ABU DHABI OIL REFINING COMPANY (TAKREER)

RUWAIS REFINERY EXPANSION (RRE) PROJECT

PROJECT NO. 5578 / AGREEMENT NO. 09-5578-E-4

EPC PACKAGE - 4 : TANKAGE AND ASSOCIATED INTERCONNECTING PIPING

DOCUMENT / DRAWING COMMENTS SHEET

COMMENTS TO BE RETURNED TO:
COMPANY/PMC

FAX NO.:

BY DATE:

FAX NO.:

BY DATE:

Contractor Transmittal No.	**T-DH-5578-E4-1587**	**Recd. Date**	**29 Oct 2010**
Document No.	**5578-E4-HSE-HU-00014**	**Rev. Date**	**20 Oct 2010**
Document Title	**Personal Protective Equipment (PPE) Management Procedure**	**Rev**	**0**

COMMENTS:

By: **Signed** **Date**

Review Code:

1. REJECTED : REVISE AND SUBMIT ☐
2. COMMENTS AS NOTED : WORK MAY PROCEED SUBJECT TO COMPLIANCE WITH AND INCORPORATION OF COMMENTS ☐
3. NO COMMENTS : WORK MAY PROCEED ☐
4. INFORMATION ONLY. : ACCEPTED FOR INFORMATION ONLY ☐

No. of Pages attached to this form :

PERSONAL PROTECTIVE EQUIPMENT (PPE) MANAGEMENT PROCEDURE

AGREEMENT NO.	**:**	**09-5578-E-4**
PROJECT NAME	**:**	**Ruwais Refinery Expansion Project EPC-4: Tankage & Associated Interconnecting Piping**
COMPANY	**:**	**Abu Dhabi Oil Refining Company (TAKREER)**
PMC	**:**	**Mott MacDonald Ltd.**
CONTRACTOR	**:**	**Daewoo Engineering & Construction Co., Ltd.**

This page is a record of all revisions of this document. All previous issues are hereby superseded and are to be destroyed.

DOC. CLASS: T/1

DIST. CODE: 18/19

REV	DATE	REASON FOR ISSUE	PREP	CHKD	REVD	APP'D	COMPANY
0	20 Oct 2010	Issued For Construction	D. Bhandari	A. Mesquita	D Y Kim	M Heo	
B	16 August 10	For Review and Approval	C Wardman	D Y Kim	J Brand	M Heo	
A	25 Jun 10	For Review and Comment	C Wardman	D Y Kim	J Brand	M Heo	
SIGNED (Initials)							

NOTES:

(a) Revisions are denoted by a vertical line placed in the right-hand margin against the revised text.

(b) PREP = Prepared by, CHKD = Checked by, REVD = Reviewed by, APP'D = Approved by.

(c) In case of conflict between any requirements stipulated in this document with the contractual requirements, the contractual requirements shall prevail.

REVISION INDEX DETAILS

Rev	Location of Change	Brief Description of Change

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1. INTRODUCTION

This procedure has been developed to provide a guideline for the selection, use and maintenance of Personal Protective Equipment (PPE) on the RRE Project, EPC- 4 (Hereafter "PROJECT").

The use of personal protective equipment should always be the last control measure to be considered when controlling hazards, however there will be minimum defined PPE that should be worn at all times when entering the site. Non compliance to PPE requirements should be seen as a serious offence, as this is one of the most fundamental HSE Management principles and disregard for this principle waters down the effectiveness of the entire HSE Management system.

1.1 Purpose

The purpose of this procedure is to provide guidelines that ensure adequate selection, provision, use, maintenance and enforcement of use of PPE for CONTRACTOR and its subcontractor personnel.

Its use does neither eliminate the hazard nor does it prevent incidents but helps to reduce the impact or adverse health effects, if used correctly.

The purpose and objective of this procedure can be summarized as follows:

1.1.1 Clearly define the scope of this procedure

1.1.2 Outline responsibilities in terms of this procedure

1.1.3 Detail references in terms of PPE Management

1.1.4 Define the selection and use PPE on site, including;

- Head Protection
- Hand Protection
- Foot Protection
- Protective Clothing
- Eye Protection
- Ear Protection
- Fall Arrest
- Respiratory Protection

1.1.5 Detail the requirements for care and maintenance of PPE

1.1.6 Define training requirements in terms of use and maintenance of PPE

1.2 Scope

The PPE Management Procedure is applicable to all personnel working on the PROJECT, including the site, off-site and camp locations.

The procedure is limited to the requirements of general PPE requirements of head, hand, foot, eye, ear, fall, respiratory protection, protective clothing and fall arrests systems. It is however important to understand that specific PPE requirements should be clearly defined in job specific risk assessments.

1.3 References

1.3.1 HSE-CP 55 Personal Protective Equipment (PPE)

1.3.2 American Conference of Governmental Industrial Hygienists (ACGIH)

1.3.3 British Standards (BS)

1.3.4 European Standards (BS EN)

1.3.5 The Health and Safety Executive (HSE)

2. DEFINITIONS

ACGIH American Conference of Governmental Industrial Hygienists (ACGIH) is a professional association of industrial hygienists and practitioners of related professions, with headquarters in Cincinnati, Ohio, USA. One of its goals is to advance worker protection by providing timely, objective, scientific information to occupational and environmental health professionals.

ANSI The American National Standards Institute or ANSI is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States.

BS British Standards (BS) are the standards produced by BSI Group which is incorporated under a Royal Charter (and which is formally designated as the National Standards Body (NSB) for the UK). The objectives of BS are to
set up standards of quality for goods and services, and prepare and promote the general adoption of BS and schedules in connection therewith and from time to time to revise, alter and amend such standards and schedules as experience and circumstances require.

BS EN ISO British- (BS), European- (EN) and International (ISO) standards

CE The initials “CE” stand for Conformité Européenne, which is French for “European Conformity. This mark indicates that the manufacturer has ensured each of their products bearing this mark have undergone testing and conform to the standards set forth in the European Directive(s) applicable to each product respectively.

Company Abu Dhabi Oil Refining Company (TAKREER)

Contractor Daewoo Engineering and Construction Company Ltd.

HSE The Health and Safety Executive (HSE) is a non-departmental public body in the United Kingdom. It is the body responsible for the encouragement, regulation and enforcement of workplace health, safety and welfare, and for research into occupational risks in England and Wales and Scotland.

PMC Mott MacDonald

PPE Personal Protective Equipment is defined as all equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work & which protects him against one or more risks to his/her health or safety. For example: safety helmets, gloves, eye protection, high-visibility clothing, safety footwear & Fall Protection System

3. RESPONSIBILITIES

3.1 Project Manager

The Project Manager is responsible to ensure that this procedure is applied consistently at all levels including DEC, subcontractors, vendors and visitors.

3.2 HSE Manager

The HSE Manager is responsible for the monitoring of use of PPE through HSE personnel and to provide guidance, advice and training in regards to selection, use and maintenance of PPE. He will ensure that "bad" or "worn" PPE is confiscated and replaced immediately after identification. He will also ensure that adequate communication is done regarding mandatory PPE requirements for site.

3.3 Line Managers

The Line Managers are responsible for the provision of all necessary safety equipment to execute the works safely, and has to ensure that PPE is maintained in a "good" condition. Line Managers will also have to ensure that PPE is inspected as required.

3.4 Supervisors

The Supervisors are responsible to ensure that their workers are provided with adequate PPE, and "bad" or "worn" PPE are replaced as and when required. The Supervisors will also ensure that workers strictly comply with PPE requirements for site, and lead by example in this regard.

3.5 Safety Personnel

Safety personnel shall carry out daily inspection to properly ensure that PPE requirements are met, and specific PPE requirements are strictly followed. Safety personnel will at all times lead by example and ensure their required PPE are worn and in "good" condition.

