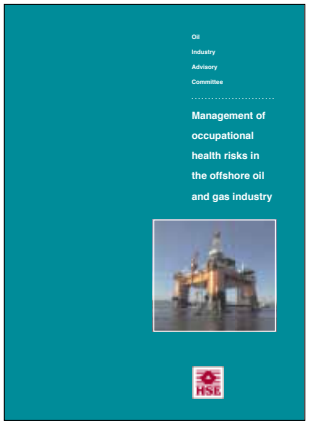
Oil Industry Advisory Committee

Management of occupational health risks in the offshore oil and gas industry



This is a free-to-download, web-friendly version of ISBN 978 0 7176 0886 7 (1st edition, published 1996). This version has been adapted for online use from HSE s current printed version.

You can buy the book at www.hsebooks.co.uk and most good bookshops.

ISBN 978 0 7176 0886 7
Price £8.00

This book describes the occupational health hazards and risks found in the offshore oil and gas industry, the general principles you can use to ensure the continued good health of the offshore workforce and guidance on where to find more detailed advice, particularly on how to control specific health hazards.

The advice in this book is aimed at installation operators, installation owners, contractors and other offshore employers with responsibilities for the health of workers on installations, pipelay barges, heavy lift vessels and similar vessels. It is intended to help them to manage occupational health risks in the offshore industry.

Foreword

This is guidance prepared, in consultation with the Health and Safety Executive (HSE), by the Oil Industry Advisory Committee (OIAC) which was appointed by the Health and Safety Commission as part of its formal advisory structures. The guidance represents what is considered to be good practice by the members of the Committee. It has been agreed by the Commission. Following this guidance is not compulsory and you are free to take other action. But if you do follow this guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

Contents

Introduction

1 This booklet describes in broad terms:

- the occupational health hazards and risks found in the offshore oil and gas industry;
- the general principles you can use to ensure the continued good health of the offshore workforce; and
- where to find more detailed advice, particularly on how to control specific health hazards.

2 The guidance contained in this booklet is aimed at installation operators, installation owners, contractors and other offshore employers with responsibilities for the health of workers on installations, pipelay barges, heavy lift vessels and similar vessels. It is intended to help them to manage occupational health risks in the offshore industry. It should also interest safety representatives, members of safety committees and other offshore workers. Much of it will be relevant to diving operations offshore, though the booklet does not deal with illness specifically related to diving.

3 The principles described in this booklet apply equally to work in the onshore oil and gas industry, where the guidance will also be of value. However, the booklet s main aim is to show how the principles apply to work offshore.

What does the law require?

4 All employers, including offshore operators and owners and contractors, have legal duties to protect workers health. The Health and Safety at Work etc Act 1974 (HSW Act) applies to all work activities onshore and to the offshore oil and gas industry. It requires employers to ensure the health and safety of their employees and other workers who may be affected. The basic principle of the Act is that the main responsibility for controlling risks lies with those whose operations create them. Thus the owner or operator of an installation has responsibilities towards everyone working on the installation. But contractors also have responsibilities for health risks to their employees or others arising from their activities. These responsibilities overlap, so the law requires duty holders to co-operate with each other in ensuring health and safety. Employees also have duties not to endanger themselves or others.

5 Regulations made under the Act deal with many specific hazards to health such as chemicals, noise, ionising radiation and manual handling. Most of these regulations apply offshore or set standards which help to comply with the broad duties under the HSW Act. The specific regulations (such as the Control of Substances Hazardous to Health Regulations 2002 (COSHH) or the Manual Handling Operations Regulations 1992) cover most of the main health hazards found offshore. Where the specific regulations do not apply, the Management of Health and Safety at Work Regulations 1999 require employers to assess risks, make arrangements for health and safety and provide health surveillance.

6 HSE has published detailed guidance on what you should do to comply with the regulations (see Appendix). This booklet provides an overview of managing occupational health problems offshore, but it does not go into detail on the law.

What is occupational health ?

7 Occupational health is about ***protecting the physical and mental health of workers*** and ensuring their welfare in the workplace. It deals with the relationship between someone s state of health and his or her job. This is very wide ranging,

but a priority is to ***prevent ill health arising out of conditions at work***. Other important aspects include:

- ensuring ***fitness*** to perform a job safely;
- providing ***first-aid and emergency medical*** services;
- health ***education and promotion***;
- ***rehabilitation*** after illness or injury.

All these aspects are relevant to the offshore oil and gas industry, but this booklet deals mainly with preventing ill health at work. Further advice on other aspects of occupational health can be found in the Appendix.

Why does occupational health matter?

8 Safety is rightly a priority offshore. Yet across industry, each year many more people become ill as a result of their work than are killed or injured in industrial accidents. Most diseases caused by work do not kill, but they can involve years of pain, suffering and discomfort for those affected. They include respiratory disease, dermatitis, and hearing loss caused by excessive noise. As well as the human cost, there are potential production costs from loss of performance, staff turnover, retraining, adjusting work processes which have been found to affect health and, in extreme cases, dealing with medical emergencies. You can avoid or reduce these costs by acting before problems arise.

How to manage occupational health issues

9 You can manage occupational health issues with the same basic principles you use to manage safety or any other business area. For example:

- your company should have a clear policy for health and safety;
- every level of management should be committed to achieving the policy - top management commitment is essential;
- integrate health and safety functions with other management functions.

10 It is best to avoid arbitrary distinctions between health and safety as they overlap to a great extent. Yet it is important to recognise that health issues are often much less clear-cut than safety issues. Cases of ill health arising from exposure to hazardous substances may take years or even decades to show up.

An illustration

The effects of being hit on the head by a falling brick are immediate and visible. There is no doubt what caused them. However, if the same brick is ground to a very fine powder which is inhaled over a long period, the possible result (lung disorder) may not be seen for years. It may be difficult to tie the result back to the brick dust.

