HEALTH AND SAFETY MANUAL

CH 13: Occupational Hazards and Diseases

13.1 GENERAL

In order to reinforce the preventive measures which has a possibility of risk on crew health, below procedure has been formulated to mitigate and reduce exposure of crew to a reasonably possible minimum level.

A risk assessment to be carried out for controlling various occupational hazards including vibration and noise, and appropriate action to be taken to reduce the risk to a reasonable level.

13.2 VIBRATION

Vibration is a mechanical phenomenon whereby oscillations occur about an equilibrium point.

Mechanical vibration is vibration that occurs in a piece of machinery or equipment, or on a ship as a result of its operation. Mechanical vibration can cause severe back pain and long-term damage to hands and fingers.

There are two types of mechanical vibration to be considered;
   1) hand-arm vibration and
   2) whole-body vibration.

Hand-arm vibration is vibration transmitted into workers’ hands and arms. This can come from use of hand-held power tools (such as chipping hammers, grinders, Pneumatic tools etc), or by holding materials being worked by hand-fed machines (such as pedestal grinders).

Regular and frequent exposure to hand-arm vibration can lead to permanent health effects collectively known as hand-arm vibration syndrome(HAVS), as well as specific diseases such as carpal tunnel syndrome(CTS). This is most likely when contact with a vibrating tool or work process is a regular part of a seafarer’s job. Occasional exposure is unlikely to cause ill health.

The following can be symptoms and effects of HAVS:

• tingling and numbness in the fingers which can result in an inability to do fine work (for example, assembling small components) or everyday tasks (for example, fastening buttons);
• loss of strength in the hands which might affect the ability to do work safely;
• the fingers going white (blanching) and becoming red and painful on recovery, reducing ability to work in cold or damp conditions, e.g. outdoors.

The following can be Symptoms and effects of CTS:

• tingling, numbness, pain and weakness in the hand which can interfere with work and everyday tasks and might affect the ability to do work safely.

Whole-body vibration is mechanical vibration which is transmitted into the body through the supporting surface when seated or standing during a work activity, for example, riding in a rescue boat in choppy seas. One of the primary health effects of whole-body vibration can be back pain.
13.2.1 Measurement and evaluation of exposures to vibration

13.3 Maximum exposure levels / Exposure points system and ready-reckoner

The daily exposure action value and daily exposure limit value are as follows:

<table>
<thead>
<tr>
<th>Daily Exposure Action Value*</th>
<th>Hand-arm Vibration</th>
<th>Whole-body Vibration</th>
<th>Action Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.5m/s²</td>
<td>0.5m/s²</td>
<td>Above this limit, it is required to -</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>a) reduce the seafarer's exposure;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>b) implement a programme of organisational or technical measures; and c) provide crew with information, instruction and training.</td>
</tr>
</tbody>
</table>

| Daily Exposure Limit Value*  | 5.0m/s²            | 1.15m/s²             | This is the maximum amount of vibration a crew may be exposed to on any single day. If the vibration levels are above this limit, then the reasons why the limit has been exceeded to be analysed and action taken to reduce the exposure below this value. The organisational or technical measures shall be amended to ensure the limit is not exceeded again. |

The table below is a ‘ready reckoner’ for calculating daily vibration exposures. Data required for calculation is the vibration magnitude(level), which can be obtained from the work equipment manual and exposure time, which will be the expected period of work. The ready-reckoner covers a range of vibration magnitudes up to 40 m/s² and a range of exposure times up to 10 hours.

The exposures for different combinations of vibration magnitude and exposure time are given in exposure points instead of values in m/s² A(8).

- exposure points change simply with time: twice the exposure time, twice the number of points;
- exposure points can be added together, for example where a worker is exposed to two or more different sources of vibration in a day;
- the exposure action value (2.5 m/s² A(8)) is equal to 100 points;
- the exposure limit value (5 m/s² A(8)) is equal to 400 points;
1. Find the vibration magnitude (level) for the tool or process (or the nearest value) on the grey scale on the left of the table.

2. Find the exposure time (or the nearest value) on the grey scale across the bottom of the table.

3. Find the value in the table that lines up with the magnitude and time. The illustration shows how it works for a magnitude of 5 m/s² and an exposure time of 3 hours: in this case the exposure corresponds to 150 points.