3.6 Site Personnel

All site personnel have the responsibility for signing for any personal protective equipment issued to them and shall ensure that it is used as required. They are responsible for maintaining and using the correct PPE while performing their task and complying with HSE rules and regulations and immediately reporting "bad" or "worn" PPE to their supervisors to ensure maintenance or replacement is done. They will be responsible to perform daily and pre-task inspections on all applicable PPE.

4. PERSONAL PROTECTIVE EQUIPMENT

The basic PPE to be worn by all site personnel at all times are a safety helmet, safety glasses with side protection (panniers), steel toe capped safety footwear and overalls (100% cotton only or fire resistant). Any specific PPE requirements will be detailed in the Method Statement and/ or Risk assessment relevant to the job being performed.
Helmets are to be worn as designed; wearing and rigging the helmet to facilitate the rim facing backwards will not be tolerated and is in violation of this PPE Procedure.

All PPE used on site shall as a minimum have the CE marking. Non compliance to PPE requirements will result in disciplinary action.

4.1 Head Protection

4.1.1 General
Safety Helmets/ Hard hats protect the wearer against head injuries caused by falling objects, blows or other impacts. The helmet gives some protection against splashing by liquids. It should be manufactured from plastics.

The following are examples of activities and processes involving risks of falling objects or impacts, which may require the provision of head protection:

- Building work, work on (or near) scaffolding and demolition work.
- Work in pits, trenches, shafts and tunnels.
- Work with bolt-driving tools.
- Blasting work.
- Work near hoists, lifting plant, cranes and conveyors.
- Work with containers, machinery, silos, storage bunkers and pipelines.
- Transport activities involving a risk of falling material.
- Work from suspended access systems, etc.

Head protection shall fit properly and be comfortable. Personnel requiring head protection shall be provided with instruction on its use and maintenance including, where appropriate, compatibility with other types of PPE.

Helmets are required to be replaced if subjected to severe impact. The use of paint (aerosol type) may affect the integrity of the helmet and should not be allowed. Metal safety helmets shall not be worn.

4.1.2 Selection

There are three types of head protection used widely in industry:

- Industrial safety helmets that can protect against falling objects or impact with fixed objects.
- Industrial scalp protectors (bump caps), which can protect against striking fixed obstacles, scalping or entanglement.
- Caps, etc. that can also protect against scalping/entanglement.

All personnel entering PROJECT workplaces where a risk of head injury may exist shall wear safety helmets.

4.1.3 Special Requirements

Air Supplied Helmets

The air supplied helmets (positive pressure hoods) should be worn when working with chemical sprays or grit blasting.

Welding Helmets/ Caps

Welding helmets/ caps, which give protection against dangerous arc radiation and hot particles of weld metal, shall be worn when engaged in welding operations. It is important to note that welding helmets should provide adequate head protection at the same time, or should be compatible with safety helmets/ hard hats.

4.1.4 Care and Maintenance

Safety helmets must be properly cared for and maintained by:

- Storing them in a safe place when not in use, for example on a peg or in a cupboard.
- Visually examining them regularly for signs of damage or deterioration.
- Replacing defective harness components.
- Regularly cleaning or replacing the sweat band.

All safety helmets are susceptible to loss of strength and impact resistance from ultraviolet light, temperature extremes and chemical degradation. An inspection and maintenance program that includes provision for replacement should be established.

The service life of a safety helmet can be extended by cleaning both the shell and harness as part of the maintenance program. These parts can be scrubbed with a mild detergent (not soap) to remove dirt and stains, rinsed thoroughly with warm water (40° C), wiped dry and then inspected for any signs of damage. This should also be carried out before issuing a used safety helmet to another person.

4.1.5 Color Coding of Safety Helmets

Safety Helmets will be color coded to easily differentiate between different disciplines and staff levels. The following color coding will be applied on the PROJECT.

Supervisors

- Supervisors - White Helmets
- Civil and Architecture – White with brown band
- Tank – White with green band
- Piping – White with red band
- Equipment & Structure – White with blue band
- Electrical and Instrument – White with black band

Labor

- Labour - Yellow
- Civil and Architecture – Yellow with brown band
- Tank – Yellow with green band
- Piping – Yellow with red band
- Equipment & Structure – Yellow with blue band
- Electrical and Instrument – Yellow with black band

HSES – Green

4.1.6 Codes and Standards

Helmet standard shall comply with EN *397 - Industrial Safety Helmets*

Other Relevant standards for protective headgear are:

– EN 443:1997 Specification For Protective Helmets For Fire-fighters;

– EN 812:1997 – industrial Bump Caps.

4.2 Eye Protection

4.2.1 General

Eyes can be damaged by dust particles, fumes, liquids and certain types of light (e.g. lasers, welding flash, ultra-violet). Protection may take the form of:

- Shatter-proof spectacles.
- Various types of goggles.

- Face shields.
- Visors.
- Various types of tinted glasses.

The lenses of eye protectors shall be kept clean as dirty lenses restrict vision, which can cause eye fatigue and lead to accidents.

4.2.2 Selection

The selection of eye protection depends primarily on the hazard. However, comfort, style and durability must also be considered.

- Safety spectacles are similar in appearance to prescription spectacles but may incorporate optional sideshields to give lateral protection to the eyes.
- Eyeshields are like safety spectacles but are heavier and designed with a frameless one-piece moulded lens. Vision correction is not possible as the lenses cannot be interchanged. Some eyeshields may be worn over prescription spectacles.
- Safety goggles are heavier and less convenient to use than spectacles or eyeshields. They are made with a flexible plastic frame and one-piece lens and have an elastic headband. Safety goggles are more prone to misting than spectacles. Double glazed goggles or those treated with an anti-mist coating may be more effective where misting is a problem. Where strenuous work is done in hot conditions, ‘direct ventilation’ goggles may be more suitable. However these are unsuitable for protection against chemicals, gases and dust. ‘Indirect ventilation’ goggles are not perforated, but are fitted with baffled ventilators to prevent liquids and dust from entering. Indirect ventilation goggles will not protect against gas or vapour.
- Faceshields are heavier and bulkier than other types of eye protector but are comfortable if fitted with an adjustable head harness. Faceshields protect the face but do not fully enclose the eyes and therefore do not protect against dusts, mist or gases. Visors on browguards or helmets are replaceable. They may be worn over standard prescription spectacles and are generally not prone to misting. Face shields with reflective metal screens permit good visibility while effectively deflecting heat.
- Face shields must not interfere with the wearing of a hard hat and are not a replacement for the requirement to wear safety glasses or goggles but a supplement to these.
- Glare filters or sunglasses: UV Protection for Eyes. Wearing suitable glare filters protects the eyes from UV flash from welding and allied processes. Sunglasses protect the eyes against the sun's harmful UV rays. Exposure to the sun's UV radiation can lead to a sunburn-like condition called photokeratitis, which is normally a temporary, but uncomfortable, condition. Long-term exposure to the sun's harmful invisible rays can speed up ageing of the macula, the focusing part of the retina, and can also lead to cataracts. It is important therefore to specify and/or buy sunglasses that meet minimum standards for protection. Sunglasses must conform to British Standard BS EN 1836:1997.
- The wearing of tinted or sunglasses inside buildings, structures or tanks where lighting may be limited is strictly prohibited. This practice reduces visibility and increases susceptibility to accidents.

4.2.3 Special Requirements

Corrective Lenses

Personnel wearing corrective lenses require the same level of eye protection as those without corrective lenses. A specially designed cover safety glass is to be worn on top of the corrective lenses. Impact resistance corrective lenses with side shields may be used for general purpose.