11 So health problems may not be as obvious as a safety failure such as a structural collapse, a machinery accident, or fire and explosion. Most people may never see cases of occupational ill health while at work. They may miss the connection between the effect and its cause. So it is even more important to adopt a pro-active approach to managing health issues. HSE guidance is available on this in the publication *Health risk management guide: A practical guide for managers in small and medium-sized companies* (see Appendix), but the main steps to follow are:

- find out if there is a problem;
- decide what to do based on what you have found out (for example, set objectives and targets to meet);

- put the decisions into practice;
- check that the action has made improvements (eg that targets have been met).

Safety management system

In the offshore industry the management of health issues is integrated into the installation s safety management system (SMS). This ensures that health objectives are built into existing control systems, such as permits to work and audits. Even more effective is to assess potential occupational health problems at the design stage. It is much easier to design out a health problem, or design in adequate controls, than to put right a problem once everything is in place.

12 The rest of this booklet looks in more detail at how you can develop an occupational health management programme. It deals mainly with specific workplaces, such as individual installations or barges, but programmes should also consider workers who move from place to place and are exposed to different hazards. There are four main sections:

- identifying ***hazards*** to health (a hazard is anything with the potential to cause harm, such as chemicals, noise or vibration);
- assessing the ***risks*** posed by the hazards identified (a risk is the likelihood, great or small, that someone will actually be harmed by the hazard in the circumstances in which it is met);
- introducing measures to ensure that the health risks are adequately ***controlled*** (ie that they are reduced to the lowest level that is reasonably practicable) and checking that the measures remain effective; and
- making arrangements to ***mitigate*** the effects if the control measures fail or if problems arise which could not have been foreseen.

Involving the workforce

Workforce involvement and commitment are essential to the success of any health or safety programme. Offshore workers are closest to the hazards and it is their health which will benefit. Throughout this booklet there are suggestions about the part workers can play in protecting their health. These include:

- helping to identify hazardous agents;
- identifying jobs which might involve exposure to these agents;
- suggesting improvements to the way jobs are done;
- reporting problems or symptoms;
- providing feedback on the effectiveness of controls.

Further guidance on encouraging workforce involvement in health and safety is contained in the Oil IAC booklet *Play your part!* (see Appendix).

Identifying hazards to health

Is there a problem?

13 Finding out if there is a problem means identifying hazards to health, a hazard being anything which might cause harm. Collecting information provides a basis to assess risks. Paragraph 10 explains that health hazards are often harder to recognise than safety hazards. So identifying hazards requires care and a structured approach.

14 Managers can do much of the hazard identification based on their knowledge of the work activity, though they may need access to specialist advice or assistance (eg from occupational hygienists, nurses or physicians) in carrying it out. Useful advice is available from HSE and other sources (see Appendix), including data sheets supplied with equipment or chemicals. As a general guide, however, the main health hazards found in the offshore oil and gas industry divide into the following five broad groups:

- ***chemical hazards;***
- ***physical hazards*** such as noise, vibration or radiation;
- ***biological hazards*** such as micro-organisms;
- ***ergonomic hazards*** such as manual handling;
- ***psychosocial hazards.***

15 Tables 1-5 give examples which can be found offshore of each of these groups of hazards. The tables describe briefly the possible short-term (acute) and long-term (chronic) adverse health effects of each example. The tables are not exhaustive, but they should help to find the more significant hazards.

Preparing a hazard inventory

16 You should try to identify all hazards, using whatever means you think are most suitable. The law does not require you to draw up a hazard inventory, that is to say a list of agents on the installation or barge which might present a hazard. But you may find an inventory to be a systematic way of gathering your thoughts. If so, it may help to divide the inventory into the five groups listed in paragraph 14. You could add extra groups if you are also looking for safety hazards such as slippery surfaces and defective equipment.

17 Try to involve as many people as possible in drawing up the list. For example:

- ***storemen*** can list chemicals in their stores;
- ***mud engineers*** can list their mud treatment chemicals;
- ***painting contractors*** can list their paints and coatings;
- ***the camp boss*** can list floor cleaners and detergents used in the galley and laundry.

Table 1 Chemical hazards

Agent	*Example*	*Source or use*	*Potential health effect*
Toxic substances	Hydrogen sulphide	Sour gas production, bacterial activity in stagnant water	Acute - respiratory irritation, chemical asphyxiation
	Benzene	Component of crude oil, concentrated in gas dryer vent emissions and Wemco Units	Acute - central nervous system effects Chronic -anaemia, leukaemia
	Methanol	Gas drying and hydrate control	Acute - narcotic effects, damage to the optic nerve
Corrosive substances	Hydrochloric acid	Well stimulation	Acute - skin, eye and respiratory irritation, burns, ulceration, tissue destruction
	Sodium hydroxide (caustic soda)	Drilling fluid additive	Acute - skin, eye and respiratory irritation, burns, ulceration, tissue destruction
	Sulphuric acid	Wet batteries, regenerant for reverse osmosis water makers	Acute - skin, eye and respiratory irritation, burns, ulceration, tissue destruction
Irritant substances	Man-made mineral fibre	Thermal insulation and construction materials	Acute - skin irritation, dermatitis Chronic -possible lung cancer risk
	Cement dust	Oilwell cementing	Acute - skin, eye and respiratory irritation, dermatitis
	Sodium hypochlorite	Injection water treatment	Acute - respiratory irritation
Sensitising substances	Isocyanates	Two pack paints	Acute - respiratory and skin allergic reactions after sensitisation
	Glutaraldehyde	Biocide for water treatment systems	Acute - respiratory and skin allergic reactions after sensitisation
	Terpenes	Degraded d-limonene based degreasers	Acute - degradation fumes may cause sensitisation
Possible carcinogens	Asbestos	Thermal insulation and construction materials (encountered during removal)	Chronic -asbestosis, bronchial carcinoma, mesothelioma
	Polycyclic aromatic hydrocarbons	Used engine oils	Chronic -possible skin carcinomas