4. Compare the points value with the exposure action and limit values (100 and 400 points respectively). In this example the score of 150 points lies above the exposure action value.
The colour of the square containing the exposure points value tells you whether the exposure exceeds, or is likely to exceed, the exposure action or limit value:

- Above limit value
- Likely to be above limit value
- Above action value
- Likely to be above action value
- Below action value

5. If a worker is exposed to more than one tool or process during the day, repeat steps 1 – 3 for each one, add the points, and compare the total with the exposure action value (100) and the exposure limit value (400).

### 13.3.1 Control Measures:

The following can be the possible control measures, to reduce the health risk due to Vibration, but not limited to:

- Other alternative working methods which can possibly reduce or eliminate crew exposure to vibration
- Involve more people and sharing the load thereby minimising the hours of exposure
- When purchasing new work equipment the vessel in co-ordination with purchase department can receive equipments with reduced vibration, and should receive the following from the supplier:
  - a) warning of any vibration-related risks from using the equipment
  - b) information on safe use and, where necessary, training requirements
  - c) information on how to maintain the equipment
  - d) information on the vibration emission of the equipment
- By reviewing or implementing appropriate maintenance programmes for work equipment(Tools), the workplace(environment) and workplace systems(Time and work place management) in order to mitigate Vibration which can be caused by wear and tear or misalignment of components
- As far as practicable, anti-vibration handles can be used as required. Old tools which cannot be retrofitted with anti-vibration handles should be considered for replacement with modern tools, where appropriate.
- By reviewing and improving the design and layout of workplaces and workstations to improve work postures, which will minimise loads on seafarers hands, wrists and arms
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- By providing adequate information and training to seafarers to ensure that Crew are familiar with the effects of vibration and familiar with work equipment which should be used correctly and safely in order to reduce exposure to mechanical vibration.

- Limits can be imposed on the duration and intensity of the use of equipment which are being regularly used on prolonged basis, such as chipping hammers.

- By providing protective clothing to keep seafarers warm and dry, which will encourage good blood circulation which helps to protect against developing vibration white finger.

- By adapting measures to seafarers who are particularly sensitive to vibration and

- By improvising on working system by taking into account the results from any health surveillance that has been carried out.

- To comply with control measures as per the risk assessment carried out.
CONTROL OF VIBRATION

Objective – To protect seafarers from the risks related to exposure to vibration.

Risk Assessment
Risk assessment to be carried out to assess the level of mechanical vibration to which seafarers are exposed. If necessary this may require a measurement of the Exposure Limit Value and Exposure Action Value for Hand-arm vibration and Whole-body Vibration.

Health Surveillance
May be required following the risk assessment.

To be reviewed if there are significant changes which may affect its validity, or if results of health surveillance indicate there is a further risk.

A copy of the risk assessment is to remain on the vessel.

Daily Exposure Limit Value
Hand-arm = 5.0m/s²
Whole-body = 1.15m/s²

Daily Exposure Action Value
Hand-arm = 2.5m/s²
Whole-body = 0.5m/s²

If this limit is exceeded, suitable and sufficient information, instruction and training shall be provided to the seafarers.

This is the maximum amount of vibration a seafarer may be exposed to on any single day.

If this limit is exceeded then the reasons to be identified and take action to reduce the exposure below this value.

Once the organisational and technical measures have been completed the effectiveness of the measures shall be re-assessed.

The effectiveness of the technical and/or organisational measures shall be re-assessed.

If it is found the Daily Exposure Limit Value has been exceeded
13.4 NOISE

A form and level of environmental sound that is generally considered likely to annoy, distract or even harm other people.

Noise on board ships can cause hearing loss which can be temporary or permanent.

People can experience temporary deafness after leaving a noisy place which although normally recovers within a few hours should not be ignored, it is a sign that continued exposure could cause permanent damage. Permanent hearing damage can be caused immediately by sudden extremely loud explosive noises such as from cartridge operated machines.

Hearing loss is usually gradual because of prolonged exposure to noise, such as working in an engine room without wearing hearing protection. It may only be when damage caused by noise over the years combines with hearing loss due to ageing that people realise how deaf they have become.

Hearing loss is not the only problem. People may develop tinnitus (ringing, whistling, buzzing or humming in the ears), a distressing condition which can lead to disturbed sleep.

