RISKworld

issue 19 spring 2011 — the newsletter of risktec solutions limited

In This Issue

Welcome to Issue 19 of RISKworld. If you would like additional copies please contact us, and feel free to pass on RISKworld to other people in your organisation. We would also be pleased to hear any feedback you may have on this issue or suggestions for future editions.

Contact: Steve Lewis (Warrington)
steve.lewis@risktec.co.uk

Contents

Postgraduate Success!

As Risktec heads towards the milestone of 10 year's trading, we are pleased to report that the company continues to grow and develop. The statistics across the bottom of this page give some insight into the scale of our activity. Throughout, we have strived to maintain our core values (Teamwork, Integrity, Empowerment, Solutions) as the company has grown, and are pleased that our most recent customer satisfaction survey has confirmed that we are maintaining consistently high levels of client satisfaction.

Our training and education business, launched 2 years ago, in conjunction with Liverpool John Moores University, is progressing extremely well and we have been delivering programmes to a number of clients around the world. Our first students have now gained MSc awards, with many others progressing towards formal post-graduate awards. In addition, other bespoke programmes have been delivered or are underway.

Since the launch of our training business over 600 people have attended more than 30 different modules delivered by over 30 teachers from Risktec; of these modules, about half contribute to a formal post-graduate award, whilst the balance lead to CPD credits or evidence.

We have been particularly pleased with how receptive our clients have been to the programmes and with the positive feedback received. We have also invested in a state-of-the-art training and conferencing suite at our principal office in Warrington and are delighted to be supporting the development of risk and safety professionals across the world.

This edition of RISKworld brings into focus the importance of having effective safety cases that can help reduce risk, backed by good quality hazard identification and risk assessment. A salutatory reminder of the responsibilities of everyone involved in high hazard industries and the potentially global implications of our actions comes from the recent earthquake and tsunami in Japan, and the resultant impact on the sentiment towards nuclear power.

Contact: Alan Hoy (Warrington)
alan.hoy@risktec.co.uk

RISKTEC SOLUTIONS *Launch - Sept 2001 Projects - 1659 Clients - 547 Employees - 129 Offices - 10*

Debunking Safety Cases – Three Myths and Realities


Nimrod's focus on 'paper safety' is the antithesis of a good safety case

A safety case aims to provide a valid and reasonable confirmation that a facility is sufficiently safe. Safety cases have been in place for many years in major hazard sectors in some regulated environments such as Europe and Australia. They have also been adopted as best practice by many international operators in other regions of the world where such legislation does not exist. What's more, in the aftermath of last year's explosion and oil spill disaster in the Gulf of Mexico, the US government is also currently assessing the feasibility of adopting safety cases for offshore activities.

There are many 'myths' or misconceptions about safety cases – some reflecting difficulties in the early years of safety cases in the 1980s and 1990s, and some still present in certain sectors, such as the UK military environment, as exposed by the recent Nimrod review [Ref. 1]. However, for every past weakness there is an opportunity to learn from experience and improve the reality of safety cases today. Below we debunk three common myths by portraying the reality of a good safety case.

Myth #1 – A safety case has to be a huge and expensive tome

Safety cases have certainly been prepared that are too long and bureaucratic with unnecessary detail, written in obscure and difficult to understand language. Many have often resembled archaeological digs of ancient design documents that have little bearing on today's risks, or have simply been a reworking of perfectly adequate existing hazard studies, or have relied on expensive quantitative risk studies to justify situations that good engineering judgement would deem unacceptable.

Reality #1 – A safety case is a succinct, value for money report

The safety case is a single, concise, through-life 'document-lite' report with a clear audit trail to supporting information. It is written in easy to understand language and is proportionate to the level of risk. It focuses on real safety rather than paper safety. Use is made of existing studies, with qualitative risk assessment used to identify the vast majority of safety improvements, and more time-consuming quantitative risk assessment used selectively (e.g. when comparing options).