Table 2 Physical hazards

Agent	*Example*	*Source or use*	*Potential health effect*
Noise	Machinery noise	Engine rooms, compressor rooms, drilling brake, air tools, machine shop (metal grinding)	Acute - temporary threshold shift Chronic - noise-induced hearing loss
	Relief valve noise	Actuation of relief and emergency blowdown valves	Acute - physical damage to inner ear, including burst eardrum
	HVAC noise	Accommodation ventilation systems	Chronic - sleep disturbance, irritation
Vibration	Handtool vibration	Needlegunning	Chronic - hand-arm vibration syndrome
Ionising radiation	Sealed sources	Radiography, well logging, densitometers, interface instruments	Acute - radiation burns, radiation sickness Chronic - blood disorders, leukaemia, carcinomas
	Naturally occurring radioactive material	LSA scale in tubulars and process plant	Chronic - possible lung disorders
Non-ionising radiation	Ultraviolet	Arc welding, sunshine	Acute - sun burns, keratoconjunctivitis Chronic - melanomas
	Infra-red	Flares	Acute - sun burns, blistering Chronic - cataracts
	Electromagnetic fields	Transformers, power cables	Acute - induced body currents, static shocks
Thermal extremes	Heat	Wellhead area, near the flare, on the monkey board under certain conditions	Acute - sweating, fatigue, skin burns, heat stress
	Cold	Open modules in winter	Acute - shivering, hypothermia

Table 3 Biological hazards

Agent	*Example*	*Source or use*	*Potential health effect*
Water-borne bacteria	Legionella pneumophila	Cooling systems, domestic water systems	Acute - Legionnaires disease
Food-borne bacteria	E. Coli	Contaminated food	Acute - gastro-intestinal disorders, food poisoning

Table 4 Ergonomic hazards

Agent	*Example*	*Source or use*	*Potential health effect*
Manual handling	Moving equipment and containers	Pipe handling on drillfloor, sack handling in sack store, manoeuvring equipment in awkward locations	Acute - back spasm, torn ligaments Chronic - slipped disc, back pain
Workstations	Offices with display screen equipment	Poorly designed office furniture and poorly laid out workstations	Acute - headaches, muscular discomfort Chronic - upper limb disorder

Table 5 Psychosocial hazards related to work

Agent	*Source*	*Factor*	*Potential effect*
Stressors connected with work organisation and job content	Organisation and job design	Ambiguity of job requirements, unclear reporting relationships, over-supervision, under-supervision, constant paperwork	Acute - worry, interrupted sleep, excessive smoking and eating, fatigue, argumentativeness and acrimony
	Work planning issues	Work overload or underload, unrealistic targets, lack of clear planning, poor time management, atmosphere of uncertainty due to constant change, poor communications, inadequate training	Chronic -possible serious physical and mental ill health, particularly if pressures are intense. Stress has been associated with high blood pressure, heart disease, thyroid disorders and mental problems including anxiety and depression
	Relationships at work	Personality clashes, blame culture, age and background differences, constant personnel changes, bullying, sexual or racial harassment	
	Work environment	Noise, air quality, overcrowding, ergonomics	
	Working hours	Inflexible or overdemanding work schedules	
	Working and living in a hazardous environment	Mistakes can be catastrophic, vulnerable to mistakes of others, responsible for the safety of others	
Offshore location stressors	Artificial society	Male dominated society, rigid work and social hierarchy, limited leisure and exercise options, no alcohol	
	Lack of privacy	Shared cabins, same faces, same routine, feeling of claustrophobia and imprisonment	
	Living on the job	Difficult to turn off in leisure time Difficulty of escape in an emergency Reliance on helicopter travel, adverse weather	

18 Remember to include any emissions, that is substances not brought aboard for use, but created there by the work activity, such as welding fume, exhaust gases or hydrogen sulphide. As well as these ***chemical agents*** there may be:

- ***physical agents*** such as noise, vibration, ionising and non-ionising radiations;
- ***biological agents*** such as legionella;
- ***ergonomic problems*** such as heavy or awkward loads, badly sited valves and sample points;
- possible ***psychosocial stressors***, such as the way that work is organised.

19 Examine the completed lists to highlight those agents which are known or likely to be hazardous to health. If you are not certain whether they are hazardous or not, you may need to undertake further investigation or obtain advice. For most health hazards there are specific regulations (and supporting guidance - see Appendix) which will help to identify significant hazards, but the following are also useful guides:

- ***chemicals*** - the safety data sheet (SDS) and label usually provide sufficient information;
- ***physical agents*** - intensity and frequency are important;
- ***ergonomic hazards*** - for manual handling, for example, the task, the working environment, size and shape of load and individual capability are key factors.

Assessing risks to health

How big is the problem?

20 With the information collected on health hazards you can decide what to do to protect workers health. This means assessing risks to health. As paragraph 12 shows, there is an important difference between ***hazard*** and ***risk*** . A hazard is something which ***could*** do harm (such as a toxic chemical), but the risk is the actual chance that someone ***will*** be harmed by the chemical. Risk depends on:

- the nature of the hazard; and
- the extent to which workers are exposed to the hazard and for how long (this is crucial - see paragraph 26).

Figure 1 shows the relationship between these factors.

21 So, when a health hazard with enough ***severity*** to cause harm is on a worksite; and there is a potential for ***exposure*** of a worker to the hazard; there is a ***risk*** to the health of the worker.

How big is the risk?

