Risk Management Strategies for Operational Excellence

Graham Westgarth
President
Teekay Marine Services

Before launching into the main content of the presentation, I thought it would be appropriate to provide some form of definition of what I mean by "Risk Management for Operational Excellence."

As a starting point, I looked at the various definitions of each of the words, and came up with the following:

Risk:

- A situation involving exposure to danger, or
- The possibility that something unpleasant will happen

Manage:

- Administer and regulate, or
- Maintain control or influence over

Strategy:

- Overall plan of attack

Operations:

- Working, or
- Action, or
- Way things work

Excellence:

- Surpass, or
- Be superior, or
- Do extremely well

If we then bundle the above together, we would probably agree that the title of this paper could be interpreted as something like:

> *The development, and implementation of plans of attack, to regulate the potential for something unpleasant happening, to a degree which is superior to legislative and customer requirements or others within the industry.*

Having written down the above statement in preparation for this presentation I realised the level of ambition seemed somewhat low. I then set about thinking

how I could quantify “Operational Excellence” in some way, and during the research came up with the following probability examples.

Some probabilities of adverse events:

10^{-1}	dying by Russian roulette
10^{-4}	mother dying while giving birth (typical OECD) *(civilization would end if this risk was not accepted)*
10^{-5}	dying of cancer by eating a peanut butter sandwich a day
10^{-6}	woman killed by husband or lover (US)
10^{-7}	annual probability of being killed by lightning
10^{-8}	probability that if something happened to a German, it happened to a specific German
10^{-9}	**annual probability is once since life appeared on earth**

When looking at these scenarios, the reality of the situation is that even if we were to reach consensus that a probability of 10^{-9} could be classed as excellent performance, in the event of an incident involving multiple deaths or major oil spillage, the social, political and environmental consequences in today’s world are of such a magnitude that the only option open to responsible ship operators is to strive for perfection. A tall order indeed.

Before embarking upon a discussion of how we in Teekay have embarked upon this quest, I thought it would be worthwhile to reflect for a few moments on the industry performance over the last three decades or so. If we firstly look at the number of large oil spills (over 700 tons) between 1970 and 2002 (figures provided compliments of ITOPF), we can see the following pattern:

1970 – 1979	24.2 spills per year on average
1980 – 1989	8.9 spills per year on average
1990 – 1999	7.3 spill per year on average

All in all a significant improvement. Although it could be argued that the incremental improvement between 1980–1989 and 1990–1999 is somewhat less than that achieved between 1970–1979, it is still a 22% improvement.

Perhaps even more worthy of note has been the reduction in the number of tanker incidents (ie: groundings, collision, etc.) where we can see that the run rate has reduced from something like a thousand a year in the late 1970s to closer to 100 per year in the early 2000s (size of fleet 1980 – 2000). Whilst in our view this is still far from good enough, there is little doubt that very significant progress has been made.

It is also worth bearing in mind when looking at environmental considerations that, in statistics gathered for the period 1990 by the National Response Centre, transportation of petroleum accounts for only 12% of the Worldwide Average

Annual Release of Petroleum. Of the remainder, 47% is from natural seepage, 38% from consumption of petroleum and 3% in the extraction of petroleum. In stating this, I fully acknowledge that 12% should not be considered acceptable.

So what has driven this improvement? Arguably and somewhat regrettably, I believe the major improvement driver has been legislative, which in turn has often been initiated as the result of significant incidents within the industry. Perhaps the best example of this is the introduction of the International Safety Management Code which became mandatory in 1998.

Other factors which have exerted a positive influence have been the vetting requirements put in place by various oil majors, Port State Control, and a number of proactive ship owners who see improving standards as not only a moral obligation, but also because it makes good business sense. I like to believe that Teekay is one such company.

I would say at this point however, that the amount of legislation in existence is such that it needs to be carefully managed. We need now to look at effective implementation, and consider taking a different approach to assessing how effectively risk is being managed in the industry. The industry itself needs to become more proactive in developing tools and methodologies which continue to drive the bar higher. I will return to this point later in my presentation.

