



المفتاح للمقاولات ذ.م.م.
KEY CONSTRUCTION W.L.L.

SAFETY MANUAL



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POLICY

Key Construction WLL (Key Const.) has a major concern for the health and safety of all its employees, plus the well-being of all their Contractors (s) employees. Key Const., is firmly committed to translating this concern into effective action with full regard to National Laws and Ministerial Decrees.

It is the policy of Key Const., to conduct activities in such a manner that the health and safety of all employees and of other persons are safeguarded and that proper regard is paid to the conservation of the environment.

In all its operations Key Const., has an ultimate objective, to ensure a working environment which affords all employees full safety harmful physical and mental influences.

All Key Const., employees and contractor(s) personnel have a personal delegation to work in safe manner, to co.operate in efforts to create and maintain safe working conditions and to report all hazards to their Area Management.

GARRY ADRIAAN
General Manager

* Prepared By : Mr.Jassim Marhoon

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1.0 INTRODUCTION

This Safety Manual has been produced to be aware of hazards in operational areas and to be aware of the action to take in reducing the risks of injury or damage.

1.1 POLICY

1.1.1 Conduct its activities in a manner that ensures the health and safety of its staff, its contractors' employees and other persons whom its activities effect.

1.1.2 Ensure the protection and safe operation of all plant and equipment.

1.1.3 Comply fully with all laws and statutes in those areas specific to operations.

1.2 OBJECTIVES

1.2.1 Encourage, support and promote a high standard of preventive, curative health/safety programme.

1.2.2 Encourage, support and implement methods aimed at continual improvement of safety at work.

1.2.3 Maintain a Safety Department to assume an advisory, monitoring and training role in all aspects of safety. Emphasis is to be given to training in safe driving techniques and safe working practices.

1.2.4 Ensure by design, auditing and quality assurance techniques that facilities are built to comply with international and national standards for safe production, safe working and accident prevention.

1.2.5 Ensure by procedures, techniques and surveys that facilities are operated and maintained to a high standard such that they remain safe and reliable with a practical minimum risk of injury to personnel, breakdown, leakage and fires.

- 1.2.6 Promote safety consciousness in employees and contractor via training, competitions, incentives, posters etc.
- 1.2.7 Report and analyses any injury with follow up of recommendations to prevent recurrence. Accountability for all accidents shall be at Departmental Head level as a minimum.
- 1.2.8 Consider and evaluate contractor safety performance when letting tenders and ensure application of safe working practices in all contracts.
- 1.2.9 Work with Government Departments, technical advisers, local authorities and professional bodies as appropriate and take the initiative where necessary to promote workable and improved codes of practice and regulations in the field of health and safety.

2.0 RESPONSIBILITIES

2.1 The Safety Officer Shall: -

- 2.1.1 Ensure that the Safety Rules are adhered to by the Personnel.
- 2.1.2 Implement the Safety Rules where necessary
- 2.1.3 Carry out work site surveys on daily and weekly basis and report to Construction/Project Manager
- 2.1.4 Inspect tools and protection equipments arriving on site prior to issue
- 2.1.5 Record and analyses accidents, injuries, damages and report to construction/Project Manager.
- 2.1.6 Inspect and report to Construction/Project Manager that the YARD and office areas are maintained in suitable condition for work, health and safety.
- 2.1.7 Ensure that the safety and fire precautions are constantly enforced.
- 2.1.8 Ensure that the safety requirements are regularly investigated and made available
- 2.1.9 Keep up-to-date with recommended safety literature and display safety placards.
- 2.1.10 Ensure that healthy work conditions are maintained.
- 2.1.11 Advise the Construction/Project Manager of any enforcement of new safety regulations as per kingdom of Bahrain Law or of any improvement of existing safety methods.

