



# **SAFETY GUIDELINES FOR INTERNATIONAL ONSHORE PIPELINE CONSTRUCTION**

**EDITION 1**

**Published by:  
The World Federation of Pipeline Industry Associations**

**November 2003**



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On behalf of the World Federation of Pipeline Industry Associations it gives me great pleasure to see published the first edition of the Safety Guidelines for International Onshore Pipeline Construction.

Health and Safety walk hand in hand in our every day pipeline construction activities which we all share from the top to the bottom of our companies wherever in the world we are working. The World Federation Members subscribes to all that is being done to minimise injury and loss of life on pipelines and associated construction activities being carried out throughout the world.

This manual is not meant to be a treatise on all aspects of safety wherever in the world our members operate instead we have in Part 1 attempted to highlight important general aspects of safety leaving Parts 2, 3 and 4 to be completed by the particular Association of for the particular country or project.

These guidelines are not being produced in hard copy but will be available on the World Federation and IPLOCA websites to be reviewed and downloaded by individual association members.

This is Edition 1 and undoubtedly there will be changes and revisions which in the first instance will be accommodated in Part 5 Addenda until such time as they need to be incorporated in a new edition of this document.

I should like to thank the Pipe Line Contractors Association of Canada for their basic document and to Technip Germany Ltd., and Tekfen Insaat Ve Tesisat A.S. for the work they have done to produce these guidelines and I also wish to thank members of the 2002-2003 Board for their comments and suggestions in the final preparation of these guidelines.

Peter Blome  
President of IPLOCA  
2002-2003

# **SAFETY GUIDELINES FOR INTERNATIONAL ONSHORE PIPELINE CONSTRUCTION**

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## INTRODUCTION



One of the first tasks of the World Federation of Pipeline Industry Associations has been to draft the first edition of these Safety Guidelines formulated in such a manner as to be capable of use by all members of the respective Federation Associations.

The guidelines are designed to complement existing programmes and regulations that are provided by various government and regulatory authorities worldwide and are not meant to replace or subordinate established legal and regulatory operating rules, regulations and requirements that may be in place in a particular country or for a particular project. Such additional codes may be added in the respective sections of these guidelines so as to make the guidelines applicable for a specific country and for a specific project.

It is the intention that all work performed by Members of the World Federation will be carried out in accordance with the relevant statutory safety provisions and all reasonable practical measures taken to avoid risk to its employees or to others who may be affected. Members will continually endeavour to provide safe places of work, safe systems and procedures of working and through orderly good maintenance care and attention of plant and equipment avoid personal injuries or risks to the health of its employees.

The Federation have agreed a basis Safety Policy which is set out hereafter and Management and supervisory staff of the Federation's Association Members have the responsibility of implementing this policy throughout their company and must ensure that Health and Safety considerations are always given priority in planning their day-to-day operations. All employees and sub-contractors of World Federation Association Members are expected to co-operate in carrying out this policy and must ensure that their own work, so far as is reasonably practicable, carried out without risk to themselves or others.

Federation Association Members are obliged to appoint a senior construction manager within their organisation having particular responsibility for Health Safety and Welfare and for any project to appoint a Safety Officer to give advice to all levels of their staff regarding statutory obligations, safe working practices, training and cost effective safety procedures.

## World Federation of Pipeline Industry Associations

### Health & Safety Policy



**The World Federation of Pipeline Industry Associations subscribes to the philosophy that all accidents are preventable and is committed to the following policy with respect to Health and Safety.**

- Encourage its Members to initiate safety initiatives and strive to obtain safety awards.
- Keep its Members fully abreast of safety initiatives adopted by others and considered applicable to the activities of its Members.
- Promote the highest level of health and safety amongst its Members activities.
- Require its members to submit Safety Statistics annually on the basis of which WPLIA will publish overall statistics for its Members activities.
- Ensure that each Member designates a Safety Manager whose name will be published annually in the individual association's Directory of Members.
- Each Association to instigate an annual award for Safety Awareness and Compliance.
- Observe the requirements of the WFPIA Safety Manual for Onshore Pipeline Construction.



## PART 1

# BASIC SAFETY GUIDELINES



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A

**SAFETY RESPONSIBILITIES**

## **SAFETY RESPONSIBILITIES**

The overall responsibility for Health, Safety and Welfare within the IPLOCA Member Company rests with the Management of that Company. Accordingly the following sets out the responsibility within the Company structure for implementing the Company's Health and Safety Policy.

### **ASSIGNMENT OF RESPONSIBILITY**

#### **1. EXECUTIVE MANAGEMENT**

- (a) Provide and keep up to date a Statement of the Company's Policy for Health and ensure that it is brought to the notice of all employees. The statement provides a philosophy and commitment that set levels of expectations for safety performance.
- (b) Maintain overall control for Safety.
- (c) Ensure established safety policies are administered and enforced.
- (d) Ensure that field operations personnel are aware of and practice policies and procedures set out in the safety program.
- (e) Prepare instructions for the organisation and methods for carrying out the Company Policy, to make each person aware of their responsibilities and the means by which they can carry them out.
- (f) Administer the Policy throughout the Company by appointing a named Senior Executive to be responsible for the co-ordination of the safety performance on all company projects.
- (g) Know the appropriate statutory requirements affecting the Company's operations in whichever country the work is being carried out.
- (h) Ensure that appropriate training is given to all Staff as may be necessary.
- (i) Insist that sound working practices are observed as laid down by the relevant Codes of Practice and that work is planned and carried out in accordance with the statutory provisions appertaining thereto.
- (j) Ensure that tenders are adequate to provide for the cost of proper welfare facilities, safe working methods and equipment to avoid injury, damage and wastage.
- (k) Ensure that there is liaison on Health and Safety matters between the Company and others working on the site.
- (l) Institute reporting, investigations and costing of injury, damage and loss, and promote analysis of investigations to discover trends and eliminate hazards.
- (m) Discipline, re-educate and/or train any member of Staff failing to discharge satisfactorily their responsibilities for Health and Safety.
- (n) Instigate liaison with external accident prevention organisations and arrange for the distribution of Safety literature throughout the Company.
- (o) Arrange for adequate funds and facilities to meet the requirements of the Company Policy.
- (p) Make certain that Managers, Engineers, Foremen, etc., understand that injuries, equipment damage and wastage will all be taken into account when bonus, salary review and promotion are being decided.
- (q) Set a personal example when visiting sites by wearing appropriate protective clothing
- (r) Arrange for regular reports to be prepared to analyse safety performance, accident statistics, losses and training standards.

- (s) Instigate a Company Safety Award Programme
- (t) Make allowance for equipment / tool inspection and on going maintenance to ensure it's safety and integrity

## **2 CONSTRUCTION MANAGER**

- (a) Ensure that the standards required by the Management of the IPLOCA member company are fully implemented, taking into account Company Procedures, the Company Safety Policy, accepted safe working practices and local legal obligations and standards.
- (b) Understand the Company Policy for Health & Safety and ensure that the personnel appointed to manage site operations are aware of their responsibilities under the Policy.
- (c) Ensure that key personnel have received adequate training and instruction to permit them to carry out their obligations satisfactorily.
- (d) Check the Safety Procedures regularly-and assist when necessary in the resolving of difficulties that arise in this regard.
- (e) Check that the standards being applied on site meet local requirements and internationally approved standards.
- (f) Check that inspection, examination, testing and reporting procedures have been established and are functioning correctly.
- (g) Discipline staff who do not comply with the requirements of established Company Health and Safety procedures.

## **3 PROJECT MANAGER**

- (a) Be fully conversant with the Company Policy for Health and Safety and ensure that it is readily available on each site. Plan all work in accordance with its requirements and ensure that the Safety Procedures are regularly examined to establish if improvements or additions need to be made.
- (b) Determine at the Project Planning Stage:
  - (i) The standards that apply in the country where the Project is based.
  - (ii) The most appropriate order and method of working.
  - (iii) Provision of adequate lighting and safe method of electrical distribution
  - (iv) Allocation of responsibilities between the Company and others on the site.
  - (v) Hazards that exist from underground and overhead services.
  - (vi) Welfare facilities required.
  - (vii) Fire precautions to be established.
  - (viii) The need for any particular training or instruction required for Site Personnel.
  - (ix) Temporary works provision (scaffolding, excavation support, etc).
- (c) Provision of written instructions in unusual situations not covered by Company Policy to establish working methods and sequences, outline potential hazards at each stage and indicate precautions to be adopted.
- (d) Ensure, so far as is reasonably practicable, that work once started.
  - (i) Is carried out as planned and that account is taken of changing or unforeseen conditions as the work proceeds.
  - (ii) Is carried out in accordance with good construction practice and the relevant applicable codes and any other appropriate local statutory requirements.
- (e) Discipline any member of Site Supervisory Staff for failing to discharge safety responsibilities satisfactorily.
- (f) Check working methods and precautions with Site Management and the Project Safety Officer before work starts.
- (g) Take appropriate action when notified of disregard on site of the Safety Officer's advice.
- (h) Set a personal example when visiting a site by wearing appropriate protective clothing.
- (i) Carry out any necessary notifications to Enforcement Authorities, Police, etc. as required by Company Policy, or local statutory requirements.

#### **4 PROJECT ENGINEERS & SUPERINTENDENTS**

- (a) Understand the Company Safety Policy for Health and Safety and ensure that it is brought to the notice of all employees, particularly new employees. Carry out all work in accordance with its requirements and bring to the notice of the Project Manager any improvements or additions which are felt necessary.
- (b) Organise sites so that work is carried out to the required standard with minimum risk to employees, other Contractors, the Public, equipment or materials.
- (c) Where necessary, issue written instructions setting out the method of work. Identify training needs and advise the Project Manager and Project Safety Officer of these as and when necessary.
- (d) Know the requirements of the relevant local safety regulations and ensure that they are observed on site.
- (e) Ensure that suitable staff are appointed to keep all registers, records and reports up to date and properly filled in, and ensure that they are kept in a safe place. Ensure that copies of regulations are available and statutory notices are prominently displayed, when and where necessary.
- (f) Ensure that the "competent persons" appointed to make the necessary inspections of scaffolding, excavations, plant, etc., have sufficient knowledge and are experienced and qualified to evaluate all aspects of safety relating to the item being inspected.
- (g) Ensure that Supervisors and Operatives under your control are aware of their responsibilities for safe working and are not required or permitted to take unnecessary risks.
- (h) Establish procedures to ensure that any electricity supply is installed and maintained in a safe and proper manner.
- (i) Establish procedures to ensure that all information available, relating to services on the site is obtained and that services are located, marked and plotted accurately before excavation work starts. Do not allow mechanical excavation to take place within limits of the services laid down by the service authority and the Company Policy.
- (j) Plan and maintain a tidy site.
- (k) Implement arrangements with Sub-Contractors and others on site to avoid confusion about areas of responsibility for Health, Safety and Welfare.
- (l) Establish procedures to check that all machinery and plant on site, including power and hand tools, are maintained in good condition and that all temporary electrical equipment is of suitable, safe voltage.
- (m) Ensure that adequate supplies of approved protective clothing and equipment are maintained on site.
- (n) Establish systems to ensure that the protective clothing is issued as and when required.
- (o) Ensure that adequate First Aid facilities are on site and that all persons on site are aware of their location and procedure for receiving treatment for injuries. Establish emergency evacuation procedures for sending injured personnel to hospital.
- (p) Ensure that a system is organised in the event of an emergency for applying First Aid and that necessary emergency procedures have been established on the site.
- (q) Liase, when necessary, with the Local Enforcing Authority and act upon advice given by Inspectors.
- (r) Liase with the Project Safety Officer and when necessary seek his advice before commencing new methods of work or potentially hazardous operations.
- (s) Ensure that adequate fire precautions are provided taking into account special requirements on the site and local Permit to Work Systems. Site offices and welfare facilities must be adequately protected and any flammable liquids or liquefied petroleum gases stored and used safely.
- (t) Examine drawings and soil investigation reports to determine excavation support requirements in advance, and provide details in accordance with Company Policy
- (u) Set a personal example by wearing appropriate personal protective clothing and equipment on site.
- (v) Ensure that any accident on site that results in an injury to any person (not just employees) and/or damage to plant or equipment is reported in accordance with Company Policy, or local requirements.

- (w) Allow and ensure reasonable time to communicate safety controls; i.e. weekly Safety Meetings, Hazard Identification and Control Talks including management with Management / Foremen with workers etc.
- (x) Ensure Plans and Controls are in place to protect public safety. I.e. signs, control personnel, public awareness programmes etc.
- (y) Ensure that recommendation and or follow action required arising from incident investigations are acted upon in a timely and fair manner.

## **5. SUPERVISORS/FOREMEN**

- (a) To know and apply the Company's safety policy and relevant occupational health and safety legislation and ensure and ensure that it is brought to the notice of Operatives under your control. Carry out all work in accordance with its requirements and ensure that the rules and practices are in compliance.
- (b) To ensure that all employees work in a safe manner and use all protective devices and procedures required by the Company, in accordance with legislation, to protect their health and safety.
- (c) To advise all employees of any potential or actual dangers and how to isolate, prevent, or remove them.
- (d) To arrange for medical treatment as required, in the case of injury or illness including transportation to a doctor or hospital as necessary.
- (e) To report all accidents immediately, to investigate all accidents fully, and to advise management on how to prevent similar accidents in the future.
- (f) To carry out regular inspections of the work place to ensure a safe and healthy environment.
- (g) The supervisor shall evaluate an employee's performance to determine whether the employee is competent at the required work task. Direct supervision should be given to an employee unfamiliar with certain tasks.
- (h) Know the Regulations applicable to the work on which your operatives are engaged and insist that these Regulations are observed.
- (i) Incorporate safety instructions in routine orders and see that they are obeyed.
- (j) Do not allow Operatives to take unnecessary risks.
- (k) Ensure that new employees are shown the correct method of working and are advised of all safety precautions applicable to their work.
- (l) Ensure that any special rules applying on the site are being implemented correctly and check that Permit to Work Systems are being complied with.
- (m) Commend Operatives who, by action or initiative, eliminate hazards.
- (n) Do not allow "horse-play" or dangerous practical jokes and discipline those who consistently fail to consider their own safety, or that of others around them.
- (o) Report immediately any defects of plant or equipment.
- (p) Report any accident, however minor, to the Project Safety Officer immediately.
- (q) Set a personal example by wearing protective clothing and by carrying out your own work in a safe manner.
- (r) Look for, and suggest ways of eliminating hazards. Bring to the notice of Supervision any improvement or addition to the Company Safety Policy that you feel should be made.

## **6. PROJECT SAFETY OFFICER**

- (a) Advise Management on preparation, promulgation and review of the Company Safety Policy for Health, Safety and Welfare, including the organisation and arrangements for carrying out the Policy.
- (b) Give advice to Management on:
  - (i) Legal requirements affecting Health, Safety and Welfare.
  - (ii) Prevention of injury and damage.
  - (iii) Provision, selection and use of protective clothing and equipment.
  - (iv) New working methods, equipment or materials which could reduce risks.
  - (v) Proposed changes in legislation.

- (vi) Potential hazards on new sites before work starts and Health and Safety factors affecting the selection of plant or equipment, etc.
- (c) Carry out regular inspections of sites and workplaces to determine whether work is being carried out in accordance with Company Policy and the relevant statutory provisions. Provide an inspection report to the Project Manager or other nominated person(s) and liaise with all Management levels giving advice on how to deal with problems that affect Health & Safety.
- (d) Assist Management in notifying the Enforcing Authority of dangerous occurrences, losses, accidents, and so on, in accordance with Company Policy.
- (e) Assist Management in any dealings with the Enforcing & Safety Authorities.
- (f) Carry out investigations of accidents in accordance with Company Policy and prepare and provide reports and statistics in accordance with requirements applicable for the Project or the Country.
- (g) Check and report on the provision and maintenance of welfare facilities, statutory literature and information.
- (h) Check and report on the effectiveness of equipment and procedures established to deal with fire or other disasters.
- (i) Provide advice on training requirements and arrange training courses where required.
- (j) Endeavour to establish, at all levels within the Company, an understanding that compliance with the regulations and prevention of injury and damage, is a profitable and essential integral part of business and operational efficiency.
- (k) Set a personal example by wearing all necessary protective clothing when on site.
- (l) All necessary Notices, Regulations, Registers and Accident Report Forms will be issued by the Project Safety Officer and he will check that personnel have been assigned to keep registers up to date.

## **7. ENGINEERS & SURVEYORS**

- (a) Read and understand the Company Policy for Health & Safety.
- (b) Have a working knowledge of the various statutory requirements governing the Company's work.
- (c) Observe all Health & Safety rules that apply on the section of the contract where his operation is in progress.
- (d) Set a personal example by wearing all necessary protective clothing when on site.
- (e) Report any unsafe practices or situations noted when working on site to the Section Engineer or Project Safety Officer.

## **8. OPERATORS**

- (a) Read and understand the Company Health and Safety Policy and carry out work in accordance with its requirements.
- (b) Use the correct tools and equipment for the job.
- (c) Wear safety footwear at all times and use, where necessary, all protective clothing and safety equipment provided, (e.g. safety helmets, goggles, respirators etc).
- (d) Keep tools in good condition.
- (e) Report immediately to Supervision any defects in plant or equipment.
- (f) Work in a safe manner at all times. Do not take unnecessary risks that could endanger yourself or others. If possible, remove site hazards, (e.g. remove or flatten nails sticking out of timber, tie unsecured access ladders, etc.)
- (g) Do not use plant or equipment for work for which it was not intended, nor if you are not trained or experienced to use it.
- (h) Warn other employees, particularly new employees and young people, of particular known hazards.
- (i) Do not play dangerous or practical Jokes or "horseplay" on site.

- (j) Report to Supervision any person seen abusing the welfare or safety facilities provided.
- (k) Report any injury to yourself that results from an accident at work, even if the injury does not affect your ability to work.
- (l) Report any damage to plant or equipment
- (m) Suggest safer methods of working.

## **9. SUB-CONTRACTORS**

- (a) All Sub-Contractors will be expected to comply with the Company Policy for Health Safety and Welfare and must liaise with the Site Management about any difficulties foreseen that may affect Health & Safety on site.
- (b) All work must be carried out in accordance with the relevant statutory provisions and take into account the safety of others on the site and the General Public.
- (c) Sub-Contractors' employees are not permitted to alter any scaffold provided for their use or use or interfere with any plant or equipment on the site, unless authorised.
- (d) All plant or equipment brought on to site by Sub-Contractors must be safe and in good working condition, fitted with any necessary guards and safety devices, and with any necessary certificates displayed and available for checking.
- (e) Power tools or electrical equipment must operate at an accepted, safe voltage. All transformers, generators, extension leads, plugs and sockets must be in good condition and constructed and installed to approved standards.
- (f) Any injury sustained or damage caused by Sub-Contractors employees must be reported immediately to this Company's Representative (Project Engineer/Project Safety Officer).
- (g) Sub-Contractors' employees must comply with any safety instructions given by the Company's Management Team.
- (h) The Company shall appoint a Project Safety Officer to inspect sites and report of Health and Safety matters. Sub-Contractors informed of any hazards or defects noted during such inspections will be expected to take immediate action to rectify shortcomings.
- (i) Suitable Welfare facilities and First Aid equipment in accordance with the regulations must be provided by Sub-Contractors for their employees, unless arrangements have been made for Sub-Contractors employees to have the use of the Company's facilities.
- (j) Any material or substance brought on site that has Health, Fire or Explosion risks must be used and stored in accordance with regulations and current recommendations, and information must be provided to any other person on site who may need it.
- (k) Sub-Contractors shall ensure that workplaces are kept tidy and all debris, waste materials, etc., cleared away as work proceeds.
- (l) Sub-Contractors must provide and insist on the use by their employees of all necessary protective equipment required on site.
- (m) Sub-Contractors must give adequate training and instruction to their operatives to make them aware of hazards existing on the site and the correct procedures to deal with these risks.

## **10. PLANT ENGINEERS & PLANT FOREMAN**

- (a) Read and understand the Company Policy for Health and Safety and ensure that it is brought to the notice of all employees under your control.
- (b) Ensure that all plant sent to site is safe and fully efficient, is guarded and equipped with safety devices and has been tested and thoroughly examined in accordance with regulations.
- (c) Ensure that all plant operators are only employed on equipment that they are qualified to operate.
- (d) Ensure that all tests, thorough examinations and inspections of plant are carried out as required and that all necessary records are maintained.

- (e) Give advice to site supervision on the suitability or otherwise of plant for specified operations and ensure that any necessary safety instructions are issued with power tools or equipment.
- (f) Arrange for regular servicing and maintenance of all plant and ensure that defects are dealt with promptly.
- (g) Ensure that site management do not continue to use plant if defects which could affect its' safety are reported.
- (h) Ensure that work in the workshop is carried out safely, all power tools and equipment are operating safely and that lighting & heating, etc., are maintained in safe condition, floors are free of debris and that all access routes are clear.
- (i) Ensure that all plant operators and fitters have been provided with any necessary protective equipment (ear defenders, goggles, gloves etc).
- (j) Ensure that plant is suitable from a safety viewpoint and complies with all statutory requirements and current recommendations. In particular, ensure that noise levels are not above recommended limits.
- (k) Ensure that facilities are provided to reduce risks of employees contracting industrial dermatitis.
- (l) Co-operate with the Project Safety Officer and act on his recommendations.
- (m) Ensure that all fire protection measures are provided and maintained.
- (n) Ensure first aid facilities are provided and maintained.
- (o) Ensure all accidents are reported as required by Company Policy.
- (p) Set a good example by using and wearing any necessary protective clothing or equipment, when appropriate



## 11. PLANT OPERATORS

- (a) Read and understand the Company Safety Policy and carry out work in accordance with such requirements.
- (b) Know the legal requirements affecting the use of your machine and ensure that the machine is used in accordance with those requirements.
- (c) Ensure that any defect in the machine is reported immediately to the Plant Engineer/Foreman. Do not continue to operate the machine if the defect affects its safe use.
- (d) Make regular inspections of your machine for defects at least once a week, and, if your machine is classed as a lifting appliance, make a report on your inspection in the inspections register.
- (e) Ask for, and use, ear protection to ensure that you do not suffer from gradual loss of hearing due to prolonged exposure to noise.
- (f) Never try to use the machine for work for which it was not designed. If in doubt, ask the Plant Engineer/Foreman for advice.
- (g) Wear suitable safety footwear and protective clothing, as you are exposed to the same hazards as others on the site when not in the cab of your machine
- (h) Suggest ways to eliminate hazards or improve working methods. Ensure when operating your machine, that other persons are well clear, especially when reversing.
- (i) Ensure, if necessary, that you work with a Banksman / Swamper and, if so, you are both sure before starting work, of the meaning of signals which may be used. (In the case of cranes, the ANSI signaling system shall be used.)
- (j) Report all accidents or damage, however minor, to your supervisor.
- (k) Check prior to starting work with the Section Engineer Foreman or other Supervision, of the location of underground or overhead services. Do not approach or excavate within distances of services given in the Company Safety Policy.

- (l) Operators should wear seatbelts at all times the Equipment is in motion.

## 12. WELDERS, FITTERS & ALL OTHER SKILLED PERSONNEL

- (a) Read and understand the Company's Safety Policy and carry out work in accordance with its requirements.
- (b) Report to your Superintendent or Foreman any defects in plant or equipment discovered while carrying out servicing on site.
- (c) Use the correct tools and equipment for the job and report any defect noted in tools and equipment.
- (d) Work in a safe manner at all times, wear suitable footwear and protective clothing. When required, ask for, and use, safety equipment such as welding goggles, ear defenders, respirators, safety goggles, etc.



- (e) Ensure that you do not carry out repairs or servicing on plant or machinery while the engine is running, unless absolutely necessary and ensure that any guards removed to carry out repairs are replaced.
- (f) Ensure that you do not carry out repairs on vehicles or plant unless safety precautions have been taken, i.e. prop tipper body, fit locking bar to ram on boom, lower dozer blade or excavator bucket to ground, etc.
- (g) Ensure that all precautions are taken when using welding equipment to eliminate risks to your own Health and Safety, the Health and Safety of others and that the danger of fire is minimised.
- (h) Suggest to Supervision ways of improving safety and eliminating hazards.
- (i) Reporting to your Superintendent or Foreman any person abusing welfare facilities.
- (j) Warn new employees particularly apprentices and young people, of known hazards.
- (k) Report any accident or damage, however minor, to Supervision.
- (l) Take all personal hygiene measures necessary to prevent industrial dermatitis.

## 13. TRANSPORT SUPERINTENDENT & FOREMEN

- (a) Read and understand the Company Policy on Health and Safety and ensure that it is brought to the notice of all employees under your control.
- (b) Ensure that all vehicles are safe and fully efficient, are maintained and serviced as recommended and that all necessary tests, insurances, licences, etc., are up to date, and in compliance with local requirements.
- (c) Ensure that all drivers are in possession of the appropriate driving licence or permits and that they are aware of any special requirements and restrictions that may be applicable.
- (d) Ensure that all defects reported are attended to immediately
- (e) When providing vehicles for use on site, ask for information of site hazards and instruct drivers accordingly, e.g. excavations open, over head cables, blasting operations, etc.
- (f) Ensure drivers are provided with any necessary safety equipment.
- (g) Give instructions where necessary on the safety of loads, in particular ensure all procedures are followed when hazardous loads are to be carried. Notify all appropriate authorities as required when moving large or unusual loads.

- (h) Arrange for any necessary special training for drivers.
- (i) Ensure that appropriate welfare facilities are provided and maintained for drivers.
- (j) Ensure that vehicles are parked safely in the yard at the end of shift.
- (k) Co-operate with the Project Safety Officer and act on his recommendations.
- (l) Ensure that Fuels are stored and dispensed safely and in accordance with relevant statutory requirements.
- (m) Ensure that Fire Protection measures are provided and maintained.
- (n) Ensure First Aid facilities are provided and maintained.
- (o) Ensure all accidents are reported as required by Company Policy.
- (p) Set a personal example by using and wearing any necessary protective clothing, when appropriate.

#### **14. DRIVERS**

- (a) Read and understand the Company's Safety Policy and carry out work in accordance with its requirements.
- (b) Ensure that any defect in your vehicle is reported immediately to your Foreman or Transport Superintendent.
- (c) Make regular inspections of your vehicle for obvious defects.
- (d) Wear suitable safety footwear and protective clothing, as you are exposed to the same hazards as others on the site when not in the cab of your vehicle.
- (e) Report to Site Office or a Site Superintendent before travelling around any site.
- (f) Get out of the cab of your vehicle when it is being loaded with loose materials (unless suitable means are provided to protect the cab).
- (g) Drive in a safe manner at all times and be particularly careful when driving on site taking into consideration the conditions of temporary access roads or roads that are under construction and being used for access purposes.
- (h) Ensure before reversing that there are no obstructions or people behind the vehicle. Preferably ask someone to act as Banksman or Swamper when you reverse.
- (i) Ensure that when reversing or driving towards an edge, that a suitable stop has been provided to prevent the vehicle going over the edge.
- (j) Ensure that having tipped the load, the vehicle does not travel forward until the tipper body has returned to the travelling position. This is particularly important on sites with overhead services, or uneven ground.
- (k) Report all accidents or damage, however minor, to the Transport Manager.
- (l) Ensure that any load on your vehicle is well secured also that your vehicle is not overloaded or loaded in such a way as to affect the handling of the vehicle. Local restrictions should be taken into account when arranging to move unusually large loads by road.
- (m) Hazardous materials should be moved with extra care. All loads must be properly secured to the vehicle and any special requirements that apply on the site must be complied with.
- (n) Drivers are required to exercise care at all times and to comply strictly with all local traffic laws.
- (o) Drivers and Passengers should wear seatbelts at all times when the Vehicle is in motion.