Welding Operations (Eye, Face and Neck Protection)

Welding operations require special eye, face and neck protection for the operator. Assistants, Firewatchers will also require protection against ultra-violet radiation.

Safety Goggles/ Face Shields

Certain operations are significantly more hazardous to the eyes, and the eye protection selected must be suitable against particular hazard in question. For operations including grinding, scraping, chipping, the handling of chemicals and solvents, sample taking, etc, advice should be sought from the HSE Department. Full-view goggles/face shields may be required and they should be suitable for dust or chemical protection.

4.2.4 Care and Maintenance

The lenses of eye and face protectors must be kept clean as dirty lenses restrict vision, causing eye fatigue and leading to incidents.

Scratched or pitted lenses should be replaced as they may impair vision and their resistance to impact may be impaired. Transparent face shields should be replaced when warped, scratched or brittle with age.

Eye protectors shall normally be issued on a personal basis and used only by the person they are issued to. If eye protectors are re-issued for any reason, they shall be thoroughly cleaned and disinfected. Eye protectors shall be protected by being placed in suitable cases when not in use. Eye protector headbands shall be replaced when worn out or damaged.

4.2.5 Codes and Standards

Welding shields must be suitable for protection against molten metal and hot particles and conform to the requirements of BS EN 175: 1997 Personal protection: equipment for eye and face protection during welding and allied processes, or an equivalent specification. It must be used in conjunction with appropriate welding filter – BS EN 169 or EN 379).

Other relevant standards for eye protection are as follows:

- BS 1542:1982 Specification for Equipment for Eye, Face and Neck Protection Against Non-Ionising Radiation Arising During Welding and Similar Operations.
- EN 165 Personal Eye Protection: Vocabulary.
- EN 166 Personal Eye Protection: Specifications
- BS EN 169:1992 Filters for eye protectors used in welding and similar operations.

- BS EN 172: 1995 Specification for Sunglare Filters Used In Personal Eye Protectors For Industrial Use.
- BS EN 175:1997 – Eye and Face Protection during Welding and Allied Processes.
- BS EN 379:1994 Specification for Filters with Switchable or Dual Luminous Transmittance for Personal Eye-Protectors Used in Welding and Similar Operations.
- EN 465:1995 / BS EN 466-1:1995- Protective clothing against liquid chemicals. Performance requirements for chemical protective clothing with spray-tight connections between different parts of the clothing.
- EN 467:1995 - Protective clothing against liquid chemicals. Performance requirements for garments providing protection to parts of the body
- BS EN 1836:1997, Personal eye protection - Sunglasses and Sunglare Filters for General Use. British Standards Institute 1997.
- BS EN 170: Specification for Ultra Violet filters.

4.3 Hand Protection

4.3.1 General

Gloves of the appropriate type shall be worn to prevent damage to the hands. The correct type for wear depends upon whether the hazard is from:

- Rough or sharp objects;
- Hot objects;
- Oils, solvents, corrosive substances and chemical contamination.

Gloves themselves can become a hazard if not in good condition as they can become caught in machinery, and loose-fitting, wet or oily gloves do not provide a good safe grip.

Care shall be taken in the donning, use, removal and storage of protective gloves. They shall be maintained in good condition, checked regularly and discarded if worn or deteriorated.

The gloves shall be a good fit, leaving no gap between the wearer's sleeve and the glove itself. If there is a danger of chemicals entering the glove at the cuff, armlets shall be worn. Gloves shall be maintained in accordance with the manufacturer's instructions.

Contact between the gloves and chemicals shall be kept to a minimum as the physical characteristics of a glove can be altered by some chemicals and may lead to the impairment of its protective properties.

Chemicals shall not be allowed to come into contact with the skin.

4.3.2 Selection

The table 1 below (UK Health and Safety Executive) recommends the most suitable glove materials to protect wearers from exposure. The importance of using material depends on the extent of the exposure. The table should be referenced when working with different materials.

TABLE 1: GLOVE MATERIAL FOR DIFFERENT CHEMICAL GROUPS

CHEMICAL GROUP	GLOVE MATERIAL					
	Natural Rubber	Nitrile Rubber	Neoprene™	PVC	Butyl	Viton™
Water Miscible Substances	×	×	×	×		
Oils		×				
Chlorinated Hydrocarbons						×
Aromatic Solvents						×
Aliphatic Solvents		×				×
Strong Acids					×	
Strong Alkalis			×			
PCBs						×

4.3.3 Special Requirements

Approved safety gloves must be worn for specific types of exposure;

Leather Rigger Gloves
Leather rigger gloves are required to be carried by all members of the crew, carrying out heavy duty lifting work. Fire fighting gloves provide better protection against heat and flame.

Chemical Handling (PVC/Neoprene Gloves)
Particular care should be taken when handling chemicals, which must not come into contact with the skin. PVC gloves for handling acids/alkalis should be worn. Special gloves are available (Nitrile) for handling solvents. Handle and remove gloves carefully to avoid contamination of hands and inside the gloves.

Wash hands and arms frequently, dry them carefully and use a hand cream to prevent dryness of the skin through loss of natural oils. Keep cuts and abrasions covered with waterproof plasters.

Kevlar Gloves

These gloves are worn as a preventive measure against major hand injuries, cuts, abrasions, and scrapes.
Kevlar gloves are suitable for working with glass, metal, wire and other sharp objects
These gloves may also resist organic solvents and diluted acids. Some designs are washable and breathable.
Kevlar brand fibres provide strength at high temperatures, which makes it appropriate for gloves and mittens used in high heat applications. The fibre of the glove is inherently flame-resistant, and unlike nylon, polyester and polyethylene, it will not won't melt, burn or support combustion in the air, ignite, or conduct electricity.
There are several types of Kevlar gloves that are flame-resistant, useful for work in the welding field.
One drawback to Kevlar is that it can be broken down by ultraviolet light, so it cannot be used in areas where there would be constant, long-term exposure to the sun.

Electrical Work (Electric Gloves / Power Isolation Gloves)

Wear approved Electric gloves while working on live electric equipment, however after the power is isolated and proven dead, general purpose gloves can be used.

4.3.4 Care and Maintenance

Where tests show that penetration through a glove can occur, a control system of regular glove checking, cleaning and replacement must be put in place.

Gloves are to be regularly examined for cuts, punctures, abrasion, cracks, contamination, etc. Areas between the fingers and other flex points must be carefully examined. Other gloves may be tested for leaks by inflating with low-pressure air (200 kPa) and immersing in a water bath while still under pressure.

Although it may be practical to decontaminate and re-use gloves in certain situations, the cleaning process usually does not remove all the toxic material, thus reducing breakthrough time for subsequent use. Discarded and contaminated gloves are to be destroyed in order to prevent unauthorized retrieval and use (this is especially important for gloves that may have been in contact with very toxic substances.)

Gloves should be stored at ambient temperatures away from light, moisture, solvents and chemicals. Each person should be issued with protective gloves on a personal basis to prevent the spread of contagious skin infections.

If rubber gloves for electrical work become dirty or soiled, they can be cleaned by washing with soap and water at a temperature not exceeding the glove manufacturer's recommended limit, then thoroughly dried and dusted with talcum powder. If insulating compounds such as mastic or paint continue to stick to the gloves, the affected parts should be sparingly wiped with a suitable solvent and re-cleaned. They may then be returned to their storage box or pouch.

4.3.5 Codes and Standards

Gloves suitable for general industrial use shall conform to the specifications contained in BS EN 420 -*BS EN 420:1994 General Requirements for Gloves*.

Gloves suitable for personnel working with electricity shall conform to BS EN 697 - *BS 697, 1986, Specification for Rubber Gloves for Electrical Purposes*. Gloves shall be rated for the voltage of the equipment to be worked on.