As a guide, potentially harmful noise levels are quite likely where seafarers
a. have to shout to be clearly heard by someone 2 metres away;
b. experience temporary dullness of hearing, or ringing in their ears after leaving the work space;
c. are exposed to impulsive noises such as the sudden release of compressed air, or loud explosive noises from equipment such as cartridge-operated tools;
d. are exposed to high-level impact noise from hammering on metal surfaces, or using chipping hammers; or
e. work in machinery spaces.
As a rough guide to determine whether noise measurements are required the test below can be used.

<table>
<thead>
<tr>
<th>Test</th>
<th>Likely noise level</th>
<th>Noise measurements will be needed if seafarers are subject to this level of noise for more than</th>
</tr>
</thead>
<tbody>
<tr>
<td>The noise is intrusive, but normal conversation is possible.</td>
<td>80 dB(A)</td>
<td>6 hours</td>
</tr>
<tr>
<td>You have to shout to talk to someone 2 metres away.</td>
<td>85 dB(A)</td>
<td>2 hours</td>
</tr>
<tr>
<td>You have to shout to talk to someone 1 metre away.</td>
<td>90 dB(A)</td>
<td>45 minutes</td>
</tr>
</tbody>
</table>

### Exposure action values and exposure limit values

<table>
<thead>
<tr>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the noise levels are higher than this value</td>
</tr>
<tr>
<td>a) suitable and sufficient information, instruction and training are to be provided to seafarers;</td>
</tr>
<tr>
<td>b) to provide hearing protection.</td>
</tr>
<tr>
<td>If the noise levels are at or above this value</td>
</tr>
<tr>
<td>a) as far as practicable the crew to wear hearing protection;</td>
</tr>
<tr>
<td>b) the area shall be identified by a sign specifying hearing protection is worn and access to the area must be restricted as far as is practicable.</td>
</tr>
<tr>
<td>If the noise levels exceed this value a programme of technical or organisation measures (or both) shall be established to reduce exposure to as low as is reasonably practicable.</td>
</tr>
<tr>
<td>Crew must not be exposed to noise exceeding this value.</td>
</tr>
<tr>
<td>If the noise levels exceed this value then action to be taken to reduce the exposure limit to below this value.</td>
</tr>
</tbody>
</table>
A-weighted is used to measure average noise levels
C-weighted is used to measure peak, impact or explosive noises

13.4.1 CONTROL MEASURES:

The following can be the possible control measures, to reduce the health risk due to Noise, but not limited to:

- Other alternative working methods which can possibly reduce or eliminate crew exposure to Noise
  
  a) When purchasing new work equipment the vessel in co-ordination with purchase department can receive equipment's with minimal Noise, and should receive information on safe use and, where necessary, training requirements and information on how to maintain the equipment

- By reviewing or implementing appropriate maintenance programmes for work equipment, the workplace and workplace systems in order to reduce Noise, which can be caused by wear and tear or misalignment of components

- By reviewing and improving the design and layout of workplaces and workstations in order to avoid and minimise work period in noisy environment

- For noise generated by impact, can verify the possibility of eliminating the impact, reducing its velocity, changing from metal to plastic materials, or cushioning or coating one or both of the surfaces

- By minimizing, if possible, the time during which the noisy equipment is run

- By providing adequate information and training to seafarers to ensure that Crew are familiar with the effects of Noise and familiar with usage of work and personal protective equipment which should be used correctly and safely in order to reduce exposure to Noise

- By adapting measures to seafarers who are particularly sensitive to Noise and

- By improvising on working system by taking into account the results from any health surveillance that has been carried out.

- Regularly monitor the noise levels by the noise meter provided and comply with control measures as per the risk assessment carried out

Except in an emergency, noise in the accommodation and service spaces should not exceed the following limits –

<table>
<thead>
<tr>
<th>Area</th>
<th>Maximum Noise Limit dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation Space</td>
<td></td>
</tr>
<tr>
<td>Cabins and hospitals</td>
<td>60</td>
</tr>
<tr>
<td>Mess rooms</td>
<td>65</td>
</tr>
<tr>
<td>Recreation room</td>
<td>65</td>
</tr>
<tr>
<td>Open recreation areas</td>
<td>75</td>
</tr>
<tr>
<td>Offices</td>
<td>65</td>
</tr>
</tbody>
</table>
The maximum noise limits stated above are in accordance with IMO Resolution A.468(XII) Code on Noise Levels on Board Ships.

