Using LOPA to Analyze Past Catastrophic Accidents Including Space Shuttle
Challenger Disaster and 2008 Mortgage Market Crisis

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ABSTRACT

It has been established in the chemical process industry that Layer of protection Analysis (LOPA) is a very helpful tool in analyzing systems safety. It is an effective semi-quantitative risk assessment and mitigation technique which involves independent layers of protection to maximize safety and minimize risk. LOPA has not yet been liberally applied to other industries outside the chemical process industry. Can the contributions of LOPA to the process industry be extrapolated to other industries? Is there a generic approach that could be used to analyze a broader assortment of hazardous situations? This paper will try to apply LOPA to past catastrophic accidents and will evaluate the effectiveness of this technique. The two major accidents to be considered are the space shuttle Challenger disaster and the 2008 mortgage market crisis. This research will attempt to analyze these events within the LOPA framework. This might result in designing new layer(s) and looking into the aspects of culture, organizational structure issues, ethics and human errors. In case of the Challenger disaster, the primary reason for the occurrence of the accident was poor decision making on the part of the management. An attempt will be made to incorporate such issues into the layers and try to maintain their independence. The probabilities for these layers might be difficult to ascertain, yet an attempt will be made to provide a method of determining the same. The generic model will help project managers to predict safety shortcomings and to take proactive actions to maintain and achieve relevant independent layers of protection.