## 15. STORES SUPERINTENDENT

- (a) Understand the Company's Health and Safety Policy.
- (b) Ensure that the stores area is set out in a safe manner and that adequate means of access/egress are available to all working areas.
- (c) Ensure that adequate stairs, steps or ladders are available to areas above ground level.
- (d) Ensure that all necessary protective equipment, fire fighting appliances and the like are readily available for use.
- (e) Ensure that storage and handling facilities for hazardous materials are suitable safe and comply with relevant legislation.
- (f) Ensure that any mechanical handling equipment is in good condition and properly maintained, and operated only by trained staff.
- (g) Ensure that all equipment sent to site from stores has been checked and is in good condition. Necessary certificates of test/examination should be available as required.
- (h) Ensure that all electrical equipment and power tools sent to site from stores have been checked and are safe and in good condition and are operable at a suitable and safe voltage.
- (i) Ensure that any other equipment, tools, or materials sent to site from stores are suitable and safe when used for the purposes for which they were intended. If in doubt, ask for confirmation from Technical Staff, or other competent persons.
- (j) Ensure that full instructions for the safe use of any article or substance is sent with the article or substance, or check that full instructions are available on site.
- (k) Ensure that a stock of protective clothing and safety equipment is available for issue to sites when required.
- (l) Ensure that material or equipment delivered to the Store is stacked or stored in a position and manner that does not create a hazard.
- (m) Report any accident that results in damage or injury, in accordance with Company Policy.
- (n) Co-operate with the Project Safety Officer and implement his advice.
- (o) Ensure that any flammable or hazardous material destined for site has correct and adequate marking on it, or its container, to identify it and satisfy relevant requirements for marking such materials.

## 16. OFFICE MANAGEMENT

- (a) Read and understand the Company Policy for Health and Safety and ensure that it is brought to the notice of all employees under your control.
- (b) Ensure that the requirements of any relevant regulations are complied with
- (c) Ensure that all office machinery is safe, fitted with any necessary guards or safety devices and is serviced and maintained as recommended by the manufacturer.
- (d) Ensure that staff required to use office machinery are trained in its use and are not permitted to attempt to carry out any repairs unless authorised.
- (e) Ensure that offices are laid out and maintained to ensure safety of staff and visitors
- (f) Co-operate with the Project Safety Officer and implement his advice.
- (g) Ensure that all fire fighting equipment is maintained, fire exits kept clear and fire drills organised on a regular basis.
- (h) Ensure that First Aid facilities are available
- (i) Ensure that all accidents are reported in accordance with the Company Policy.
- (j) Ensure all staff work safely and do not take unnecessary risks.



- (k) Ensure that all necessary welfare provisions are provided and maintained.
- (l) Set a personal example.
- (m) Work with other Supervisors and Foremen to ensure that the Safety Record Systems and Documentation are maintained in a proper and legible manner.

**17. OFFICE STAFF**

- (a) Read and understand the Company's Safety Policy and carry out your work in accordance with its requirements.
- (b) Ensure that the clothing and particularly the footwear you wear at work is suitable from a safety viewpoint.
- (c) Do not try to use, repair or maintain any office equipment or machinery for which you have not received full instructions or training.
- (d) Report any defects in office equipment or machinery immediately to your Supervisor.
- (e) Find out from your Supervisor the position of the First Aid Box.
- (f) Ensure that you know the procedure in the event of a fire.
- (g) Report any accident or damage, however minor, to your Supervisor.
- (h) Ensure that corridors, office floors, doorways, etc. are kept free from obstruction.
- (i) Do not attempt to lift or move, on your own, articles or materials so heavy as likely to cause injury.
- (j) Do not attempt to reach items on high shelves unless using steps or a properly designed hop-up; do not improvise or climb.
- (k) Suggest ways of eliminating hazards and improving working methods.
- (l) Dispose of spent matches, cigarette ends, etc. properly.
- (m) Warn new employees, particularly young people, of known hazards.

**18. ALL EMPLOYEES**

- (a) Read, understand, and comply with the Company's safety policy, safe work practices, procedures, and rules contained within the safety program.
- (b) To wear the safety equipment and personal protective devices and clothing required by regulations and his/her employer.
- (c) To notify his/her supervisor of any unsafe conditions or acts that may be of danger to other workers or himself/herself.
- (d) To report all accidents and injuries to his/her supervisor immediately.
- (e) To take every reasonable precaution to protect the safety of other workers and himself/herself.
- (f) Employees must attend all scheduled safety meetings.

**B**

**OVERALL SAFETY GUIDELINES**

# OVERALL SAFETY GUIDELINES

## EMPLOYEE ORIENTATION

It is the supervisor's responsibility to ensure that the worker upon being hired is provided with the following:

- 1.1 Orientation covering company safety programs and safe work practices, as well as reference to all applicable Government regulations and the Project Emergency Plan.
- 1.2 A description of workers duties and responsibilities.
- 1.3 The name of the workers' immediate supervisor and the supervisor in charge of the project.
- 1.4 The name of the first aid attendant and the availability of first aid services.
- 1.5 The name of the Safety Committee Representative (when required).

## PERSONAL PROTECTIVE EQUIPMENT

Personal Safety Devices must be used as directed to protect one's-self and/or alert others to one's location. (i.e. water flotation device when working on, over or near the banks of swift moving or deep water courses/bodies, luminescent safety vests when working around equipment and/or when controlling traffic, Knee pads, faller's pants etc.

### 1. HEAD PROTECTION

- 1.1 Approved Hard Hats must be worn at all times.



### 2. EYE PROTECTION

- 2.1 Approved safety glasses must be worn by all personnel performing activities that may cause an injury to an eye. This also applies to others situated in the area in which work is being performed.

- 2.2 Goggles must be worn when handling chemicals.

- 2.3 Face shields and approved safety glasses must be worn by all personnel using grinders or buffers.



### 3. HEARING PROTECTION

- 3.1 Hearing protection must be worn in areas of high noise levels (Over 85 db) where noise cannot be decreased or isolated. Examples of such areas are:

- A. Jack hammer or tamper operation
- B. Operating or adjacent to heavy equipment
- C. Grinding
- D. When you cannot hear someone talking to you because of surrounding noise
- E. Sand blast operations
- F. Rock drill operation

**Rule of Thumb:** If you cannot converse normally with another person within 3 feet of you, hearing protection is required.

### 4. HAND PROTECTION

- 4.1 Suitable work gloves are to be worn when handling hot, sharp, rough or splintered materials.

- 4.2 Chemical resistant gloves must be worn when working with chemicals, solvents, cements, etc.



5. **FOOT PROTECTION**

5.1 All persons must supply and wear boots that meet Approved Standards for construction

6. **CLOTHING**

6.1 Jewellery or loose clothing that creates a hazard to the worker is not to be worn.

6.2 Shirts and long pants shall be worn at all times. Sleeveless shirts are not acceptable.

6.3 The need for fire retardant work wear will be evaluated on a job-to-job basis by the Project Superintendent and/or the Project Safety Supervisor.



7. **RESPIRATORY PROTECTION**

7.1 Recommended respiratory protection, meeting approved requirements, such as dust masks or chemical cartridges shall be worn/used where required.



8. **FALL PROTECTION**

8.1 Full Body Harness shall be worn and securely tied-off at all times when working at Height and as dictated by legislative requirements or Clients standards.

**EMERGENCY PREPAREDNESS**

The purpose of Emergency Preparedness is to ensure that all possible Emergency Response Resources are in place equal to the scope and magnitude of a potential catastrophic event.

**Emergency Preparedness includes:** Response Equipment, Standards of Operation, Regulatory Requirements and including Education and Training of individuals and crews on what to do in the event of an emergency.

**\*\*Note - Emergency Preparedness differs from Emergency Response in the context of pro-actively versus re-activity to a serious incident/accident.**

**EMERGENCY RESPONSE**

1. **OBJECTIVE**

The purpose of Emergency Response is to ensure a rapid recovery from a serious accident or serious event.

Specifically, the objectives are to:

- a. Minimize injury to the public and company personnel,
- b. Minimize damage to the public and property,
- c. Assist in restoring normal conditions as directed,

Guidelines and procedures should be specific to each project, should an emergency develop while constructing the pipeline.

2. **EMERGENCY COMMUNICATION**

2.1 **Emergency Priorities**

The first steps involve assessing the hazard, evacuating personnel from the area, identifying resources at hand and delegating priority activities (e.g. initiate communications, render first aid, crowd control, etc.)

- a. Contact key personnel (first aid, safety, superintendent).
- b. Give location.
- c. Give short precise account of what happened.
- d. Give types of injuries and number of casualties.

If there is a gas emergency first call the Owner Company to initiate internal emergency response. Owner personnel will usually then take charge of the situation and all Project and contractor personnel will take direction from them.

If the emergency is the result of a broken power line or electric cable, call the local Hydro/Power Company first. Hydro/Power personnel will initiate the emergency response and take charge.

Once the emergency response has been initiated, contact the Project Construction Superintendent. The Company is responsible for notifying and reporting to all owners, authorities and regulatory agencies as required.

## **2.2 PRIORITY OF ACTIONS**

The priority of actions to be taken by the initial delegation and subsequent follow-up is as follows:

- a. Clear the area,
- b. Protect yourself and others,
- c. If possible minimize property damage,
- d. If possible protect the environment.

**Remember:** Do not place yourself in danger if you do not have the knowledge or the proper training.

**Possible incidents, which could occur during a Pipeline Project, are as follows:**

- a. Industrial accident/injury,
- b. Gas emergency,
- c. Communications/cable breakage,
- d. Electrical emergency,
- e. Environmental emergency.
- f. Fire emergency,
- g. Hazardous product spill

## **2.3 MEDIA RELATIONS**

All on-site personnel shall direct all inquiries (TV, Radio, Press, etc.) regarding any accident/incident to the company-designated spokesman. Personnel shall at no time publicly express an opinion as to blame or cause.

## **PERSONAL CONDUCT**

### **1. Intoxicants & Drugs**

The use, possession, sale, manufacture or distribution by any person, of alcohol, illegal drugs, or any other intoxicants causing impairment is strictly prohibited on Company property and at any work site associated with the project. This includes any work vehicle or equipment, and/or parking lots.

**Employees performing safety sensitive duties may be subject to mandatory drug testing.**

### **3. PRESCRIPTION DRUGS**

- 3.1 Employees must notify their immediate supervisor or the safety department of any prescription drugs used under the direction of a physician. It can then be determined if that employee can drive or carry on work-related duties safely during such time as he/she is required to take the prescribed medication.
- 3.2 Be sure to inform your supervisor and First Aid Personnel of any medical conditions, allergies, and reactions to medication that you may have.

### **4. WEAPONS**

- 4.1 In accordance with the law, and unless authorized by the Company, possession of firearms or game hunting devices by any person on the work site including any camp or camp site is strictly prohibited.

## **JOINT HEALTH & SAFETY COMMITTEE**

1. The safety committee is a joint committee made up of employees and employer representatives consulting in cooperative spirit to identify and resolve safety and health problems in support of the safety program.

## 2. **FUNCTION**

- 2.1 Make recommendations for the introduction, implementation and enforcement of safety and health policies and procedures at the work site.
- 2.2 Assist in the identification of occupational safety and health hazards in the workplace and recommend means of controlling these hazards.
- 2.3 Recommend and promote safety and health programs for the education and information of the employees.
- 2.4 Receive, consider and, where necessary, assist with investigating complaints respecting safety and health of any person at the work site and make recommendations jointly with the employer for corrective action.
- 2.5 Where requested to do so, the committee shall review the information gathered from the monitoring and measuring procedures and, where necessary, make recommendations to the employer.
- 2.6 Participate in planned inspections and accident investigations at the work site, concerning the safety and health of employees.

## 3. **MEETINGS**

Meetings shall be held on a regular scheduled basis.

## 4. **RIGHT TO REFUSE - UNSAFE WORK**

It is the right of all employees to refuse to perform work they believe unsafe. Employees are encouraged to exercise this right if confronted by a situation or directive they believe could result in injury to themselves or their fellow workers.

## **HAZARD ASSESSMENT**

1. Prior to the commencement of work duties, a hazard assessment shall be done of the work area. The assessment should be documented and the employees should be informed of any areas of concern revealed by the assessment and instructed on any applicable safe work practices.
2. A Hazard Assessment is performed to locate, identify and to eliminate the risk of accident or injury on the worksite.
3. Hazard Assessment involves;
  - a. hazard identification
  - b. hazard assessment
  - c. hazard management – elimination or substitution, or control, or personal protection
  - d. corrective action, and
  - e. follow up.

## **LOCKOUT/TAG OUT**

1. Lockout and tag out procedures and requirements must be adhered to before performing any service or other work on equipment and machinery.
2. All parts, extensions and attachments must be secured against movement, and all sources of stored energy released, before maintenance and repair work begins.
3. Lockout devices and tags put on by another person must not be removed.



## **WORKER FITNESS**

1. Sprains and strains, or Musculoskeletal Injuries (MSI), are the most common forms of occupational injury. Be prepared mentally and physically to do the job. The following will help reduce your chances of injury.
  - a. Warm up and stretch before starting physical labour.
  - b. Use erect posture, reduce twisting and avoid overexertion.
  - c. Use the squat technique for lifting.
  - d. Get help when moving heavy items.
  - e. When performing repetitive tasks, remember, that even a moment of rest can make a difference when relieving tired muscles and joints.

C

**PIPELINE CONSTRUCTION**  
**OPERATIONAL SAFETY**

# PIPELINE CONSTRUCTION OPERATIONAL SAFETY

## A. MOBILISATION OF EQUIPMENT

### Description

The planning, scheduling, permitting and movement of equipment to the job location.

### Equipment Commonly Used

Heavy construction equipment - cranes, bulldozers, side-booms, etc.

Truck-tractors, floats, lowboys, tankers

Light equipment - pickups, 4x4s, welding machines etc.

Miscellaneous equipment - office and storage trailers, mobile camps etc.

Bulldozer D9



Side-Booms



Paywelders



Bending Machine



Grader and Roller



### General/ Safety Hazards

Equipment loading and binding

Equipment storage

Fatigue from travelling

Road travel

### Applicable Protective Devices

Leather Gloves, Proper Clothing, Safety Helmet, Safety Boots, Body Harness, Face Masks or Goggles, SCB Apparatus, Respirators, Dust Masks etc



Correct equipment - i.e. trailers rated for loaded capacities  
Proper loading and binding of equipment

### Most Common Injuries

Injuries related to motor vehicle accidents

Material handling injuries (sprains, strains, bruises, lacerations)

Struck by and crushing injuries when loading/unloading equipment

Trips/falls from equipment

### Some Do's & Don'ts

Keep an accurate trip log

Plan a safe route prior to leaving keeping in mind tunnels, bridges, terrain and rush hours for major cities.

Pre-trip inspect vehicles and equipment before transporting

Stay alert while travelling - rest if you are tired

Use the "Three Point Method" for entering and exiting equipment (make contact with at least 3 points of the equipment when ascending or descending, 2 hand and 1 foot/ 2 feet and 1 hand.

## B. MAINTENANCE OF EQUIPMENT

### Description

- Major overhaul
- Regularly scheduled maintenance
- Repair and servicing of construction equipment at a specific maintenance facility or field location, including required transport
- Unscheduled maintenance due to breakdown

### Equipment Commonly Used

- Grinders/sanders
- Hand tools. (manual/electrical/air operation)
- Jacks, hoists, cranes
- Lube vehicles/equipment
- Metal working machines
- ainting equipment
- Welding/cutting torches

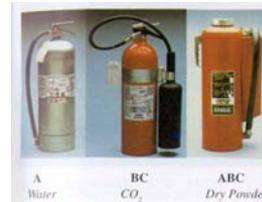
### General Safety Hazards

- Eye exposure
- Falling and flying objects
- Hands, arms, legs, foot exposures
- Lifting exposures
- Radiation exposures
- Terrain exposure
- Trips, slips, falls
- Various chemical exposures



### Applicable Safety Devices

- Appropriate work clothing
- Approved chemical containers
- Breathing protection
- Chemical resistant gloves
- Chocking, blocking devices
- Fire fighting equipment
- Hearing protection
- Lockout/tag-out devices
- Safety glasses/goggles
- Safety shoes
- Work gloves



### Most Common Injuries

- Bruises
- Crush injuries
- Flash burns
- Fractures (heat/chemical)
- Head concussions
- Lacerations
- Objects in eye
- Punctures
- Scrapes
- Strains/sprains



### Some Do's & Don'ts

- Follow lockout/tag-out procedures
- Keep work area clean
- Properly handle, store and dispose chemicals
- Properly block and chock equipment
- Read material safety data sheets
- Seek solid ground for lifting equipment
- Use only approved proper tools
- Wear flame retardant, fire resistant or 100% cotton clothing
- Wear personal protective equipment
- Don't inflate rim tyres without using a Safety Cage

## 1. EQUIPMENT OPERATION AND MAINTENANCE

- 1.1 Only employees who have demonstrated competency in knowledge and operating capability should be allowed to operate machinery and equipment.
- 1.2 Do not operate equipment, which is in an unsafe condition. All operators must make a careful inspection of their equipment at the start of each shift. Equipment deficiencies are to be reported to your supervisor immediately.
- 1.3 Equipment operator Log/Hoist Books, where required, shall be located on the equipment and the operator shall ensure they are kept up to date.
- 1.4 In Government jurisdictions where special licenses are required for select equipment, (i.e.: Hoist Tickets) the operator shall supply the employer with a copy of such licensing.
- 1.5 Seat belts, where supplied by Manufacturer shall be maintained and worn at all times.
- 1.6 All heavy equipment shall be equipped with an operational back up alarm.
- 1.7 It is the responsibility of workers when approaching working equipment to be knowledgeable of the danger zone and to identify their presence to the Operator.



### **Danger Zone: Specific equipment Danger Zones must be respected at all times.**

- 1.8 Oilers/swampers/*banksmen/flagmen* are required to wear fluorescent high visibility vests while performing duties.
- 1.9 No cleated equipment shall be driven across hard surfaced highways, without protecting the surface of the highway. Crossing material shall be placed at least one meter (3.25 feet) from the edge of the highway when not in use. (Refer to 20. TRAFFIC CONTROL).
- 1.10 Equipment shall not cross railroads unless authorization has been obtained and/or until authorized flag persons, preferably furnished by the railroad company, have indicated that is safe to do so.
- 1.11 An inspection of the rails shall be made immediately after equipment passage to insure that the rails have not been damaged.
- 1.12 The operator of any crane, pipelayer, dragline, backhoe, or any other lifting device is prohibited from bringing the boom or any part of the machine or load within the arc zone of high voltage lines. Check Government and local hydro regulations for safe working distances.
- 1.13 No worker other than the operator shall ride on a machine unless a seat is provided.
- 1.14 All equipment outfitted with a winch shall ensure the operator is protected from the danger of flying cables by the means of a substantial cable guard.
- 1.15 When stopped for any reason and the operator dismounts or another worker mounts the equipment, the operator shall ensure the safety lockout is engaged or the machine is turned off.
- 1.16 Where an unattended unit is parked on a sloping ground or adjacent to an excavation, the operator shall ensure the brakes are applied or the machine is blocked to prevent movement.
- 1.17 Wiping, oiling, adjusting or repairing shall not be undertaken while the machine is in motion. Oiling and greasing may be carried out by an oiler or serviceman with only the power unit left running and done under the direction of the operator.
- 1.18 When significant adjustments or repairs are necessary, all power units shall be shut down before adjustments or repairs are commenced. Lockout procedures are recommended.
- 1.19 No machine shall be operated unless manufacturers guards are installed and properly maintained.
- 1.20 No one shall climb on any equipment while it is in motion.
- 1.21 No other person other than the operator or other authorized person is permitted in the cab while equipment is in operation.

- 1.22 The guiding of lines onto drums by means of hand or foot is prohibited. The proper spooling of lines onto drums shall be ensured by the use of spooling devices or in an emergency, the use of a steel bar.
- 1.23 Wire rope shall be securely fastened to the drums and at least **five full turns** of wire rope shall be kept on winding drums at all times.
- 1.24 Sheaves and drums which have become chipped or have worn or broken flanges, rim, spokes, hubs or grooves shall be replaced.
- 1.25 The critical diameter of sheaves used with wire ropes shall be 20 times the diameter of the wire rope.
- 1.26 Suspended equipment or heavy parts, beneath which workers must work, shall be blocked.
- 1.27 Decks, platforms, steps, etc. shall be kept free from oil, grease and loose tools.
- 1.28 Three point positioning is to be used when mounting and dismounting equipment.
- 1.29 Side Boom Units (Pipe Layers) whenever possible should be parked with the boom lowered.
- 1.30 Equipment when parked for any period of time must not be parked within the limits of approach or under any Overhead Power Conductor/Line.

## 2. VEHICLE OPERATION

- 2.1 Only employees possessing a valid drivers license may operate company vehicles. The proper class of licence must correspond with the vehicle being operated.
- 2.2 Where possible, drivers shall submit a current drivers abstract prior to commencing duties.
- 2.3 Suitable provision shall be made for seating employees when they are being transported by vehicle or boat.
- 2.4 Vehicles shall not be operated on roadways in excess of maximum capacity allowed by the applicable government regulations or permit.
- 2.5 No stops shall be made on a trestle or bridge for unloading or picking up employees.
- 2.6 Crew vehicles shall be pulled off to the side of the road or right-of-way when employees are boarding or disembarking. Insure four-way flashers are used.
- 2.7 When employees are being transported by vehicle, loose equipment or material shall not be carried in the passenger compartment.
- 2.8 Buses and vehicle cabs shall not be used to transport flammable material (i.e. propane bottles, gas cans, pumps, generator sets).
- 2.9 Each vehicle shall be inspected daily by the driver to whom the vehicle is assigned. All necessary inspection reports shall be filled out and submitted as required. Any defect shall be reported immediately to the driver's Supervisor or the person in charge of equipment maintenance. Any hazardous defects shall be repaired before the vehicle is put into use.
- 2.10 No person shall be allowed on the bed of a truck during winching operations.
- 2.11 All loads must be adequately secured to prevent movement while being transported.
- 2.12 Seat belts when equipped in vehicles shall be worn at all times.
- 2.13 Four wheel drive vehicles shall be operated as recommended by the manufacturer.
- 2.14 All backup alarm systems, where equipped on vehicles, shall be in working order.
- 2.15 All vehicles shall be operated in a safe and responsible manner.
- 2.16 Vehicles shall be parked in a visible location and **away from the work area**.
- 2.17 Where required, vehicle driver's Log Books shall be properly completed and submitted on a regular basis as required by Government regulation.
- 2.18 Before backing up a vehicle, ensure there is a clear line of vision and travel established.



### **3. WORKPLACE HAZARDOUS MATERIALS**

Federal and Government Regulations shall be observed in respect to the handling of controlled and hazardous workplace materials.

### **4. TRANSPORTATION OF DANGEROUS GOODS**

Federal and Government Regulations shall be observed in respect to the transportation of dangerous goods.

### **5. EXPLOSIVES**

The loading, transportation, storage, preparing, fixing and firing of explosives shall be governed by the applicable Government regulations.

#### **5.1 Qualifications for Blasters**

- 5.1.1 In some regions, blasters are required to be approved and certified, generally through the Workers' Compensation Board, Department of Labour, or other Government Agency. The Company shall ensure that no person shall be allowed to conduct or direct a blasting operation unless that person is a holder of a valid blasters certificate where required by the authority having jurisdiction.
- 5.1.2 In regions where certification is not required, only workmen experienced and competent in the handling of explosives shall be permitted to handle, haul or detonate explosives.
- 5.1.3 A list of competent and/or certified blasters must be posted at the work location.

#### **5.2 Transportation**

- 5.2.1 All vehicles used to transport explosives shall conform to the local Government Transportation of Dangerous Goods regulations.
- 5.2.2 All drivers transporting explosives shall be trained and certified in the transportation of explosives.

#### **5.3 Magazines**

- 5.3.1 Explosives and detonators shall not be stored together in a magazine.
- 5.3.2 Magazines are to be properly identified, federally licenced, locked and located in a secure area.
- 5.3.3 Regulations regarding inventory of explosives and maintenance of magazines shall be strictly adhered to.
- 5.3.4 Any amount of lost or stolen explosive product must be reported as required by the Explosive Regulation.
- 5.3.5 Disposal of damaged explosives shall be done as recommended by the manufacturer.

#### **5.4 Rock Drilling**

An extreme hazard may exist in any area where blasting has taken place during previous construction or where grade blasting precedes ditch blasting. This hazard may be in the form of lost or abandoned explosives or un-detonated explosives located in rock rubble or lodged in bootlegs.

- 5.4.1 All drillers shall be experienced and familiar with the work to be performed prior to commencing activities.
- 5.4.2 All Government regulations regarding drilling shall be strictly adhered to.
- 5.4.3 No Driller shall drill a hole within the prohibited radius beside any loaded hole. These distances may change from region to region. The driller shall ensure he is aware of the required distance.
- 5.4.4 Drillers shall ensure that the work surface is bare and clean of debris before engaging drill.
- 5.4.5 No attempt shall be made to remove or destroy any explosives or detonators that may be encountered. Work in the area shall cease immediately and supervision notified.
- 5.4.6 Dust control devices shall be kept in good working order.
- 5.4.7 Required PPE shall be worn by all drillers.

## 5.5 Blast Signals

- 5.5.1 Warning signs detailing the Blasting Procedure shall be erected on all accesses to the blast area.
- 5.5.2 All workers shall familiarize themselves with Blast Warning Signals and obey them.

## 5.6 Initiating the Explosives

- 5.6.1 When loading holes, only wooden or plastic tamping poles shall be used.
- 5.6.2 Non-sparking tools are to be used when priming explosives.
- 5.6.3 Artificial lighting shall be in place and used when required.
- 5.6.4 Once holes are loaded, they must be guarded until initiated (fired).
- 5.6.5 No loose or boxed explosives or detonators shall be left unattended.
- 5.6.6 Loaded holes must not be driven over by mobile equipment.
- 5.6.7 An appropriate blasting machine shall be used for the number of circuits/detonators to be fired.
- 5.6.8 Precautions shall be taken to minimize fly rock.
- 5.6.9 Securing the Blast Site:
  - a. Danger area clear of workers/equipment (minimum of 500 m)
  - b. Guards have been assigned and instructed as to duties.
  - c. Warning signals have been posted (Sec. 5.5).
- 5.6.10 Proper warning signals are sounded before firing the charge.
- 5.6.11 No blasting shall occur during electrical storms

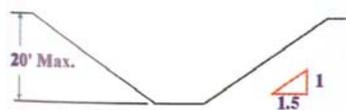
## 5.7 After the Blast has Occurred

- 5.7.1 If a misfire occurs, wait 30 minutes for safety fuse and 10 minutes for electrical.
- 5.7.2 Lead wires are to be shorted out immediately after firing.
- 5.7.3 No other person enters the blast site until blaster has examined for hazards (unstable slopes, loose rocks, trees, etc.)
- 5.7.4 Blaster must make thorough check for misfired charges.
- 5.7.5 No person to enter blast site until blaster has given permission.
- 5.7.6 All clear signal is sounded.
- 5.7.7 Any hazards are corrected before workers are employed in that area (loose rocks, trees, misfires etc).

## 5.8 Misfire Procedures

- 5.8.1 Only qualified workers in the blast area.
- 5.8.2 Metallic equipment used only under controlled conditions.
- 5.8.3 Misfires will be identified before other work done.
- 5.8.4 Any drilling to refire is carried out under the direction of the blaster.
- 5.8.5 No dynamite is to be removed from any misfired hole.
- 5.8.6 Only ammonium nitrate products can be washed out with water.
- 5.8.7 No person shall remove, relight, disturb any fuse or any part of a misfired charge.

