20 Years On Lessons Learned from Piper Alpha – The Evolution of Concurrent and Inherently Safe Design

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Abstract

It has now been over 20 years since the North Sea Piper Alpha disaster in 1988. There have been many lessons learned, some documented others just etched in memory. The event chronicled many significant changes in the offshore industry across many world offshore regions. The emanating point for most sweeping changes has been the Cullen Report and the UK North Sea industry. This paper reviews some of the critical lessons and identifies many 'secondary' finer points that also constitute important learnings many of which still need to be addressed, if pragmatic life cycle safety and performance are to be assured.

The paper looks at major changes instigated by step changes in safety criticality regarding offshore assets. It is argued that the ‘second tier ‘modes of failure such as corrosion, materials degradation, environmental cracking, erosion, plant ergonomics, etc need to be better examined. These mechanisms are particularly dangerous threats to the integrity of deep offshore/subsea assets, and the new arctic projects whereupon the de facto costs of any post construction intervention would be sky-high rendering them almost untenable. It is noted that such root causes of failure as witnessed in practice or as predicted in theory have yet to be fully appraised and as a result need to be addressed. The authors’ use wide ranging experiences and case histories to highlight such concerns, offering where appropriate rational fit for purpose solutions.

The industry disconnections between urgency to build, relevant knowledge transfer, and management of change, are identified, and refocused. Powerful advances in risk based mechanical, process, materials, and corrosion engineering are emphasized and the use of Key Performance Indicators (KPI’s) and advanced engineering analyses are reasoned for best life cycle integrity management. To keep up with the pace of growth particularly in the deepwater sector, the methods of concurrent and inherently safe design (CISD) have evolved in a world where the practicalities and costs of modification, repair and retrofit are extremely difficult. Hence getting it right at the outset is paramount. Thus the drive for more purposeful investment at design, with higher CAPEX being considered more justifiable, than the traditional practice of postponing costs (and problems) to OPEX. In this way the previously ominous ‘gray' zone between the two cost centers can be far better bridged for best plant safety and commercial advantage.