22 You may identify a risk, but it may not be big enough to cause concern. It is not possible to remove all risk from everything we do. Instead, the law requires that the level of risk is kept as low as is ***reasonably practicable***. There is guidance on what this means for different circumstances, but it recognises that a ***minimum*** level of risk can be acceptable.

Figure 1 Relationship between hazard and exposure

Health risk = severity of the hazard x potential for exposure

Severity of the hazard means the capability of the agent to do harm.

For example
- the toxicity of a chemical;
- the sound pressure level at the operator s ear and the frequency of a noise source;
- the intensity and penetrability of ionising radiation;
- the mass of a load.

In some cases, the severity of the hazard may be greater for some workers who are more susceptible to its effects. For example, they might be sensitised to certain chemicals. This means you might need to introduce extra measures to protect them. First, though, you should deal with the risks to most people.

Potential for exposure means the opportunity given to the agent to do harm.

For example
- the form in which a chemical is used (eg powder, granules);
- the length of time of each period of exposure;
- the frequency of the exposures;
- the effectiveness of the controls in use.

23 You must make a judgement about the level of risk - which is what is meant by risk assessment. This does not have to involve complex calculations. The law requires ***quantitative*** risk assessment (QRA) techniques to be applied only to certain ***major*** offshore risks, but not to occupational health risks. Guidance on risk assessment is available from HSE (eg the free leaflet *Five steps to risk assessment*). Some general advice is set out in paragraphs 24-30.

Using occupational exposure limits

Many agents have been given occupational exposure limits, which will aid you in making judgements about risk. These are limits for exposure to certain agents over time. If exposures are kept below these limits, the risk that exposure will be harmful to workers will be low. Some agents are given maximum exposure limits (MELs), which mean that exposures must be reduced to as low a level as is reasonably practicable and ***in any case*** be below the limit. Finally, many agents have no official exposure limits, so your company should devise its own in-house standards. Nevertheless, as a general guide, keeping exposures below given limits means that the risks are likely to be under adequate control. This allows you to give priority to controlling the more serious risks.

The assesment process

24 Assessing health risks can be straightforward. At one extreme, there is unlikely to be much of a risk from a hazardous substance which is always handled in a closed system, or from a noisy machine in an area which is never entered - but do not overlook all the possible jobs which could involve exposure, such as maintenance, sampling or cleaning. At the other extreme, manually de-bagging a hazardous substance without suitable controls in sack-rooms will almost certainly give rise to an unacceptably high risk.

25 Between these extremes judgements are harder. You may need specialist help to make the assessment, to carry out measurements, or to propose control methods. You may also need help where there are no recognised national or international standards, as is the case for many hazardous substances. If your company carries out similar activities in several places, the risks may be similar. It may be possible to produce a generic assessment to cover all of them, though it will still need to identify and take full account of local variations.

26 Your assessment could include the following:

- Identify all the jobs and tasks within those jobs which could expose workers to the hazardous agents. Start with a list of every job type found on the installation or barge. Examine this list (with the help of line supervisors) to identify those job types with a significant chance of exposure. Next identify the tasks within those jobs where the chance of exposure occurs and to which agents. For example, the derrickman may have a significant chance of exposure to hazardous substances when adding powdered chemicals to the mud through the hopper, or a possible ergonomic risk from lifting and moving the sacks in which the chemicals are supplied. Do not overlook contract workers who may be exposed when visiting the installation or barge for a short time.
- Observe and analyse each of the tasks identified to assess the risk involved. Discuss the task with the worker and supervisor in depth and watch it being performed at the worksite. Find out how often and for how long the exposure occurs, who is involved, which parts of the body are exposed and how effective any control measures already in use are. Encourage workers to report any other useful information such as:

- ***health symptoms*** they may have noticed and how often and when they occur;
- suggestions for improving the ***task design***;
- problems with the current ***job procedures***.

An example

Reading a painting procedure in the office is not enough. Watch painting being carried out to see:

- which paints are actually used;
- the state of the spray equipment;
- what type of breathing apparatus is provided and how it is fitted, worn, tested and stored;
- whether the workers are aware of the hazards of the paints and of the procedures they should be using.

- Take measurements and samples, if necessary, to compare exposures with legal exposure limits or in-house standards.
- Based on the analysis and observation and using the information collected, make a health risk assessment of the task. A subjective assessment based on discussion and supporting evidence should be sufficient. For each hazard present during the task, the assessment should show whether the control measures in use are successful in reducing the risk to an acceptably low level.
- If the assessment shows the current method of performing the task to be satisfactory and that risks to health are low, record the result and inform everyone involved. If the current method is shown to be unsatisfactory, select and install further control measures.

What about subtle risks?

27 Do not look only at the immediate risk. For example, certain levels of noise may not affect hearing directly, but can interfere with communication or affect sleep, causing a different type of problem. A poorly designed workstation may give rise to headaches and tiredness over a period of use. Chemical and physical risks may have a psychological effect as well as a physical one - working in a poorly controlled environment may cause stress, which affects health in a more subtle way. Talk to the workers affected to pick up these underlying effects.

28 Assessing what are known as psychosocial risks (see Table 5) is especially complex. There is no objective method for measuring the extent or likelihood of harm to health. People often respond to different pressures in different ways and at different times. In general, however, risks are greatest where:

- people are under a wide variety of different or conflicting pressures at any one time;
- the pressures are sustained over long periods and are not offset by adequate periods of rest and recuperation;
- workers lack the management support, training and skills needed to help them cope;
- pressures at work coincide with major problems or pressures in people s personal lives. These pressures (see Table 6 opposite) are outside employers legal responsibilities, but are worth bearing in mind as they may increase an employee s susceptibility to workplace pressures.