## 6. EXCAVATIONS



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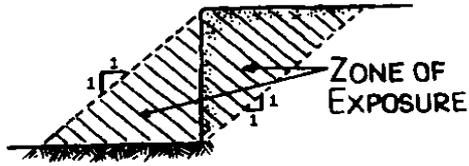
- 6.1 Excavations must be carried out in accordance with Government Health & Safety Regulations. A Professional Engineer's report addressing support structures or sloping requirements including written instructions may be required on certain types of excavations.
- 6.2 Prior to the start of excavation, utility services in the area, such as electrical, telecommunication, gas, water and sewer, must be located, identified and marked. The facilities of first call should be utilized. All hazards that could result in worker injuries are to be identified, removed or controlled.
- 6.3 Trees, utility poles, rocks or similar objects near the area to be excavated must be removed or secured to ensure worker safety.
- 6.4 Pointed tools must not be used to locate gas or electric facilities.
- 6.5 Excavation slopes or shoring must be inspected daily or more frequently if required and must be determined to be sound.
- 6.6 The sides of an excavation must be trimmed or scaled to remove any loose material that could endanger workers.
- 6.7 A level area extending 1m (3 feet) back from the edge of the trench must be maintained free of materials and equipment.
- 6.8 In excavations over 1.5m (4 feet), a ladder must be available in the immediate area of the workers. The ladder shall be of such a length that it goes from the bottom of the excavation and extend 1m (3 feet) above the ground.
- 6.9 Manufactured or prefabricated support systems including trench boxes and shoring cages must be designed and certified by a professional engineer. The certification must show how and for what soil types and depths the support system may be used, and must be available at the site during the use of the system.

#### **6.10 Remember**

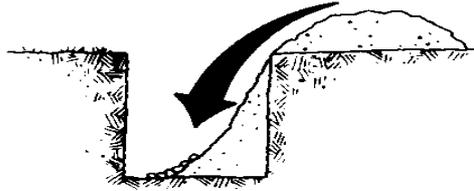
- 6.10.1 No worker shall enter a trench or excavation unless Government requirements have been met.
- 6.10.2 A worker does not have to be completely buried in soil to be seriously injured or killed. Workers who have been only buried up to their waist have died as a result of the pressures exerted by the soil on their bodies.
- 6.10.3 Excavations in, or near, "back-filled" or previously excavated ground are especially dangerous since the soil is "loose" and does not support itself well.
- 6.10.4 Water increases the possibility of a cave-in. The increased water pressure exerted on the soil can be the final factor in causing the walls to collapse.
- 6.10.5 Clay can be extremely treacherous if dried by the sun. Large chunks of material can break off a trench wall after having been stable and solid for a long period of time.
- 6.10.6 It is not safe to assume that because the walls of an excavation are frozen that it is safe to enter. Frozen ground is not an alternative to proper shoring.
- 6.10.7 An excavation should be considered a confined space and appropriate evaluation and controls undertaken to ensure workers are not exposed to contaminated atmospheres.
- 6.10.8 Should a ditch or excavation fail, do not attempt rescue with mechanical equipment.

## TYPES OF SOIL COLLAPSE

- 1) **General zone of exposure** - the area where workers are exposed to mass soil/rock movement.



- 2) **Spoil pile slide** - poor excavating procedures where the excavated material is not placed far enough away from the edge of the excavation.



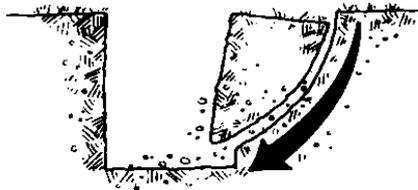
- 3) **Side wall shear** - common to clay-type soils, which are exposed to drying.



- 4) **Slough-in (cave-in)** – common to previously excavated material, sand and gravel mix.

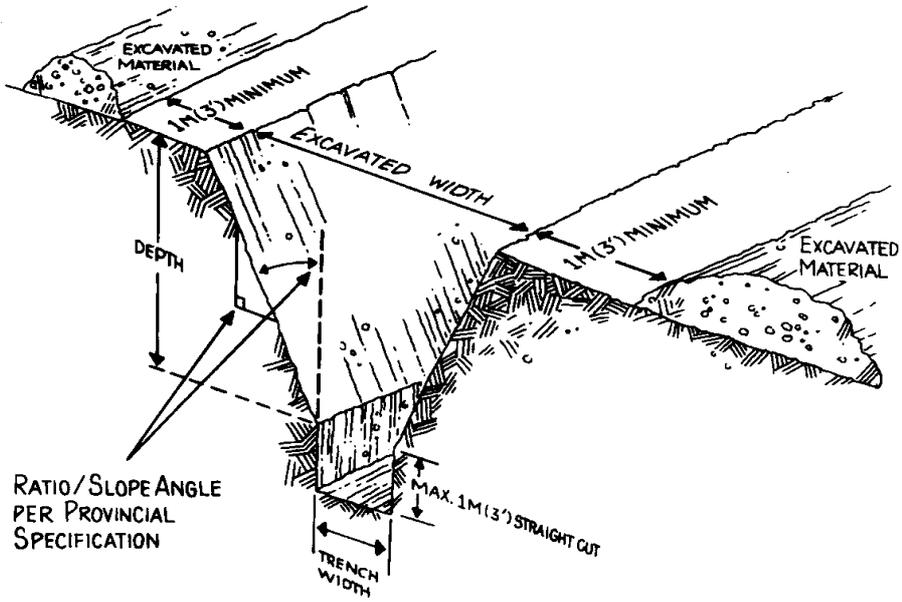


- 5) **Rotation** - clay type soils when saturated with water.

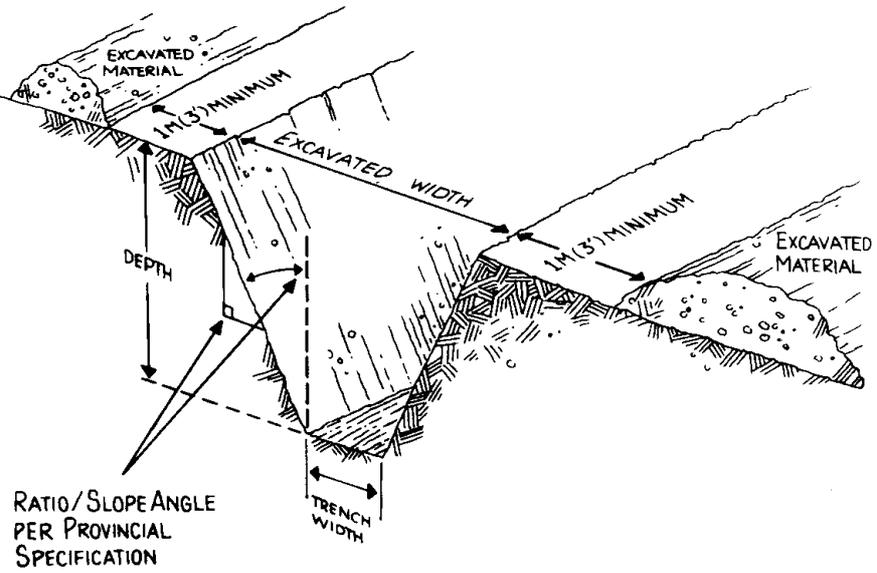


# Minimum Requirements for Safer Excavations

## COMBINATION SLOPE AND VERTICAL FACE



## FULLY SLOPED (VEE'D) EXCAVATION



**7. POWER LINES**

When work is to be performed in the vicinity of overhead power lines, the following precautions should be observed.

- 7.1 Proper signage identifying the hazard is to be erected.
- 7.2 Safe clearance distances are to be observed (check local requirements).
- 7.3 Qualified personnel only are to operate equipment in the immediate area of a power line.
- 7.4 Tower footings may require fencing to avoid encroachment of equipment.
- 7.5 When working adjacent to a hydro corridor be sure to check for electrical induction and to follow appropriate mitigation procedures.

**“Sample” Safe Approach Distances**

| Operating Voltage<br>(Phase to Phase) | Minimum Safe<br>Approach Distance |
|---------------------------------------|-----------------------------------|
| Less than 40,000 Volts                | 3 meters                          |
| 40,000 - 144,000 Volts                | 4 meters                          |
| 144,000 - 240,000 Volts               | 5 meters                          |
| 240,000 - 500,000 Volts               | 7 meters                          |

**“Remember”**

- a. You do not have to make direct contact with a power line to be injured.
- b. Check local hydro, Government Regulation or Local Requirements safe working distances.

**8. CONFINED SPACE ENTRY**

**No worker shall enter or perform work in a confined space unless:**



- 8.1 The worker is aware of the applicable Government Regulations.
- 8.2 The worker has received permission from his supervisor to perform work in a confined space area and if required, a safe work permit obtained.
- 8.3 The worker has been informed of, and is familiar with all hazards associated with entry into the confined space.
- 8.4 The worker has been instructed in and understands the safe work procedure regarding work to be performed.
- 8.5 All necessary personnel protective equipment, monitoring equipment and ventilation equipment is in good working order, located at the confined space location and used by the worker.

**9. PREPARATION OF RIGHT OF WAY**



**9.1 Clearing and Grading**

- 9.1.1 **Underground and/or Overhead Encumbrances**  
Before grading and clearing starts all underground utilities, pipelines and overhead power lines and obstacles are to be identified and marked. All buried pipeline owners must be consulted and it must be determined how the line is to be protected. (i.e. ramped with soil, daylight ramp, mats etc).

- 9.1.2 Grading shall be performed to an extent necessary to provide a safe, level-working surface for construction equipment. Only those access roads designated by the company shall be used for accessing work sites.
- 9.1.3 In clearing the right of way give due consideration for the interest of land owners and tenants, and work in such a manner which shall cause minimal damage and inconvenience.
- 9.1.4 Workers shall have fire extinguishers, first aid kit and signal device, (air horn or whistle) in close proximity to their work area.
- 9.1.5 Fallers and buckers shall ensure a safe escape route is cleared before a tree is felled and bucked.

## **9.2 Chainsaw Operations**

- 9.2.1 All brush and other objects, which might catch the saw, shall be cleared away prior to bucking a log and logs shall be bucked from the uphill side.
- 9.2.2 When a tree starts to fall, fallers shall quickly get away to a safe distance.
- 9.2.3 When power saws are being used, sawers shall stop the saw during any major change in position.
- 9.2.4 Power saws must be allowed to cool before refueling. Smoking is prohibited during refuelling operations.
- 9.2.5 Leg protective pads, chain saw gloves, chain saw boots, hearing protection and face shields shall be used by all fallers and buckers.
- 9.2.6 Crews burning brush on the right-of-way must use extreme caution to prevent the possibility of sparks igniting a forest fire.
- 9.2.7 Burning permits shall be obtained from the appropriate authorities when required and all restrictions contained on such permits shall be observed.
- 9.2.8 Stay clear 100 meters of Hydra Axe operation.

***Remember: The hazard zone around the tree is “twice the height of the tree”.***

## **10. PIPE HANDLING**

### **10.1 Stockpiling Pipe**

- 10.1.1 Only personnel directly involved in pipe handling operations should enter the stockpile site.
- 10.1.2 Support skids should be sufficiently level prior to placing the pipe to ensure integrity of the piles.
- 10.1.3 Pipe racks must be substantially constructed and placed level on a solid foundation.
- 10.1.4 Provision must be made to prevent pipe from accidentally rolling off the storage rack.
- 10.1.5 The pipe shall extend one meter (three feet) beyond cross timbers and employees shall work at the ends of pipe keeping hands clear.
- 10.1.6 Each tier of pipe shall be adequately blocked when stringers are used between tiers.
- 10.1.7 Rolling pipe into a stockpile will not be permitted.
- 10.1.8 Short lengths (3 meters shorter than maximum length) shall be stockpiled on top rung only.
- 10.1.9 Chocks or skid stakes shall be used at each skid line to prevent the possibility of the stockpile collapsing.
- 10.1.10 The area where pipe is to be stockpiled shall be kept clear of all debris and garbage removed to an approved dump site.

### **10.2 Unloading Pipe**

- 10.2.1 Extreme care shall be exercised in spotting the lifting equipment at pipe unloading sites so that there is adequate clearance of overhead obstructions.

- 10.2.2 All personnel shall keep in the clear when cutting steel bands or wire securing the pipe to the railroad car or trailer. Extreme care must be used around band choppers.
- 10.2.3 The guide lines shall be of sufficient length to enable employees hooking pipe to stand clear while guiding the pipe.
- 10.2.4 All slings, hooks, cables and guide lines shall be inspected daily by the operator and shall be repaired or replaced when found defective. All pipe hooks must be certified.

### **10.3 Stringing Pipe**

- 10.3.1 No pipe stringing shall take place within 500m of blasting operations.
- 10.3.2 When hauling pipe by truck, sled or tractor boom, the load shall be adequately and properly secured with a belt every 3m.
- 10.3.3 Signs and flags shall be placed on each side of the point on a highway where trucks are entering and leaving the right-of-way.
- 10.3.4 Loads of skids being hauled to the line shall be secured.

## **11. BENDING**

- 11.1 All employees working in the vicinity of the bending operation shall be alert for movement of pipe joints to and from the bending machine.
- 11.2 Hearing protection to be worn when working in vicinity of the bending machine.
- 11.3 Slings to be inspected on a daily basis.
- 11.4 All workers not directly involved with bending operations are not permitted to be in the area of bending machine. The hazard zone for bending operations is 20 meters (60 feet) from the bending machine.
- 11.5 Keep hands clear of bending shoes and all pinch points.
- 11.6 Tag lines are suggested for controlling overhead suspended loads.
- 11.7 Steering of the pipe when entering the bending shall be done from the rear of the pipe. The rear of the pipe is considered to be the opposite end in which the pipe is travelling.
- 11.8 Do not ride on pipe.
- 11.9 Maintain eye contact with the side boom operator when working in and around moving machinery. Use reflective safety vest for additional visibility.
- 11.10 Low gear is to be used by operators when spudding pipe into the bender.

## **12. BORING AND DRILLING**

### **12.1 Excavation**

- 12.1.1 Prior to commencing boring operations, ensure all permits have been secured.
- 12.1.2 All underground cables and pipelines shall be accurately located and marked prior to commencing boring or punching operations.
- 12.1.3 Bore pits must be secured and adequately sloped or shored with approved trench support systems, in accordance with the Occupational Health and Safety Act, ensuring protection to both workers and public.
- 12.1.4 When any trench support system is used, approved documentation including professional engineered drawings and installation/removal procedures must be available on site.
- 12.1.5 Proper access and egress such as a ladder and/or ramp shall be installed in bore pit.

- 12.1.6 If entry into pipe or casing is required, check Government regulation regarding confined space entry, and refer to company procedures.

## **12.2 Boring Machine Operation**

- 12.2.1 It is imperative that appropriate clothing and protective equipment be worn. Long hair and loose clothing creates an extremely dangerous situation around rotating augers.
- 12.2.2 Operating characteristics and safety requirements of the type of boring machine used should be made known and adhered to by all workers.
- 12.2.3 Workers must always be aware that they stand in a location that is clear in the event the auger binds and flips the machine against the trench wall.
- 12.2.4 When back reaming and pulling a cable through the borehole, approved swivels will be used to connect rotating drill rod head with cable.
- 12.2.5 If blasting is required within the bore, only qualified personnel shall perform blasting operations (Refer to 5.1 Qualifications for Blasters).

## **12.3 Directional Drilling**

- 12.3.1 All buried utilities are to be located and exposed as necessary before drilling.
- 12.3.2 Strike Alert Systems ensured to be in proper working order.
- 12.3.3 Ground Mats and Grounding Rods will be installed before driving Anchor Stakes.
- 12.3.4 Proper tools and clamps, together with the correct procedures, are to be used to disassemble or uncouple drill rods.
- 12.3.5 The flow of Bentonite slurry shall be planned and managed for containment in and around the work area.

## **12.4 Underground Piercing Tools (moles/torpedoes/rockets)**

- 12.4.1 Basic compressed air safety guidelines must be followed when operating piercing tools, like all compressed air tools, as outlined in 12.5. Occasionally two people are required when using tool; one to operate and one outside the excavation pit to control air supply.
- 12.4.2 Air supply will be shut off before lifting the tool. Proper technique will be used when lifting to avoid back injury (i.e. lifting with legs not back).
- 12.4.3 The tool will be monitored to be sure that the air hose does not cause an unsafe condition around the pit.
- 12.4.4 The operator must be aware of what is in front of the material that is about to be broken. In the event that the tool runs but does not move forward, caution will be taken that no contact has been made with a buried electric line or other potentially hazardous obstruction that could cause personal injury.

## **12.5 Compressed Air Tools**

- 12.5.1 Approved hearing protection shall be worn by any worker who is in proximity of a working air tool that exceeds the safe noise level (85 db).
- 12.5.2 When connecting air hoses, a positive lock system is to be used such as safety clips on universal type fittings or anti-whip lines. Hoses and fittings are to be checked periodically for damage.
- 12.5.3 Air supply at the compressor shall be shut off and the tool bled before disconnecting a hose.
- 12.5.4 The hose shall be held securely and aimed in a safe direction away from all workers and public when blowing out debris.
- 12.5.5 All air compressors shall be parked and secured at a safe distance from the excavation pit to prevent inadvertent rolling or falling into the pit.

- 12.5.6 Air tools shall be operated at a maximum of 110 psi (760 kPA) air pressure.
- 12.5.7 It shall be ensured and all guards, covers, controls or other safety devices are not missing or inoperative.
- 12.5.8 The immediate work area shall be kept clear of all unauthorized personnel.
- 12.5.9 An air tool shall not be used for any purpose other than that for which it was intended.

## **12.6 Gas Powered Equipment**

- 12.6.1 Equipment must never be re-fuelled under power lines
- 12.6.2 Generators shall have a Ground Fault Interrupter circuit breaker for each circuit used.
- 12.6.3 Jumping Jacks/compactors, as with all equipment that must be moved manually, will be lifted in a proper manner using the legs not the back.
- 12.6.4 Water pump hoses will be connected and used in a proper manner ensuring back pressure cannot build up to an unsafe level in the discharge line, causing the pump to overheat.
- 12.6.5 When refuelling small gas engines such as those on jumping jacks, generators and water pumps, the temperature of the equipment will be cool enough to avoid combustion in the event of spillage.
- 12.6.6 All engines will be operated in a well ventilated area. If required to operate in deep trenches or enclosed vans, sufficient ventilation or exhaust hoses must be used.
- 12.6.7 Heed project environmental guidelines if you must refuel around any watercourse or wetland area. Do not refuel within 100 metres of water body.

## **13. WELDING OPERATIONS (Pipe Gang)**

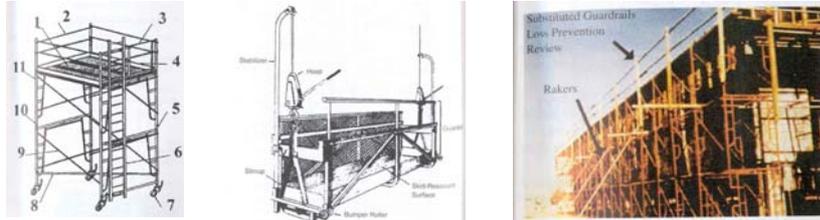
- 13.1 Pipe shall never be picked up or lowered while any worker is between the tractor and pipe.
- 13.2 Pipe shall never be moved, carried or swung over workers.
- 13.3 Workers shall stand clear of booms when loads are being lowered or lifted and the tractor operator shall not lift or lower until workers are in the clear.
- 13.4 All slings and clamps shall be inspected on a daily basis. (Clamps must be certified).
- 13.5 Lock skids shall be employed in all instances where danger of shifting pipe exists. Defective skids shall be removed from service.

### **13.6 Welding**

- 13.6.1 Propane cylinders must not be allowed in trench. Cylinders must be secured outside of trench
- 13.6.2 Compressed gas cylinders shall not be hoisted by slings or magnets dropped or subjected to impact, shall normally be kept upright, and shall be secured against falling during storage, transportation or use. Cylinders shall not be handled by means of regulators or used as rollers or work supports.
- 13.6.3 Full and empty cylinders shall be kept separate and identified.
- 13.6.4 Welders shall check their equipment at frequent and regular intervals for defects, particularly for defective cable in wet areas.
- 13.6.5 All cylinders shall have safety caps in place when not in use.
- 13.6.6 All workers exposed to hazards from welding or burning operations shall use recommended personal protective equipment.
- 13.6.7 Buffing and grinding operators shall wear face shields and safety glasses.
- 13.6.8 Workers assigned duties in welding shacks shall have and use effective respiratory equipment in accordance with company policy and procedure.

- 13.6.9 All grinders shall be equipped with guards.
- 13.6.10 All propane bottles shall be equipped with regulators.
- 13.6.11 All welding rigs shall be equipped with fire extinguishers.
- 13.6.12 Extreme caution shall be taken to prevent fires. Oxyacetylene hoses shall be equipped with flash back arrestors or check valves.

**13.7 Scaffolding Safe Erection and Use**



- 13.7.1 Scaffolds are frequently used in fabrication and station work, and should always be erected under the supervision of a person experienced in their erection and use.
- 13.7.2 Inspect frames, braces, platform hooks, and other structural components for damage and check compatibility of components. Inspect planks for splits, knots and dryness. Do not use any structural components that are bent, damaged or severely rusted.
- 13.7.3 Check for overhead wires and other energy sources. Check ground conditions, surface elevation and clear the area of debris.
- 13.7.4 Level and compact loose backfill and use gravel as a base if possible. Provide protection against erosion from rain or thawing and place mudsills as required.
- 13.7.5 Ground all electrical equipment and don't take anything for granted. Check before you climb.

**14. WELD INSPECTION (Radiographic & Ultrasonic Inspection)**

Radiographic and Ultrasonic Inspections are a part of welding operations and as a rule are very safe operations. There is however a potential for bodily injury, particularly with Radiographic Inspections (X-ray, Gamma-ray) and therefore the following must be observed.

- 14.1 All Radiographic operations, equipment, and licensing must be in accordance with applicable local, Government, and federal regulations. Personal Protective Equipment requirements such as dosimeters and survey meters must be utilized by Radiographic crews as outlined in these regulations.
- 14.2 Only trained and certified Qualified Operators (QO) shall be utilized for any Gamma-ray exposure device operation.
- 14.3 No single person Radiographic Units are to be permitted to the work site.
- 14.4 All Radiographic Inspection Units shall be equipped with 360-degree amber rotating lights. These lights shall be placed on the top of each unit and clearly visible to all personnel. Do not enter the area if you see the light flashing. Lights will be turned off when Radiography is not in progress.
- 14.5 The Radiographic work area shall be clearly marked with warning signs, and/or barrier rope where applicable. Do not enter this area until Radiography operators signal you through. The radiographer responsible for exposure device operation will be identified by wearing a bright orange vest where applicable.
- 14.6 Radio or cellular communications, although optional is highly recommended for all inspection crews.
- 14.7 Prior to inspection activities:
  - 14.7.1 All equipment shall be inspected by inspection crews for proper working condition. All defective equipment shall be repaired or replaced immediately.

- 14.7.2 All areas for inspection shall be supported and stationary. Under no conditions shall the pipe be moved during inspection activities.
- 14.7.3 The potential radiation hazard area shall be clear of all non-Radiographic personnel.
- 14.8 During inspection activities the potential radiation hazard area shall be constantly monitored by Radiographic personnel to ensure possible entry by other workers is minimized.
- 14.9 Upon completion of inspection activities all radiation exposure devices shall be locked or de-energized and removed from the immediate work area.
- 14.10 Take care when travelling on the ditch side of the pipe, you may not notice Radiographic operations on the work side. Be aware at all times the location of Radiographic crews.
- 14.11 Should you inadvertently enter a potential radiation hazard area and believe you may have been exposed, report to first aid and radiographic personnel immediately.
- 14.12 All inspection waste such as developer and fixer chemistry, lead pac, and ultrasonic coupling other than water, shall be collected and disposed as outlined in applicable local, Government, and federal regulations.

## **15. COATING**

### **15.1 Coating (Epoxy)**

Some coatings may be subject to Specific Regulations and Particular Safety Requirements or Codes of Practice including reference to applicable Statutory or Advisory Standards relating to the Country, Territory or State in which the work is being carried out.

#### 15.1.1 Preparation

- a. Manufactures data sheet for grit shall be reviewed and understood prior to using product. Copy to be on site.
- b. Approved supplied air systems are to be used while performing sand blast operations.
- c. Air system filters to be checked on a daily basis and replaced if necessary.
- d. Personal Protective Equipment such as hoods, gloves, long sleeve shirts and trousers shall be worn.
- e. Persons not involved with sand blast operations shall not enter work area.

#### 15.1.2 Application

- a. Manufactures data sheet for epoxy coating shall be reviewed and understood prior to using product. Copy to be on site.
- b. Personnel protective equipment (eye, hand, respiratory) to be used when handling product.
- c. Product inventory to be kept.
- d. Required disposal standards and methods to used for containers brushes, rollers, rags etc.

## **16. LOWERING-IN**

- 16.1 Pipe shall be tied off and/or anchored at end prior to lowering sections to prevent pipe jumping skid or into ditch.
- 16.2 Slings and cradles to be inspected daily for any visible damage. Damaged slings are not to be used (Refer to manufacturers specifications).
- 16.3 Isocyanates are contained in foam used for padding and breakers. Proper protective equipment will be worn when working with or around Isocyanates. Disposal of waste products will be as per manufacturers instructions or recommendations.
- 16.4 All pipe lowering shall be directed by the Supervisor or his delegate with signals to the tractor operators and others. Standard signals are to be used.
- 16.5 Belts, slings, block and boom lines shall be secured to the boom when not in use while the tractor is moving.
- 16.6 No worker shall be in the ditch on the pipe or between the pipe and ditch while the pipe is being lowered into the ditch.
- 16.7 The ditch shall not be crumbed by hand unless it meets the criteria specified by Government Health and safety regulations.

## **17. BACKFILL**

- 17.1 No backfilling shall be commenced until all personnel are clear of the working area.
- 17.2 The operators of any machines or vehicles being used in backfilling operations shall keep their swampers in sight at all times.
- 17.3 The operators of any truck employed in backfilling operations shall ensure that everyone is clear of the area before approaching the ditch or dumping the load.
- 17.4 Dumping of loads will be as directed by the spotter signals to be used shall be in place prior to dumping
- 17.5 Special attention must be paid to all overhead Hydro/Power lines or telephone lines (Refer to 7. POWER LINES).

## **18. TIE-INS**

Tie-ins in bell holes are considered a non-permitted confined space. Precautions to ensure that ladders and ramps to assure access and egress. This is particularly important when one side of a pipe isolates and restricts workers from an immediate escape route.

### **18.1 Prior to making bell hole welds:**

- 18.1.1 The pipe must be adequately blocked to prevent movement;
  - 18.1.2 The ditch must be properly shored or sloped;
  - 18.1.3 There must be adequate ventilation;
  - 18.1.4 There must be an adequate means of access and egress, such as a ladder or ramp;
  - 18.1.5 There must be adequate working space provided.
  - 18.1.6 Right-of-way traffic must be minimized in the vicinity of tie-ins.
- 18.2 Workers shall not stand on live end of pipe while lining up tie-in joint.
  - 18.3 Lines known or suspected of having transmitted sour gas product shall be adequately tested and purged for the protection of those workers making tie-ins or cut-outs.

## **19. TESTING**

Pigging and Testing of pipelines shall be carried out in accordance with the applicable regulations made under Specific Regulations and Particular Safety Requirements or Codes of Practice including reference to applicable Statutory or Advisory Standards relating to the Country, Territory or State in which the work is being carried out.

- 19.1 Before removing the pig catchers or test fittings, pressure shall be relieved from each end of the line.
- 19.2 Only approved pipe fittings shall be used.

### **19.3 Pigs propelled by compressed air:**

- 19.3.1 The dispatching end of the pipeline shall be sealed with a fitting welded securely to the pipe line. Lines 152 millimetres (6 inches) or less in diameter may be sealed with a cap held in place with threaded fittings providing that the clamps are adequately designed to prevent blowing off the sealing caps. The various types of bolted pipe couplings on the market, designed to join two pipe ends pressure tight, are not adequate for this purpose.
- 19.3.2 The receiving end of the pipe shall be equipped with a pig catcher or trap so that there is no danger of a pig being blown free of the line at the end of its run. Such traps or catchers shall be welded to all lines.
- 19.3.3 All air hoses, fittings, valves, etc shall be adequate for the pressure used and be maintained in good condition.