- 2.1.12 Prepare and issue safety reports.
- 2.1.13 Advise the Construction/Project Manager of any legal/contractual requirements affecting safety, health and welfare.
- 2.1.14 The Yard Safety Officer is directly responsible to the Construction/Project Manager.
- 2.2 The Safety office will explain to all Supervisory Personnel the requirements of the Safety Manual and its implementation.
- 2.2.1 General Safety of personnel.
- 2.2.2 Safe operation and working with equipments.
- 2.2.3 Hazardous Working: -
- ◆ With electrical equipments
 - ◆ At height/on scaffolding
 - ◆ While welding/cutting and other hot working grit blasting and painting
 - ◆ Hydrotesting
 - ◆ Ionising radiation for all this connected with radioactive substances/X-ray equipments
- 2.2.4 Fire prevention and fire fighting - Methods of fire prevention and use of safety equipment.
- 2.2.5 First aid treatment.
- 2.2.6 Accident Reporting - Preparation of reports and whom to inform first in case of accidents.
- 2.2.7 In emergency situation - What supervisors should do and guide workmen to safe location/place.

2.3 Safety officer shall demonstrate/give training to group of personnel regarding the use of the following: -

2.3.1 Personnel Protection Equipment.

2.3.2 How and when to use safety equipments/gears.

2.3.3 How to identify lifting, equipment, whether they are tested and certified and the appropriate colour coding.

2.3.4 In addition to the above, the Safety Officer will explain the meaning of various safety signs displayed at the Yard.

2.3.5 The above demonstration shall be given in a separate room/area earmarked for the purpose.

2.3.6 New personnel on arrival/commencing duty at Yard shall be given general awareness on safety and safe working requirements initially by Safety Officer and periodically as and when required, by the Supervisors. Wherever possible Safety Officer shall attend such training sessions held by Supervisors.

2.4 The Engineers and the Supervisors on site shall: -

2.4.1. Understand the Company's Policy and appreciate the responsibility allocated to each grade of Supervisors.

2.4.2 Enforce the Safety Rules during works.

2.4.3 Ensure the safety working conditions on their area.

2.4.4. Request assistance of the Safety Office as and when necessary.

2.4.5 Verify that the maintenance works are being carried out by qualified and authorised personnel.

2.4.6 Provide written instructions whenever necessary.

The Engineers and the Supervisors are directly responsible to the yard Manager for the above.

2.5 The Design Engineer while designing shall take into consideration the risks arising or involved during construction or in the use of equipments.

2.6 The Plant Engineers/Supervisors must: -

2.6.1 Ensure that all the equipments on the Yard are safe and in good working condition, either belonging to the Company or procured on hiring basis.

2.6.2 Ensure that all the equipments are equipped with required safety devices and has been subjected to all the necessary tests.

2.6.3 Ensure that periodic test, inspection and maintenance are carried out.

2.6.4 Attend promptly to all equipment defects, which are brought to their notice by Safety Officer.

2.6.5 Ensure that all workmen wear safety clothing, helmets, shoes and eye protection while working.

2.6.6 Advise the Yard Manager regarding the repair of defective equipments.

3.0 DISTRIBUTION OF THE SAFETY MANUAL

- 3.1 Copies of the Safety Manual shall be available with the Construction/Project Manager for distribution to all the Engineers, Supervisors, Sub-Contractors and Client personnel working on the Yard.
- 3.2 The enforcement of these safety rules is the responsibility of each and every Supervisor as well as the Safety Personnel.

4.0 **OBLIGATION OF KEY CONST..PERSONNEL, CLIENT, SUB-CONTRACTORS
& VISITORS**

- 4.1 Any persons of client, Sub-Contractors and/or others shall undertake to abide by the Regulations either stipulated in the manual or specially enforced on certain occasions By the yard manager.
- 4.2 They must observe all local safety regulations and by-laws of kingdom of Bahrain.
- 4.3 Each Sub-Contractors shall follow the safety procedure / requirements.
- 4.4 Persons failing to follow the safety Rules as stipulated in this manual, will be subject To disciplinary actions to be decided by safety Officer/Construction/Project Manager.
- 4.5 Persons found under the influence of alcohol or drugs will be immediately and Permanently expelled from the yard.

