COMPARATIVE REVIEW OF HSE REQUIREMENTS FOR SPECIFIED OFFSHORE FABRICATION ACTIVITIES

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Executive Summary

Report Overview

This report summarises an investigation into the offshore construction HSE regimes applying in each of the following areas:-

- Atlantic Canada (Nova Scotia)
- South Korea
- United Kingdom
- Norway
- US Gulf of Mexico

The terms of reference for this study also required that a selection of particular trades to be found in the offshore construction industry be considered. These were:-

- Sandblasting
- Painting
- Scaffolding
- Welding
- Rigging and Lifting

The study has considered the legal framework applying in each of the subject regimes, along with additional Codes and Standards, either national, international or company-specific. It also considers the degree to which enforcement of the applicable requirements is pursued, in terms of prosecutions and levels of penalties applied. Further local perspectives from personnel with experience of such operations in each area have also been sought and documented. Finally, a discussion on the likely relative costs associated with compliance has been compiled, along with a discussion on the degree to which government support may be a factor in this sector.

Overview of Findings

Canadian, United States and South Korean regimes are largely prescriptive in their requirements, i.e. a detailed ruleset has been set down which workplaces are required to strictly meet with in order to ensure legal compliance. In contrast the regimes applying in Norway and the UK are more goal-setting in their approach, i.e. there is less emphasis on laying down specific requirements to be met, in favour of a more general requirement that ‘adequate’ ‘suitable’ and ‘sufficient’ measures are in place to safeguard health

and safety, without specification of what these might be. Thus, in these regimes, the onus is placed more firmly on the employer to demonstrate that what he has adopted is adequate, suitable and sufficient and this cannot be achieved merely by stating that he meets a particular Code or Standard.

Allied to the preceding point, the UK and Norwegian regimes also rely heavily on the concept of 'risk assessment' to demonstrate that adequate, suitable and sufficient measures have been put in place. To a lesser extent, this concept is also present in Korean legislation, which requires the production of a Process Safety Report in respect of premises with 'harmful or dangerous facilities'.

To those unfamiliar with goal setting legislation it may seem that the regulations are simpler to comply with and are set at a much higher level. Also, the ability for employers to set their own safety standards may seem appealing. However, neither of the previous observations are correct. **Goal setting legislation permits the regulator to constantly push the employers to improve health and safety standards. It is not possible for any employer to achieve 100% compliance because continual effort is required to maintain standards and improve performance.**

The overall conclusions of the study are that there are many differences in approach and degree of regulation amongst the subject regimes, but that there are also many core areas of similarity between them. The principal difference in approach is between countries adopting a 'goal setting' approach (UK and Norway) and those where a prescriptive regime mainly applies (Canada, South Korea and the USA). It is considered that goal setting places much the greater onus on the employer to ensure that he has done all that is reasonably practicable to assure the health and safety of his employees. Prescription, particularly in the USA, is principally used as a means by which the employer can avoid liability for accidents at the work place as he can cite 'code compliance' as a defence against prosecution.

The following is a summary of the findings reached as a result of the comparisons carried out between Canadian requirements and those of the other subject regimes.

Canada vs. South Korea

A review of legislative requirements in South Korea against the Canadian model indicates that the majority of the Canadian requirements are also broadly addressed in Korean OSH legislation. However, it is probably true to say that the rights of the employee are not as strong as in Canada, e.g. there is no right of refusal under Korean legislation, except in situations of 'extreme danger' and the right of representation and negotiation by the workforce, in the forms of trade unions or through Safety Committees is all but non-existent. It is considered that the principal weakness of the Korean regime lies with its enforcement. It is clear from such accident statistics data that is available and the anecdotal evidence from personnel working there that the fatality rates in construction yards are at a level which

would be totally unacceptable in the other subject regimes, yet it would appear that there are insufficient penalties applied to deter management in this industry from continuing to take risks with their workforce's safety.

Canada vs. UK

The detailed compliance matrix review (Appendix 2) of UK versus Canadian requirements indicates that the vast majority of provisions which apply in Canada are also addressed in UK legislation. However, it should be noted that the 'risk assessment' element mentioned in the overview above is considered to be more onerous than the straightforward 'code compliance' approach adopted in Canada and the USA. The UK regime is considerably less concerned with laying down specific measures which must be taken with regard to the safeguarding of the workforce, in favour of an approach which generally requires that 'all reasonably practicable' measures must be adopted to reduce risks to a level that is as low as reasonably practicable – the ALARP position.

Added to the above goal setting approach, there is little doubt that the legislative burden in the UK weighs heavily on many employers. Newspapers and other media regularly report on increasingly vociferous complaints emanating from various employers' organisations regarding the volume and complexity of HSE legislation, particularly that emanating from the European Union. The degree to which their complaints can be considered justifiable is of course open to debate, but there is little doubt that the 'compensation culture' which was previously assumed to be a largely American phenomenon, is now gaining ground in the UK.

Overall, it is concluded that HSE legislative requirements in the UK are generally more onerous than those applying in Canada, principally due to the goal setting approach adopted in the former.

It is further concluded that enforcement is rigorously applied, although many critics would argue that it is often reactive in nature, i.e. following a major accident event, rather than as a result of ongoing inspection work. It is, however, the case that emphasis in the UK is shifting to an increased focus on inspection, rather than on documentary evidence of compliance, although it is too early in this process to gauge whether this will lead to a more proactive regime. Financial penalties are in theory unlimited for cases prosecuted in higher courts and large fines and extensive adverse publicity for the firms involved are considered to be a deterrent to the more flagrant or regular breaches of such legislation which were a feature of the UK picture prior to the introduction of the Health and Safety at Work Act.

Canada vs. Norway

Based on a limited study of the Norwegian Health and Safety legislation it is clear that the Norwegian regulatory system is based around a 'goal-setting' approach, which takes the form of requiring that stated objectives are to be met. This is in contrast to the prescriptive Canadian regulations, where standards of safety are set in most cases by more detailed specification for plant equipment and procedures and there is more emphasis on satisfying the specific requirements rather than more general requirements.

The requirement also exists in the Norwegian Internal Control Regulations for a risk assessment, which requires the ''identification of dangers and problems and against this background assesses the risk and draws up plans and measures to reduce such risks'' with the responsibility being placed firmly on the employer to demonstrate adequate compliance. This again contrasts with the Nova Scotia provincial legislation, where there is no requirement for risk assessment.

Also as part of the Norwegian legislation the obligation to introduce and operate internal control rests with the person responsible for the enterprise. This means the management or owner of the enterprise. The internal control must be introduced and operated in collaboration with the employees, working environment committees, safety delegates etc.

A number of Norwegian construction industry regulations and standards have been found and are listed in the detailed compliance matrix (Appendix 2). However, where specific topics or activities are not covered by guidance, there are general duties in place as part of the Worker Protection and Working Environment Act that must be adhered to. The Canadian construction industry however, is considered to have a more comprehensive and detailed list of regulations and standards in place for specific topics and activities, with more emphasis on specific requirements rather than general provisions.

NORSOK standards add the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry and are based on recognised international standards. Where NORSOK standards are not found, priority shall be given to the use of ISO standards or other relevant recognised standards. It should also be noted that Norway is not a member of the EU (European Union) and as such does not have to comply with any EU regulations and guidance that maybe in place, unlike the United Kingdom.

From the above, it is concluded that the overall burden of HSE compliance in Norway is likely to be greater than that required in Canada and will probably be roughly on a par with costs in the UK, given that the regimes are broadly similar in these areas. The Norwegians may benefit to a certain extent from their non-membership of the EU, but it is felt that any cost savings from this are likely to be offset by the extremely high cost of labour, unionised workforce and heavy emphasis on environmental protection of their coastlines.

It must also be stated that Norway presents a very significant anomaly to the expected results of this review. Norway has recently been successful in tendering for two major construction projects, for reasons which are not readily apparent from review of the performance indicators covered in this report. Norway has the highest average wage costs of any nation in the world, provides by far the most comprehensive welfare benefits of any of the surveyed nations, has the greatest level of absenteeism amongst its workforce and operates a very onerous goal-setting HSE compliance regime. All of these factors could be expected to mitigate against the likelihood of a successful tender. There is a long standing suspicion amongst competitor countries that the Norwegian government provides subsidies to its offshore construction industry, but it has not been possible to find any conclusive evidence that this is the case. Indeed, inspection of reports from a variety of independent sources, including the World Bank and World Trade Organisations, do not support the contention that government support occurs to any significant extent in the offshore construction industry.

Canada vs. USA

A review of American Occupational Health and Safety standards has confirmed that the legislation is highly prescriptive. This essentially means that complying with the letter of the law is difficult but that by complying a company can evade any liability for employee accidents in the work place. Unfortunately, it also means that complying with the law does not in any way guarantee a safe working environment. The standards contain no duties for continuous improvement of safety, elimination of all hazards, control, mitigation etc. There is no mention of risk assessment or a risk based approach to hazard management. Indeed, hazard management systems receive very little mention in the OSH standards at all.

Unlike in Canada, much of the legislation is specific to sectors of industry such as construction, agriculture and maritime activity. The legislative structure is “bottom heavy” i.e. there are very few high level general requirements of employers, suppliers etc. There is a general duty on employers written into the 1970 OSH act to provide a safe place of work. However, this general duty does not appear to be used by the regulator to bring prosecutions as it would be in other countries, such as the UK. From a European perspective it would seem that an entire level of legislation is missing, covering the principles of risk management and safety management. Such a system is the absolute opposite of the UK and Norwegian “goal setting” legislation.

The American OHS legislation is highly prescriptive but this in itself does not mean it is ineffective. However, there is evidence to suggest that its thorough application in offshore construction yards is doubtful. Added to this, the attention of the regulator in these locations is highly unlikely unless an accident has resulted in a fatality.

In conclusion, it has been suggested that the principles of a good safety culture in many offshore construction yards are preached but not practiced.

Overall Conclusions

Notwithstanding the differences in approach detailed above, it is generally concluded that the cost of HSE compliance is not a principal factor in the competitiveness, or otherwise, of the offshore construction industries in each area.

Evidence suggests that labour costs are considered to contribute an absolute maximum of 40% to total project costs and that the proportion of that 40% which is devoted to HSE compliance is no more than 5%, with anecdotal evidence suggesting that it may in fact be as low as 1% - 2%. Although there are variations in costs between the subject regimes, it is concluded that these are not of a magnitude that would deter or attract customers to a particular region or country. It is likely that the significant drivers are more likely to be associated with overall labour costs, delivery schedule, the experience of the workforce and the ease of availability of raw materials for such construction work. As has been discussed above, the recent successes by Norwegian construction yards must be considered to be anomalous set against the extremely high cost of labour, generous social benefits and onerous HSE compliance regime in that country. By contrast, South Korea has by far the lowest labour costs, the least empowered workforce and the weakest legislative regime and punishment system for HSE transgressions of the areas reviewed. It is therefore perhaps not surprising that they hold a distinct competitive edge over many of their competitors. However, it must be noted that the price paid for this is an accident rate which would be completely unacceptable in many other countries.

1 Introduction

Lloyd's Register EMEA (hereinafter LR) have carried out a review of representative Canadian and foreign Health, Safety and Environmental (HSE) standards, practices and procedures applied in various divisions of the offshore construction industry. The principal purpose of the review is to identify whether adherence to Canadian HSE standards places Canadian companies at a significant disadvantage in terms of cost, and hence competitiveness, when compared to other similar activities conducted elsewhere in the world.

The following jurisdictions have been selected for comparative review:-

- US Gulf of Mexico
- Norway
- United Kingdom (North Sea)
- South Korea

The review provides an overview of the Occupational Health and Safety regulations and standards applying in each of the above subject regimes and will also discuss any additional requirements applying to the following specific job types found in offshore construction:-

- Sandblasting
- Painting
- Scaffolding
- Welding
- Rigging and Lifting

2 Report Scope

The scope of the report encompasses the following principal elements:-

- Research and documentation of the HSE standards applying to each of the nominated fabrication activities under the Canadian and other subject regimes;
- Identification and comparison of the cost implications associated with ensuring compliance with each regime's legislative requirements;
- Identification of the means by which compliance with applicable legislation in each subject regime is assured;
- Identification and comment on the degree to which enforcement is pursued in each of the subject regimes;
- Comment on the effect of cost of pursuing compliance with required HSE standards in each of the subject regimes.
- Comment on the degree to which government and other third parties may be instrumental in securing work in the offshore construction sector.

3 Report Methodology

In order to obtain the best possible representative picture of the impact of HSE Standards applying in the subject jurisdictions, several key areas for comparison have been identified, as detailed in the following sub-sections.

3.1 Legislative Requirements

Detailed research has been undertaken into selected legislative requirements governing offshore construction activities for each of the nominated job types in each of the subject regimes. Those applying to Canada have been used as the baseline for comparison with the other areas and a gap analysis undertaken to ascertain if, and where, Canadian companies operate under more stringent legislative requirements than found elsewhere amongst their competitors. A summary of the results of this review is given in Section 4 below, with the detailed information supporting the conclusions reached given in Appendices 1 and 2 of this report.

3.2 Enforcement

It is recognised that the stringency of HSE Standards applying in each of the subject jurisdictions does not in itself provide a valid guide to their impact on relative competitiveness, as it takes no account of the degree and rigour of enforcement in each area. Thus, an investigation has been carried out into the range of penalties available to the legislative bodies charged with prosecuting offences against the legislation chosen for comparison and provides a qualitative assessment of the degree of rigour in enforcement apparent in each jurisdiction. A summary of the results of this review is given in Section 5 below, with the detailed information supporting the conclusions reached given in Appendix 3.

3.3 Company Requirements

A further area which has been identified as potentially relevant is the degree to which specific company requirements impact on the cost of HSE in the subject areas. A review has therefore been carried out, identifying an example of one of the principal offshore fabricators in each regime and assessing whether or not their internal HSE expectations are working for them and whether these expectations give particular advantage (or disadvantage) to the companies involved. A summary of the results of this review is given in Section 6 below.

3.4 Other Perspectives

In order to obtain a broader perspective on the HSE regimes in the subject areas, comments and opinions were sought from personnel who have worked in the industries and countries covered in this report. Views were sought regarding the reality, rather than the theory, of legislative compliance and an insight obtained into the actual health and safety working practices as opposed to the widely published health and safety principles of the companies. Details of the opinions offered are given in Section 6 below.

3.5 Environmental Requirements

A further area which has been subjected to review is the degree to which offshore construction activities are governed by the need to obtain specific permits and consents for certain types of activities and whether the time and effort involved in doing so place a particular region at a disadvantage. It is considered that Environmental requirements are most suited to a comparative review of permits and consents considerations; hence the review has focussed on this area. A summary of the results of this review are given in Section 8 below, with the detailed information supporting the conclusions reached given in Appendix 3.

3.6 Results of the Comparison Matrix

A basic matrix was compiled which sets out Canadian occupational health and safety requirements in specific areas. This matrix was then used to compile a comparison matrix for each country under consideration. The results provide an indication about the type of legislation which is in place. However, caution is advised, the matrices present a limited number of comparisons and not all legislation is shown due to space and time constraints. A summary of the findings from the comparison exercise are given in Section 9, and the detailed Comparison Matrix is given in Appendix 2.

3.7 Conclusions

This section (Section 10) sets out the conclusions of the report based on all of the information gathered in the above sections. Conclusions are presented on a country by country basis and a comparison is made with Canadian requirements in each case.

3.8 Cost Considerations

This section (Section 11) gives some information as to the cost of HSE compliance in each of the subject regimes. Both direct costs, e.g. the cost of PPE provision and training, and indirect costs, e.g. the benefit systems in place in each area have been considered.

3.9 overnment and Third Party Influence

This section (Section 12) considers the degree to which governmental and non-governmental organisations may be influential in the relative success of each regime in winning offshore construction work.

4 Legislative Requirements

4.1 Overview

A detailed review of the types of legislative (i.e. government initiated HSE requirements and country-specific Codes and Standards) in each of the subject regimes has been carried out, focussing where possible on the specific job types identified in Section 2 of this report. As discussed in Section 2 above, it is not possible to conduct an in-depth review of each and every requirement, thus the review has focussed on the following key areas:-

- Details of the government body or bodies responsible for HSE within their jurisdictions
- An overview of the framework under which legislation is enacted and a review of the generic HSE legislation in each area
- A review of any additional legislation specific to the job types listed in Section 1 above

Thereafter, using the Canadian legislative requirements as a base case, a gap analysis has been carried out between their content and those of the other subject regimes. Comparison Matrices have been constructed for each country, highlighting areas where Canadian requirements were found to either not exist in other areas, or where compliance was less exacting than that required in Canada. Full details of the results of this review can be found in Appendix 2 of this document. Based on the outcome of the detailed review, it has been possible to draw the following conclusions with regard to the legislative approach in each of the subject regimes.

4.2 Canada

Responsibility for Occupational Health and Safety in Canada exists at two levels, namely federal and provincial. The offshore construction industry is governed by provincial requirements and for the purposes of this review, the Nova Scotian regime, being generally typical of provincial requirements, was selected for review.

The Occupational Health and Safety Act (S.N.S 1996, c.7) pertains to general safety, health and conditions of work for the Canadian province of Nova Scotia. The Act states general provisions, while relevant topics covered by the accompanying Occupational Safety General Regulations include:-

- Personal Protective Equipment
- Fall Protection and Scaffolding
- Ventilation
- Handling and Storage of Materials

- Hoists and Mobile Equipment
- Welding and Cutting

Canadian provincial (and federal) legislative requirements are prescriptive in nature, i.e. they lay down specific requirements which must be met in order to demonstrate compliance. The regulations are generally framed in mandatory terms, i.e. employers *shall* ensure that a stated measure is carried out, but this absolute duty is qualified in some instances by the term 'reasonably practicable', which means practicable unless the person on whom a duty is placed can show that there is a gross disproportion between the benefit of the duty and the cost, in time, trouble and money, of the measures to secure the duty. However, it is stressed that there are relatively few instances where this qualification is available – in the vast majority of cases, the specific and detailed provisions must be followed to the letter.

4.3 South Korea

The government body responsible for occupational health and safety in South Korea is KOSHA – Korea Occupational Safety and Health and the principal Act in this regard is the Industrial Safety and Health Act 1990 (as amended), supported by a variety of Korean National Standards. The Industrial Safety Act is chiefly concerned with the overall framework which employers must have in place, in terms of general duties, policy requirements, establishment of committees etc. The only specific area addressed in any detail within the regulations relates to the restriction, use and handling of chemical substances, there is no mention of requirements with regard to PPE, lifting equipment, ventilation, etc. However, it should be noted that it cannot be assumed that no regulations exist with regard to these activities, just that these are not framed within the terms of the Industrial Safety Act. Indeed, as the Enforcement Regulations which accompany the Act contain detailed provision with regard to such things as the inspection of protective equipment, it is highly probable that there will exist regulations requiring that such equipment is provided, but as some sections of the Korean government's website are currently unavailable, particularly that of the Ministry of Labor, it has not been possible to definitively confirm this one way or another.

Even more so than in Canada, the Korean requirements are prescriptive in nature, there is no mention at all of 'reasonable practicability' with regard to the application of the provisions, nor is there any concept of 'due diligence' stated.

4.4 United Kingdom

The UK Health and Safety Commission (HSC) and the Health and Safety Executive (HSE)[1] are responsible for the regulation of almost all the risks to health and safety arising from work activity in the

[1] Ref: United Kingdom Health and Safety Executive (www.hse.gov.uk)

UK The principal Act is the Health and Safety at Work, etc 1974, (HASAWA) under which has been enacted a great number of Statutory Instruments which further extend and refine the provisions of the main Act. The HASAWA lays down the principal duties and obligations of both employers and employees (similar to the 'general provisions' contained in the Canadian Act). Subsequent SIs cover a wide variety of topics including:-

- Personal Protective Equipment at Work
- Workplace (Health Safety and Welfare)
- Manual Handling Operations
- Lifting Operations and Lifting Equipment
- Provision and Use of Work Equipment
- Management of Health and Safety at Work

In addition to the above, the offshore construction industry also uses a wide range of British and European Standards, governing particular work types, e.g. welding, lifting and respiratory protection.

The principal difference between the legislative regime applying in the UK when compared to Canada is that the former is entirely goal setting in its approach. Each of the legislative elements is based on the principal that employers must take all 'reasonably practicable' steps to assure the health and safety of their employees. The regulations contain no prescriptive requirements with regard to the means by which this is to be achieved.

4.5 Norway

The Norwegian Labour Inspection Authority is a governmental agency under the Ministry of Labour and Government Administration and has administrative, supervisory and information responsibilities in connection with the Worker Protection and Working Environment Act. The Worker Protection and Working Environment Act, as amended, stipulates that all employees in Norwegian companies must have a satisfactory working environment. Construction activities are more specifically addressed under the Safety, Health and Working Environment on Construction Sites (construction client regulations) Regulation No 377.

In addition, a variety of Norewegian specific NORSOK standards are also relevant, and cover such activities as sandblasting, painting, scaffolding, welding, rigging and lifting and the provision of PPE.

Norwegian regulation can be considered as primarily goal-setting in approach and in that respect is similar to the regime in the UK. However, the NORSOK standards add a degree of prescription to the control of many of the activities studied in this report and are generally thought to be amongst the most onerous in the world.

4.6 United States Gulf of Mexico

At federal level, The Department of Labor, Occupational Safety and Health Administration (OHSA) administers health and safety requirements to ensure worker safety and health in the United States, principally through the formation of various alliances and partnerships with employers. The governing legislation in this regard is the Occupational Safety and Health Act of 1970, Section 18 of which encourages (but does not mandate) individual States to develop and operate their own job safety and health programs. State Plans are required to be 'as least as effective' as comparable federal standards, but as neither Texas nor Louisiana, where the majority of offshore construction work in the USA is undertaken, have such plans in place, federal requirements apply in these areas.

The Act is supplemented by a variety of Job Specific Federal OHSA Standards and other Codes and Standards issued by professional institutes or national standards bodies. Those relevant to the offshore construction industry are those associated with general industry, construction and maritime (shipyards, marine terminals, longshoring). While some standards are specific to just one category, others apply across industries. Among the standards with similar requirements for all sectors of industry are those that address access to medical and exposure records, personal protective equipment, and hazard communication. The standards also include specific activities such as scaffolding, welding, PPE, rigging and lifting, sandblasting and painting, etc.

In common with South Korea and to a slightly lesser extent Canada, legislative requirements in the USA are entirely prescriptive in their requirements. Strict compliance with the requirements therein is a defence against prosecution and there are no elements of 'reasonable practicability' or risk based assessment included.

4.7 Conclusions

As can be seen from the preceding sections, legislative requirements in each of the subject areas studied can be broadly divided into two regime types as follows:-

Prescriptive	Goal Setting
Canada, South Korea, USA	UK, Norway

This is a very important distinction, as the means of ensuring compliance varies significantly for each approach. At first sight, goal setting regimes can appear very attractive, removing as they do often very onerous prescriptive requirements. For example, the USA OSHA Scaffolding Regs lay down very specific physical requirements for scaffolding elements, e.g. minimum widths for work platforms (20 inches), toeboards (4 inches), requirements for handrails, etc, etc. In contrast, the UK regulations covering

working at height state only that there should be suitable and sufficient guard-rails and toe-boards, barriers or other similar means of protection to prevent, so far as is reasonably practicable, the fall of any person. Similarly, where the Canadian regulations lay down specific requirements regarding the equipping of mobile cranes in terms of alarms, horns, lights, etc, the equivalent UK legislation requires the risks associated with the use of such equipment is reduced to a level that is as low as reasonably practicable, without specifying how this is to be achieved. However, it must be appreciated that the requirement to demonstrate that all 'reasonably practicable' measures have been taken places a duty on an employer beyond that which applies in a prescriptive regime. Under prescription, it will generally be sufficient defence against prosecution for an employer to demonstrate that he has complied fully with applicable regulations. The fact that an accident has still occurred, notwithstanding that code compliance has been demonstrated, will not be sufficient grounds for a prosecution. In contrast, in a goal setting environment, the onus is firmly on the employer to demonstrate that he has taken all reasonable practicable steps to avoid the accident occurring. This is generally a more difficult proposal than merely demonstrating code compliance, as it involves proving firstly that he has firstly identified all of the 'reasonably foreseeable' risks associated with the task, secondly that all actions which might reasonably be expected to remove, reduce or mitigate against the identified risks were taken and thirdly that the cost of further measures in this regard were 'grossly disproportionate' to the further risk reduction which might be obtained. In order to make such a demonstration, the majority of legislation in the UK and in Norway contains a requirement for risk assessments to be carried out –this is not required under prescriptive regimes. These risk assessments are necessarily time-consuming and therefore costly, and must be repeated at regular intervals to ensure that they remain current. Whilst some types of risk assessments are relatively straightforward, others require the involvement of specialist personnel, e.g. in the measurement of dust in the air, noise at work, etc. **It is therefore considered that the absence of a requirement for risk assessment in 'prescriptive' regimes will result in significant cost savings to operators in those areas.**

5 Enforcement

5.1 Overview

This section of the reports aims to review the potential costs to industry as a result of breaching occupational health and safety legislation. In an attempt to estimate the impact of failure to comply with national OHS legislation, the following factors are considered for each country.

- Level of Penalties
- Degree of Enforcement

Most countries incorporate into law information regarding the maximum level of penalties which may be imposed for breaches of health and safety legislation. However, the actual level of penalties and degree of enforcement are not generally available. These facts have been researched specifically for this report and in some cases obtained using information provided by LR personnel working locally.

5.2 Canada

5.2.1 Level of Penalties

The Canadian province of Nova Scotia follows the enforcement regime detailed below to ensure any offences in the matter of these regulations is assessed and guilty parties are accused rightfully. The Occupational Health and Safety Act states:

"A person who
(a) contravenes this Act or the regulations; or
(b) fails to comply with
(i) an order or direction made pursuant to this Act or the regulations, or
(ii) a provision of a code of practice …,

is guilty of an offence and liable on summary conviction to a fine not exceeding two hundred and fifty thousand dollars, or to a term of imprisonment not exceeding two years, or to both a fine and imprisonment."

"In addition to a fine imposed …the court may impose a fine not exceeding twenty-five thousand dollars for each additional day during which the offence continues."

"Where a person is convicted of an offence pursuant to this Act and the court is satisfied that, as a result of the commission of the offence, monetary benefits accrued to the offender, the court may order the offender to pay, in addition to a fine imposed… a fine in an amount equal to the estimation by the court of the amount of the monetary benefits. 1996, c. 7, s. 74."

5.2.2 Degree of Enforcement

The control and inspection is under the jurisdiction of the provinces. Nova Scotia, Newfoundland and Labrador, and New Brunswick are those most likely to be involved in inspecting offshore construction yards. Below is a sample indicating the level of inspection carried out. Newfoundland and Labrador Workplace Health and Safety Inspection Activity 1999-2003.

	1999	2000	2001	2002	2003
Directive Statistics					
Total Directives Issued	3,082	3,587	2,370	2,906	3,210
Total Inspections Conducted	2,078	2,553	2,096	2,234	2,148
Client Generated Assignments					
Complaints	298	400	362	345	382
Accidents	115	130	90	97	124
Incidents	34	30	40	33	35
Work Refusals	2	5	7	6	6
Requests for Inspection	23	19	9	9	17
Stop Work Orders Issued					
Stop Work Orders	22	57	87	91	135

5.2.3 Conclusions

The possible penalties for breaches of health and safety legislation are approximately the same as those in the UK and the USA. Inspection activity would seem be on a level with that in the UK. This level of inspection is probably far more intensive than the regimes in the USA and South Korea.

5.3 South Korea

5.3.1 Level of Penalties

Enforcement of Health and Safety legislation in South Korea is the responsibility of the Ministry of Labor and is enacted under the "Enforcement Regulations for Industrial Safety and Health Act", last amended in Oct 1997. Chapter IX – Penal Provisions of the Industrial Safety and Health Act specifies the penalties for breaches of that Act and provides for a sliding scale of jail terms and / or fines, according to the seriousness of the offence.

At the top end of the scale, imprisonment for not more than five years or a fine not exceeding fifty million Won (approximately $ 57,000 CAD) may be levied for the most serious breaches of the Act.

From this top level of punishment, imprisonment terms and fines decrease progressively through the following stages:-

- Not more than three years imprisonment or a fine not exceeding 20 million Won (approximately $23,000 CAD)
- Not more than one years imprisonment or a fine not exceeding 10 million Won (approximately $11,500 CAD)
- A fine not exceeding 10 million Won (no imprisonment option)
- A fine not exceeding 5 million Won (approximately $5,700 CAD) (no imprisonment option)
- A fine not exceeding 3 million Won (approximately $3,500 CAD) (no imprisonment option)

5.3.2 Degree of Enforcement

It has not been possible to obtain definitive information on the degree to which legislative compliance is actively pursued. Although a Korean National Bureau of Statistics exists, it does not publish figures on this topic, nor has it been possible to obtain information on prosecutions, etc from the news media or from other public domain sources. Some local perspectives on this issues are offered in Section 7 below, but it is stressed that these are personal opinions which it has not been possible to verify using confirmed data.

