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Analysis of Major Marine Claims

Report By**: UK P&I Club**
The Largest P& I Club of World Fleet

How is maritime risk changing?
The UK P&I Club has published a comprehensive analysis of all major claims (those amounting to more than US$100,000) filed by its Members between 1987 and 1997. Club membership accounts for around 20% of the world)s deep-water fleet. Consequently, this project provides a uniquely representative, global picture of maritime risk.

The overriding messages
Risk is, of course, inherent in our industry and can never be wholly eliminated. However, a clear message of the report is that the application of sound risk management principles could do much to reduce the incidence of claims. But before shipowners can put a realistic risk management plan together, they need to be able to identify, assess and prioritize the main risks. This Analysis, like its predecessors, should help.
The change in risk management focus is already evident. A decade ago, the maritime world concentrated its loss-prevention efforts on technical matters, such as the water-tightness of hatchcovers. Now it has become generally accepted that such issues are only part of the story and that the root-cause of the great majority of claims is human error. Further confirmation of this fact is provided by the latest figures which amount to a convincing argument for

Continued on page 2

INSIDE THIS ISSUE

Building to Code is Not the Answer

Report By**: International Risk Management Institute**

Detailed investigations of natural disasters can provide many clues for improving risk management programs. In the last 30 years, EQE International has conducted more than 100 such investigations. In terms of human toll, the worst year was 197 But the year with the most disastrous events---perhaps resulti in the largest economic loss---was 1999. we will review many of the lessons learned from these disasters with the goal of giving you useful information to improve your risk management program. One such lesson is the folly of placing too much confidence in local building codes.

The past millennium closed with a series of devastating earthquakes and windstorms throughout the world, often resulting in extensive damage to heavily urbanized and industrialized areas.

In particular, the catastrophes caused by the earthquakes in Turkey and Taiwan exacted severe Human, social, and economic tolls, with significant implications for multinationa and U.S.-based Organizations.

The economic aftershocks felt worldwide could have been much worse. Taiwan)s high-tech industry produces much of world)s supply of electronics components. It is concentrated i the city of Hsinchu, just outside the damaged area. Hsinchu a the companies located there came very close to experiencing major damage in the earthquake and did suffer a near-total los of power for about a week.

If the earthquake had been on one of the numerous faults clos to or in Hsinchu, or near Taipei, the losses would have been staggering. Component shortages could have affected comput makers worldwide for 6 to 12 months.

In the case of Turkey, one-third of its gross national product (GNP) is generated in or near the Istanbul region, which was barely affected by the Izmit earthquake. A similar-sized earthquake near Istanbul and on the same fault system could make the 1999 Izmit event look small in comparison.

Built-to-Code Can Be a Meaningless Term

continued from page 1

placing the emphasis on education and training in loss prevention.

Some key findings

- **Major claims as a percentage** of all claims have grown from 64% to 72% by value in the ten years under study (although, by number, major claims represent only 2% of the total)
- **Major claims are increasing** in their **individual value** but reducing in number
- **Cargo and personal injury** respectively are the two most frequent types of major claims
- There has been an increase in **pollution** claims since 1993, against the general trend and in contrast to the previous two years when they were in decline
- **Human error** accounts for 58% of major claims
- **Shore person error** is noticeably increasing
- **Pilot error** accounted for US$100m third-party and collision claims during the 10 years
- 45% of **personal injury** claims are due to crew error but there has been a significant reduction in both their value and number.
- **The US** accounts for 20% of major claims but their number and value are falling significantly
- A third of major claims occur in **USA, Netherlands, Japan and Italy**
- **Bulk carriers** between 10,000 and 30,000gt account for 68% of bulk carrier claims and 72% of their value. However, structural failure on these ships is decreasing
- There has been a two-thirds reduction in **ship failure** claims during the 90s
- On **passenger and containership**s, structural failure rates are increasing
- Most structural failure claims relate to cargo; the most common incident is **hatchcover failure** and 10-20 year old ships are most prone
- There has been a dramatic decrease in **dry bulk and crude oil** cargo claims
- The value of **container cargo claims** has nearly doubled since 1989
- **Wet damage** accounts for 25% of cargo claims
- The trend in **containers lost overboard** is worsening

What causes major claims?