5.0

TRAFFIC

5.1 All personnel, client, sub-contractors and visitors are expected to drive with caution inside the Yard premises and must follow the basic rules mentioned hereunder: -

- 5.1.1 Strictly follow traffic signs as displayed.
- 5.1.2 Observe a maximum speed of 20 km/hr.
- 5.1.3 Always park vehicles in areas allocated with hand brakes applied.
- 5.1.4 Do not block entry/exit for emergency vehicle.
- 5.1.5 Do not drive a vehicle improperly loaded/fastened.
- 5.1.6 Do not drive a vehicle without valid driving license.

6.0 GENERAL WORK CONDITIONS

- 6.1 It is the Supervisor's responsibility to keep the site tidy and clean.
- 6.2 All equipments must be returned to its former storage place after the use to avoid accidents.
- 6.3 All areas including staircases, walkways and scaffolding used by the personnel must be kept clear and free from oil and grease.
- 6.4 All papers, greasy clothes and other domestic waste shall be disposed off in skips placed around the yard on completion of work and at the end of the day.
- 6.5 The Supervisors must ensure that drinking water is always available.
- 6.6 Small tools and equipments used must conform to the recognised standards.
- 6.7 The Supervisors must ensure that the access to work is safe and satisfactory and that adequate lighting is provided during the hours of darkness time.

7.0 INDIVIDUAL SAFETY PROTECTION EQUIPMENT

7.1 CLOTHING

7.1.1 The Supervisors must issue each employee with necessary protective clothing. The Supervisors must ensure that protective clothing are kept relatively cleaned by the employee.

7.1.2 Overalls made from synthetic material shall not be worn by personnel. Any piece of clothing becoming contaminated with any kind of flammable liquid must be removed at once. It is forbidden to work stripped to the waist or wear shorts.

7.2 HELMETS

7.2.1 The wearing of helmet is compulsory on site at all times. The safety helmets must be of approved type conforming to BS5240, ANSI-Z31.

7.3 SAFETY SHOES

7.3.1 The wearing of safety shoes is compulsory. The safety shoes shall be conforming to BS 1870 Type (I).

7.4 PROTECTIVE GLOVES

7.4.1 The wearing of gloves is recommended for protection against chemical, physical and biological hazards.

7.4.2 Cotton hand gloves should be worn while rigging.

7.4.3 Leather hand gloves should be worn while welding, cutting and burning.

7.4.4 Special high insulation BS-647 hand gloves to be worn by electricians, while working on HV/LV lines.

7.4.5 All gloves shall be of approved industrial standard.

7.5 EYE/FACE PROTECTION

7.5.1 The wearing of eye/face protection is compulsory while grinding, welding and cutting etc., where flying sparks/objects may cause damage to the eyes.

7.5.2 Wearing of safety spectacles is compulsory for the following type of works:

-
- Chipping, hammering and shearing at any location.
- Assisting sand/grit blasting operation.
- Cutting and burning (tinted).

7.5.3 Wearing of face shield is compulsory for: -

- Welding
- Grinding

7.6 Wearing of complete blasting hood with air supply is compulsory for sand/grit blasting.

7.7 Safety glasses for general work activities shall be worn by all personnel at site including visitors.

7.8 BODY PROTECTION

7.8.1 Wearing of overalls is compulsory and any other type of loose clothing is forbidden.

7.9 EAR PROTECTION

7.9.1 Wearing of disposable ear plugs or ear muffs are compulsory for protection of ears against noise, whenever high noise levels are generated in excess of 85db.

8.0 ELECTRICAL INSTALLATION/MAINTENANCE

- 8.1 Electricians or duly assigned sub-contractors are the only personnel authorised to work on, repair or modify electrical installations and equipments.
- 8.2 Only qualified personnel shall be authorised to work on switchboards and junction boxes.
- 8.3 It is prohibited to use electrical equipment which does not meet safety standards. All power tools will be 110 volt. Use of 220 volt tools is not allowed.
- 8.4 Electric cables shall be properly insulated and earthed to conform to safety requirements and must be surveyed regularly by electricians for replacement as and when required.
- 8.5 Attention is brought to the fact that every accessible high voltage cable/equipment must be properly fenced and labelled.
- 8.6 When work is being carried out on high voltage cables, locking devices shall be on switches and controls to prevent the unauthorised or accidental passage of current. Only authorised Electrician can switch on high voltage installations or part of installations.
- 8.7 Electricians shall not wear aluminium helmets.
- 8.8 Electric power supply cables laying above ground shall be adequately protected so as not be liable to damage.