**CONTROL OF NOISE**

**Objective** – to reduce and prevent the risk of seafarers being exposed to harmful levels of noise

- **Risk Assessment**
  - Risk assessment is carried out to assess the level of noise to which seafarers are exposed. If necessary this may require a measurement of the Exposure Limit Values & Exposure Action Values, to determine if they have been exceeded.

- **A copy of the risk assessment is to remain on the vessel.**

- **Lower Exposure Action Values**
  - Daily or weekly personal exposure = 80dB
  - Peak sound pressure = 135dB

- **Upper Exposure Action Values**
  - Daily or weekly personal exposure = 85dB
  - Peak sound pressure = 137dB

- **If this value is exceeded the ship owner is to provide hearing protection.**

- **If at or above this value hearing protection shall be worn and the area is to be identified by means of a sign stating hearing protection is to be worn.**

- **If this value is exceeded a programme of technical or organisational measures are to be implemented.**

- **This is an absolute limit. Seafarers shall not be exposed to noise exceeding this value.**

- **Immediate action is to be taken to reduce the exposure limit value, and the reasons why it has occurred are to be identified.**

- **Health Surveillance**
  - May be required following the risk assessment.

- **To be reviewed if there are significant changes which may affect its validity, or if results of health surveillance indicate there is a further risk.**

- **If the Exposure Limit Values have been exceeded. Daily or weekly personal noise exposure = 87dB. Peak sound pressure = 140dB.(Any reduction in exposure provided by hearing protection may be taken into account when calculating this value).**

- **A suitable and sufficient information, instruction and training are to be made available to seafarers.**
13.5 Hazardous Substances

Many substances found on ships are capable of damaging the health and safety of those exposed to them. They include not only substances containing hazard warning labels (e.g., on dangerous goods cargoes and ships’ stores) but also, for example, a range of dusts, including hardwood dusts, fumes and fungal spores from goods, plant or activities aboard ship.

Risk assessment will identify where personnel are working in the presence of substances hazardous to health or safety, and evaluate any risks from exposure. Appropriate measures should be taken to remove, control or minimise the risk.

The risk assessment will also provide information to determine whether health surveillance is appropriate (Refer HSM Chapter 12).

As an aid to the identification of hazards and the assessment of risks from dangerous goods reference may be made to the International Maritime Dangerous Goods Code or to the Chemical data sheets contained in the Tanker Safety Guides (Gas and Chemical) issued by the International Chamber of Shipping. Information concerning hazardous cargoes carried in bulk should be available where applicable to allow the assessment to be made.

In the case of ship’s stores etc., reference should be made to the manufacturer’s instructions and material safety data sheets (MSDS), which may be supplied with the goods. Reference may also be made where appropriate to the series of publications issued by the Health and Safety Executive under the Control of Substances Hazardous to Health Regulations. MSDS should be displayed near the storage area.

The risk assessments shall also consider the risk arising from exposure to carcinogens and mutagens.

A “carcinogen” is a substance for which evidence exists establishing a link between exposure to it and the development of cancer, and a “mutagen” is a substance for which evidence exists establishing a link between exposure to it that substance and heritable genetic damage.

Vessel to ensure that supplier of a dangerous chemical to provide information about the hazards. This information is usually provided on the package itself (E.g. by means of a label) and, if supplied for use at work, in a Material Safety Data Sheet (MSDS)

Where the risk assessment reveals a risk to workers’ health and safety from carcinogens and mutagens, and the measures required in section do not result in the complete removal of that risk, it must be ensured that in no circumstances does the exposure exceed the limit values set out in the Regulations

13.5.1 Prevention or control of exposure:

The first consideration should always be to prevent exposure by removing the substance, eg by substituting a less harmful one.
Where this is not reasonably practicable, prevention or control of exposure may be achieved by any combination of the following means:

(a) total or partial enclosure of the process and handling systems;
(b) use of plant, processes and systems of work which minimise the generation of, or suppress and contain/prevent, spills, leaks, dust fumes and vapours of hazardous substances;
(c) the limitation of the quantities of a substance at the place of work;
(d) keeping the number of persons who might be exposed to a substance to a minimum, and reducing the period of exposure;
(e) prohibiting eating, drinking and smoking in areas that may be contaminated by the substance;
(f) hygiene measures, including providing adequate washing and laudering facilities and regular cleaning of walls/bulkheads and other surfaces;
(g) the designation of those areas which may be contaminated and the use of suitable and sufficient warning signs; and
(h) the safe storage, handling and disposal of hazardous substances and use of closed and clearly labelled containers.

