

# Application of Risk Management in the Marine Transportation System

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I am pleased to have the opportunity to participate in this symposium. I attended the Marine Transportation System (MTS) National Conference in Warrenton, Virginia, last November and I consider this a golden opportunity to further develop the foundation that was established there.

I recognize the diverse group of experts representing industry, regulatory agencies, classification societies, port infrastructure, academia, and special interest groups. Like the MTS Conference, the success of this symposium will rely not on our individual expertise but on our collective willingness to participate with an open mind and a discipline to stay focused on the objective: learn from each other.

I am here to discuss the need for risk assessment and risk management from the perspective of those of us who actively participate in the marine transportation industry. It is impossible to completely eliminate operating risk, and the expectations of customers and the general public are more demanding than ever. However, by using risk assessments and by applying sound risk management principles as part of an overall company-wide quality management system, we place ourselves in a *proactive* position by identifying hazards and introducing preventive and/or mitigating steps. This is much preferred to the alternative of being in a reactive state, which can lead to onerous—and sometimes ill-conceived—legislation and regulations and can alienate our customers as well as our fellow citizens.

First, I will cite definitions of risk assessment and risk management. Then, I will show by example how the company I represent integrates risk management and

risk assessments in daily work activities, regardless of complexity or size, and strives for continuous improvement. I will close by sharing what I consider to be important factors in conducting a risk assessment from an end user's point of view.

In 1996, the April-June issue of the U.S. Coast Guard publication *Proceedings* was dedicated to the topic "Risk Management in the Maritime Industry." One article included the following definitions of risk assessment and risk management:

- Risk assessment is "... the use of information to define the potential safety threats resulting from exposure of individuals or populations to hazardous events, hazardous materials, physical agents, chemicals and situations. While no risk assessment is devoid of value judgements, risk assessment should be an objective engineering/scientific enterprise aimed at approximating the truth about a possible threat to humans or the environment."
- Risk management is "... the process of weighing alternatives for controlling risks and selecting the most appropriate course of action. While risk managers may use information from risk assessments when making decisions, they may also consider information about engineering, economics, law, ethics, and politics."

The article went on to say

Ideally, risk assessment should provide systematic results to evaluate and manage technologies. It should answer whether evidence is sufficient to prove specific risks and benefits. Answers to questions about acceptability of risks,

or when a risk situation merits regulation, clearly involve values. On the other hand, the information in the assessments of the risk level should be objective. Given answers to questions of acceptable risk, the question of acceptable evidence becomes scientific not political.

I repeat, "Given answers to questions of acceptable risk, the question of acceptable evidence becomes scientific not political."

This is a very interesting and important point that I will come back to after I mention a few words about how the company I represent, SeaRiver, integrates risk assessment and risk management in its daily activities and planning sessions. For those who are not familiar with the company, SeaRiver Maritime, Inc., under different names and forms of organization, has been in the business of transporting crude and petroleum products for over 50 years. It is one of the largest companies that owns and operates U.S. flag tankers. The company owns/operates a fleet of nine oceangoing tankers engaged primarily in West Coast Alaskan North Slope trade and transporting chemicals and refined products from the U.S. Gulf Coast to the East Coast. SeaRiver also owns/operates 10 inland towboats, 6 harbor tugs, and 5 barge units. As such, it represents the only Jones Act liquid bulk carrier operating on all coasts and in the inland waterway system of the United States. SeaRiver serves more than 60 customers. The company also provides a wide range of marine services, including vessel vetting, inland and ocean chartering, offshore lightering management, and marine requirements planning.

SeaRiver is committed to maintaining its leadership presence as a technically proficient, financially stable, high-quality owner/operator of U.S. flag vessels. SeaRiver's reorganization in 1993 was directed at furthering that commitment. SeaRiver's commitment is demonstrated and documented by the quality of its people and equipment; by its dedication to the responsible management of environmental, health, and safety concerns; and by constantly seeking to improve its quality performance.