Within Teekay, we have spent a number of years developing a suite of tools which we believe reflect best practices, and are hopefully leading us toward the "holy grail" of perfection. I would like to take this opportunity to talk you through a number of these.

Before delving into the detail however, I have for the purpose of illustrating the complexity of today's environment, listed below our main "risk management tools":

- Marine Operations Management System (ISO 9001, 14001, OHSAS 18001)
- Seafarer's Competence for Operational Excellence (SCOPE)
- HSEQ Review
- Fleet Safety Instructors
- Planned Maintenance System
- Structural Integrity Management System
- Internal Inspection Scheme
    - ISO and ISM
    - Global Inspectors
- Quarterly Seafarer Workshops
- Management Visits
- Superintendent Visits
- Risk Management Board

- TORA – Risk Analysis Tool
- Emergency Response Organisation

Broadly speaking, these tools have been developed to manage what we consider to be the three major elements of risk, namely structural integrity, equipment integrity and last, but probably most importantly, people. The programs we have developed to manage these components are briefly outlined in the following paragraphs.

The overall management system which houses all of the above is our Marine Operations Management System (MOMS). This is based on the *Plan* ⇨ *Do* ⇨ *Check* ⇨ *Act Cycle*. It is risk- and web-based, easy to use, and provides a line of sight from the overall vision of the company to each individual's roles, responsibilities and actions. It is a system which basically provides the framework for all of our risk management strategies.

1. <u>Structural Integrity Management System</u>

   This is basically a program that takes a life cycle approach to asset maintenance from newbuilding to final disposal. Key components of the program are:
   - Newbuild policies and best practices, especially around the design, plan approval and supervision phases;
   - Vessel specific structural manuals based upon original design, fatigue analysis, and coating specification;
   - Internal inspection requirements, inspection guidelines, reporting, etc.;
   - Third party inspection requirements;
   - Training of internal staff in carrying out inspections; and
   - Review of inspections and a remedial action process.

2. <u>Equipment Integrity</u>

   Our planned maintenance system is the primary tool to ensure ongoing equipment integrity. It includes a list of all critical systems and components to be maintained, overhaul intervals, critical spare part requirements, work instructions, risk evaluation and safety requirements. It also incorporates a defect reporting system allowing us to trend deficiencies across vessels with identical equipment. In addition to the above, we are just completing a pilot project on Condition Based Maintenance using tools such as vibration monitors and lube oil analysis. This basically tells us how "healthy" a particular piece of machinery is. This is important in that it should provide us with a pre-warning of failure, and mean that we only overhaul machinery when it is required. Such an approach eliminates wasteful effort in overhauling machinery which is functioning perfectly. It's also noteworthy that, statistically, incidents of failure increase dramatically after an overhaul. One could therefore argue that overhauling machinery only when necessary could reduce the number of such failures.

3. Human Factors

As I believe we are probably all aware, perhaps a company's most important asset in managing risk is the quality of its people. With this in mind, Teekay initiated the Seafarer Competence for Operational Excellence (SCOPE) project in late 2002. After the "Erica" and "Prestige" incidents, regulators and the industry focused very much on the quality of the 'hardware' (ie: the ships). We saw it as a logical and parallel step to also look at the quality (competence) of the 'software' (ie: the seafarers crewing the vessels). Although the detail is not available, an informed high-level review of the tanker industry incident records would conclude that human error is the root cause underlying probably the majority of maritime incidents. Focusing therefore on this area is a major plank of our proactive approach to risk management, and our desire to ensure that the competence of our personnel far exceeds the legal requirements. A combination of very competent personnel supported by work processes driven by best practices offers the best defense against human error, and will guarantee the delivery of a quality service. It is also a very visible demonstration of our commitment to the ongoing professional development of our seafarers, and the desire that they are given every opportunity to attain their full potential.