- 19.3.4 During a pig run, all persons in the vicinity shall be kept well clear of the pipe ends.
- 19.3.5 The pressure shall be released through suitable valves before fittings of any kind are loosened or removed from the pipeline.

**19.4 Low-Pressure Testing Pipelines under 700kPa (100 psi)**

- 19.4.1 Pipe ends shall be sealed with a fitting welded to the pipe for all lines larger than 152 millimetres (6 inches) in diameter. Welded caps are preferable for all sizes of pipe, but caps held in place with threaded fitting may be used on lines 152 millimetres (6 inches) and smaller in diameter.
- 19.4.2 During the time a line is under pressure, all persons shall be kept clear of pipe ends.
- 19.4.3 Fittings shall not be loosened or removed from the pipe until all internal pressure has been released.

**19.5 High-Pressure Testing Pipe Over 700 kPa (100 psi)**

- 19.5.1 The pipe line shall be sealed only with welded, flanged or threaded fittings rated to a pressure at least equal to the maximum working pressure of line.
- 19.5.2 Only those persons concerned with the testing are allowed in the immediate vicinity of pressure pumps and pipe ends or exposed sections during the test.
- 19.5.3 Pressure shall be released from the line before any loosening or removal of fittings is permitted.
- 19.5.4 Care shall be taken when handling flammable products such as methanol.

**20. TRAFFIC CONTROL**

**20.1 Flagging**

- 20.1.1 Control of traffic in construction zones shall be done in accordance with Government/Municipal regulations. Where required, a traffic control plan must be submitted to local regulatory authorities. Only competent trained personnel are to be used for flagging operations.
- 20.1.2 All personnel, engaged in the practice of flagging, will be dressed as follows to promote high visibility when approached by on-coming motorists.
  - a. High Visibility Vest (Fluorescent)
  - b. Fluorescent Stop and Slow Paddles
- 20.1.3 In high speed traffic conditions the retention of local police to ensure required speed reductions is highly recommended.
- 20.1.4 During the night operations, flag personnel will utilize, at all times, a red flashlight or similar signalling device.

**20.2 Signage**

- 20.2.1 All traffic signs and traffic control devices used on job sites are installed for the safety and convenience of the travelling public and shall be erected in accordance with Government or Municipal regulations.



- 20.2.2 Barricades, flashers, or flares, warning signs and/or temporary fencing shall be erected on each side of the road or railroad before excavation commences.
- 20.2.3 Poorly maintained, defaced, damaged or dirty construction signs are ineffective and shall be replaced, repaired or cleaned without delay.
- 20.2.4 Warning signs shall not be removed until road and highway crossings are properly levelled, shoulders repaired and ditches cleared.
- 20.2.5 Vehicles shall not be parked on the roadway or shoulder before the pipeline crossing.

D

**SAFETY GUIDELINES FOR SPECIFIC  
PIPELINE OPERATIONS**

# SAFETY GUIDELINES FOR SPECIFIC PIPELINE OPERATIONS

## 1. BASIC DO'S AND DON'TS ON THE PIPELINE

Here are some basic do's and don'ts on the pipeline. The sections that follow will provide you with more specific do's and don'ts for the various operational activities in pipeline construction.

### Do's and Don'ts

Do - follow all safe work instructions  
Do - wear suitable clothing for the job  
Do - use all personal protective equipment (ppe) as directed  
Do - practice good housekeeping  
Do - know your worker rights  
Do - know what to do in the event of an emergency  
Do - operate and maintain vehicles and equipment in a safe manner  
Do - locate and mark all buried facilities before digging  
Do - follow manufacturers' recommended standards for the operation and care of tools and equipment  
Do - follow all safety procedures, "when in doubt ask"

Don't - possess or use alcohol, unauthorized drugs or firearms on the job site  
Don't - enter a trench that is not sloped or supported as required by regulations  
Don't - walk under suspended loads or between unsecured materials or equipment  
Don't - engage in theft, vandalism or violent activities on the job site  
Don't - harass or intimidate co-workers  
Don't - disturb wildlife or bother livestock  
Don't - refuel within 100 meters of a watercourse or water body  
Don't - leave gates open or drive off ROW allowances/easements

## 2. VEHICLE MANAGEMENT

Vehicle operation is the most frequently exercised task in the pipeline construction industry. Vehicles and trucks are operated by office, yard and field staff in support of operations throughout a project. The operation and management of vehicles on a work site goes beyond the health and safety of the driver alone. Many other workers and the public in general greatly add to the risk of injury and damage should an accident occur.

### Typical Equipment

- Cars, crew buses, crew cab trucks, pick-up trucks, flat deck trucks *and trailers* , *low-bed trucks and trailers*, welders' rigs, dump trucks, service vehicles, emergency support vehicles, tractor units to pull trailers, trucks to haul dangerous goods, *fuel tankers and water tankers*.

### Common Safety Hazards

- Road and travel conditions
- Excessive speed
- Driver judgment
- Driver fatigue
- Vehicle condition
- Weather conditions
- Other vehicles
- Pedestrian traffic
- Wildlife
- Unforeseen mechanical defects.
- *Narrow roads and Rights of Way.*

### **Common Injuries/Illnesses**

- Multiple trauma injuries.

### **Common Protective Devices**

- Seat belts, tire chains, flares, first aid kits, fire extinguishers, all regulatory safety devices, back-up alarms (where required), environmental spill kit (where required), all necessary vehicle records and documents.

### **Do's and Don'ts**

Do - have a valid license for the class of vehicle you are operating.

Do - be competent, fit and able to operate vehicle assigned

Do - provide driver's abstract when requested

Do - report all problems and/or maintenance needs to your foreman

Do - obey all company and regulatory practices and procedures

Do - ensure vehicle is in safe mechanical condition before operating

Do - have permission from company to operate vehicle

Do - inspect vehicle daily and record of inspection (if possible)

Do - alter your driving to conform to the conditions of the road

Do - always observe and anticipate the actions of others

Do - drive defensively, be patient and understanding of others

Don't - operate a vehicle under the influence of alcohol or drugs

Don't - operate a vehicle in a state of mental disorientation or extreme fatigue

Don't - take unnecessary chances or risk the safety of others

Don't - operate a vehicle unless you are trained, certified, qualified and experienced

### **3. EQUIPMENT TRANSPORT**

Equipment transport involves the planning, scheduling, permitting and movement of equipment prior to, during and on completion of the work.

#### **Typical Equipment**

- Heavy construction equipment - side booms, dozers, back hoes, etc., tractor trailer combinations, buses, light equipment - pickups, miscellaneous equipment - office and storage trailers, skids, fencing, lighting, etc.

#### **Common Safety Hazards**

- Road conditions,
- Equipment loading and binding, improper routing,
- Uneven ground, power-lines, fatigue from travelling,
- Unforeseen mechanical defects, weather conditions, motor vehicle accidents/incidents, trips/slips/falls.
- *Narrow roads and Rights of Way.*

#### **Common Injuries/Illnesses**

- Impact and crushing injuries.
- *Multiple trauma injuries.*
- Strains.
- Sprains.

#### **Common Personal Protective Equipment**

- Gloves, appropriate work clothing, safety boots/hard hats (Approved), safety glasses,
- Seat belts.
- HI-Visibility jackets, waistcoats, tabards, arm-bands et

#### **Common Protective Devices**

- Load binders, chains, straps, chocking and blocking devices, tire chains/flares, fire extinguisher/first aid kit, back-up alarms, seat belts

## **Do's and Don'ts**

- Do - plan a safe route in advance of departure keeping in mind road restrictions, bridges, overpasses, tunnels and peak traffic periods
  - Do - pre-trip, en-route and post trip vehicle inspections
  - Do - use the "three point" contact method for entering and exiting equipment or heights (i.e. When ascending or descending 2 hands and 1 foot, 2 feet and 1 hand)
  - Do - stay alert while travelling - rest when tired (refer to national safety code regulations)
  - Do - maintain an accurate trip log (per national safety code regulations)
  - Do - wear the seat belt
  - Do - abide by local, municipal and Government transport regulations
  - Do - watch for overhead power lines
  - Do - follow the regulations
  - Do - use common sense when doing physical tasks
- Don't - use drugs or alcohol  
Don't - take unnecessary chances

## **4. EQUIPMENT MAINTENANCE**

### **Job Description**

Construction equipment requires repair and servicing at a maintenance facility or field location. This may include scheduled maintenance, unscheduled maintenance, major overhaul or repair due to breakdown.

### **Typical Equipment**

- Service vehicles/equipment, hand tools - regular, air hoisting devices/jacks, welding/cutting torches, grinders/sanders, hydraulic equipment

### **Common Safety Hazards**

- Trips/slips/falls
- Site conditions
- Falling objects
- Lifting hazards
- Chemical/fume exposure
- Eye exposure
- Hand/arms/leg/foot exposures
- Flying objects
- Noise

### **Common Injuries/Illnesses**

- Punctures
- Scrapes/lacerations
- Strains/sprains/fractures
- Crush injuries/bruises
- Eye injuries
- Skin irritation
- Burns/frostbite
- Head injuries

### **Common Personal Protective Equipment**

- Appropriate work clothing, safety boots/hard hats (Approved) hearing protection, breathing protection, safety glasses/face shields, work gloves

### **Common Protective Devices**

- First aid kits, chocking/blocking devices, approved chemical containers, fire extinguishers, back-up alarms, eye-wash devices, lockout/tag out devices, material safety data sheets

## **Do's and Don'ts**

- Do - keep work area clean
- Do - work on solid ground when lifting equipment
- Do - properly block and chock equipment
- Do - wear suitable clothing
- Do - wear personal protective equipment
- Do - watch your step
- Do - follow lockout/tag out procedures
- Do - properly handle, store and dispose of chemicals
- Do - use only approved proper tools
- Do - read safety data sheets
- Do - be aware of nearest exit
- Do - be aware of hazard zones

- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available.
- Don't - weld or use torches near chemicals, compressed air or flammable liquids.
- Don't - jump off equipment
- Don't - wear jewellery or loose clothing
- Don't - leave equipment running while adjusting or fuelling
- Don't - use drugs or alcohol
- Don't - take unnecessary chances

## **5. OPERATION OF AIR TOOLS**

### **Job Description**

Air tools are commonly used during construction operations. There are different types and they are all powered by compressed air supplied through a rubber hose.

### **Typical Equipment**

- Jack hammers, air compressors, air guns, torpedo/underground piercing tools, wet bore machines, hoses

### **Common Safety Hazards**

- Whipping hoses
- Falling/flying objects
- Rotating equipment
- Slips/trips/falls
- Contacting underground utilities
- Coiled air hoses
- Temperature extremes
- Environmental/site conditions/terrain

### **Common Injuries/Illnesses**

- Injuries from lifting
- Eye injuries
- Sprains/strains
- Scrapes/cuts/lacerations
- Crushes/bruises
- Hearing loss

### **Common Personal Protective Equipment**

- Proper work clothing including gloves, safety glasses/face shield, hard hats and safety boots (Approved), insulated shock resistant gloves, hearing protection

### **Common Protective Devices**

- First aid kits, fire extinguishers, restraint system for whipping hoses, perimeter work area protection

## Do's and Don'ts

- Do - regularly inspect tools and hoses before using
- Do - obtain underground utility locates for the work area
- Do - get help before lifting or moving heavy objects
- Do - wear appropriate clothing and personal protective equipment
- Do - keep loose clothing clear of rotating equipment
- Do - bleed air before disconnecting tool
- Do - practise good housekeeping
- Do - watch out for falling objects from top of the ditch
- Do - shut off equipment when re-fueling
- Do - use proper shoring or slope equipment when air back tools are used in a trench

- Don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - use an air tool for any purpose other than what it is intended for.

## 6. CLEARING/GRADING

### Job Description

In order to make the right-of-way a suitable work area, the removal of trees, brush and other vegetation is required.

### Typical Equipment

- Dozers, graders, skidders, de-limbers, chain saws, hydro-axes, hydro-vacs, all terrain vehicles (quads, ski-doods, etc.), brush burners and propane sleds

### Common Safety Hazards

- Moving equipment
- Tree limbs and brush
- Flying and falling objects
- Insects, animals, reptiles, poisonous plants
- Rough terrain and heavy bush
- Hands, arms, legs, foot exposure
- Power lines/hot lines/facilities
- Chain saw hazards
- Trips/slips/falls



### Common Injuries/Illnesses

- Crush injuries
- Stings and bites/rashes/infections
- Burns/cuts/lacerations
- Eye injuries, punctures
- Strains/sprains/bruises

### Common Personal Protective Equipment

- Appropriate clothing - long sleeve shirt/fallers pants, hearing protection, safety footwear /hard hats (Approved), gloves/safety glasses goggles/face shields, proper all terrain vehicle safety equipment

### Common Protective Devices

- First aid kits, signal horns, back-up alarms, fire extinguishers, hot line stakes/utility markers, communication devices, signage

## Do's and Don'ts

- Do - inspect equipment prior to use do - wear recommended protective equipment
- Do - stay within the operator's vision
- Do - wear suitable clothing

- Do - keep cutting equipment sharp
- Do - watch your step
- Do - use recommended ointments and repellents
- Do - use care and caution when using chain saws
- Do - watch for falling objects
- Do - use extreme caution when adjusting dozer blades

- Don't - take unnecessary chances
- Don't - walk with chain saw running
- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - wear jewellery
- Don't - grasp moving winch line
- Don't - stand between winch and object being pulled
- Don't - leave equipment running while adjusting or fuelling
- Don't - use drugs or alcohol

## 7. ROCK DRILLING AND BLASTING

### Job Description

Right of way and ditch construction may require the use of pneumatic drills to bore through rock. This enables blasters to place explosive charges that systematically break rock in a controlled manner.

### Typical Equipment

- Backhoes, air tracks/compressors, explosives/blasting machines/blasting mats, tampers/vibration monitors/continuity meters, det-cord/detonators, magazines/rock shields, ladders



### Common Safety Hazards

- Trips/slips/falls
- Accidental explosions/un-detonated explosives (bootlegs/cut-offs)
- Dust/noise, vibrations
- Flying objects
- Un-shunted blasting caps
- Static electricity/electrical storms/power lines
- Hazardous material handling and storage
- Unauthorized personnel within the blast zone
- Drilling too close to loaded holes
- Weather extremes



### Common Injuries/Illnesses

- Cuts/lacerations/bruises
- Sprains/strains
- Struck by flying objects
- Hearing loss
- Eye injuries
- Breathing difficulties
- Powder headaches
- Crushing injuries/fractures

### Common Personal Protective Equipment

- Work gloves, appropriate work clothing, safety boots/hard hats (Approved), hearing protection, dust respirator/breathing protection (where required), high visibility, vests, safety glasses/ goggles

## Common Protective Devices

- First aid kits/fire extinguishers, anti-whip & tie devices/blowers, communication equipment, dust collectors/back-up alarms, ditch shoring/sloping or other protection, signage and horns, blast screens

## Do's and Don'ts

- Do - drill appropriate depth into rock and place proper charge in hole
- Do - wear personal protective clothing
- Do - transport, handle and store explosives according to federal, Government and local laws and regulations.
- Do - know and follow recognized blast signals
- Do - wear hearing and eye protection
- Do - stay at least 300 meters from the blasting zone
- Do - notify others in the area of blasting
- Do - take vibration readings if blasting done in confined areas or near structures
- Do - ensure you are Governmentally certified to handle explosives

- Don't - return to blast zone until all clear is signalled
- Don't - engage in horseplay
- Don't - leave loaded holes unattended
- Don't - smoke around explosives don't - touch or grab drill stem
- Don't - enter equipment hazard zones don't - use drugs or alcohol
- Don't - wear jewellery or loose clothing

## 8. PIPE HAULING AND STRINGING

### Job Description

Pipe is loaded and transported from the place of manufacture, coating or stockpile to the pipeline right-of-way where it is off-loaded and strung.

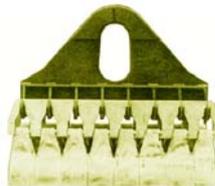


### Typical Equipment

- Tractors and trailers (pole-trailers/tridems/tandem axles), sidebooms/stringing booms, slings/wire rope/skids, cranes/rollingons/athley wagon, pipe bunks, certified pipe hooks, tow tractors, tarps (if required), tag lines

### Common Safety Hazards

- Moving equipment
- Traffic/congested right-of-way
- Falling objects
- Swinging pipe hooks
- Temperature extremes
- Pinch points
- Overhead lines
- Rolling/falling pipe/load shifts
- Site conditions
- Skid handling
- Trips/slips/falls



### Common Injuries/Illnesses

- Injuries due to motor vehicle accidents
- Sprains/strains/fractures
- Crushes/pinches/bruises

## Common Personal Protective Equipment

- Work gloves/safety glasses, appropriate work clothing, safety boots/hard hats (Approved), hearing protection, breathing protection, high visibility vests

## Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, appropriate signage, safety horns

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - watch your step
- Do - know the proper hand signals

- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - stand between pipe and equipment
- Don't - stand between pipe and ditch
- Don't - engage in horseplay
- Don't - wear jewellery or loose clothing
- Don't - walk under suspended loads don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take unnecessary chances don't - ride on moving equipment
- Don't - turn your back on on-coming traffic
- Don't - take for granted that the truck driver or equipment operators can see you.

## 9. PIPE BENDING

### Job Description

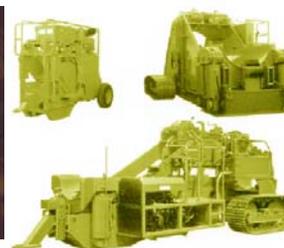
A bending machine is used to shape the pipe to conform to the contours of the terrain or to change the direction of the line route.

### Typical Equipment

- Sidebooms/tractor, bending machines, bending mandrels, reach rods, slings, wire rope, tag lines

### Common Safety Hazards

- Moving equipment
- Trips/slips/falls
- Riding on pipe/struck by pipe
- Pinch points
- Hydraulic line ruptures
- Flying objects
- Temperature extremes
- Skid handling



### Common Injuries/Illnesses

- Crushes/pinches/bruises
- Sprains/strains
- Burns
- Eye injuries
- Hand injuries
- Cuts/fractures



### Common Personal Protective Equipment

- Safety glasses, appropriate work clothing including gloves, safety boots/hard hats (Approved), hearing protection, breathing protection, high visibility vests



## Common Protective Devices

- First aid kits, fire extinguishers, communications equipment, back-up alarms, appropriate signage

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - keep proper distance when tagging pipe
- Do - keep pipe from swinging
- Do - know the proper hand signals
- Do - check pipe slings for wear and defects
- Do - make sure the pipe is properly chalked



- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - stand between pipe and equipment
- Don't - stand between pipe and ditch
- Don't - wear jewellery or loose clothing
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - get hands between the pipe and the bending machine
- Don't - commence the bending process until all workers are clear



## 10. DITCH EXCAVATION

### Job Description



A ditch is excavated to a specified depth for placement of the pipe. Support systems may be used in certain ground conditions to maintain the trench.

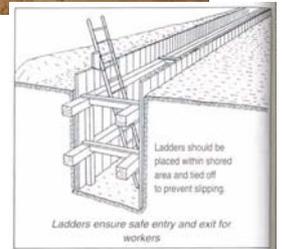
### Typical Equipment

- Dozers (with rippers), wheel ditchers, backhoes/excavators/rock breakers, ladders, hydraulic shoring jacks/trench boxes/timber shoring, concrete saws



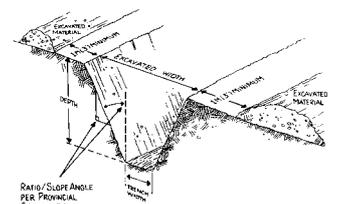
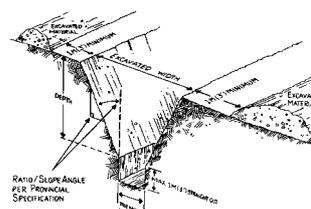
### Common Safety Hazards

- Ditch cave-ins
- Moving equipment
- Falling objects
- Dust and flying objects
- Rotating equipment
- Falling in ditch, water in ditch
- Weather conditions
- Temperature extremes



### Common Injuries/Illnesses

- Crush injuries/bruises
- Hearing loss
- Strains/sprains/fractures
- Eye injuries
- Cuts and scrapes



### Common Personal Protective Equipment

- Appropriate work clothing, gloves, safety glasses, safety boots/hard hats (Approved), hearing protection, breathing protection (where required)

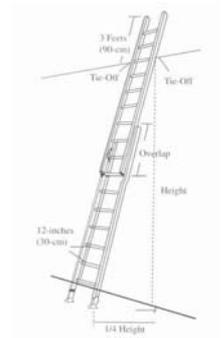
## Common Protective Devices

- First aid kits, fire extinguishers, back-up warning devices

## Do's and Don'ts

- Do - wear required personal protective equipment
- Do - stay in the operator's vision
- Do - make sure ladders extend at least a metre above top of ditch
- Do - install the trench support system correctly before entering the ditch
- Do - monitor air quality conditions where warranted

- Don't - enter equipment hazard zones
- Don't - use drugs or alcohol
- Don't - walk on material over ditches
- Don't - walk too near the edge of the ditch
- Don't - engage in horseplay



## 11. END PREP

### Job Description

Prior to the pipe being welded during automatic welding operations, the pipe bevel is prepared using an automatic die cutter.

### Typical Equipment

- Side booms, prep machines, ladders, hydraulic pumps and hoses, shaving magnets, slings

### Common Safety Hazards

- Metal shavings
- Moving equipment
- Noise
- Pinch points
- Overhead hazards
- Slips/trips/falls
- High pressure hydraulic devices
- Environmental/site conditions/terrain
- Bending/lifting exposure
- Eye hazards
- Loose clothing
- Temperature extremes



### Common Injuries/Illnesses

- Burns, eye injuries
- Sprains/strains/fractures
- Scrapes/bruises/cuts/lacerations

### Common Personal Protective Equipment

- Proper work clothing, safety glasses/face shields, hard hats/ safety boots (Approved), cut resistant gloves, hearing protection

### Common Protective Devices

- Back-up alarms, first aid kits, fire extinguishers

## Do's and Don'ts

- Do - inspect hydraulic lines daily and before using
- Do - wear appropriate clothing and personal protective equipment
- Do - wear hearing protection

- Do - get help before lifting or moving heavy objects
- Do - practice good housekeeping

- Don't - wear jewellery or loose clothing
- Don't - engage in horseplay
- Don't - enter prep hazard zone
- Don't - pick up shavings without proper protective gloves
- Don't - use drugs or alcohol
- Don't - take unnecessary chances

## **12. PE FUSION**

### **Job Description**

PE (polyethylene) pipe comes in straight joints of 14m or coils of 150m. It is joined together by heat fusion, a controlled melting process that bonds the polyethylene together at 500 degrees F. Specialized tools are used to achieve the proper joining pressures and heat cycles. The fusions are visually, electronically and pressure tested. If a failure occurs, the section is cut out and the pipe is fused back together.

### **Typical Equipment**

- Side booms, generators, saddle application tools, heating irons & faces, butt fusion machine, electro fusion sequencer, hydraulic & manual butt fusion machine, ladders/shoring equipment, chamfering tools and facers, pipe cutters/extension cords

### **Common Safety Hazard**

- Electric shocks
- Burns
- Slips/trips/falls
- Eye exposure
- Site conditions
- Ditch cave-ins
- Traffic (pedestrian) hazard
- Rigid and slippery pipe in cold weather
- Congested work area
- Pinch points
- Noise
- Exposure to natural gas
- Risk of blow through on live gas mains
- Hand tools operating at high temperatures

### **Common Injuries/Illnesses**

- Burns
- Eye injuries
- Strains/sprains/crushes
- Scrapes/bruises/cuts/lacerations
- Dizziness from natural gas

### **Common Personal Protective Equipment**

- Proper work clothing including gloves, hard hats/safety boots (Approved), safety glasses/face shields, high visibility vests, knee pads

### **Common Protective Devices**

- First aid kits, fire extinguishers, traffic control devices, back-up alarms, trench box/hydraulic jacks/lumber shoring, ground fault circuit interrupter, area warning cones

### **Do's and Don'ts**

- Do - inspect equipment & tools regularly
- Do - wear appropriate clothing and personal protective equipment
- Do - use appropriate equipment when transporting pipe (e.g. Coiled pipe trailers)

- Do - use caution when handling coiled pipe, especially in the winter
- Do - use recommended melt times & procedures
- Do - get help before lifting or moving heavy objects
- Do - practice good housekeeping
- Do - stay within protection area
- Do - shut off equipment when re-fuelling

- Don't - walk or stand on pipe, especially in the winter
- Don't - engage in horseplay
- Don't - leave hot equipment in dangerous or unprotected places don't - take unnecessary chances
- Don't - use drugs or alcohol

### 13. PIPE GANG - FRONT END

#### Job Description

Before pipe in the field can be welded up, it must first be aligned and held securely in place, which is the responsibility of the front-end pipe gang. A pneumatically operated "line-up" clamp is inserted in the pipe and expanded inside the ends of two joints of pipe, aligning the ends for tack welding. On smaller diameter pipe, an external clamp may be used for alignment purposes.



#### Typical Equipment

Sidebooms/tack rigs, welding equipment/bottle racks, air compressors, internal welder, grinders/buffers/ hand tools, internal & external line up clamps, preheat trucks/sleighs, tech shack/slings/skids



#### Common Safety Hazards

- Congested work area
- Falling/flying objects
- Slips/trips/falls
- Electrical shock
- Noise
- Exposure to dust, fumes and gases
- Site conditions
- High pressure hoses
- Pinch points
- Power lines
- Moving equipment
- Temperature extremes



#### Common Injuries/Illnesses

- Burns
- Eye injuries/arc flash
- Sprains/strains/fractures
- Scrapes/bruises
- Hearing loss
- Crush injuries/bruises/cuts



## Common Personal Protective Equipment

- Appropriate work clothing including gloves, safety glasses/face shields/hearing protection, welders' hoods/knee pads (welders), safety boots/hard hats (Approved), welding sleeves or jackets, high visibility vests, respirator for welding fumes



## Common Protective Devices

- Reach rod lock-out, back-up alarms, WHMIS/TDG labels, first aid kits, fire extinguishers

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - frequently check pneumatic hoses and clamps
- Do - keep flammable materials out of weld areas
- Do - keep hands clear when inserting and expanding the line-up clamp
- Do - be alert to heavy equipment moving back and forth
- Do - wear respiratory protection
- Do - wear appropriate clothing and personal protective equipment
- Do - use proper lifting techniques
- Do - avoid pinch points
- Do - practice good housekeeping

- Don't - look directly at welding arc don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - go under suspended loads
- Don't - ride on pipe or equipment
- Don't - work on ditch side of pipe without adequate walking or standing area

## 14. PIPE WELDING - BACK END

### Job Description

Joints of steel pipe are welded together into one continuous pipeline using manual, semi-automatic or automatic welding procedures. Radiographic or ultrasonic inspection is conducted to ensure the integrity of the welds. Unacceptable welds are repaired by grinding and re-welding or are cut out using torches and re-welded.