Heat resistant gloves shall be worn during welding and they shall conform to BS EN 407 - *BS EN 407:1994 Protective glove against thermal risk (heat and or fire).*

Other Relevant Standards for hand protection are:

- BS EN 388:1994 – Protective gloves against mechanical risks
- BS EN 374 (Parts 1 To 3) Protective Gloves Against Chemicals and Micro-Organisms [13].
- BS EN 388:1994 Protective Gloves Against Mechanical Risks [14].
- BS EN 421:1994 Protective Gloves Against Ionising Radiation to Include Irradiation and Contamination.

4.4 Foot Protection

4.4.1 General

Safety footwear protects against hazards ranging from dermatitis to crushing injuries. Within this broad range of hazards, consideration needs to be given to the possibility of contact with chemicals, extremes of heat, slippery surfaces, punctures from nails or other sharp objects, and electrical hazards both live and static. All personnel working in, or visiting, potentially hazardous areas such as construction sites, workshops, process areas, etc. must wear safety footwear at all times while in the area.

The following are examples of activities involving risks to the feet.

- **Construction,** work on building and demolition sites will usually require safety footwear to protect the feet from falling objects, objects dropped by the handler, tripping accidents and wheels running over feet.
- **Mechanical and Manual Handling,** there may be a risk of objects falling on or crushing the front of the foot. There may be a risk of a fall through slipping which could result in damage to the heel on impact.
- **Electrical,** people who work where there are flammable atmospheres shall wear anti-static footwear to help prevent ignitions due to static electricity.
- **Thermal,** work in hot conditions requires footwear with heat-resistant and insulating soles.

- **Chemical,** footwear provided when working with hazardous chemicals shall be both impermeable and resistant to attack by chemicals.
- **Welding**, Select boots that meet the safety requirements, during these operations there is an increased risk from sparks and molten metal and slag.

  Look for a compliance mark inside boot. Wear leather, steel-toed, high-topped boots in good condition. They protect feet and ankles from injury. In heavy spark or slag areas, use fire resistant boot protectors or leather spats strapped around pant legs and boot tops to prevent injury and burns.

4.4.2 Selection

The selection of foot protection depends primarily on the nature of the hazard. However, comfort, style and durability also need to be taken into account. The choice shall be made on the basis of compatibility with the work, degree of protection afforded, and the requirements of the user.
Generally, safety footwear shall be flexible, wet resistant and absorb perspiration. Boots are required where ankles need protection. The ability of the footwear to resist corrosion, abrasion and industrial wear and tear must also be considered. The manufacturer's instructions and markings for appropriate use and level of protection shall always be followed.

The key features of safety footwear which shall be considered in selection are:

- **Soles**, work shoes and boots shall have treaded soles for slip-resistance. Soles can be heat and oil resistant, slip resistant, shock resistant, anti-static or conductive.
- **Steel Toe-Caps,** they shall be capable of resisting a heavy sharp object falling from a considerable height.
- **Heat Resistance,** leather or other heat resistant materials can be used in safety footwear to offer protection against heat, sparks and molten metal. Leather spats are often employed to protect from these extremes.
- **Waterproofing,** people working in wet places shall wear safety footwear impervious to water. Rubber and PVC are suitable waterproofing materials for footwear because they are not permeable. There are 'breathable materials' which are water resistant, but which also allow air to get through and perspiration to get out, and may therefore be more comfortable and more hygienic.
- **Anti-static** footwear offers protection against the hazard of static electricity and gives some protection against mains electric shock. Anti-static footwear to be worn where there is both a hazard from static build up and the possibility of contact with mains electricity. The soles to have a resistance low enough to allow static electricity to leak slowly away while maintaining enough resistance to protect against a 240 V mains electric shock.

4.4.3 Special Requirements

Safety Shoes/ Boots
These are the most common types of safety footwear and normally comprise rubber soles and leather uppers with integrated steel toecaps. They may also have features such as slip resistant soles and steel mid-soles.

Rubber Boots
These protect against water and wet conditions and are useful in jobs where the footwear needs to be washed and disinfected for hygienic reasons, such as in food handling. Usually made from rubber, they are also made from polyurethane and PVC that have greater chemical resistance. Rubber boots are available with steel toecaps and instep guards.

Conductive Footwear
It also prevents the build up of static electricity. It is particularly suitable for handling sensitive components or substances. It gives no protection against electric shock.

Leather Spats
These are to be used by welders to provide extra protection to feet and ankles from sparks, molten metal and extremely hot slag.

4.4.4 Care and Maintenance

Safety footwear must be maintained in good condition, checked regularly and discarded if worn or deteriorated. Bootlaces are to be checked and replaced if necessary. Materials lodged in the sole tread should be removed without further damaging the tread. Stitching should be checked for loose, worn or cut seams.

Protective silicone sprays or waxes may be used to give protection against wet conditions.

4.4.5 Codes and Standards

Relevant Standards for foot protection are:

- BS EN 345-1:1992 Specification for Safety Footwear for Professional Use.
- BS EN 346-1:1992 and BS EN 346-2:1996 Specification for Protective Footwear for Professional Use
- BS EN 347-1 and BS EN 347-2:1996 Specification for Occupational Footwear for Professional Use.

4.5 Body Protection

4.5.1 General

During normal day-to-day construction work, body protection such as overalls shall be used. This is one of the mandatory PPE requirements to enter the Construction site. These are adequate to provide protection against dirt, grime, small oil splashes, minor abrasions and burns etc.

Standard overalls with long sleeves shall be used by all personnel, which are made of 100% cotton. No polyester cotton blends will be allowed.

Unique colored overalls shall be used by CONTRACTOR and its Subcontractor, with at least the Company's name printed on the overall. CONTRACTOR has selected a light blue overall with a blue strip across the shoulders for its labor and the same color for its Supervisors, but in a two piece.

4.5.2 Selection

The following factors should be considered when selecting overalls.

- Chemical and hazardous substances protection required
- Protection from Fibres and Dust required
- Foul weather protection required
- Protection from fire, sparks & welding debris

4.5.3 Special Requirements

Protection from chemicals and hazardous substances:

- Low Risk Chemicals can be protected against by wearing chemical-resistant clothing.
- Strong Solvents, Oils and Greases require heavier protection afforded by coats, overalls and aprons made from neoprene or polyurethane coated nylon, or Terylene or rubber aprons.
- Chemical Suits protect against more potent chemicals. They are totally encapsulating suits which are either vapour-proof or liquid-splash proof and are fed with breathable air. Chemical suits have a life expectancy of three to four years and must be inspected every three months even if not in use. This entails an air test and looking at all of the seams.
- Vapour Suits protect against hazardous vapours. They must be air-tested with the manufacturer's test kit, before being stored in a protective case. Manufacturers of vapour proof suits generally provide a testing and repair service.
- Splash-Resistant.

Fibres and Dust
Protection can be obtained by wearing suits made from bonded olefin, which keeps out fibres and particles.

Foul Weather Duties
These garments give protection against wind, and rain, and some protection against splashing from liquids. The clothing will offer a degree of protection if the wearer is inadvertently exposed to a fire situation. The garment shall be manufactured from approved materials.

Protection from fire, sparks & welding debris
Special consideration must be taken when working in hazardous environments where hydrocarbons are present. Cotton will provide some protection in the event of a fire; however fire resistant coveralls are preferred and may be a requirement of an area that work may take place. There is also an extreme hazard when welding, due to slag molten metals and sparks generated during welding and cutting operations. In these cases leather or other resistant aprons or welding clothing is required on top of regular coveralls to provide adequate protection.