Myth #2 – The safety case is for the regulator, written by a consultant

The first safety cases were undoubtedly written entirely for the regulator. The regulator had set out its requirements and the operator wrote the safety case in a way which showed compliance with the regulations. Worse, the paper chase was usually outsourced to a handful of consultants working from their back offices. As a result, the safety cases often lacked practical insights from actual operational knowledge and experience.

Reality #2 – The safety case is developed by the operator for the operator

The safety case is not primarily for the regulator but is good discipline for the operator. It is the working document to improve safety. The workforce is involved in developing and maintaining the safety case – operators and maintainers have the most knowledge and experience of the equipment and procedures. Indeed, the best safety cases are those developed with the workforce in mind first, the operator second and the regulator third. Consultants are best used to provide independent facilitation, specialist technical studies or transfer best practice between operators.

Myth #3 – The safety case is a tick-in-the-box, one-off event which can be consigned to the shelf

Some operators have viewed the safety case as a necessary evil to get a tick-in-the-box. As an impediment to operation surely it simply requires a one-off effort to gain the regulatory stamp of approval? After all, the safety case is only a piece of paper isn't it? Once written, it can languish in a nice looking folder on-the-shelf.

Reality #3 – The safety case is a living document, ensuring the process of continuous improvement

The safety case is about the process of ensuring continuous improvement in safety performance. It is aimed at delivering world-class safety by developing appropriate behaviours within the operator. The regulator focuses on the active verification of the claims made, rather than nit-picking a paper document. A major benefit of the safety case comes from the process of preparing it, rather than the document itself. The safety case is a living document, readily accessible to the workforce, for keeping abreast of hazards as changes occur, whether in technology, knowledge, the organisation or procedures.

So have safety cases been successful?

A safety case presents a high obligation on the operator, who must demonstrate an understanding of risks and prove they are under control. As such, it goes beyond compliance with prescriptive legislation or standards, to show how risks have been reduced as low as reasonably practicable.

But have safety cases actually been successful? Have they been more successful than prescriptive approaches to safety?

The general consensus is that safety cases have been very successful (see Ref. 2). Public inquiries into major accidents have shown that simply complying with basic standards without any real consideration of prioritising risks caused many of the problems. Moreover, the regulator has much more impact under a goal-setting, risk-based regime than a simple ticked-box, go/no go approach.

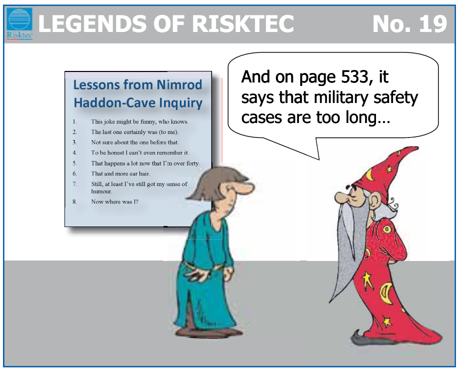
Conclusion

There are no fundamental flaws in the concept of safety cases, rather there are issues around applying the concept in practice. Many of the myths of safety cases have arisen from past difficulties but, with over 20 years of practice, industry itself has created the best practice realities of today.

Contact: Steve Lewis (Warrington)
steve.lewis@risktec.co.uk

References

1. The Nimrod Review, Charles Haddon-Cave QC, 28th October 2009.
2. Regulatory Approaches to Offshore Oil and Gas Safety, US Chemical Safety and Hazard Investigation Board, Public Hearing, December 2010.



SEMS: Safety and Environmental Management Systems

How to ensure cost-effective and high-quality hazard analysis

Introduction

In response to the Deepwater Horizon oil spill in the Gulf of Mexico, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) has undertaken the most aggressive and comprehensive reform of the offshore oil and natural gas regulatory process in the history of the industry. Enhanced safety standards have been implemented through new regulations and guidance, to increase safety and ensure oil and gas development is conducted responsibly.