5.3.3 Conclusions

As can be seen from the above, the level of financial penalties available for breaches of the Industrial Safety and Health Act are low compared to other regimes and it is interesting to note that where imprisonment and financial penalty options are provided, these are on an 'either or' basis, i.e. there appears to be no provision for imposing imprisonment and a fine together. Anecdotal evidence from Section 7 suggests that the principal means by which enforcement is pursued is through the 'punishment' of senior personnel held to be responsible, but it has not been possible to verify the extent to which the Korean legal system is active in enforcing HS&E legislation in the area.

5.4 United Kingdom

5.4.1 Level of Penalties

The following penalties are taken from current HSE enforcement guidelines.

For breach of Duties under Sections 2-6 of the Health and Safety at Work Act (HASWA) failure to discharge a duty under these sections of HASWA carries a maximum fine on conviction in the magistrates' court of £20,000 (approximately $48,100 CAD). In the Crown Court, the maximum penalty is an unlimited fine.

Breaches of specific Health and Safety Regulations are punishable in the Magistrates' Court by a £5,000 (approximately $12,000 CAD) fine and in the Crown Court by an unlimited fine.

For breach of the terms of an improvement or prohibition notice, or of a remedy order made by the court, the maximum penalty on conviction in the magistrates' court is a £20,000 fine and/or 6 months imprisonment. On conviction in the Crown Court the maximum penalty is an unlimited fine and/or two years imprisonment.

Serious breaches of health and safety are almost always dealt with in Crown Court. Some examples of recent fines following convictions are given below. The examples are taken from the November 2003 edition of “The Safety and Health Practitioner” which is the journal of the Institute of Occupational Safety and Health.

Example 1
“Crushing death costs company £200,000” ($464,200 CAD)
The fine followed the death of a foundry worker crushed to death by a 40 tonne charge car. The company was found to have 3 previous convictions for breaches of health and safety legislation.

Example 2
“Accident Led to Permanent Disability”
A glass cutting and manufacturing company was fined a total of £35,000 ($81,235 CAD) on 3 counts of beaching health and safety legislation. The employee had stepped on an unguarded section of conveyor, trapping his leg.

5.4.2 Degree of Enforcement

Health and Safety Commission / Health and Safety Executive

The HSC has a 20 page enforcement policy which is published freely on their website. The policy clearly sets out the following; the purpose and method of assessment, the principles of enforcement, investigation, prosecution, death at work and penalties for health and safety offences.

The principles of enforcement are not restricted to prosecutions. The HSE is keen to stress that enforcement includes promoting compliance with the law and achieving continuous improvement in standards of health and safety.

Most of the HSE inspectors work in the field operations directorate (FOD). FOD offices are organised into regional groups throughout Britain. FOD is also organised into broad sector groupings such as the railway industry.

The following is a list of key summary points and trends taken from the HSE "Health and Safety Offences and Penalties 2002/2" report.

The average fine per 'case' has fallen from £11,141 in 2001/2002 to £8,828 in 2002/2003 – a drop of 21%.
The average fine per 'offence prosecuted' has fallen from £8,234 in 2001/02 to £6,040 in 2002/03 – a drop of 27%.

The number of enforcement notices has increased from 11,082 in 2001/02 to 13,263 in 2002/03 – a rise of 20%.

Cases investigated by HSE led to prosecutions in a total of 933 cases involving 1,688 separate alleged offences in 2002/03. Of these 933 cases, 86% resulted in a conviction.

HSE prosecuted a total of 22 Managers and Directors in 2002/03. 11 of these were convicted. The largest fine in 2002/03 was £240,000 ($578,000 CAD) in a case where a major scaffold collapse occurred in a busy city centre putting passers by at serious risk.

Local Authority Enforcement

In 2001/2 there were 1060 full time equivalent local authority inspectors with health and safety powers in the United Kingdom. Local authority inspectors concentrate mainly on offices, shops, retail premises and accommodation providers such as hotels. Industrial sites and construction sites are usually outwith the scope of these inspectors.

The information below is presented to indicate that the HSE are free of this work load and can therefore concentrate on specific industries.

Local authority inspectors made 266,000 visits, 157,000 were preventative visits involving full inspection of health and safety standards. Preventative inspection visits account for around 60% of visits each year. Inspectors made 15,000 visits as a result a specific health and safety initiatives and a further 19,000 visits were made to investigate the circumstances of work place accidents.

In 2001/02 there were almost 1100 premises per inspector. The rate of premises per inspector shows the resources available to assist business in complying with health and safety law (the higher the rate the lower the resource available).

In 2001/02, there were 251 visits per inspector which equates to 229 visits per 1000 premises. During 2001/02 local authorities issued 5960 enforcement notices. The number of improvement notices issued by local authorities was 4820. In 2001/02, there were 5.1 formal notices issued per 1000 premises.

5.4.3 Conclusions

Risk assessment underpins the HSC/Es approach to the regulation of risk from work activities. Risk assessment ensures that the employer's response in managing risk is commensurate with the risk. HSE inspections may be made as a result of a complaint from an employee or as a result of an injury. However, the majority of inspections are made without warning and are planned as part of a major programme of preventative inspection designed to check on standards, gather information and ensure compliance with the law. The 'average' fines imposed on transgressors in the UK is relatively modest and there is regular criticism that these do not enough to deter often breaches of health and safety law. However, there is no upper limit to the level of fines which can be imposed and penalties can often be severe for flagrant breaches of regulations.

5.5 Norway

5.5.1 Level of Penalties

In dealing with enterprises that do not comply with the requirements of the Worker Protection and Working Environment Act, the Labour Inspection Authority may respond with:

Orders

When statues and regulations are violated, the agency may give the enterprise an order to correct the situation within a given time limit. This is done in writing and the recipient has the opportunity to lodge an appeal.

Coercive Fines

If the order is not complied with, coercive fines may be imposes. The size of the fine is dependant upon several factors, but the main rule is that it shall be unprofitable to violate the Working Environment Act.

Shutdown of Operation

An enterprise may be shut down with immediate effect if the life and health of its employees are in imminent danger. Shutdowns may also be imposed when enterprises fail to comply with orders given.

Police

The agency may report enterprises to the police for serious breaches of the act. A serious violation can result in fines, or, in the worst case, imprisonment.

The principal enforcement Act in Norway is Act No. 4 of 4 February 1977 respecting workers' protection and the working environment, as amended to Act No. 2 of 6 January 1995. Section 85 - *Liability of proprietors of enterprises, employers and persons managing enterprises on behalf of the employer*. This states that any proprietor of an enterprise, employer or person managing an enterprise on behalf of the employer who wilfully or negligently contravenes the provisions or orders contained in or issued by virtue of this Act shall be liable to a fine, imprisonment for up to three months, or both.

In the event of particularly aggravating circumstances, imprisonment for up to two years may be imposed. When determining whether such circumstances exist, particular importance shall be attached to whether the violation involved or could have involved a serious hazard to life or health, and whether it was committed or allowed to continue in defiance of orders or requests from public authorities, decisions made by the working environment committee, or in defiance of demands or requests from safety delegates or from safety and health personnel.

In the event of offences that involved or could have involved a serious hazard to life or health, any proprietor of an enterprise, employer, or person managing an enterprise on behalf of the employer shall be liable to penalty under this section, unless the person concerned has acted in every respect in a fully satisfactory manner according to his or her duties under this Act.

5.5.2 Degree of Enforcement

Little information is available regarding the degree of compliance achieved in Norway, principally due to the fact that many of the websites and other literature on this subject is available in the Norwegian language only. Anecdotal evidence suggests that serious breaches of legislation will be followed up and the culprits prosecuted under the various acts detailed above.

5.5.3 Conclusions

Due to the lack of data regarding prosecutions in Norway, it is not possible to draw definitive conclusions regarding the effectiveness of the regime in that area. However, it is certainly true to say that the Norwegians, as a nation, are considered to have a highly developed sense of social responsibility, evidenced by their 'cradle to grave' social welfare provision, relatively low crime rate and high standard of living. They are acutely sensitive to matters associated with pollution, being one of the countries most adversely affected by acid rain pollution from Eastern Europe. It is therefore considered likely that the population as a whole would expect to see transgressors in this and associated arenas such as health and safety charged and prosecuted. Uniquely amongst the regimes reviewed, penalties in Norway are designed to ensure that it is not possible to profit from breaches of the regulations. This is an important point, as criticism is regularly made elsewhere that many employers are minded to gamble with the health and safety of their employees, reasoning that the chances of being caught are slim and the punishment not too severe even if they are prosecuted.

5.6 United States Gulf of Mexico

5.6.1 Level of Penalties

Every establishment covered by the 1970 Occupational Safety and Health Act is subject to inspection by OSHA compliance safety and health officers (CSHOs). These individuals, who are chosen for their knowledge and experience in occupational safety and health, are thoroughly trained in OSHA standards and in the recognition of occupational safety and health hazards. In states with their own occupational safety and health plans, state CSHOs conduct inspections.

OSHA conducts two general types of inspections, programmed and unprogrammed. Establishments with high injury rates receive programmed inspections, while unprogrammed inspections are used in response

to fatalities, catastrophes, and complaints (which are further addressed by OSHA's complaint policies and procedures).

The following is a list of the types of violations that may be cited and the penalties that may be proposed:

Other-Than-Serious Violation:
This is a violation that has a direct relationship to job safety and health, but probably would not cause death or serious physical harm. A proposed penalty of up to US$7,000 ($9282 CAD) for each violation is discretionary. A penalty for an other-than-serious violation may be adjusted downward by as much as 95 percent, depending on the employer's good faith (demonstrated efforts to comply with the Act), history of previous violations, and size of business. When the adjusted penalty amounts to less than US$50 ($66 CAD), no penalty is proposed.

Serious Violation:
This is a violation where a substantial probability that death or serious physical harm could result and where the employer knew, or should have known, of the hazard. A mandatory penalty of up to US$7,000 ($9,282 CAD) for each violation is proposed. A penalty for a serious violation may be adjusted downward, based on the employer's good faith, history of previous violations, the gravity of the alleged violation, and size of business.

Wilful Violation:
This is a violation that the employer intentionally and knowingly commits. The employer either knows that what he or she is doing constitutes a violation, or is aware that a hazardous condition existed and has made no reasonable effort to eliminate it.

The Act provides that an employer who wilfully violates the Act may be assessed a civil penalty of not more than US$70,000 ($92,820 CAD) but not less than US$5,000 ($6,630 CAD) for each violation. A proposed penalty for a wilful violation may be adjusted downward, depending on the size of the business and its history of previous violations. Usually no credit is given for good faith.

If an employer is convicted of a wilful violation of a standard that has resulted in the death of an employee, the offence is punishable by a court-imposed fine or by imprisonment for up to six months, or both. A fine of up to US$250,000 ($331,500 CAD) for an individual or US$500,000 ($663,000 CAD) for a corporation may be imposed for a criminal conviction.

Repeated Violation:
This is a violation of any standard, regulation, rule or order where, upon re-inspection, a substantially similar violation is found. Repeated violations can bring fines of up to US$70,000 ($92,820 CAD) for each such violation.

Failure to Correct Prior Violation:
Failure to correct a prior violation may bring a civil penalty of up to US$7,000 ($9,282 CAD) for each day the violation continues beyond the prescribed abatement date.

5.6.2 Degree of Enforcement

The OHSA website provides the following data regarding Federal inspection for the 2003 fiscal year.

The total number of Federal inspections during 2003 was 39,798. On the basis that the OHSA employs 1,123 inspectors each inspector conducts an average of 35 inspections per year or 3 per month.

2003 Enforcement Type and Penalties
The OHSA provide the following data which results from Federal inspections for the 2003 fiscal year.

Number of Violations	Percent %	Type	Total Penalties US$ (Canada $)	Average Penalty / Violation US$ (Canada $)
406	0.4	Wilful	13,251,536 (17,571,537)	32,639 (43,279)
59,899	71.7	Serious	52,358,997 (69,428,030)	874 (1159)
2,152	2.6	Repeat	9,557,281 (12,672,955)	4441 (5889)
222	0.3	Failure to Abate	1,187,349 (1,574,424)	5348 (7091)
20,533	24.6	Other	2,542,015 (3,370,712)	123 (163)
350	0.4	Unclassified	3,483,185 (4,618,703)	9952 (13196)
83,562	100	TOTAL	82,380,363 (109,236,361)	986 (1307)

Table 5.1 - 2003 OHSA Violation Data

Number	Percent	Reason for Inspection
9,025	(22.7%)	Complaint/accident related
22,426	(56.3%)	High hazard targeted
8,347	(21%)	Referrals, follow-ups, etc.

Table 5.2 - 2003 OHSA Inspections by Reason for Inspection

Number	Percent	Industry Sector
22,916	(57.6%)	Construction
8,554	(21.5%)	Manufacturing
328	(0.8%)	Maritime
8,000	(20.1%)	Other industries

Table 5.3 - 2003 OHSA Inspections by Industry Sector

5.6.3 Conclusions

Level of Penalties

The potential penalties for breaches of OSH legislation can be quite high. However, the 2003 data indicates that most financial penalties are quite low. For example, in 2003 the most serious violations (wilful violations) have only attracted an average fine of US$32,000 ($42,432 CAD).

Degree of Enforcement

The total number of Federal inspectors available in 2004 is 1,123. These inspectors cover the whole of the USA. Some assistance is available from the 22 states which have state OHSA plans. These states employ their own inspectors to support the Federal OHSA plan. It is clear from the tables above that OHSA is forced to target its inspections at “high hazard” activities and “incident investigations”. It is concluded that a reasonable degree of enforcement is applied. However, this enforcement is largely dependent upon the industry in question being identified as “high hazard” or having had a reasonably serious incident to draw it to the attention of OHSA.

Gulf of Mexico Specific Conclusions

For the purposes of this report it is assumed that most Gulf of Mexico offshore construction activity takes place in Louisiana or Texas. Neither state has a voluntary OHSA state plan which means that there are probably very few state resources available to assist Federal OHSA inspectors. It is therefore suggested that, in the absence of serious accidents, the offshore construction yards receive few OHSA inspections.

In February 2004 OHSA published a list of the 13,000 workplaces with the highest injury and illness rates. These are listed by state and a brief review reveals no apparent offshore construction facilities (although there are a number of shipyards). This tends to support the conclusion that offshore construction work places will not feature on the OHSA routine inspection plan.

6 Company Requirements

6.1 Overview

The scope of this report involves a comparison of the occupational health and safety regulatory regimes in several different countries. It is appropriate therefore to consider some examples of larger companies working in the field of offshore construction. A single example is given for each country which includes an outline of their main business area and company safety policies and procedures. Every effort has been made to choose examples which provide the reader with a reasonable comparison between the different countries. In some cases the globalisation of the oil and gas industry means that the examples chosen have operating bases in many areas of the world. The following companies were chosen for review

Canada	SNC Lavalin
South Korea	Samsung Heavy Industries (SHI)
UK	AMEC
Norway	Aker Kvaerner
USA	J Ray McDermott

A detailed review of the individual company policies for the above is given below, however it is clear that all have fully developed HSE mission statements, policies and procedures in place. As might be expected, workforce safety and the prevention of environmental damage is stated to be of paramount importance to every operator surveyed. Only SNC Lavalin and SHI explicitly confirm that they hold ISO 9001 and 14001 and OHSAS 18001 accreditation, but it is thought almost certain that Aker Kvaerner and AMEC will also be accredited to these bodies. J Ray McDermott are in the process of applying for ISO 14001 accreditation and state that they have in place an Integrated Management System (IMS) modelled after the ISO 9001 system. It is therefore considered that all of the surveyed organisations have broadly similar company policies in place.

6.2 Canada

6.2.1 Overview

Several companies with operations based in Canada were suggested. For the purpose of this analysis SNC Lavalin has been selected. Their website states that SNC Lavalin “is one of the world’s leading groups of engineering and construction companies”.

6.2.2 SNC Lavalin

SNC-Lavalin's track record includes landmark undertakings such as the Hibernia Offshore Oil Platform off Newfoundland's coast, to the detailed design of the ExxonMobil Sable Tier II Project off the coast of Nova Scotia, currently being executed by the Offshore Division's base in Halifax, Nova Scotia. SNC-Lavalin's integrated engineering and management systems and its multi-disciplinary teams allow it to offer a complete range of professional services, for fixed and floating structures as well as subsea pipelines and developments, anywhere in the world. In every project it undertakes, SNC-Lavalin considers Health and Safety and the Environment as its highest priorities.

Health and Safety Policy
As an engineering construction and manufacturing company operating worldwide, the SNC-Lavalin Group and its subsidiaries ("SNC-Lavalin") make occupational health and safety a primary objective in all of their activities both in Canada and abroad.

The Board of Directors established the Occupational Health and Safety Committee and mandated it to monitor the general Policy on Occupational Health and Safety. Each business unit, operating division or wholly-owned subsidiary is responsible for enforcing the laws and regulations under this general policy, along with the operating guidelines issuing therefrom, which are applicable to all employees without exception. The following information has been drawn directly from the company's website:-

Measures implemented by SNC-Lavalin include, among other things:

Training employees so they can help integrate the occupational health and safety standards into SNC-Lavalin activities;
Developing construction, operating and working methods to ensure that occupational health and safety objectives are part of SNC-Lavalin project quality criteria;
Producing an annual report on SNC-Lavalin's progress in attaining its occupational health and safety commitments and objectives.

SNC-Lavalin, with regard to all the establishments where it is assigned a mandate or responsibility in occupational health and safety matters, has an objective of zero accidents in the workplace and the elimination at source of any risk or danger.

All units, divisions and subsidiaries are responsible for reporting any fatal or serious accident resulting in lost time or property damage and to present their reports on such matters to the company's Occupational Health and Safety Committee.

SNC-Lavalin has identified measurable objectives which are specific and adapted to each type of operation in which it is involved which will be subject to periodic review.

SNC-Lavalin favours a return-to-work policy to assist those who have been involved in a workplace accident at any of its worksites or facilities.

The Director, Occupational Health and Safety, is responsible for verifying official directives regarding occupational health and safety and to assure that all offices, plants and worksites comply with laws, regulations and operating policies. Status reports are submitted to the company's Occupational Health and Safety Committee.

This general policy is supplemented by another organizational health and safety policy specific to construction work sites.

6.3 South Korea

6.3.1 Overview

There are several major companies involved in offshore construction projects in South Korea, based principally in the Ulsan and Pusan areas of the country. For the purposes of this analysis, one of the largest, Samsung Heavy Industries, has been selected for review of the company health and safety requirements.

6.3.2 Samsung Heavy Industries (SHI)

One of the largest players in the offshore construction arena and based at Geoje Shipyard, Geoje City, to the south west of Busan, this yard recently completed the Sea Rose FPSO for owners Husky Energy, to be deployed in the White Rose field offshore Atlantic Canada.

SHI hold OHSAS 18001, ISO 9001 and were the first shipyard to obtain ISO 14001 accreditation. Their HSE Policy appears comprehensive; amongst the on-site facilities provided are an HSE laboratory dedicated to analysis of particles, toxic substances and noise generated at workplaces, with the intention of obtaining improvement in the working conditions for employees based on the results of analyses.

SHI have also developed an HSE Alliance between themselves and the major operators to whom they are contracted, e.g. BP, BG, Chevron Texaco, CP, RasGas, Modec, Statoil, LR. The purpose of the HSE Alliance is to promote, encourage and develop consistent HSE Standards and procedures, and to implement these across the entire workforce.

SHI appear to have in place a well developed training program in HSE, delivered from their own on-site HSE Training Centre. The purpose of the Training Centre is to train workers in accident prevention at the

SHI yard. Workers receive hands-on experience in accident / incident avoidance and are given a mixture of lecture room training and practical, including the following specific courses:-

- Scaffolding and use of safety belt
- Confined spaces
- Crane operations and lifting equipment
- Fire fighting
- Safety Use of Utilities (electric and gas)
- Use of Cherry Picker
- Emergency response

As an example of the content of these courses, the SHI programme for crane and lifting operations provides education in the operation and inspection of such equipment and has the following principal objectives:-

- Dissemination of basic principles associated with these activities;
- Operation of remote control;
- Safe rigging methods;
- Wire / sling inspection;
- Signalling and warnings during lifting operations;
- Selection of sling belts;
- Securing methods.

Other training programs have similar, clear objectives. However, it should be noted that SHI employ in excess of 16,000 persons at their yard, at least 60% of whom are sub-contractors, rather than direct employees. Whilst the training facility is undoubtedly 'state of the art' in many respects, it is new and there are obvious limitations on the number of personnel which can be accommodated within it for training purposes. It is also the case that training is offered firstly to direct employees before consideration is given to the sub-contractors, therefore it is considered that it will take several years as a minimum before anything like a full training program will be carried out for all workers at the yard.
SHI also operate an ongoing campaign, aimed at the achievement of 365 LTI free days. The company's website states that to date, they have already achieved a period of 13 million man-hours (100 LTI free days). It is not stated which calendar period this covers. This program extends and applies equally to both direct employees and subcontractors

Finally, there is also an ongoing 'Total Health Program" aimed at the prevention and treatment of muscular / skeletal diseases. A complete suite of fitness facilities is provided on-site, incorporating physical strength examination rooms where a wide variety of sophisticated equipment is provided, along with a gymnasium, fitness centre and swimming pool.

6.4 United Kingdom

6.4.1 Overview

AMEC has been chosen as an example of a company which owns and operates offshore construction yards in the UK. However, it should be noted that the offshore construction industry within the UK is presently limited to a very few sites, principally in the north-east of England, which provide 'topsides' fitting out of vessels (mainly FPSOs constructed elsewhere in the world and then sailed to Tyneside for finishing). Both of the sites in the UK dedicated to jacket fabrication (at Ardesier and Methil in Scotland) are presently mothballed and there is no prospect of any further work going to these yards in the near and medium term future.

6.4.2 AMEC

AMEC's website gives the following general information:-

AMEC is a leading international provider of total life of asset services to clients in the Upstream oil and gas industry. The company holds a market-leading position in front end consultancy services, engineering & design, project management, construction, integration and commissioning of complex facilities and asset support services.

A pioneer in the development of innovative approaches to project delivery, AMEC offers extensive experience of long-term service relationships and different ways of working with clients and 'best-in-class' contractors. Imaginative partnering arrangements have produced significant cost savings, faster project delivery and greater long-term value to its customers.

AMEC's international engineering and design capability extends from front-end support through all project phases to completions support; linked by world leading technology solutions for multi site project partnering.

Safety, Health & Environment Policy

1. This policy statement applies to all AMEC's operations wherever they are carried out.
2. AMEC considers effective safety, health and environmental management to be of prime importance to its business and is committed to continuous improvement in performance in all these areas.
3. AMEC's overall goal is to protect both people and the environment. AMEC recognises that attaining the absolute goal of causing no harm to people or the environment is extremely challenging and will work with clients, suppliers and the workforce towards achieving this goal.

4. AMEC will:
   - Comply with all legislative requirements pertaining to safety, health and the environment as its minimum standard;
   - Pursue high standards of safety, health and environmental management as an integral part of efficient management of the business ensuring that all business decisions take proper account of safety, health and environmental implications;
   - Work with clients to minimise negative and maximise positive environmental impacts from their operations and will conduct its own operations and offer its services in an environmentally responsible manner;
   - Employ a consistent framework for the management of safety, health and environmental issues across all its operations;
   - Maintain, review and report on clear safety, health and environmental performance indicators including:
     - accident and incident performance rates
     - attainment of annual safety, health and environmental objectives
     - training achievement
     - results of safety, health and environmental audits
     - Review and, if necessary, revise this policy on an annual basis.

5. The Chief Executive has overall responsibility for implementing this policy and has appointed a corporate level director to lead the safety, health and environmental function. Individual responsibilities of key AMEC plc personnel are set out clearly in supporting documents.

6.5 Norway

6.5.1 Overview

Aker Kvaerner has been chosen as an example of a company with an operating base in Norway which is involved in offshore construction activity.

Field Development within Aker Kvaerner is multidisciplinary and technology based, covering all technical and management functions for carrying out execution of offshore oil and gas developments.

Core competencies:

Turnkey deliveries of offshore oil & gas production and processing installations
Total capabilities - engineering, procurement, project management and completion services

Their website states;

“Aker Kvaerner takes responsibility for entire field developments, from front-end studies through detailed design and engineering, procurement, fabrication, installation, hook-up and commissioning. Aker Kvaerner delivers complete field development solutions and undertakes all activities necessary to provide the facilities needed for oil and gas production and processing. Our products range from the largest and most advanced production facilities to unmanned facilities platforms. “

6.5.2 Aker Kvaerner

The Aker Kvaerner website states the following with regard to safety performance and safety culture:-

“Avoiding injuries to personnel and damage to material and non-material assets is the only goal which Aker Kvaerner can accept with regard to health and safety. We believe that every injury and accident can be prevented.”

“Good management of health, safety and environment (HSE) is an overriding priority and while the responsibility for implementing good HSE practices rests with line managers, all others associated with Aker Kvaerner and its operations are expected to be responsible for their actions, including those which may impact others.”

”It is Aker Kvaerner’s intent to foster openness and dialogue with the employees and the public, anticipate and respond to their concerns about hazards and impacts of operations, products, wastes or services including those of cross-border or global significance.”

6.6 United States Gulf of Mexico

6.6.1 Overview

There are several Major companies involved in offshore construction in the Gulf of Mexico. These are based principally in the states of Louisiana and Texas. For the purposes of this report a single company has been selected for review, namely J Ray McDermott (JRM). JRM operate the Morgan City fabrication site in Louisiana and have a long track history of offshore construction projects for both fixed and floating facilities. Since its opening in 1956, JRM claim that the Morgan City fabrication yard has built more offshore structures and decks than any other fabrication facility in the world. It has also been the model utilised by JRM for expanding its fabrication facilities worldwide.

6.6.2 J Ray McDermott (JRM)

HSE Philosophy

The commitment of JRM management starts with the HS&E philosophies that have been adopted as follows:

- All occupational and environmental incidents can be prevented.
- All operations must be performed safely and with minimal environmental impact.
- All personnel have the right and responsibility to stop any work they feel may be unsafe.
- Working safely and following company HS&E policies and procedure are conditions of employment.

HSE Policy

Each JRM division has adopted the following policy which is reviewed with all employees.

J. Ray McDermott considers the protection of human health, safety, and the environment for all its employees, contractors, customers, and the community to be of primary importance. As such, the company will maintain a Health, Safety & Environment (HS&E) program conforming to the best management practices of the marine construction industry. The overall success of the HS&E program is based on the following:

Management commitment, planning, and accountability
Management is responsible and accountable for protecting employees, assets and the environment in accordance with the company charter. In addition, prevention of injuries and illnesses and environmental preservation must be made a priority during project planning, operations, maintenance, and construction activities.

Employee participation and accountability
Line supervisors are accountable for the actions of their subordinates and will always reinforce safe work behaviours. All employees are responsible for stopping unsafe acts, alerting management of unsafe work areas, and for following company HS&E policies and procedures.

Compliance
The company will commit to strive for compliance with all applicable HS&E regulations, codes, and standards and will develop and enforce procedures which provide guidance to all employees on their responsibilities for meeting or exceeding these requirements.

Training

The company will provide adequate training to ensure understanding of good HS&E practices and regulatory requirements.

Continuous Improvement

The company will strive for continuous improvement in its HS&E performance through regular measurement and review of its programs and processes.

Managers, supervisors, employees, contractors, customers and vendors must work together to develop the proper attitude, practice and promote proper work habits, use good judgement, and comply with all applicable HS&E rules and regulations to ensure J. Ray McDermott is a safe and respectable environment in which to work.

HSE Management System

JRM has an Integrated Management System (IMS) for purposes of enhancing, formalizing, and standardizing its overall business functions. The system, modelled after the ISO 9001 system, provides mandatory guidelines to all JRM Business Units on how to manage each aspect of it business including HS&E. The HS&E Management System Guidelines are given top priority for development and implementation. These guidelines contain the following fourteen (14) main elements:

1. Management Commitment & Planning
2. HS&E Standards and Procedures
3. Risk Identification, Assessments & Control
4. Employee Participation
5. Engineering & Change Management
6. Contractor HS&E Management
7. Compliance Controls
8. Equipment & Facility Maintenance
9. Health Management
10. Preventive and Corrective Actions, Assessments, & Audits
11. Training
12. Emergency Preparedness, Response & Security
13. Control of Documents & Records
14. Performance Measures

These guidelines were written not only to meet applicable government and industry standards, but to exceed them in critical areas where risk to JRM employees or the environment is greatest. Regular management reviews ensure full implementation is reached and continuous improvement maintained.

As an example the following text is extracted from Section 11 “training”;

Orientation

Employees, subcontractors, and visitors are required to attend a JRM HS&E orientation before entering any JRM facility or vessel. Orientation includes:

- Review of the HS&E Philosophy and Policy
- Review of the facility or vessel layout including restricted areas and areas where special hazards may exist
- Policies as outlined in the HS&E Handbook on PPE and safe work practices as applicable
- What steps should be taken in an emergency

In addition, all employees, subcontractors, and visitors going offshore to a JRM vessel are required to attend a personnel transfer orientation on safe transfer procedures for boats, helicopters, personnel baskets, and swing ropes.