(i) use of appropriate procedures for the measurement of hazardous substances, in particular for the early detection of abnormal exposures resulting from an unforeseeable event or an accident;
(j) the taking of individual/collective protection measures; and
(k) where appropriate, drawing up plans to deal with emergencies likely to result in abnormally high exposure.

These measures should be applied to reduce the risk to personnel to the minimum, but where they do not adequately control the risk to health, personal protective equipment should be provided in addition.

Personnel should comply fully with the control measures in force.

For certain substances very specific control measures apply; e.g. asbestos, benzene. In cases where failure of the control measures could result in risk to health and safety, or where their adequacy or efficiency is in doubt, the exposure of personnel should be monitored and a record kept for future reference.

### 13.6 GAS HAZARDS
#### 13.6.1 Oxygen (Deficiency)

Normal atmosphere contains 21% oxygen by volume. As the amount of available oxygen decreases below the normal 21% by volume, breathing tends to become faster and deeper. Most people would fail to recognize the danger until they are too weak to be able to escape without help. This is especially so when escape involves the exertion of climbing.

The oxygen content of the atmosphere in enclosed spaces may be low for several reasons. The most obvious one is if the space is in an inert condition (on tankers), and the oxygen has been displaced by the inert gas. Oxygen may also be removed from an atmosphere by chemical reactions, such as rusting or the hardening of paints or coatings. The process of bacteriological degradation also consumes oxygen. It must be expected that any space, which has been closed for any significant
period, may be deficient in oxygen – especially if uncoated. Any space adjacent to or otherwise
connected with a space that has been pressurised with inert gas may also be deficient in oxygen.

While individuals vary in susceptibility, all will suffer impairment if the oxygen level falls to 16% by
volume. Exposure to an atmosphere containing less than 10% oxygen content by volume inevitably
causes unconsciousness. The rapidity of onset of unconsciousness increases as the availability of
oxygen diminishes, and death will result unless the victim is removed to the open air and resuscitated.

An atmosphere containing less than 5% oxygen by volume causes immediate unconsciousness with
no warning other than a gasp for air. If resuscitation is delayed for more than a few minutes,
irreversible damage is done to the brain, even if life is subsequently saved.

Visual and audible alarm settings on personal oxygen meters are typically set for 19.5 percent
oxygen. If the alarm is activated, all personnel should vacate the space immediately.

13.7 TOXIC GASES

The toxicity of petroleum gases can vary widely depending on the major hydrocarbon constituents of
the gases.
Several indicators are used to characterise the effects of toxic vapours in various concentrations.

- **Threshold Limit Value (TLV)** – airborne concentrations of substances under which it is
believed that nearly all workers may be exposed day after day with no adverse effect. There
are three different types of TLV:

- **Time Weighted Average (TLV-TWA)** – The airborne concentration of a toxic substance
averaged over an 8 hour period, usually expressed in parts per million (ppm).

- **Short Term Exposure Limit (TLV-STEL)** – The airborne concentration of a toxic substance
averaged over any 15 minute period, usually expressed in parts per million (ppm).

- **Ceiling (TLV-C)** – The concentration that should not be exceeded during any part of the
working exposure.

In spite of the fact that serious health effects are not likely as a result of exposure to TLV
concentrations, the values are only guidelines. Best practice is to maintain concentrations of all
atmospheric contaminants as low as reasonably practicable (ALARP).

13.7.1 Hydrogen Sulphide

Hydrogen Sulphide (H₂S) is a very toxic, corrosive and flammable gas. This gas is present in ‘sour’
crude Oil and at times found in Fuel Oil. H₂S is colourless, is heavier than air, has a relative vapour
density of 1.189 and is soluble in water.
The effects of H₂S at various increasing concentrations in air are laid out in the following table:

<table>
<thead>
<tr>
<th>H₂S Concentration (ppm by volume in air)</th>
<th>Physiological Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 – 0.5 ppm</td>
<td>First detectable by smell.</td>
</tr>
<tr>
<td>10 ppm</td>
<td>May cause some nausea, minimal eye irritation.</td>
</tr>
<tr>
<td>25 ppm</td>
<td>Eye and respiratory tract irritation. Strong odor.</td>
</tr>
<tr>
<td>50 – 100 ppm</td>
<td>Sense of smell starts to break down. Prolonged exposure to concentrations at 100 ppm induces a gradual increase in the severity of these symptoms and death may occur after 4-48 hours exposure.</td>
</tr>
<tr>
<td>150 ppm</td>
<td>Loss of sense of smell in 2-5 minutes.</td>
</tr>
<tr>
<td>350 ppm</td>
<td>Could be fatal after 30 minutes inhalation.</td>
</tr>
<tr>
<td>700 ppm</td>
<td>Rapidly induces unconsciousness (few minutes) and death. Causes seizures, loss of control of bowel and bladder. Breathing will stop and death will result if not rescued promptly.</td>
</tr>
<tr>
<td>700+ ppm</td>
<td>Immediately fatal.</td>
</tr>
</tbody>
</table>

Note: Persons over-exposed to H₂S vapor should be removed to clean air as soon as possible. The adverse effects of H₂S can be reversed and the probability of saving the person's life improved if prompt action is taken.

Table – Typical effects of exposure to hydrogen sulphide (H₂S)
The TLV-TWA of hydrogen sulphide is 5 ppm over a period of eight hours. Special care must therefore always be taken during the bunkering.

More details provided in Cargo Operation manual (Tanker).

13.7.2 Benzene

Benzene is considerably more toxic than generalised hydrocarbon vapours and typically has a TLV-TWA of 1 ppm over a period of eight hours.

Benzene primarily presents an inhalation hazard. It has poor warning qualities as its odour threshold is well above the TLV-TWA. An exposure to this chemical also presents a long-term chronic health hazards. Benzene can also be absorbed through the skin and is toxic if ingested.

These chemicals are present in significant quantities in many petroleum cargoes such as gasolines, gasoline blending components, reformats, naphthas, special boiling point solvents, turpentine substitute, white spirits and crude oil.
13.7.3 Mercaptans

Mercaptans are colorless, odorous gases generated naturally by the degradation of natural organisms. Their smell has been likened to rotting cabbage.

Mercaptans may occur on ships where seawater has remained beneath an oil cargo or where oil residues are left in tanks that contain water. They are also found in water treatment plants and ballast treatment facilities.

Mercaptans are also present in the vapours of pentane plus cargoes and in some crude oils. They are also used as an odorizing agent in natural gas. The initial effects of Mercaptans on people are similar to those caused by H2S exposure.

13.8 ASBESTOS

Working with asbestos can release small fibres into the air. Breathing these fibres in can eventually lead to a number of fatal diseases. These include:

- Asbestosis or fibrosis (scarring) of the lungs;
- Lung cancer; and
- Mesothelioma (cancer of the inner lining of the chest wall / abdominal cavity).

Although the body will get rid of most of the larger fibres that can enter the nose and mouth, tiny fibres can pass into the lungs. The body naturally gets rid of any asbestos fibres taken in with food and water. Asbestos fibres cannot be absorbed through the skin. Provided the asbestos material is intact and in a position where it cannot easily be damaged, it will not pose a risk to health by releasing fibres into the air.

There is no cure for asbestos-related diseases. There is usually a long delay between first exposure to asbestos and the first symptoms of disease. This can vary between 15 and 60 years. It is possible that repeated low-level exposures may lead to asbestos-related diseases.

13.8.1 Uses of Asbestos

Asbestos was used earlier for thermal insulation (lagging), brake (friction) linings, jointing and packing. In addition to solid sheets, it may occur in sprayed form, pre-formed mouldings and inside insulating boards.

13.8.2 Protection

The hazard from asbestos only exists where material is in dust or fibrous forms. The hazard increases with disturbance of the material.

Asbestos-free materials shall be used for all applications, including jointing, packing, lagging and brake linings.

Any dust, broken or disturbed material containing, or suspected to contain asbestos should be double-bagged (in plastic bags) and clearly marked.
On all new ships being delivered after 01 July 2012, Asbestos-free declarations and supporting documentations will be collected from shipyard and equipment manufacturers’ prior vessel’s delivery. These documentations will be reviewed by the Superintendent in charge of the take over and then handed over to the Master. This point has been included in the task list which is part of Management of Change.

On existing ships, before finalizing any repair work (including work at ship yard) carried out after 01 July 2012, company will obtain and verify necessary Asbestos-free declarations and supporting documentations from service provider and manufacturers. This point has been included in the task list which is part of Management of Change.