The newly promulgated Workplace Safety Rule (30 CFR 250,1902) requires offshore operators to have clear programmes in place to identify potential hazards when they drill, clear protocols for addressing those hazards, and strong procedures and risk reduction strategies for all phases of activity, from well design and construction to operation, maintenance and decommissioning. The regulation applies to all offshore facilities, including mobile offshore drilling units (MODUs), floating production, storage and offloading facilities (FPSOs), tension-leg platforms (TLPs) and spars.

SEMS

The Workplace Safety Rule specifically requires operators to have a Safety and Environmental Management System (SEMS), which is a comprehensive safety and environmental impact programme designed to reduce human and organisational errors. The Workplace Safety Rule makes mandatory American Petroleum Institute (API) Recommended Practice 75, which was previously voluntary. Operators must comply with the provisions of the regulation and have their SEMS programme in place by November 15, 2011.

Box 1 – Scope of hazard analysis

- Hazards of the operation.
- Previous incidents.
- Control technology applicable to the operation under evaluation.
- Qualitative evaluation of the possible safety and health effects on employees and potential impacts to the human and marine environments.
- Assurance that recommendations are resolved and the resolution is documented.

Facility-level hazard analysis

One of the most important elements of the SEMS is the facility-level hazard analysis. It should be appropriate to the complexity of the operation and identify, evaluate and manage the hazards involved in the operation (see Box 1). Significantly, it must be performed by persons with experience in the operations being evaluated and the methodology of hazard analysis employed.

For operators with onshore facilities already covered under OSHA's process safety management (PSM) standard (29 CFR 1910.119), these requirements are familiar. Since 1992, facilities containing highly hazardous chemicals have been required to perform similar hazard analyses, although operators were allowed five years to conduct their first round of hazard analyses, whereas BOEMRE requires assessments within the year.

Critical factors for hazard analyses

There are three critical factors which have a direct effect on the quality and cost-effectiveness of hazard analyses:

1. Information availability

Hazard analysis entails the compilation and review of key information such as piping & instrument drawings, equipment layout drawings, process conditions & control philosophy, operating procedures and critical operating parameters.

Since the quality of the hazard analysis depends directly on the quality of information available to the team, it is critical to confirm its correctness prior to the study. Otherwise additional resources will be necessary to help track down missing information, which frequently results in delays and extended meeting time ("seat time").

2. Knowledge and experience

Individuals who are "A" performers in the field are invariably the ones best suited to participate in the hazard analysis. In situations where scheduling and logistics are complicated, using an independent third-party facilitator and scribe to conduct the hazard analysis has been shown to reduce the amount of time team members spend in meetings and optimises their contribution to the study.

Involving the workforce in conducting the hazard analysis is critical in gaining ownership of the SEMS program. People who help identify the risks and barriers become better equipped to identify hazards in the future and understand the importance of maintaining the existing barriers.

3. Tools used for the study

Choosing a software tool to capture the hazard analysis can also result in time and cost savings, e.g. applications such as PHAWorks or PHA Pro. Results from the hazard analysis can be simply and effectively downloaded and imported into existing action tracking systems. While Word or Excel can also be used, they can be cumbersome to manipulate and more difficult to interpret and update after the study is complete.

One of the most potent and increasingly popular techniques is the 'bow-tie' method, because it provides a clear visualisation of the crucial link between the barriers and the associated tasks, procedures, responsible individuals and competencies required to maintain the barriers. The method thus highlights how the management system provides assurance that risks will continue to be properly managed. Software such as BowTieXP can also help speed up bow-tie studies.

Conclusion

The deadline for the SEMS programme is demanding. Fortunately there are proven ways of developing cost-effective and high quality facility-level hazard analyses. Of course, this is only part of the solution. Risk levels will remain the same, or could even increase, until tangible improvements are fully implemented. If SEMSs are to play a real part in improving safety, they'll also need to be backed up by real action.