9.0 PLANT EQUIPMENT

- 9.1 The plant equipment shall be driven/operated only by experienced and qualified personnel.
- 9.2 Safety guards shall be provided for the rotating part of the equipment.
- 9.3 The plant equipment must be maintained in good working condition by carrying out routine maintenance as recommended by manufacturer.
- 9.4 The plant equipment must be assembled in accordance with manufacturer's instructions.
- 9.5 Maintenance of cranes must be carried out regularly and with particular attention to be given to the following checks: -
- a. Condition of wire ropes and pendants.
 - b. Spooling of wire ropes on drums.
 - c. Condition of brakes and all safety equipments.
- 9.6 The concerned person and Construction/Project Manager shall be informed immediately of any malfunction of any of the machines, by the operator.
- 9.7 Maintenance of the equipments shall be carried out only by qualified personnel.
- 9.8 Equipments shall be stopped while refuelling, or lubricating the moving parts.
- 9.9 Moving or heated parts of the equipment shall not be worked on when the equipment is running.

10.0 USE OF CRANES

- 10.1 The cranes shall have current test certificate and be operated only by qualified personnel with licence.
- 10.2 The following precautions shall be taken while operating a crane.
- 10.2.1 Carry out routine daily checks for obstructions, conditions and cleanliness.
 - 10.2.2 Ensure that the correct capacity chart is used and never overload the crane.
 - 10.2.3 Do not swing the machine, unless the area in front and behind the machine is clear.
 - 10.2.4 Do not leave the machine unattended, while the engine is in motion.
 - 10.2.5 Never leave the machine without an operator while a load is suspended.
 - 10.2.6 Never carry loads over people.
 - 10.2.7 Loads shall be taken smoothly and never dragged or pulled sideways. Swinging shall be done slowly.
- 10.3 The cranes shall be retested by an independent approved examination authority after all major alteration or repairs.
- 10.4 Crane shall not be operated near any overhead power line, unless it is necessary, the power should be switched of for the duration of the lifting operation.
- 10.5 No hoisting, lowering, swinging or travelling shall be done, while somebody is on the load or hook.

- 10.6 The cranes shall be fitted with following safety devices: -
 - 10.6.1 Safe load indicated giving warning to drive as the safe load limit approaches.
 - 10.6.2 A device giving clear audible warning when the crane is reversing, tracking or slewing.
 - 10.6.3 Over boom and over hoist cut out.

- 10.7 At the end of works, the cranes shall be stopped and shut down by qualified personnel and left in the following conditions.
 - 10.7.1 Tower Cranes
Boogies must be locked or chocked top the rails and boom must be left in the "free swing" position.

 - 10.7.2 Mobile Cranes
Must be boomed down t 45 degrees with swing brakes applied. Load must be removed from the hook and the hook must be raised to the highest operating position.

- 10.8 No personnel other than authorised operators shall ride on moving cranes, forklifts or any other plant.

12.0 LIFTING EQUIPMENT AND SLINGS

- 12.1 All slings, shackles, chain falls, tirsors, come-alongs, used for lifting operations must be checked and only used if in good working condition certified by an authorised third party and colour coded.
- 12.2 Any handling/lifting shall be made by experienced riggers under the supervision of a foreman.
- 12.3 Damaged and deformed slings shall not be used and must be replaced with new slings.
- 12.4 Safe working load conditions must be known for all the slings and marked on it.
- 12.5 Selection of slings must be made in accordance with the weight to be lifted and angle of the slings.
- 12.6 To avoid damage, the slings shall be properly maintained and stored in a place.
- 12.7 Adequate care must be taken while slinging operation to avoid damages to the slings or to prevent from any slippage of the sling when there is no pad eye.

