

Title	Offshore Technology Report 96 521: Improving Inherent Safety
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Executive Summary	<p>An 'Inherently safer' approach to hazard management is one that tries to avoid or eliminate hazards, or reduce their magnitude, severity or likelihood of occurrence, by careful attention to the fundamental design and layout. Less reliance is placed on 'add-on' engineered safety systems and features, and procedural controls which can and do fail. Unlike these 'add-on' approaches, which add cost and can be maintenance intensive, some applications of inherent safety can lead to enhanced safety and lower capital and operating costs, Two of the key principles of inherent safety, intensification and simplification, are extremely relevant to the economics of offshore installations, and a more systematic use of these principles could further improve safety and reduce costs offshore.</p> <p>This Pilot Study has been undertaken to assess the extent to which the concept and principles of 'inherent safety' are being applied in the development and design of offshore oil and gas installations on the UKCS. It included reviews of some recent literature and some of the main regulations affecting the design and operation of offshore installations. However the main element of the study was a number of interviews with representatives of some of the leading Design Contractors and Operating companies. Only a small number of people were interviewed from 5 companies, but the findings were sufficiently consistent to give confidence that they reflect the wider view of the UK offshore industry.</p> <p>The findings show that the term 'inherent safety' is only just beginning to be recognised in the industry, mainly as a result of its inclusion in the Design Safety Case Guidance, and the UKOOA Fire and Explosion Hazard Management Guide. Although many safety professionals would recognise the term, few seem to have a clear view as to its meaning and principles. There appears to be a number of subtle but significant differences of opinion as to what inherent safety is, including 'hazard avoidance', 'hazard prevention', 'risk minimisation', and 'good engineering'. Whilst all of these may form part of an inherently safer strategy, they do not encompass a full understanding of the role of inherent safety. There is therefore a need to raise awareness of the principles of inherent safety, such as those presented in the many papers and books by Trevor Kletz, and perhaps to develop in more detailed definition and set of principles for use in the offshore industry.</p> <p>Although few designers would be familiar with the term 'inherent safety', many do apply some of its principles such as inventory reduction and simplification, but not always in a systematic way. Further opportunities to reduce inventory, simplify plant, and apply the other inherently safer principles might be identified if these principles were made more visible, and incorporated into systematic hazard studies, design reviews and procedures.</p> <p>Some of the main drivers in the offshore industry at present, to reduce manning levels and provide minimum facilities installations, encourage the use of compact and simple technology and reduce the need for operators to be present. These objectives are fully compatible with an inherently safer approach to design. Similarly, moves to more flexible and open client-contractor relationships can create the sort of environment that promotes the challenging of past practices and encourages innovation. In this type of environment the ideas of inherent safety can flourish and reap the greatest rewards for both the designer and operator.</p> <p>Good hazard management depends on a clear understanding of the hazards and their interaction with the design and its operation. If the design is to be optimised to avoid or reduce the hazards of operation this needs to be done early on in the development of the design. However project programmes often do not seem to</p>

recognise that the most critical part of any project is at the very start, when all the major decisions are taken about the location and type of installation, and the processes to be adopted. By the time the concept design is finished, most of the installation's build and operational costs will have been fixed, and most of the opportunities to deal with hazards in an inherent way will also have passed.

Companies may spend some time evaluating various options from an economic point of view, but these studies may not address safety as a key parameter. If safety is treated as a simple go/nogo criteria at these early stages of design, many opportunities for an inherently safer, and perhaps cheaper, installation may be lost. Project managers should consider allocating a little more resource and time at the start of the concept design stage to challenge the basis of design and identify and evaluate alternatives that may be inherently safer (and perhaps cheaper).

Overall the design of offshore installations do reflect many applications of inherent safety, but n more systematic and visible use of these principles could lead to even more robust safety performance. Dealing with the hazards at source may also provide the most cost effective route to good safety performance, and the main principles of an inherently safer approach go hand-in-hand with cost reduction. The industry therefore stands to benefit by promoting a greater awareness and application of inherent safety and its principles.

So we would suggest that senior managers and designers in operating and engineering companies in the U K need to be made more aware of the concepts, practicalities and benefits of inherently safer approaches to hazard management. This could be achieved through the usual mechanisms such as publications, workshops, research and guidance. The regulator could also give support and encouragement to this by emphasising further the safety importance of inherently safer approaches in regulations, ACoPs and guidance.

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