Possible personal or family pressures

Agent	*Source*	*Factor*	*Potential effect*
Work/family relationship stressors	Disrupted home/social life	Homesickness, missing family and social events, unable to be involved in community, feeling of isolation and losing chunks of life, bad weather may disrupt rotas	Marital and family breakdown, excessive alcohol consumption, plus effects in Table 5
	Relationship with spouse and family	Drifting away from spouse and family, development of different interests and friends, threatened by spouse s independence, wind-down period at start of break	
	Inability to support in domestic crises	Spouse has to cope alone, difficulty of contact and communication, feeling of powerlessness	
	Domestic relocation	Company may require relocation, loss of extended family and friends, disruption to schooling, clubs, interests	

Reviewing the assessment

29 Health risk assessment is a continuing and evolving exercise. Assessments should be kept up to date. When a task changes, for example by introducing new control measures, repeat the assessment for the new circumstances. Assess new tasks also. For tasks carried out only occasionally, such as well stimulation, an existing assessment can form the basis for the new one. Concentrate on those elements which differ. Occasionally a whole operation goes into a different phase. For example, a drilling programme might be succeeded by a production-only phase. This operation is so different that you probably need a new assessment.

30 As well as assessing operations, you can carry out desktop assessments on new designs. This allows you to make changes and install controls right from the start of a new installation s life, or when proposing plant or structural modifications, or buying new equipment. Design stage assessment provides the most cost-effective opportunity to reduce risks. For example, properly designed local ventilation control can be provided at processes involving hazardous substances, or sources of noise eliminated or reduced by design. It may also be possible to design out risks to those doing the construction, equipment installation or subsequent maintenance work.

Lifestyle and work

Some health problems can be caused both at work and at home. Some existing health conditions can be made worse by work. For example, a heavy smoker is more likely to suffer breathing problems if exposed to chemicals at work. Hearing can be damaged by noise from personal stereos as well as by noise at work. Be aware that work and non-work health risks can overlap, especially offshore where people work and live on the installation or barge. Many companies prefer to deal with all health issues, whether they arise from work or home. They encourage workers to look after their health, for example by giving advice on smoking, drinking, diet and exercise. Various methods can be used:

- health promotion campaigns, such as Look after your heart ;
- appointing a health promotion adviser;
- talks, posters and leaflets;
- advice by the offshore medic.

The challenge is to get individuals to buy in to a better lifestyle by convincing them that it is in ***their interests*** to change. Support programmes such as stop-smoking clinics and exercise classes can help, but the only way to real success is with the full commitment of the individual.

Controlling Risks to Health

Selecting control measures

31 If the health risk assessment shows that you need further control measures, make sure you select the most appropriate type. The following generally accepted hierarchy of control measures can help to select the most effective measures for any situation:

1 **Elimination or substitution**
2 **Engineered controls**
3 **Procedural controls**
4 **Personal protective equipment**

Figure 2 (on page 19) explains this hierarchy in more detail.

32 The more powerful the method of control, the higher it is in the hierarchy. It is always best, if you can, to remove any causes of health risk. Choose control measures lower in the hierarchy only if it would not be reasonably practicable to choose a higher one. This can take account of cost. For example, it would not be realistic to fully automate the derrick on a platform with only one well to drill. You may have specialist advisers to recommend controls. They need to keep in close touch with operational managers so that their recommendations are in line with plans for the installation.

33 Personal protective equipment (PPE) is usually the last choice. It only protects the wearer and only if worn properly all the time. But it can be a good stop-gap measure until you can arrange something better, for example at the next shutdown. If you provide your workers with PPE, the law requires you to ensure that it is properly maintained and that workers use it properly.

Controlling psychosocial risks

34 There is no single way of controlling psychosocial risks. But you can help by ensuring that:

- workloads are manageable and workers have the time, resources and training to deal with them;
- there is good communication, particularly during periods of change;
- workers have the chance to play a part in planning and organising their own jobs and are encouraged to report any pressures which may be building;
- people working in isolation or in safety-critical tasks are given proper training and support to help them cope.

35 As indicated in paragraph 28, stressors linked to people s personal or family lives (see Table 6) are generally outside an employer s control and so are not a direct part of their health and safety responsibilities. But managers can help prevent problems by, for example, careful planning of rotas and leave and by ensuring they are not disrupted unnecessarily. As well as health and safety benefits, there are potential advantages from reduced absenteeism and improved morale.

Figure 2 The hierarchy of control measures

1 Elimination or substitution

Stop using the offending process, substance or equipment, or use it in a different form.

For example
- use less toxic degreasers and rig washes;
- stop using carbon tetrachloride in laboratories;
- use mercury-free downhole samplers;
- replace noisy pumps and compressors with less noisy ones (when reasonably practicable to do so, such as during a major refurbishment);
- use smaller sacks for mud additives.

2 Engineered controls

Redesign the process or equipment, if reasonably practicable, to eliminate the release of the hazard; enclose the process or equipment to capture and absorb the hazard or release it in a safe place; or dilute to minimise the concentration of hazard on release.

For example
- install exhaust ventilation over shale shakers and mixing hoppers;
- install acoustic hoods and enclosures;
- use fume cupboards in laboratories;
- use automatic pipe handling apparatus on drilling rigs.

3 Procedural controls

Institute work systems and procedures so that work is performed in a way that limits exposure to hazards.

For example
- limit work periods in hot environments;
- limit access to noisy modules;
- classify hydrogen sulphide areas;
- develop good housekeeping and chemical rotation procedures.

4 Personal protective equipment

Select, provide and ensure the use of appropriate protective equipment.

For example
- respiratory protective equipment, such as facemasks and breathing apparatus;
- personal protective equipment, such as gloves, goggles and aprons;
- hearing protective equipment, such as earmuffs and earplugs.