11.0 SCAFFOLDING AND WORKS AT HEIGHT

- 11.1 Scaffolding shall be erected for working above two meters height in accordance with the good practice and safety regulations.
- 11.2 Beyond two meters height, they must be fitted with adequate hand railing, ladders and toe boards.
- 11.3 The scaffolding shall be braced and secured for stability.
- 11.4 The wooden boards which are used for making scaffolding must have a minimum thickness of 35 mm and tied/secured firmly to the scaffolding.
- 11.5 Tool belts, tool bags or safety belt must be used. All type of portable and hand tools must be attached.
- 11.6 All scaffold structures shall be erected with approved components conforming to BS 1139.
- 11.7 Scaffolding must be designed, erected, altered and dismantled only by experienced workmen under the direction of a competent supervisor, in conformance with BS 1139.
- 11.8 Each and every scaffold erected, regardless of duration of use, shall comply with the requirements stated.
- 11.9 Scaffolding shall be designed to cater for the build up of loads during blasting operations. To prevent excessive build up of spent shot boards shall be regularly swept and/or boards, including toe boards, shall be so positioned to allow spent shot to cascade down off the boards.

13.0 GAS CYLINDER

- 13.1 Gas cylinders shall be kept clean, stored away from organic substances, rubbish (wood, cloth) and from direct sunlight.
- 13.2 Gas cylinders should be stored in a dry and well ventilated place. Flammable substances shall not be stored together with gas cylinders. Oxygen cylinders shall be stored separately from cylinders containing flammable gases.
- 13.3 Gas cylinders shall be securely fixed to avoid falling over. Also, the protective cap must be placed in position after the use.
- 13.4 While in use the cylinders shall be kept vertical preferably on racks. Cylinders shall be stored in the upright position.
- 13.5 It is required to purge the cylinder before fitting the pressure gauge.
- 13.6 Hoses not in good condition shall not be used. Care shall be taken to see that the hoses should not be coiled around the cylinder or the body of the person who is using it.
- 13.7 Empty cylinders shall be stored separately and kept in vertical position.
- 13.8 It is forbidden: -
- 13.8.1 to handle cylinders by their valves.
 - 13.8.2 to carry the liquified gas cylinders with the valve open.
 - 13.8.3 to use a leaking cylinder.
 - 13.8.4 to check a leakage with a flame (only soap water can be used).
 - 13.8.5 to use copper connections on acetylene gas.
 - 13.8.6 to set the pressure of acetylene gas above 1.5 bar (21 psi).

13.8.7 to manipulate the torch flame near or against cylinders.

13.8.8 Gas cylinders must be colour coded as shown below: -

Oxygen	:	Black
Acetylene	:	Maroon
Nitrogen	:	Grey + Black cap should have black stripe and clearly marked "NITROGEN" in black.
Compressed Air	:	Grey
Medical Oxygen	:	White
Propane (Butane)	:	Red
Argon	:	Blue

All cylinders must be marked clearly to show the type of gas contained therein.

14.0 PAIN T AND FLAMMABLE MATERIALS

- 14.1 Approved flammable materials, particularly paint shall be used under the supervision of the Paint Supervisor.
- 14.2 Approved solvent for cleaning the tools and equipments shall be used. The cleaning to be done in ventilated area or outside under the supervision of the Supervisor.
- 14.3 Before using a flammable material, the user shall be informed of the chemical/physical hazards. The lowest temperature at which a liquid will give off sufficient vapour to ignite, when exposed to an open flame is termed as FLASH POINT user to be informed of this.
- 14.4 Paint and solvent shall be used or mixed outside or in a well ventilated area.
- 14.5 Smoking or usage of flame is forbidden on and around the places where flammable materials are used and stored.



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KEY CONSTRUCTION W.L.L.

From: _____

To: Safety Officer

ACCIDENT REPORT

Name :

Designation :

Token Number :

Name of the site where accident took place :

Date and Time of Accident :

Date and Time of reporting the
accident by the employee :

Date and Time when the employee
stopped work :

Brief description as to how the
accident occurred :

Exact nature of injury :

Was there any contributory negligence
on the part of the employee concerned. :

Did the accident occur due to any defect
of the machinery? :

Name of two witnesses (if any) :

(1) _____

(2) _____

Signature of
Safety Supervisor : _____

Name : _____

Date: _____

Designation : _____

15.0 PROHIBITED MATERIALS

15.1 The following materials shall not be allowed in any application.

15.1.1 Polychlorinated Biphenyl (P.C.B.), Pyrolysis, Asbestos and its derivatives.

15.1.2 Asbestos and materials containing asbestos.

16.0

GRINDING MACHINES AND ABRASIVE WHEELS

16.1 The major hazard associated with grinding machines and abrasive wheels is the disintegration of the wheel while in service. Bench grinders shall have clear guards fitted to them.