Training Requirements

A training program for initial and refresher training of all its employees and temporary employees (subcontract labour) has been established to meet all applicable government and company requirements. A training matrix has also been established showing the training and physical exams required for production groups, ship crews, and task specific assignments. Existing training includes training on the following:

- HS&E Work Practices
- Hazard Control System
- Supervisor Responsibilities
- Craft Specific Training
- Safe Vessel Operations and water survival (Marine only)

7 Other Perspectives

7.1 Overview

The preceding sections of this document have attempted to describe the legislative regimes applying in each of the subject regimes. However, it is acknowledged that there can often be a vast difference in what is stated to be in place and what is actually to be found in practice. In order to try to obtain a more complete picture of HSE implementation and attitudes, LR EMEA have approached several local sources for their perspectives on each of the subject regimes. The views expressed are personal and necessarily offered informally and without prejudice, but it is hoped that they will assist in forming a more rounded view of the various subject regimes. The persons interviewed gave their views on the condition that they would remain anonymous, therefore where necessary, minor changes to their comments have been made to remove references which could lead to their identification. Where this has occurred or where additional text has been added for clarity, square brackets have been used. The purpose of this section is to try to gain a feel for the actual experience of operations 'on the ground' in each of the regimes. As will be seen from the detailed comments, experience is often at significant variance from the high minded HSE policy statements which most companies aspire to.

7.2 Canada

…….We audit sites where construction work is being carried out on our vessels / rigs and generally find standards are good. The workforce are heavily unionised and so significant pressure is brought to bear by these organisations on companies to maintain and improve HSE. Requirement for local content has a negative impact on productivity in all areas and resourcing good local personnel with sufficient relevant experience in the HSE area is an ongoing problem. HSE personnel are generally not of as high a calibre as can be found in North Sea sectors – this can lead to misplaced initiatives being introduced or delays occurring whilst trivial HSE matters are investigated, as the person or persons carrying out such investigations are inexperienced or unable to distinguish between what is important and what is not…….***Snr Drilling Company HSE Advisor, UK based but with experience of regimes in Canada, Norway and South Korea***

….. In the large fabrication facilities (Halifax, Marystown, Bull Arm) site access is generally restricted until site-specific safety training is completed. Safety equipment, including coveralls, gloves, glasses, boots, headgear and safety harnesses (where applicable) is mandatory. All such equipment must meet the requirements of the Canadian Standards Association (CSA). All sites have safety supervisors who do circulate and make observations where necessary.

In large part, the fact that these worksites are strongly unionized has contributed to this safety weighting of activities. The union exercises their rights under provincial regulations to participate fully and equally in Joint Occupation Safety and Health Committees on site. Individual workers have the right to refuse to undertake work that is considered to be unsafe. This right has been used, some say as a bargaining chip, in the past although there have been no incidents of this sort in any of the fabrication facilities recently. Individual workers are very consistent in the utilisation of their own personal protective equipment but many are very tolerant of others not wearing or using their equipment. Failure to use PPE is a disciplinary offence within labour agreements. Sub-contractors are subjected to the same requirements while on site.

The respect for these requirements is backed by programs for the provision of safety equipment, for training, accident investigation and reporting, etc. – all of which contribute to the operating overheads of these facilities. They also are provided by the companies to their workers on regular time – so workers are paid while receiving this training.

In smaller facilities, however, the depth of the culture varies from lip service to the regulations through to full compliance with the intent of legislated requirements. In many small facilities there are posted requirements which are not respected in all cases. In many cases, systems installed for particular hazards may not be subject to repair and maintenance and evidently had been installed for regulatory compliance rather than to address an agreed problem. It is largely a compliance mentality and very, very, few companies do more than is necessary for compliance.

Accidents in smaller facilities appear to be categorized as crushing while lifting, slip or falls from intermediate heights. The facilities themselves are in provincial jurisdiction and few oversight resources are available so visits by government inspectors are rare. Sub-contractor control varies from stringent to none at all ……..**Senior Surveyor, based in Canada**

7.3 South Korea

……. In general, safety culture in South Korea is fairly abysmal. Conversely, the Koreans' ability to paper over cracks is masterful and, although I haven't looked, I suspect the [company] websites look fairly comprehensive in this area. Fundamentally, most Koreans really have no idea whatsoever about safety. In a recent incident, senior management staff [from a major construction company] were removed from office as a show of action for some recent accidents at the yard (5 fatalities in first 2 weeks this year). Its all about paying lip service to the law here. Quality is the same. Consequently, if we tried to collate lost time accident statistics (for example), we would be unlikely to get an objective set of data. This is also the case because the way the laws will be written will be to "protect face", a very important concept in this area…….***Ship Surveyor, based in South Korea***

…….Yards in South Korea are given our procedures and HSE policies and told to work with them, but we don't specifically audit to check on degree of implementation. We ask each tendering company to produce an HSE plan prior to contract award and these are included in the bid evaluation process prior to contract award, although they do not carry as much weight as the other factors – e.g. cost and delivery schedule. Korean construction companies are only required to notify us if an accident / injury occurs on our actual project. We therefore have no knowledge of overall accident rates in these yards. We maintain our own ex-pat Yard Team on-site for the duration of the project, which includes an HSE advisor, who tries to ensure that work on our project is carried out in a safe manner, but I would not pretend that there are not considerable problems in such a schedule driven environment……. ***Snr Drilling Company HSE Advisor, UK based but with experience of regimes in Canada, Norway and SK***

…….It is important to understand that [offshore and ship] construction is performed in an entirely different way here to what was the norm in the UK and elsewhere. Construction is done on a 'block' basis, i.e. large fabricated sections weighing up to 1000 tonnes apiece are lifted in, often over the heads of personnel working on one of the up to four vessels being worked on in the same dry dock. Ordering companies have a high degree of confidence that Korean yards will meet their delivery targets – which can often be as little as 5-6 weeks for construction of an LNG tanker, for instance. Back in the UK, it used to take anything up to 3 years to complete such a project. At least one vessel sails away per week from my yard. Safety standards in Korea are nowhere near as good as in the west, but they are improving, albeit slowly. The current fatality rate is frightening – in [another] yard, I am aware of at least 8 and possibly 9 fatalities already this year and when I first arrived here, my own yard was averaging 1 every 6-8 weeks.

However these accidents are reported in a strange way. At the behest of the government, unless directly related to a construction activity, these are not recorded as a 'construction' accident. So for example, there was somebody recently electrocuted whilst doing maintenance work on a crane - this is not deemed to be a construction related accident (even though the crane is obviously used in such activities) and is recorded separately elsewhere. They are also creative about LTI recording – here it is not an LTI unless 4 days absence occurs and medical treatment cases are not recorded at all. There is also a culture of under-reporting, although this is improving of late.

There is also some training provided, in basic skills such as use of harnesses, rigging, etc, but one of the biggest difficulties with this is again to do with the sectionalised production system. We can train a specific work crew in these skills, but what then tends to happen is that they are sent back down the production line to do whatever their particular part of the process is on the next upcoming vessel and a new crew arrives to start on whatever the next phase of our project is. It is therefore likely that this crew will not have received training, so we are back at square one in this regard. It should also be borne in mind that in general, between 60 – 70 per cent of the average workforce at a Korean yard is not directly

employed – they are sub-contractors and it is true to say that such training as is offered is generally given to the directly employed labour force, at the expense of the sub-contractors.

It remains the case that this industry is incredibly schedule driven, hence it is a constant battle to try and balance the competing demands of safety over contract performance. The management are still on the look-out for 'quick fixes' regarding HSE and struggle to comprehend that a longer haul is involved. However, over the past couple of years, the major operator companies have got together to form HSE Alliances in the various yards, with the purpose of trying to improve standards. A mission statement was produced, which was endorsed by senior Korean management. Although I had the impression that the alliance was only being tolerated at the beginning, more recently I have noticed a more positive reaction, as management gradually realised that HSE doesn't merely mean that they have to spend money without any apparent return. They are starting to appreciate that they incur costs associated with down-time, accident investigation and most of all to their reputation. The construction business is deeply competitive and they are aware that work may go elsewhere if the major players don't want to be associated with the yard with a much worse record than others. As the ex-pats all know each other, we share safety information among ourselves. Korean management doesn't particularly like this – part of the competitiveness culture between yards - but they know they can't stop it.

At my yard, we have risen from maybe 10th to 15th in the overall construction yard safety rankings (this includes straightforward shipyards as well as offshore fabricators) to our current best in class position. So far this year, we have not suffered a fatality, but there have been 6 LTIs, so we still have a way to go. We now have monthly safety meetings – these are largely driven by the ex-pat safety advisors, but we do have local participation as well. The local HSE staff tend to be young, so although they usually hold some sort of qualification, they lack experience.

As regards accident types, falls from heights are by far the most common cause of fatalities, as you might expect in a yard, with heavy lifts next. As I mentioned before, the sectionalised construction process means that heavy lifts are constantly being undertaken and in very close proximity to other projects, so lots of confined space incident potential. Because these lifts are part and parcel of daily life in the yard, workers tend to not even notice when they are occurring and there is a view that one lift is much like another, so no detailed planning goes on and accidents are frequent.

KOSHA are generally hands off, until a fatality occurs, when they will investigate. The general rule seems to be that if 3 fatalities occur within a reporting period, the CEO, or sometimes another senior member of the management, will initially be charged with manslaughter. This charge will then be argued down by the lawyers and the general outcome is that the member of staff will be fired - or at least we don't see him again at the yard, I can't be sure that he isn't just moved elsewhere. We never hear the outcome of

whatever prosecution is then launched. My perception is that a fine, rather than imprisonment is usual, but I have no specific information – this type of thing never gets reported in the media.

As I say, things are generally improving. When [my company] first came to Korea, we asked the yard for a copy of their Safety Management System. It didn't exist, so we insisted that one was produced. It now exists, but I would have to say that the vast majority of the Koreans haven't got a clue what it is supposed to achieve. I am trying to educate the local HSE personnel in this regard. They tend to be well qualified, though not necessarily in a discipline related to safety, but they are also generally young and lacking in experience.

I have also been successful at introducing a near-miss and hazardous incident reporting system – this also didn't exist previously. It now stands with a total of 5,000 such incidents, which sounds a lot, but really isn't when you consider the size of the yard and the [many thousands of] people who work here. However, we now conduct a quarterly analysis of the types of such incidents and have institute specific campaigns to target the obvious problem areas. We don't expect to solve these overnight, but we hope to see a gradual improvement in the targeted areas. For me, any improvements which occur in safety standards here will be down to greater involvement by the majors. The legislation, such as it is, is not rigorously enforced and tends to just be something to hang a retro-active prosecution off, rather than being a vehicle for improvement……***Oil Company HSE Manager, based major Korean offshore construction site***

7.4 United Kingdom

……Dealing with health and safety issues is the second biggest thorn in the side of UK business – after employment law – in terms of its distraction of management time, and the costs of compliance. This is one of the main findings of a recent survey carried out by the Institute of Directors (IoD). The real impact of red tape claims it is now "widely accepted" that the regulatory burden and complexity of complying with health and safety, employment, environmental and other laws in the UK are "restricting economic development and [are] a competitive handicap". Just over 50 per cent of the 427 respondents to the survey – all self selecting members of the IoD or other business leaders – said health and safety as a red-tape issue had a major or significant impact on their business activities. Almost 50 per cent were concerned about the cost implications of health and safety, despite the efforts of the HSC2 and others to promote good health and safety as a business benefit. James Walsh, the IoD's Parliamentary and European advisor suggested that regulation in health and safety had gone too fare and needs to be reined in. He said: "Regulations could be reformed to make them easier to comply with, without diminishing their impact." Other health and safety related issues singled out for complaint in the survey

[2] Health and Safety Commission

are workforce regulation – including compulsory trades union recognition – and the Working Time Directive (WTD)3 The TUC's Head of Safety, Hugh Robertson, said that far from being an impediment, trades union representation in the workplace had been a "major step forward" in improving health and safety and, therefore, reducing costs. "Workplaces without unions are likely to have twice as many accidents and injuries as those with representation. Days lost as a result are a major cost"***……Extract from article published in SHP (The Safety and Health Practitioner) magazine, April 2004***

……Safety Culture in both onshore and offshore workforces has improved dramatically in the UK post Piper Alpha. This in part is due to an increased awareness of and implementation of regulatory standards by both workforce and management The introduction of the Safety Case Regulations SI 1992/2885 which subsequently introduced and implemented, Permit to Work System, Tool Box Talks, STOP Cards, Scoff-tags etc, has focused both the workforce and supervisory staff to better plan, discuss and complete the tasks to be undertaken and to ensure that worksites are rigorously monitored. This has also led to an increased awareness by workgroups of other activities in adjacent areas (onshore offshore construction sites are a good example), thus providing a more global overview and more efficient use of resources. The introduction of the Safety Representatives and Safety Committees Regulations SI 1989/971 and The Safety Management System procedures has allowed both Management and workforce to better communicate on safety issues and both are subject to regular audit by SHE Inspectorate thus ensuring standards are maintained. The compulsory wearing of Personal Protective Equipment, Hard Hats, Safety Glasses etc has also contributed to the reduction of minor injuries once commonplace in the industry.

The Safety Culture being practiced offshore has also been adopted at onshore construction yards. Current practice at onshore construction yards require new employees/visitors to undergo a comprehensive Safety Induction and to successfully complete electronically a thorough post induction questionnaire which requires a high percentage pass rate before an individual is allowed on site unaccompanied. Workplace conditions are also much improved. Power cables, welding cables, air hoses, etc., are now raised from the floor and tied on hangers thus reducing tripping hazards. Overhead lifts are preceded by visual and audible warnings, flashing lights/sirens unless the lift is of a heavy nature in which case the area is barriered off and only personnel involved with the lift have access. All ladders to scaffolding are lashed secure and a Scaff-tag displayed, recording date of last scaffold inspection and status, i.e. Green for safe or Red for unsafe and not to be used. If working above ground level without scaffolding a safety harness must be worn at all times, however the issue of the harness from the stores can only be authorised by the site Safety Officer with whom the task must be discussed and agreed prior to the task being undertaken. During breaks etc, a squad is deployed to sweep and remove all debris from the floor minimising trip and slip hazards. This activity occurs at every break.

[3] EU legislation limiting the number of hours employees may work over a specified period of time

My impression on recent visits to onshore construction yards is that both management and workforce, as offshore, are committed to promoting the safest work conditions achievable, and, by thorough pre-activity interactive communication and planning are providing a high efficiency resulting in target dates being achieved safely…….***Former Major Oil Company Offshore Inspection Engineer, now Onshore Auditor***

7.5 Norway

HSE standards are generally good. I have no knowledge of any fatalities at the major construction yards (this doesn't mean that they haven't occurred, but I think that they are rare events). As in Canada, the heavily unionised labour force applies pressure in the HSE arena. Regulator is generally hands-off. If an incident occurs, it is reported to the police, who may or may not investigate - generally they do in all but the most minor cases……. ***Snr Drilling Company HSE Advisor, UK based but with experience of regimes in Canada, Norway and SK***

…….My view is that Norwegian yards probably lead the way with respect to the adoption of 'best in class' safety standards, due in no small measure to a very strong and sometimes militant union presence. However, from my own experience, this is only true in the large yards – smaller enterprises can be fairly hair-raising in the approach to health and safety and don't seem to be nearly as much under the microscope in this connection as larger enterprises, but then they often not unionised and are often remote from the big construction areas…….***HSE Engineer, now UK based but with several years experience in Norway***

7.6 United States Gulf of Mexico

….. One yard has had two major incidents/accidents in the past three years. Both caused by operating lifting gear out of the design, weather and allowable operational conditions. These accidents were as a direct result of trying to meet delivery dates and avoid penalties. The ensuing court case and subsequent lost time penalties, environmental damage/impact and the (fortunately minor) injury to personnel makes one question the judgment of these actions and the levels of management involved in the decision making processes. This is especially pertinent to many of the larger companies that preach safety from the pulpit to such an extent that we (and all other sub-contractors) are no longer permitted in their yards without providing written proof of adequate insurance and liability coverage. This is presented as a safety issue but is clearly to try and prevent liable actions in the event of an accident/incident on their premises.

All the yards and offshore workshops have a basic policy that safety shoes, helmets and glasses are required on site. Some also enforce the use of safety harnesses above six feet from the ground and use of life vests when working over or near water. Their general understanding of enclosed spaces and tank entry procedures are generally limited. Use is made of mechanical ventilation but no testing of the

atmosphere is conducted. If it is tested this is generally only for oxygen levels. No other chemicals are tested for - this can be particularly dangerous when dealing with offshore vessels carrying contaminated well fluids and barges used for carrying oils. It is also noted that there is little attention paid to entering long pipe or tubulars during jacket fabrication (e.g. legs and risers). These invariably become oxygen deficient spaces and are contaminated with welding gases and deposits.

The yards and shops generally adhere to the OHSA requirements as a matter of law rather than safety - i.e. if someone is hurt or killed they can demonstrate that they complied with the safety requirements and are not liable (or liability is minimal). Of the numerous yards only one small locally owned yard stands out as the one that proactively attempts to maintain a safe working environment. They operate a safety training centre, regular training programs; have safety officers in the field continuously and regular safety meetings and briefings. They also promote their safety record as a major selling tool (low lost accidents numbers - implies higher productivity). They operate a disciplinary process and do dismiss staff for misconduct and breaches of safety. This is the only company in this region that I have worked at that actively pursues this process. The larger multi national companies generally do not have or operate this philosophy.

Control of the use of safety equipment on site is also haphazard. The majority of sites check you have the equipment to enter but pay little attention to it's use. If an accident occurs this usually results in a purge of the yard which may last from a few days to a few weeks depending on the severity or nature of the accident. However, old habits quickly re-establish and they resume until another accident occurs and the cycle goes round. One effective use of the breach of site safety rules commonly practiced by the more unscrupulous yards is to harass surveyors, client representatives and inspectors with the aim of ejecting them from the yard for infringements of the rules. This is not a safety issue but means to get rid of unwanted intervention as they see it.

Recording accidents is generally rare unless it involves lost time, hospitalization or attendance by the emergency services. Check the lost time record boards posted at the yards. If they are accurate I would be amazed. Defining an accident is also a grey area. Not all companies record all accidents only those that result in lost time to the person or lost production. Minor injuries (cuts, bruises, eye irritation etc.) may be recorded in the medical log but are not reflected in the accident log.

Activities such as painting, sand blasting and scaffolding are normally controlled by the input of the client and they insist on the appropriate controls being in place. Yard practice for sand blasting and painting is that it is normally done in segregated areas where possible. If not possible then it is the individual's responsibilities to take care of their own safety in those areas.

Safety posters are liberally posted through the yards and safety campaigns are run on a regular basis. A number of companies operate a reward scheme for employees who make up monthly safety slogans. These are displayed throughout the works and on large boards at the entrance.

Louisiana is one of the most litigious states in the USA (number 5 according to a recent national poll). If a case has a chance that it can be proven it will go to court. Settlements vary from hundreds to multi million dollar depending on the incident …….***Senior Surveyor based in Louisiana***

7.7 Conclusions

It is apparent from the above comments that conditions in South Korea are markedly poorer than found elsewhere and that the development of a successful HSE regime is still some way off. It is also clear that conditions in American yards leave something to be desired in terms of a 'holistic' approach to Health and Safety. This is considered to highlight the flaws which are inherent in an entirely prescriptive regime - whilst it may be the case that all prescriptive requirements are met, it is apparent that this may not necessarily be sufficient to guarantee the safety of the workforce. This is likely to also be the case in Canada. The goal setting regimes in the UK and Norway appear to have generally succeeded in raising standards in these countries, compared to conditions which applied prior to their introduction.

8 Environmental Requirements

8.1 Overview

A review of applicable environmental legislation has been carried out, with the purpose of providing information regarding the environmental regulatory requirements within each of the countries reviewed. In each case the following information was identified;

- the regulatory body,
- the applicable legislation
- the potential penalties for breaching the legislation.

In each case it was found that the broad requirements of the environmental regimes in each country are broadly similar, e.g. no damage to the environment (except where permitted under the terms of the law). It is thought likely that the degree of enforcement is likely to be broadly similar to that discussed for health and safety issues, i.e. South Korea may be less rigorous in their approach than the other subject regimes and it is likely that Norway and Canada will be the most environmentally sensitive of the areas reviewed.

9 Results of Comparison Matrix

9.1 Overview

A basic matrix was compiled which sets out Canadian occupational health and safety requirements in specific areas. This matrix was then used to compile a comparison matrix for each country under consideration. The results provide an indication about the type of legislation which is in place. However, caution is advised, the matrices present a limited number of comparisons and not all legislation is shown due to space and time requirements. It should be noted that the matrices only show legislation in the other subject regimes which is approximately equivalent to regulations in force in Canada. Thus, it will not highlight areas where the subject regimes have additional or more onerous regulations that those in Canada. For example, in the UK, there is a whole raft of additional regulations covering specific areas not covered in detail within the Canadian regime, e.g. Noise at Work, Electricity at Work, Highly Flammable Liquids and Liquefied Petroleum Regulations. It should also be noted that where UK regulations have been compared against Canadian requirements in the matrices, the areas of comparison are often only a very small part of the total scope of the Regulation. For example, the UK Workplace (Health, Safety and Welfare) Regulations are relevant when looking at ventilation requirements in the workplace, which is mentioned in Canadian requirements, however these regulations are much more wide-ranging that just dealing with this particular topic – they also cover temperature, lighting cleanliness, workplace dimensions and space, falls or falling objects, windows, traffic routes, doors, washing and sanitary facilities, change and rest facilities, etc, etc.

The results of the comparison exercise generally indicate that there are very few areas where the Canadian regulations are more onerous than the equivalent legislation in Norway and the UK. This is largely because of the goal-setting nature of the latter regimes, where employers are required to take 'all reasonable precautions' to safeguard the health and safety of their workforce. Comparison of Canadian regulations with those applying in the USA has revealed that the latter is much weaker in terms of requirements to set high level policy goals, e.g. there is no requirement in the USA to have a safety policy in place, appoint safety representatives, etc. However, review of the prescriptive regulations applying particularly to the construction industry has revealed that the US requirements are considerably more detailed than those found in Canada.

Comparison between Canada and South Korea has revealed that South Korean regulations are generally much weaker in areas such as the need to involve the workforce in matters relating to health and safety, e.g. there is no requirement to appoint safety committees or representatives or to communicate safety policy to staff. It is felt that this is likely to be a reflection of the overall workplace culture in South Korea,

where employees enjoy few, if any, rights and where trade union organisations, if they exist at all, have little influence.

10 Conclusions

10.1 Overview

The preceding sections have identified and discussed the various component parts of the HSE legislative regimes applying in each of the subject jurisdictions and have compared the H&S requirements of each area against those applying in Nova Scotia, Canada. The following overall basic findings have been observed.

Canadian, United States and South Korean regimes are largely prescriptive in their requirements, i.e. a detailed rule set has been set down which workplaces are required to strictly meet with in order to ensure legal compliance. In contrast the regimes applying in Norway and the UK are more goal-setting in their approach, i.e. there is less emphasis on laying down specific requirements to be met, in favour of a more general requirement that 'adequate' 'suitable' and 'sufficient' measures are in place to safeguard health and safety, without specification of what these might be. Thus, in these regimes, the onus is placed more firmly on the employer to demonstrate that what he has adopted is adequate, suitable and sufficient and this cannot be achieved merely by stating that he meets a particular Code or Standard.

Allied to the preceding point, the UK and Norwegian regimes also rely heavily on the concept of 'risk assessment' to demonstrate that adequate, suitable and sufficient measures have been put in place. To a lesser extent, this concept is also present in Korean legislation, which requires the production of Process Safety Report in respect of premises with 'harmful or dangerous facilities', although it is considered that employers and workers in that country will have little or no understanding of the concept of risk assessment.

To those unfamiliar with goal setting legislation it may seem that the regulations are simpler to comply with and are set at a much higher level. Also, the ability for employer to set their own safety standards may seem appealing. However, neither of the previous observations is correct. Goal setting legislation permits the regulator to constantly push the employers to improve health and safety standards. It is not possible for any employer to achieve 100% compliance because continual effort is required to maintain standards.

10.2 Canada vs. South Korea

A review of legislative requirements in South Korea against the Canadian model indicates that the majority of the Canadian requirements are also broadly addressed in Korean OSH legislation. However, it is probably true to say that the rights of the employee are not as strong as in Canada, e.g. there is no right of refusal under Korean legislation, except in situations of 'extreme danger' and the right of

representation and negotiation by the workforce, in the forms of trade unions or through Safety Committees is all but non-existent.

It is considered that the principal weakness of the Korean regime lies with its enforcement. It is clear from such accident statistics data that is available from this country that the fatality rates in construction yards is at a level which would be totally unacceptable in the other subject regimes, yet it would appear that there are insufficient penalties applied to deter management in this industry from continuing to take risks with their workforce's safety.

10.3 Canada vs. UK

The compliance matrix review (Appendix 2) of UK versus Canadian requirements indicates that the vast majority of provisions which apply in Canada are also addressed in UK legislation. However, it should be noted that the 'risk assessment' element discussed in Section 10.1 above is considered to be more onerous than the straightforward 'code compliance' approach adopted in Canada and the USA. The UK regime is considerably less concerned with laying down specific measures which must be taken with regard to the safeguarding of the workforce, in favour of an approach which generally requires that 'all reasonably practicable' measures must be adopted to reduce risks to a level that is as low as reasonably practicable – the ALARP position.

Added to the above goal setting approach, there is little doubt that the legislative burden in the UK weighs heavily on many employers. Newspapers and other media regularly report on increasingly vociferous complaints emanating from various employers' organisations regarding the volume and complexity of HSE legislation, particularly that emanating from the European Union. The degree to which their complaints can be considered justifiable is of course open to debate, but there is little doubt that the 'compensation culture' which was previously assumed to be a largely American phenomenon, is now gaining ground in the UK. The past few years has seen the inexorable growth of advertisements for companies willing to take on compensation claims, including those relating to accidents at work, on a no-win, no-fee, basis. This in turn has led to many companies agreeing to settle such claims outside of court, whether or not liability has been established, in order to avoid expensive legal fees associated with defending such actions.

Overall, it is concluded that HSE legislative requirements in the UK are generally more onerous than those applying in Canada, principally due to the goal setting approach adopted in the former. It is further concluded that enforcement is rigorously applied, although many critics would argue that it is often reactive in nature, i.e. following a major accident event, rather than as a result of ongoing inspection work. Financial penalties are in theory unlimited for cases prosecuted in higher courts and large fines and extensive adverse publicity for the firms involved are

considered to be a deterrent to the more flagrant or regular breaches of such legislation which were a feature of the UK picture prior to the introduction of the Health and Safety at Work Act.

10.4 Canada vs. Norway

Based on a limited study of the Norwegian Health and Safety legislation it is clear that the Norwegian regulatory system is based around a 'goal-setting' approach, which takes the form of requiring that stated objectives are to be met. This is in contrast to the prescriptive Canadian regulations, where standards of safety are set in most cases by more detailed specification for plant equipment and procedures and there is more emphasis on satisfying the specific requirements rather than more general requirements.

The requirement also exists in the Norwegian Internal Control Regulations for a risk assessment, which requires the ''identification of dangers and problems and against this background assesses the risk and draws up plans and measures to reduce such risks'' with the responsibility being placed firmly on the employer to demonstrate adequate compliance. This again contrasts with the Nova Scotia provincial legislation, where there is no requirement for risk assessment.

Also as part of the Norwegian legislation the obligation to introduce and operate internal control rests with the person responsible for the enterprise. This means the management or owner of the enterprise. The internal control must be introduced and operated in collaboration with the employees, working environment committees, safety delegates etc.

A number of Norwegian construction industry regulations and standards has been found and listed in the detailed compliance matrix (Appendix 2). However, where specific topics or activities are not covered by guidance, there are general duties in place as part of the Worker Protection and Working Environment Act that must be adhered to. The Canadian construction industry however, is considered to have a more comprehensive and detailed list of regulations and standards in place for specific topics and activities, with more emphasis on specific requirements rather than general provisions.

NORSOK standards add the provisions deemed necessary to fill the broad needs of the Norwegian petroleum industry and are based on recognised international standards. Where NORSOK standards are not found, priority shall be given to the use of ISO standards or other relevant recognised standards. It should also be noted that Norway is not a member of the EU (European Union) and as such does not have to comply with any EU regulations and guidance that maybe in place, unlike the United Kingdom. However, Norway is a member the European Economic Area (EEA) which consists of the EU member countries together with Norway, Iceland, and Liechtenstein. As an EEA member, Norway has assumed most of the rights and obligations of the EU single market but is still free to provide subsidies to certain of its indigenous industries, although there is little evidence to be found that it does so in the area of offshore

construction (see Section 12 below for a fuller discussion of the issues associated with government support to this industry).

From the above, it is concluded that the overall burden of HSE compliance in Norway is likely to be greater than that required in Canada and will probably be roughly on a par with costs in the UK, given that the regimes are broadly similar in these areas. The Norwegians may benefit to a certain extent from their non-membership of the EU, but it is felt that any cost savings from this are likely to be offset by the extremely high cost of labour, unionised workforce and heavy emphasis on environmental protection of their coastlines.