Using control mesasures

36 Once control measures are installed make sure they are used properly, by:

- working procedures, workpacks, platform instructions, permit to work systems and other means of managing work on the installation or barge;
- educating the workforce on the hazards and risks involved in their work and how the control measures will protect their health.

37 Both methods demand that the workforce receives adequate ***information, instruction and training***. These are required by law. Good ways of doing this include:

- providing workers with safety data sheets and workplace posters;
- making presentations at health and safety meetings;
- one-to-one training given by supervisors or specialists.

Maintaining, examining and testing control measures

38 Putting in place a regime of maintenance, examination and testing for each control measure will help to ensure that their performance does not drop off with time:

- for ***engineered controls***, such as exhaust ventilation, this will be part of the installation s maintenance programme;
- for ***procedural controls***, this should be part of the company s document control and review systems;
- for ***personal protective equipment***, arrange routine inspection and recording.

Monitoring and review

39 Having put an occupational health programme into practice, you should check that it has made improvements and that those improvements will be maintained. Methods of monitoring and review include:

- ***Workplace monitoring*** using instruments or samplers to show whether emissions are being properly controlled.

For example
- fixed hydrogen sulphide monitoring systems;
- regular dust inspections of bulk cement systems by Tyndall beam;
- routine noise and vibration surveys;
- contamination checks after LSA scale work.

- ***Personal monitoring*** of individual exposure to check that exposure limits are met.

For example
- personal monitoring for benzene by personal pump and absorbing tube;
- noise exposure by personal dosemeter;
- radiation exposure by film badge.

- ***Performance monitoring*** of specific indicators to show continuous improvement towards set targets. For example, monitoring sickness absence rates and records of occupational illness or sick bay visits can help, particularly to show a fall in the number of cases.
- ***Audit and review,*** for example as part of the safety management system audit programme.

Health surveillance

40 Health surveillance means having a system to look for early signs of ill health caused by work, so that you can act to protect individuals. It includes keeping a health record for each worker at risk. If possible, this record should continue from job to job. Often surveillance includes other regular procedures like:

- enquiries about symptoms;
- hearing checks (audiometry);
- medical examinations;
- testing blood or urine samples.

See the Appendix for more detailed advice on the health surveillance procedures appropriate for particular hazards.

41 Health surveillance is mandatory in some cases, such as work with certain chemicals or with ionising radiation. It may also be appropriate, under the Management of Health and Safety at Work Regulations 1999, where there is a high level of exposure to other hazards. In cases of doubt, you should introduce health surveillance where:

- it is known that an identifiable disease or adverse health condition can be related to the work;
- techniques are available which could detect signs of the disease or condition;
- it is reasonably likely that the disease or condition could occur in the conditions in which the work is actually done; and
- surveillance is likely to help to protect the health of the workers to be covered.

Mitigating effects on health

42 The main aim of an occupational health programme is to prevent workers health being affected by their job. But you also need to be able to act quickly if anything goes wrong, to minimise any ill effects. For example:

- if health surveillance shows that a worker s exposure to lead is approaching the agreed limit, remove the worker from exposure before any harm is done;
- if symptoms of minor ailments are detected, take action to prevent them becoming major health problems.

43 While offshore, workers cannot visit their GP if a health problem arises. Instead, medics and first-aiders should be provided, trained and equipped to deal with the full range of health problems that may arise. From time to time a worker may develop a serious health problem or suffer a serious injury. There should be arrangements to transport the sick or injured worker to shore promptly and safely to receive medical attention. Acting quickly and efficiently will help to prevent the condition getting worse and improve the worker s chance of recovery.

44 Finally, workers who have recovered from illness or injury may still have difficulty in adjusting again to work, especially after a long period. They may need assistance or advice to hasten the day when they return to being a valued and productive part of the industry s workforce.

Conclusion

45 Working in the offshore oil and gas industry can involve exposure to a wide range of hazardous substances, radiations, noise, extremes of heat and cold and ergonomic hazards. All have the potential to harm the health of workers, immediately or in later life. This booklet and the other guidance to which it refers aim to encourage and help companies to adopt a comprehensive and systematic occupational health programme for their offshore operations. Ensuring that such programmes are introduced and implemented properly by everyone offshore will allow the offshore workforce to look forward to a healthy and productive working life and a long and healthy retirement.

Appendix: Sources of further advice

HSE priced publications

Managing health risks

Management of health and safety at work. Management of Health and Safety at Work Regulations 1999. Approved Code of Practice and guidance L21 (Second edition) HSE Books 2000 ISBN 978 0 7176 2488 1

Successful health and safety management HSG65 (Second edition) HSE Books 1997 ISBN 978 0 7176 1276 5

Health risk management: A practical guide for managers in small and medium-sized enterprises HSG137 HSE Books 1995 ISBN 978 0 7176 0905 5

Hazardous substances

Control of substances hazardous to health (Fifth edition). The Control of Substances Hazardous to Health Regulations 2002 (as amended). Approved Code of Practice and guidance L5 (Fifth edition) HSE Books 2005 ISBN 978 0 7176 2981 7

A brief guide on COSHH for the offshore oil and gas industry HSG125 HSE Books 1994 ISBN 978 0 7176 0851 5

Health surveillance at work HSG61 (Second edition) HSE Books 1999 ISBN 978 0 7176 1705 0

Medical aspects of occupational skin disease Medical Guidance Note MS24 (Second edition) HSE Books 1998 ISBN 978 0 7176 1545 2

Seven steps to successful substitution of hazardous substances HSG110 HSE Books 1994 ISBN 978 0 7176 0695 5

EH40/2005 Workplace exposure limits: Containing the list of workplace exposure limits for use with the Control of Substances Hazardous to Health Regulations 2002 (as amended) Environmental Hygiene Guidance Note EH40 HSE Books 2005 ISBN 978 0 7176 2977 0

