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## *Special Issue on Close Calls, Near Misses and Early Warnings*

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# Near-Miss Management: Managing the Bottom of the Risk Pyramid

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Analyses of serious accidents reveal that prior to an accident, a number of related incidents occur with limited or no impact. Collectively, these incidents are called near-misses, close calls, near accidents or accident precursors. Near-misses are often indicators of system failures that can lead to serious outcomes. Therefore, a Near-Miss Management System (NMMS) can be a powerful tool to reduce risk and improve system reliability. The concept of a near-miss can be applied to almost any operation in any industry.

Although there is not a single, agreed-upon definition of a 'near-miss', for our discussions we will embrace the following broad definition: a near-miss is an event, observation, or situation that possesses the potential for improving a system's safety and/or operability by reducing the risk of upsets, some of which may eventually cause serious damage.

The concept can also be illustrated through a new version of the Safety Pyramid discussed in earlier studies by U Oktem and A Meel (2008, 'Near-Miss Management: A Participative Approach to Improving System Reliability', in *Encyclopedia of Quantitative Risk Assessment and Analysis*, Melnick, E, and Everitt, B (eds). John Wiley & Sons Ltd. Chichester, UK, pp 1154-1163), which we have re-named the Risk Pyramid. Oktem and Meel extended the bottom region of the pyramid to include events with no damage (incidents on the cusp of accidents), which we have referred to as 'Foreshadowing Events and Observations.' We modify the pyramid further by adding: (a) another layer to the bottom of the pyramid where the organization believes there are no risks: 'Positive Illusions, Unsafe Conditions and Unobserved Problems – Unawareness, Ignorance, Complacency'; and (b) a new dimension called 'risk perception' along the height of the pyramid. The Risk Pyramid includes all the elements of the Safety Pyramid but extends beyond visibly unsafe operations to include misleading or non-visible (non-obvious) conditions (such as Positive Illusions, Unsafe Conditions and Unobserved Problems). Of course, it is worth noting that the categories in the risk pyramid represent a continuum, with uneven overlapping areas as one moves up the progression.

As in the Safety Pyramid, the Risk Pyramid illustrates that serious adverse events are often preceded by a large number of related incidents with lesser impact and an even larger number of incidents with no adverse effects. Near-misses form the bottom portion of this pyramid while accidents form the top.

The very bottom level of the Risk Pyramid (Positive Illusions, Unsafe conditions and Unobserved Problems), or what we can think of as the 'False Comfort Zone,' describes the conditions in which management, employees and/or customers are under the impression that they are not facing any risks. Problems go unobserved, as do unsafe conditions, aided by general attitudes of ignorance or unawareness. But the false comfort can often go beyond ignorance of existing risks and turn into something more pernicious, a belief that the organization has 'risk immunity' – that everything is proceeding so successfully according to plan that risks cannot exist, thus complacency prevails. In this 'False Comfort Zone,' near-miss events take the form of positive illusions, unsafe conditions and unobserved events.

A recent example of positive illusions, where seemingly good results were near-misses in disguise, comes from the well-publicized Madoff Scandal. As has been described extensively in the media, Bernard L Madoff's firm created a sense of risk-free investing through a combination of consistently high returns, images of trustworthiness (Madoff himself was non-executive chairman of the NASDAQ stock market and served as the Chairman of the Board of Directors and on the Board of Governors of the National Association of Securities Dealers (NASD)), and a brand of exclusivity. All of these factors created positive illusions that masked the true risks.

Other examples of positive illusions that in retrospect were clearly near-misses include the cases of Bearings in 1990 and AIG in 2008. One can argue that failure to notice and act on the weak signals around subprime lending describes the recent case of Fannie Mae's 'accident,' where they lost \$59 billion in 2008, leading to a \$15 billion cash injection from the government (ref: *Washington Post*, Feb 27, 2009, p D1). Another example of near-miss oversight is the recent Salmonella outbreak incident of the Peanut Corporation of America, which resulted in the loss of lives and massive recalls. Based on the FDA's report (FDA 2009), the Peanut Corporation of America repeatedly shipped peanut butter that had initially been identified as having Salmonella, but then approved on the second round of testing. By doing this repeatedly without suffering adverse consequences, the company developed an attitude of 'no risk,' or complacency, toward batches initially identified as



contaminated. Thus they did not make any effort to change the manufacturing conditions.

Many recent events in the financial industry have been driven by operational failures. The risk and control self-assessment process (RCSA) on which the industry continues to rely has proved inadequate for managing these risks.

A near-miss management system instituted properly can reduce the risk of accidents by catching the 'near-miss' signals early and alerting the organization to the potential danger. Although many institutions have some type of near-miss system under various names, their effectiveness in preventing events with high negative impacts varies widely. The Wharton Risk Center's Near-Miss study, conducted in 2000, shows that in order for a near-miss management system (NMMS) to be effective, it must cover the entire range of operations and must contain the essential components of eight steps, all of which should be

implemented successfully. These steps are:

- Step 1** Identification and recognition of a near-miss
- Step 2** Disclosure (reporting) of the identified information/incident
- Step 3** Prioritization and classification of information for future actions
- Step 4** Distribution of the information to proper channels
- Step 5** Analyzing causes of the problem
- Step 6** Identifying solutions (remedial actions)
- Step 7** Dissemination of actions to the implementers and general information to a broader group for their knowledge
- Step 8** Resolution of all open actions and review of system checks and balances

While a near-miss programme must be an integral component of any risk management system, it cannot alone provide a comprehensive risk prevention mechanism. It should be strengthened with other preventive intelligence tools/actions.

Integration of near-misses into risk assessment methods can be accomplished in two different, and complementary, ways:

- a) By using near-miss data to develop better, more realistic, estimate of failure probabilities;
- b) By revising and modifying the results of conventional risk analysis, such as fault trees, to make the system more robust.

Near-miss management systems can improve the outcome of risk evaluation in financial industries

by providing more complete risk evaluation for each of the components of the operational risk management framework (resource failure likelihood, business impact analysis and risk shield analysis).

For example, in recent years, before the financial crisis hit, companies pressured their loan officers to sell high volumes of credit cards and mortgages, and, as a result, loan officers made simple mistakes while processing quantities of paperwork. Had these near-miss events been recognized, they could have alerted the financial services companies to the non-desirable exposure of uncompleted documentation and helped them avoid significant losses due to incomplete documentation that prevented the legal procedures from being implemented during recovery of funds.

Although there is a wealth of research in this area, there is still a lot to be learned about why management and workers fail to recognize the real risks. The question still remains: What are the conditions in different industries that will enable organizations to reside at the bottom of the Risk Pyramid?

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