The report summarizes the main causal trends in cargo, property, pollution, collision and personal injury claims and concludes that human error, though declining marginally, continues to be the major challenge, accounting for 58% of major claims. Crew error is reducing but pilot and shore person error are on the increase. Ship failure presents a much more optimistic picture with a two thirds reduction.

Shore person error is identified as a continuing major problem, particularly in respect of cargo claims where the trend is worsening. Ship failure, in spite of the improvements recorded, is also a significant factor in cargo claims, with hatch cover failures alone being implicated in US$34m worth of claims in the ten-year period.
Pilot error is another reason for concern. For example, nearly a third of all major property claims (around US$10m pa) were attributable to this. Deck officer errors have shown no significant trend downwards. However, crew error, an above average cause prior to 1992, has since fallen and now follows the trend for all major claims. While this may well partly reflect the even greater emphasis given to crew training in STCW 95, there is no cause for complacency; crew error continues to cause 45
target crewing.

Principal Causes

Deck Officer Error	25%
Crew Error	17%
Shore Error	9%
Structural Failure	9%
Equipment Failure	9%
Under Investigation	6%
Mechanical Failure	5%
Pilot Error	5%
Eng. Officer Error	2%
Other	12%

continued from page 2

Where do major claims occur?

Countries

In the ten years under study, major claims have occurred in 75 countries but just 10 of these have accounted for half the total claims value. (USA, Japan, Netherlands, Italy, UK, South Korea, Belgium, Brazil, Germany, China) It is interesting to note the bias that some of these ports have to certain categories of claim: the Netherlands (cargo), Belgium (property), South Korea (pollution), China (collision), and USA (personal injury). Nearly 40
twice as many as cargo claims. Having said that, it is worth noting that the total number of US-based claims is dropping and this includes personal injury claims.
Nevertheless, the average value of such claims is increasing; eight individual injury claims exceeded
US$1.6m whereas no cargo claims were this high. Certain classes of ship seem to be associated with claims in particular

tankers in Italy, South Korea and Brazil, containerships in Germany, Reefers in Belgium, Japan and South Korea and rig & supply ships in the USA and UK.

Ports

Major claims have arisen in more than 400 different ports. This would tend to indicate that no one port should become complacent when it comes to risk analysis as clearly, major claims can occur anywhere. However, the five ports, which witnessed the most claims, are Rotterdam, Antwerp ,new Orleans, Houston and Singapore . Each of these, except New Orleans, showed an above average occurrence of cargo claims. These represented the biggest single risk in Rotterdam, Antwerp and Houston. Property damage claims, though generally quite low in number, were perceptibly highest in Antwerp where, interestingly, pilot error accounted for the largest value of claims. Both facts possibly reflect the difficult approach to that port.

sophisticated controls in place at these developed ports.

Among individual port-related aberrations worthy of investigation are:

- The high proportion of collision claims in Singapore (26% of all major claims there)
- The exceptionally high incidence of personal injury claims in New Orleans (51%) and the surprising fact that the percentage of these that are non-crew related is more than three times higher than the Club average
- The unexpectedly high number of claims involving bulk carriers in New Orleans and Houston, compared with Rotterdam and Antwerp
- The high proportion (80%) of major claims in Rotterdam that are cargo-related

How do different ship types fare?

Bulk carriers
Bulk carriers produced a slightly higher percentage of claims (21%) than their representation in the Club entry (19%) would lead one to expect. The trend, like that of all major claims, is downward and the average value of bulk carrier claims is consistently below the trend. The part played by ship failure is slightly greater than with other ship types, human error is the main problem, accounting for 55% of claims. Medium sized ships of between 10,000 and 30,000gt account for 68% of claims by number and 72% by value even though these constitute only 60% of the Club bulker entry.
Dry cargo ships
The trend here follows the overall declining frequency trend although the average value of claims is rising. As in previous analyses, ships of between 10 and 20 years old are at greatest risk, accounting for 58% of claims, most of which are for cargo. Shore personnel error accounts for a particularly large proportion of these claims.
Tankers
Contrary to popular belief, pollution is not the most frequent type of major claim, although it is highest by value. Cargo claims are the most frequent, closely followed by personal injury .The most important causes are, in order of value, deck officer, crew and pilot error and structural failure. The highest risk ships are between 10 and 20 years old and between 10,000 and 100,000gt.
The overall trend of tanker claims has been one of steady improvement since 1991.
Reefers
The incidence of major reefer claims (193 in the 10 years) is above trend. However, in spite of the sophistication of the equipment and the high value of the cargoes, the average values are not exceptionally high. Ships in the 5-9 year age band have a relatively poor record yet ships older than 20
years account for remarkably few claims. This suggests that younger ships may be victims of their comparatively complex technology in combination with under-trained personnel.
Passenger ships
Like bulk carriers, these ships produce more and higher value claims than would be predicted by their Club entry. The