Control of lead at work. Control of Lead at Work Regulations 2002. Approved Code of Practice and guidance L132 (Third edition) HSE Books 2002 ISBN 978 0 7176 2565 9

Work with materials containing asbestos. Control of Asbestos Regulations 2006. Approved Code of Practice and guidance L143 HSE Books 2006 ISBN 978 0 7176 6206 7

An introduction to local exhaust ventilation HSG37 (Second edition) HSE Books 1993 ISBN 978 0 7176 1001 3

Maintenance, examination and testing of local exhaust ventilation HSG54 (Second edition) HSE Books 1998 ISBN 978 0 7176 1485 1

Breathe freely: A workers information card on respiratory sensitisers Pocket card INDG172 HSE Books 1994 (single copy free or priced packs of 25 ISBN 978 0 7176 0771 6) www.hse.gov.uk/pubns/indg172.pdf

Approved classification and labelling guide. Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. Guidance on Regulations L131 (Fifth edition) HSE Books 2002 ISBN 978 0 7176 2369 3

CHIP for everyone HSG228 HSE Books 2002 ISBN 978 0 7176 2370 9

Legionnaires disease. The control of legionella bacteria in water systems. Approved Code of Practice and guidance L8 (Third edition) HSE Books 2000 ISBN 978 0 7176 1772 2

Physical agents

Work with ionising radiation. Ionising Radiations Regulations 1999. Approved Code of Practice and guidance L121 HSE Books 2000 ISBN 978 0 7176 1746 3

Wear your dosemeter Pocket card INDG207 HSE Books 1995 (single copy free or priced packs of 25 ISBN 978 0 7176 1782 1) www.hse.gov.uk/pubns/indg207.pdf

Controlling noise at work. The Control of Noise at Work Regulations 2005. Guidance on Regulations L108 (Second edition) HSE Books 2005 ISBN 978 0 7176 6164 0

Hand-arm vibration. The Control of Vibration at Work Regulations 2005. Guidance on Regulations L140 HSE Books 2005 ISBN 978 0 7176 6125 1

Ergonomic hazards

Manual handling. Manual Handling Operations Regulations 1992 (as amended). Guidance on Regulations L23 (Third edition) HSE Books 2004 ISBN 978 0 7176 2823 0

Work with display screen equipment. Health and Safety (Display Screen Equipment) Regulations 1992 as amended by the Health and Safety (Miscellaneous Amendments) Regulations 2002. Guidance on Regulations L26 (Second edition) HSE Books 2003 ISBN 978 0 7176 2582 6

Upper limb disorders in the workplace HSG60 (Second edition) HSE Books 2002 ISBN 978 0 7176 1978 8

Manual handling: Solutions you can handle HSG115 HSE Books 1994 ISBN 978 0 7176 0693 1

Ergonomics offshore Resources pack online at www.hse.gov.uk/offshore/ergonomics.htm

Psychosocial hazards

Making the stress Management Standards work: How to apply the Standards in your workplace Leaflet MISC714 International Stress Management Association 2005 (single copy free or priced packs of 15 ISBN 978 0 7176 6157 2) www.hse.gov.uk/pubns/misc714.pdf

Other general guidance

Personal protective equipment at work (Second edition). Personal Protective Equipment at Work Regulations 1992 (as amended). Guidance on Regulations L25 (Second edition) HSE Books 2005 ISBN 978 0 7176 6139 8

Respiratory protective equipment at work: A practical guide HSG53 (Third edition) HSE Books 2005 ISBN 978 0 7176 2904 6

Health care and first aid on offshore installations and pipeline works. Offshore Installations and Pipeline Works (First Aid) Regulations 1989. Approved Code of Practice and guidance L123 HSE Books 2000 ISBN 978 0 7176 1851 4

A guide to the Offshore Installations (Safety Case) Regulations 2005. Guidance on Regulations L30 (Third edition) HSE Books 2006 ISBN 978 0 7176 6184 8

A guide to the Offshore Installations and Pipeline Works (Management and Administration) Regulations 1995. Guidance on Regulations L70 (Second edition) HSE Books 2002 ISBN 978 0 7176 2572 7

Play your part. How offshore workers can help improve health and safety Booklet INDG421 HSE Books 2008 (single copy free or priced packs of 10 ISBN 978 0 7176 6286 9) www.hse.gov.uk/pubns/indg421.pdf

HSE free leaflets

Managing health and safety: Five steps to success Leaflet INDG275 HSE Books 1998 (single copy free or priced packs of 10 ISBN 978 0 7176 2170 5) www.hse.gov.uk/pubns/indg275.pdf

Five steps to risk assessment Leaflet INDG163(rev2) HSE Books 2006 (single copy free or priced packs of 10 ISBN 978 0 7176 6189 3) www.hse.gov.uk/pubns/indg163.pdf

Getting specialist help with health and safety? Pocket card INDG420 HSE Books 2008 (single copy free or priced packs of 25 ISBN 978 0 7176 6274 6) www.hse.gov.uk/pubns/indg420.pdf

The Employment Medical Advisory Service and you Leaflet HSE5(rev1) HSE Books 2000 www.hse.gov.uk/pubns/hse5.pdf

COSHH a brief guide to the Regulations: What you need to know about the Control of Substances Hazardous to Health Regulations 2002 (COSHH) Leaflet INDG136(rev3) HSE Books 2005 www.hse.gov.uk/pubns/indg136.pdf

Noise at work: Guidance for employers on the Control of Noise at Work Regulations 2005 Leaflet INDG362(rev1) HSE Books 2005 (single copy free or priced packs of 10 ISBN 978 0 7176 6165 7) www.hse.gov.uk/pubns/indg362.pdf