Every purchase order issued includes a statement to attach necessary Asbestos-free declarations and supporting documentations issued by manufacturers. Any material used as a working part of the ship after 01 July 2012 shall be supported with an asbestos free declaration. Upon delivery of these items, Chief Officer and Chief engineer shall review and receive the Asbestos-free declarations and supporting documentations. In case this documentation is not available, vessel shall inform office and not use the material till the documentation is received.

Before carrying out any maintenance / repair work or installing new equipment after 01 July 2012, necessary Asbestos-free declarations and supporting documentations shall be confirmed prior using materials, equipment, installations and parts as per annex I. If there are no Asbestos-free declarations and supporting documentations available, the repair work should not be started and Master shall contact the Superintendent for further follow up.

Copy of Asbestos-free declarations and supporting documentations shall be maintained on board and in office. The vessel’s superintendent is the nominated person for ensuring that Asbestos-free declarations and supporting documentations are provided for any installation of new equipment and for any repair work.

A file should be initiated in the vessel for maintaining all the Asbestos-free declarations and supporting documentations. This should be kept with Master. Classification societies will audit the documentation during annual safety construction and safety equipment surveys.

### 13.9 DERMATITIS

The symptoms of Dermatitis include redness, itching, scaling and blistering. If it gets worse the skin can crack and bleed and the dermatitis can spread all over the body. It can be bad enough to keep you off work or compel you to change jobs. If it is recognised early and adequate precautions are taken, most people will make a full recovery. But some people can be affected for life.

The skin coming into contact with particular substances or chemicals causes dermatitis. Because of this it is sometimes called ‘occupational contact dermatitis’. How quickly you get it depends on a number of things:

- The substance;
- Its strength or potency;
- How long and how often it touches the skin.
Some things might affect you almost the first day you use them, others might take weeks, months or even years to cause occupational dermatitis.

Dermatitis usually affects the hands or forearms, the places most likely to touch the substance. But you can get it on your face, neck or chest from certain types of dusts, liquids and fumes. Dermatitis can even spread to parts of your body that haven’t been in contact with the substance. It can be very painful. But with a little care most cases can be prevented.

13.9.1 Prevention

In some jobs, you may not be able to avoid working with substances which can cause dermatitis but there is still a lot you can do to protect yourself:

- Wearing gloves. It may not be appropriate to wear gloves all the time, but wearing gloves when handling substances that can cause dermatitis (and remember to change them frequently) will help.
- Using barrier and moisturising cream before and after work. This will help to protect and replace the natural oils that your skin loses when you wash or when you come into contact with detergents and solvents.
- Wear a face shield or full-face mask, and protective coveralls where liquids, fumes or dust that can cause dermatitis might get onto your face and neck.
- Keep your skin clean.
- Make sure your protective clothes are clean and intact.
- Keep your workplaces clean, including machinery and tools.

DO NOT use industrial solvents or detergents (e.g. toluene, gasoline, laundry detergents), which are not designed for use on skin, to clean your hands, or any other part of your body.

If you start to get dermatitis and it is spotted at an early stage, you can do something about it. If you ignore the problem, it might not go away: it could affect you for life. Report any skin problems to the ship’s medical Officer as soon as possible.

13.9.2 Supervisors

Officers and supervising crew should ensure that crew take proper precautions to prevent unnecessary skin contact with chemicals and other substances, which could cause dermatitis. This includes proper use of Personal Protective Equipment.

Heads of Departments shall ensure that adequate supplies of Personal Protective Equipment and proprietary hand cleansers are maintained on board for their departments.

13.10 HEAT RELATED ILLNESS

All ship-staff are to be aware of the problems that can be encountered by individuals while working in hot and humid environments. These conditions are largely brought on by heat and dehydration – and with proper care it is possible to prevent them.
Heat Cramps

- Heat cramps are muscle contractions, usually in the hamstring muscles (the muscles at the back of the calves).
- These contractions are forceful and painful.
- These cramps are believed to be connected to heat, dehydration, and poor conditioning, rather than due to lack of salt or other mineral imbalances. They usually improve with rest, drinking water, and a cool environment.

Heat Syncope

This is a fainting spell induced in a person when the body tries to compensate for the excessive heat by diverting blood from the brain to the skin.