Contact: Kris Smith (Houston)
kris.smith@risktec.com

Lessons learned from 100s of HAZOPs...
or how to get the most out of the HAZOP process

In the last issue of RISKworld we introduced some of the methods available to identify hazards associated with a process or design. One of the best known methods is the HAZOP (Hazard and Operability) study, which is an extremely useful technique for brainstorming hazards in a structured way.

There are, however, a number of common pitfalls which can give HAZOPs an undeserving poor reputation of being unnecessarily long, tedious and unfocused. To help get the most out of HAZOPs we have pooled decades of experience collected over several hundred HAZOPs to produce a compendium of practical tips (see inset).

Investment in HAZOP planning, in terms of understanding the design, getting the right information and people together and ensuring everyone is properly briefed is a key pre-requisite to a successful HAZOP. During the study itself, the emphasis is on drawing out and focusing the collective expertise to identify and characterise the full spectrum of hazards, spending time in proportion to the real issues and associated risk.

Contact: Alan Finn (Warrington)
alan.finn@risktec.co.uk

Before the HAZOP meeting

- Plan your HAZOP meeting well in advance.
- Understand the requirement - are you reviewing a concept design, a detailed design or a fully operational process? What level of detail of information is available?
- Define the boundaries of your HAZOP study; keep the boundaries simple and clear. Break the design down into logical, discrete study nodes that are relatively self-contained.
- Employ an experienced and independent facilitator as chairman and a separate scribe.
- Choose team members carefully; all members of the team should have a good understanding of the design or operations.
- Avoid using 'pressed' people or otherwise unwilling team members as they are unlikely to be productive.
- 4-6 core members is ideal; engage others on an 'as-required' basis.
- Prepare a suitably comprehensive pack of supporting information well ahead of time, including briefing material, study nodes, guidewords, design information, drawings, procedures, operating manuals, etc.
- Confirm the accuracy and validity of supporting information, and identify any limitations.
- Consider using a software tool to improve speed and accuracy, but guard against its potential to act as an unnecessary distraction for team members.

During the HAZOP meeting

- As chairman, give an overview of how you expect the meeting to operate; not every member of the team may have been to a HAZOP before.
- Ask everyone to identify themselves and why they are attending.
- Ask the designer to give an overview of the process or plant, to ensure that all members of the team understand the design.
- Ensure that all members of the HAZOP team are involved; ask open questions to draw people into the discussion.
- As chairman, make sure that you summarise the outcome of each discussion point to confirm agreement, including any actions.
- Look for evidence to back up any statements made, especially where they are used to rule out hazards.
- Beware of fallacies such as "this can't happen because I have never seen it" or "it's not credible because it hasn't happened before".
- Spend time proportionately to risk; major hazards deserve more attention than low consequence, low frequency hazards.
- Allow for regular short breaks to enable the team to re-focus, as attention can diminish over time.
- Allow plenty of time. It is better to finish early than late.
- Follow-up the HAZOP meeting with a summary of actions ahead of the formal minutes, so that progress can be made immediately.

De-Risking Offshore Wind Energy

Europe has seen exponential growth in offshore wind energy over the last decade with the UK at the forefront. New licences recently awarded by the UK government, for example, will see offshore generating capacity increase from about 2 GW to around 33 GW by 2020 [Ref. 1], which is equivalent to the output of about 30 modern nuclear reactors.

What are the risks?

Box 1 identifies the most significant risks associated with developing and operating offshore wind farms. These encompass, for example, the fact that:

- Cabling incidents have historically been the number one source of insurance claims.
- No offshore wind farm construction project has been completed without a contractor going bankrupt.
- Large 5 MW turbines need to be designed, manufactured and then proven in field-operating conditions for a period of 2-years.
- Tailor-made vessels for transporting the turbines will typically take 4 years to design and construct.
- During the operational phase the hazards of 'blade throw' and gross structural failure are ever present, (depicted above).

