socket considered causative/contributory to stow collapse incident

Each component must work as intended by the designers for the lashing system to perform as required. Caution should be exercised wherever there is a departure from the standardised stowage plans.

Even intact, well maintained gear needs to be properly applied and monitored throughout a voyage with the crew re-tightening loose lashings as appropriate.

Loose lashings can permit a container stack to move as the ship rolls and bear on the adjacent stacks, in turn putting those lashings under additional load. With each subsequent failure, the loading on the adjacent stacks is increased as the ship rolls. What results is a progressive collapse with the disengagement/lack of restraint due to lashings leading to the overloading and resulting failure in a sequential or stepwise manner.

The aftermath of lashings having worked loose

Due to the effects of wear, both fixed and portable lashing gear can become degraded over time. As lashing gear is changed out or replaced, stocks of lashing gear may comprise different versions of the same items for example, turnbuckles both with and without locking nuts. This complicates the task of properly securing the stow.

Where there is no segregation of loose lashing gear, damaged or degraded lashing gear can end up back in circulation. The aperture of container sockets can become enlarged due to wear and the strength compromised due to corrosion.

5. Fully automatic twistlocks (FATs)

The design of the portable lashing equipment may also, on occasion, be found wanting under certain circumstances. In February 2006, there were four high-profile container losses that occurred in the Bay of Biscay area which were understood to have been as a result of a combination of the use of a new type of twistlock (a fully automatic twistlock) and new larger container ship designs. Although these incidents involved only one particular design of FAT, they caused several of the main lashing equipment suppliers to withdraw their FATs from service.

Over the last three or four years, most of the leading lashing equipment manufacturers have started to re-introduce FATs which are based on new designs.

6. Voyage planning/navigation

Whilst a container stow is exposed to the significant effects of weather, it is the motions of the ship encountered in the course of the voyage – specifically roll, pitch and heave – that have the greatest bearing on the forces exerted on the lashings.

The strength of a lashing system is designed in respect of certain idealised conditions set by the classification society in their rules. The conditions encountered at sea can ultimately overload the lashings.

Improper voyage planning or navigation which does not take account of the movement of weather events can impose excessive accelerations on the stow. Speed, course and ship stability condition are all important considerations.

Minimising future losses

The onus of loss prevention often seems to fall heaviest on the carrier, although this is perhaps natural as carrier-borne losses are the most visible break in the transit chain.

Whilst upstream issues cannot be directly controlled by a carrier, there is an increased focus of regulation which aims to mitigate some persistent risks. Industry readiness and enforcement of the SOLAS Chapter VI amendments remains to be seen, but properly implemented will assist.

The management of downstream avoidable shipping stresses is where the greatest gains for a carrier may lie. For example, it requires a robust system of control and record keeping to ensure that loose lashing gear is inspected promptly, maintained periodically and changed out as required. Failures should not occur at a significantly lower load than the certified breaking strength.

Carriers should acknowledge that Cargo Planners are often obligated to only check that the stack weights are within limits and may not be required to check the lashing forces. Ship checks need to be performed and diverging inputs identified.

There should be proper voyage planning to avoid excessive accelerations, including alterations of course or speed, early avoidance of adverse weather areas and timely ballasting taking into account the actual stability condition. Avoiding beam seas to avoid undue rolling is a normal practice on container ships.

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