10.5 Canada vs. USA

A review of American Occupational Health and Safety standards has concluded that the legislation is highly prescriptive. This essentially means that complying with the letter of the law is difficult but that by complying a company can evade any liability for employee accidents in the work place. Unfortunately, it also means that complying with the law does not in any way guarantee a safe working environment. The standards contain no duties for continuous improvement of safety, elimination of all hazards, control, mitigation etc. There is no mention of risk assessment or a risk based approach to hazard management. Indeed, hazard management systems receive very little mention in the OSH standards at all.

Unlike in Canada, much of the legislation is specific to sectors of industry such as construction, agriculture and maritime activity. The legislative structure is “bottom heavy” i.e. there are very few high level general requirements of employers, suppliers etc. There is a general duty on employers written into the 1970 OSH act to provide a safe place of work. However, this general duty does not appear to be used by the regulator to bring prosecutions as it would be in other countries such as the UK. From a European perspective it would seem that an entire level of legislation is missing covering the principles of risk management and safety management. Such a system is the absolute opposite of the UK and Norwegian “goal setting” legislation.

The American OHS legislation is highly prescriptive but this in itself does not mean it is ineffective. However, there is evidence to suggest that its thorough application in offshore construction yards is doubtful. Added to this, the attention of the regulator in these locations is highly unlikely unless an accident has resulted in a fatality.

In conclusion, it has been suggested that the principles of a good safety culture in many offshore construction yards are preached but not practiced.

11 Cost Considerations

The original scope of work called for comment on the relative costs of complying with HSE legislation in each of the countries. However, it is also recognised that any attempt to estimate the costs associated with compliance and draw conclusions across the subject areas is a complex and multi-faceted process, given the wide differences which exist between the types of regimes in place and the degree of enforcement pursued. Commercial-in-confidence issues necessarily precludes any detailed analysis on the actual cost of compliance with HSE requirements, as this is intimately associated with general company operating costs which are not available in the public domain. The following section is intended to act only as guide to the overall costs of employing labour, of which the cost of HSE compliance would form a component, rather than offering a definitive judgement on the degree to which HSE compliance affects competitiveness.

It is considered that there are two distinct areas which are key to the overall cost of HSE. These can be defined as:-

- the part of the 'indirect' cost of employing labour, e.g. in terms of training, supervision and equipment provided to personnel.
- the 'social' costs of employment, including the cost of compensation payments to injured workers and the insurance or other types of premium charged in this regard.

Both of the above elements are discussed in the following sub-sections.

11.1 Indirect Costs

Effects of Company Size on the Cost of Compliance

Discussion

As a start point for this analysis, information has been drawn from the UK HSE's publication '**Costs of Compliance with Health and Safety regulations in SME's**[4]. The principal purpose of this report was to investigate the degree to which small and medium sized companies are disadvantaged by the costs associated with implementation of HSE legislation in the UK when compared with large enterprises, and its principal conclusion is that SME's are significantly disadvantaged in this regard. The report surveyed a

[4] Source:- Costs of Compliance with Health and Safety regulations in SME's – Research Report 174 - Prepared by Entec UK (on behalf of the Health and Safety Executive 2003. ISBN 0-7176-2782-9

SME = Small and Medium Size Enterprises – in the context of the report, an SME is taken to be a company employing less than 500 people

variety of industry types, one of which was the construction sector, in selected areas, namely the USA, UK European Union, Australia and New Zealand. From the findings of the report, it was found that training provision was the main expenditure for all sectors studied across the medium-sized organisations. Provision of PPE was the second largest expenditure for the majority of the sectors (including construction). It is therefore reasonable to assume that these two elements present the greatest capital costs associated with safety in the offshore construction industry. The report further concluded that in all countries studied, small firms bear a relatively higher burden of costs than larger businesses. The report states that it was not possible to provide a 'rule of thumb' that could be used to estimate the extent to which compliance costs borne by smaller firms are greater than those for larger firms. However, where it was possible to quantify differential impact on small businesses, it appeared that the burden faced by businesses with few employees is at least 35% higher than for the largest size of firm (i.e. firms with more than 500 staff). It is also reasonable to assume that SMEs will not necessarily have the health and safety expertise in house that is afforded by larger organisations. Consequently SMEs may be slower to realise the costs of accidents and the benefits of health and safety interventions.

Although the research referred to above does not include all of the countries covered by the main body of this report, it is clear that the overall findings, i.e. that the relative cost of legislative compliance in SME's is greater than that in large enterprises, applied universally across the areas studied. It is therefore reasonable to conclude this pattern will be repeated worldwide. If this is the case, then there is two subject regimes which are likely to be significantly advantaged due to the economies of scale found in large enterprises, namely South Korea and the USA.

South Korea specialises almost exclusively in hull and jacket construction projects – very little topsides construction work is undertaken. Consequently, this work goes on alongside ship construction projects in extremely large shipyards along the Korean coastline. Hyundai Heavy Industries (HHI) and Samsung Heavy Industries (SHI) employ, either directly or on a sub-contract basis, circa 42,000 and 16,000 workers respectively. The vast majority of them are engaged in ship-building operations, however as expenses such as training and PPE provision are likely to be broadly similar in the ship-building and offshore construction divisions, it is reasonable to assume that Korean enterprises benefit from the greater economies of scale which can be expected in very large organisations, as demonstrated in the HSE report discussed above.

The USA also carries out both jacket and topsides completion work at a variety of large yards, and although these are not on the scale of the operations found in South Korea, they will certainly be well into the 'large enterprise' category identified in the HSE report above and as such can expect to benefit from the economies of scale available to such enterprises.

In contrast, offshore construction work undertaken in Canada, UK and Norway is generally now restricted to topsides completion works, although Norway has recently successfully tendered for two jacket construction projects. However, it should be noted that at the Norwegian sites where these jackets are being built, the total workforce numbers less than 200 at each location. At the only active offshore construction site in the UK (at Wallsend, Tyne and Wear), a similar number of persons are employed on individual topsides projects. Evidence from Canada suggests that workforces at the larger sites (Irving Shipbuilding Inc, Bull Arm in Nova Scotia and Marystown, Newfoundland), can peak at around 650 personnel and average around 300 - 450, but there are numerous smaller fabricators, with a workforce anywhere from 10 employees upwards.

Conclusions

It is reasonable to expect that the findings of the HSE report will be broadly repeated worldwide and that large enterprises will be advantaged from economies of scale available to them with regard to the cost of HSE compliance. Even though the majority of companies involved in this type of work are multi-nationals, it is still expected that they will generally purchase HSE 'hardware' such as PPE within the individual countries in which they operate, rather than on a global basis. A coarse evaluation of the comparative cost of PPE is given below.

It is also anticipated that another area where individual site size is important is in the area of HSE training and supervisory costs. As was stated in the HSE's analysis, the majority of employers cite this as being the most significant cost associated with compliance. Anecdotal evidence suggests that at most, a single HSE advisor is present on most offshore construction projects, therefore the unit cost should be approximately the same across all enterprises. However, this will represent a higher percentage of total project costs for smaller enterprises, when compared to larger ones. This effect will become even more pronounced if a variety of smaller contractors are used to outsource any or all of the specialised job types studied within this report.

Comparative Costs of PPE provision

Discussion

The undernoted is a comparison of the costs of providing 1 off various representative PPE elements, assuming that such equipment is bought locally in each of the subject regimes. In all cases, prices are shown exclusive of Sales Taxes, in local currency and in the equivalent $CAD (in red), to allow direct comparison of the amounts involved.

	UK		Norway		South Korea (Note 1)		USA		Can
	£	$CAD	NOK	$CAD	WON	$CAD	$US	$CAD	$CAD
High visibility waistcoat	£6.95	$17.02	NOK306	$60.79	WON14,835	$17.02 (Note 2)	$19.50	26.76	$24.08
Safety helmet	£6.00	$14.70	NOK104	$22.66	WON6,480	$7.98	$8.00	10.98	$8.90
Safety spectacle	£2.80	$6.86	NOK37	$7.35	WON12,960	$15.12	$4.90	6.73	$9.92
Rigger boot	£43.88	$107.49	NOK866	$172.04	WON41,040	$47.88	$17.00	23.33	$60.48
Coverall	£24.95	$61.12	NOK507	$100.72	WON92,880	$108.37	$119.00	163.33	$89.00
Ear defenders	£15.40	$37.72	NOK98	$19.46	WON23,760	$27.72	$13.90	19.08	$22.29
Total	**£99.98**	**$244.91**	**NOK1918**	**$383.02**	**WON177120**	**$224.09**	**$182.30**	**$250.21**	**$214.67**

Note 1 – It has not proved possible to obtain local prices for PPE in South Korea. Our contacts in that country advise that there are no manufacturers of such equipment and it is therefore usual to purchase these items from the UK. The prices quoted are the equivalent in Korean WON of the prices charged to a Korean shipyard by a UK supplier

Note 2 – Our contacts advise us that these items are not in general use in South Korea and no price could be obtained. For comparison purposes, the UK price for these items has been used, as it is assumed that were these required, they would also be sourced in the UK.

Conclusions

As can be seen from the above table, there is little variation in the approximate cost of PPE provision amongst the subject regimes, with the exception of Norway, where costs are significantly higher and in Canada, where the sampled items appear to cost somewhat less. However, caution is urged in placing reliance on the results of this survey as it is highly probable that many operators will have negotiated advantageous wholesale or block purchase discounts from their suppliers. Thus, the cost of an individual one-off item as detailed above may be some way in excess of the price paid by companies. It may also be the case that supplies may not be bought from local suppliers, although anecdotal evidence suggests that certainly in Norway and in the UK at least, local suppliers are used.

HSE Compliance as a Percentage of Overall Labour Costs

Assessing the likely costs of HSE compliance is necessarily an inexact science, without access to individual company's detailed project cost breakdowns. However, the following section attempts to

coarsely quantify the likely break-out costs of compliance, based on LR's experienced judgement in this area.

LR provide certification and verification services to a wide variety of clients worldwide, including new offshore construction projects. This work is multi-disciplined and obviously requires to be costed prior to commencement. As a general rule the manhours, and therefore the cost, of certifying or verifying the safety aspects of a project generally fall within the range of between 4% and 8% of the total. The larger the project, the lower the proportion becomes, thus for major construction works, we would expect the safety elements to contribute no more that 4% - 5% of the overall budget. This likely percentage is further borne out in various publications researched as part of this report's preparation which also suggest that HSE costs account for no more than 5% of overall labour costs. Advice from experienced cost and project managers has revealed that for a typical offshore construction project, labour costs account for between 30% and 40% of total project costs. It should also be noted at this point that their view of the likely overall percentage contribution of HSE costs to total project costs was lower than suggested by the other evidence, i.e. at around 1% to 2%. Thus, the overall cost of HSE is dependant on the levels of wages earned by workers in that sector in each of the subject regimes. The following tables shows average earnings in the construction sector for each of the subject regimes, although it should be noted that it was not possible to obtain this information in respect of South Korea. For that country, the national average wage has been used, which is likely to have produced an overestimate when applied to the construction industry.

Country	Average Annual Wage (Construction Sector)	Equivalent Average Annual Earnings ($CAD)	HSE Costs as a percentage of average Construction Sector earnings ($CAD) (assuming 5% of total costs)
Norway	NOK 307,932	61,064	3053
UK	GB £20,421	50,970	2584
United States	US $32,456	44,125	2206
Canada	CAD $37,587	37,587	1879
South Korea	WON 25,382,053	29,514	1476

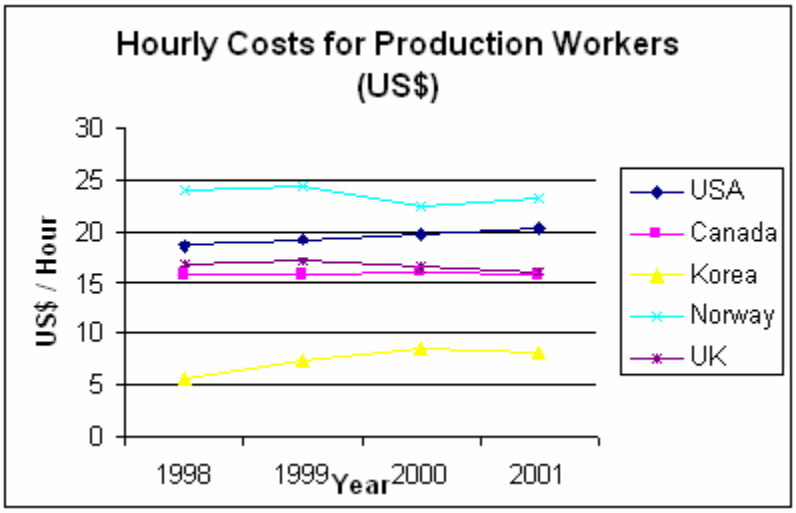
The cost of compliance can be broadly estimated by the proportion of time that an employer has to spend training the average employee in safe working practices. Additionally, the employer must provide supervisory and management personnel with further safety training to enable them to monitor compliance. Since time is money, perhaps one of the best and most readily available ways to compare the cost of HSE compliance is to compare the cost of labour.

The quote below is taken from a news article intended to highlight the plight of Korean workers but it also perhaps indicates one of the main reasons why Korea has an edge in the market when it comes to winning work.

“Repression has kept the cost of labour low for Korean industry. Although wages have been rising in all the "Asian tiger" countries, partly because of growing labour militancy, the salary of a Korean industrial worker is still far below that of someone doing the same job in the U.S., Europe, or Japan. The average cost of an hour’s labour, including wages and benefits, in Korea was $5.53 in 1993. In the U.S. it was $16.73. In Britain it was $12.76. Korean workers paid for their country’s enormous industrial growth with a low standard of living” ….. ***News Article, March 1997***.

The chart below indicates the relative cost of labour in the five countries which are part of this study. If we assume that all countries provide the same level of safety training then we conclude the following;

- The UK and Canada would incur the same training costs
- Norway would incur the most cost (nearly 4 times higher than South Korea)
- South Korea could easily bear the cost of training and remain competitive



SOURCE: U.S. BUREAU OF LABOR STATISTICS, August 2003

11.2 Social Costs

Compensation / Cost to Employers Following Injury at Work

It is not possible within the scope of this report to provide a detailed analysis of the cost of injury / illness amongst the workforce in each of the subject regimes. Matters such as the differences in the types of compensation arrangements in force, accident / illness definition, collation of appropriate statistics, etc, etc, make arriving at a set of comparable data extremely difficult. However a recently published UK HSE report[5] did attempt to identify the types of schemes in existence in a variety of countries, including UK, Canada and the USA and to draw comparisons between the costs and effectiveness of each of the regimes. As the report acknowledges, the main difficulty in directing comparing the cost of schemes in the UK with elsewhere is due to the more complex way in which illness and injury is compensated in that area. The UK currently operates a two-track approach to occupational injury and disease insurance. On the one hand, there is "no fault" access to limited state benefits and, on the other hand, litigation based access to damages under Employers' Liability insurance. Indeed, it is pertinent to note that the cost of Industrial Injuries Disablement Benefit at £728m in 1998/99 is close to the cost of employers' liability at £872m in 2000. The combined total of these two elements, i.e. circa £1.5 billion, is close to the British Confederation of British Industry's estimation for the same period.

The following is a précised summary of the findings given in the report:-

- UK arrangements were designed to ensure employers have funds to meet costs arising from employees' litigation for compensation, and were not designed to motivate health and safety or rehabilitation;
- Schemes in other countries, including the USA and Canada explicitly aim to provide a financial motivation for employers to reduce the number and severity of injuries and cases of ill-health – particularly by the use of experience rating and ensuring all (recognised) costs are funded by a single benefits scheme;
- The USA and Canadian schemes aim to reduce the uncertainty about compensation costs and the level of legal costs by operating a "no fault" scheme with capped benefit levels;
- The Canadian scheme has been designed to increase the level of health and safety advice available to SMEs as an integral part of insurer activity;
- Most schemes outside of the UK, including those in Canada and the USA aim to cover all work related injuries, often including road traffic accidents, and hence place a different boundary on "work".

[5] Source: Changing business behaviour - would bearing the true cost of poor health and safety performance make a difference? Contract Research Report 436/2002, Greenstreet Berman Ltd, for the Health and Safety Executive

- The cost of employers' liability in the UK cannot be compared with the cost of overseas schemes, as the cost of injury and ill-health in the UK is spread across a number of state benefits and insurance schemes whilst overseas insurance schemes are more integrated;
- Workers' compensation is conceived as a form of insurance that covers the costs and lost earnings caused by injury – in the same way that other (non-occupational) insurances aim to cover the consequences of (say) ill-health from natural causes.
- The cost of workers' compensation outside of the UK was found to be in the range of 1.5% to 3% of payroll, depending on which country is under consideration. The cost of employers' liability is approximately 0.23% of the total salary bill in the UK. The report further identified current estimates of the costs of ill health and injury in the UK. After excluding non-injury costs, such as equipment damage, the costs of injury and ill-health were found to be in the UK are about:

    - 1% of payroll if only tangible costs are included, i.e. excluding pain and suffering,
    - 2.5% of payroll if pain and suffering are included.

Thus the principal conclusion of the report was that the cost of workers' compensation in the other countries surveyed was comparable to the actual cost of work related ill-health and injury in the UK.

Unfortunately, the above report did not include Norway and South Korea within the list of countries surveyed (although it should be noted that the principal conclusion given immediately above was found to apply to a further range of countries, including Continental Europe (principally Germany) and Australia). For completeness, the following sections give a brief summary of the systems and likely costs associated with South Korea and Norway, but further research would be required to draw specific conclusions with regard to these regimes and those in the USA, Canada and the UK.

South Korea

Due to the unavailability of the Korean Ministry of Labor website, it has not been possible to obtain detailed information on the arrangements which are in place to compensate workers following injury / illness at work. It is almost certain that even if access to this website could be obtained, there would be very little, if any, precise information given as to the costs of providing worker compensation. However, it would appear from what limited information is available, that a government-run workers' compensation insurance scheme is administered, but it has not been possible to discover the nature and scope of the scheme. From the following anecdotal evidence, it would appear that the scheme may be less than comprehensive:-

"In big industries the situation is changing a bit - because of the unions - but without unions there is no protection. You only get 70% of the basic wage, which is less than half of the normal salary, for accidents and then only if the company doesn't wriggle out of it, cover it up. But if someone is off work ill they get either very little or nothing, depending on the size of the firm. They have to pay a large part of their treatment, even if they are covered by insurance. In small firms, there is no cover. I was called in to inspect the incidence of occupational disease in a large shipyard. The year before - the worst year - medical reports showed 20 victims. The very next year, when I was invited to check if the medical exam was done correctly or not, they reported 220. And then I added 65 more after reviewing the documents. They were nearly all pneumoconiosis and hearing loss problems. I think this year we can go even further - on organic solvent poisoning."….***Dr Yang Kil-seung***, Korean Medical Practitioner [6]

Norway

There is little doubt that the cost of injury and illness in the Norwegian workforce is extremely burdensome. The 2004 Economic Survey from Norway[7] reports as follows:-

"Measures to reduce the recourse to sick leave need to be taken. A 2001 agreement (without financial incentives) between the unions, employers and the government to cut the amount of sick leave by 20 per cent from mid-2001 to the end of 2005 will be difficult to fulfil as sick leave has already risen by more than 10 per cent since then. Hence, the authorities should explore other mechanisms to reduce absence rates, notably through a tightening of the sickness benefits or of their eligibility criteria. Also, enhanced monitoring of the working capabilities of beneficiaries should be further strengthened by the National Insurance Authority. Despite above-average life expectancy, Norway has a higher share and a higher inflow of people on disability pensions than most other OECD countries, and so far, few of these eventually re-enter the work force. There is also a substantial flow out of long-term sickleave into disability

[6] Source: Socialistworld website at http://www.socialistworld.net/publications/southkorea/index2.html?/publications/southkorea/sk11.html

[7] Source: Economic Survey of Norway 2004 at website: http://www.dep.no/filarkiv/203076/policy-brief-norway-04.pdf

schemes. As a result, 10 per cent of the working population and a third of those over 55 are now on disability pensions. The corresponding expenditures put severe pressure on public finances: about 5 per cent of GDP per year is now being spent on disability, rehabilitation and sickness benefits. This disquieting development can partially be explained by Norway's high participation rate, which means that people more prone to fall sick or into disability nevertheless join the work force. Still, it is plausible that important causes are the overall generosity of the benefit system and inadequate monitoring. To reduce the inflow into permanent disability, a temporary disability benefit is now granted (for a period of between one to four years) when future work-capacity of the individual in question is uncertain; permanent disability pension will only be granted when the individual has no work-capacity. However, further efforts should be made to reduce attractiveness of the schemes and to counter abuses facilitated by complaisant doctors and weak controls. Moreover, independent audits of disability claims should be instituted."

As is stated above, 5% of Norwegian GDP goes towards funding sickness and disability payments. At 2003 levels, this equates to approximately US$10.5 billion, i.e. over five times the equivalent in GBP paid in the UK. This does not include the cost to employers from lost productivity. Some of the reasons for this become clear within another report into absenteeism at work[8]. This report contains a league table of benefit paid in 16 European countries, which reveals that the level of benefits on offer in Norway are amongst the highest anywhere in Europe. In Norway, benefit is paid at 100% of earnings, with no waiting period and continues without reduction for a maximum period of one year. Only Luxembourg and Denmark also provide comparable levels of benefit. By contrast, the UK offers only fixed statutory sick pay at a level of £66.15 per week (less than a seventh of the average wage), for a maximum of 28 weeks. This report also detailed levels of absenteeism throughout Europe and confirms that in Norway average annual sick days per worker crept up from 18 in 2000 to an annualised 20 through the first half of 2002. This is twice the rate in the UK and almost four times that of the USA. In Canada, rates run at circa 8.5 days per year.

Effect of Right of Refusal on Productivity

There is a further potential cost burden on employers associated with the right in some regimes of workers to stop work if they believe that safety has been compromised. This right is only enshrined in legislation in Canada, Norway and the USA and to a lesser extent in South Korea, although it should be noted that certainly in the UK at least, most responsible companies include this right within their own safety policies. Unfortunately, it has not been possible to gauge the relative cost of the right of refusal as no statistics are available in the public domain to indicate how many, and the length of any stoppages which have occurred in each area. Anecdotal evidence suggests that stoppages are, and remain, fairly

[8] Preventing absenteeism in the workplace, European Foundation for the improvement of Living and Working Conditions – 1997 at website http://www.eurofound.ie/publications/files/EF9715EN.pdf

common in Norway and Canada, primarily due to the strong union presence in yards in these countries. It is believed that stoppages are less common in the USA, much less common in the UK and almost unheard of in South Korea.

12 Government and Other Third Party Influence

12.1 Introduction

Another potential area where certain countries may be advantaged when tendering for offshore construction contracts is in the degree to which their efforts in this regard are supported by their governments, either openly or covertly. The following sub-sections investigate the extent to which government involvement is prevalent in each of the subject regimes.

12.2 Norway

Discussion

It is a long held perception in many other countries active in this sector that the Norwegian government actively subsidizes firms in that country to provide a competitive edge during tendering. Although Norwegian voters rejected European Union (EU) membership in 1994, Norway retains membership in the European Economic Area (EEA) which consists of the EU member countries together with Norway, Iceland, and Liechtenstein. As an EEA member, Norway has assumed most of the rights and obligations of the EU single market. In the offshore petroleum sector, Norwegian authorities encourage the use of Norwegian goods and services. However, it is also the case that Norway has been successful in winning contracts for overseas jacket construction, for example, both the Encana Buzzard and BP Clair jackets are currently under construction there, and suspicion is prevalent, particularly within other EU countries, that the Norwegian yards who tendered successfully for these contracts have been subsidized in some form or another by the government. However, an exhaustive search of available data provides only limited evidence of such support.

A World Trade Organisation Report[9] concluded that petroleum activities (including associated construction works) are largely open to foreign companies, although state ownership in the sector remains significant. Policies towards state participation in the sector are being reconsidered, including the partial privatization of the national oil company. Norway is also in the process of aligning its legislation in the petroleum and natural gas sector with EU regulations. The report further states that Norway has a relatively diversified manufacturing sector, with many activities linked to the petroleum sector, shipbuilding and metal processing and that support to manufacturing enterprises is generally low. Such support as is given benefits mainly small and medium enterprises and is not industry-specific, with the exception of shipbuilding where aid must comply with EU rules.

[9] Source: World Trade Organisation - *Trade Policy Review – Norway.* Doc No WT/TPR/G/70, Published 2002 Report by the Secretariat

It must also be noted that the cost of labour in Norway is extremely high – the highest of all developed nations[10]. However, it is also the case that the Norwegian offshore construction workforce are highly skilled and experienced and it is therefore expected that they may be able to make significant gains in terms of productivity and schedule delivery. This has an additional knock-on effect on borrowing requirements, in that the companies involved will pay significantly less in interest payments if a shortened project schedule is achieved.

Conclusion

It would appear that there exists the potential for the Norwegian government to offer some form of assistance to SME's in the offshore construction industry, but no evidence that they have done so, particularly with regard to the country's recent successes with the Clair and Buzzard projects. A Press release issued at the time of the award of the BP Clair contract made no mention of government involvement. Speaking about the award from BP, Sverre Skogen, CEO of Aker Kvaerner said: 'This award demonstrates that our long experience and specialisation in jacket construction has paid off and suggests that our yards can be competitive in the international market.' This would appear to suggest that the award was made on competitive merit rather than as a result of government intervention. That is not to say that the government were not involved in encouraging BP and Encana to build in Norway, but it does not appear as if there was any direct subsidies involved.

With regard to the domestic market, it is considered that there is virtually no prospect of overseas competitors obtaining significant major construction work at the expense of local Norwegian companies. From LR's own experience, the Norwegian market in many areas related to the petroleum industry is heavily biased towards the use of local companies and the influence of the almost entirely state owned exploration companies Statoil and Hydro, coupled with the classification society Det Norske Veritas (DnV) is paramount.

12.3 UK

Discussion

Membership of the EU is the key factor limiting the extent to which the UK government can seek to subsidize offshore construction in this country. A UK company based in Nigg Bay, Scotland were amongst the unsuccessful bidders for the BP Clair jacket, although a large proportion of the topsides module construction work went to AMEC, in Wallsend, Tyne and Wear, England. The Minister for

[10] Source: HOLD

Energy, Brian Wilson said at the time that he "……welcomed the decision by BP……as a huge boost for employment in the North East, which shows that competitively priced bids from UK fabricators will succeed".

Once again, suspicions regarding Norwegian subsidies were voiced, with the Minister promising "a detailed study to try, once and for all, to get to the bottom of these charges. The preliminary findings do not bear them out but, when the work is completed, I intend to publish these findings.", whilst acknowledging that, "the unfortunate reality is that Nigg was not among the frontrunners for the jacket contract."

Failure to win the above contract means that the facilities at Nigg Bay and a second jacket construction yard in Scotland remain mothballed, as far as offshore construction work, although it should be noted that some work is ongoing at one of these sites to construct offshore wind turbines, a likely future growth area as interest in sustainable energy resources increases. It is generally acknowledged that the UK is no longer competitive in the jacket fabrication sector of offshore construction. However, the AMEC yard at Wallsend has enjoyed reasonable, if erratic, success in attracting contracts for topsides fitting out and tanker conversions.

Wallsend is located in a deprived area of the North East of England and as such obtains subsidies from the EU in a variety of areas. However, none of these are directly paid to companies in the construction industry (or indeed in any other sector) – this type of direct support is forbidden under EU regulation - and it must therefore be assumed that any successful tender on the part of AMEC has been achieved by wholly commercial considerations.

Conclusions

The UK government does not provide direct subsidies to support the offshore construction sector and it is therefore the case that work won by AMEC and other yards in the Tyne and Wear area is obtained on a straightforward commercial basis.

12.4 South Korea

Discussion

The position with regard to potential government influence is entirely different in South Korea, when compared to western regimes. South Korea operates what is known as a chaebol economy, an historical system which can be traced back to Japanese colonial rule in the 1920's and 1930's. The major features of chaebol to be noted are:

- They are conglomerates of many companies clustered around one holding company. The parent company is usually controlled by one family.

- There are four ‘superchaebol’ which between them employ over half a million South Koreans and control the jobs of millions more.
- Of the four ‘superchaebol’, three are amongst the market leaders in the South Korean offshore construction industry, namely Hyundai, Samsung and Daewoo.

The crisis in the Asian tiger economies during the late 1990’s precipitated government attempts to reform the chaebol, but with only patchy success, due in no small measure to the endemic corruption which exists amongst elected representatives and public officials, where the giving and receiving of bribes is a business norm. Government and chaebol organisations are interconnected and mutually supportive. The Korean government is known to own (or is a shareholder in) companies in many sectors, including heavy industry, of which offshore construction is a part, and has also in the past bailed out big enterprises in crisis.

Conclusions

Although there is no doubt whatsoever that business is booming in the Korean ship and offshore construction industries in terms of orders, the companies who operate in this arena are generally extremely poor financial performers. Many would be virtually bankrupt, were they not supported by other more profitable divisions of the same chaebol via an illegal but still common system of cross-unit financing, very significant government subsidy and government directed loans at preferential rates, and a protectionist ethic which strives to prevent the opening up of domestic markets to foreign competition.