16.2 The following safety precautions shall be observed when using grinding machines or abrasive wheels.

16.2.1 All personnel using grinding machines and abrasive wheels shall be given appropriate training.

16.2.2 Correct size and type of abrasive wheels shall be fitted by experienced personnel on to the machine. All personnel operating grinding machine shall be given appropriate training.

16.2.3 The maximum permissible peripheral speed of an abrasive wheel must never be exceeded.

16.2.4 Abrasive wheels identified should be as per British Standard 4481, Part-I.

16.2.5 Grinding wheels must always be handled with care. Often wheel breakage can be attributed to careless handling and storage. Wheels damaged from these causes may appear perfect yet represents a danger to operatives. Manufacturers inspect wheels prior to packing to ensure that they are despatched in perfect condition. On receipt, they must be inspected carefully to determine if they have been damaged in transit.

16.3 The following general rules must be observed for portable grinding machine: -

16.3.1 Inspect the disc for any defects.

16.3.2 Check the safety guards are correctly fitted and secured firmly.

16.3.3 Check that the wheel has the correct speed rating.

- 16.3.4 Ensure that correct spacers are in use where applicable.
- 16.3.5 While changing disc/power brushes, power shall be isolated or plug removed from the socket.
- 16.3.6 Portable grinders shall be of 110V rating. Use of 220V grinders is not allowed unless specified permission obtained.
- 16.4 The following general rules must be observed for bench grinders: -
 - 16.4.1 On starting the machine, and after the wheel reaches its normal running speed, commence use of the grinder.
 - 16.4.2 Apply the workpiece to the grinding wheel slowly and do not use excessive pressure.
 - 16.4.3 Keep the work piece properly secured and use a hold for small pieces.
 - 16.4.4 Keep the work piece rest adjusted as closely as practical to the wheel.
 - 16.4.5 Do not strike the wheel, or use the side of the wheel for grinding, unless it is so designed.
 - 16.4.6 Switch off and wait till the wheel has stopped before making adjustments.
 - 16.4.7 The plug shall be removed or power supply isolated before any adjustments are to be made, especially on high speed grinding wheels.

17.0 GRIT AND SHOT BALANCING

- 17.1 The abrasive material used in grit and shot blasting and the particles generated by the process are a serious health hazard to the operator of the equipment and to the other persons in the area.
- 17.2 Warning notice shall be positioned around the work area which shall be fenced off.
- 17.3 The grit or other substance to be used in blasting shall not include any free silica.
- 17.4 The atmosphere within 60 metres of the blasting operations must be free from flammable gas.
- 17.5 Personal protection equipments as detailed below shall be worn by the operator.
 - 17.5.1 Safety shoes/boots
 - 17.5.2 Chrome leather ribbed PVC heavy duty
 - 17.5.3 Aprons
 - 17.5.4 Full blasting hood with air supply
 - 17.5.5 Ear defenders
- 17.6 The following safety precautions must be taken by the operator: -
 - 17.6.1 The nozzle of the equipment shall be fitted with a "shut off" control of the "deadman" type.
 - 17.6.2 The nozzle, hose, compressor and workpiece shall be electrically earthed (grounded), to prevent a static electrical charge from developing.

- 17.6.3 When blasting is being performed in a confined space ensure that the exit manway is kept clear at all times. Second man shall be kept as standby at exit to the confined space.
- 17.6.4 The air intake to the blasting equipment must be in an area free from combustible or harmful vapours.
- 17.6.5 No blasting shall be performed on plant or equipment which is under pressure.
- 17.6.6 The compressor shall be attended by one man at all times during times of operations in hotwork/hazardous areas of work.