### Typical Equipment

- Side booms, welding shacks/welding machines, bevelling machines, automatic welding equipment, bottle trucks/racks, oxy-acetylene & propane torches, slings/skids/ladders/tag lines, welding electrodes/wire, grinders/buffers/hand tools

### Common Safety Hazards

- Congested work area
- Falling/flying objects
- Slips/trips/falls
- Respiratory exposure
- X-ray exposure
- Noise/site conditions
- Electrical hazards
- Pinch points
- Moving equipment
- Temperature extremes
- Traffic/pedestrian hazards
- Fire hazard
- Compressed air exposure



## Common Injuries/Illnesses

- Scrapes/bruises/cuts
- Burns
- Strains/sprains/fractures
- Crush injuries
- Eye injuries/arc flash
- Hearing loss



## Common Personal Protective Equipment

- Proper work clothing including gloves, safety glasses/face shields/hearing protection, welders' hoods/knee pads (welders), safety boots/hard hats (Approved), welding sleeves or jackets, high visibility vests, respirator for welding fumes

## Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, grinder guards, WHMIS/TDG labels

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - keep flammable materials out of weld areas
- Do - stay out of radiographic area during x-ray
- Do - be alert to heavy equipment moving back and forth
- Do - wear a respirator
- Do - wear appropriate clothing and personal protective equipment
- Do - avoid pinch points
- Do - practice good housekeeping
- Do - ensure shack floors are secured before moving
- Do - ensure shack properly placed before entering

- Don't - engage in horseplay don't - use drugs or alcohol
- Don't - take unnecessary chances don't - breath welding fumes
- Don't - watch welding arc without proper eye protection
- Don't - work on ditch side without adequate walking or standing area

## 15. PIPE WELDING - POOR BOY

### Job Description

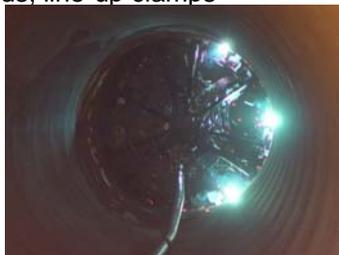
Combining the pipe gang and back end welding into one operation. Joints of pipe are lined up and welded together into one continuous pipeline using manual, semi automatic or automatic procedures. Radiographic or ultrasonic inspection is conducted to ensure the integrity of the welds. Unacceptable welds are repaired by grinding and re-welding or are cut out using torches and re-welded.

### Typical Equipment

- Sidebooms/tack rigs, welding machines/welding equipment, mobile welding trucks, bevelling machines, grinders/buffers/hand tools, oxy-acetylene & propane torches, bottles & gauges, ladders/stools, slings/skids/wind boards, line-up clamps

### Common Safety Hazards

- Congested work area
- Falling/flying objects
- Slips/trips/falls
- Noise/fatigue
- Electrical hazard
- Respiratory exposure
- Site conditions
- X-ray exposure
- Pinch points
- Power lines
- Fire hazard



### Common Injuries/Illnesses

- Eye injuries/arc flash
- Skin irritation
- Strains/sprains/fractures
- Scrapes/bruises/cuts
- Burns
- Hearing loss
- Crush injuries



### Common Personal Protective Equipment

- Proper work clothing including gloves, safety glasses/face shields/hearing protection, hard hats/safety boots (Approved), welders' hoods, knee pads (welders), welding sleeves or jackets, high visibility vests, respirator for welding fumes

### Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, reach rod lock-outs, regulators/check valves, WHMIS/TDG labels

### Do's and Don'ts

- Do - regularly inspect equipment
- Do - keep flammable materials out of weld areas
- Do - follow x-ray precautions
- Do - wear respiratory protection
- Do - wear appropriate clothing and personal protective equipment
- Do - shut off equipment when re-fuelling
- Do - practice good housekeeping
- Do - watch for moving equipment

- Don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - breathe welding fumes
- Don't - watch welding arc without proper eye protection

## 16. INTERNAL REPAIR

### Job Description

After the joints of steel pipe have been welded together, radiographic or ultrasonic inspection is conducted to ensure the integrity of the welds. Should the inspection detect a flaw deep in the weld, the repair may best be done internally.

### Typical Equipment

- Picker trucks, mobile welding trucks, large diameter fans, internal repair machine (sneaky), grinders/buffers/hand tools, slings, welding machines & equipment, oxy-acetylene torches and equipment

### Common Safety Hazards

- Lack of oxygen/welding fumes
- Electrical shock
- Confined work area
- Slips/trips
- Pinch points
- Fire hazards
- Noise, fatigue

### Common Injuries/Illnesses

- Eye injuries
- Sprains/strains/fractures
- Burns
- Cuts/bruises

- Hearing loss

### Common Personal Protective Equipment

- Appropriate work clothing including gloves, fire retardant coveralls, welding sleeves and jacket, safety glasses/face shield, safety boots/hard hats (Approved), hearing protection, body harness, particle mask

### Common Protective Devices

- First aid kits, fire extinguishers, oxygen monitor, asbestos blankets, 5 minute egress bottle & mask, warning signs, communication devices

### Do's and Don'ts

- Do - obtain permit if required
- Do - shut off all vehicles
- Do - test audible alarm systems
- Do - test visual oxygen gauge
- Do - test fan and electrical wires
- Do - test 5 minute air pack
- Do - test and check respirator
- Do - test radio communications
- Do - check the safety harness
- Do - check cutting torch tips
- Do - check for ample oxygen
- Do - check for proper signs

- Don't - leave the site unattended
- Don't - engage in horseplay
- Don't - use unqualified workers
- Don't - forget to sign off the permit don't - use drugs and alcohol
- Don't - take unnecessary chances

## 17. PIPE COATING/JEEPING

### Job Description

The pipeline is coated and/or wrapped with special materials to prevent corrosion. Coating integrity is confirmed through detection of bare spots with special detectors (jeeps).

### Typical Equipment

- Coating truck/mix trailer, sand blast truck, compressor/sandblast equipment, pre-heat equipment, hand tools, holiday detectors (jeeps), slings, torches/patch sticks, ladders, generator sets

### Common Safety Hazards

- Chemical exposure
- Respiratory exposure
- Noise, eye hazards
- Electrical hazards
- Trips/slips/falls
- High pressure hoses
- Site conditions



### Common Injuries/Illnesses

- Fractures/cuts/bruises
- Sprains/strains
- Respiratory illness
- Hearing loss
- Abrasions/skin irritations
- Burns

## Common Personal Protective Equipment

- Appropriate clothing including gloves, safety glasses/face shield, hard hats/safety boots, respirators (dust/vapour), hearing protection, sand blast apparel, disposable coveralls

## Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, eye wash stations, air delivery system (Approved), Material Safety Data Sheets

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - remain in operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - use caution around moving equipment
- Do - use extreme caution when jeeping
- Do - remove chemicals from your skin immediately

- Don't - jump off equipment
- Don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - walk on the pipe
- Don't - breath coating fumes

## 18. BORING

### Job Description

Boring equipment is used for drilling or auguring under roads, railroads, rivers, driveways and landscaped areas, thus allowing the passage and placement of the pipe.

### Typical Equipment

- Backhoes, side boom, dozers, hoisting devices, boring machines, pumps/de-watering equipment, specialized equipment for tunnel entry, slings, shoring devices (if required), ladders, hand tools, barricades or snow fence, torpedoes, light towers

### Common Safety Hazards

- Electrical shock
- Confined spaces
- Improper ventilation
- Ditch cave-in
- Falling/flying objects
- Rotating equipment
- Slips/trips/falls
- Congested work area
- Contacting underground utilities
- Water in ditch, lighting
- Compressed air
- Site conditions



### Common Injuries/Illnesses

- Hand/arm/foot injuries
- Eye injuries
- Sprains/strains/fractures
- Scrapes/bruises
- Crush injuries
- Hearing loss

### Common Personal Protective Equipment

- Appropriate clothing including gloves, safety glasses/face shield, hearing protection, safety boots/hard hats (Approved)

## **Common Protective Devices**

- First aid kits, fire extinguishers, back-up alarms, air moving equipment (if required)

## **Do's and Don'ts**

- Do - regularly inspect equipment
- Do - obtain underground utility locates for the work area
- Do - ensure the work area is secured from the public
- Do - plan and know escape routes from ditch
- Do - use ladders
- Do - wear appropriate clothing and personal protective equipment
- Do - keep loose clothing clear of rotating equipment
- Do - watch for soil movement due to vibrating machinery
- Do - shut off equipment when re-fuelling
- Do - practice good housekeeping
- Do - properly shore or slope bore pit/ditch
- Do - watch out for objects falling from top of ditch line
- Do - get help when lifting or moving heavy tools or equipment
- Do - know and recognize worksite hazards

- Don't - get near or under rotating equipment
- Don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - jump or slide into the ditch

## **19. DIRECTIONAL DRILLING**

### **Job Description**

The use of drilling equipment, which can travel a directed path through the use of accurate tracking and guiding systems. It can be guided over, under and around utilities, structures, rivers and highways. A transmitter located in the borehead is tracked by a computer/receiver. The information is sent to the operator who can then direct and guide the head from the bore machine.

### **Typical Equipment**

- Side booms/picker trucks, directional boring machines, sounds/transmitters, digitrack computer/receivers, bore rods and grease, bore heads and reamers, bentonite and polymers, mud pumps, light towers

### **Common Safety Hazards**

- Rotating equipment
- Electrical shock
- Congested work areas
- Slips/trips/falls
- Dust exposure
- Underground utilities
- High pressure hoses

### **Common Injuries/Illnesses**

- Eye injuries
- Sprains/strains/fractures
- Cuts/scrapes/bruises
- Hearing loss

### **Common Personal Protective Equipment**

- Appropriate work clothing insulated lineman's gloves, safety glasses, safety boots/hard hats (Approved), hearing protection, dusk masks, high visibility vests

## Common Protective Devices

- First aid kits, fire extinguishers, grounding stakes, voltage mats, electric strike alert sensing system, operating instructions, guards/handrails, area cones

## Do's and Don'ts

- Do - plan the bore
- Do - expose utilities before boring across
- Do - use proper placement of mats, stakes and cones
- Do - place grounding stakes into the ground before driving anchor stake
- Do - test the strike alert system before boring
- Do - read operating instructions and procedures
- Do - wear insulated lineman's gloves and boots when assisting the operator in any capacity (i.e. Greasing rods, install anchor stake, etc.)

- Don't - use pipe wrenches to uncouple drill rod
- Don't - rotate the drill rod while anyone is in contact with any part of the drill string
- Don't - modify thrusts or bore levers so they do not spring return to the off position when released
- Don't - use drugs or alcohol
- Don't - take unnecessary chances

## 20. CONCRETE PRODUCTS

### Job Description

Concrete products are commonly used in fabrication and plant facilities. Other uses include the manufacture of weights and pipe protection.

### Typical Equipment

- Sidebooms/tractors, Ready-mix trucks and pumping equipment, concrete mixers, loaders, concrete pouring buckets/skids, concrete vibrators, ready mix equipment, forms, reinforcing bars and wire, propane heaters, hand tools, lighting equipment, slings, formwork

### Common Safety Hazards

- Chemical exposure
- Moving equipment
- Pinch points
- Trips/slips/falls
- Site condition
- Temperature extremes
- Overhead hazard
- Fire hazard



### Common Injuries/Illnesses

- Crushes/bruises/pinches
- sprains/strains/fractures
- Eye injuries
- Chemical reactions
- Cuts



### Common Personal Protective Equipment

- Safety glasses/face shields, appropriate work clothing including gloves, hard hats and safety boots (Approved), hearing protection, breathing protection

### Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, WHMIS labels

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - use designated signal person
- Do - know the proper hand signals and when to use
- Do - practice good housekeeping
- Do - handle banding with care
- Do - ensure proper placement of skids

- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - get between equipment and pipe or forms (avoid pinch points)
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - ride on moving equipment

## 21. LOWERING IN

### Job Description

After the pipe sections are properly welded together, cleaned and coated and the ditch bottom has been cleared of rocks and debris and/or padded, the pipe sections are lowered into the ditch by tractors using lowering-in belts or cradles in a carefully coordinated action.

### Typical Equipment

- Sidebooms, dozers, link belts/backhoes, mormon boards, lowering-in belts/cradles, rated cables and slings, skid sleigh/sloop, transport equipment, hand tools/coating jeeps, ladders/ditch pillows

### Common Safety Hazards

- moving equipment
- overhead power lines
- open excavations
- site conditions
- slips/trips/falls
- pinch points
- falling objects
- congested work areas
- cave-in exposure
- temperature extremes



### Common Injuries/Illnesses

- crushes/bruises
- cuts/lacerations
- eye injuries
- sprains/strains/ fractures



### Common Personal Protective Equipment

- Appropriate work clothing including gloves, safety glasses/face shield, hard hats and safety boots (Approved), hearing protection, high visibility vests

### Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, traffic control devices (where required), communication devices

## Do's and Don'ts

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - coordinate lowering in procedure

- Do - wear appropriate clothing and personal protective equipment
- Do - use caution around moving equipment
- Do - shut off equipment when re-fueling
- Do - use designated signal person
- Do - use caution and follow procedures when installing foam breakers or pillows
- Do - practice good housekeeping
- Do - watch footing
- Do - inspect any slings and cradles before use

- Don't - stand between pipe and the ditch
- Don't - engage in horseplay
- Don't - stand or crawl under suspended loads
- Don't - enter equipment hazard zones
- Don't - stand on pipe
- Don't - enter ditch
- Don't - back up equipment without signaling
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take Unnecessary Chances

## 22. FABRICATION

### Job Description

At various locations along a pipeline, special pipe assemblies such as flow control valves, side taps, and scraper launchers or traps must be installed. Fabrication crews are required for this purpose.

### Typical Equipment

- Sidebooms/pickers/cranes, welding machines and welding equipment, tape/coating equipment, sandblasting equipment, grinders/hand tools, bevelling equipment, hoisting devices, propane/cutting torches, pipe clamps/lineup clamps, air movement devices (if required), scaffolding/ladders, shoring (where required), skids

### Common Safety Hazards

- site conditions
- overhead power lines
- existing facilities
- slips/trips/falls
- respiratory exposures (dust & fumes)
- falling objects
- temperature extremes
- x-ray exposure
- chemical exposure



### Common Injuries/Illnesses

- burns
- cuts/scrapes
- crushes/pinches/bruises/contusions
- eye injuries
- sprains/strains/fractures



### Common Personal Protective Equipment

- Appropriate work clothing including gloves, safety glasses/face shield, hard hats and safety boots (Approved), hearing protection, welder protective clothing

### Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, air quality monitors, fall protection (where required), check valves, guards

### Do's and Don'ts

- Do - regularly inspect equipment

- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - shut off equipment when re-fuelling
- Do - watch for moving equipment
- Do - use designated signal person
- Do - practice good housekeeping
- Do - keep flammable materials out of weld areas
- Do - inspect any slings before use
- Do - watch your footing
- Do - stay out of radiographic area during x-ray
- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - back up equipment without signalling
- Don't - look at welder's arc without eye protection
- Don't - breathe welding fumes
- Don't - sandblast without proper safety equipment
- Don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take unnecessary chances

### 23. TIE-INS - MAINLINE

#### Job Description

Portions of the pipeline installed at road and river crossings or connection points are welded, coated and buried after most of the mainline has been laid. Tie-in crews are required for this purpose.

#### Typical Equipment

- Sidebooms, backhoes, welding machines, oxy-acetylene and propane torches, welding electrodes, pipe/lineup clamps, bevelling machines, shoring devices (where required), pumps, light towers, skids/ladders/slings, tape/coating equipment, sandblasting equipment, grinders/hand tools

#### Common Safety Hazards

- Exposed utilities
- Trips/slips/falls
- Arc flash
- Temperature extremes
- Moving equipment/pinch points
- Chemical exposure/burns
- Overhead hazard/fire hazard
- Electrical shock, traffic hazards
- Site conditions
- Noise
- Trench slope and soil position
- Damaged slings



#### Common Injuries/Illnesses

- Crushes/pinches
- Bruises/contusions
- Sprains/strains/fractures
- Eye injuries
- Burns
- Hearing loss

#### Common Personal Protective Equipment

- Sandblasting apparel, Safety Glasses/face shield, appropriate work clothing including gloves, hard hats and safety boots (Approved), hearing protection/welder's hood, breathing protection/respirator (where required), high visibility vests

## **Common Protective Devices**

- First aid kits, back-up alarms, fire extinguisher, ladders, rated slings, propane regulators, traffic control, proper sloping, trench boxes or shoring, electrical mitigation devices, oxy-acetylene check valves

## **Do's and Don'ts**

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - shut off equipment when re-fuelling
- Do - watch for moving equipment
- Do - use designated signal person
- Do - practice good housekeeping
- Do - keep flammable materials away from welding areas
- Do - inspect slings before use

- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - sandblast without proper safety equipment
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - look at welder's arc without proper eye protection
- Don't - breath welding fumes
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - carry construction material or equipment in personnel carriers

## **24. TIE-INS - DISTRIBUTION**

### **Job Description**

After a new line has been installed and tested, it is connected to an existing pressurized main, often in a restricted excavation. Various methods may be used to tie-in to the existing main. These methods depend on the size and type of both the existing main and the new line.

### **Typical Equipment**

- Cranes/Sidebooms/tractors/backhoes, welding machines, oxy-acetylene and propane torches, tape/coating equipment, saddle application tool, grinders/hand tools, lineup clamps/bevelling machines, electro fusion sequencer/heating irons, pumps/skids/ladders/slings, trench support system

### **Common Safety Hazards**

- Exposed utilities
- Trips/slips/falls
- Ditch/trench cave-in
- Traffic, water in trench
- Arc flash, temperature extremes
- Release of pressurized gases
- Confined work spaces
- Electrical shock
- Fire/explosion
- Exposure to natural gas
- Dust, fumes

### **Common Injuries/Illnesses**

- Cuts/scrapes
- Crushes/pinches/bruises
- Sprains/strains/fractures
- Eye injuries burns
- Dizziness

## **Common Personal Protective Equipment**

- Safety glasses/face shield, appropriate work clothing including gloves, hearing protection, breathing protection, hard hats and safety boots (Approved), high visibility vests, welder's hood

## **Common Protective Devices**

- First aid kits, fire extinguishers, back-up alarms, ground fault circuit interrupter, timber shoring/hydraulic shoring jacks, traffic control devices, oxy-acetylene regulators/check valves/propane regulators, electrical mitigation devices, air quality monitors

## **Do's and Don'ts**

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - shut off equipment when re-fueling
- Do - watch for moving equipment
- Do - follow recommended manufacturer's and company policy and procedures
- Do - practice good housekeeping
- Do - keep flammable materials away from areas where welding is being performed
- Do - ensure proper placement of skids
- Do - inspect slings before use
- Do - check field records for existing mains
- Do - be aware of pressure in the existing gas main

- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - look at welder's arc without proper eye protection
- Don't - breathe natural gas which can by-pass tapping equipment
- Don't - attempt tie-ins without full knowledge and training of procedures

## **25. CATHODIC PROTECTION**

### **Job Description**

Underground steel pipelines can be corroded by harmful electric current occurring naturally between the steel pipe and the surrounding soil. To prevent this, a system known as cathodic protection is installed in one of two basic forms. One form uses sacrificial anodes made of magnesium to take the harmful current. The other form passes an electrical current through the pipe equal in strength to the harmful current in order to negate its effect. Both systems require the attachment of electrical wires to the pipe by CAD welding.

### **Typical Equipment**

- Cad welding equipment, hand tools, auger, ladders

### **Safety Hazards**

- site conditions
- slips/trips/falls
- confined work spaces
- temperature extremes

### **Common Injuries/Illnesses**

- burns
- eye injuries
- sprains/strains
- scrapes/bruises

## **Common Personal Protective Equipment**

- Appropriate work clothing including gloves, safety glasses/face shield, hard hats and safety boots (Approved)

## **Common Protective Devices**

- First aid kits, fire extinguishers, shoring devices (if required), guards

## **Do's and Don'ts**

- Do - regularly inspect equipment
- Do - wear appropriate clothing and personal protective equipment
- Do - practice good housekeeping
- Do - watch your footing
- Do - watch yourself and co-workers during the cad burning process

- Don't - look directly at the burning process
- Don't - breathe welding fumes
- Don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances

## **26. BACKFILL/CLEANUP**

### **Job Description**

When the completed pipeline has been lowered into the ditch and all tie-in and fabrication connections have been completed, the pipeline is covered up and the ditch is filled with dirt level to the surrounding terrain. The right-of-way is graded and re-seeded in accordance with the client's requirements. Fences cut or disturbed are repaired and the berm replaced where required.

### **Typical Equipment**

- Link belts/backhoes/dozers/ graders, dump trucks, rock pickers/padders, concrete augers, asphalt hot boxes, tampers/fencing tools, front end loaders, road restoration equipment, farm tractors and implements ladders

### **Common Safety Hazards**

- hot lines
- asphalt burns
- moving equipment
- slips/trips/falls
- noise
- temperature extremes
- rollover exposure
- overhead power lines
- traffic hazards
- site conditions

### **Common Injuries/Illnesses**

- crushes/bruises
- sprains/strains/fractures
- burns
- bites/stings/rashes
- eye injuries

- hearing loss
- cuts/scrapes

### Common Personal Protective Equipment

- Appropriate work clothing including gloves, safety glasses/face shield, hard hats and safety boots (Approved), hearing protection, breathing protection (dust masks), high visibility vests

### Common Protective Devices

- First aid kits, fire extinguishers, back-up alarms, traffic control devices

### Do's and Don'ts

- Do - regularly inspect equipment
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - shut off equipment when re-fuelling
- Do - watch for moving equipment
- Do - use designated signal person
- Do - practice good housekeeping
- Do - stay clear of rotating equipment and augers
- Do - watch your footing
- Do - check soil conditions and location of hot lines
- Do - inspect any slings before use

- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - enter equipment hazard zones
- Don't - back up equipment without signalling
- Don't - move heavy equipment onto unstable or soft ditch soil
- Don't - move equipment onto hotlines
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - use drugs or alcohol
- Don't - take unnecessary chances
- Don't - carry construction material or equipment in personnel carriers

## 27. TESTING/PIGGING

### Job Description

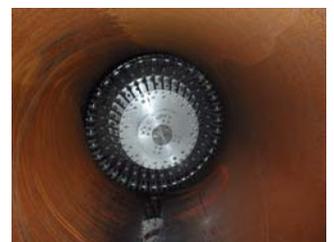
The completed pipeline is tested to ensure it will operate at designated pressures without leaking. Pressure tests are usually conducted using air or water by filling the pipeline and holding a designated pressure for a period of time. When testing is complete a valve is opened and the pressure is released. The line may be cleared or cleaned by pushing a pig through the line using gas or air.

### Typical Equipment

- Pigs/ launchers/catchers/piping, pressure recorders/fill/pressure pumps, test manifolds/squeeze pumps, compressed gas, welding machines and equipment, leak detectors, compressors/anti-whip cables, boilers/propane heaters, de-watering systems, skids/grinders/hand tools, light towers, hoarding (when required)

### Common Safety Hazards

- Chemical exposure/burns
- Falling/flying objects
- Moving equipment
- Trips/slips/falls
- Electrical shocks
- Fire hazard
- Overhead hazard
- High pressure water, air or gas
- Temperature extremes



- Poor illumination
- Site conditions
- Noise, fatigue
- Pinch points

### Common Injuries/Illnesses

- Cuts/scrapes
- Crushes/pinches/bruises/contusions
- Burns
- Sprains/strains/fractures
- Eye injuries



### Common Personal Protective Equipment

- Safety glasses/face shield/hearing protection, welder's hood/high visibility vests, appropriate work clothing including gloves, hard hats and safety boots (Approved)

### Common Protective Devices

- First aid kit, fire extinguisher, back-up alarms, signage/test warnings, trench boxes or shoring (where required), electrical mitigation devices, traffic control devices, fire fighting equipment

### Do's and Don'ts

- Do - Stay Alert To Fire Emergencies
- Do - regularly inspect test equipment and fittings
- Do - remain within the operator's line of vision
- Do - wear appropriate clothing and personal protective equipment
- Do - shut off equipment when re-fuelling
- Do - watch for moving equipment
- Do - use designated signal person
- Do - inspect slings before use
- Do - make sure that anti-whip cables are in place
- Do - stay clear of manifold
- Do - ensure de-watering pipe under pressure is secure
- Do - practice good housekeeping

- Don't - stand or place equipment in line with de-watering valve or pig catcher
- Don't - exceed designated pressure
- Don't - enter equipment hazard zones
- Don't - walk under suspended loads
- Don't - jump off equipment
- Don't - engage in horseplay
- Don't - ride on equipment unless appropriate seating is available
- Don't - use drugs or alcohol
- Don't - take unnecessary chances

## 28. RIVER CROSSINGS

### Job Description

Rivers and streams are crossed by pipelines using various methods. Preparations for crossings require many of the same operations included in land lay, such as welding, coating and concrete placement. The use of marine equipment is often employed.



### Typical Equipment

- Sidebooms, dozers, draglines, backhoes, barges/dredges/power boats/flexi-floats, sauerman set-ups/lasers, winches/wire rope, cranes, light towers/pumps, skids/ladders, drills, concrete mixers

## **Common Safety Hazards**

- Congested work area
- Watercourse traffic
- Slips/trips/falls
- Noise
- Site conditions
- Water hazards
- Cave-in exposure
- Pinch points
- Temperature extremes
- Cables
- Moving equipment

## **Common Injuries/Illnesses**

- Sprains/strains/fractures
- Eye injuries
- Scrapes/bruises
- Cuts/lacerations
- Crush injuries

## **Personal Protective Equipment**

- Proper work clothing including gloves, safety glasses (when required), hard hats and safety boots (Approved), cut resistant gloves, high visibility life vests, buoyant lifeline across river (if required)

## **Common Protective Devices**

- First aid kits, fire extinguishers, ditch shoring or sheet piling, back-up alarms communication devices, signage in water course, river buoys and life lines

## **Do's and Don'ts**

- Do - plan and know escape routes
- Do - wear appropriate clothing and personal protective equipment
- Do - stay alert to moving equipment
- Do - watch for bank slippage
- Do - watch your footing
- Do - inspect equipment before use
- Do - inspect pull heads, cable connections and winch lines prior to pulling a section.
- Do - get help before lifting or moving heavy objects
- Do - practice good housekeeping
- Do - shut off equipment when re-fuelling
- Do - approach the shoreline from up stream
- Do - stay clear of winch lines

- Don't - operate a powerboat unless qualified
- Don't - overload or stand up in the boat
- Don't - enter restricted areas
- Don't - stand between pipe and equipment
- Don't - walk under suspended loads
- Don't - grab moving winch lines
- Don't - park vehicles in work area
- Don't - wear jewellery or loose clothing
- Don't - stand near the edge of the water
- Don't - engage in horseplay
- Don't - use drugs or alcohol
- Don't - take unnecessary chances



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**GENERAL SAFETY GUIDELINES**

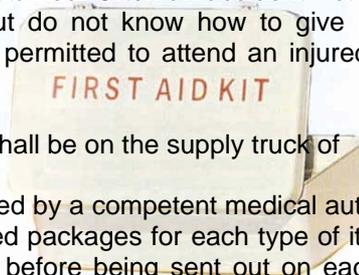
## GENERAL SAFETY GUIDELINES

### OPERATIONAL SAFE PRACTICES AND STANDARDS

#### FIRST AID

Provision for prompt medical care and First Aid services for every employee shall be made prior to the commencement of the project. First Aid is the immediate and temporary care given to the victim of an accident or sudden illness until the services of a doctor can be obtained. Often an accident victim is hurt rather than helped by persons who want to do something, but do not know how to give First Aid correctly. Only people properly qualified in First Aid should be permitted to attend an injured or sick person.

1. All construction gangs shall be provided with a First Aid kit that shall be on the supply truck of the gang with a qualified First Aid person in charge of it.
2. The First Aid kit shall consist of those medical items recommended by a competent medical authority all housed in a suitable weatherproof container with individual sealed packages for each type of item. The contents of the First Aid kit shall be checked by the employer before being sent out on each job to ensure that any expended items have been replaced.
3. The foreman of each construction gang is responsible for First Aid treatments and he or a designated member of the gang should be qualified in First Aid.
4. An injured employee shall immediately report an injury to his foreman, regardless of how small.
5. A proper emergency procedure should be established for every project and where applicable the telephone numbers of the physicians, hospital, or ambulances shall be conspicuously posted and the foreman of each gang made aware of this information and how to immediately call for assistance.
6. All accidents shall be reported to the field office by the foreman and the foreman shall see that a proper accident report is made regarding any injury.