There is also absolutely no doubt that the very considerable power wielded by the major chaebols is a very significant factor in driving down costs and keeping wages at a low level, particularly further down the chain, e.g. amongst suppliers of materials and labour to the chaebols. In practice, many smaller companies have no choice whatsover as to the markets they supply – they will be wholly indentured to one or more of the major chaebols and will thus have no opportunity to seek out potentially more lucrative outlets for their services.

Overall, it is concluded that the offshore construction industry in South Korea is subsidized to a significant degree by the government and that the lack of public accountability and oligarchic nature of the chaebol organisations, coupled with the restrictions on foreign investment serve to greatly enhance the likelihood of Korean offshore construction companies successfully tendering for work.

12.5 USA

Discussion

As might be expected in a free-market capitalist economy such as the USA, companies engaged in offshore construction work in the USA are privately owned and do not receive subsidies from the US government. It must therefore be assumed that tenders by companies operating in this arena are bid and won on a commercial basis. That is not to say that operators in this sector are profitable – the offshore

construction sectors of both J Ray McDermott and KBR, for example, have been running at substantial operating losses over recent years. It is also important to note that one area where the US government has recently been influential is in the imposition of tariffs on imported steel. The primary purpose of this measure was to provide aid to the beleaguered 'Big Steel' companies in the US, however it is likely to have had an adverse effect on the competitiveness of US offshore construction companies, who would have been forced to either pay the increased tariffs to the companies from whom they import or to source presumably more expensive steel from US producers.

Conclusions

As can be seen from the above, the US government is not above imposing protectionist measures to support its indigenous industries where it deems these to be necessary, however there is no evidence that the offshore construction sector is an area likely to be targeted for such support in the foreseeable future.

12.6 GATT and NAFTA

GATT has an appended Agreement on Technical Barriers to Trade in which it was agreed under the heading *Technical Regulations and Standards,* Article 2 that members shall ensure that technical regulations are not prepared, adopted or applied with a view to or with the effect of creating obstacles to trade. There are however, legitimate objectives which would permit what may appear to be restrictive standards. These legitimate objectives include national security requirements, prevention of deceptive practices, **protection of human health or safety,** animal or plant life or health, or **the environment**. It can therefore be concluded that higher occupational safety and health standards, due to demands of society within the member state, would not be a violation of GATT. It can also be concluded that the provisions of this Article are meant to encourage members to harmonize technical regulations, and not necessarily to the lowest common denominator. This is particularly evident in the areas of protection of human health and safety where special procedures exist to permit rapid adoption of standards if required.

NAFTA has nearly identical provisions to the above within Articles 904 to 908.

Based upon review of these agreements, it can also be concluded that differing standards should not be the basis for protective measures, as those activities related to occupational health and safety are within the jurisdiction of the member state in which the activity takes place and not of the member state which may be the recipient or consumer of the product.

Appendix I – Detailed Legislative Requirements

Overview

The following sections of this report contain a review of the types of legislative (i.e. government initiated HSE requirements) in each of the subject regimes. As discussed in Section 2 above, it is not possible to conduct an in-depth review of each and every requirement, thus the review has focussed on the following key areas:-

-Details of the government body or bodies responsible for HSE within their jurisdictions

-An overview of the framework under which legislation is enacted and a review of the generic HSE legislation in each area

-A review of any additional legislation specific to the job types listed in Section 1 above

Thereafter, using the Canadian legislative requirements as a base case, a gap analysis has been carried out between their content and those of the other subject regime. Comparison Matrices have been constructed for each country (see Section 9), highlighting areas where Canadian requirements were found to either not exist in other areas, or where compliance was less exacting than that required in Canada.

Canada

Responsibility

The federal government agency which serves to discourage and prevent all Canadian work-related illnesses and injuries is the Canadian Centre for Occupational Heath and Safety (CCOHS)[11]. This federal departmental corporation was established in 1978 and reports to the Parliament of Canada through the federal Minister of Labour.

The CCOHS Mission:

"To be the Canadian Centre of Excellence for work –related injury and illness prevention initiatives and occupational health and safety information,

To promote health and safety in the workplace in Canada to:

- ***Facilitate***

  Consultation and cooperation among federal, provincial and territorial jurisdictions

  Participation by labour and management

[11] Source: Canadian Centre for Occupational Health and Safety (CCOHS) (www.ccohs.ca)

- ***Assist in the development and maintenance of policies and programs***
- ***Serve as a national centre for information relating to occupational health and safety"***

Legislative Framework and Generic HSE Legislation

Responsibility for Occupational Health and Safety in Canada exists at two levels, namely federal and provincial. At federal level, the Canada Labour Code (R.S 1985, c. L-2) applies. Part II of this code introduces the regulations and legislation put in place for Occupational Health and Safety in Canada. However, application of this Code is strictly limited to well defined industry types, essentially inter-provincial or international operations, such as banks, railways, shipping etc. The offshore construction industry is not included within the operation of the Code (in common with approximately 90% of industry in Canada) and it is thus not necessary to investigate its requirements further in this report. In industries where the Code does not apply, Occupational Health and Safety is dealt with by provincial legislation on this topic. The majority of offshore construction work in Canada is carried out in Newfoundland and Nova Scotia provinces and the Occupational Health and Safety arrangements in the latter have been selected for detailed comparison against requirements in the other subject jurisdictions.

Provincial Occupational Health and Safety in Nova Scotia

The Occupational Health and Safety Act (S.N.S 1996, c.7) pertains to general safety, health and conditions of work for the Canadian province of Nova Scotia. The Act states general provisions, while relevant topics covered by the accompanying Occupational Safety General Regulations include Personal Protective Equipment; Ventilation, Handling and Storage of Material, Hoists and Mobile Equipment, and Welding and Cutting. The general provisions and detailed regulatory requirements are given in the Comparison Matrix in Section 9 and have been reviewed individually against requirements in the other subject jurisdictions. The regulations considered to most affect the job types studied are as detailed in the next subsection

Job Specific Legislative Requirements

Personal Protective Equipment

The use of personal protective equipment generally applies to many of the subject areas in question, including welding, sandblasting and painting. The Act states that:-

"Where personal protective equipment or devices are required…an employer shall ensure that

(a) an employee receives adequate training in proper use and care of the personal protective devices; and

(b) employee wears or uses the personal protective equipment or devices in accordance with the instruction and training provided."

When considering hazards to eyes, face or neck a regulation is given stating that "Where a person is exposed to a hazard that may irritate or injure the eyes, face, or front of the neck, an employer shall

ensure that protective equipment is worn that is appropriate to the hazard and complies with CSA[12] standard…"

Another regulation stating; "Where a person is exposed to a respiratory hazard that may cause injury or disease, an employer shall provide and ensure the use of adequate respiratory protective equipment that is appropriate to the hazard", is give in respect to respiratory hazards.

Ventilation

It is stated that an employer shall:

"…provide for a supply of fresh air into, and removal of air from, a workplace or part thereof that is, so far is reasonably practicable, sufficient to keep air reasonably pure, and render harmless all gases and vapours, dust or other impurities that are likely to endanger the health or safety of any person therein;"

The employer is also responsible for ensuring that:

"…where a process is carried out that produces a gas, vapour, dust or other impurity that is likely to be inhaled to an injurious extent by a person in the workplace, provide and use such mechanical means as are capable of preventing such inhalation so far as is reasonably practicable,
effectively carrying off and disposing of the impurity, and preventing the recirculation and re-entry into the workplace of air containing the impurity…"

Another regulation pertaining to the ventilation in the workplace states that an employer shall:

"ensure that all ventilation systems used for controlling the dissemination of gases, vapours, dust or other impurities, including their collection systems and emptying processes, are designed, installed, operated, maintained and repaired in an adequate manner by a competent person."

Handling and Storage of Material

This section of the Regulations touches on the subject of lifting and states:

"Where the lifting or moving of a thing or person may be a hazard to the health or safety of a person at the workplace, an employer shall ensure that adequate and appropriate equipment for the lifting and moving is provided; and training and instruction as to the appropriate method of performing the lifting and moving is provided in accordance with the equipment manufacturer's instructions, or, work methods and lifting and moving techniques."

Hoists and Mobile Equipment

As the title of this section of the Regulations suggests, it states many regulations concerning the act of lifting and rigging in the workplace.

[12] Ref: Canadian Standards Association (CSA) (www.csa.ca)

General Provisions and duties expected of the employer include:
“An employer shall ensure that a hoist , industrial lift truck or powered mobile equipment is erected, installed, assembled, started, operated, used handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, maintained repaired, modified and dismantled in accordance with the manufacturer’s specifications, or the specifications certified by an engineer.”
“An employer shall ensure that a hoist, industrial lift truck or powered mobile equipment is operated by a designated competent person; has gears and moving parts securely guarded by adequate means where necessary to prevent a hazard to a person in the workplace; and has a load on it adequately secured where necessary to prevent a hazard to a person I the workplace; and is provided with safe means of access and exit from the operator’s position and any passenger’s position.”

Evidently the operation of hoists and lifting equipment involve various safety equipment and precautions to be considered. The Act states the following concerning this area:
“An employer shall ensure that a mobile crane, industrial lift truck or powered mobile equipment is equipped with an audible back-up alarm…; a manually operated horn, unless such a horn was not installed at the time of manufacture; adequate front and rear lights when equipment is used after dark or in dimly lit areas; an adequate braking system; and a screen, shield, grill, deflector, guard or other adequate protection of the operator, where the operator may be exposed to the hazard of flying or intruding objects.”
“An employer shall ensure that a hoist or powered mobile equipment that is equipped with outriggers or stabilizers is operated with the outriggers or stabilizers engaged, unless the manufacturer’s specifications permit otherwise.”
“An employer shall ensure that a hoist, industrial lift truck or powered mobile equipment is not altered in such a way as the render ineffective a safety device or control, except where the change has been certified in writing by the manufacturer or an engineer to afford protection equal to or greater than the protection afforded by the original safety device or control.”
“An employer shall take adequate precautions to ensure that a hoist, industrial lift truck or powered mobile equipment does not tip or roll over.”

Operation precautions such as the following have also been considered:
“An employer shall ensure that a hoist, industrial lift truck or powered mobile equipment that has ropes, drums and sheaves is inspected…”
“An employer shall ensure that, where a person works under a hoist, industrial lift truck or powered mobile equipment that is raised from the ground, the equipment is provided with blocking or other adequate means of support in case the means of lifting fails.”

Rigging Hardware in this section of the Act is defined as “a chain, cable, webbing, bucket, grapple, hook, ring, sling or other device used to attach a load to a hoist.” Under the subject of rigging hardware the following regulations have been stated in this Act:
“…an employer shall ensure that rigging hardware is constructed, installed, operated, inspected, and maintained in accordance with the applicable ASME [American Society of Mechanical Engineers] standard listed…”
“...an employer shall insure that a person inspecting the rigging hardware before each use to ensure that no defect exists that may affect its structural integrity.”
“…an employer shall ensure that a person inspects the rigging hardware before it is put into initial service or after one month or more of disuse; and once during every year that it is in operation.”
“Where the competent person conducting an inspection… identifies a defect that may affect the structural integrity of the rigging hardware, an employer shall ensure that the rigging hardware is removed from service until; such time as it is repaired.”
“An employer shall identify safe lifting capacity of rigging hardware on the device in a permanent and clearly legible manner.”
“An employer shall ensure that a person using the rigging hardware received adequate training and other information sufficient to ensure that they are knowledgeable about the capacity of the rigging hardware.”
“Before a load is raised by a hoist, an employer shall ensure that a competent person ensures that the load is secure to the hoist in an adequate manner by means of appropriate rigging hardware.”

Tools

This section of the Regulations covers the requirements in respect of a variety of tools and equipment provided at the workplace. Amongst the general duties in this regard, an employer is required to:-

“ensure that a tool, its accessories and supplies are

- made of good quality material adequate for the work for which they are intended to be used;
- inspected before being used, and, if not in an adequate condition, repaired or replaced before use;
- used only for their intended purpose;
- equipped with a device to ensure a secure hand grip where necessary; and
- installed, assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired and dismantled in accordance with the manufacturer's specifications, or, where there are no manufacturer’s specifications, in accordance with adequate work procedures developed by a competent person……”

The section then goes on to define a series of specific requirements in respect of portable power and powder actuated tools. In respect of the former, these requirements include ensuring that such tools:-

- …"are repaired by a designated competent person;
- where powered by electricity, is double insulated or grounded, except where battery operated;
- where lines or hoses are connected to the tool, has a shut-off mechanism installed on the tool so as to be immediately accessible to the operator; and
- is an explosion-proof device where there is a risk of an explosive atmosphere."

This section defines powder-actuated tools as a tool that, by means of a powder- generated explosive force, propels or discharges a fastening device for the purpose of impinging it on, affixing it to or causing it to penetrate another object or material.

In respect of such tools and employer is required to:-

…"ensure that a powder-actuated tool is operated by a competent person in accordance with Sections 1 to 9 of ANSI[13] standard A10.3-1995, "American National Standard for Construction and Demolition Operations - Powder-Actuated Fastening Systems - Safety Requirements". "

and that:-

… the fastener and the powder load complies with the requirements of ANSI standard A10.3-1995, "American National Standard for Construction and Demolition Operations - Powder-Actuated Fastening Systems - Safety Requirements". "

Welding, Cutting Burning and Soldering

The Regulations define Welding or Allied Process as "any specific type of electric or oxy fuel gas welding or cutting process." These types include arc welding, brazing, solid-state welding, soldering, resistance welding, and other welding methods. The Act states the following applies to the welding process in the workplace:
"An employer shall ensure that welding or allied process equipment is erected, installed, assembled, started, operated, used, handled, stored, stopped, inspected, serviced, tested, cleaned, adjusted, carried, maintained, repaired, and dismantled in accordance with the manufacturer's specifications."
"An employer shall ensure that, before a welding or allied process is commenced, the person who is to operate the equipment has inspected the area surrounding the operation to ensure that adequate

[13] Ref: American National Standards Institute (ANSI) (www.ansi.org)

precautions have been taken to remove from the area all hazardous material or processes that produce combustible, flammable or explosive material, dust, gas or vapour; and to prevent fire or explosion."
"Where welding or allied process is performed above an area where a person may be present, an employer shall ensure that adequate means of protection are taken to protect a person below the operation from sparks, debris and other falling hazards."
"An employer shall ensure that no person performs a welding or allied process on a container, pipe, vale or fitting that holds or may have held an explosive, flammable or otherwise hazardous substance; or may become pressurized to the point of being a hazard to a person at the workplace, unless the welding or allied process is performed in accordance with written work procedure adopted by the employer."
"Where welding or allied process is performed on a natural gas pipeline or a liquids pipeline associated with a natural gas pipeline, an employer shall ensure that an engineer certifies that the written work procedure…is in Accordance with American Petroleum Institute standard…"
"Where a gas welding or allied process is carried on, the employer shall provide a flashback arrestor between the torch and the fuel gas and oxygen supply that prevents the reverse flow of fuel, gas, oxygen or air from the torch to the supply lines, and stops flame from burning back from a torch into the supply lines; ensure that hose lines or pipelines for conveying the gases to the burner and the couplings are legibly marked or identified to ensure the hoses are not interchanged; and ensure that the torch is ignited by a lighting device that is designed for that purpose."

South Korea

Responsibility

The government body responsible for occupational health and safety in South Korea is KOSHA – Korea Occupational Safety and Health[14] , established under the authority of the Korea Occupational Safety & Health Agency Act(Law No. 3931) promulgated on May 30, 1987. This body states it purpose as:
"To contribute to the development of national economy through providing a safe and comfortable working environment for workers and promoting employers to actively conduct accident prevention activities, by implementing various industrial accident prevention activities."

Legislative Framework and Generic HSE Legislation

The principal legislative instruments governing occupational health and safety in South Korea is the Industrial Safety and Health Act 1990 (as amended). This act addresses health and safety issues under the following principal headings:-

Chapter I General Provisions
Chapter II Safety and Health Management System
Chapter III Safety and Health Control Rules
Chapter IV Measures for Preventing Harm and Hazard

[14] Ref: Korean Occupational Safety and Health Administration (KOSHA) (www.kosha.or.kr)

Chapter V	Health Management of Employees
Chapter VI	Supervision and Order
Chapter VII	Industrial Action Prevention Fund
Chapter VIII	Supplementary Provisions
Chapter IX	Penal Provisions

Within the definitions given in Chapter I of the Act, the term ""industrial accidents" is stated to mean that "…an employee dies from or gets injury or ill by construction, equipment, raw materials, gas, vapor, powder, dust, etc., or work and other operation, which are related to his work…" . It is thus clear that the provisions of this legislation extend to the offshore construction industry and the contents thereof have therefore been carried forward for comparison against the requirements of the Canadian legislation which covers these aspects. Refer to the Comparison Matrix in Section 9 for detailed information in this regard.

Job Specific Legislative Requirements

The Act above is supported by a somewhat limited variety of Korean National Standards[15] relating to Health and Safety. Where appropriate, these have been identified and are included in the Comparison Matrix in Section 9 below, however it should be noted that research carried out during the compilation of this report has revealed that in addition to KOSHA described above, the Ministry of Labor also plays an important role in legislating in this arena. However, it has not been possible to access that Ministry's website, or to obtain detailed information on its involvement from other sources, in the time available for the execution of this report. Hence, it should be borne in mind that there may be additional legislative requirements or particular national Codes and Standards, falling under the jurisdiction of the Ministry of Labor which it has not been possible to review during this study.

United Kingdom

Responsibility

The UK Health and Safety Commission (HSC) and the Health and Safety Executive (HSE) [6] are responsible for the regulation of almost all the risks to health and safety arising from work activity in Britain and their mission is stated to be:-

"To protect people's health and safety by ensuring risks in the changing workplace are properly controlled."

[15] Ref: Korean national standards (http://web.idrc.ca/en/ev-36308-201-1-DO_TOPIC.html)

Legislative Framework and Generic HSE Legislation

Health and Safety legislation in the UK is enacted as statute law, which consists of so-called 'enabling' Acts of Parliament, together with a large number of Statutory Instruments (SIs), often referred to as 'subordinate' or 'delegated' legislation. The principal 'enabling' Act in respect of Health and Safety is the Health and Safety at Work, etc 1974, (HASWA) under which has been enacted a great number of SIs which further extend and refine the provisions of the main Act. The HASWA lays down the principal duties and obligations of both employers and employees (similar to the 'general provisions' contained in the Canadian Act). Subsequent SIs cover a wide variety of topics – the following are considered to be particularly relevant to the scope of this report.

Personal Protective Equipment at Work Regulations 1992
Until the introduction of these regulations, there existed very little guidance or indeed legislation covering this matter, other than a duty to *provide* such equipment, under a range of discrete legislation, for example the Protection of Eyes Regulations of 1974. The regulations have the following principal aims:-

- so that they fully implement the EC directives on this topic, where they apply
- cover all aspects of the provision, maintenance and use of PPE at work and in other circumstances
- revoke and replace almost all pre-HASWA and some post HASWA legislation dealing with PPE.

Regulation 4 requires that employers *shall* ensure that *suitable* PPE is provided to their employees who may be exposed to a risk to their health and safety while at work.
Regulation 6 requires that an assessment of PPE is carried out prior to its adoption, to confirm that it is suitable, within the terms of the regulations.

The assessment shall include:-

- an assessment of any risk or risks that have not been avoided by other means;
- the definition of the characteristics that the PPE must have in order to be effective against the risks identified in the assessment, taking into account any risks that the equipment itself may create;
- a comparison of the characteristics of the PPE available with the characteristics referred to defined above.

Regulation 10 states that the employer shall take *all reasonable steps* to ensure that any PPE provided is properly used – this is less than an 'absolute' duty, i.e. it introduces the concept of reasonable practicability, however the employee has an absolute duty to use any PPE thus provided, in accordance with any training received in its use and any instructions given to them in this regard.

Workplace (Health Safety and Welfare) Regulations 1992

These regulations cover a wide range of workplace aspects including heating, lighting and ventilation. Regulation 6 – Ventilation. Effective and suitable provision shall be made to ensure that every enclosed workplace is ventilated by a sufficient quantity of fresh or purified air. Any plant used in order to comply with this requirement shall include an effective device to give visible or audible warning of any failure of the plant, where necessary, for reasons of health and safety.

Regulation 5 relates to maintenance of workplace equipment, specifically mechanical ventilation systems and states they shall be maintained in 'an efficient state, in efficient working order and in good repair'.

Manual Handling Operations Regulations 1992

These regulations supplement the general duties placed on employers and others by the Health and Safety at Work Act and the Management of Health and Safety at Work Regulations, 1992.

Regulation 4 requires that each employer shall:

- so far as reasonably practicable avoid the need for their employees to undertake any manual handling operations that involve a risk of injury.
- Where it is not reasonably practicable to avoid the employer shall:
  - make suitable and sufficient assessment of all manual handling operations to be undertaken (the manual handling assessment should include the following considerations: the task, the load, the working environment and the individual capability)
  - take appropriate steps to reduce the risk of injury to the lowest level reasonably practicable
  - take appropriate steps to provide employees with general indications (or precise information) on the weight and centre of gravity of each load.

The regulations also require that each employee shall make full and proper use of any system of work provided by their employer to reduce the risk of injury.

The Lifting Operations and Lifting Equipment Regulations 1998

The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER) came into force on 5 December 1998. In the main, LOLER replaced existing legal requirements relating to the use of lifting equipment, for example the Construction (Lifting Operations) Regulations 1961, the Docks Regulations 1988 and the Lifting Plant and Equipment (Records of Test and Examination etc) Regulations 1992.

Generally, the Regulations require that lifting equipment provided for use at work is:

- Strong and stable enough for the particular use and marked to indicate safe working loads;
- Positioned and installed to minimise any risks;
- Used safely, i.e. the work is planned, organised and performed by competent people; and
- Subject to ongoing thorough examination and,
- Where appropriate, inspection by competent people.

Provision and Use of Work Equipment Regulations 1992

These comprehensive regulations revoke much of the old legislation and are intended to implement the (EC) Machinery Safety Directive and to simplify and clarify the existing law forming a coherent, single set of health and safety requirements concerning the provision and use of work equipment.

These regulations incorporate important provisions of both a general and specific nature. The term work equipment covers almost every form of machine, appliance and hand tools used by people at work

These regulations are of a mandatory nature and 'shall' apply in respect of work equipment provided for, or used by any employees at work.

Regulation 5 states that every employer shall ensure that work equipment is suitable for the purpose bearing in mind the working conditions and the risk to health and safety of the workers and any additional risk posed by using the equipment, the employer shall also ensure that the equipment is only used for those operations for which it is suitable.

Regulation 6 states that every employer shall ensure work equipment is maintained in working order and in good repair and that any maintenance logs are kept up to date.

Regulation 7 requires that where the use of the work equipment is likely to involve a specific risk to health and safety then the use of the equipment should be restricted to those designated to do the work and that the employer shall ensure that they are given adequate training.

Regulations 8 and 9 relate to information, instruction and training, the employer shall ensure that all those who use work equipment are given adequate health and safety information and instruction on the use of the equipment. The employer shall ensure that all those who use work equipment and their supervisors have received adequate health and safety training.

Management of Health and Safety at Work Regulations 1992

These regulations and their associated duties overlap with many existing regulations (e.g. The Control of Substances Hazardous to Health (COSHH) Regulations. Usually compliance with the more specific regulation will be sufficient however where the duties in these regulations go beyond those in the more specific regulations additional measures will be required to comply fully with Management of Health and Safety at Work Regulations (MHSWR).

The vast majority of the duties specified in these regulations are of an absolute nature, qualified as they are by the word 'shall', compared with the HASWA, where the duties are qualified by the phrase 'so far as reasonably practicable', a lower level of duty.

Regulation 3 states that every employer shall make a suitable and sufficient assessment of:

The risks to the health and safety of their employees to which they are exposed while at work

The risks to the health and safety of those not in their employ arising out of or in connection with the conduct by them of their undertaking, for the purpose of identifying the measures they need to take to comply with the requirements and prohibitions imposed on them by or under the relevant statutory provisions.

There is also a requirement that any assessment shall be reviewed if it is suspected to no longer be valid or there has been a significant change in the matters to which it relates.
Risk assessment is the principal feature of these regulations and guidance on risk assessments is provided in an accompanying Approved Code Of Practice.
Regulation 4 stipulates that every employer shall make and give effect to such arrangements as are appropriate …. for the effective planning, organisation, control, monitoring and review of the preventive and protective measures.
This requires the employer to consider the systems necessary to ensure the effective management of health and safety.
Regulation 5 requires that every employer shall ensure that their employees are provided with such health surveillance as is appropriate, having regard to the risks to their health and safety identified by the assessment.
The principal objective of any health surveillance activity is to detect adverse health effects at an early stage, thereby enabling further harm to be prevented.
Regulation 6 requires that every employer shall appoint one or more competent persons to assist them in undertaking the measures they need to take to comply with the requirements and prohibitions imposed on them by or under the relevant statutory provisions. The employer must also ensure that this competent person has adequate time and means to enable them to fulfil their function. The competent person should have sufficient training and experience or knowledge and other qualities to undertake the measures.
Regulation 7 states that every employer shall establish and, where necessary, give effect to appropriate procedures to be followed in the event of serious and imminent danger to people at work in their undertaking nominate a sufficient number of competent people to implement these procedures in so far as they relate to the evacuation from the premises of employees and others at work ensure that none of their employees have access to any area occupied by them to which it is necessary to restrict access on grounds of health and safety unless the employee concerned has received adequate health and safety instruction.
The aim is to establish procedures to be followed if situations present serious and imminent danger and under what circumstances they should stop work and move to a place of safety.
Regulation 8 states that every employer shall provide their employees with comprehensible and relevant information on the risk to their health and safety identified by the assessment, the preventive and protective measures and the procedures for evacuation. This information can be provided in whatever form is most suitable in the circumstances (e.g. poster)
Regulation 9 makes provision for employers jointly occupying a work site to co-operate and co-ordinate their health and safety activities.
Regulation 10 relates to subcontractors undertaking work in other people's premises and that both their employer and the host employer should ensure they are provided with adequate information and instruction regarding relevant risks to their health and safety.

Regulation 11 states that every employer shall, in entrusting tasks to their employees, take into account their capabilities as regards health and safety. Also, to ensure that employees receive adequate training particularly where there is a change in employee duties, new equipment or new technology or a change in the system of work.
This regulation introduces a consideration of human factors in ensuring appropriate levels of health and safety provision. Employers need to consider both the physical and mental abilities of employees, in addition to their knowledge training and experience, when allocating tasks.
Regulation 12 relates to the duties of the employee to use the safety equipment/devices, systems of work provided by their employer and also to report any hazards to their employer.

Job Specific Legislative Requirements

Legislation in the United Kingdom (UK) is supported by guidance issued by the British Standards Institute[16], European Standards and International Standards.
The BSI group is a world leader providing standards covering every aspect of the modern economy from protection of intellectual property to technical specifications for personal protective equipment. British Standards is based in London, UK and has extensive relationships with National Standards Bodies throughout the world.
British Standards is the National Standards Body of the UK, responsible for facilitating, drafting, publishing and marketing British Standards and other guidelines. With collaborative ventures and a strong national and international profile, British Standards is at the heart of the world of standardization.
British Standards provides UK industry and other stakeholders with their major access to and influence on standardization, both in the European arena (with CEN, CENELEC and ETSI) and internationally (with ISO and IEC).
A complete listing of all British Standards related to welding, painting etc. cannot be provided in this report. Individual standards are produced for specific activities covering design and operational guidance. Below are some examples of British Standards (designated by the letters BS). The additional designation EN indicates that a European (CEN) standard has been ratified by BSI. The designation ISO similarly applies to international standards.
BS5973:1993 Code of practice for access and working scaffolds and special scaffold structures in steel.

BS EN ISO 10882-2:2000 Health and safety in welding and allied processes. The sampling of airborne particles and gases in the operator's breathing zone. Sampling of gases.
BS EN 175:1997 Personal Protection. Equipment for eye and face protection during welding and allied processes.
BS 7212:1989 Code of practice for safe use of construction hoists.
BS 4275:1997 Guide to implementing an effective respiratory protective device programme.

[16] Ref: British Standards Institute (www.bsi-global.com)

Norway

Responsibility

The Norwegian Labour Inspection Authority[17] is a governmental agency under the Ministry of Labour and Government Administration and has administrative, supervisory and information responsibilities in connection with the Worker Protection and Working Environment Act and coordinates the partnership with the European Agency for Health and Safety at Work.
The agency's overall objective is a healthy working environment for all, safe and secure employment conditions and meaningful work for the individual and encourages enterprises to work systematically towards compliance with the working environment laws and regulations.

Working environment authorities

Several agencies monitor working environment activities in Norwegian workplaces, depending on whether they are onshore, offshore or in aviation. The following agencies are considered to be job specific legislative requirements.