Furthermore, the return on investment is highly sensitive to cost and time over-runs. A typically expected return on investment of 10% per annum would be reduced to 9% should the project over-run by 12 months, which is generally considered a 50:50 chance, or to 8.5% in the event of a 10% cost over-run [Ref. 2].

While the ultimate consequences of incidents affecting people are generally less severe than risks from offshore oil & gas platforms, they could still result in fatalities, delays, increased costs and loss of reputation. As a result, the UK's health & safety watchdog, the HSE, has categorised offshore wind as a "high" rather than "major" hazard industry [Ref.2].

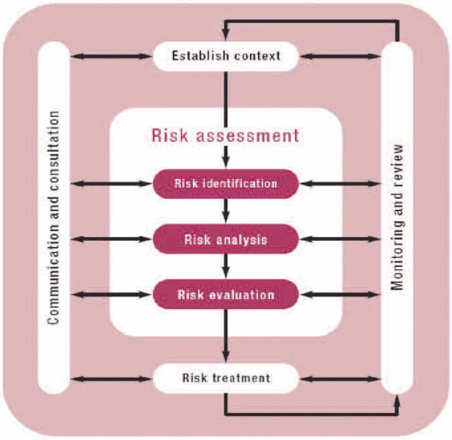


Figure 1 - High Level Risk Management Process [Ref. 3]

How should these risks be managed?

The approach required to manage offshore wind development risks effectively can draw on the experience of processes, tools and techniques proven and optimised over many years in the oil & gas, transport and nuclear sectors (see Fig. 1). These are readily transferable, but come with a number of challenges, including:

- Ensuring that the overall approach and level of detail is proportionate to the risk.
- Finding the appropriate balance between qualitative and quantitative risk assessment techniques.
- Identifying risks as early as possible, recognising that the cost of risk controls can escalate significantly as the project progresses while their effectiveness diminishes.
- Ensuring visibility and effective "hand-over" of risks across life-cycle interfaces, particularly when owned by different stakeholders.
- Seeking "lessons learned" from previous experience and similar developments.
- Taking positive steps to gather meaningful industry-specific operating and failure data to improve understanding of the risks.
- Remembering that applying the right processes, tools and techniques alone will not reduce risk – implementation of tangible risk reduction measures is needed.

Mistaken identity?

An offshore wind farm could be viewed as either an onshore wind farm that happens to be offshore or a marine construction that happens to include wind turbines. Whilst this is understandable given the industry's relative infancy and the rapid influx of interested parties from a wide range of backgrounds, neither perspective provides a complete picture of the associated risks and also brings competing approaches to risk management which are far from unified.

The time is surely ripe for the offshore wind industry to embrace its own identity and channel its collective knowledge and experience into tackling the specific risks and other challenges of offshore wind generation.

Box 1 - Typical offshore wind farm risks

Project complexity – multiple contracts & stakeholders, contractor availability & solvency
Financial – lower return on investment
Interfaces – land, port, marine, aviation
Technology – foundations, turbines, grid connection
Cabling – availability, routing, j-tube design, installation method, land/sea interface
Wind, wave & current – impact on structures and activities
Subsurface conditions – geohazards, scour, accretion
Installation – heavy lifts, collision, damage
Collision – visiting or passing vessels
Transport – marine, aviation, accommodation
Environmental impact – sedimentary, biological, visual, fishing, navigational
Health & safety – working at height, confined space, electrical & mechanical working, structural failures, fire, vessel transfer, evacuation & rescue, diving
Security threats – physical, cyber

References

1. The Crown Estate, Supporting information relating to the announcement of Round 3" [www.thecrownestate.co.uk].
2. Offshore Wind Logistics 2011, Hanson Wade, January 2011.
3. ISO 31000 [2009]; "Risk Management Principles and Guidelines".