Protect your hearing or lose it! Pocket card INDG363(rev1) HSE Books 2005 (single copy free or priced packs of 25 ISBN 978 0 7176 6166 4) www.hse.gov.uk/pubns/indg363.pdf

Hand-arm vibration: Advice for employees Pocket card INDG296(rev1) HSE Books 2005 (single copy free or priced packs of 25 ISBN 978 0 7176 6118 3) www.hse.gov.uk/pubns/indg296.pdf

Control the risks from hand-arm vibration: Advice for employers on the Control of Vibration at Work Regulations 2005 Leaflet INDG175(rev2) HSE Books 2005 (single copy free or priced packs of 10 ISBN 978 0 7176 6117 6) www.hse.gov.uk/pubns/indg175.pdf

Keep your top on: Health risks from working in the sun Leaflet INDG147(rev1) HSE Books 1998 (single copy free or priced packs of 20 ISBN 978 0 7176 1578 0) www.hse.gov.uk/pubns/indg147.pdf

Industrial radiography: Managing radiation risks Ionising Radiation Information Sheet IRIS1(rev1) HSE Books 2000 www.hse.gov.uk/radiation/ionising/index.htm

Radiation doses: Assessment and recording Ionising Radiation Information Sheet IRIS2(rev) HSE Books 2000 www.hse.gov.uk/radiation/ionising/index.htm

Aching arms (or RSI) in small businesses: Is ill health due to upper limb disorders a problem in your workplace? Leaflet INDG171(rev1) HSE Books 2003 (single copy free or priced packs of 15 ISBN 978 0 7176 2600 7) www.hse.gov.uk/pubns/indg171.pdf

Working together to reduce stress at work: A guide for employees Leaflet MISC686 International Stress Management Association 2005 (single copy free or priced packs of 15 ISBN 978 0 7176 6122 0) www.hse.gov.uk/pubns/misc686.pdf

Violence at work: A guide for employers Leaflet INDG69(rev) HSE Books 1996 (single copy free or priced packs of 10 ISBN 978 0 7176 1271 0) www.hse.gov.uk/pubns/indg69.pdf

The idiot s guide to CHIP 3: Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 Leaflet INDG350 HSE Books 2002 (single copy free or priced packs of 5 ISBN 978 0 7176 2333 4) www.hse.gov.uk/pubns/indg350.pdf

Why do I need a safety data sheet? CHIP 3 Leaflet INDG353 HSE Books 2002 (single copy free or priced packs of 10 ISBN 978 0 7176 2367 9) www.hse.gov.uk/pubns/indg353.pdf

Read the label: How to find out if chemicals are dangerous Leaflet INDG352 HSE Books 2002 (single copy free or priced packs of 15 ISBN 978 0 7176 2366 2) www.hse.gov.uk/pubns/indg352.pdf

Incident at work? Flyer MISC769 HSE Books 2007 www.hse.gov.uk/pubns/misc769.pdf

A short guide to the Personal Protective Equipment at Work Regulations 1992 Leaflet INDG174(rev1) HSE Books 1995 (single copy free or priced packs of 15 ISBN 0 7176 6141 1) www.hse.gov.uk/pubns/indg174.pdf

These leaflets are available from HSE Books

Publications from the National Radiological Protection Board

Advice on limiting exposure to electromagnetic fields (0-300GHz) Documents of the NRPB, Vol 15, No 2, 2004 ISBN 0 85951 532 X

Review of the scientific evidence for limiting exposure to electromagnetic fields (0-300GHz) Documents of the NRPB, Vol 15, No 3, 2004 ISBN 0 85951 533 8

Publications from trade associations

Many trade associations and institutions publish guidance on occupational health issues. The following is a sample.

United Kingdom Offshore Operators Association (UKOOA)

Medical aspects of fitness for offshore work EHS11A Issue No 6 April 2008

First aid and medical equipment on offshore installations EHS12 Issue No 1 December 2000

Guidelines for environmental health for offshore installations EHS23 Issue No1 2007

Energy Institute

Code of practice for safe handling of drilling fluids 1992 ISBN 0 471 93461 5

Code of practice for occupational hygiene audits 1993 ISBN 0 85293 125 5

Psychological wellbeing in the workplace 1999 ISBN 0 85293 248 0

Procedures for reporting occupationally related illness 1999 ISBN 0 85293 246 4

Occupational health provision 2002 ISBN 0 85293 373 8

International Association of Oil and Gas Producers

Managing health for field operations in oil and gas activities 343 May 2003

Step Change in Safety

Leading performance indicators. Guidance for effective use Step Change in Safety PO Box 1040X Aberdeen AB12 3YL

While every effort has been made to ensure the accuracy of the references listed in this publication, their future availability cannot be guaranteed.

Further information

For information about health and safety ring HSE s Infoline Tel: 0845 345 0055 Fax: 0845 408 9566 Textphone: 0845 408 9577 e-mail: hse.infoline@natbrit.com or write to HSE Information Services, Caerphilly Business Park, Caerphilly CF83 3GG.

HSE priced and free publications can be viewed online or ordered from www.hse.gov.uk or contact HSE Books, PO Box 1999, Sudbury, Suffolk CO10 2WA Tel: 01787 881165 Fax: 01787 313995. HSE priced publications are also available from bookshops.

British Standards can be obtained in PDF or hard copy formats from the BSI online shop: www.bsigroup.com/Shop or by contacting BSI Customer Services for hard copies only Tel: 020 8996 9001 e-mail: cservices@bsigroup.com.

The Stationery Office publications are available from The Stationery Office, PO Box 29, Norwich NR3 1GN Tel: 0870 600 5522 Fax: 0870 600 5533 e-mail: customer.services@tso.co.uk Website: www.tso.co.uk (They are also available from bookshops.) Statutory Instruments can be viewed free of charge at www.opsi.gov.uk.

Published by HSE 09/09