continued from page 3

frequency of claims has been climbing since the late 1980s. Most are personal-injury related. Passenger claims can be costly, reflecting consequential loss to typically high-earning individuals. Higher risk ships are those older than 25 years and below four years which together
Accounted for 64% by number and 61% by value.
Containerships
The trend since 1993 has been a deteriorating one. The increase in the number of serious cargo explosions and fires is worrying. Shore error is a greater problem than with any other ship type, causing 21% of all major claims compared with an all-ship Club average of 9%. Claims are concentrated within ships above 10,000gt and with a bias towards ships less than 10 years old.
Parcel carriers
The incidence of major claims has increased of late with cargo claims predominating at 56% by number, followed by personal injury claims at 15%. Ships between 10 and 20 years old account for half of all claims. Those below 6,000gt account for 43%.
Rig and supply boats
Claims have reduced since the late 80s. 83% of claims are crew-injury-related and 57% are caused by crew error.

What is the impact of ship failure?

Structural failure has seen the most dramatic improvement, peaking in 1990-91 then halving the following year.
Mechanical failure saw a similar effect, falling by almost a third in 1990. Although it rose somewhat in the following year, it is still significantly lower than in the late 80s. Equipment failure, too, has declined though it has yet to see such spectacular improvements as have structural and mechanical failure.
USA, Cyprus, Bahamas and Panama flags are particularly prone to structural failure claims, although the first two are showing signs of improvement. The Bahamas and Russian flags present reason for concern with a deteriorating record.
Ship failure most commonly triggers cargo claims. Of these claims a large proportion is attributable to hatchcover failures, largely in 10-20 year old ships of between 6,000 and 30,000gt, with those above 10,000gt the worst affected.

How significant is human error?

Three out of every five major claims are directly related to human error.
Why people go on making mistakes is a question which our data cannot adequately answer. However, the evidence is that even properly trained personnel can become careless and even reckless when responding to excessive commercial pressures or suffering from fatigue, discomfort, boredom or stress. Specific risk areas appear to be:

- Language problems in mixed nationality ships, and between ship and shore-side personnel, particularly when engaged in critical activities such as berthing and bunkering
- Confusion due to poor communication between master and pilot
- Fatigue resulting from smaller crews and shorter Turn round times in port
- Minor miscalculations leading to ship instability and consequent cargo loss
- Pride inducing crew to carry out tasks single-handedly which should be executed with assistance
- Calculated risks by masters and officers responding to commercial pressures

Human error shows a pattern of incidence similar to that of ship failure, peaking in ships between 10 and 14 years old. The reasons are unclear.

The trends in the main categories of cargo claims are:

Cargo claims are by far the biggest drain on the Club)s resources, accounting for nearly 40% of all claims (27% by value).

Risk Category by Risk	
Cargo	27%
Personal Injury	20%
Pollution	19%
Property	16%
Collision	11%
Other	7%

- **Wet damage** , giving

Continued From Page 4

- rise to some US$26m Club claims over the 10 There has been no discernible worsening in this
- situation but no improvement either
- **Contamination** - with inadequate tank cleaning main cause -little change
- **Shortage** -where there have been substantial improvements
- **Lost overboard** -worsening
- **Sinkings** -worsening
- **Theft** -worsening
- **Physical damage** -improving