Contact Gareth Ellor (Glasgow)
gareth.ellor@risktec.co.uk

The Effects of Ageing and the Implications for Risk & Safety Management

One of the knock-on effects of the rising energy demand is a push to extend the life of already ageing installations across the major hazard industries, notably in the oil, gas & chemical and nuclear power sectors. For example, as operations in the North Sea approach their 40th anniversary, many platforms are approaching or have exceeded their design life. Similarly, the UK's existing fleet of ageing nuclear reactors is being asked to fill the energy gap as the long wait for new build nuclear energy continues. Indeed, more and more facilities throughout the world are likely to exceed their original design life, often by many years.

The ageing process

The ageing phenomenon is not necessarily related to the chronological age of equipment, but is a function of its condition and how this is changing. Equipment which faces harsh environmental, chemical or operational conditions, is subjected to poor maintenance, or has a high cycle rate is more likely to deteriorate over time. Thorough monitoring of plant condition and tuning of maintenance and upkeep requirements is a logical step towards sustaining or improving overall reliability and maintainability.

Condition not time

Condition-based maintenance programmes aim to improve knowledge of equipment condition, thus allowing maintenance to focus on areas of immediate concern. This is a marked change from the conventional time-based approach where maintenance scheduling is 'set in stone' regardless of physical condition or performance. With a condition-based scheme, operators learn to 'Look, listen and feel' and are able to flag-up issues before failures occur.

Going, going, gone!

Another symptom of ageing facilities is the increasing likelihood of being unable to replace equipment on a like-for-like basis as components become obsolete. This is potentially problematic for items requiring periodic replacement and can be a major issue for systems reaching the end of their serviceable life.

In identifying suitable replacements, it is crucial to establish the fundamental function required, especially those that are safety-related. Moreover, there may be an opportunity to improve safety and operational availability by reviewing a number of alternative options.

One particular issue is that a new equipment option may be software controlled, which can increase flexibility, but at the expense of safety justification, which is less straightforward.

Ageing risk management

The ageing process can significantly alter the performance, availability and risk profile of a facility. The integrity management of ageing installations depends crucially on knowing equipment condition and associated degradation processes, as well as identifying obsolescent systems or components. As a result, age-related issues are playing a much greater part in thorough reviews and periodic reviews of safety. Regulators such as the UK's Health and Safety Executive (HSE) and the Nuclear Installations Inspectorate, and Norway's Petroleum Safety Authority are also stepping up their scrutiny. Last year, for example, the HSE launched an Ageing and Life Extension Inspection Programme, which aims to ensure that risks to asset integrity associated with ageing and life extension are controlled effectively. The first duty holder inspection has now been completed and follow-up inspections are set to continue.

Conclusion

As the demand for energy continues its inexorable rise, the effects of ageing on safety and availability of major hazard facilities are likely to present new challenges to operators across the globe.

Contact: : Jasjeet Singh (Warrington)
jasjeet.singh@risktec.co.uk

Degradation

- **Material Properties** - *Is the material choice still appropriate given the effects of ageing?*
- **Operational Conditions** - *Is continuous & cyclic operation for the remaining life of the plant justified? Are restrictions needed?*
- **Maintenance Practices** - *Should maintenance be reactive, preventive, condition-based or a combination?*

Obsolescence

- **Obsolete Equipment** - *Can I get replacement for my 1960s instruments?*
- **New Needs** - *This technology can't handle my new requirements!*
- **New Technology** - *Should I swap this bulky difficult to maintain kit with new technology which is virtually maintenance free?*
- **New Standards** - *I need to upgrade my waste treatment process to meet new requirements.*

UK Principal Office
Wilderspool Park
Greenall's Avenue
Warrington WA4 6HL
United Kingdom
Tel +44 (0)1925 611200
Fax +44 (0)1925 611232

Other UK Offices
Aberdeen
Ashford
Edinburgh
Glasgow
London

Middle East
Dubai
Muscat

North America
Calgary
Houston

For further information, including office contact details, visit:
www.risktec.co.uk
or email:
enquiries@risktec.co.uk