#### GOOD HOUSEKEEPING

Good housekeeping is one of the first rules of accident prevention and shall be of primary concern to all superintendents and foremen. Good housekeeping shall be planned at the beginning of the job by supervisory personnel and carefully supervised by them to the final cleanup of the job. Confusion will be reduced and operations will be made more effective where good housekeeping planning has been carefully made.

1. Right of Ways must be kept free of wrapping and foodstuffs. Bottles and or can tops can cut, entrap or otherwise harm wild and or domestic animals.
2. Close all fences behind you. Do not drive over laid down fences or gates.
3. During the course of construction the work areas must be kept clean of scrap and debris of all kinds.
4. Rubbish, debris, waste, and useless materials constitute fire and accident hazards and shall be removed from the work area as fast as it accumulates. This applies in particular to field warehouse and field shop areas where operations may remain at one place over a temporary period of time. Machinery should be checked to be sure that all oil has been wiped from areas where employees may step to prevent them from slipping on such surfaces.
5. Any oil spills should be immediately cleared up to avoid a safety or fire hazard.



#### DRINKING WATER

Typhoid fever, dysentery and other diseases are often the result of contaminated drinking water and lack of proper sanitation on the job, Pipeline work requires the job to be constantly moving and the question of the supply of potable water is important.

1. An adequate supply of potable water shall be provided in all places of employment.
2. Portable containers used to dispense drinking water shall be capable of being tightly closed, and equipped with a tap. Water shall not be dipped from the container.

3. Any container used to distribute drinking water shall be clearly marked DRINKING WATER and not **used** for any other purpose.
4. The common drinking cup is prohibited.
5. Where single service (paper or plastic) cups (to be used only once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

## SANITATION

Toilets at the construction job site shall be provided for employees as required by the Statutory Standards, Requirements or Codes of Practice of the specific Country, Territory or State as well as those set forth in the Contract Documents and shall be set out in a **table to be inserted in Part V (Addenda) of this Manual.**

## NOISE

1. Protection against the effects of noise exposure shall be provided when the sound levels exceed those recommended by the Standards, Requirements or Codes of Practice established for a specific Country, Territory or State as well as those set forth in the Contract Documents., when measured on the 'A' scale of a standard sound level meter at slow response and shall be set out in a **table to be inserted in Part V (Addenda) of this Manual.**
2. When employees are subjected to sound levels exceeding those listed in the Table, feasible administrative or engineering controls shall be utilised. If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels to within the levels set out.
3. If the variations in noise levels reaches the maximum of intervals of 1 second or less the noise is to be considered continuous.
4. In all cases where the sound exceed the values shown therein, a continuing, effective hearing conservation program shall be put in place.
5. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, the combined effect should be considered, rather than the individual effect of each.
6. Exposure to impulsive or impact noise should not exceed 140dBA peak sound pressure level.

## IONIZING RADIATION

1. In construction and related activities involving the use of sources of ionizing radiation, the applicable, provisions of the Atomic Energy Commission's Standards for Protection Against Radiation, relating to protection against occupational radiation exposure, shall apply.



2. Any activity that involves the use of radioactive materials or X-rays, shall be performed by competent persons specially trained in and qualified to operate such equipment in a proper and safe manner.

## NON-IONIZING RADIATION

1. Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.
2. Proof of qualification of the laser equipment operator shall be available and in possession of the operator at all times.
3. Employees, when working in areas in which a potential exposure to direct or reflected laser light greater than 0.005 watts (5 milliwatts) exists, shall be provided with anti-laser eye protection devices.
4. Areas in which lasers are used shall be posted with standard laser warning placards.
5. Beam shutters or caps shall be utilised, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch break or overnight, or at change of shifts, the laser shall be turned off.
6. Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.
7. The laser beam shall not be directed at employees.
8. When it is raining or snowing, or when there is dust or fog in the air, the operation of laser systems shall be avoided where practicable; in any event, employees shall be kept out of range of the area of source and target during such weather conditions.

## GASES, VAPOURS, FUMES, DUSTS, AND MISTS.

1. Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the threshold Limit Values as required by the Statutory Standards, Requirements or Codes of Practice of the specific Country, Territory or State, as well as those set forth in the Contract Documents shall be avoided and these shall be set out in a **table to be inserted in Part V (Addenda) of this Manual.**
2. To achieve compliance, administrative or engineering controls must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective measures shall be used to keep the exposure of employees to all contaminants within the limits prescribed in this section. Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person.
3. Paragraphs (1) and (2) of this section do not apply to the exposure of employees to airborne asbestos dust for which special regulations apply.

## ILLUMINATION

Construction areas, corridors, offices, shops and storage areas shall be lighted while any work is in progress to not less than the minimum illumination listed in the Table set forth In Part III of this manual.

## VENTILATION

1. **GENERAL** - Whenever hazardous substances such as dusts, fumes, mists, vapours, or gases exist or are produced in the course of construction work, their concentrations shall not exceed the limits specified in the section under Gases, Vapours, Fumes, Dusts, and Mists. When ventilation is used as an engineering control method, the system shall be installed and operated according to the requirements of this section.
2. **LOCAL EXHAUST VENTILATION** - Local exhaust ventilation shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapours, and gases in concentrations causing harmful exposure. Such exhaust systems shall be so designed that dusts, fumes, mists, vapours, or gases are not drawn through the work area of employees.
3. **DESIGN AND OPERATION** - Exhaust fans, jets, ducts, hoods, separators, and all necessary operated as to ensure the required protection by maintaining a volume and velocity of exhaust sufficient to gather dusts, fumes, vapours, or gases from said equipment or process, and to convey them to suitable points of safe disposal, thereby preventing their dispersion in harmful quantities into the atmosphere where employees work

## PERSONAL PROTECTIVE EQUIPMENT

The employer is responsible for ensuring that all personnel are issued with and wear the appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions.



## HEAD PROTECTION

Employees working in areas where there is a possible danger of head injury from impact or from falling or flying objects, or from electrical shock and burns, shall be protected by protective helmets.

## HEARING PROTECTION

1. Whenever it is not feasible to reduce noise levels or duration of exposures ear protective devices shall be provided.
2. Ear protective devices inserted in the ear shall be fitted or determined individually by competent persons.  
Plain cotton is not an acceptable protective device

## EYE AND FACE PROTECTION

1. Employee shall be provided with eye and face protection equipment when machines or operations present potential eye or face injury from physical, chemical or radiation agents.



2. Employees whose vision requires the use of corrective lenses in spectacles shall be protected by goggles or spectacles of one of the following types:
  - (i) Spectacles whose protective lenses provide optical correction.
  - (ii) Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles.
  - (iii) Goggles that incorporate corrective lenses mounted behind the protective lens.

## RESPIRATORY PROTECTION

1. In emergencies, or when controls are required to prevent harmful exposure to employees, appropriate respiratory protective devices shall be provided by the employer and shall be used.



2. The chemical and physical properties of the contaminant, as well as the toxicity and concentration of the hazardous material, shall be considered in selecting the proper respirators.
3. The nature and extent of the hazard, work requirements, and conditions, as well as the limitations and characteristics of the available respirators, shall be factors considered in making the proper selection.
4. Employees required to use respiratory protective equipment shall be instructed in the use and limitations of such equipment.
5. Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.
6. Respiratory protective equipment that has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use.

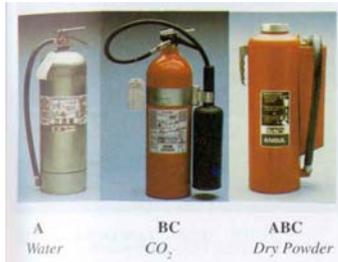
## LIFE JACKETS, ETC.

1. Employees working over or near water, where the danger of drowning exists, shall be provided with an approved life jacket or buoyant work vests.
2. Prior to and after each use, the buoyant work vests or life-preservers shall be inspected for defects which would alter their strength or buoyancy. Defective units shall not be used.
3. Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet.
4. A least one life saving skiff shall be immediately available at locations where employees are working over or adjacent to water.

## FIRE PROTECTION AND PREVENTION

### FIRE PROTECTION

1. The employer shall be responsible for the development and maintenance of an effective fire protection and prevention program at the job site throughout all phases of the construction work and shall ensure the availability of the fire protection and suppression equipment required.



2. Access to all available fire-fighting equipment shall be maintained at all times.
3. All fire fighting equipment, provided by the employer, shall be conspicuously located.
3. All fire fighting equipment shall be periodically inspected and maintained in operating condition. Defective equipment shall be immediately replaced.
5. As warranted by the project, the employer shall provide a trained and equipped fire-fighting organisation (Fire Brigade) to assure adequate protection to life.
6. Extinguishers and water drums, subject to freezing, shall be protected from freezing.
7. A fire extinguisher, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the job site. This requirement does not apply to the integral fuel tanks of motor vehicles.
8. Carbon tetrachloride and other toxic vaporising liquid fire extinguishers are prohibited.

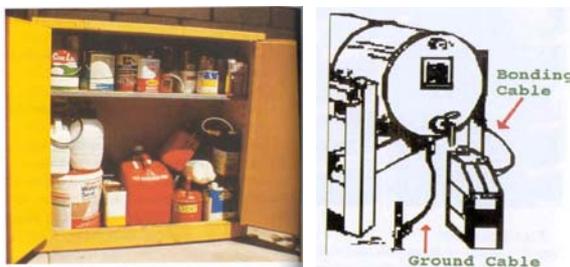
### FIRE PREVENTION

1. Electrical wiring and equipment for light, heat, or power purposes shall be installed in compliance with the requirements of the applicable country codes set forth in **Part II of this manual**.
2. Smoking shall be prohibited at or in the vicinity of operations that constitute a fire hazard, and such areas shall be conspicuously posted: "No Smoking or Open Flame".
3. **Open Yard Storage**
  - (a) Combustible materials shall be piled with due regard to the stability of piles and in no case higher than 20 feet.
  - (b) Driveways between and around combustible storage piles shall be at least 15 feet wide and maintained free from rubbish, equipment, or other articles or materials. Driveways shall be so spaced that a maximum grid system unit of 50 feet by 150 feet is produced.
  - (c) The entire storage site shall be kept free from accumulation of unnecessary combustible materials. Weeds and grass shall be kept down and a regular procedure provided for the periodic cleanup of the entire area.
  - (d) Method of piling shall be solid wherever possible and in orderly and regular piles. No combustible material shall be stored outdoors within 10 feet of a building or structure.
  - (e) Portable fire extinguishing equipment, suitable for the fire hazard involved, shall be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, shall be placed so that minimum travel distance to the nearest unit shall not exceed 100 feet.
4. **Indoor Storage**
  - (a) Storage shall not obstruct, or adversely affect, means of exit.
  - (b) All materials shall be stored, handled, and piled with due regard to their fire characteristics.
  - (c) Non-compatible materials, which may create a fire hazard, shall be segregated by a barrier having a fire resistance of at least 1 hour.

- (d) Materials shall be piled to minimise the spread of fire internally and to permit convenient access for Fire-Fighting. Stable piling shall be maintained at all times. Aisle space shall be maintained to safely accommodate the widest vehicle that may be used within the building for fire-fighting purposes.
- (e) Clearance of at least 36 inches shall be maintained between the top level of the stored material and sprinkler deflectors if installed.
- (f) Clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.
- (g) A clearance of 24 inches shall be maintained around the path of travel of fire doors unless a barricade is, provided, in which case no clearance is needed. Material shall not be stored within 36 inches of a fire door opening.

#### STORAGE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS

- 1 Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids. Approved metal safety cans shall be used for the handling and use of flammable liquids in quantities greater than one gallon, except that this shall not apply to those flammable liquid materials that are highly viscous (extremely hard to pour), which may be used and handled in original shipping container. For quantities of one gallon or less, only the original container or approved metal safety cans shall be used for storage, use and handling of flammable liquids.



2. Storage areas shall be kept free of weeds, debris, and other combustible material not necessary to the storage.
- 3 At least one portable fire extinguisher shall be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.
- 4 At east one portable fire extinguisher shall be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids.
- 5 There shall be no smoking or open flames in the area used for fuelling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids.
6. Conspicuous and legible signs prohibiting smoking shall be posted.
7. Motors of all equipment being fuelled shall be shut off during the fuelling operation.

#### SIGNS, SIGNALS AND BARRICADES

1. Signs and symbols required for accident prevention shall be visible at ail times when work is being performed, and shall be removed or covered promptly when the hazards no longer exists.



2. Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, (i.e. defective tools, equipment, etc).
3. Construction areas shall be posted with legible traffic signs at points of hazard.
- 4 When operations are such that signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street, flagmen or other appropriate traffic controls shall be provided.
5. Hand signalling by flagmen shall be by use of red flags at least 18 inches square or sign paddles, and in periods of darkness red lights shall be used.

6. Flagmen shall be provided with and shall wear a red or orange warning garment while flagging. Warning garments worn at night shall be of reflective material.

## RIGGING EQUIPMENT FOR MATERIAL & LOAD HANDLING

### GENERAL

1. Rigging equipment for material handling shall be inspected regularly and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be immediately removed from service.
2. Rigging equipment shall not be loaded in excess of its recommended safe working load.
3. Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.
4. Special custom design grabs, hooks, clamps, or other lifting accessories, shall be marked to indicate the safe working loads and shall be proof-tested prior to use to 125 percent of their rated load.

### ALLOY STEEL CHAINS

1. Welded alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer.
2. Hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chains, shall have a rated capacity at least equal to that of the chain.
3. Job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments shall not be used.
4. Rated capacity (working load limit) for alloy steel chain slings shall conform to the specified standard.
5. Whenever wear at any point of any chain link exceeds that set out in the specified standard; the assembly shall be removed from service.

### WIRE ROPE

1. Refer to the manufacturers recommendations as to the safe working loads, classifications, and grades for steel wire rope and slings with various terminations. The safe working load recommended by the manufacturer shall be followed, provided that a safety factor of not less than 5 is maintained. **See Table In Part V of this manual.**
2. Protruding ends of strands in splices on slings and bridles shall be covered or blunted.
3. Wire rope shall not be secured by knots, except for haul back lines on scrapers.
4. The following limitations shall apply to the use of wire rope:
  - (a) An eye splice made in any wire rope shall have not less than three full Tucks. However, this requirement shall not operate to preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited.
  - (b) Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in pulling loads, shall consist of one continuous piece without knot or splice.
  - (c) Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.
  - (d) Wire rope shall not be used if, in any length of eight diameters, the total number of visible broken wires exceeds 10 percent of the total number of wires, or if the rope shows other signs of excessive wear, corrosion, or defect.
  - (e) When U-Bolt wire rope clips are used to form eyes, the **Table in Part V of this manual** shall be used to determine the number and spacing of clips.
  - (f) When used for eye splices, the U-Bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

## TOOLS HAND AND POWER

### GENERAL REQUIREMENTS

1. All hand and power tools and similar equipment, shall be maintained in a safe condition.
2. When power operated tools are designed to accommodate guards, they shall be equipped with such guard, when in use.

## HAND TOOLS

1. Employers shall not issue or permit the use of unsafe hand tools.
2. Wrenches, including adjustable, pipe, end, and socket wrenches shall not be used when **jaws are sprung** to the point that slippage occurs.
3. Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.
4. The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

## POWER OPERATED HAND TOOLS

1. Electric power operated tools shall either be of the approved double-insulated type or grounded.
2. Extension cords used with portable electric tools and appliances shall be of three-wire type.
3. The use of electric cords for hoisting or lowering tools shall not be permitted.
4. Pneumatic power tools shall be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.
5. All hoses exceeding 1/2 inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.
6. The fluid used in hydraulic powered tools shall be fire-resistant, and shall retain its operation characteristics at the most extreme temperatures to which it will be exposed.
7. The manufacturers safe operating pressures for hoses, valves, pipe filters, and other fittings shall not be exceeded.
8. Only employees who have been trained in the operation of Powder-Actuated Tools shall be allowed to operate that particular tool.
9. The tool shall be tested each day before loading to see that safety devices are in proper working condition.
10. Any tool found not in proper working order, or one that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
11. Impact tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.
12. Loaded tools shall not be left unattended.
13. Tools shall not be used in an explosive or flammable atmosphere
14. All tools shall be used with correct shield, guard, or attachment recommended by the manufacturer.

## ABRASIVE WHEELS AND TOOLS

1. All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation, and shall be equipped with safety guards
2. Floor and bench-mounted grinders shall be provided with work rests that are rigidly supported and readily adjustable. Such work rests shall be kept at a distance not to exceed one-eighth inch from the surface of the wheel
3. All employees using abrasive wheels shall utilize eye protection gear.

## WOODWORKING TOOLS

1. All fixed power driven woodworking tools shall be provided with a disconnect switch that can either be locked or tagged in the off-position.
2. All portable, power-driven circular saws shall be equipped with guards above and below the base **plate or shoe**.

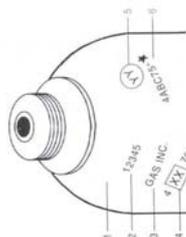
## JACKS - LEVER AND RATCHET SCREW AND HYDRAULIC

1. The manufacturer's rated capacity shall be legibly marked on all jacks and shall not be exceeded.
2. All jacks shall have a positive stop to prevent over-travel

## WELDING AND CUTTING

### GAS WELDING AND CUTTING

1. **Transporting, moving, and storing compressed gas cylinders**
  - (a) Valve protection caps shall be in place and secured.



- (b) When cylinders are hoisted, they shall be secured on a cradle, sling-board, or pallet. They shall not be hoisted or transported by means of magnets or choker slings.
- (c) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall **not be** intentionally dropped, struck, or permitted to strike each other violently.
- (d) When cylinders are transported by powered vehicles, they shall be secured in a vertical position.
- (e) Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm not boiling, water shall be used to thaw cylinders loose.
- (f) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved. Keep cylinders out of direct rays of the sun.
- (g) A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.
- (h) When work is finished, when cylinders are empty, or when cylinders are moved at any time, the cylinder valve shall be closed.
- (i) Compressed gas cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

## 2. **Placing Cylinders**

- (a) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them. When this is impractical, fire resistant shields shall be provided.
- (b) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.
- (c) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.
- (d) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

## 3. **Treatment of Cylinders**

- (a) Cylinders, whether full or empty, shall not be used as rollers or supports.
- (b) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorised by him, shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier.
- (c) No damaged or defective cylinder shall be used.

## 4. **Use of fuel gas**

The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

- (a) Before a regulator to a cylinder valve is connected, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame, or other possible sources of ignition.
- (b) The cylinder valve shall always be opened slowly to prevent damage to the regulator. For quick closing, valves on fuel gas cylinders shall not be opened more than 1 1/2 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that **the fuel** gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.
- (c) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.
- (d) Before a regulator is removed from a cylinder valve, the cylinder valve, shall always be closed and the gas released from the regulator.
- (e) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the work area. In the event that fuel gas should leak from the cylinder valve, rather than from the valve stem, and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the work area. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the work area.
- (f) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the work area.

## 5 Hose

- (a) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colours or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage shall not be used.
- (b) When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 12 inches shall be covered by tape.
- (c) All hoses in use, carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion, or be in any way harmful to employees, shall be inspected at the beginning of each working shift. Defective hose shall be removed from service.
- (d) Hose which has been subject to flashback, or which shows evidence of severe wear or damage, shall be tested to twice the normal pressure to which it is subject, but in no case less than 300psi. Defective hose, or hose in doubtful condition, shall not be used.
- (e) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.
- (f) Boxes used for the storage of gas hose shall be ventilated.
- (g) Hoses, cables, and other equipment shall be kept clear of passageways, ladders and stairs.

## 6. Torches

- (a) Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills, or other devices designed for such purposes.
- (b) Torches in use shall be inspected at the beginning of each working shift for leaking shut-off valves, hose couplings, and tip connections. Defective torches shall not be used.
- (c) Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

## 7 Regulators and Gauges

Oxygen and fuel gas pressure regulators, including their related gauges, shall be in proper working order while in use

## 8. Oil and Grease Hazards

Oxygen cylinders and fittings shall be kept away from oil or grease. Cylinders, cylinder caps and valves, couplings, regulators, hose, and apparatus shall be kept free from oil or greasy substances and shall not be handled with oily hands or gloves. Oxygen shall not be directed at oily surfaces, greasy clothes, or storage tank or vessel. Tools used for coupling and uncoupling Cylinders, cylinder caps and valves, couplings, regulators, hose, and apparatus shall be kept free from oil or greasy substances.

## ARC WELDING AND CUTTING

### 1 Manual electrode holders

- (a) Only manual electrode holders which are specifically designed for arc welding and cutting, and are of a capacity capable of safely handling the maximum rated current required by the electrodes, shall be used.



- (b) Any current carrying parts passing through the portion of the holder which the arc welder or cutter, grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

### 2. Welding cables and connectors

- (a) All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.
- (b) Only cable free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

- (c) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.
  - (d) Cables in need of repair shall not be used. When a cable, other than the cable lead referred to in sub-paragraph (2) of this section, becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tape or other equivalent insulation.
3. Ground returns and machine grounding
- (a) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit that it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units that it services.
  - (b) Pipelines containing gases or flammable liquids, or conduits containing electrical circuits, shall not be used as a ground return.
  - (c) When a structure or pipeline is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks, or heat at any point shall cause rejection of the structures as a ground circuit.
  - (d) When a structure or pipeline is employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.
  - (e) The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.
  - (f) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.
4. Operating Instructions
- Employers shall instruct employees in the safe means of arc welding and cutting as follows:
- (a) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees.
  - (b) Hot electrode holders shall not be dipped in water; to do so may expose the arc welder or cutter to electric shock.
  - (c) When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be switched off.
  - (d) Any faulty or defective equipment shall be reported to the supervisor
5. Protection & Shielding
- (a) Proper safety gear hoods and or goggles must be worn by welders and cutters.
  - (b) Whenever practicable, all arc welding and cutting operations shall be shielded by non-combustible or flameproof screens which will protect employees and other persons working in the vicinity from the arc.

## FIRE PREVENTION

- 1. When practical, objects to be welded, cut, or heated shall be moved to a designated safe location or, if the objects to be welded, cut, or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place, or otherwise protected.
- 2. No welding, cutting, or heating shall be done where the application of flammable paints, or the presence of other flammable compounds, or heavy dust concentrations create a hazard.
- 3. If the object to be welded, cut or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.
- 4. Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.
- 5. When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed, and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the fire-fighting equipment provided is to be used.
- 6. Drums, containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

- 7 Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built up pressure during the application of heat.

## VENTILATION AND PROTECTION IN WELDING, CUTTING AND HEATING

### 1. Mechanical Ventilation

For purposes of this section, mechanical ventilation shall meet the following requirements:

- (a) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems
- (b) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits, as defined in the section under ventilation.
- (c) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits, as defined in the section under ventilation.
- (d) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.
- (e) All air replacing that withdrawn shall be clean and respirable.
- (f) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.

### 3. Welding, Cutting and Heating in confined spaces

- (a) Except as provided in sub-paragraph (b) of this paragraph either general mechanical or local exhaust ventilation meeting the requirements of paragraph (a) of this section shall be provided whenever welding, cutting, or heating is performed in a confined space.
- (b) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

### 4. Inert-Gas Metal-Arc Welding

Since the inert gas metal arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal arc welding, the decomposition of chlorinated solvent by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process until the following special precautions have been taken.

- (a) The use of chlorinated solvents shall be kept at least 200 feet, unless shielded, from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.
- (b) Employees in the area not protected from the arc by screening shall be protected by filter lenses meeting the requirements under eye protection of this Manual. When two or more welders exposed to each other's arc, filter lens goggles of a suitable type, meeting the requirements of eye protection of this Manual shall be worn under welding helmets. Hand shields to protect the welder against flashes and radiant energy shall be used when either the helmet is lifted or the shield is removed.
- (c) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

### 5. General Welding, Cutting & Heating.

- (a) Welding, cutting, and heating, not involving conditions described in paragraph (2) or (3) of this section, may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.
- (b) Employees performing any type of welding, cutting, or heating shall be protected by suitable eye protective equipment.
- (c) Necessary precautions shall be taken by the welder to protect his ears when welding in a bell-hole.
- (d) Eye protection shall be worn by all employees doing any buffing or grinding work.
- (e) Welding trucks shall be equipped with approved fire extinguishers, first aid kits, etc.

## WELDING, CUTTING AND HEATING THROUGH PROTECTIVE COATINGS

- 1 Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability.  
Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.
- 2 Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be flammable, they shall be stripped from the area to be heated to prevent ignition.
- 3 Protection against toxic preservative coatings:
  - (a) In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application, or the employees shall be protected by air line respirators.
  - (b) In the open air, employees shall be protected by a respirator.
- 4 The preservative coatings shall be removed a sufficient distance from the area to be heated to ensure that the temperature of the un-stripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heating area may be used to limit the size of the area required to be cleaned.

## LIFTING EQUIPMENT- CRANES

- 1 The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all cranes. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer. Only qualified and experienced operators shall operate a crane.
- 2 Rated load capacities, and recommended operating speeds, special hazard warnings or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while he is at his control station.
- 3 Hand signals to crane operators shall be those prescribed by the applicable ANSI standard for the type of crane in use. An illustration of the signals shall be posted at the job site, **see Table in Part V of this Manual.**
- 4 The employer shall designate a competent person who shall inspect all machinery and equipment prior to each use, and during use, to make sure it is in safe operating condition. Any deficiencies shall be repaired, or defective parts replaced before continued use.
- 5 A thorough, annual inspection of the hoisting machinery shall be made by a competent person, or by government or recognised private agency. The employer shall maintain a record of the dates and results of inspections for each hoisting machine and piece of equipment.
- 6 Wire rope shall be taken out of service when any of the following conditions exist:
  - (a) In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay.
  - (b) Wear of one third the original diameter of outside individual wires. Kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure.
  - (c) Evidence of any heat damage from any cause.
  - (d) Reductions from nominal diameter of more than one sixty-fourth inch for diameters up to and including five-sixteenths inch, one thirty-second inch for diameters three-eighth inch to and including one-half inch, three sixty-fourths inch for diameters nine-sixteenths inch to and including three-fourths inch, one-sixteenth inch for diameters seven-eighths inch to 1 1/8 inches inclusive three-thirty-seconds inch for diameters 1 1/4 to 1 1/2 inches inclusive.
  - (e) In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.
  - (f) Wire rope safety factors shall be in accordance with the Table set forth In Part V of this manual.
- 7 Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts or equipment shall be guarded if such parts are exposed to contact by employees, or otherwise create a hazard.
- 8 Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, shall be barricaded in such a manner as to prevent an employee from being struck or crushed by the crane.
- 9 All exhaust pipes shall be guarded or insulated in areas where contact by employees is possible in the performance of normal duties.
- 10 Whenever internal combustion engine powered equipment exhausts in enclosed spaces, tests shall be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gases or an oxygen deficient atmosphere.

11. All windows in cabs shall be of safety glass, or equivalent, that introduces no visible distortion to interfere with the safe operation of the machine.
12. Where necessary for rigging or service requirements, a ladder, or steps, shall be provided to give access to the cab roof.
13. Guard-rails, handholds, and steps shall be provided on cranes for easy access to the car and cab. Platforms and walkways shall have anti-skid surfaces.
14. Fuel tank filler pipe shall be located in such a position, or protected in such manner, as to not allow spill or overflow to run onto the engine, exhaust, or electrical equipment of any machine being re-fuelled.
15. An accessible fire extinguisher, shall be available at all operator stations or in cabs of equipment.
16. Except where electrical distribution and transmission lines have been de-energized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines equipment or machines shall be operated in close proximity to power lines only in accordance with the following:
  - (a) For lines rated 50 KV. or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet.
  - (b) For lines rated over 50 KV, minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 KV. over 50 KV, or twice the length of the line insulator, but never less than 10 feet.
  - (c) In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 KV, and 10 feet for voltages over 50 KV up to and including 345KV, and 16 feet for voltages up to and including 750 KV.