18.0 COMPRESSED AIR

- 18.1 Compressed air may be used for operating pneumatic tools and equipments.
- 18.2 Before any pneumatic equipment is installed or pneumatic tools prepared for use, the manufacturer's instructions shall be read and fully understood.
- 18.3 Pneumatic tools and equipment shall not be used for any purpose other than that for which they were designed. Non-standard attachments and accessories shall not be used.
- 18.4 The compressed air supply must be regulated to the correct pressure, adequately filtered, dried and where necessary lubricated.
- 18.5 The means of disconnection from the air supply must be easily accessible. All pneumatically operated equipment (tool, hoist etc.) must be disconnected from the air supply before changing attachment (tool bits, abrasive wheels, etc.) or before carrying out any adjustment or dismantling.
- 18.6 Safety goggles and breathing masks shall be worn where grit or dust may be produced or disturbed. Ear protectors shall be worn where the work generates high noise levels in excess of 85DB.
- 18.7 In no circumstances should compressed air be directed at any part of a person's body.
- 18.8 Precautions must be taken to prevent clothing, hair, rags, etc, from becoming entangled with moving parts.
- 18.9 Maintenance of pneumatically operated equipment shall be carried out at regular intervals by competent persons. Tools shall not be modified or the labels and descriptions defaced or removed.
- 18.10 Safety mechanisms shall not be interfered with or immobilised.

18.11 Only hoses and couplings of the recommended size and rating shall be used, they shall also be in good condition. All couplings shall be wired to prevent their parting. Leaking hoses shall be removed from work place.

18.12 Compressed air shall not be used to clean working areas.

19.0 CUTTING AND WELDING WORKS

- 19.1 Welders must wear overalls and boots to protect themselves from flying sparks.
- 19.2 Welders must wear full face shield while carrying out welding and for protection against injury of the eyes/face.
- 19.3 Electrical welding equipment must be kept and maintained in good working condition.
 - 19.3.1 Welding objects should be properly earthed by cable lugs and clamps.
 - 19.3.2 Welding cable shall be regularly checked against cuts or damage to the insulation.
 - 19.3.3 Electrode holders shall be of an approved standard.
- 19.4 Wherever welding or cutting is to be performed, fire extinguishers must be positioned in the vicinity of the welding/cutting equipment and be easily accessible.
- 19.5 All combustible materials in the vicinity of the welding operation must be removed, or, if this is not possible, covered by flame resistant materials.
- 19.6 The work area must be kept clean and any wooden floors in the area covered with flameproof mats. Oil trays, etc. must be thoroughly cleaned.
- 19.7 Flame resistant screens must be erected around the work area to prevent sparks from flying outside the immediate working. (while working in hotwork/hazardous areas)
- 19.8 While cutting, gas cylinders shall not be taken into a confined space.
- 19.9 Torches must be lit outside before being passed into a confined space.

- 19.10 Hose lines shall not cross traffic lanes or walkways. If this is unavoidable they must be protected by ramps or channels.
- 19.11 Special care must be taken when handling acetylene cylinders. Acetylene has explosive limits of 2.5% to 82% by volume in air so that even a slight leak could result in fire or explosion.
- 19.12 The torches and regulators used shall be fitted with "flash back" arresters.
- 19.13 Hoses used in cutting shall conform to British Standard 5120.
- 19.14 Ignition of torches must be made using the "gas lighters" which are supplied for this purpose.

20.0 RADIO ISOTOPES

- 20.1 Radiography shall be carried out in accordance with written procedures.
- 20.2 These procedures shall encompass isotope storage, handling, transport, exposure and actions in case of emergency.
- 20.3 Procedures shall be written to satisfy statutory, Client and Company requirements.
- 20.4 All personnel operating isotope projection equipment and/or X-ray generating equipment shall be trained, classified workers, monitored for radiation exposure under an acceptable scheme administered by an approved body e.g. N.R.P.B. of the United Kingdom.
- 20.5 Adequate barriers warning signs and lights shall be deployed to earmark restricted access areas during radiography.
- 20.6 Once removed from the secured storage pit or container no isotope shall be left unattended by the classified worker.
- 20.7 Isotopes shall be stored in a secured storage pit or container. This shall be enclosed by a secured fence. The dose rate at this boundary fence shall not exceed 7.5 micro sievert per hour.
- 20.8 Radioactive substances shall be kept in specially designed containers conforming to B.S. 4097 and type "B" approved, with adequate shielding, shutters and locks.