Consistent with this commitment, SeaRiver's Safety Management System has been audited and certified as complying with the International Management Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code) as well as with International Standards Organization 9002 (ISO 9000 Series of Standards). SeaRiver is also an active participant in industry-sponsored programs, including the American Waterway Operators' Responsible Carrier Program and the Chemical Manufacturers Association's Responsible Care Partnership Program.

The purpose of this overview is not to present a self-serving advertisement to a captive audience in hopes of attracting new business opportunities (although I brought plenty of business cards for those interested). The purpose is to acknowledge that, like many of the entities present today, SeaRiver manages a diverse range of operations, customer needs, and levels of operational risk.

Wednesday, March 24, 1999, marked the 10th anniversary of the grounding of the *Exxon Valdez* in Prince William Sound, Alaska. Before this accident, Exxon Shipping Company, the predecessor of SeaRiver, had a long-standing focus on personnel safety and operations integrity. The *Valdez* spill was clearly inconsistent with that track record. Nevertheless, the severity of the event was such that an intense self-examination was undertaken.

This intense effort continues today as a company-wide approach to risk management and safety that we believe has produced unequaled safety performance by a U.S. flag shipping company. SeaRiver's risk management philosophy begins with the fact that the safety and protection of its people, vessels, cargoes, and the environment is the preeminent core value of the company.

This means that any time safe operations contend with commercial or other interests, all risks must be thoroughly assessed, and if the risks cannot be managed to an acceptable level, the operation is not undertaken. We expect to, and in fact do, incur costs in order to conform to this safety culture and commitment. However, we also believe that there are offsetting benefits that enable us to be very competitive in the marketplace. We truly believe safety is not a net cost but a competitive advantage. For SeaRiver then, safety is the wellspring for all company performance.

For example, we recently evaluated what initially appeared to be a very promising venture barging gasoline upriver for a third party on an inland tow. The commercial opportunities and financial rewards were promising. However, after extensive evaluation by the risk assessment process, we were unable to convince ourselves that we could take the necessary steps to adequately prevent or mitigate the inherent risk in this profitable opportunity. The result—we did not bid on the business.

Safe marine operation is principally a challenge in managing human behavior. Incident investigations continue to confirm that errors made by personnel are by far the greatest single cause of accidents and near misses. Recent industry and government studies confirm that more than 80 percent of all incidents are directly or indirectly attributable to human behavior. There are some, and I fall into this category, who believe that all failure can ultimately be traced to a form of human involvement.

Instilling a safe mindset into management, shore staff, officers, and unlicensed personnel is both an art and an emerging science. There is no silver bullet, no single element, and no unique program that ensures the desired results. Instead, many elements must be consistently followed and credibly addressed to the point where they become second nature, deeply embedded into the company culture. There are certain key elements that SeaRiver has found to be most critical to the creation of this mature safety culture.

1. Management credibility. Safety in all its operations is the preeminent company core value. Management must set the expectations, procure the resources to achieve the expectations, and make financial and commercial decisions that are totally consistent with this focus and that demonstrate management commitment.

2. Clear policies. The company must ensure that its policies are not ambiguous and employees must believe that the policies will be consistently followed and enforced. This means that behavior that leads or could lead to an unsafe workplace, such as alcohol or drug abuse or refusal to follow established safety procedures, is inconsistent with the principal company core value and is not tolerated.

3. Belief and commitment. Our employees must believe in the company and be committed to its objectives—every employee at every level must be actively engaged in safety management. They must feel a personal responsibility to behave safely, look out for the safety of others, and bring constructive ideas for safety improvement to management. If all personnel truly believe in safety then they will adopt it as a personal core value. The extended benefit of this “true belief” is that safety on the job is replicated by safety at home and off the job. If this is not the case, then safety is viewed as a “condition of employment” and not as a desirable personal characteristic and safety results will deteriorate.

Personnel safety is the key to overall safe operations. Recognizing that human factors are a significant contributing element in accidents, the awareness of and attention to detail that are key to having people work safely are also critical to maintaining the integrity of the vessel, the cargo, and the environment. In a mature safety culture, the attitude needed to be successful in these areas must be identical. Failure or poor performance in any of these areas, regardless of the success in others, must be carefully evaluated to determine the nature of the problem. Although corrective action must be clear, swift, and timely, it must not be a knee-jerk reaction. One of management's greatest challenges is to understand this delicate balance.