4.5.4 Care and Maintenance

All types of body protective clothing and equipment must be maintained in good condition and checked regularly. It must be repaired or discarded if damaged. General-purpose coveralls should be regularly laundered to prevent irritation and the spread of skin infections. Coveralls that are damaged or torn must be repaired or replaced.

Chemical suits should be washed in warm water and a mild soap whenever they have come into contact with chemicals. Suits should be hung up to dry before being stored in cases or hung on hangers. Chemical suits have a life expectancy of three to four years and must be inspected and tested every three months, even if not in use. The inspection and testing must include an air test with examination of all seams for leakage.

Vapor suits must be air tested, after use and cleaning, with the manufacturers test kit before being stored in a protective case. Where available and when necessary, the manufacturer’s testing and repair services should be used.

4.5.5 Codes and Standards

Relevant Standards for protective Clothing are:

- BS EN 366:1993 Protective Clothing. Protection against Heat And Fire. Method of Test: Evaluation of Materials and Material Assemblies When Exposed To A Source Of Radiant Heat.
- BS EN 367: 1992 Protective Clothing. Protection against Heat and Flames. Test Methods. Determination of Heat Transmission on Exposure to Flame.
- BS EN 368:1993 Protective Clothing: Protection against Liquid Chemicals: Resistance of Materials to Penetration by Liquids.

- BS EN 464:1994 Protective Clothing for Use Against Liquid and Gaseous Chemical Including Aerosols and Solid Particles. Test Method. Determination of Leak-Tightness of Gas-Tight Suits (Internal Pressure Test).
- EN 465 Protective Clothing: Protection Against Liquid Chemicals: Performance Requirements: Type 4 Equipment: Protective Suits With Spray-Tight Connections Between Different Parts Of The Protective Suit.
- BS EN 468:1995 Protective Clothing for Use against Liquid Chemicals. Test Method. Determination of Resistance to Penetration by Spray (Spray Test).
- EN 469 Protective Clothing for Fire-Fighters.
- EN 470 Protective Clothing for Use in Welding and Similar Activities.
- BS EN 471:1994 Specification for High-Visibility Warning Clothing.

4.6 Hearing Protection

4.6.1 General

Where personnel experience a daily personal noise exposure of greater than 85dB (A), then ear protection shall be provided. Where area noise surveys indicate noise levels of greater than 90dB (A), signs shall be posted to indicate that each high noise area has been designated an Ear Protection Zone and ear protection shall be worn in these areas. Personnel working in an Ear Protection Zone, or in an area where there is a likelihood of very loud impulsive noise, shall be provided with ear protection and trained to use it.

Information, instruction and training on the use of ear protection shall include:

- The duty of personnel to wear appropriate ear protection in high noise level environments.
- The damage that can occur to hearing through noise exposure.
- How to fit ear protection properly, and use it with other PPE.
- The importance of using ear protection at all times, so that its effectiveness is not compromised.
- The reductions in effectiveness caused by long hair, earrings, hats etc., particularly if these become caught between the seal of an earmuff and the head.

No exposure to continues or intermittent noise above 115dB (A) is permitted under any circumstances.

4.6.2 Selection

Ear protection shall be hygienic, and shall not interfere with other PPE. For example, ear plugs shall be chosen in circumstances where another item of PPE, such as such as safety glasses, would interfere with the seal of ear muffs and consequently reduce their effectiveness.

Comfort is an important consideration. Where possible, personnel shall be offered a choice of appropriate ear protection so they may select which type suits them best. Disposable ear protection may be preferable to re-usable in certain circumstances.

4.6.3 Special Requirements

The following types of hearing protection are available:

- **Earplugs**, which fit into the ear canal.
- **Semi-inserts or canal caps** which cover over the entrance to the ear canal.
- **Earmuffs**, which completely cover the ear.
- **Enclosures**, which encase the entire head.

4.6.4 Care and Maintenance

Ear protection shall be checked daily to ensure it remains clean, and in good condition. Replace compressible earplugs that are no longer soft and pliable and earmuffs where the seals show signs of damage. Check that headbands remain tight, and replace headbands that are worn out or damaged.

Earplugs and semi-inserts (canal caps) shall be issued on a personal basis and used only by the person they are issued to for hygiene reasons. Re-useable ear protection shall be thoroughly cleaned and disinfected after use, and stored in a suitable case when not in use.

4.6.5 Codes and Standards

Other relevant standards for ear protection are as follows:

- BS EN 352-1: 1993 – Hearing Protectors – Ear muffs.
- BS EN 352-2:1993 – Hearing Protectors – Ear plugs.
- BS EN 352-3:1997 - Hearing Protectors – Ear muffs attached to a safety helmet.
- BS EN 352-4:2004 -Hearing Protectors–Ear muffs attached to a safety helmet as for BS EN 352-1.

4.7 Respiratory Protection

4.7.1 General

Personnel may be exposed to harmful vapors, dust and other airborne contaminants by the design or operating procedures of the worksite, in these circumstances it will be necessary to provide Respiratory Protective Equipment (RPE) to personnel. This will be identified as one or more of the control measures after conducting a task risk assessment (Information Material Safety Data Sheet).

It will be necessary to correctly identify the respiratory hazards, smokes, the product of combustion, dust, abrasion material, liquids, gases, vapors from chemicals, solvents, etc. The concentration and combination of the harmful substances should be assessed for their degree of toxicity. Advice the selection of RPE for particular applications can be sought from HSE Section.

Prior to the selection of suitable RPE, due consideration should be given to potential face-fit problems, including the wearing of facial hair. Full beards are not permitted for staff that may be required to wear respiratory protection during their normal working day, in particular, self contained breathing apparatus for fire fighting, rescue or H_2S escape.

Respiratory protection may be required for normal working conditions or emergency conditions and fall into two general categories:

- Those providing air which must pass through a filtering mechanism (referred to as respirators).
- Those providing an air supply from an uncontaminated source (referred to as breathing apparatus).

Note: It is important to remember that filtration respirators are unsuitable for atmospheres which are deficient in oxygen.

The following concentrations of contaminants shall not be exceeded:

Table 2: Maximum Concentration of Contaminants in the Air

Contaminants	Concentration
Oil Mist	0.5 mg/m³
Carbon Dioxide	500 ppm
Carbon Monoxide	5 ppm

The air must be free from all odour and contamination by dust, dirt or metallic particles and shall not contain any other toxic or irritating ingredients. It shall also be at a temperature which operators find comfortable.

The following facts should be considered when carrying out work with RPE
With all these types of apparatus it is essential to ensure correct adjustment of the retaining straps to give proper fitting and thus prevent the ingress of harmful contaminants.

- Breathing apparatus for work in confined areas shall be selected after consideration of the working conditions.
- All life saving PPE shall be inspected on monthly basis and records shall be retained.

- It must be emphasized that respirators are only designed to afford protection against relatively low concentrations of toxic substances, and if there is doubt as to the correct level of protection that is required, then the higher level of protection will be selected. This may mean that in certain circumstances a respirator is deemed to be inadequate and breathing apparatus is required.

4.7.2 Selection

As there are many types of RPE, care is needed to choose the right equipment for a particular situation. First Line Supervisors shall involve wearers in the selection process and, where possible, provide them with a choice of suitable RPE.

Where there is doubt over the selection of suitable RPE, CONTRACTOR shall confirm with the manufacturer or supplier that the chosen equipment is suitable for the task and for the conditions in which it is to be used.

A guide to the selection of Respiratory Equipment is shown in the attachments.

4.7.3 Special Requirements

Principal types of RPE which may be used on the PROJECT are:

Dust Respirators
Dust respirators are usually of the filter type and provide protection against dusts that are not potentially dangerous.