Because of the contribution of structural failure in cargo claims, the question of flag becomes important. Panama, Cyprus and the Bahamas show a disproportionately high number of cargo claims, although Panama is clearly improving. Malta and Russia are deteriorating.
In general, as might be expected, it is the older ships that experience slightly more expensive claims, with the 10-20 year band being a particular risk group. In newer ships the claims level is improving. Approximately 59% of cargo claims are incurred on tramp ships but there are signs of improvement in this group.
Although containers accounted for 14% of the claims, *containerships* do not emerge as a particular problem. The main risk area appears to be the carriage of containers on non-containerships //

Continued From page 1

Both Turkey and Taiwan utilize the most advanced earthquake building codes in the world, based on the codes used in California and Japan. Yet, thousands of buildings - most of which were built in the last 5 years (and many under construction) collapsed completely or were total losses. The primary reasons were lack of code compliance caused by poor engineering and poor construction.

Poor engineering played the much larger role, as the failed structures were designed without the required earthquake-resistant features. The buildings should have collapsed, regardless of the quality of the construction. In effect, the ruined structures were designed and built without adequate inspection (of either the design or the construction) by the government building authorities to assure that the building code requirements were being met.

This is not a unique problem; it is a common occurrence throughout the world, even in the most advanced countries. The same situation exists to some extent in virtually all the world)s seismic regions, including the entire Mediterranean region, particularly Israel, Greece, and Italy; the Caribbean; most of Asia; and parts of the United States.

Not all structures in Taiwan and Turkey were poorly designed and constructed. Many were built well, particularly some of the industrial structures. These were not damaged significantly by the earthquake. This shows that modern building codes can-and do provide adequate protection when they are followed.

In summary, an advanced building code is nearly meaningless without the combination of good architecture, engineering, construction, and inspection. In effect, the often-used term (built-to-code) means nothing unless all four features are executed together properly.

(Built-to-Code) versus Performance Based Design

While many structures that met building-code requirements in Turkey and Taiwan were not significantly damaged in the earthquake, many others were total or near total losses. The reason for this, which may be surprising to some people, is simple. Modern building codes are intended to protect people, not investments.

For example, the typical modern commercial high-rise building in San Francisco, Seattle, or Tokyo is designed to the same earthquake standards as a nearby low-value farm building. In all cases, the intent is to assure life safety and prevent collapse in a severe earthquake, and to prevent extensive damage in a moderate earthquake.

Also, building codes do not address business interruption---that problem is left to the owner. If improved performance is needed or wanted, then the owner must require a higher level of design. Nowadays this is called (performance based design.) It is not legally mandatory.
However, risk managers, CFOs, and facility owners who understand the limitations and the expected performance of structures built to just comply with modern building codes recognize the value of performance based design.

continued from page 5

Addressing Business Interruption

After the Taiwan and Turkey earthquakes, serious business interruptions were common, even when the buildings were undamaged. This was primarily because the building codes did not require that manufacturing equipment be protected. In addition, certain architectural features, such as raised floors and suspended ceilings, were often extensively damaged as a result of the earthquakes. Unbolted or unbraced equipment toppled and/or slid, causing severe damage.
Extended disruptions resulted.

The worst example occurred in Hsinchu, Taiwan. There, high-tech equipment failed at very low levels of shaking. The equipment was not designed to withstand earthquakes, nor was it properly braced, resulting in significant business interruptions. This is not a problem unique to Taiwan; it is also the norm in the rest of the world, including California and Japan. These problems can be easily remedied at a very reasonable cost.

It is important to remember that in high-tech industries, equipment accounts for more than 90 percent of the value of the plants. Yet typically, minimal protection exists to guard equipment from earthquake damage. Reasonable risk control includes protection from this type of loss. Cost-benefit analyses consistently show that adding this level of protection is good business.

In Taiwan and in Turkey, business interruptions were the major contributors to financial losses for industry. These were often secondary losses, caused by damage to interrelated systems. For example, the structural failure of shipping piers along the Turkish coast in the affected area prevented the shipping of raw materials and finished goods for up to several months after the Izmit earthquake.

Understanding these relationships often require sophisticated system analyses. Addressing these issues requires a thorough understanding of the systems and fault-tree probability analyses. Again, cost-benefit analyses consistently show the benefit of examining these possible loss scenarios before an earthquake strikes.