#### OPERATION OF AUTOMOTIVE EQUIPMENT

1. No driver shall use any motor vehicle equipment having an obstructed view to the rear unless:
  - (a) The vehicle has a reverse signal alarm audible above the surrounding noise level or
  - (b) The vehicle is backed up only when an observer signals that it is safe to do so.
2. All vehicles in use shall be checked at the beginning of each shift to assure that the following parts, equipment and accessories are in safe operating condition and free of apparent damage that could cause failure while in use: service brakes, including trailer brake connections, parking system (hand brakes); emergency stopping system (brakes); tires; horn; steering mechanism, coupling devices; seat belts; operating controls; and safety devices. All defects shall be corrected before the vehicle is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defroster, fire extinguishers, etc., where such equipment is necessary.
3. The winchblock used on trucks or tractors shall have a safety bridle on the hook.
4. Cables and hoisting equipment shall be inspected daily. Damaged cable or hoisting equipment shall be replaced or repaired immediately.
5. The partaking by drivers or operators of intoxicating liquor during working hours is strictly prohibited. No driver or operator may operate any vehicle or piece of equipment whilst under the influence of liquor.
6. Vehicles or equipment should never be stopped in the centre of the road. Drivers should always pull over to one side before stopping. If a breakdown occurs at night and the vehicle lights go out, the vehicle should be protected with appropriate signals until aid is secured.
7. Before stopping or attempting to turn, the driver should always give proper signals to vehicles approaching from the rear.
8. Drivers should look both ways before crossing railroad tracks, and should put the truck in low gear until the tracks are crossed.
9. The driver must stop and look in both directions before driving onto a major highway from a minor road.
10. The driver shall slow down and sound the horn when approaching a blind curve.
11. Drivers should drive as close to the right hand (or left hand depending on the country) side of the road as safety permits.
12. Drivers shall slow down the moment children are seen on the sidewalk or roadway.
13. Rear view mirrors must be kept in good condition and used for the purpose intended. Drivers should make it as easy as possible for the approaching traffic to pass, and must NOT HOG THE HIGHWAY.
14. The drivers of all trucks loaded with men or materials, when starting down a steep hill shall shift to a lower gear as is necessary to ensure complete control.
15. Truck and car drivers shall immediately report all accidents involving personal injury or property damage to their supervisor.
16. All trucks operating in convoy shall travel a minimum of 300 feet apart.
17. All truck drivers shall be responsible for the safety of men on their trucks, for compliance with safety regulations and for speed limits set by law. Only trained and qualified drivers shall be allowed to drive company vehicles.
18. Vehicles used to transport employees shall have seats firmly secured and adequate for the number of employees to be carried.
19. Seat belts shall be installed in all motor vehicles.
20. Tools and material shall be secured to prevent movement when transported in the same compartment with employees.

21. Employees shall not ride with their arms or legs outside of the truck body, in a standing position, on running boards, seated on fenders, or seated on truck loads.
22. The driver of a gang truck shall be certain that the men do not leave the truck until it has come to a complete stop.
23. Truck drivers shall not drive faster than the speed prescribed by law and shall have the vehicle under control at all times.
24. Drivers must not permit outsiders on company equipment or vehicles.
25. No Flammable liquids or loose materials of any kind shall be permitted in the compartments in which people are riding

#### TRANSPORTATION OF MATERIALS

1. All pipe loads shall be boomed with not less than three chains, and the chains shall not be less than 3/8 inch, good quality, with adequate strength for application. Loose end of boomer chains shall not be allowed to drag. Boomer handles shall be operated from the ground and on the right side of the vehicle. Employees should never stand over a boomer when releasing or taking up on loads.
2. All haulage vehicles, whose pay load is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cab shield and/or canopy adequate to protect the driver from shifting or falling materials.
3. Operating levers controlling hoisting or dumping devices on haulage bodies shall be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.
4. Leather or leather-palm gloves shall be worn by employees when unloading pipe.
5. The load shall be examined carefully to see that stakes on both sides of the truck or wagon bed are securely set to prevent pipe from rolling when the boomers are released.
6. A power line pole should not be used as a snub for a winch when materials are moved or a truck is pulled when stuck, as there is a danger of shorting the wires when the strain is taken off the pole.
7. Skids shall be properly placed when handling pipe or heavy materials.
8. Hooks or calipers on "A" frame of trucks shall be securely fastened to prevent swinging when not in use.
9. Trailers being pulled by vehicles or equipment with king pin connections shall have a safety chain of sufficient size to hold the load should the king pin break.
10. Materials shall be properly loaded to prevent shifting or falling while in transit.
11. Loads extending beyond the rear of the bed should be protected by red flags during the day and red lights at night. Over-width loads shall not be permitted except when necessary, and then shall travel only during the daylight hours with necessary warning flags and if necessary an escort vehicle.
12. Overhead clearance and width shall be checked before passing under low wires, cables, underpasses and bridges.
13. When vehicles are parked, engines shall be stopped and emergency brakes set.

#### EARTHMOVING EQUIPMENT

1. These rules apply to the following types of earthmoving equipment, Scrapers, Loaders, Crawler or Wheel Tractors, Bulldozers, Off-Highway Trucks and Graders.



2. Seat belts shall be provided on all equipment covered by this section.
3. Seat belts need not be provided for equipment that is designed only for stand-up operation.
4. Seat belts shall not be provided for equipment that does not have rollover protective structure or adequate canopy protection.
5. No operator shall move or cause to be moved construction equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate safely the movement of the equipment and vehicle involved.
6. Every emergency access ramp and berm used by an employer shall be constructed to restrain and control runaway vehicles.
7. All earthmoving equipment mentioned in this section shall have a service braking system capable of stopping and holding the equipment fully loaded.
8. All bi-directional machines, such as rollers, compactors, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operational condition.

9. No employer shall permit earthmoving or compacting equipment that has an obstructed view to the rear to be used in reverse gear unless the equipment has in operation a reverse signal alarm distinguishable from the surrounding noise level or an employee signals that it is safe to do so.
- 10 Scissor points on all front-end loaders, which constitute a hazard to the operator during normal operation, shall be guarded.

## OPERATION OF SPECIFIC CONSTRUCTION EQUIPMENT

### GENERAL

- 1 Only qualified men shall be assigned as operators. Absolute regard for safety of employees and the public shall be shown by operators.
2. All equipment shall be inspected daily and maintained in good working condition. An inspection report shall be given to the supervisor immediately upon completion.
3. All equipment shall be driven off roads or highways at night. Where any portion of any machine or equipment projects into the road it shall be marked by red lights or flares.
4. Operators shall not permit oiling or greasing, refuelling or repairs until motors on the vehicles have been stopped
5. All drive chains, sprockets, gears, v-belts, and open shafting shall be properly guarded and guards shall be kept in position when the machine is in operation.
6. The practice of employees sleeping or resting under equipment during rest periods shall be prohibited.
7. If there is any question as to visibility, or when working close to people on the ground, the operator shall get a signal from a banksman / swamper or foreman before moving.
8. Persons shall not be permitted to ride on equipment unless it is suitably equipped for such transport.
9. A banksman / swamper shall not go in between to hitch or unhitch a tractor or other equipment such as trailers, dope pots, and sleds until they have been stopped and the operator shall not move equipment until the banksman / swamper is clear of the equipment.
10. All machine operators shall familiarise themselves with rules for "Highway and Railroad crossings."
11. All blades and booms shall be lowered when equipment is not in use.
12. Workmen shall not ride pipe except for balancing pipe in line-up and then not in standing position.
13. Workmen shall not ride boom lines, crane hooks, headache balls, etc.
14. Pipe lines being constructed in the vicinity of high tension power lines shall be properly grounded at all times.



### PILE DRIVING EQUIPMENT

1. Overhead protection, which will not obscure the vision of the operator shall be provided. Protection shall be the equivalent of 2 inch planking or other solid material of equivalent strength.
2. Stop blocks shall be provided for the leads to prevent the hammer from being raised against the head block.
3. A blocking device, capable of safely supporting the weight of the hammer, shall be provided for placement in the leads under the hammer at all times while employees are working under the hammer.

4. Guards shall be provided across the tip of the head block to prevent the cable from jumping out of the sheaves.
5. When the leads must be inclined-in driving of batter piles, provisions shall be made to stabilise the leads.
6. Fixed leads shall be provided with ladder, and adequate rings, or similar attachment points, so that the loft worker may engage his safety belt lanyard to the leads. If the leads are provided with the loft platform(s) such platform(s) shall be protected by standard guardrails.
7. Steam hose leading to a steam hammer or jet pipe shall be securely attached to the hammer with an adequate length of at least 1/4 inch diameter chain or cable to prevent whipping in the event the joint at the hammer is broken. Air hammer hoses shall be provided with the same protection as required for steam-lines.
8. Safety chains, or equivalent means, shall be provided for each hose connection to prevent the line from thrashing.
9. Steam line controls shall consist of two shut-off valves, one of which shall be a quick acting lever type within easy reach of the hammer operator.
10. Outriggers, thrust-outs, or counterbalances shall be provided as necessary to maintain stability of pile-driver rigs.
11. Engineers and winch-men shall accept signals only from the designated signalmen.
12. All employees shall be kept clear when piling is being hoisted.

#### DITCHING MACHINES



1. Cleaning rocks, roots, or dirt from buckets on digging wheel or conveyor shall not be done while machine is in motion.
2. Cables and fastenings shall be checked daily on digging wheel, and conveyors and brakes shall be checked before operating machine on inclines.
3. Operator shall demand that all employees or public stand in the clear of the conveyor as well as the digging wheel while machine is in operation.
4. Operator shall make sure that all employees are clear of the machine, and that all men employed in the operation have been located or accounted for before the operator moves the machine or engages the clutch of the digging wheel.
5. Employees shall stand clear of skids or timbers placed under the ditcher tracks.

In addition to the requirements specified in the preceding paragraphs, all of the requirements under Material Handling Equipment in this manual shall be followed and observed.

#### BULLDOZER



1. All steps, tracks, or any surface used to mount the rig shall be clean, dry, free of grease, oil, mud or dirt.
2. All controls should be properly set for start-up and all guards and safety devices in place and working.
3. The bulldozer operator shall make certain that all employees are off and completely clear of the bulldozer before any operations are initiated.
4. Bulldozers shall be equipped with headache rack or protective cover constructed of material sufficiently strong to protect operator when they are used in clearing operations.
5. The bulldozer shall not be operated on right of way unless the brush gang is in the clear.
6. Operators shall make certain that helpers are in the clear when stumps are pulled by winch and cable.
7. Operators shall never attempt to make any repairs or adjustments or grease machines without first disengaging clutch, and shutting the engine down.
8. Substantial cribbing should be provided it necessary when working on or under the raised blade.

In addition to the requirements specified in the preceding paragraphs, all of the requirements under Material Handling Equipment in this manual shall be followed and observed.

## SIDE-BOOM AND TOW TRACTORS



1. Before operating a side-boom or tow tractor, the operator shall make sure everyone is in the clear. Workmen shall not stand beneath tractor boom when lifting or lowering.
2. No tractor or side-boom shall be operated until all controls have been inspected, tested, and are in good working order.
3. Operators are responsible for winch brakes, cable and pipe on side-booms. Faulty winch brakes must be repaired before using tractor.
4. Employees shall not stand directly in front of cable hitches, tractors, and pipe during "bending" operations or moving of pipe.
5. Employees shall not pass under or work under a suspended load inside the angle of winch line, or near a cable, chain or rope.
6. Pipe shall never be picked up or lowered while any employees are between the tractor and the pipe, and pipe shall never be carried over the heads of employees.
7. Employees shall not attempt to ride on a cable, chain, sling, or other attachment or on a load or material being moved by means of side boom tractor.
8. No one should give signals, directions, or other instructions to an equipment operator unless he has been trained, authorised and directed to do so.
9. No operator shall leave his operating position while a load is hanging or held up by the side boom without blocking under the load.
10. Operators shall not allow anyone to ride on machines unless specific preparation is made for such transport.
11. All side-boom hooks shall be equipped with a safety catch or lock to prevent cable slipping out.
12. A chain shall be attached to each side-boom and belt or line chained to boom when tractor is not carrying a load and is moving along the right of way.
13. A tractor or side-boom shall not be run across a ditch until it has been ascertained that no injury can result if ground does cave in,
14. When dozing sides of ditch or backfilling, no workers shall be in the ditch.
15. In addition to the requirements specified in the preceding paragraphs, all of the requirements under Material Handling Equipment in this manual shall be followed and observed.

## MAINTENANCE, REPAIRS, SERVICING

1. No service, repairs, or maintenance shall be done on any machine or equipment until it has been moved to a place where the machine will not be exposed to vehicle or equipment traffic and out of the work area unless and until proper barricades and guards have been set up to provide a safe working area.
2. No work shall be done on any machines or equipment for any purpose until and unless the equipment has been shut down and locked out, brakes set, and all blades, buckets, etc., have been lowered completely to the ground or properly blocked.
3. Machine parts shall not be washed in gasoline, either kerosene, diesel oil, or a safety solvent shall be used.
4. Suspended motors or machinery, etc., beneath which mechanics must work shall be blocked or cribbed.
5. Hoisting equipment shall be carefully checked before being used for heavy loads.
6. All guards should be replaced after repairs have been completed.
7. New parts for installation and old parts removed from a machine must be placed in the clear.
8. Tools, such as hammers, chisels and wrenches, shall be kept in safe workable condition and each employee shall be responsible for the condition of that equipment and tools which he uses.
9. Employees shall wear goggles when using buffers, emery wheels, and grinders, and while chipping and cutting.
10. Do not strike two hardened metal surfaces together, such as a ball peen hammer against a shaft. Use a wooden block between high carbon surfaces, or a soft-headed hammer.
11. All electrical equipment shall be adequately grounded. Extension cords and outlets shall be kept in good repair.
12. Mechanic's truck shall have at least one 15 pound dry chemical fire extinguisher.

13. No welding, brazing, or cutting should be done on any tank or vessel that has contained flammable liquids unless it has been gas freed and/or thoroughly washed and completely filled with water.
14. Drivers of fuel trucks shall be required to keep the equipment in good condition and such drivers shall follow all applicable rules under "Operation of Automotive Equipment".

#### FUELLING OF EQUIPMENT

1. Tank trucks used to transport split loads of gasoline and other fuels shall be the type provided with double bulkheads and drainage between compartments to prevent contamination from leaks. A separate pump shall be used for gasoline only, and there shall be no connecting lines between compartments.
2. The dome openings and draw-off faucets shall be painted identifying colours such as red for gasoline; green for kerosene, and black for diesel fuel. The dome openings for the tank trucks compartments shall have the names of the products stenciled around them.
3. An outer shield shall be placed over the muffler on all fuel trucks. The tail pipe shall be extended to a safe point clear of the unloading connections and the pump.
4. Each fuel truck shall be provided with at least one approved tire extinguisher, such as a 15 pound dry chemical type.
5. Motors on equipment shall be stopped and burners on dope pots extinguished before fuelling.
6. Smoking within 100 feet shall be prohibited while equipment is being fuelled and in the case of gasoline, there shall be no open fires, welding, or burning in the nearby area.
7. Care shall be taken not to overfill any equipment with fuel. If fuel is spilled the engine or burner shall not be started until the spillage is mopped up.
8. In fuelling equipment, the metal fill nozzle shall be kept in contact with the lip of the tank opening to eliminate any static accumulation.
9. Gasoline shall never be handled in open containers, and safety cans shall be used when handling small quantities.
10. The washing of equipment parts, hands, or any object with gasoline shall be prohibited, and fuel truck drivers shall not dispense it for that purpose. A standard solvent, kerosene or diesel fuel shall be used.
11. Fuel trucks shall be equipped with reflector or approved dry cell battery type warning lights for emergency highway use.
12. Stationary storage fuel tanks shall be vented and entirely clear of buildings or equipment at the warehouse. If the tanks are not buried, they shall be grounded and properly vented.
13. The fill nozzle opening on all equipment shall have a fastened cap in place except when tank is being filled.

#### MARINE OPERATIONS AND EQUIPMENT

##### MATERIAL HANDLING OPERATIONS

1. Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained, and properly secured.
2. Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp, or a safe walkway, shall be provided.
3. When the upper end of the means of access rests on or is flush with the top of the bulwark, substantial steps, properly secured and equipped with at least one substantial handrail approximately 33 inches in height, shall be provided between the top of the bulwark and the deck.
4. Obstructions shall not be laid on or across the gangway.
5. Unless the structure makes it impossible, the means of access shall be so located that the load will not pass over employees.
6. Only experienced and qualified personnel shall be allowed to handle boats of any type.
7. Every launch or motor boat shall be equipped with two oars.
8. Each boat, barge and dredge shall be equipped with sufficient fire extinguishers to control fires, and with other required marine safety equipment.
9. Boats and work barges shall never be overloaded either with employees and/or equipment and/or supplies. The load shall be properly distributed to prevent capsizing.
10. When a dragline is used on a barge for digging, it shall be firmly secured to the barge.

## WORKING SURFACES OF BARGES

1. Only authorised personnel shall be allowed on barges and dredges.
2. Employees shall not be permitted to walk along the sides of covered lighters or barges with coamings more than 5 feet high, unless there is a 3 foot clear walkway, or a grab rail, or a taut hand-line is provided.
3. Decks and other working surfaces shall be maintained in a safe condition.
4. Employees shall not be permitted to pass fore and aft, over, or around deck-loads, unless there is a safe passage.
5. Employees shall not be permitted to walk over deck-loads from rail to coaming unless there is a safe passage. If it is necessary to stand at the outboard or inboard edge of the deck-load where less than 24 inches of bulwark, rail coaming, or other protection exists, all employees shall be provided with a suitable means of protection against falling from the deck-load.
6. The employer shall ensure that there is, in the vicinity of each barge in use at least one 30inch lifeline with not less than 90 feet of line attached, and at least one portable or permanent ladder which will reach the top of the apron to the surface of the water.
7. Employees walking or working on the unguarded decks of barges shall be equipped with approved work vests or buoyant vests.



F

SAMPLE

SAFETY & ACCIDENT FORMS

**PRELIMINARY ACCIDENT REPORT**

|   |  |  |                         |
|---|--|--|-------------------------|
| <b>Deatiled Report Required within 3 days</b> |  | <b>Control No</b>                                |                         |
| <b>Accident Location :</b>                    |  | <b>Date of Accident</b>                          | <b>Time of Accident</b> |
|   |  |  |                         |
| <b>Company</b>                                |  | <b>Personnel Injured</b>                         | <b>Badge Number</b>     |
|   |  |  |                         |
| <b>Type of Injuries</b>                       |  | <b>Property Damage and Estimated Cost Damage</b> |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
| <b>Description of Accident</b>                |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
| <b>Witness Statement</b>                      |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
| <b>Cause of Accident</b>                      |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
| <b>Corrective Action to be taken</b>          |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
|   |  |  |                         |
| Signed : _____                                |  | Badge No. : <input type="text"/>                 |                         |
| <b>Name (Printed)</b> <input type="text"/>    |  |  |                         |
| <b>Job Title :</b> <input type="text"/>       |  |  |                         |
| <b>Company :</b> <input type="text"/>         |  | <b>Date of Report :</b> <input type="text"/>     |                         |

## ANALYSIS OF “ON THE JOB” INJURY OR “JOB RELATED” ILLNESS

### CIRCLE IN EACH GROUP

#### 1 : ACTIVITY OF EMPLOYEE

- 01 Operating / Using
- 02 Manually carrying, Transporting or Handling
- 03 Walking, or Running
- 04 Standing, Sitting, or Sleeping
- 05 Fighting, Horse play
- 06 Climbing Up or Down
- 07 Falling, Pushing, Pulling
- 08 Bending, Twisting
- 09 Lifting Lowering
- 10 Athletics
- 11 Riding a Bicycle
- 12 Passenger on a Bicycle
- 13 Riding a Motor Cycle
- 14 Passenger on a Motor Cycle
- 15 Driving a Motor Vehicle
- 16 Passenger seated in a Motor Vehicle Seat
- 17 Passenger without a proper seat in a motor vehicle
- 18 Being transported by Animal
- 19 Passenger in a Plane
- 20 Cooking
- 21 Bathing, Swimming
- 22 Horse Riding
- 23 Fishing
- 24 Working
- 25 Helping, Assisting
- 98 Activity – NEC
- 99 Activity No Data

#### 2 : SOURCE OF INJURY

(The Object, Substance, Exposure or bodily motion which directly produced or inflicted the injury)

- 01 Machines
- 02 Vehicles
- 03 Hand Tools
- 04 Chemicals
- 05 Flammable and hot substances
- 06 Dust and Particles
- 07 Working Surfaces
- 08 Materials
- 09 Drilling Equipment
- 10 Other Sources
- 11 Unknown : or Unidentified

#### 3 : ACCIDENT TYPE

(The event which directly resulted in the injury)

- 01 Struck against
- 02 Written rules
- 03 Caught in or Between or Under
- 04 Rubbed, Abraded or Penetrated
- 05 Fall of person from different level
- 06 Fall of person at same level
- 07 Bodily reaction of person
- 08 Contact with electrical current
- 09 Contact with temperature extremes
- 10 Contact with Radiation, Toxic or Noxious substance(s)
- 11 Transportation Accidents
- 12 Other
- 13 No Data

#### 4 : HAZARDOUS CONDITION

(The hazardous physical condition or circumstances which permitted or occasioned the occurrence of the accident.)

- 01 Improperly Guarded
- 02 Improper Arrangement, Procedures, etc.
- 03 Defects
- 04 Inadequacies (Light, Space, Other)
- 05 Excess (Speed, Heat, Other)
- 06 Other
- 07 No Hazardous Condition
- 08 Undetermined, insufficient information

#### 5 : UNSAFE ACT

(The Violation of a commonly accepted safe procedure, which directly permitted or occasioned the occurrence of the previously named accident procedure type.)

- 01 Unsafe Driving Procedure
- 02 Operating without Authority, Failure to secure or Warn
- 03 Taking unsafe position or posture
- 04 Operating or Working at unsafe speed
- 05 Using unsafe equipment, Hands instead of Equipment, Equipment unsafe
- 06 Working on moving or Dangerous Equipment
- 07 Unsafe Loading, Placing, Mixing, etc.
- 08 Making Safety Devices Inoperative
- 09 Failure to use safe attire or personal protective Equipment (PPE)
- 10 Horseplay
- 11 Other
- 12 No Unsafe Acts

#### 6 : PERSONAL FACTOR

- 01 Attitude
- 02 Lack of knowledge or Skill
- 03 Physical Defects
- 04 Unsafe Act Committed by person other than injured
- 05 Other

#### 7: UNSAFE ACT

- 01 Incomplete or Insufficient Instruction
- 02 On-Job Rules Not Enforced
- 03 Personnel Protective Equipment (PPE) Not Provided
- 04 Safe Tools/ Equipment Not Provided
- 05 Adequate & Safe Plant Facilities or Equipment not Provided
- 06 Inadequate Inspection
- 07 Inadequate Job Planning
- 08 Too Much Rush
- 09 No Written Rules

**PLEASE COMPLETE FRONT (PART I) OF THIS FORM**

**DETAILED ACCIDENT REPORT**  
**PART I**

|   |            |
|---|------------|
| PLEASE COMPLETE PART II,III & IV OF THIS FORM<br>PLEASE ATTACH PHOTOGRAPHS OF ACCIDENT SITE | Control No |
|---|------------|

|                     |                  |                  |
|---------------------|------------------|------------------|
| Accident Location : | Date of Accident | Time of Accident |
|                     |                  |                  |
|                     |                  |                  |

|         |                   |              |
|---------|-------------------|--------------|
| Company | Personnel Injured | Badge Number |
|         |                   |              |
|         |                   |              |

|                  |   |
|------------------|---|
| Type of Injuries | Property Damage and Estimated Cost Damage |
|                  |   |
|                  |   |
|                  |   |
|                  |   |

|  |
|--|
| Names and Addresses and Details of Witnesses |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

|   |   |
|---|---|
| Signed : _____  | Badge No. : <input style="width: 100%;" type="text"/>     |
| Name (Printed) <input style="width: 95%;" type="text"/> |   |
| Job Title : <input style="width: 95%;" type="text"/>    |   |
| Company : <input style="width: 95%;" type="text"/>      | Date of Report : <input style="width: 95%;" type="text"/> |

**ANALYSIS OF “ON THE JOB” INJURY OR “JOB RELATED” ILLNESS**

**(Part II)**

**CIRCLE IN EACH GROUP**

**1 : ACTIVITY OF EMPLOYEE**

- 01 Operating / Using
- 02 Manually carrying, Transporting or Handling
- 03 Walking, or Running
- 04 Standing, Sitting, or Sleeping
- 05 Fighting, Horse play
- 06 Climbing Up or Down
- 07 Falling, Pushing, Pulling
- 08 Bending, Twisting
- 09 Lifting Lowering
- 10 Athletics
- 11 Riding a Bicycle
- 12 Passenger on a Bicycle
- 13 Riding a Motor Cycle
- 14 Passenger on a Motor Cycle
- 15 Driving a Motor Vehicle
- 16 Passenger seated in a Motor Vehicle Seat
- 17 Passenger without a proper seat in a motor vehicle
- 18 Being transported by Animal
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- 20 Cooking
- 21 Bathing, Swimming
- 22 Horse Riding
- 23 Fishing
- 24 Working
- 25 Helping, Assisting
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- 99 Activity No Data

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**(The Object, Substance, Exposure or bodily motion which directly produced or inflicted the injury)**

- 01 Machines
- 02 Vehicles
- 03 Hand Tools
- 04 Chemicals
- 05 Flammable and hot substances
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- 07 Working Surfaces
- 08 Materials
- 09 Drilling Equipment
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- 11 Unknown : or Unidentified

**3 : ACCIDENT TYPE**

**(The event which directly resulted in the injury)**

- 01 Struck against
- 02 Written rules
- 03 Caught in or Between or Under
- 04 Rubbed, Abraded or Penetrated
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- 06 Fall of person at same level
- 07 Bodily reaction of person
- 08 Contact with electrical current
- 09 Contact with temperature extremes
- 10 Contact with Radiation, Toxic or Noxious substance(s)
- 11 Transportation Accidents
- 12 Other
- 13 No Data

**4 : HAZARDOUS CONDITION**

**(The hazardous physical condition or circumstances which permitted or occasioned the occurrence of the accident.)**

- 01 Improperly Guarded
- 02 Improper Arrangement, Procedures, etc.
- 03 Defects
- 04 Inadequacies (Light, Space, Other)
- 05 Excess (Speed, Heat, Other)
- 06 Other
- 07 No Hazardous Condition
- 08 Undetermined, insufficient information

**5 : UNSAFE ACT**

**(The Violation of a commonly accepted safe procedure, which directly permitted or occasioned the occurrence of the previously named accident procedure type.)**

- 01 Unsafe Driving Procedure
- 02 Operating without Authority, Failure to secure or Warn
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- 06 Working on moving or Dangerous Equipment
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- 08 Making Safety Devices Inoperative
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- 02 Lack of knowledge or Skill
- 03 Physical Defects
- 04 Unsafe Act Committed by person other than injured
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- 03 Personnel Protective Equipment (PPE) Not Provided
- 04 Safe Tools/ Equipment Not Provided
- 05 Adequate & Safe Plant Facilities or Equipment not Provided
- 06 Inadequate Inspection
- 07 Inadequate Job Planning
- 08 Too Much Rush
- 09 No Written Rules

**PLEASE COMPLETE FRONT (PART I) OF THIS FORM**



**DETAILED ACCIDENT REPORT**  
**PART IV**

**DETAILED SKETCH**







**PIPELINE CONSTRUCTION SAFETY AWARDS PROGRAMME**

**INTERNATIONAL PIPELINE & OFFSHORE CONTRACTORS ASSOCIATION. (IPLOCA)**

**ANNUAL SAFETY REPORT**

(Please read the notes on reverse side of this form)

|            |             |
|------------|-------------|
| Contractor | Report Year |
|            |             |

**SAFETY PERFORMANCE**

|                                     |            |
|-------------------------------------|------------|
| MAINLINE (50,000 Man hours or more) | Year Total |
| Lost -time accidents                |            |
| Hours worked                        |            |
| Fatalities                          |            |

|   |            |
|---|------------|
| DISTRIBUTION (20,000 Man hours or more) | Year Total |
| Lost -time accidents                    |            |
| Hours worked                            |            |
| Fatalities                              |            |

|  |            |
|--|------------|
| SPECIALITY - Transportation (20,000 Man hours or more) | Year Total |
| Lost -time accidents                                   |            |
| Hours worked   |            |
| Fatalities   |            |

|   |            |
|---|------------|
| SPECIALITY - Other (20,000 Man hours or more) | Year Total |
| Lost -time accidents                          |            |
| Hours worked                                  |            |
| Fatalities                                    |            |

|  |            |
|--|------------|
| SPECIALITY - Other (Less than 2,500 Man hours) | Year Total |
| Lost -time accidents                           |            |
| Hours worked                                   |            |
| Fatalities                                     |            |

## AWARD CATEGORIES

The **International Pipeline and Offshore Contractors Association Construction Safety Awards Program** recognizes best safety performance in the following five categories.