I mentioned earlier that, in the aftermath of the *Exxon Valdez* grounding, an intense self-examination was undertaken. One area that was reevaluated was in-tank operations. Traditional (industrywide) procedures included tank preparation (tank washing, gas-freeing, and atmospheric testing), monitoring in-tank personnel, notification procedures, and emergency response preparedness. Yet few preventive or mitigating steps were in place to reduce or eliminate the risk of an employee or contractor falling while working along the tank's internal structure.

Historical data suggested that, over the life of a vessel, a significant in-tank-related injury (or fatality) was possible. This finding was clearly inconsistent with our safety

culture. We decided to look for a solution outside the marine industry. The answer came from the refinery setting, where fall protection equipment and related procedures are used extensively. In short order, all SeaRiver vessels were retrofitted (in-tank and above deck) with modified ladders and equipped with fixed and/or portable fall protection equipment to ensure the associated risk was prevented or mitigated to an acceptable level. Since its introduction over 8 years ago, fall protection continues to be an integral part of our safety program for in-tank operations and when personnel (employees and contractors) are working aloft.

This example helps illustrate why potential personnel and operating risks must be thoroughly examined by a systematic process to ensure that all aspects of the operation are reviewed. This review can vary in its complexity, ranging from a brief job hazard analysis for routine work activities to formal risk assessments to assess new trade patterns.

In each case, the risk assessment process helps us identify potential risks and, if feasible, prevent hazardous situations. If prevention is not possible, mitigating steps must be introduced to reduce risk to an acceptable level without causing increased exposure elsewhere; if that is not possible, then you must withdraw from the particular activity.

Safety must be an area with its own learning curve. Company management and personnel must be interested in the lessons derived from operating incidents and near misses. Employees need to see relevant changes as a result of the lessons learned. Learning from incidents and near misses then becomes a key input to the company's continuous improvement process.

To achieve success, management must also want to know the complete story. Therefore, the incident investigation component must focus on identifying true causes and consequences. Safety statistics must be compiled with an integrity that eliminates debate about the numbers; deteriorating or improving statistics must serve as a barometer of the underlying soundness of the safety culture and not as the short-term focus of management's attention.

Finally, sharing safety experiences and approaches and lessons learned with industry competitors, customers, contractors, and all industry stakeholders is an essential element in developing an industry safety culture. The elements I have just discussed are essential for the continuing development of SeaRiver's safety culture. And there is one other element that bonds them all together.

Leadership begins with management; the leadership that bonds our safety elements into a mature culture comes from within our company. It comes from the people who, day in and day out, demonstrate the capacity and ability to guide, instruct, direct, conduct, and show others the practice of safe operations. Experienced and knowledgeable crew—the captain, an officer (deck or engine), a seasoned deckhand on an inland tug—are the



people who provide the critical leadership that blends these elements into a mature safety culture.

Through procedures, quality people and focused training are key building blocks of operating safety. Documented procedures as found in quality manuals represent the blueprints of safety but only if they are approached systematically and if they accurately reflect how tasks are executed.

The terms systematic and system have become commonplace throughout industry and the quality movement. In fact, this symposium, as well as the National Conference held in Warrenton, focuses our attention on issues in the context of the MTS. But what do we really mean? Do we share a common understanding of what constitutes a sound system?

We at SeaRiver believe that documentation of each defined system must address all five essential elements:

- Definition of scope and objectives,
- Establishment of procedures,
- Identification of responsible and accountable resources,
- Selection of verifications and measurements, and
- Incorporation of a mechanism for continuous improvement.

The continuous improvement element is one that needs constant attention from management because a system's long-term effectiveness and management of change can be realized only if it includes an ongoing feedback process to drive the system to strive for greater effectiveness, continual health, and safety and environmental improvements.