Fine Dust Respirator (Catalyst Dust)
Dust respirators are used for fine dust (catalyst dust) during loading / unloading operations. These respirators provide reliable, effective protection against fine particulates, good for protection against airborne infectious diseases reduced heat build up to offer comfortable protection, particularly in hot and humid conditions.

Cartridge and Canister Respirators
Cartridge and canister respirators are used in areas where there are heavier concentrations of dusts or vapours. They can be designed to give protection against specific hazardous chemicals, thus it is vital to ensure that the correct type is used for the risk involved.

Self Contained Breathing Apparatus
Self-contained type breathing apparatus has a face-piece connected to a cylinder of compressed air and is for use in dangerous or toxic atmospheres. The duration of a cylinder is calculated on the basis of a rate of consumption of 40 litres per minute and then reduced by a safety factor of 10 minutes.

Supplied Air Breathing Apparatus
Supplied Air breathing apparatus has a face-piece connected to a source of uncontaminated air through a hose. This also is for use in dangerous or toxic atmospheres with the advantage over the self-contained type that the time a person can spend in an area is not limited by cylinder capacity. When using SABA personnel will have an escape bottle and appropriate training.

4.7.4 Care and Maintenance

The performance of a tight-fitting face piece (filtering face pieces, half and full-face masks) depends on a good contact between the wearer's skin and the face-seal of the mask. For this type of equipment, a fit check needs to be performed each time the RPE is put on. Loose-fitting face pieces (hoods, helmets, visors, suits etc.) cannot be used in negative pressure equipment that relies on the wearer's lung power to draw in air. Maintenance of RPE is essential and shall include cleaning, disinfection, examination, repair, testing and record keeping. In addition, facilities for its safe storage shall be provided.

RPE shall not be modified in any way without the knowledge and consent of the manufacturer.

Compressed breathing air used in RPE shall at least have:

- Oxygen content by volume of between 19.5 percent and 23 percent.
- Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less.
- Carbon monoxide content of 10 ppm or less.
- Carbon dioxide content of 1000 ppm or less.
- Lack of noticeable odour.
- Oxygen concentrations greater than 23 percent shall only be used in equipment designed for oxygen service

4.7.5 Codes and Standards

BS 4275 (Use and Maintenance of Respiratory Protective Equipment.) gives standards for breathing air quality

4.7.6 Medical Fitness to use Respirator

Respirators that use filters to prevent particulates or gases from being inhaled can increase the work of breathing during inhalation by up to 85 mm of water pressure. As the filters become fouled during use, resistance to breathing increases. Expiratory effort is not as significantly affected by these respirators.
In contrast, air-supplied positive pressure respirators may require increased expiratory effort, as the user must breathe out against air pressure that is greater than normal. The extra respiratory effort increases as the rate of breathing increases with work activity.
Vision may be restricted by these devices in several ways. A curved lens may produce distracting reflections that can affect safety or performance accuracy. Eyepieces invariably limit visual fields and binocular vision may be difficult or impossible, especially at close range.

Medical assessments of workers for respirator use should be performed

- during pre-placement examinations for jobs where a respirator will or may be used;
- when a worker who is expected to use a respirator returns to work following major surgery or prolonged illness; and
- in conjunction with regular periodic medical surveillance or health examinations.

The examination should be directed towards the system and disorders covered in the functional inquiry and medical history, plus the background information about the intended use of the respirator. Special attention should be given to the skin and hair of the head and face, facial contour, and vision. Where special tests are indicated, they should be used. For example, pulmonary function tests, audiometric tests, tests for visual acuity, etc. may be useful in particular cases.
All persons required to wear any respirator during the course of their work shall receive a proper fit test performed by a competent person. The fit test and all training will be recorded and available for audit.

4.8 Fall Protection

4.8.1 General

Fall protection equipment shall be used when a worker may fall a vertical distance of 1.8 meters or more. Where a fall arrest harness is used they will be used in conjunction with a double lanyard and energy absorber fitted with an auto locking snap hook and will be visually inspected prior to use.

The principles of the use of fall protection equipment are summarized as follows:

- Any person at risk of a potential injury producing fall shall be secured by industry approved personnel fall arrest protection equipment.

A person suffering a fall when secured to a fall arrest system shall:

- Be subjected to an arresting force not exceeding 3.6KN (360kg)
- Be wearing equipment which will distribute fall arrest forces over the body in a way which minimize the possibility of injury, and
- Be connected to a system which will limit free fall to 1.8 m, to prevent the user from striking grade or objects that could cause injury, and will maintain the wearer in a survivable (head forward) post fall arrest position.

Personnel fall arrest equipment shall be installed in accordance with this procedure and applicable regulations. They shall be selected according to the hazards posed during the job and used per the manufacturer's instructions and their intended use.

All fall protection equipment must have manufacturer's labels that at a minimum bear the following information:

- Manufacturer's name, address and contact details
- Date of manufacture
- Serial number
- Recognised certifying body (ANSI, EN, CE)

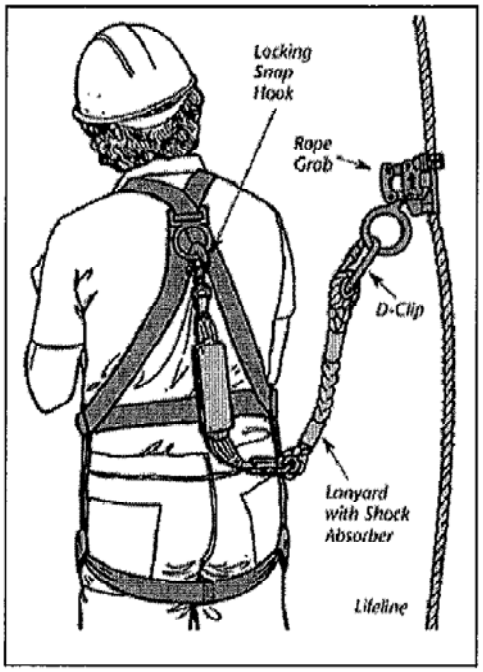
4.8.2 Selection

There are basically three types of fall protection systems to select. The selection will be based upon a Task Risk Assessment (JSA). The systems are:

- Travel restraint systems: Prevents a person from reaching a position from where a fall could occur.
- Work positioning systems: Provides a worker with continues tension thereby freeing both hands to be used for a task, i.e. reporting, photography, maintenance.
- Fall arrest systems: Does not prevent a fall from occurring in the first instance but arrests a fall after it has occurred.

The main types of fall arrest equipment are:

- Fall arrest harness (full body)
- Work positioning harness (full body)
- Cross Arm Straps (travel restraint only)
- Connectors (e.g. hooks, carabiners)
- Lanyard (with & without a shock absorber)
- Anchorage point
- Rope grabs (mechanical grabs)
- Retractable lanyards (inertia reel)
- Winching equipment
- Safety/ catch nets
- Beam clamps



4.8.3 Special Requirements

Full Body Harness

The full body harness provides a secure means of attaching the worker to the fall protection system and is designed to distribute the arresting forces encountered in a fall in a uniform and safe manner. The harness must be comfortable to wear, fit correctly, be free of defects, not hinder movement and bear the valid color coding.

Where a fall arrest harness is required, it shall be used in conjunction with a double lanyard fitted with an energy absorber attached to the dorsal D-ring on the back of the harness, by way of auto locking snap hook.

There are primarily two types of harnesses, namely the fall arrest harness and the work positioning harness. The fall arrest harness has a single rear D-ring attachment. The work positioning harnesses has multiple attachment points such as at the rear, front and sides of the harness.