- The Labour Inspection Authority is responsible for onshore supervision (which includes loading and unloading ships and aircraft)
- The Norwegian Maritime Directorate monitors maritime activities (fishing, trapping vessels and the merchant marine)
- The Petroleum Directorate monitors offshore oil installations in the Norwegian sector

Legislative Framework and Generic HSE Legislation

The Worker Protection and Working Environment Act as amended by Act No. 27 of 30th April 2003 stipulates that all employees in Norwegian companies must have a satisfactory working environment. The act applies to all businesses that have employees, except for the merchant marine and the fishing fleet. All companies are obliged to adopt a systematic approach to their working environment and the employer is responsible for complying with the requirements of the act, and for ensuring that it maintains a healthy and safe working environment. This is specifically noted in the Regulations Concerning a Systematic Approach to Health, Environment and Safety in the Workplace (Internal Control Regulations) which promotes efforts to improve conditions in the workplace in regard to;
The working environment and safety
Prevention of damage to health or disturbances to the environment from products or consumer services
Protection of the external environment against pollution and improved treatment of waste

[17] Ref: Norwegian Labour Inspection Authority (www.arbeidstilsynet.no/om/engelsk.html)

These regulations require enterprises to have written objectives in relation to health, environment and safety activities. Roles and responsibility regarding health and safety issues must also be clarified. Risk analysis and assessments must be carried out, and plans of action made and carried out according to assessments.
The person responsible for the enterprise must also ensure that internal control is introduced and performed in the enterprise and that this is done in collaboration with the employees and their representatives so as to ensure that the objectives of the health, environmental and safety legislation are achieved.
The Labour Inspection Authority oversees that enterprises comply with the requirements of The Worker Protection and Working Environment Act. Supervision will mainly be aimed at enterprises with the poorest working conditions, where there is little willingness to correct problems. This is done by;
Internal Control Audits: Reviews of enterprises' internal control systems to reveal whether regulations and procedures are being followed,
Verifications/Inspections: Intermittent tests to check whether internal control systems function well and that companies meet legal requirements,
Investigating Accidents: All serious and life threatening accidents are investigated by the Labour Inspection Authority.

Job Specific Legislative Requirements

Construction Requirements
The Safety, Health and Working Environment on Construction Sites (construction client regulations) Regulation No 377 of 21 April 1995 laid down by royal decree pursuant to the Working Environment Act shall apply to temporary or mobile construction sites or any workplace were construction activities are carried out.
The following NORSOK standards[18] are also considered to be relevant to construction operations and have been developed by the Norwegian petroleum industry.
NORSOK Standard S-006, HSE Evaluation of contractors
This standard describes items and methodology for evaluating and following up the HSE management systems used by contractors. The standard applies to both operational and construction related operations, including new facilities and modifications to/conversion of existing plants.

NORSOK Standard S-012, Health, Safety and Environment (HSE) in construction-related activities
This standard defines requirements related to health, safety and environment (HSE) related to construction and installation activities on and offshore, including marine installation activities.
Sandblasting
Sandblasting Regulation (1990)

[18] Ref: NORSOK Standards (www.norsok.no)

This regulation is concerned with limitations of exposure of sandblasters to silica dust, employer responsibilities, requirements to be met by sand or other abrasive blasting agents and the supply of suitable respirators to exposed workers.

Painting

Regulations for the labelling of paints, varnishes, adhesives etc. that contain organic solvents (1970)

These regulations are designed to ensure that employers and workers are aware of the organic-solvent content of the product to be used

Scaffolding

Scaffolds, ladders and work on roofs etc. – Directives with guidance (1989)

These directives apply to the manufacturing, mounting and use of scaffolds, ladders and other constructions. The content includes responsibilities, general stipulations on prevention measures, planning of work, certification of compliance, marking, written instructions, qualification and training of personnel, technical requirements, types of scaffolds, suspended scaffolds, ladders and buildings under construction.

Welding

Air contamination during arc welding (1986)

Contains regulations concerning ventilation systems, welding techniques and methods (to reduce welding fumes), measurement of air contamination, respiratory protective equipment to be used, maintenance and training of personnel, details on health hazards associated with welding fumes, exposure limits and standards.

NORSOK Standard M-601 Welding and Inspection of Piping

This standard covers additional and optional technical requirements to ASME B31.3 for welding and weld inspection of piping systems. This standard applies to all piping fabrication including prefabrication, module assembly, package or skid mounted units, site and field installations.

Rigging and Lifting

Lifting devices and lifting tools (1990)

These rules apply to devices used in connection with cranes. The contents includes general obligations, design, safety devices, electrical devices, hydraulic devices, information and warnings to be affixed to the equipment, mounting markings, monitoring, obligations on the operator and the use of the lifting devices.

NORSOK Standard R-CR-002 Lifting Equipment (Common Requirements)

This standard specifies the basic requirement for the design, fabrication, testing and other relevant services of lifting equipment and is in compliance with requirements in harmonised CEN standards. If

relevant CEN standards have not been issued the priority shall be FEM standards, ISO and relevant recognised standards.

Personal Protective Equipment (PPE)
Directive on Personal Protective Equipment (1995)
These regulations cover respiratory protective equipment, ear protection, head and eye protection, protective equipment for hands and arms, legs and feet, safety belts etc. and contain general requirements concerning protective equipment, type approval, marking and direction for use and responsibilities of employers.

Regulation on the use of personal protective equipment in the workplace (1993)
This regulation makes the use of PPE obligatory when the safety, health or welfare of a worker cannot be protected fully by technical equipment or by modification of work methods or processes. The relevant obligations of employers are outlined covering (supply of PPE, hazard evaluation, storage, maintenance and testing, training and info for workers)

United States Gulf of Mexico

Responsibility

Federal Responsibility

The Department of Labor, Occupational Safety and Health Administration (OHSA)[19] aims to ensure worker safety and health in the United States by working with employers and employees to create better working environments. Since its inception in 1971, OSHA has helped to cut workplace fatalities by more than 60 percent and occupational injury and illness rates by 40 percent. At the same time, U.S. employment has doubled from 56 million workers at 3.5 million worksites to more than 115 million workers at 7.1 million sites.

In Fiscal Year 2004, OSHA has an authorised staff of 2,220, including 1,123 inspectors. The agency's appropriation is US$457.5 million (Canada$ 606.7 million).

The OSHA is focusing on three strategies: 1) strong, fair and effective enforcement; 2) outreach, education and compliance assistance; and 3) partnerships and cooperative programs.

[19] Ref: USA Occupational Health and Safety Administration (OHSA) (www.osha.gov)

A ***strong, fair and effective enforcement program*** establishes the foundation for OSHA's efforts to protect the safety and health of the nation's workers. OSHA seeks to assist the majority of employers who want to do the right thing while focusing its enforcement resources on sites in more hazardous industries - especially those with high injury and illness rates. Strong enforcement has helped to increase reported violations by nearly 8 percent while helping to drop the number of injuries and fatalities in the workplace to its lowest point ever in 2002.

OSHA's ***Alliance Program*** enables trade and professional organizations, businesses, labour groups, educational institutions and government agencies that share an interest in workplace safety and health to collaborate with OSHA to prevent injuries and illnesses in the workplace. A signed formal agreement between OSHA and the organization provides goals addressing training and education, outreach and communication and promoting national dialogue on workplace safety and health.

In the ***Strategic Partnership Program***, OSHA enters into long-term cooperative relationships with groups of employers, employees, employee representatives and, at times, other stakeholders to improve workplace safety and health. These partnerships focus on safety and health programs and include enforcement and outreach and training components. Written agreements outline efforts to eliminate serious hazards and provide ways to measure the effectiveness of a safety and health program.

The majority of offshore construction work in the USA is carried out in Texas and Louisiana. A review of information currently available indicates that none of the major offshore construction sites in these states participate in any Alliance or Partnership Programs with the OHSA.

State Responsibility

For the purposes of this report most USA offshore construction activity is assumed to take place in the Gulf of Mexico States of Texas and Louisiana.

Section 18 of the Occupational Safety and Health Act of 1970 (the Act) encourages States to develop and operate their own job safety and health programs. OSHA approves and monitors State plans and provides up to 50 percent of an approved plan's operating costs.

There are currently 22 States and jurisdictions operating complete State plans (covering both the private sector and State and local government employees) and 4 - Connecticut, New Jersey, New York and the Virgin Islands - which cover public employees only. (Eight other States were approved at one time but subsequently withdrew their programs).

States must set job safety and health standards that are "at least as effective as" comparable federal standards. (Most States adopt standards identical to federal ones.) States have the option to promulgate standards covering hazards not addressed by federal standards.

A State must conduct inspections to enforce its standards, cover public (State and local government) employees, and operate occupational safety and health training and education programs. In addition, most States provide free on-site consultation to help employers identify and correct workplace hazards. It is noted that Louisiana and Texas do not participate in the OHSA scheme.

Legislative Framework and Generic HSE Legislation

The Occupational Safety and Health Act of 1970 is the key legislation covering Occupational Safety and Health (OSH) in the USA.
The complete OSH act contains 34 sections; the following sections are relevant.
Section 5 Duties
Section 6 Occupational Health and Safety Standards
Section 10 Procedure for Enforcement
Section 17 Penalties
Section 18 State Jurisdiction and State Plans

In general, the Act covers all employers and their employees in the 50 states, the District of Columbia, Puerto Rico, and other U.S. territories. Coverage is provided either directly by the federal Occupational Safety and Health Administration (OSHA) or by an OSHA-approved state job safety and health plan.

The Act defines an employer as any "person engaged in a business affecting commerce who has employees, but does not include the United States or any state or political subdivision of a State." Therefore, the Act applies to employers and employees in such varied fields as manufacturing, construction, longshoring, agriculture, law and medicine, charity and disaster relief, organized labour and private education.

The Act does not cover:

- Self-employed persons;
- Farms which employ only immediate members of the farmer's family;
- Industries in which other federal agencies, operating under the authority of other federal laws, regulate working conditions. This category includes most working conditions in mining, nuclear energy and nuclear weapons manufacture, and many aspects of the transportation industries;
- Employees of state and local governments, unless they are in one of the states with OSHA-approved safety and health plans.

Basic Provisions / Requirements

The Act assigns OSHA two regulatory functions: setting standards and conducting inspections to ensure that employers are providing safe and healthful workplaces. OSHA standards may require that employers adopt certain practices, means, methods or processes reasonably necessary and appropriate to protect workers on the job. Employers must become familiar with the standards applicable to their establishments and eliminate hazards.

Compliance with standards may include ensuring that employees have and use personal protective equipment when required for safety or health. Employees must comply with all rules and regulations that apply to their own actions and conduct.

Even in areas where OSHA has not set forth a standard addressing a specific hazard, employers are responsible for complying with the OSH Act's "general duty" clause. The general duty clause states that each employer "shall furnish . . . a place of employment which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

States with OSHA-approved job safety and health plans must set standards that are at least as effective as the equivalent federal standard. Most of the state-plan states adopt standards identical to the federal ones.

Job Specific Legislative Requirements

Job Specific Federal OHSA Standards

Standards are grouped into four major categories: general industry (29 CFR 1910); construction (29 CFR 1926); maritime (shipyards, marine terminals, longshoring--29 CFR 1915-19); and agriculture (29 CFR 1928). While some standards are specific to just one category, others apply across industries. Among the standards with similar requirements for all sectors of industry are those that address access to medical and exposure records, personal protective equipment, and hazard communication.

It is anticipated that offshore construction sites would be required to meet the standards associated with general industry, construction and maritime activity.

Scaffolding Requirements

The following general industry OHSA standards are applicable;

29 CFR 1910.28 Safety Requirements for Scaffolding
29 CFR 1910.29 Manually Propelled Mobile Ladder Stands and Scaffolds
29 CFR 1910.28 Safety Requirements for Scaffolding

This standard is prescriptive, comprehensive and highly technical. It covers many different types of scaffolds in sections (a) to (v). However, the main requirements for offshore constructions are likely to be covered in part (a) “general requirements for all scaffolds” as discussed below.
Due to the highly technical nature of the standards it is not possible to summarise all of the duties imposed upon employers within this report. A summary of some of the non-technical general requirements is given below.

- Scaffolds and their components shall be capable of supporting without failure at least four times the maximum intended load.
- Scaffolds and other devices mentioned or described in this section shall be maintained in safe condition. Scaffolds shall not be altered or moved horizontally while they are in use or occupied.
- Any scaffold damaged or weakened from any cause shall be immediately repaired and shall not be used until repairs have been completed.
- Scaffolds shall not be loaded in excess of the working load for which they are intended.
- An access ladder or equivalent safe access shall be provided.
- The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.
- Overhead protection shall be provided for men on a scaffold exposed to overhead hazards.
- Employees shall not work on scaffolds during storms or high winds.
- Employees shall not work on scaffolds which are covered with ice or snow, unless all ice or snow is removed and planking sanded to prevent slipping.
- Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

29 CFR 1910.29 Manually Propelled Mobile Ladder Stands and Scaffolds

This standard is prescriptive, comprehensive and highly technical. It covers many different types of scaffolds in sections (a) to (f). However, the main requirements for offshore constructions are likely to be covered in part (a) “general requirements” as listed below.

As before a summary of some of the non-technical general requirements is given below.

This standard is intended to prescribe rules and requirements for the design, construction, and use of mobile work platforms (including ladder stands but not including aerial ladders) and rolling (mobile) scaffolds (towers). This standard is promulgated to aid in providing for the safety of life, limb, and property, by establishing minimum standards for structural design requirements and for the use of mobile work platforms and towers.

- Work platforms and scaffolds shall be capable of carrying the design load under varying circumstances depending upon the conditions of use. Therefore, all parts and appurtenances necessary for their safe and efficient utilization must be integral parts of the design.
- Specific design and construction requirements are not a part of this section because of the wide variety of materials and design possibilities. However, the design shall be such as to produce a mobile ladder stand or scaffold that will safely sustain the specified loads. The material selected shall be of sufficient strength to meet the test requirements and shall be protected against corrosion or deterioration.
- The design load of all scaffolds shall be calculated on the basis of:
    - Light - Designed and constructed to carry a working load of 25 pounds per square foot.
    - Medium - Designed and constructed to carry a working load of 50 pounds per square foot.
    - Heavy - Designed and constructed to carry a working load of 75 pounds per square foot.
- All ladder stands and scaffolds shall be capable of supporting at least four times the design working load.
- The maximum work level height shall not exceed four (4) times the minimum or least base dimensions of any mobile ladder stand or scaffold. Where the basic mobile unit does not meet this requirement, suitable outrigger frames shall be employed to achieve this least base dimension, or provisions shall be made to guy or brace the unit against tipping.

Further industry specific standards are also in place for maritime and construction activity.

29 CFR 1915.71 Scaffolds or Staging in Shipyards

The above standard covers scaffolding in shipyards and supplements the requirements of the general requirement 29 CFR 1910.28. It contains many shipyard specific requirements but the basic principles of compliance are the same as those quoted above. This standard may only apply to offshore construction yards if a marine vessel was being constructed at a yard with shipbuilding facilities.

29 CFR 1926 Sub-Part L Scaffolds (Construction)

The above standard contains the Federal requirements for scaffolding in the construction industry. The standard lists the following;

general requirements
additional requirements for specific scaffolds

training requirements
scaffold specifications
criteria for determining safe access and fall protection

It is clear from the standards that the construction industry is a significant “user” of scaffold in the USA. However, the definition of “construction” covers a wide range of activities and sites, only one of which is offshore construction yards. The detailed content of the standard is far to complex to be repeated in this report. However, requirements of the standard are prescriptive for each type of scaffold.

Welding Requirements

The following general industry OHSA standard is applicable.

29 CFR 1910 Sub-Part Q; Welding, Cutting and Brazing

The standard contains the following sections;

1910.251 Definitions
1910.252 General Requirements
1910.253 Oxygen Fuel Gas Welding and Cutting
1910.254 Arc Welding and Cutting
1910.255 Resistance Welding

A summary of the general requirements is given below;

Fire Hazards
If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place.

Guards
If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks, and slag, and to protect the immovable fire hazards.

Restrictions
If the controls stated cannot be followed then welding and cutting shall not be performed.

Combustible Material

Wherever there are floor openings or cracks in the flooring that cannot be closed, precautions shall be taken so that no readily combustible materials on the floor below will be exposed to sparks which might drop through the floor. The same precautions shall be observed with regard to cracks or holes in walls, open doorways and open or broken windows.

Fire Extinguishers

Suitable fire extinguishing equipment shall be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hose or portable extinguishers depending upon the nature and quantity of the combustible material exposed.

Fire watchers shall be required whenever welding or cutting is performed in locations where other than a minor fire might develop or where combustible material exists with a 35 foot radius.

Fire watchers shall have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch shall be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smouldering fires.

Authorisation

Before cutting or welding is permitted, the area shall be inspected by the individual responsible for authorizing cutting and welding operations. He shall designate precautions to be followed in granting authorization to proceed preferably in the form of a written permit.

Prohibited Areas

Cutting or welding shall not be permitted in the following situations:

- In areas not authorised by management
- In sprinkler fitted building where that system is inhibited
- In the presence of explosive atmospheres
- In areas near the storage of large quantities of exposed, readily ignitable materials

Management

Management shall recognize its responsibility for the safe usage of cutting and welding equipment on its property and:

- Based on fire potentials of plant facilities, establish areas for cutting and welding, and establish procedures for cutting and welding, in other areas.
- Designate an individual responsible for authorizing cutting and welding operations in areas not specifically designed for such processes.
- Insist that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment and the safe use of the process.
- Advise all contractors about flammable materials or hazardous conditions of which they may not be aware.

Protection of Personnel

The above section of the standard contains highly prescriptive requirements for eye protection. It also considers fall protection and other protective clothing.

Health Protection and Ventilation

Contamination

The requirements in this paragraph have been established on the basis of the following three factors in arc and gas welding which govern the amount of contamination to which welders may be exposed:

- Dimensions of space in which welding is to be done
- Number of welders
- Possible evolution of hazardous fumes, gases, or dust according to the metals involved

Maximum Allowable Concentration

Local exhaust or general ventilating systems shall be provided and arranged to keep the amount of toxic fumes, gases, or dusts below the maximum allowable concentration as specified in 1910.1000 of the standard.

Precautionary Labels

A number of potentially hazardous materials are employed in fluxes, coatings, coverings, and filler metals used in welding and cutting or are released to the atmosphere during welding and cutting. The suppliers of welding materials shall determine the hazard, if any, associated with the use of their materials in welding, cutting, etc.

Ventilation for Welding and Cutting

Mechanical ventilation shall be provided

- In a space of less than 10,000 cubic feet (284 m(3)) per welder
- In a room having a ceiling height of less than 16 feet (5 m).

- In confined spaces or where the welding space contains partitions, balconies, or other structural barriers to the extent that they significantly obstruct cross ventilation.
- Minimum rate. Such ventilation shall be at the minimum rate of 2,000 cubic feet (57 m(3)) per minute per welder, except where local exhaust hoods are provided.

Further industry specific standards are also in place for maritime and construction activity.

Rigging and Lifting

The following general industry OHSA standard is a typically applicable standard. The requirements are highly prescriptive. Some examples of the requirements are presented below.

29 CFR 1910 179; Overhead and Gantry Cranes

New and Existing Equipment
All new overhead and gantry cranes constructed and installed on or after August 31, 1971, shall meet the design specifications of the American National Standard Safety Code for Overhead and Gantry Cranes, ANSI B30.2.0-1967.

Modifications
Cranes may be modified and re-rated provided such modifications and the supporting structure are checked thoroughly for the new rated load by a qualified engineer or the equipment manufacturer.

Rated Load Marking
The rated load of the crane shall be plainly marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block and this marking shall be clearly legible from the ground or floor.

Designated Personnel
Only designated personnel shall be permitted to operate a crane covered by this section.

Access to Crane
Access to the cab and/or bridge walkway shall be by a conveniently placed fixed ladder, stairs, or platform requiring no step over any gap exceeding 12 inches. Fixed ladders shall be in conformance with the American National Standard Safety Code for Fixed Ladders, ANSI A14.3-1956.

29 CFR 1910 184; Slings
A sample of the requirements is given below;

This section applies to slings used in conjunction with other material handling equipment for the movement of material by hoisting, in employments covered by this part. The types of slings covered are those made from alloy steel chain, wire rope, metal mesh, natural or synthetic fibre rope (conventional three strand construction), and synthetic web (nylon, polyester, and polypropylene).

Safe Operating Practices
Whenever any sling is used, the following practices shall be observed:

- Slings that are damaged or defective shall not be used
- Slings shall not be shortened with knots or bolts or other makeshift devices
- Slings shall not be loaded in excess of their rated capacities
- Slings shall be securely attached to their loads
- Slings shall be padded or protected from the sharp edges of their loads
- All employees shall be kept clear of loads about to be lifted and of suspended loads

Inspections
Each day before being used, the sling and all fastenings and attachments shall be inspected for damage or defects by a competent person designated by the employer. Additional inspections shall be performed during sling use, where service conditions warrant. Damaged or defective slings shall be immediately removed from service.

Sling Identification
Alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and reach.

The following industry specific standards also apply to rigging and lifting.

Ship Yards
29 CFR 1915 Sub-Part G Gear and Equipment for Rigging and Materials Handling which includes;
1915.11 Inspection
1915.12 Ropes, Chains and Slings
1915.13 Shackles and Hooks
1915.14 Chain Falls and Pull-Lifts
1915.15 Hoisting and Hauling Equipment
1915.16 Use of Gear
1915.17 Qualifications of Operators

Construction

The following standard is applicable to the construction industry; 29 CFR 1926.251 Rigging Equipment for Material Handling.

Sand Blasting and Painting

No specific OHSA standards are in place directly covering these activities. However, the activities are covered within the general duties of many OHSA standards. OHSA offer a shipyard employment risk guidance tool from which the following information is taken.

Painting applications may expose workers to the following hazards:

- Fire and Explosion Hazards
- Respiratory Hazards
- Contact with Coatings or Solvents
- Slips and Trips
- Fall Hazards
- High Pressure Hazards
- Work Environment Temperature and Related Hazards
- Electrical Hazards
- Limited Access/Egress

Specific standards are in place to cover each of the items listed above. One such example is general industry standard 1910.94 Ventilation. Paragraph 1910.94(a)(2) covers "Dust hazards from abrasive blasting." and states the following;

1910.94(a)(2)(i)

Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources shall be considered in making an evaluation of the potential health hazards.

1910.94(a)(2)(ii)

The concentration of respirable dust or fume in the breathing zone of the abrasive-blasting operator or any other worker shall be kept below the levels specified in 1910.1000.

(Note: 1910.1000 is the general industry standard covering permissible levels of air contamination for toxic and hazardous substances)

Codes and Standards

Whilst OHSA produces some guidance for compliance with its standards it also often makes reference to guidance available in the codes and standards of professional institutions or the national standards body. The examples given below are referenced from the OHSA standards discussed in the previous sections.

Scaffolding
The following material is available from the American National Standards Institute (ANSI). ANSI A10.8-1988 Scaffolding Safety.

Welding
The following material is available from the American Welding Society (AWS).

American Welding Society - Terms and Definitions - A3.0-1969
AWS A6.1 (1966) Recommended Safe Practices for Gas Shielded Arc Welding
ANSI Z49.1-67 Safety in Welding and Cutting

The following material is available from the National Electrical Manufacturer's Association (NEMA).
NEMA EW-1 (1962) Requirements for Electric Arc Welding Apparatus.

The following material is available from the National Fire Protection Association (NFPA)
NFPA 51B-1962 Standard for Fire Protection in Use of Cutting and Welding Processes.

Rigging and Lifting
The following material is available from the American National Standards Institute (ANSI). ANSI B30.2-43 (R 52) Safety Code for Cranes, Derricks, and Hoists. ANSI B30.2.0-67 Safety Code for Overhead and Gantry Cranes.

The following material is available from the Crane Manufacturer's Association of America, Inc. (CMAA).
CMAA Specification 1B61, Specifications for Electric Overhead Travelling Cranes

Painting
Office of Health and Safety, Center for Disease Control (CDC), Engineering Services Safety Manual, Section 16-00-100 (1997, January 2) describes the hazards of paint spraying operations and discusses appropriate controls.

The following material is available from the National Fire Protection Association (NFPA). NFPA 33-1969 Standard for Spray Finishing Using Flammable and Combustible Material.

The following material is available for purchase from the National Institute for Occupational Safety and Health (NIOSH). Registry of Toxic Effects of Chemical Substances

Sand Blasting
The following material is available from the American National Standards Institute (ANSI).
ANSI Z87.1-68 Practice of Occupational and Educational Eye and Face Protection
ANSI Z88.2-69 Practices for Respiratory Protection
ANSI Z89.1-86, Protective Headwear for Industrial Workers Requirements

Conclusions

Based on a limited study of occupational safety and health (OSH) legislation this section concludes that there are no specific Gulf of Mexico (Louisiana or Texas) OSH requirements. The Federal standards covering scaffolding, welding and rigging are specific and quite prescriptive. General industry standards exist and these are complemented by specific standards for construction and ship yard activities. However, where specific topics are not covered by OHSA standards (painting and sand blasting) there are general duties in place requiring the employer to protect their workforce.

Appendix 2 – Detailed Compliance Matrix

Canada vs. South Korea

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
13 - Employers' precautions and duties	Requires that employers take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, provide and maintain equipment, machinery, etc properly equipped with safety devices, provide training, instruction supervision, etc, ensure that employees are made aware of any health or safety hazards and all devices and equipment provided for their protection and generally conduct their undertaking such that their employees are not exposed to health and safety hazards as a result of that undertaking. Employers are also required to consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, provide additional training for committee members as prescribed in the regs, to comply with the Act and to ensure that their employees do likewise and to establish an occupational H&S policy or progam if one is required by the Act or regs.	Article 5	Article 5 states that employers shall observe standards for preventing industrial accidents as prescribed by the Act and provide information to employees on H&S in the workplace. They are further required to safeguard lives and maintain and promote the safety and health of their employees by creating a proper working environment through the improvement of working conditions, and to comply with the industrial accident preventive policy executed by the state. Unlike under the Canadian regulations there is no requirement to take 'every reasonable precaution' and no requirement to provide training, just information.
14 **-** Precautions to be taken by contractors	Requires that contractors take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, that the work of the employer and self-employed are co-ordinated and the communication of information necessary for health and safety takes place, ensure that measures and procedures required by the Act are carried out and to ensure that every employee, self-employed person and employer complies	There are no requirements stated for contractors	

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
	with the Act or regs		
15 - Precautions to be taken by constructors	Duties are the same as for contractors above.	There are no requirements stated for constructors	
16 - Precautions to be taken by suppliers	Requires that supplier take every precaution that is reasonable in the circumstances to ensure that any device, equipment, machinery, etc supplied is in safe condition and in compliance with the Act and regs when it is supplied. If responsible for maintenance, maintain the equipment in a safe condition and ensure that any biological, chemical or physical agent supplied is labelled in accordance with federal and provincial regulations	Article 2	Article 2 states that any person who designs, manufactures or imports machinery, facilities and other equipment, or who manufactures or imports raw materials, or who designs or constructs any construction, shall observe the standards as prescribed by the Act in for the carrying out of such activities and that they shall strive to prevent the occurrence of industrial accidents caused by use of such equipment. Again, there is no specification regarding 'every reasonable precaution, nor are any requirements laid down with regard to maintenance or labelling of hazardous materials.
17 - Employees' precautions and duties	Requires that employees take every precaution that is reasonable in the circumstances to protect their own health and safety and that of those around them, co-operate with the employer or fellow employees, ensure that protective devices, equipment and clothing are used or worn, consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, to comply with the Act the regulations. Employees have a further duty to report any condition, device, equipment, machinery, etc that may be dangerous to the employer and if the matter is not remedied satisfactorily to the committee or representative and if still not resolved, to the Division.	Article 6	Article 6 states that employees shall observe standards for the prevention of industrial accidents laid down in the Act and that they must accept measures taken by their employer or other related organisations intended to prevent industrial accidents. Again, there is no specification regarding 'every reasonable precaution, nor is there any requirement regarding the wearing or use of protective equipment, nor any onus to report dangerous conditions, equipment etc.
27 - Requirement for policy	Required where five or more employees are regularly employed	Articles 8 & 9	Article 8 states that the Minister of Labor, in conjunction with the Policy Deliberation Committee shall establish and publish a mid-term and long-term basic plan on prevention of industrial accidents. It would appear from this provision that accident

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
			prevention planning is a centralised government function in South Korea and that no further policy or planning requirements exist at individual workplaces. Article 9 does indicate that the Minister of Labor may consult with other bodies, if it is deemed necessary for the effective execution of the Industrial Accident Prevention Plan, these bodies include other state agencies, employers, employer's organisations and other related bodies. Consultation does not appear to extend to employees.
28 - Requirement for program	Required where twenty or more employees are regularly employed	See comments under Articles 8 & 9 above.	
29 - Requirement for committees	Required where twenty or more employees are regularly employed, discretionary where less than 20 are employed	Articles 13, 14, 15, 17	Article 13 requires employers to assign a person to be in charge of safety and health management, who is required to exercise general control over a variety of specified matters, including the establishment of the Industrial Accident Prevention Plan, the preparation and modification of safety and health management regulation (see Article 20) below, matters concerning health and safety education, inspection and improvement of the workplace, medical examinations, accident investigation, accident and incident recording and reporting, the suitability of PPE, etc. Article 14 requires the employer to have a workplace supervisor, who is required to undertake duties in relation to H&S. These appear to relate principally to the prevention of danger in the workplace Article 15 requires the employer to appoint a safety manager, to assist the 'person in charge of management' referred to in Article 13 in 'technical matters' related to safety. There is a similar requirement under Article 15 for a Health Manager and in Article 17 for the employer to assign an Industrial Health Doctor to the workplace

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
			(the regs do not state that he must be present on site). The duties and responsibilities for each of the above posts appear to be a matter for Presidential Decree and there are provisions to allow the Minister of Labor to appoint additional persons to these posts, set the qualifications, duties and powers for them and to replace them if necessary. This would again indicate a substantial degree of centralized control of the operations of these persons. Article 19 states that the employer shall establish and operate an Industrial Health and Safety Committee. composed of equal numbers of employees and employers representatives. However, this is qualified by stating that in places with fewer than 1000 employees a 'Labour Management Council', which is required under a different Act (The Labour-Management Council Act) shall be considered to also by the Industry Health and Safety Committee.
30 - Composition and procedure of committee	Composition to be agreed between employer and employees, but specific requirements are laid down with regard to several aspects of composition, meeting frequencies, etc	Article 19	The Industrial Health and Safety Committee requires to be composed of equal numbers of employees and employers representatives. However, this is qualified by stating that in places with fewer than 1000 employees a 'Labour Management Council', which is required under a different Act (The Labour-Management Council Act) shall be considered to also by the Industrial Health and Safety Committee.
31 - Functions of committees	Covers involvement of employers and employees in HSE matters, co-operative auditing, participation in inspections ,investigation of complaints, advising on PPE, etc	Article 19	Article 19 sets out the duties for the Industrial Health and Safety Committee. These are broadly the same as the duties stated for the 'person in charge of management', as described under Article 13 above
33 - Requirement for and functions of representatives	Requires appointment of at least one H&S representative where five or more are employed.	No additional requirement.	
34 - Response to written recommendations	Required within 21 days	Article 19	Employers are required to 'fulfil faithfully' matters decided by the committee in certain specific

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
			areas, but no time limit is set
35 - Duty of employer to provide certain information	Requires the employer to disclose to the committee the results of any workplace occupational health and safety inspections, monitoring on testing	Article 11	Article 11 requires an employer to inform his employees of amongst other things, matters relating to safety and health management of the working place and it is assumed that this would include the items mentioned under Canadian regs.
38 - Availability of information at workplace	Lays down specific requirements for the display of information	Article 11	Article 11 requires an employer to inform his employees of the essentials of the Act and Orders enacted under it, by posting or keeping copies at the workplace
42 - Right of employee to observe and be paid	Allows nominated employees to observe workplace H&S monitoring or the taking of samples, measurements, etc.	Not included	
43 - Right to refuse work and consequences of refusal	Allows any employee to refuse to do any act at his place of work which he has reasonable grounds to believe may endanger H&S	Article 26	Article 26 provides that an employee may stop work and seek shelter if any urgent risk arises at the workplace and that he should not be disadvantaged, e.g. dismissed for so doing. The provisions of this Article are considered to be more restrictive than those applying in Canada, as it would appear that the unsafe condition must actually exist, as opposed to the Canadian regs, which require only 'reasonable grounds' for believing that H&S is at risk.
44 - Restriction on assignment of work where refusal	Requires that no other employee is assigned work refused by another unless he has been made aware of the refusal, the reason for it, and his own right to refuse to carry out the task	Not included	
45 - Prohibition of "discriminatory action"	Prohibits adversely affecting an employee who has exercised his rights under 44 above	Article 26	See comments above
Right to make complaint or file grievance	Employees who have money or entitlements held to which they are entitled under the terms of this Act have the right to file a grievance and have the complaint dealt with by final and binding arbitration	Not included	
47 - Powers of officers	Right of entry by officers into premises to carry out inspections, tests, etc	Articles 26, 34, 51	Article 26 provides that if a serious accident has occurred, the Minister of Labor may have a labor inspector and other experts conducted an investigation.