Recognizing Design Weaknesses

In Turkey, most buildings collapsed because they were not properly designed. In Taiwan, most buildings collapsed because they had one particularly weak design feature in common, called (soft-story.) This involves inadequate ground-level structural design for earthquakes, often necessitated by local custom or the need for larger open spaces on the ground floor. This feature can be easily corrected and collapses avoided with minimal additional design attention and cost.

From a risk management perspective, it is important to realize that local customs affect the earthquake resistance of buildings. Relying on local codes and design practices can be very risky. Instead, multinational corporations should develop in-house procedures for consistent design and construction wherever the building is located, founded on performance based design that will always exceed local requirements for important facilities.

Location, Location, Location

The earthquakes of 1999 showed that the location of the buildings is all-important. In both Turkey and Taiwan, hundreds of structures collapsed completely because they were directly on top of the faults. This is especially tragic since the locations of the faults were known, particularly in Turkey. Prudent real-estate management would dictate the examination of available fault location data prior to construction, thus avoiding the problem.

As is typically the case, much of the damage was exacerbated by soft soils beneath the buildings, amplifying the ground motions. Unfortunately, many industrial facilities, and increasingly many commercial buildings, are located in such areas, including Silicon Valley in California and most major cities in Japan. Again, proper risk management can address this issue by avoiding such locations and designing new construction to higher performance levels to account for the
Increased earthquake load.

Summary

The key lesson for earthquake risk management learned time and time again, especially recently in Taiwan, Turkey, and several other areas affected by earthquakes, is that (built-to-code) is not enough to prevent major losses. It simply does not address protection against business interruption and does not correlate with recent losses.

(Built-to-code) is no substitute for conducting appropriate risk management studies to truly identify the extent of possible losses before construction begins. This knowledge can then be employed to assure that the design and construction adequately address the risks. This is true in the United States and in the rest of the world as well

The Death of the Australian Reinsurance Market

Report by: **-Reaction Magazine**

It has finally happened. The Australian international reinsurance market is now all but dead. ReAC announced in early 2000 that it was to stop taking on new business following the announcement of crippling 1999 losses and a plummeting share price. ReAC was the last of the big three Australian international reinsurers to fall. 1999 saw the demise of its two youngest - it only survived for two underwriting years. The fact that all three are Australian international reinsurers. All writing similar property/ catastrophe type risks, all from the same part of the world, are now gone is no coincidence. Something was very wrong with the strategies and the underwriting of these companies.

The companies were all eventually brought down by heavy catastrophe losses. But many other companies around the world were exposed to Cat losses.
Some observers argue the companies were too far away from the risk to monitor what was going on as a result their knowledge and ability to asses risk was less than it would have been if they had a presence in the markets where they were writing business.
These theory seems plausible, ReAC, New Cap Re, GIO Re have all gone but one Australian reinsurer still remains QBE because QBE Europe. But presence in local market cannot alone explain the difference in fortunes. QBE has a longer history writing reinsurance as a core line of business, good quality underwriting and very strong retrocession arrangements.
The newness of the companies has also been the basis for many theories about the failure. The most common accusation leveled at the companies that they were so naive and took on a lot of under priced business, high risk business from the London market.
Other argument that in order to grow and become established players in the market, the three companies had to write the business, new players are in no position to decline the business as a result of unacceptable terms or rates. The broad issue was they wrote overseas risks they didn t understand. They were regarded as underwriters of last resorts.
New Cap Re speedy withdrawal from the market (established 1997) shocked not only industry observers but the company clients as well. A Company becomes insolvent from star-up with $ 250m of fresh capital in two years.
Their biggest problem was that they overexposed themselves to catastrophe losses, which was then exacerbated. By the fact that their business was under-priced to start with.
But GIO Re was not as new as the other two. It had been for 13 years at the time of its demise. It also had the advantage of being created when the reinsurance pricing was better. GIO actually made reasonable profits on the reinsurance line. But this profitability caused GIO to lower its guard. It soon began to take higher risks.
The reinsurance management influenced the general management to take higher risks with greater retention and less retrocession because it had been profitable.
But the volume of catastrophes that the three companies were exposed to is often blamed on the underwriters. Sometimes individuals are named as being the source of the entire problem. But underwriters alone were not to blame, although some individual underwriters activities were part of the problem, there was a lack of senior management control to oversee appropriate protection mechanisms

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Dear Reader
If you have

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