Connectors (Snap Hooks)

Connectors are used to secure fall arrest system components such as lanyards, and energy absorbers to a workers fall arrest harness. Where connectors are attached to fall protection systems they must be;

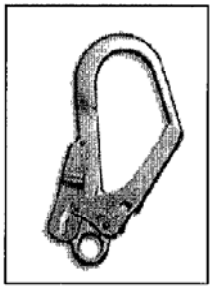
- Drop forged
- Rust resistant
- Free of sharp edges
- Auto locking design (requires a double action to open)
- Have a minimum break strength of 5000 pounds/ 22.2 KN
- Have manufacturer and strength rating capacity markings clearly stamped on the connector

Fall arresting connectors come in many different designs. The nature of the job should be considered when selecting connectors. Connectors that fit over a ladder rung or scaffold rail should be selected when working on scaffolding or ladders.

Some typical examples of connectors are:

TYPICAL SNAP HOOK

AUTO LOCKING CARIBINER



SCAFFOLDING/ LADDER SNAP HOOK

Connectors must not be dropped onto a hard surface. Any connector that has suffered an impact on a hard surface from a height of 5 meters or more must be removed from service. Cracks invisible to the naked eye may have been developed making the connector unsafe.

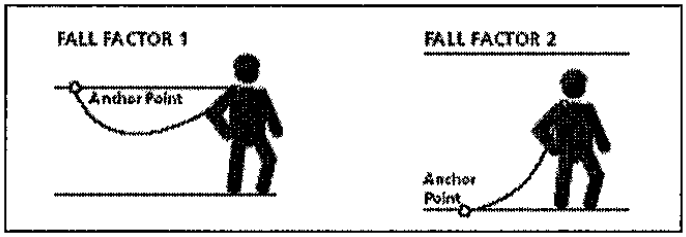
Lanyards

Fall arrest lanyards are made of rope, webbing or wire cable which is then attached to the workers harness and connected to a solid anchorage, and is an integral part of the fall arrest system. A lanyard can provide restraint or tension and therefore allow work positioning. It is prohibited to tie a fall arrest lanyard onto itself as a means of anchoring the lanyard unless the lanyard is specifically designed for such use. Double lanyards shall be used in all cases.

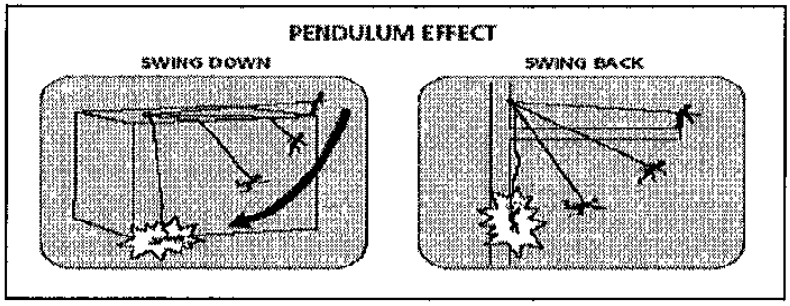
Care must be taken when using a lanyard to prevent it from contacting surfaces that are sharp, corrosive, cold, and hot or in any way capable of damaging the lanyard when it is in use. In case such hazards cannot be avoided a cable lanyard shall be used.

In cases where falls are possible a shock absorber should be incorporated into the fall protection system. Shock absorbers should limit the force of a fall to 3.6 KN (360kg).

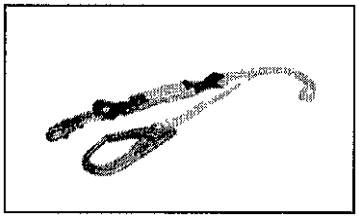
Lanyards should be connected to a suitable anchor (16KN strength if certified or 22KN strength if not certified) and whenever practical, be connected above the user in order to maintain a fall-factor-one (1) ratio. Fall-factor-two (2) ratios are to be avoided.



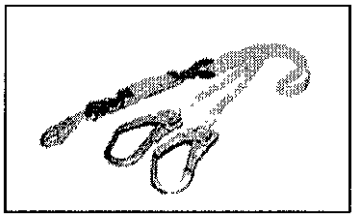
During use of lanyards care must be taken to avoid the following pendulum hazard.



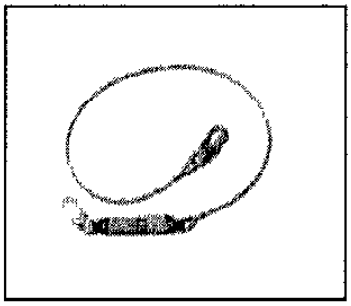
The following are examples of typical webbing lanyards with shock absorbers incorporated in the lanyard.



SCAFFOLD/ LADDER LANYARD



DOUBLE LANYARD



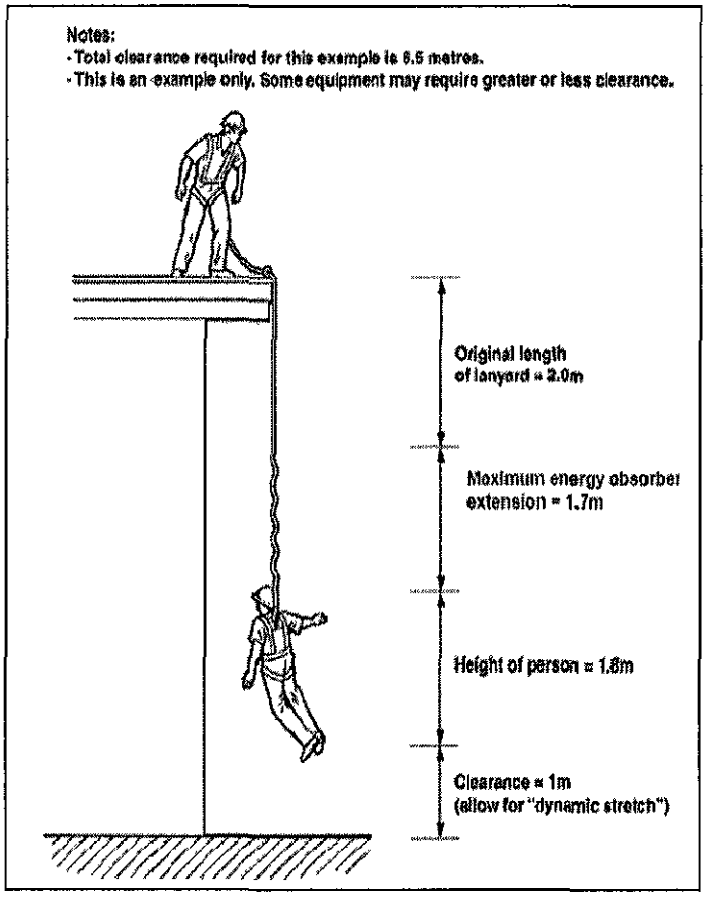
CABLE LANYARD

Energy Absorbers

An energy absorber (also known as a shock absorber or load limiter) is designated to limit the force of fall to a safe limit (3.6KN) so the person that falls does not sustain internal injuries in the process of the fall being arrested. An energy absorber shall be integrated into the fall protection system, whenever a fall is possible. Energy absorbers shall always be connected to the fall arrest harness D-ring positioned at the back of the fall arrest harness.

The use of energy absorbers introduces an inherent hazard which is a product of the manner in which the energy absorber absorbs impact forces. When a person falls, the energy absorber extends by way of stitches built into the webbing. This reduces the impact of the forces.

Extreme care must be taken when considering the "fall distance" when rigging fall arrest systems. The following is an example of what needs to be calculated in assessing the adequacy of a fall arrest system.



Additional hazards may exist in the event the fall line is not free from obstructions. Every effort must be taken to reduce the likelihood of striking objects that may be below a worker, should he accidentally fall.