Earlier, I cited the 1996 *Proceedings* article that noted the importance of following a systematic process and maintaining objectivity when deciding on risk levels to ensure that determination of acceptable evidence becomes scientific and not political.

This point is essential to the success of any risk assessment because it has a direct bearing on the value of the resultant recommendations and the level of cooperation demonstrated by all stakeholders during implementation.

As one stakeholder, I am concerned about the collective ability of all stakeholders to abide by the risk assessment protocols and maintain the integrity of the risk assessment process. Preordained conclusions in response to external pressure(s) to take swift action well before the problem is truly understood or accurately defined or the use of incorrect, unreliable, or unsubstantiated data exemplify ways to undermine the risk assessment process and waste precious time and resources. Under such circumstances, a formal, large-scale risk assessment of a major port or waterway runs the risk of being criticized as a good intention that fell short of its mark.

In the spring of 1995, shipping companies that traded in Prince William Sound proposed a risk assessment study

to the other principal stakeholders in that area of Alaska. The proposal included involving local residents and special interest groups, government officials at the state and federal levels, and industry representatives. The purpose was to "improve the safety of oil transportation in Prince William Sound." A quantitative basis for understanding the current level of risk and evaluating proposed risk mitigation measures through various modeling techniques was selected.

The result of this risk assessment was an important element in furthering the enhancement to the safe transportation of oil through Prince William Sound. However, the effectiveness of this 2-year effort has been, and continues to be, debated because all participants in one way or another have failed to consistently adhere to the true definitions of risk assessment and risk management and the application of the study's recommendations. If we are not careful, the forthcoming risk assessment of Puget Sound and the Straits of Juan de Fuca may experience similar setbacks.

In review of the key elements of the definitions referenced previously:

- Risk assessment is "an *objective* engineering/scientific enterprise aimed at approximating the truth about a possible threat to humans or the environment."
- Risk management is "the process of weighing alternatives for controlling risks and selecting the most appropriate course of action."

So, in the spirit of continuous improvement, what can we learn from this experience? As with any significant project, to save time, effort, and expense thorough planning must be followed from the start. Stakeholders must take the time to ensure that all participants have a clear understanding and buy in to the scope, objectives, methodology, recommendations, and timing of the overall process and its implementation. Credibility and trust are critical to the process: it is essential for each stakeholder to respect the knowledge, experience, and resources that fellow stakeholders provide.

Quantitative analysis is only as good as the quality of data used, whereas a qualitative process relies heavily on the knowledge and experience as well as the mix and balance of the participants.

The duration of the risk assessment process from initial proposal to final implementation is another important consideration. There is a fine line between conducting a thorough assessment and one that appears to deliberately extend beyond the tolerance of the stakeholders and/or customers.

If the risk assessment is assigned under the auspices of a regulatory body, in this case the U.S. Coast Guard, the process stands a better chance of preserving its objectivity, and results will help identify the best recommendations, strategy, and method(s) of implementation.

The United States is blessed with large ocean area accesses to its ports on the mainland coasts coupled with vast rivers and internal waterway systems that serve the mainstream of commerce. Preservation of these resources, development of a healthy port infrastructure, and perpetuation of personnel safety and safe operations will prosper only through the following:

- Promotion of open dialogue and collaboration;
- Blending of viewpoints of disparate entities;
- Commitment to proven processes;
- Generation of balanced, justifiable solutions; and
- Recognition that the process must embrace continuous improvement.

As we enter the 21st century, we must recognize the importance of our commercial lifeline and agree to do what

is necessary to nurture and develop a national marine transportation system that is based on the fundamental principle of safety. Furthermore, the assessment of risk, whether on a global scale or a regional basis, must result from the cooperative effort of all stakeholders, free from the pressures of politics and parochial interests. We recognize that implementation of risk prevention or mitigating measures in most cases will reflect the realities of the political environment and the pressures of specific interests. The real challenge is to ensure that the fundamental findings of risk assessment are not compromised by these external factors.

I ask each of you to join me in accepting this challenge and ensuring that we identify and implement the best strategies needed to improve the safety and integrity of our marine transportation system.