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
			Article 34 provides that the Minister of Labor may order that harmful or hazardous machinery to be inspected. No specific information is given regarding rights of entry. Article 51 authorises a labor inspector to enter business premises to question personnel therein, carry out inspections and to remove any material necessary to carry out such inspections
51 - Power to issue stop orders	Allows officers to order the cessation of use of dangerous equipment	Article 51	Article 51 authorises the Minister of Labor to take action to prohibit the continued use of any structure, machine, equipment, etc if deemed necessary after an inspection.
55 - Orders and consequences of orders	Details powers of officers to compel employers to stop work, fence off hazards, etc	Article 51	Article 51 authorises the Minister of Labor to order the discontinuation of whole or partial works associated with machinery or equipment deemed to be dangerous. Article 52-2 authorises the Minister of Labor to order the suspension of an entire business following certain specified accident events
56 - Compliance notices and determination of compliance	Requires an employer to submit to the officer a compliance notice, indicating that he has dealt with the inspector's concerns.	No specific requirement	
58 - Restriction on use of chemicals	Requires that dangerous substances be labelled or their use prohibited, limited or otherwise restricted	Articles 37, 38, 39, 40 & 41	Article 37 forbids the manufacture of yellow phosphorus, benzidine and other substances harmful to health, except where specifically permitted by Presidential Decree. Article 38 requires that undertakings seeking to manufacture or use dichlorobenzidine and other materials especially harmful to health shall obtain advance permission from the Minister of Labor. Article 39 requires that containers containing benzene and other harmful substances must be labelled with specific information, including denomination, contents, effect on human body, storage and

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
			handling arrangements and emergency information in the event of a release of such as substance. Article 40 requires that a report shall be prepared for 'new chemicals' and submitted to the Minister of Labor. Such a report is to give information on the harmfulness of the substance involved. The Minister of Labor may then make orders requiring the installation of facilities for storage, making available PPE, etc. Article 41 requires an employer to prepare Material Safety Data Sheets in respect of chemical substances used in the workplace, including the name of the substance, instructions for handling, effects on the environment and any other matters as determined by the Minister of Labor. N.B. There appears to be a separate Korean Control of Harmful Substance Act, which is assumed to give more detailed information, but the contents of this Act could be found
59 - Duty of employer to prepare list of chemicals	Requires employees to prepare a list of chemicals regularly used, handled produced or otherwise present at the workforce	Articles 37 - 41	As above
60 - Duties of suppliers and manufacturers	Requires manufacturers of chemical substances to disclose pertinent information regarding the composition, properties, toxicological effects of chemicals	Articles 37 - 41	As above
63 - Notice of accident at the workplace	Requires employers to notify particular types of events:- - Fire or accident occasioning bodily injury to an employee - Accidental explosion, whether injury results or not - Where a person is killed from any cause or is injured in a manner liable to prove fatal	Article 10	Article 10 requires employers to report to the Minister of Labor 'matters necessary for enforcing this Act or any order issued under this Act which are prescribed by the Order of the Ministry of Labor' , but there is no explicit requirements to notify events of the type specified in the Canadian regulations
64 - Disturbance of accident scene	Specifies that accident scenes are to be left undisturbed, except in as much as it is necessary to detail with the	No specific requirements	

Canada	Comments	South Korea	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia		**The Industrial Safety and Health Act applies throughout.**	
	immediate event or prevent further injuries		
67 - Right to appeal and consequences of appeal	Right of aggrieved persons to appeal against officer's decisions	Not included	
74 - Offences and penalties	See separate comparison of penalties / enforcement process in subject jurisdictions	See separate comparison of penalties / enforcement process in subject jurisdictions	
75 - Powers of court on conviction	As above	As above	
78 - Immunity from civil action	As above	As above	
79 - Limitation period for prosecution	As above	As above	

Canada vs. UK

Canada	Comments	UK	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
13 - Employers' precautions and duties	Requires that employers take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, provide and maintain equipment, machinery, etc properly equipped with safety devices, provide training, instruction supervision, etc, ensure that employees are made aware of any health or safety hazards and all devices and equipment provided for their protection and generally conduct their undertaking such that their employees are not exposed to health and safety hazards as a result of that undertaking. Employers are also required to consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, provide additional training for committee members as prescribed in the regs, to comply with the Act and to ensure that their employees do likewise and to establish an occupational H&S policy or progam if one is required by the Act or regs.	Health and Safety at Work Act (HASWA) – Section 2 – General Duties of employers to their employees	General duties for all workplaces
		The Construction Regulations 1961 - 1966	Defines duties of employers, contractors, employees, safety supervisors and competent persons at construction sites (offshore construction yards would fall within the definition of 'construction' given in these regs).
14 **-** Precautions to be taken by contractors	Requires that contractors take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, that the work of the employer and self-employed are co-ordinated and the communication of information necessary for health and safety takes place, ensure that measures and procedures required by the Act are carried out and to ensure that every employee, self-employed person and employer complies with the Act or regs	Management of Health and Safety at Work Regs (1992)	Reg 9 covers duty to co-operate and share information. Reg 10 covers employers duties to persons working in host employers' premises
		The Construction Regulations 1961 - 1966	Defines duties of employers, contractors, employees, safety supervisors and competent persons

Canada	Comments	UK	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
15 - Precautions to be taken by constructors	Duties are the same as for contractors above.	The Construction Regulations 1961 - 1966	Defines duties of employers, contractors, employees, safety supervisors and competent persons
16 - Precautions to be taken by suppliers	Requires that supplier take every precaution that is reasonable in the circumstances to ensure that any device, equipment, machinery, etc supplied is in safe condition and in compliance with the Act and regs when it is supplied. If responsible for maintenance, maintain the equipment in a safe condition and ensure that any biological, chemical or physical agent supplied is labelled in accordance with federal and provincial regulations	Health and Safety at Work Act (HASWA) – Section 6 – General duties of manufacturers	Requires manufacturer to ensure so far as reasonably practicable, that an article is designed and constructed such that it is safe and without risk to health if properly used, carry out sufficient testing, provide adequate information, etc.
		Provision and Use of Work Equipment Regs, 1992 (PUWER)	It is important to note that although these regs require that work equipment is suitable, safe, maintained etc, the onus is on the employer who is providing the equipment to his employees to ensure that it is safe, not on the supplier who sells it.
		Consumer Protection Act 1987	Places liability for defective products on the producer of the product, any person holding themselves out to be the producer of the product and anybody importing a product into an EU member state
17 - Employees' precautions and duties	Requires that employees take every precaution that is reasonable in the circumstances to protect their own health and safety and that of those around them, co-operate with the employer or fellow employees, ensure that protective devices, equipment and clothing are used or worn, consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, to comply with the Act the regulations. Employees have a further duty to report any condition, device, equipment, machinery, etc that may be dangerous to the employer and if the matter is not remedied satisfactorily to the committee or representative and if still not resolved, to the Division.	Health and Safety at Work Act (HASWA)	Section 7 - General duties for all workplaces
		Construction Regulations (various)	Defines duties of employers, contractors, employees, safety supervisors and competent persons at construction sites (offshore construction yards would fall within the definition of 'construction' given in these regs).
27 - Requirement for policy	Required where five or more employees are regularly	Health and Safety at Work Act (HASWA)	Section 2 – requires employers to prepare and revise as often

Canada	Comments	UK	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
	employed		as necessary a written Statement of Health and Safety Policy and bring it to the attention of their employees
		Management of Health and Safety at Work Act (1992) (MHSW)	Applies at all workplaces, but if five or more persons are employed, provisions carried out under this Act require to be recorded. Provisions are more detailed than required in Section 28 of the Canadian regs and include the need to carry out risk assessments, effective planning, control, etc of health and safety arrangements, health surveillance, appointment of competent safety managers, training, etc
28 - Requirement for program	Required where twenty or more employees are regularly employed	No additional requirements – see MHSW above	
29 - Requirement for committees	Required where twenty or more employees are regularly employed, discretionary where less than 20 are employed	Safety Representatives and Safety Committees Regulations 1977	Must be established if two or more safety representatives (see below) request it in writing
30 - Composition and procedure of committee	Composition to be agreed between employer and employees, but specific requirements are laid down with regard to several aspects of composition, meeting frequencies, etc	Safety Representatives and Safety Committees Regulations 1977	Composition to be established in consultation with requesting safety representatives and trade union representatives. Unlike the Canadian regs, no specifics are laid down regarding the function of these committees.
31 - Functions of committees	Covers involvement of employers and employees in HSE matters, co-operative auditing, participation in inspections ,investigation of complaints, advising on PPE, etc	Safety Representatives and Safety Committees Regulations 1977	Similar functions undertaken to those listed in the Canadian regs
33 - Requirement for and functions of representatives	Requires appointment of at least one H&S representative where five or more are employed.	Safety Representatives and Safety Committees Regulations 1977	Required where one or more employees are employed. Can only be appointed by recognised trade union if one exists in the workplace. Similar functions undertaken to those listed in the Canadian regs
34 - Response to written recommendations	Required within 21 days	No requirement	
35 - Duty of employer to provide certain information	Requires the employer to disclose to the committee the results of any workplace occupational health and safety inspections, monitoring on testing	Safety Representatives and Safety Committees Regulations 1977	Regulation 7 covers right to inspection of documents and provision of information to safety representatives
38 - Availability of information at workplace	Lays down specific requirements for the display of information	Health and Safety (Information for Employees) Regulations 1989	Broadly similar requirements to the Canadian regs
42 - Right of employee to	Allows nominated employees to	Safety Representatives and	Regulation 4 allows safety

Canada	Comments	UK	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
observe and be paid	observe workplace H&S monitoring or the taking of samples, measurements, etc.	Safety Committees Regulations 1977	representatives to carry out inspections, but not specifically to monitor the sorts of activities laid down in the Canadian regs
		Control of Substances Hazardous to Health (COSHH) 1994 (as amended)	Requires the forthwith informing of any employee, or his representatives, if monitoring reveals that MEL (maximum exposure limit) has been exceeded
Right to refuse work and consequences of refusal	Allows any employee to refuse to do any act at his place of work which he has reasonable grounds to believe may endanger H&S	Management of Health and Safety at Work Regulations	Regulation 7, which requires that procedures are put in place with regard to serious and imminent danger and danger areas, includes provisions which allow persons to stop work and remove themselves to a place of safety in the event that they are exposed to danger. Only in exceptional cases can work recommence where such dangers remain present.
44 - Restriction on assignment of work where refusal	Requires that no other employee is assigned work refused by another unless he has been made aware of the refusal, the reason for it, and his own right to refuse to carry out the task	No specific right	
45 - Prohibition of "discriminatory action"	Prohibits adversely affecting an employee who has exercised his rights under 44 above	No specific right	
Right to make complaint or file grievance	Employees who have money or entitlements held to which they are entitled under the terms of this Act have the right to file a grievance and have the complaint dealt with by final and binding arbitration	No specific legal requirements under HSE legislation	This type of issue would be dealt with under UK employment law, rather than HSE law, probably by an Industrial or Employment Tribunal
47 - Powers of officers	Right of entry by officers into premises to carry out inspections, tests, etc	Health and Safety at Work Act (HASWA)	Section 20 details power of inspectors. These are similar to those provided under Canadian regs
51 - Power to issue stop orders	Allows officers to order the cessation of use of dangerous equipment	Health and Safety at Work Act (HASWA)	Sections 21 and 22 details the power of inspectors to issue improvement or prohibition notices in respect of activities being carried out at the workplace
55 - Orders and consequences of orders	Details powers of officers to compel employers to stop work, fence off hazards, etc	Health and Safety at Work Act (HASWA)	Sections 21 and 22 details the power of inspectors to issue improvement or prohibition notices in respect of activities being carried out at the workplace
56 - Compliance notices and determination of compliance	Requires an employer to submit to the officer a compliance notice, indicating that he has	Health and Safety at Work Act (HASWA)	Sections 21 and 22 require that the employer takes the actions prescribed within the period

Canada	Comments	UK	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
	dealt with the inspector's concerns.		specified within the notice
58 - Restriction on use of chemicals	Requires that dangerous substances be labelled or their use prohibited, limited or otherwise restricted	Control of Substances Hazardous to Health (COSHH) 1994 (as amended)	Provides information on maximum exposure limits assigned to particular hazardous chemicals, list of substances whose use is prohibited for certain purposes, etc
		Chemicals (Hazard Information and Packaging for Supply Regulations (CHP2) 1994	Provides detailed information on the requirements for labelling of hazardous substances, including the requirement to provide Safety Data Sheets for such substances
59 - Duty of employer to prepare list of chemicals	Requires employees to prepare a list of chemicals regularly used, handled produced or otherwise present at the workforce	Control of Substances Hazardous to Health (COSHH) 1994 (as amended)	Regulation 6 requires a suitable and sufficient risk assessment to be carried out for each chemical used in the workplace. This is a considerably more onerous requirement than that indicated by the Canadian regs, but will result in a list of chemicals being produced as a 'by product' of the risk assessment
60 - Duties of suppliers and manufacturers	Requires manufacturers of chemical substances to disclose pertinent information regarding the composition, properties, toxicological effects of chemicals	Chemicals (Hazard Information and Packaging for Supply Regulations (CHP2) 1994	Safety Data Sheets, which are required for these substances give this information
63 - Notice of accident at the workplace	Requires employers to notify particular types of events:- - Fire or accident occasioning bodily injury to an employee - Accidental explosion, whether injury results or not - Where a person is killed from any cause or is injured in a manner liable to prove fatal	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995	Regulation 3 lays down requirements in this regard and requires the reporting of workplace death, major injury, injury requiring hospitalisation, or where there has been a dangerous occurrence
64 - Disturbance of accident scene	Specifies that accident scenes are to be left undisturbed, except in as much as it is necessary to detail with the immediate event or prevent further injuries	Health and Safety at Work Act (HASWA)	The power of inspectors includes the power to take measures to ensure that evidence is not tampered with, or removed until the inspector's examination of it is completed
67 - Right to appeal and consequences of appeal	Right of aggrieved persons to appeal against officer's decisions	Health and Safety at Work Act (HASWA)	Regulation 21 gives details of appeals against improvement / prohibition notices procedure
74 - Offences and penalties	See separate comparison of penalties / enforcement process in subject jurisdictions		
75 - Powers of court on conviction	As above		

Canada	Comments	UK	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
78 - Immunity from civil action	As above		
79 - Limitation period for prosecution	As above		

Canada vs. Norway

Canada	Comments	Norway	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
13 - Employers' precautions and duties	Requires that employers take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, provide and maintain equipment, machinery, etc properly equipped with safety devices, provide training, instruction supervision, etc, ensure that employees are made aware of any health or safety hazards and all devices and equipment provided for their protection and generally conduct their undertaking such that their employees are not exposed to health and safety hazards as a result of that undertaking. Employers are also required to consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, provide additional training for committee members as prescribed in the regs, to comply with the Act and to ensure that their employees do likewise and to establish an occupational H&S policy or progam if one is required by the Act or regs.	Worker Protection and Working Environment Act – Chapter III	Section 14: Duties of the Employer – General duties for all workplaces.
14 **-** Precautions to be taken by contractors	Requires that contractors take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, that the work of the employer and self-employed are co-ordinated and the communication of information necessary for health and safety takes place, ensure that measures and procedures required by the Act are carried out and to ensure that every employee, self-employed person and employer complies with the Act or regs	No specific requirements for contractors found. Considered to be covered under duties of employers/employees.	

Canada	Comments	Norway	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
15 - Precautions to be taken by constructors	Duties are the same as for contractors above.	No specific requirements for constructors found. Considered to be covered under duties of employers/employees.	
16 - Precautions to be taken by suppliers	Requires that supplier take every precaution that is reasonable in the circumstances to ensure that any device, equipment, machinery, etc supplied is in safe condition and in compliance with the Act and regs when it is supplied. If responsible for maintenance, maintain the equipment in a safe condition and ensure that any biological, chemical or physical agent supplied is labelled in accordance with federal and provincial regulations	Worker Protection and Working Environment Act – Chapter IV	Section 17: Liabilities of manufacturers, suppliers etc – Any person who manufactures, imports, sells, leases or lends technical appliances or equipment shall ensure they are designed and provided with safety devices in accordance with the requirements of the act.
17 - Employees' precautions and duties	Requires that employees take every precaution that is reasonable in the circumstances to protect their own health and safety and that of those around them, co-operate with the employer or fellow employees, ensure that protective devices, equipment and clothing are used or worn, consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, to comply with the Act the regulations. Employees have a further duty to report any condition, device, equipment, machinery, etc that may be dangerous to the employer and if the matter is not remedied satisfactorily to the committee or representative and if still not resolved, to the Division.	Worker Protection and Working Environment Act – Chapter III	Section 16: Duties of the employees – employees shall take part in creating a sound and safe working environment.
27 - Requirement for policy	Required where five or more employees are regularly employed	No specific requirement for a company safety policy was found.	
28 - Requirement for program	Required where twenty or more employees are regularly employed	No specific requirement for a company safety program was found.	
29 - Requirement for committees	Required where twenty or more employees are regularly employed, discretionary where less than 20 are employed	Worker Protection and Working Environment Act – Chapter VII	Section 23: Working environment committee – required where at least 50 employees are regularly employed, discretionary where

Canada	Comments	Norway	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
			20 to 50 are employed or if required by the Labour Inspection Authority.
30 - Composition and procedure of committee	Composition to be agreed between employer and employees, but specific requirements are laid down with regard to several aspects of composition, meeting frequencies, etc	Worker Protection and Working Environment Act – Chapter VII	Section 23: Working environment committee – Employer and employees shall have an equal number of representatives. Specific rules are issued with regard to committees, including their composition, election and terms of office etc.
		Directive on safety officers and working environment committees (1995)	This directive covers election of a safety committee, case for several committees in the one enterprise and term and duties of the safety committee.
31 - Functions of committees	Covers involvement of employers and employees in HSE matters, co-operative auditing, participation in inspections ,investigation of complaints, advising on PPE, etc	Worker Protection and Working Environment Act – Chapter VII	Section 24: Duties of the working environment committee - Similar functions undertaken to those listed in the Canadian regs
33 - Requirement for and functions of representatives	Requires appointment of at least one H&S representative where five or more are employed.	Worker Protection and Working Environment Act – Chapter VII	Section 25: Safety representatives – Safety representatives shall be elected at all establishments. Less than ten employees the parties and Labour Inspection Authority may agree upon a different system or agree not to have a safety representative. Similar functions undertaken to those listed in the Canadian regs
		Directive on safety officers and working environment committees (1995)	This directive covers the terms of office and duties of the safety officer, including training required.
34 - Response to written recommendations	Required within 21 days	Worker Protection and Working Environment Act – Chapter VII	Section 26: Duties of safety representatives – If no action has been taken within a reasonable space of time, the Labour Inspection Authority shall be notified.
35 - Duty of employer to provide certain information		Worker Protection and Working Environment Act – Chapter VII	Section 26: Duties of safety representatives – Shall be consulted, informed and able to be familiarised with existing safety rules, directives, orders, recommendations, inspections or changes to the working environment.
38 - Availability of information at workplace	Lays down specific requirements for the display of information	Worker Protection and Working Environment Act – Chapter VII	Section 26: Duties of safety representative – employees receive the necessary instruction, drills and training.

Canada	Comments	Norway	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
42 - Right of employee to observe and be paid	Allows nominated employees to observe workplace H&S monitoring or the taking of samples, measurements, etc.	Worker Protection and Working Environment Act – Chapter VII	Section 29: Other Provisions – Safety reps and members shall be allowed the time necessary to perform their duties and the employer shall ensure that holding such a position does not result in any loss of income or impairment of terms and conditions of employment.
Right to refuse work and consequences of refusal	Allows any employee to refuse to do any act at his place of work which he has reasonable grounds to believe may endanger H&S	Worker Protection and Working Environment Act – Chapter III	Section 16: Duties of employees – Employees who find their work cannot continue without danger to life or health shall interrupt their work.
		Worker Protection and Working Environment Act – Chapter VII	Section 27: Safety reps right to halt dangerous work – work may be halted until the Authority has decided whether work may be continued.
44 - Restriction on assignment of work where refusal	Requires that no other employee is assigned work refused by another unless he has been made aware of the refusal, the reason for it, and his own right to refuse to carry out the task	See above.	
45 - Prohibition of "discriminatory action"	Prohibits adversely affecting an employee who has exercised his rights under 44 above	Worker Protection and Working Environment Act – Chapter VII	Section 27: Safety reps right to halt dangerous work – The safety rep is not liable for any loss suffered by the establishment.
Right to make complaint or file grievance	Employees who have money or entitlements held to which they are entitled under the terms of this Act have the right to file a grievance and have the complaint dealt with by final and binding arbitration	No specific legal requirements under The Environment Act.	
47 - Powers of officers	Right of entry by officers into premises to carry out inspections, tests, etc	Worker Protection and Working Environment Act – Chapter XIII	Section 80: Access of Labour Inspection Authority to the establishment for inspection - details power of inspectors. These are considered similar to those provided under Canadian regs
51 - Power to issue stop orders	Allows officers to order the cessation of use of dangerous equipment	Worker Protection and Working Environment Act – Chapter XIII	Section 77: Labour Inspection Authority decisions – In the event of immediate danger the Labour Inspection Authority may close down the establishment even if no order has been carried out.
55 - Orders and consequences of orders	Details powers of officers to compel employers to stop work, fence off hazards, etc	Worker Protection and Working Environment Act – Chapter XIII	Section 77: Labour Inspection Authority decisions – details the power of Authority to issue improvement or prohibition notices in respect of activities being carried out at the

Canada	Comments	Norway	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
			workplace.
56 - Compliance notices and determination of compliance	Requires an employer to submit to the officer a compliance notice, indicating that he has dealt with the inspector's concerns.	Worker Protection and Working Environment Act – Chapter XIII	Section 77: Labour Inspection Authority decisions – Orders shall be issued in writing, and time limits shall be set for their effectuation by the employer.
58 - Restriction on use of chemicals	Requires that dangerous substances be labelled or their use prohibited, limited or otherwise restricted	Worker Protection and Working Environment Act – Chapter II	Section 11: Toxic and other substances hazardous to health – Substances shall be clearly marked giving the name of the substance and a warning in Norwegian.
59 - Duty of employer to prepare list of chemicals	Requires employees to prepare a list of chemicals regularly used, handled produced or otherwise present at the workforce	Worker Protection and Working Environment Act – Chapter II	Section 11: Toxic and other substances hazardous to health – A record of such substances showing, name, composition, properties, effects, risks, preventative and first aid measures.
		Regulations relating to the compilation and distribution of safety data sheets for dangerous chemicals	apply to the compilation and distribution of safety data sheets for chemicals that may represent a health, fire, explosion
60 - Duties of suppliers and manufacturers	Requires manufacturers of chemical substances to disclose pertinent information regarding the composition, properties, toxicological effects of chemicals	Worker Protection and Working Environment Act – Chapter IV	Section 18: Manufacturers and Importers of toxic substances and other substances hazardous to health – similar requirements to Canadian regs.
63 - Notice of accident at the workplace	Requires employers to notify particular types of events:- Fire or accident occasioning bodily injury to an employee Accidental explosion, whether injury results or not Where a person is killed from any cause or is injured in a manner liable to prove fatal	Worker Protection and Working Environment Act – Chapter VI	Section 20: Recording injuries and diseases – the employer shall ensure that all injuries during work or diseases believed to have been caused by the working conditions are recorded.
64 - Disturbance of accident scene	Specifies that accident scenes are to be left undisturbed, except in as much as it is necessary to detail with the immediate event or prevent further injuries	Not specified under The Environment Act.	
67 - Right to appeal and consequences of appeal	Right of aggrieved persons to appeal against officer's decisions	Worker Protection and Working Environment Act – Chapter XIII	Section 77: Labour Inspection Authority decisions – Orders shall contain information regarding the right to appeal, the time limits for appeal and the appeal procedure.
74 - Offences and penalties	See separate comparison of penalties / enforcement process in subject jurisdictions		
75 - Powers of court on conviction	As above		
78 - Immunity from civil action	As above		
79 - Limitation period for	As above		

Canada	Comments	Norway	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
prosecution			

Canada vs. USA

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
13 - Employers' precautions and duties	Requires that employers take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, provide and maintain equipment, machinery, etc properly equipped with safety devices, provide training, instruction supervision, etc, ensure that employees are made aware of any health or safety hazards and all devices and equipment provided for their protection and generally conduct their undertaking such that their employees are not exposed to health and safety hazards as a result of that undertaking. Employers are also required to consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, provide additional training for committee members as prescribed in the regs, to comply with the Act and to ensure that their employees do likewise and to establish an occupational H&S policy or progam if one is required by the Act or regs.	Occupational Safety and Health Act 1970 Section 5 Duties	Section 5 of the 1970 OSH Act contains the following general duties which state that “Each employer (1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees; (2) shall comply with occupational safety and health standards promulgated under this Act.”