Anchorage point for fall arresting and restraint systems

Anchorage points may be permanent (certified by an engineer) or temporary (not certified by an engineer). The following anchorage strengths requirements apply:

- Engineered arresting anchors (permanent) – 16KN strength requirement
- Engineered restraint anchors (permanent) – 3.8KN strength requirement
- Non engineered anchors (temporary) – 22KN strength requirement

A suitably qualified and experienced engineer shall be consulted if there is any doubt about the underlying structure or the anchorage point. Each worker shall have his own anchor point. It is not allowed to attach more than one person to a single anchor point. Permanent anchors shall be clearly identified.

In case of life lines, these shall only be allowed if it is ready made life lines, and are installed by suitably experienced personnel, or if the life line is designed by an engineer.

4.8.4 Care and Maintenance

Equipment must be kept in a cool, dry and well ventilated place. It must not be exposed to direct sunlight during storage. It is advisable to reserve a separate room for storage. Equipment that has been contaminated during use must be cleaned in accordance with the manufacturer's requirements.

Harnesses, lanyards and associated pieces shall be stored in a carry bag designed for this purpose. Each bag shall be labeled with the contents.

4.8.5 Codes and Standards

Relevant standards for fall protection are as follows:

- EN 361 – Fall arrest harnesses
- EN 355 – Energy absorbing devices
- EN 362 – Connectors
- EN 358 – Work positioning harnesses
- EN 353-2 – Guided type fall arrest

5. SUITABILITY AND SELECTION OF PPE

5.1 General suitability and selection criteria

PPE shall be suitable for the degree of protection which it is required to provide. In particular, PPE shall not be considered suitable unless:

- It is appropriate for the risk(s) involved.
- It is appropriate for the conditions at the place where exposure to risk may occur.
- It takes account of ergonomic requirements.
- It takes account of the state of health of the person wearing it.
- It is capable of fitting the wearer correctly.
- It is effective in controlling the risk(s) involved without increasing the overall risk(s).

Several types of PPE may be suitable for any particular job. The key issues to be considered when selecting appropriate PPE are:

- The type of job and the demands it may place on the worker. Consideration shall be given to all aspects of the job including the length of time for which the PPE will be worn, the mobility, vision and communication required by the worker, the physical effort required by the job, and the methods of work.
- The level of risks likely to be encountered.
- The parts of the body to be protected.

Personnel who will be required to use PPE shall be consulted prior to final selection of the equipment. This will provide useful input to the selection process from those who will know best what is involved during the job. The aim shall always be to choose appropriate PPE that will give the correct level of protection with the least discomfort to the user. Other factors may also need to be considered in the selection process such as:

- Disposable versus reusable.
- Maintenance requirements.
- Durability in use.
- Availability of equipment in different sizes.

All PPE shall be of the appropriate standard and shall be certified to an internationally accepted standard, e.g. European Standard (CE mark). If there are any doubts about the suitability of the PPE, advice shall be sought from a suitably qualified and competent person e.g. Safety Engineer and Occupational Health Engineer.

5.2 Compatibility of PPE

Where there is more than one risk to health that requires the wearing of PPE, it is important that the PPE selected is compatible and continues to be effective against the risks. For example, where a hard hat and a respirator are simultaneously required, it is important to check that both can be worn correctly and that both continue to give adequate protection from the risks for which they have been selected.

5.3 PPE Assessment

In order to ensure that PPE is suitable and effective for the level of protection required, the department manager shall:

- Assess any risks to health that have not been avoided by other means.
- Define the characteristics that PPE shall have in order to be effective against the assessed risks. Risks that the equipment might introduce shall also be taken into account.
- Question whether the available PPE has the characteristics that make it effective against the assessed risks.

PPE never provides one hundred percent (100%) protection, although some PPE provides very high levels of protection. It is necessary to have some indication of the level of risk so that the performance required of the PPE can be assessed. This information may have been gathered by the assessment or may be available through documents published by authoritative safety organizations, e.g. The Health & Safety Executive (HSE) or the American Conference of Governmental Industrial Hygienists (ACGIH).

In simple cases, the assessment to identify suitable PPE need not be recorded. In more complex cases, it shall be recorded and made readily accessible to those who may need to know the results.

6. STANDARDS, MAINTENANCE & STORAGE OF PPE

6.1 Minimum Standards

Protective clothing shall be issued which is suitable for an individual site. As a minimum worksite personnel are required to wear a safety helmet, safety glasses, coveralls and safety boots.

Personnel, who work inside e.g. in galleys or kitchens, cleaning accommodation, in workshops or maintaining office equipment etc., must also be provided with suitable PPE. Local rules will state the areas in which this equipment is required to be worn. Shorts and other similar sportswear should not be worn at operational sites.

The minimum standards set by the COMPANY for protective clothing or equipment shall apply, as appropriate, to all persons on site, including visitors and contractor's personnel. PPE shall comply with relevant standards as mentioned in this document.

6.2 Maintenance of PPE

- PPE must be maintained in an efficient state. The level of inspection or maintenance with respect to PPE will be determined by the type of equipment used and the conditions in which it is used.
- With simple equipment, an inspection by the user immediately before use may suffice, and maintenance may be in the form of cleaning or laundering, with the item being replaced when worn out.
- Protective clothing and equipment should be used properly, and any defects in the equipment shall be reported to the supervisor.
- Do not wear clothing or equipment that is contaminated (e.g. oil, grease or other substances), return it for cleaning or replacement.
- Where appropriate, a record of inspection and maintenance will be necessary, and manufacturer's maintenance schedules should be strictly followed.

6.3 Storage of PPE

PPE must be stored correctly. CONTRACTOR shall make appropriate arrangements for the storage of PPE:

- The storage shall be adequate to protect the equipment from damage or contamination.
- Items of PPE shall be adequate to protect the equipment from damage or contamination.

7. TRAINING IN THE USE AND MAINTENANCE OF PPE

Those involved in the use of PPE shall be given suitable instruction and training in the use of particular equipment as follows:

- 'Everyday' equipment which is simple to use will require only basic instructions.
- Personnel involvement in the use, maintenance, repairs or testing of more complex equipment will require formal training, and such training may be both theoretical and practical. In such cases, refresher training may be required, as an appropriate, and records of training details should be kept.

8. PERFORMANCE MEASURES

Compliance with this Procedure shall be monitored regularly and the number of near misses, incidents and accidents associated with PPE shall be recorded and all efforts made to eliminate, prevent and control further occurrence of these. A culture of no blame reporting of near misses and accidents shall be implemented, root causes identified and weaknesses in the system reviewed and revised to eliminate further incidents.

9. ATTACHMENTS

9.1 PPE Color Coding

9.1 PPE Colour Coding

Personal Protective Equipment Color Coding Proposal

DAEWOO E&C

LABOR COVERALLS

Dark Blue and Grey
(Daewoo on back)

LABOR HARD HATS

Civil & Architecture
(Yellow with brown band)

Tank
(Yellow with green band)

Piping
(Yellow with red band)

Equipment & Structure
(Yellow with blue band)

Electrical & Instruments
(Yellow with black band)

HSES
(Green)

Personal Protective Equipment Color Coding Proposal

DAEWOO E&C

SUPERVISOR COVERALLS

Jackets
(Grey Jacket to be used by Foreman and Field Supervisors and different color jackets will be used for Superintendents, Engineers and Supervisors)

Grey two piece coverall
(Daewoo on side of pants & different jackets)

SUPERVISOR HARD HATS

Civil & Architecture
(White with brown band)

Tank
(White with green band)

Piping
(White with red band)

Equipment & Structure
(White with blue band)

Electrical & Instruments
(White with black band)

HSES
(Green)

Personal Protective Equipment Color Coding Proposal

DAEWOO E&C

REFLECTIVE VESTS