Heat Exhaustion

- Although partly due to exhaustion – and feeling like exhaustion, as the name implies – heat exhaustion is also a result of excessive heat and dehydration.
- The signs of heat exhaustion include paleness, dizziness, nausea, vomiting, fainting, and a moderately increased temperature (101- 102 °F), which, in this case, is not truly a fever, but caused by the heat.
- Additional symptoms may be a clammy skin, diarrhea, rapid pulse, and weakness. Rest and water may help in mild heat exhaustion, and ice packs and a cool environment (with a fan blowing at the person) may also help. More severely exhausted patients may need intravenous fluids, especially if vomiting keeps them from drinking enough.

Heat Stroke

- Heat stroke is the most severe form of heat illness and characteristically indicates a failure of the body’s temperature control systems.
- Heat stroke can be fatal depending upon severity and treatment.
- It can occur even in people who are not working or exercising, if the weather is hot enough. These people have warm, flushed skin, and do not sweat. Persons who have heat stroke after a period of working in hot weather, though, may still be sweating considerably.
- Whether activity-related or not, a person with heat stroke usually has a very high temperature (106 °F or higher), and may be delirious, unconscious, or having seizures. Other symptoms may include confusion, agitation, hyperventilation, a racing pulse, and lethargy.
- These patients need to have their temperature reduced quickly, often with ice packs, and must also be given IV fluids for rehydration; they must be taken to the hospital as quickly as
possible and may have to stay there for observation since there is a possibility of organ failures due to the raising of the body’s temperature to very high levels.

13.11 PREVENTION

Heat-related illnesses can be prevented:

- The important thing is to stay well hydrated; to make sure that your body can get rid of extra heat, and to be sensible about exertion in hot, humid weather.
- Sweating is the body’s main system for getting rid of extra heat through evaporation from the skin. As long as blood is flowing properly to the skin, extra heat from the body’s core is "pumped" to the skin and removed by sweat evaporation.
- Dehydration reduces the body’s ability to dissipate heat in two ways: one, by limiting the amount of fluid available for sweating, and two, by keeping blood away from the skin to keep the blood pressure at the right level.
- Dehydration sets in because the body loses water through sweat, and it is important that that loss be made up.
- The best fluid to drink is water. When working in hot and humid conditions, it is advisable to drink at least 4.5 liters (8 pints) of cool (but not iced) water daily. Alcoholic drinks are to be definitely avoided.
- Although a little salt is lost through sweat, it is not of much significance; this loss is better made up by eating lightly salted foods rather than taking salt tablets, which may have an undesirable side effect of raising the body’s sodium content to hazardous levels.
- Remember, if the air is humid, it’s harder for sweat to evaporate, and the body finds it that much more difficult to get rid of excess heat than it would if the environment were drier. So, when working in hot and humid environments, whether it is in the engine room or inside a tank, remember to take the following precautions:
- Drink lots of water and drink it frequently. Drink more than is needed to quench thirst.
- Limit working time in such places. If work requirements compel persons to stay in these spaces for a long duration, then implement a regime of periodic breaks to rest in a cool, dry place.
- When working in tropical areas, especially during the summer months, it is recommended that work timings be adjusted so that a break is taken during the afternoons to avoid working during the hottest and most uncomfortable part of the day.
- Do not ignore the symptoms of heat exhaustion or heat stroke – bravado or an “I can manage” attitude may progress the illness to a critical stage. Recognize the symptoms early, report to the supervisor and leave the space immediately for rehydration, cooling down or further treatment.
13.12 FIRST-AID

- First aid for a person suffering from heat exhaustion or while waiting for emergency medical help for a person suffering from heat stroke:
  - Take him out of the hot environment and bring him into the accommodation.
  - Fan with a newspaper, towel or direct the air stream from a blower towards him.
  - Sprinkle with water, apply wet towels or in the case of a heat stroke victim, apply ice packs to areas of his body that have the greatest blood supply (the neck, under the arms and knees, the groin etc.).
  - Elevate the feet to direct blood back towards the head.
  - If the person is conscious, offer plenty of fluids – water (preferably lightly salted), electrolyte solution.

List of Occupational Diseases

For list of internationally recognized occupational diseases please refer to the following publication:
List of occupational diseases (revised 2010)
Identification and recognition of occupational diseases: Criteria for incorporating diseases in the ILO list of occupational diseases