1. Lowest lost-time accident frequency for contractors working **Mainline Pipeline construction** with 50,000 man hours or more worked.
2. Lowest lost-time accident frequency for contractors working **Distribution Pipeline Construction** with 20,000 man hours or more worked.
3. Lowest lost-time accident frequency for **Speciality Contractors – Transportation** with 20,000 man hours or more worked (stockpiling, hauling and stringing, hauling equipment, weights and other materials).
4. Lowest lost-time accident frequency for **Speciality Contractors – Other** with 20,000 man hours or more worked (double jointing, road boring, concrete products, hydrostatic testing and coating contractors).
5. Lowest lost-time accident frequency for **Speciality Contractors – Other** with less than 20,000 but more than 2,500 man hours worked (double jointing, road boring, concrete products, hydrostatic testing and coating contractors).

## DEFINITIONS

### Accident

Any work related event that results in a personal injury.

### Calculation Method

**Frequency** will be calculated by multiplying **Lost-Time Accidents** by the constant 200,000 and by dividing by the number of **Hours Worked**.

$$\frac{\text{Lost-Time Accidents} \times 200,000}{\text{Hours Worked}}$$

The figure 200,000 represents the number of hours that 100 employees work in a year. It is based on the universally used cross industry average of a 2,000 hours work year per employee

### Hours Worked

The total number of man hours worked on all projects for the period reported. It includes Project Administrative and Supervisory hours, but does not include Head Office man hours.

### Lost-time Accident

A Lost-Time Accident is any work related personal injury or illness that results in time lost from work. Time lost begins on a day subsequent to the day the Accident occurs which gives rise to the injury.

## INSTRUCTIONS

This Report is to be forwarded annually to the International Pipe Line & Offshore Contractors Association by the end of January in the year following the year reported. A Nil Report is to be provided if no pipeline construction hours have been worked in the year.

Lost-time claims under appeal are to be reported as lost-time until removed. In the event of a tie, when the frequency rate of two or more members are the same, the member with the most man hours will receive the award. Fatalities, while not a determinant, will be recorded and may be taken into consideration when selecting award winners.

All information will be kept confidential. Hours worked will be used to calculate frequency as shown above. A reporting year is a calendar year, and each reporting year will start with zero, with no carry over from the previous year.

Participation in the **International Pipeline and Offshore Contractors Association Construction safety Awards Program** is voluntary.

Revised April 03

**International Pipe Line & Offshore Contractors Association**

**The 200 – Health And Safety Statistics Return  
(For the period January – December 200\_)**

- Name of the Member Company :
- Name of the Nominated Safety Manager :
- 1) Total Number of Project Sites covered :
- 2) Peak Manpower Strength Deployed on sites :
- 3) Total Number of Man-hours worked (inclusive of overtime) :
- 4) Total Number of Medical Treatment Cases (MTC) :
- 5) Total Number Restricted Work cases (RWC) :
- 6) Total Number of Lost Time Injuries (LTI / LTA)
- 7) Split of LTI : (Total of (7) should equal (6))
- Hand Tools
  - Lifting equipment accidents
  - Involving Falls
  - Electrical accidents
  - Earth Collapse
  - Accidents involving Construction Equipment
  - Vehicle Accidents
  - Other
- 8) Total Number of Fatalities :
- 9) Total Number of Road Traffic Incidents (RTA) :
- 10) Majority of hand tool accidents caused by :
- 11) We hold the following ISO certifications :
- 12) Most of our work this year has taken place in (state the country) :
- SIGNED BY :
- NAME :
- POSITION IN THE COMPANY :
- DATE :

**NOTES:**

\*) Attachment : Safety Contractor Checklist (SCC) and Safety Award

- a) All returns should relate to the reporting period only.
- b) Please provide details of any particular Safety Incentive your Company initiated during the period
- c) Please provide details of any Safety Awards you received during the period.

**Send or fax this form and any attachments to :**

**The Executive Director  
IPLOCA  
(Soete Materials Research Laboratory)  
University of Gent  
B9000 GENT  
BELGIUM**

**FAX +32-9-264-3578**

**TO BE RETURNED BY**

**01 June 20\_\_**

## EQUIPMENT COLOUR CODING

### **LIFTING GEAR AND PORTABLE ELECTRICAL EQUIPMENT**

#### **SCOPE**

It is required that **all** lifting gear and **all** portable electrical equipment shall be inspected before first use and at fixed periods during its lifetime thereafter. A record of these inspections shall be kept.

To ensure that inspections are carried out and that equipment being used is in good condition. A system of colour coding has been introduced that will include but will not be limited to the following.

|   |                     |                   |                          |                   |
|---|---------------------|-------------------|--------------------------|-------------------|
| <b><u>LIFTING GEAR</u></b>                          | WIRE STROPS         | CANVAS STROPS     | HOISTS                   | SWIVELS           |
|   | SHACKLES            | HOOKS             | BLOCKS                   | RINGS             |
|   | TIRFORS             | LOWERING-IN BELTS | ROLLER AND WHEEL CRADLES |                   |
| <b><u>PORTABLE ELECTRIC TOOLS AND EQUIPMENT</u></b> | DRILLS              | GRINDING M/Cs     | POWER SAWS               | COMPRESSORS       |
|   | BELT & DISC SANDERS | BENCH DRILLS      | BENCH PLANERS & MILLERS  | WELDING M/Cs      |
|   | GENERATORS          | RECTIFIERS        | ELECTRICAL PLUGS         | ELECTRICAL CABLES |
|   | PUMPS               | WELDING CABLES    |                          |                   |

#### **PROCEDURE**

Each piece of lifting equipment will be inspected at **three (3) monthly** intervals and results of these inspections will be entered in a log. On completion of the inspection and after any repairs have been satisfactorily completed a coloured tag will be fixed to that piece of equipment. Any item that fails the inspection will be taken out of circulation and must not be used.

Portable electrical tools and equipment will be inspected at **three (3) monthly** intervals to ensure that they are in sound condition and safe to use, and results of these inspection will be entered in a log. On completion of the inspection and after any repairs have been satisfactorily completed a coloured tag will be attached to the appliance or to the power lead.

#### **COLOUR CODING**

The colour coding is nominated for a 3-month period. The designated colour will be shown on notice boards sited in convenient locations on site.

- Each period will commence on the first day and finish on the last day of the relevant period.
- Fourteen days will be allowed to complete all inspections. After which equipment not carrying the correct coloured tag for the period will be taken out of circulation and must not be used.
- The colour sequence is: -

|                   |       |                    |        |
|-------------------|-------|--------------------|--------|
| JAN<br>FEB<br>MAR | GREEN | JULY<br>AUG<br>SEP | YELLOW |
| APR<br>MAY<br>JUN | BLUE  | OCT<br>NOV<br>DEC  | RED    |



**G**

**USEFUL INFORMATION**

# EXCAVATIONS

Excavations **must** be carried out in accordance with Health & Safety Regulations and Particular Safety Requirements or Codes of Practice including reference to applicable Statutory or Advisory Standards relating to the Country, Territory or State in which the work is being carried out. A Professional Engineer's report addressing support structures or sloping requirements including written instructions may be required on certain types of excavations.

Prior to the start of excavation, utility services in the area, such as electrical, telecommunication, gas, water and sewer **must** be located. The facilities of first call should be utilized. All hazards that could result in worker injuries are to be removed or controlled.

Trees, utility poles, rocks or similar objects near the area to be excavated **must** be removed or secured to ensure worker safety.

Pointed tools **must not** be used to locate gas or electric facilities.

Excavation slopes or shoring **must** be inspected daily or more frequently if required and **must** be determined to be sound.

The sides of an excavation **must** be trimmed or scaled to remove any loose material that could endanger workers.

A level area extending a minimum of 1m (3 feet) back from the top edge of the trench **must** be maintained free of materials and equipment.

In excavations over 1.5m (4 feet), a ladder **must** be available in the immediate area of the workers. The ladder shall be of such a length that it goes from the bottom of the excavation and extend 1m (3 feet) above the ground.

Manufactured or prefabricated support systems including trench boxes and shoring cages **must** be designed and certified by a professional engineer. The certification **must** show how and for what soil types and depths the support system may be used, and **must** be available at the site during the use of the system.

## Remember

No worker shall enter a trench or excavation unless Government requirements have been met.

A worker does not have to be completely buried in soil to be seriously injured or killed. Workers who have been only buried up to their waist have died as a result of the pressures exerted by the soil on their bodies.

Excavations in, or near, "back-filled" or previously excavated ground are especially dangerous since the soil is "loose" and does not support itself well.

Water increases the possibility of a cave-in. The increased water pressure exerted on the soil can be the final factor in causing the walls of the excavation to collapse.

Clay can be extremely treacherous if dried by the sun. Large chunks of material can break off a trench wall after having been stable and solid for a long period of time.

It is not safe to assume that because the walls of an excavation are frozen that it is safe to enter. Frozen ground is not an alternative to proper shoring.

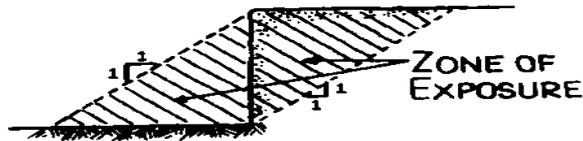
An excavation should be considered a confined space and appropriate evaluation and controls undertaken to ensure workers are not exposed to contaminated atmospheres.

Should a ditch or excavation fail, do not attempt rescue with mechanical equipment.

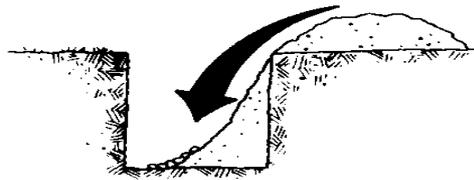
# EXCAVATIONS

## TYPES OF SOIL COLLAPSE

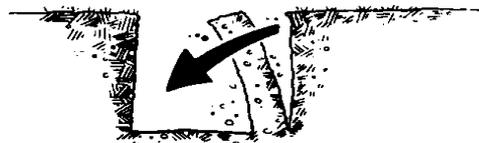
- 1) **General zone of exposure** - the area where workers are exposed to mass soil/rock movement.



- 2) **Spoil pile slide** - poor excavating procedures where the excavated material is not placed far enough away from the edge of the excavation.



- 3) **Side wall shear** - common to clay-type soils, which are exposed to drying.



- 4) **Slough-in (cave-in)** – common to previously excavated material, sand and gravel mix.

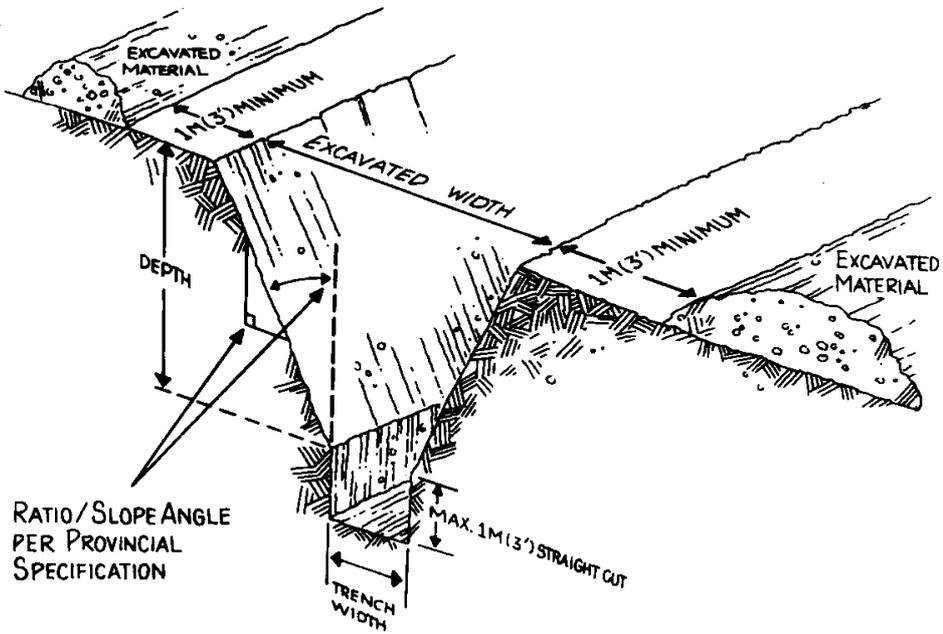


- 5) **Rotation** - clay type soils when saturated with water.

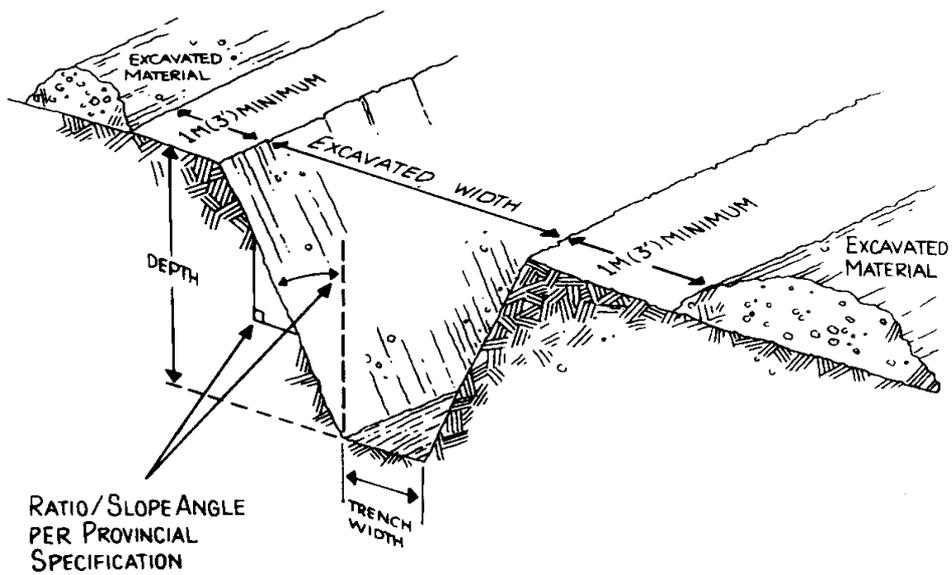
# EXCAVATIONS

## Minimum Requirements for Safer Excavations

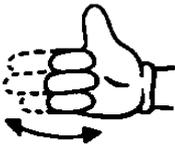
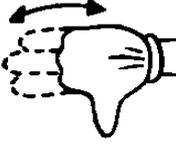
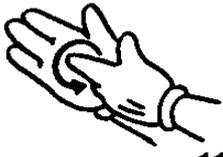
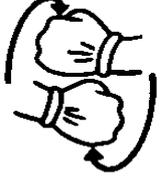
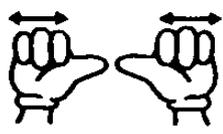
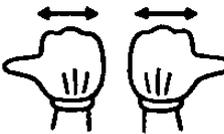
### COMBINATION SLOPE AND VERTICAL FACE



### FULLY SLOPED (VEE'D) EXCAVATION

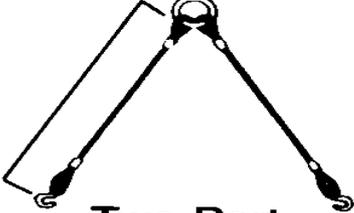


## **HAND SIGNALS FOR HOISTING OPERATIONS**

|  |   |  |   |
|--|---|--|---|
| <b>Load Up</b><br><br>1                   | <b>Load Down</b><br><br>2                | <b>Load Up Slowly</b><br><br>3      | <b>Load Down Slowly</b><br><br>4 |
| <b>Boom Up</b><br><br>5                   | <b>Boom Down</b><br><br>6                | <b>Boom Up Slowly</b><br><br>7      | <b>Boom Down Slowly</b><br><br>8 |
| <b>Boom Up Load Down</b><br><br>9        | <b>Boom Down Load Up</b><br><br>10      | <b>Everything Slowly</b><br><br>11 | <b>Use Whip Line</b><br><br>12  |
| <b>Use Main Line</b><br><br>13          | <b>Travel Forward</b><br><br>14        | <b>Turn Right</b><br><br>15       | <b>Turn Left</b><br><br>16     |
| <b>Shorten Hydraulic Boom</b><br><br>17 | <b>Extend Hydraulic Boom</b><br><br>18 | <b>Swing Load</b><br><br>19       | <b>STOP</b><br><br>20          |
| <b>Close Clam</b><br><br>21             | <b>Open Clam</b><br><br>22             | <b>Dog Everything</b><br><br>23   |   |

*“No response should be made to unclear signals!”*

## SAFE WORKING LOADS FOR WIRE ROPES

|                       |  |  |  |  |  |          |               |
|-----------------------|---|---|---|---|--|----------|---------------|
|                       | Flemish<br>Eye<br>Loop  | Vertical<br>Lift  | Chocker<br>Hitch  | Basket<br>Hitch   | △<br>60°   | △<br>90° | △<br>120°     |
| Rope Size<br>(inches) | Tons (2,000 lb)   |   |   |   |  |          | W.L.L. 2 legs |
| 1/4                   | .60   | .45   | 1.20  | 1.00  | .84  | .60      |               |
| 3/8                   | 1.34  | 1.00  | 2.65  | 2.30  | 1.85   | 1.34     |               |
| 1/2                   | 2.40  | 1.80  | 4.80  | 4.10  | 3.35   | 2.40     |               |
| 5/8                   | 3.50  | 2.60  | 7.00  | 6.20  | 5.00   | 3.50     |               |
| 3/4                   | 5.40  | 4.00  | 10.80   | 9.20  | 7.50   | 5.40     |               |
| 7/8                   | 7.00  | 5.20  | 14.00   | 12.00   | 9.80   | 7.00     |               |
| 1                     | 9.10  | 6.80  | 18.20   | 16.00   | 13.00  | 9.10     |               |
| 1 1/8                 | 11.30   | 8.40  | 22.60   | 19.40   | 15.80  | 11.30    |               |
| 1 1/4                 | 13.50   | 10.10   | 27.00   | 23.20   | 18.90  | 13.50    |               |
| 1 3/8                 | 16.40   | 12.30   | 32.80   | 28.20   | 22.90  | 16.40    |               |
| 1 1/2                 | 19.40   | 15.00   | 38.80   | 34.00   | 27.10  | 19.40    |               |
| 1 5/8                 | 23.50   | 17.60   | 47.00   | 40.40   | 32.90  | 23.50    |               |
| 1 3/4                 | 27.00   | 20.20   | 54.00   | 46.40   | 37.80  | 27.00    |               |
| 1 7/8                 | 30.50   | 22.80   | 61.00   | 52.40   | 47.70  | 30.50    |               |
| 2                     | 35.00   | 26.00   | 70.00   | 60.00   | 49.00  | 35.00    |               |

All calculated on the basis of 5-1 working load factor and based on the use of Wire Rope Industries Ltd. 6 x 19 or 6 x 37 classification regular lay preformed improved plow steel with independent wire rope centre for sizes from 1/4" diameter to 2" diameter, also supplied in Wire Rope Industries Ltd. improved plow fibre core ropes but with a slightly reduced working load limit, the two legged sling shown in the right hand box can also be supplied with 3 or 4 legs as required.

For sizes over 2" diameter consult your nearest wire rope service centre.

## SYNTHETIC ROUND SLING CAPACITIES

| Colour | Weight<br>Lb/Ft | APPROXIMATE DIMENSIONS  |                               |                      |                  | CAPACITIES IN LBS |        |         |                |
|--------|-----------------|-------------------------|-------------------------------|----------------------|------------------|-------------------|--------|---------|----------------|
|        |                 | Body<br>Dia.<br>Relaxed | Body<br>Dia.<br>Above<br>Load | Thickness<br>At Load | Width<br>At Load | Vertical          | Choker | Basket  | Min.<br>Length |
| Purple | .2              | 5/8"                    | 3/8"                          | 1/4"                 | 1 3/4"           | 2,650             | 2,120  | 6,300   | 3 ft.          |
| Green  | .3              | 7/8"                    | 5/8"                          | 3/8"                 | 2 1/8"           | 5,300             | 4,240  | 10,600  | 3 ft.          |
| Yellow | .4              | 1 1/8"                  | 7/8"                          | 3/8"                 | 2 1/2"           | 8,400             | 6,720  | 16,800  | 3 ft.          |
| Tan    | .5              | 1 1/8"                  | 7/8"                          | 3/8"                 | 2 1/8"           | 10,600            | 8,500  | 21,200  | 3 ft.          |
| Red    | .7              | 1 3/8"                  | 1"                            | 5/8"                 | 2 3/4"           | 13,200            | 10,660 | 26,100  | 3 ft.          |
| Orange | .8              | 1 3/8"                  | 1"                            | 5/8"                 | 2 1/2"           | 16,800            | 13,440 | 33,600  | 6 ft.          |
| Blue   | 1.2             | 1 5/8"                  | 1 1/4"                        | 3/4"                 | 3 1/8"           | 21,200            | 17,000 | 42,400  | 6 ft.          |
| Grey   | 2.0             | 2 1/8"                  | 1 3/4"                        | 3/4"                 | 4"               | 31,700            | 25,300 | 63,400  | 8 ft.          |
| Brownh | 3.0             | 2 3/4"                  | 2 1/2"                        | 7/8"                 | 6"               | 52,900            | 42,300 | 105,800 | 8 ft.          |

***Check Tag On Sling. Colours and capacities may differ between manufacturers.***

## METRIC CONVERSION TABLE

| Imperial              | x Factor | Metric         | x Factor    | Imperial              |
|-----------------------|----------|----------------|-------------|-----------------------|
| in                    | 2.5400   | cm             | 0.3937      | in                    |
| ft                    | 0.30480  | m              | 3.281       | ft                    |
| ft <sup>3</sup>       | 0.02832  | m <sup>3</sup> | 35.314      | ft <sup>3</sup>       |
| yd                    | 0.9144   | m              | 1.0936      | yd                    |
| mi                    | 1.6093   | km             | 0.6214      | mi                    |
| ac                    | 0.4047   | ha             | 2.4710      | ac                    |
| qt (US)               | 0.9464   | L              | 1.0566      | qt (US)               |
| qt (Cdn)              | 1.1366   | L              | 0.8798      | qt (Cdn)              |
| gal (US)              | 3.7854   | L              | 0.2642      | gal (US)              |
| gal (Cdn)             | 4.5461   | L              | 0.2200      | gal (Cdn)             |
| inch H <sub>2</sub> O | 0.2488   | kPa            | 4.0193      | inch H <sub>2</sub> O |
| @ 60°F                |          |                |             | @ 60°F                |
| inch Hg               | 3.3769   | kPa            | 0.2961      | inch Hg               |
| @ 60°F                |          |                |             | @ 60°F                |
| PSI                   | 6.8948   | kPa            | 0.1450      | PSI                   |
| Barrels               | 0.159    | M <sup>3</sup> | 6.2893      | Barrels               |
| °F -32°               | 0.56     | °C             | (°Cx1.8)+32 | °F                    |

|                 |            |                  |            |                |             |
|-----------------|------------|------------------|------------|----------------|-------------|
| ac              | acre       | H <sub>2</sub> O | water      | m              | metre       |
| C               | Celsius    | ha               | hectare    | m <sup>3</sup> | cubic metre |
| cm              | centimeter | Hg               | Mercury    | mi             | mile        |
| F               | Fahrenheit | in               | inch       | qt             | quart       |
| ft              | feet       | km               | kilometre  | yd             | yard        |
| ft <sup>3</sup> | cubic feet | kPa              | kilopascal |                |             |
| gal             | gallon     | L                | litre      |                |             |

## GLOSSARY

|                             |   |
|-----------------------------|---|
| Banksman/Flagman            | Employee who controls and directs Transport and Equipment (see Swamper)   |
| Backfill                    | Material used to cover installed pipe after padding material has been placed.   |
| Bead                        | Bubble of hot welding metal, the first pass.  |
| Bedding                     | Material, usually sand, placed below a pipe to protect coating  |
| Bender                      | Machine for bending pipe  |
| Berm                        | Profiled earth mound placed over installed pipe as protection and to prevent vehicles from crossing over pipeline. (see Roach)        |
| Boom                        | Crane Jib   |
| Breakers                    | Padding between pipe and trench wall to protect pipe  |
| Bug                         | External automatic welder   |
| Cap                         | Final weld layer  |
| Cherry Picker               | Truck mounted hydraulically operated man basket   |
| Clam                        | Excavating equipment  |
| Danger Zone                 | A location within 6 meters of a piece of heavy equipment  |
| Dog it                      | Stop heavy equipment operation  |
| Fly-jib                     | Attachment located at top of a Crane jib used to extend it's reach at height  |
| Goose                       | Internal automatic welder   |
| Holiday                     | Hole or gap in pipeline coating   |
| Hot Pass                    | Second weld layer   |
| Jeep (Holiday detector)     | Electrical device used to detect holidays in pipeline coating   |
| Joint                       | A length of pipe  |
| Loop                        | A parallel section of pipeline  |
| Mormon Board                | Backfilling implement   |
| Padding                     | Material, usually sand, placed below and at the sides of a pipe to protect coating  |
| Pass                        | A weld once around pipe   |
| Pay-Welder                  | Welding machines mounted on a tractor   |
| Pig                         | Internal pipeline cleaning or inspection device   |
| Pig Catcher                 | A device for receiving a pig  |
| Pup                         | Short length of pipe  |
| Quad                        | Welding machines mounted on a tractor   |
| Roach                       | A berm (mound of earth) over the pipeline. (see Berm)   |
| ROW                         | Pipeline right-of-way   |
| Side-Boom                   | Tractor with side boom attachment for handling pipe   |
| Shoofly                     | Access road to pipeline construction ROW  |
| Sling                       | Looped wire rope or synthetic line used for lifting pipe  |
| Sneaky                      | A manned internal pipe repair vehicle   |
| Spread                      | A pipeline construction project   |
| Spudding                    | Intentional penetration as in "spudding" pipe in a bender   |
| Stabber                     | Employee who helps line-up pipe for welding   |
| Stinger                     | Welding rod and holder.   |
| Stop Log                    | Solid barrier fixed at ground level, approximately 1m from edge of excavations to prevent trucks from reversing into the excavations. |
| Oiler/Swamper               | Employee who controls and directs Transport and Equipment (see Banksman)  |
| Tac Rig                     | Welding tractor   |
| Torpedoes/Moles<br>/Rockets | Underground earth piercing tools  |



## PART 2

# ASSOCIATION SPECIFIC GUIDELINES



## PART 3

# COUNTRY SPECIFIC GUIDELINES

**(Particular Safety Requirements or Codes of Practice relating to the Country, Territory or State in which the work is to be carried out including reference to Statutory or Advisory Standards applicable to the location of operations should be included in this section)**



## PART 4

# PROJECT SPECIFIC GUIDELINES

(Particular Safety Requirements or Codes of Practice set forth in Contact Documents or detailed by Clients, appertaining to a specific Project, including reference to statutory or advisory standards applicable to the location of operations should be included in this section)



## PART 5

## ADDENDA