21.0 PRESSURE TESTING PROTECTION

- 21.1 Pressure testing of material shall be carried out with necessary precautions and the test procedures must be carefully followed.
- 21.2 The area around any hydrostatic pneumatic test location shall be barriered and warning signs shall be erected. No authorised personnel shall enter the test area.
- 21.3 Construction works are forbidden on and around the components under test.
- 21.4 Vessels or high volume components shall not be air pressurized.
- 21.5 Pressure tests shall be conducted by qualified and experienced personnel.
- 21.6 The test shack shall be kept at a safe distance from the components under pressure test.

22.0 FIRE PREVENTION AND EMERGENCY RESPONSE PROCEDURE

- 22.1 Adequate number of suitable fire extinguishers shall be distributed around the site.
- 22.2 They must be regularly maintained and must be kept in sight and within easy reach.
- 22.3 Fire hydrants shall be kept clear of any obstructions and shall be clearly marked. Fire hoses shall be maintained in good condition.
- 22.4 Special training shall be given by Safety Officer to personnel regarding the operation of these safety equipments.
- 22.5 Areas where flammable materials are stored (fuel, paint) shall be properly advised and marked as restricted areas.
- 22.6 Signs showing the appropriate colour code/use of extinguishers shall be erected in work areas/offices.
- 22.7 Any member of personnel discovering a fire shall alert all personnel in the area in order to commence evacuation and fire fighting measures.
- 22.8 On notification of the emergency, the Supervisor concerned must immediately report to the Safety Officer, Yard Manager and clinic, if necessary.
- 22.9 The Safety Officer must directly proceed to the emergency scene.
- 22.10 The fire service shall be called by the Safety Officer after verification that the fire cannot be fought with the available measures.

23.0 ACCIDENT INVESTIGATION & REPORTING

23.1 An accident involving Contract(s) personnel shall be immediately and thoroughly investigated and reported so that: -

23.1.1 Prompt remedial action can be taken as appropriate to eliminate unsafe practices.

23.1.2 Safety performance and accident trends can be analyzed from the data.

23.2 Accident investigation should have the following objectives: -

23.2.1 To determine the sequence of events leading to the accident.

23.2.2 To deduce the reason(s) for the accident by analyzing each contributing factor in sequence.

23.2.3 To draw conclusions which highlight the cause of the accident and probability of recurrence.

23.2.4 To recommend remedial action.

23.2.5 To publish findings in a report distributed as appropriate.

23.3 It is the responsibility of the location supervisor to initiate report and Safety Office shall investigate the accident as soon as practically possible. Accident investigation and reporting shall provide a systematic and effective method for reporting and investigating occupational illness and work related accidents which have or could have caused injury, damage or loss in order to identify causes for occupational illnesses, accidents and prevent similar or associated occurrence in future.

23.4 An accident is defined as an unexpected, unplanned and undesired event resulting in injury or damage or with the potential for such results.

23.5 Accidents are listed in the order of seriousness as: -

23.5.1 Fatal Accident

A fatal accident is defined as a work related incident which causes injury which is the prime cause of death to an employee.

23.5.2 Major Accident

A major accident is defined as a work related incident whereby an employee is injured and unable to resume the total scope of his normal job function within 24 hours of the time of the injury.

23.5.3 Minor Accident

A first aid injury as a result of a work related accident with limited injury potential whereby an employee is injured and required minor medical treatment or examination but is able to resume the total scope of his normal job function within 24 hours of the time of injury.

23.5.4 Damage/Loss

(incident of more than BD 5,000)

23.5.5 Minor Incident

When an accident has occurred and resulted in damage or loss less than BD 5,000.

23.5.6 Near miss incidents: -

A near miss incident as a result of a work related act or omission which could have given rise to injury or hazard to personnel or damage to equipment.