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
14 **-** Precautions to be taken by contractors	Requires that contractors take every precaution that is reasonable in the circumstances to ensure the health and safety of persons at or near the workplace, that the work of the employer and self-employed are co-ordinated and the communication of information necessary for health and safety takes place, ensure that measures and procedures required by the Act are carried out and to ensure that every employee, self-employed person and employer complies with the Act or regs	The 1970 OSH Act and the associated Standards contain very little reference to 'contractors'. Some examples include; Construction OHS Standard 1926.16 "Rules for Construction"	On the subject of contractor responsibility for OHS issues. Construction industry standard 1926.16 "Rules of Construction" states that; "The prime contractor and any subcontractors may make their own arrangements with respect to [OHS] obligations which might be more appropriately treated on a jobsite basis rather than individually. Thus, for example, the prime contractor and his subcontractors may wish to make an express agreement that the prime contractor or one of the subcontractors will provide all required first-aid or toilet facilities, thus relieving the subcontractors from the actual, but not any legal, responsibility (or, as the case may be, relieving the other subcontractors from this responsibility). In no case shall the prime contractor be relieved of overall responsibility for compliance with the requirements of this part for all work to be performed under the contract.
15 - Precautions to be taken by constructors	Duties are the same as for contractors above.	No duties specific to constructors could be found.	
16 - Precautions to be taken by suppliers	Requires that supplier take every precaution that is reasonable in the circumstances to ensure that any device, equipment, machinery, etc supplied is in safe condition and in compliance with the Act and regs when it is supplied. If responsible for maintenance, maintain the equipment in a safe condition and ensure that any biological, chemical or physical agent supplied is labelled in accordance with federal and provincial regulations	The 1970 OSH Act and the associated Standards contain no specific duties on suppliers	Suppliers are mentioned specifically in guidance to the employers on occasions where an employer should expect to receive certain information from a supplier. Examples include; (a) a chemical supplier who should supply a material safety data sheet with each product. (b) a supplier of safety equipment should ensure that equipment is safe for use when supplied to the purchaser

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
17 - Employees' precautions and duties	Requires that employees take every precaution that is reasonable in the circumstances to protect their own health and safety and that of those around them, co-operate with the employer or fellow employees, ensure that protective devices, equipment and clothing are used or worn, consult and co-operate with the joint occupational health and safety committee and with any person performing a duty or exercising a power under the Act, to comply with the Act the regulations. Employees have a further duty to report any condition, device, equipment, machinery, etc that may be dangerous to the employer and if the matter is not remedied satisfactorily to the committee or representative and if still not resolved, to the Division.	Occupational Safety and Health Act 1970 Section 5 Duties	Section 5 of the 1970 OSH Act contains the following general duties which state that "Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct."
27 - Requirement for policy	Required where five or more employees are regularly employed	No specific requirement for a company safety policy was found.	
28 - Requirement for program	Required where twenty or more employees are regularly employed	No specific requirement for a company safety programme was found.	
29 - Requirement for committees	Required where twenty or more employees are regularly employed, discretionary where less than 20 are employed	No specific requirement for a Company Safety Committee was found.	
30 - Composition and procedure of committee	Composition to be agreed between employer and employees, but specific requirements are laid down with regard to several aspects of composition, meeting frequencies, etc	See above.	
31 - Functions of committees	Covers involvement of employers and employees in HSE matters, co-operative auditing, participation in inspections ,investigation of complaints, advising on PPE, etc	See above	
33 - Requirement for and functions of representatives	Requires appointment of at least one H&S representative where five or more are employed.	No specific requirement for Safety Representatives.	Indirect references are made to employee representatives but these refer to trade union representatives not specific safety representatives.
34 - Response to written recommendations	Required within 21 days	Not applicable (see above).	
35 - Duty of employer to provide	Requires the employer to	Not applicable (see above).	

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
certain information	disclose to the committee the results of any workplace occupational health and safety inspections, monitoring on testing		
38 - Availability of information at workplace	Lays down specific requirements for the display of information	No equivalent duty exists.	
42 - Right of employee to observe and be paid	Allows nominated employees to observe workplace H&S monitoring or the taking of samples, measurements, etc.	No equivalent duty exists	
Right to refuse work and consequences of refusal	Allows any employee to refuse to do any act at his place of work which he has reasonable grounds to believe may endanger H&S	OHS Standard 29 CFR 1977 “Discrimination Against Employees Under the 1970 OHS Act”	Employees and representatives of employees are afforded a wide range of substantive and procedural rights under the Act. Moreover, effective implementation of the Act and achievement of its goals depend in large part upon the active but orderly participation of employees, individually and through their representatives, at every level of safety and health activity. This standard deals essentially with the rights of employees afforded under section 11(c) of the Act. Section 11(c) of the Act prohibits reprisals, in any form, against employees who exercise rights under the Act.
44 - Restriction on assignment of work where refusal	Requires that no other employee is assigned work refused by another unless he has been made aware of the refusal, the reason for it, and his own right to refuse to carry out the task	See above.	
45 - Prohibition of "discriminatory action"	Prohibits adversely affecting an employee who has exercised his rights under 44 above	See above.	
Right to make complaint or file grievance	Employees who have money or entitlements held to which they are entitled under the terms of this Act have the right to file a grievance and have the complaint dealt with by final and binding arbitration	No specific legal requirements under the 1790 OHS Act.	
47 - Powers of officers	Right of entry by officers into premises to carry out inspections, tests, etc	29 CFR 1903 “Inspections, Citations and Penalties”	Section 1903.3 “Authority for Inspection” “Compliance Safety and Health Officers of the Department of Labor are authorized to enter without delay and at reasonable

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
			times any factory, plant, establishment, construction site, or other area, workplace or environment where work is performed by an employee of an employer; to inspect and investigate during regular working hours and at other reasonable times, and within reasonable limits and in a reasonable manner, any such place of employment, and all pertinent conditions, structures, machines, apparatus, devices, equipment and materials therein; to question privately any employer, owner, operator, agent or employee; and to review records required by the Act."
51 - Power to issue stop orders	Allows officers to order the cessation of use of dangerous equipment	29 CFR 1903 "Inspections, Citations and Penalties"	Section 1903.13 "Imminent danger" "Whenever and as soon as a Compliance Safety and Health Officer concludes on the basis of an inspection that conditions or practices exist in any place of employment which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through the enforcement procedures otherwise provided by the Act, he shall inform the affected employees and employers of the danger and that he is recommending a civil action to restrain such conditions or practices"
55 - Orders and consequences of orders	Details powers of officers to compel employers to stop work, fence off hazards, etc	29 CFR 1903 "Inspections, Citations and Penalties"	Section 1903.14 "Citations and Notices of Violations" "The Area Director shall review the inspection report of the Compliance Safety and Health Officer. If, on the basis of the report the Area Director believes that the employer has violated a requirement of section 5 of the Act, of any standard, rule or order promulgated pursuant to section 6 of the Act, or of any substantive rule published in

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
			this chapter, he shall, if appropriate, consult with the Regional Solicitor, and he shall issue to the employer either a citation or a notice of de minimise violations which have no direct or immediate relationship to safety or health."
56 - Compliance notices and determination of compliance	Requires an employer to submit to the officer a compliance notice, indicating that he has dealt with the inspector's concerns.	29 CFR 1903 "Inspections, Citations and Penalties"	Section 1903.19 "Abatement Verification" OSHA's inspections are intended to result in the abatement of violations of the Occupational Safety and Health Act of 1970 (the OSH Act). This section sets forth the procedures OSHA will use to ensure abatement. These procedures are tailored to the nature of the violation and the employer's abatement actions.
58 - Restriction on use of chemicals	Requires that dangerous substances be labelled or their use prohibited, limited or otherwise restricted	29 CFR 1910, 1915 and 1926 Sub-Part Z "Toxic and Hazardous Substances"	Section 1910.119 "Process Safety Management of Highly Hazardous Chemicals" specifies a mandatory process for employers for preventing or minimising the consequences of exposure to hazardous chemicals. Section 1910.1200 requires health hazard determination and health hazard communication to employees.
59 - Duty of employer to prepare list of chemicals	Requires employees to prepare a list of chemicals regularly used, handled produced or otherwise present at the workforce	No specific duty found to maintain a list.	See above for safety management of hazardous chemicals.
60 - Duties of suppliers and manufacturers	Requires manufacturers of chemical substances to disclose pertinent information regarding the composition, properties, toxicological effects of chemicals	General OSH Standard 1910 Sub-Part Z "Toxic and Hazardous Substances" 1910.1200 "Hazard Communication"	1910.1200(a) "scope and Application" states that; "This section requires chemical manufacturers or importers to assess the hazards of chemicals which they produce or import, and all employers to provide information to their employees about the hazardous chemicals to which they are exposed, by means of a hazard communication program, labels and other forms of warning, material safety data sheets, and information and training."

Canada	Comments	U.S.A.	Comments
The Occupational Health and Safety Act (S.N.S 1996, c.7) – Nova Scotia			
63 - Notice of accident at the workplace	Requires employers to notify particular types of events:- Fire or accident occasioning bodily injury to an employee Accidental explosion, whether injury results or not Where a person is killed from any cause or is injured in a manner liable to prove fatal	29 CFR 1904 "Recording and Reporting of Occupational Illnesses and Injury"	Section 1904.39 requires the following; "Within eight (8) hours after the death of any employee from a work-related incident or the in-patient hospitalization of three or more employees as a result of a work-related incident, you must orally report the fatality/multiple hospitalization by telephone or in person to the Area Office of the Occupational Safety and Health Administration (OSHA)"
64 - Disturbance of accident scene	Specifies that accident scenes are to be left undisturbed, except in as much as it is necessary to detail with the immediate event or prevent further injuries	No specific requirement was found under OHS regulations.	
67 - Right to appeal and consequences of appeal	Right of aggrieved persons to appeal against officer's decisions	29 CFR 1903 "Inspections, Citations and Penalties"	Section 1903.17 "Employer Contests" "Any employer to whom a citation or notice of proposed penalty has been issued may, under section 10(a) of the Act, notify the Area Director in writing that he intends to contest such citation or proposed penalty before the Review Commission. Such notice of intention to contest shall be postmarked within 15 working days of the receipt by the employer of the notice of proposed penalty."
74 - Offences and penalties	See separate comparison of penalties / enforcement process in subject jurisdictions		See separate comparison of penalties / enforcement process in subject jurisdictions
75 - Powers of court on conviction	As above		As above
78 - Immunity from civil action	As above		As above
79 - Limitation period for prosecution	As above		As above

Appendix 3 – Environmental Requirements

Canada

Governing Body

Environment Canada is the Canadian government agency responsible for the protection of the Environment. It is in charge of Inspections and has the required authority to prosecute environmental laws offenders. It assesses and controls dangerous chemicals, and also provides expert scientific advice on environmental issues and environmental impact assessments.

Environmental Legislation

Canadian Environmental Protection Act (1999)
This Act provides various key elements to the protection of the environment. The following is a sample of them:
Authority to require submission of information
Authority to control the introduction of new substances
Provisions to control all aspects of the life cycle of toxic substances from development through to their ultimate disposal as waste.
Provisions to issue permits to control disposal at sea
Provisions setting out the powers that may be exercised by the Minister, enforcement officers and CEPA analysts in enforcing the legislation.

Enforcement & Penalties

From the Environmental Protection perspective, Environment Canada administers two acts. The *Canadian Environmental Protection Act 1999* (CEPA, 1999) which was passed by Parliament to replace the *Canadian Environmental Protection Act* of 1988, and the pollution prevention provisions of the *Fisheries Act* (FA). There are enforcement officers, designated under CEPA, 1999, and inspectors/fishery officers, designated under the *Fisheries Act*, who ensure compliance with the two acts and corresponding regulations. There is also an enforcement and compliance policy to guide enforcement officers.

The following are the responses available to alleged violations of the CEPA, 1999: warnings, directions by enforcement officers, tickets, Ministerial orders, environmental protection compliance orders, detention orders for ships, injunctions, prosecution, environmental protection alternative measures, court orders following conviction, and civil suits by the Crown to recover costs.

Norway

Governing Bodies

The following are, from top to bottom, the governing bodies responsible for issuing, controlling and enforcing environmental laws in Norway.

Ministry of the Environment
Department for Pollution Control

This department is composed of several sections, but the section most relevant to this report is the Section for Products, Waste Management and Eco-Efficiency. It promotes eco-efficient production and consumption, including buildings and products. It also promotes waste reduction and recycling (paper, plastic, car batteries, organic waste, etc.).It defines the system for collection and treatment of hazardous waste. It hears appeals concerning hazardous waste and incinerators and aims to provide solutions to for long-standing problems of hazardous waste and industrial pollution.

Subordinate Agency: - The Norwegian Pollution Control Authority
The Norwegian Pollution Control Authority is responsible for providing the professional basis for decisions for the Ministry in connection with pollution issues. In addition, the Pollution Control Authority has an executive responsibility with regard to:
Instructions and control relating to measures to combat industrial pollution,
Acute pollution,
Chemical substances and products,
Monitoring pollution in air and water

The Pollution Control Authority is authorized to issue instructions to the County Departments of Environmental Affairs concerning pollution, waste and products.

Environmental Legislation

Two Acts form the legal basis for the Norwegian Pollution Control Authority's work
The Pollution Control Act
The Product Control Act

Pursuant to these two Acts, a number of special regulations have also been issued:-

Regulations to the Pollution Control Act
Regulations to the Product Control Act

Regulations to both the Pollution Control Act and the Product Control Act
Regulations relating to health, environment and safety in the petroleum activities.

The Main Principles of the Pollution Control Act

The Pollution Control Act dates from 1981. It is the first unified law in Norway concerning pollution and waste issues. It was at that time a political goal to create one basic legal framework for all types of pollution and waste.

The Pollution Control Act is a typical enabling act. This means that the details in each case are outlined in discharge permits and regulations issued by the pollution control authorities. The Act was established for the purpose of preventing and reducing harm and nuisance from pollution. This is reflected in the main rule of the act, which says that pollution is forbidden, unless it is specifically permitted by law, regulations or individual permits.

Section 1 of the Act states that the purpose of the Act is to protect the outdoor environment against pollution and to reduce existing pollution and waste. But environmental protection is not the only relevant consideration here. The act is also directed to secure a satisfactory environmental quality based on a balance of interests, which includes costs associated with any measures and other economic considerations.

Pollution is defined in section 6 of the Act. The definition has two aspects. In the first place, certain actions must be present. There has to be a discharge of solids, liquids or gases to air, water or ground. This discharge must be caused by human activity, not by nature itself. Secondly, there has to be a risk of adverse effects or impacts on the environment. The discharge has to affect the recipient. It is enough that the discharge may cause damage or nuisance to the environment. That is in accordance with the precautionary principle. Any damage or nuisance is relevant here, whether they affect humans, animals or nature itself.

The Norwegian Pollution Control Act distinguishes between legal and illegal pollution. Section 7, first paragraph, states the basic principle and the main rule of the act: It is not allowed to possess, do, or initiate anything that may entail a risk of pollution, unless this is specifically permitted by law.
Almost all pollution activity in Norway is based on individual permits or licences issued by the Norwegian Pollution Control Authority or the county environmental agencies. Whether a permit is granted or not, depends on the professional judgement of the pollution control authorities

The Main Principles of the Product Control Act
The purpose of the Product Control Act is to prevent products from causing damage to health or disturbances of the environment in the form of disturbances of ecosystems, pollution, waste, noise or the like. A further purpose of the Act is to prevent consumer services from causing damage to health.
This Act applies to the production, including testing, import, marketing, use and other handling of products. The Act also applies to consumer services.

Regulations relating to Systematic Health, Environmental and Safety Activities in Enterprises (Internal Control Regulations)

Through requirements as to systematic implementation of measures, these regulations promote efforts to improve conditions in companies with regard to:

- the working environment and safety
- prevention of damage to health or disturbances to the environment from products or consumer services
- protection of the external environment against pollution and improved treatment of waste

so as to ensure that the objectives of the health, environmental and safety legislation are achieved
The Internal Control Regulations ensure that systematic measures designed to ensure that the activities of the enterprise are planned, organised, performed and maintained in conformity with requirements laid down in or pursuant to the environmental legislation (Pollution Control Act and Product Control Act).

Enforcement & Penalties

The provisions on penalties and other sanctions set out in the health, environmental and safety legislation are applicable in the event of contravention of the provisions of these regulations.
The Pollution Control Act states a Permit for any activity that may lead to pollution can be issued by the Pollution Control Authority following due application from the company. It might then be requested that an Environmental Impact Assessment be carried out. It also states that the owner or the operator causing pollution damage is liable to pay compensation. Fines or imprisonment for a term not exceeding three months or both will be imposed on any person that wilfully or through negligence does not comply with this Act. If the contravention has resulted in a risk of great damage or serious nuisance, or there are otherwise especially aggravating circumstances, imprisonment for a term not exceeding two years may be imposed, with a term not exceeding five years available if the contravention resulted in a risk to human life or health. If the contravention only resulted in insignificant pollution or an insignificant risk of pollution, public prosecution will only take place if the pollution control authority applies for this.

The Product Control Act states that any person who wilfully or negligently contravenes provisions laid down in or pursuant to this Act can be penalized by fines, imprisonment for a term not exceeding three months or both unless more stringent penalty provisions apply. Contravention of the duty to take due care will be penalized only if such contravention is wilful or caused by gross negligence. Aiding and abetting is penalized in the same way.

In the event of the violation of conditions, orders or prohibitions laid down pursuant to this Act, the Ministry of the Environment may impose a coercive fine. An injunction imposing a fine provides enforceable grounds for attachment of property. The Ministry of the Environment may waive the coercive fine if this is considered appropriate.

USA

Governing Bodies

U.S. Environmental Protection Agency
EPA's mission is to protect human health and to safeguard the natural environment — air, water, and land — upon which life depends. EPA leads the nation's environmental science, research, education and assessment efforts.
EPA works to develop and enforce regulations that implement environmental laws enacted by Congress. EPA is responsible for researching and setting national standards for a variety of environmental programs, and delegates to states and tribes the responsibility for issuing permits and for monitoring and enforcing compliance. Where national standards are not met, EPA can issue sanctions and take other steps to assist the states and tribes in reaching the desired levels of environmental quality.

Environmental Legislation

Pollution Prevention Act
42 U.S.C. 13101 and 13102, s/s et seq. (1990)
The Pollution Prevention Act focused industry, government, and public attention on reducing the amount of pollution through cost-effective changes in production, operation, and raw materials use. Opportunities for source reduction are often not realized because of existing regulations, and the industrial resources required for compliance, focus on treatment and disposal. Source reduction is fundamentally different and more desirable than waste management or pollution control.
Pollution prevention also includes other practices that increase efficiency in the use of energy, water, or other natural resources, and protect our resource base through conservation. Practices include recycling, source reduction, and sustainable agriculture.

Enforcement & Penalties

EPA is responsible for enforcing and assuring compliance with environmental regulations and may delegate this responsibility to state and tribal governments. EPA's enforcement efforts focus on assisting businesses and communities with compliance training and guidance. The Agency also partners with foreign governments, international organizations and other federal agencies to help building enforcement and compliance capabilities in other countries, and to fulfil U.S. commitments under international agreements.

OECA is responsible for ensuring the compliance of the regulated community with federal environmental statuses.

The Enforcement and Compliance Docket and Information Center (ECDIC) is a contractor operated facility that provides public access to regulatory information supporting the Agency's enforcement activities.

The Enforcement and Compliance History Online (ECHO) provides compliance and enforcement information for approximately 800 000 EPA-Permitted facilities nationwide. ECHO includes permit, inspection, violation, enforcement action, and penalty information about facilities regulated under the Clean Air Act (CAA) Stationary Source Program, Clean Water Act (CWA) National Pollutant Discharge Elimination System (NPDES), and/or Resource Conservation and Recovery Act (RCRA).

United Kingdom

Governing Body

Environment Agency (EA)
The Environment Agency is the leading public body for protecting and improving the environment. The activities of the EA range from influencing Government policy and regulating major industries nationally, right through to day-to-day monitoring and clean up operations.

Authorisations
The Environmental Agency issues various permits, licences, consents and registrations. These range from major industrial authorisations, such as a licence to abstract water from rivers, down to recreational ones such as fishing licences.

Inspection and monitoring
The EA regularly inspects and monitors licence-holders, making sure that the standards set are being met. It also assesses safety reports for sites covered by the Control of Major Accident Hazards regulations and has a supervisory duty on flood defence.

Enforcement
The EA also prosecutes for environmental crime.

Environmental Legislation

EC Directive 96/61 concerning integrated pollution prevention and control
The aim of the Directive is to prevent or minimise the pollution of air, land and water by potentially polluting industrial processes "so as to achieve a high level of protection for the environment as a whole". The Directive requires competent authorities to ensure that "installations are operated in such a way that all the appropriate preventative measures are taken against pollution, in particular through the application of Best Available Techniques (BAT)". In addition the Directive states that "the technical characteristics of the installation, its geographical location and the local environmental conditions" will be taken into account when setting permit conditions.

The UK legislation implements and supplements this directive.

Pollution Prevention and Control Act 1999
The Act implements in the UK Council Directive 96/61. This Act will eventually replace Part 1 of the Environmental Protection Act 1990.

The PPC Act extends the requirements of IPC under EPA90 to include other industrial processes not previously included. IPPC also takes a far wider range of environmental impacts into account such as noise, energy efficiency, waste minimisation, use of raw materials, accident prevention and site restoration.

Pollution Prevention and Control Regulations 2000
These Regulations are the key instrument for PPC application in the UK and provide detailed regulatory requirements for IPPC control. Activities falling under the Regulations are listed in Schedule 1 to the Regulations.

Environmental Protection Act 1990
Part I of the EPA90 established a system of integrated pollution control (IPC) in order to control pollution from the most potentially polluting or technologically complex industrial processes (Part A Processes). EPA90 also introduced a separate regime for controlling emissions to air alone from generally less polluting processes (Part B Processes) known as the Local Air Pollution Control (LAPC).

The IPC and LAPC regimes are in the process of being phased out and will be replaced by requirements under the Pollution Prevention & Control Act 1999. On the entry into force of Section 6 of the Pollution Prevention and Control Act 1999, Part I of the Environmental Act 1990 will be repealed.

The EPA 1990 (Part I) makes it an offence to:

- operate a prescribed process without an authorisation;
- contravene the conditions of the authorisation;
- fail to give notice of a transfer of authorisation;
- fail to comply with an enforcement or prohibition notice;
- fail to provide required information, or knowingly to make a false or misleading statement;
- make a false entry in any records required to be kept as a condition of authorisation.

Emissions to air, land and water from “Part A” prescribed Pollution Control (IPC) regime from EA. For any emissions to air from Part A prescribed processes, an authorisation must be obtained from EA. Emissions to air from “Part B” prescribed processes require an authorisation for local air pollution control (LAPC) from local authorities.

For any discharges to water from Part A prescribed processes, an authorisation must be obtained from EA. Each authorisation contains both general and specific conditions which the operator must comply with. Authorisation conditions will be specific to the facility / emissions and will depend greatly on the use to which the receiving environment is put and its environmental sensitivity. Conditions will include the following (as a minimum):

- instantaneous and average effluent flow rate;
- effluent sampling - probably continuous and flow proportional;
- effluent monitoring and the parameters to be met.

For prescribed substances produced from Part A prescribed processes which require disposal on land, an authorisation must be obtained from EA. Each authorisation contains both general and specific conditions for compliance. Conditions are likely to relate to handling, treatment and recovery / disposal methods to be used.

Each authorisation contains both general and specific conditions which the operator must comply with. Authorisation conditions will be specific to the facility / emissions and will depend greatly on the use to which the receiving environment is put and its environmental sensitivity. Conditions will include the following:

- quality and quantity of releases of prescribed substances permitted;
- BATNEEC for preventing/minimising release of prescribed substances;
- BPEO assessment for releases to more than one environmental medium;
- monitoring programme;
- for existing plant - proposed plant upgrading programme to comply with BATNEEC / new standards.

The specific conditions set by EA will take into account BATNEEC for the prescribed process; UK obligations under EC / international law; and national quality standards or objectives.
Environmental Protection (Prescribed Processes and Substances) Regulations 1991 as amended.
These regulations specify the processes which are prescribed for the purposes of Part I of EPA90 and those controlled substances with discharges restrictions to land, air and/or water.

Enforcement and Penalties

Compliance
The Environment Agency carries out on-site inspections and monitoring to ensure the companies business complies with its environmental permits as breaches can result in extensive damage to the environment or human health.

If evidence of non-compliance is found, the EA can serve an enforcement notice or works notice. This may mean the business being required to stop some or all aspects of its work should the environmental risk of continuing be deemed as serious.

Enforcement and Prosecution Policy

The Environment Agency's revised Enforcement and Prosecution policy came into force on 1 November 1998. the policy sets out the following four key principles of good enforcement, proportionality, consistency, transparency, and targeting; the main factors on which decisions to prosecute will be based; and sets out the circumstances in which, subject to sufficient evidence, the Agency will normally prosecute. The document also sets out the Agency's policy towards the prosecution of persons and companies.

The Agency's enforcement powers are extensive and vary according to the specific legislation. Generally, the powers fall into two categories; those for the prevention or remediation of harm to the environment; and those providing a response to a criminal offence. The Agency considers both preventative and punitive responses to an event, e.g. serving Notice requiring remediation works whilst pursuing prosecution. As part of Prevention/Remediation, the powers include, Injunctions, Suspension, variation or revocation of Environmental Licences, Prohibition Notices, Enforcement Notices, Works Notices, Agency's power to carry out works and recover the costs.

A Criminal Offence will involve either of the following: Prosecution, Formal Caution or Warning.

Examples of Offence and Enforcement Response (Ref EA's "Guidance for the Enforcement and Prosecution Policy") - Examples related to Waste Management

Offence	Statutory Reference	Protective Response Options	Normal Offence Response
Depositing controlled waste on land without a licence	Ss33(1)(a) & 59(1) EPA	Notice requiring waste removal (S59) Remove waste and recover costs	Prosecution / Formal Caution
Treating, keeping or disposing of controlled waste in a manner likely to pollute or harm human health	S33(1)(c) & 59(1)EPA	Serve notice of requirement removal of waste (S59) Remove waste & recover costs Suspension or revocation of the licence, partially or in full	Prosecution
Failing to comply with Special Waste Regulations	S62 EPA Reg 18(1) SpWR		Prosecution / Formal Caution / Warning

South Korea

Governing Body

Ministry of Environment

The Article 40 of the Government Organisation Act provides the mandate for the Ministry of Environment to be responsible for works related to the protection of natural and ambient environment and the prevention of environmental pollution.

Environmental Legislation

Main regulatory Acts:

Basic Environmental Policy Act (legislated Aug. 1, 1990 amended Dec. 31, 1999)

Environmental Impact Assessment Act on Environment, Transportation and Natural Disaster (legislated Dec. 31, 1999)

Act Relating to Punishment for Environmental Crime (wholly amended Dec. 31, 1999)

Environmental Management Corporation Act (legislated May 21, 1983 last amended Dec 27, 1993)

Waste Management Act (wholly amended Mar 8, 1991 amended Dec. 31, 1999)

Enforcement and Penalties

Environmental Impact Assessment

The EIA system in Korea is used as a means to prevent environmental pollution, which may be caused by various development projects. In planning and implementing a development project, the project applicant should devise measures to reduce environmental damage and maintain a sound environment.

The EIA system was first introduced in Korea with the enactment of the Environmental Preservation Act in December 1977. Article 5 stipulates that government agencies must be consulted for urban development projects, creation of industrial sites and energy resource development. The system was put into effect with the legislation of "Regulations on the Preparation of EIA" in February 1981.

With the upgrading of the Environmental Administration to the ministerial level in 1990, the previous Environmental Preservation Act was divided into a number of separate laws. Matters concerning EIA were incorporated in the Basic Environmental Policy Act, which was enacted in August 1990
In spite of these improvements, however, problems regarding the system's effectiveness have surfaced. EIA is often prepared simply as a procedural requirement and decisions at prior consultations are not implemented faithfully. In particular, it was inappropriate for EIA to be included in the Environmental Policy Act, the objectives of which are to define the basic principles of environmental policy. Against such a backdrop, the Environmental Impact Assessment Act was enacted as a separate law on June 11, 1993 to rectify problems emerging in the course of operation of the system thus far. The Act was put into effect on December 12, 1993. Those who prepare false EIA reports are subject to criminal punishment

Implementation of EIAs
EIA documents should be drawn and agreed upon before basic decisions are made on the approval of construction of a project in question. The current Environmental Impact Assessment Act specifies the time when EIA documents should be submitted and the time when consultation is needed in each area

Implementation, Management and Supervision of EIA Consultation
Recognizing the actual situation under which implementation is not fully carried out, the EIA Act addresses the contents of consultation, obligation for implementation borne by a project applicant, and control and supervision by the head of an approval authority.

The applicant of a project is required to keep a record of consultations, designate a person in charge of the record, and notify the results of environmental impact after completion of the project to see that its consultations were faithfully implemented. The project approval authority, on the other hand, is responsible for checking whether or not prior consultations were reflected and to supervise the applicant so that consultations are faithfully implemented.

The approval authority is empowered to take necessary steps for implementation. It can suspend construction of a project judged to have brought serious damage to the environment. Furthermore, if the applicant does not obey the order to suspend operations, he/she is subject to imprisonment for up to five years or penalties of up to 50 million won. The revised Act of March 7, 1997 further tightened regulations on those in violation of the Act. Those who fail to notify the results of EIA after the completion of construction, those who fail to keep a record of prior consultation, or those who fail to designate a person in charge of records are subject to penalties of up to one million won