As part of the SCOPE project, we set STCW 95 standard as the minimum requirement. We then built on it by establishing the additional Teekay competencies required for each rank. Related to each one of these competencies is a reference to 'Best Practice', guidance on how that competence is to demonstrated, and what the criteria is for evaluating the individual's attainment of that competence. These competencies also include management and leadership skills, which we see as a vital but a previously ignored component in establishing an effective team on the vessel. These include mentoring skills for the senior officers, which is key in establishing and monitoring an individual's competency objectives during his period onboard. Each seafarer also has a Continuing Professional Development (CPD) portfolio which is a personal record of his training and competence attainments, and which will formally log the discussions and achievements for his time onboard. The system defines the competencies necessary for promotion to the next rank, and thus offers both a clear career structure to an individual as well as offering management a status overview for succession planning. Finally, It is a very useful tool in assessing recruitment candidates and facilitating a gap analysis to determine their introductory training requirements.

The current status is that SCOPE is implemented on four vessels, and plans are in place to roll it out to the remainder of the fleet. Competency management obviously needs to be dynamic to incorporate new technical or regulatory requirements. An onshore management process has been

established to ensure this happens, and to transition SCOPE from a project phase to being part of our day-to-day business. To validate the integrity of the process, and also to obtain an outside perspective, we have established external auditing of the system. We recently achieved a world first when DNV issued Teekay with the very first externally accredited certificate for our Competency Management System.

We are confident that by embarking on this industry-leading initiative, we are taking a very positive and effective step in minimising the risks stemming from that most elusive and random of factors—human error and behavioural issues.

The above program descriptions are just a small selection from the various risk management initiatives we have in place, but one has no means of knowing how effective they are without putting measurements in place. Within Teekay we are obsessed with performance management and have introduced a significant number of metrics covering operations, finance, customers and people. Such measurements include amongst others, LTIF, TRIF, Near Misses, Vessel Availability, Pollutions, Vetting Deficiencies, Port State Control Deficiencies, and ISM Deficiencies and Attrition. Each and every time we have introduced a measurement, performance has improved.

Measuring is one thing, but it needs to be accompanied by a discipline of continually reviewing and challenging the data that surrounds such measurements, and adjusting programs accordingly. We do this on a monthly, quarterly and annual basis using a system known as pbviews, which provides a high level management dashboard.

In debating the metrics, the questions always raised are where should we invest for improvement, how much should we invest, and how should we measure the effectiveness of such investment. A tool that we have recently developed to assist us in making such decisions is named “Tool for Operational Risk Analysis“ (TORA).

TORA is a tool which has a number of different functions, probably the most important of which is to quantify losses. It also assigns direct and root causes to each loss using an in-house tool we have developed called Onboard Root Cause Analysis (ORCA). TORA depicts this information in a manner which helps drive the debate as to how well our various programs are working, how much we should consider investing in reducing losses, and what we should invest in. Thereafter it provides a tracking tool for measuring the success of the investment. It is a fundamental part of our strategic decision-making process, using carefully analysed and presented data to drive objective discussions.

I mentioned earlier in the presentation that the industry should consider assessing risk management effectiveness in a different way. The current

methodology leans toward ensuring strict compliance with a plethora of different regulations. Often this assessment is carried out by different bodies and personnel. Whilst I agree this approach has up to now driven improvements in industry performance, we have still seen significant setbacks. I don't believe I need to elaborate on these.

Our view is that the time has come to take a more holistic approach in defining and assessing how risk is managed in the industry. We need to look at the risk management process within a company from its strategic objectives to the effective implementation of such on the vessels.

The best and most effective example of this that I am aware of is the safety case regime, which was enacted in the oil and gas industry in the U.K. sector of the North Sea. Unfortunately, this also came about because of an incident on the Piper Alpha platform where 167 people lost their lives. Following this, a government commission headed by Lord Donaldson produced a report which recommended moving from a regime of strict prescriptive legislation (similar to the one we currently have in the shipping industry) to one of goal setting using risk-based techniques. These recommendations were radical and constituted a quantum shift in culture. They have, however, resulted in year on year safety improvements in the oil and gas industry. I believe there is much to learn from this approach, and feel it is the next logical step for the shipping industry.

Ladies and gentlemen, thank you for your attention.