SECTION – 10
SAFETY CODE AND REGULATIONS

10.0.0.0 **GENERAL**

10.0.1.0 The CONTRACTOR shall adhere to safe construction practices and guard against hazardous and unsafe working conditions and shall comply with the OWNER's safety rules as set forth herein.

10.0.2.0 In addition, the CONTRACTOR shall adhere to and be bound by the "Safety Practices During Construction" (OISD-GDN-192) formulated by the Oil Industry Safety Directorate from time to time. A copy of the existing "Safety Practices During Construction" as presently formulated by the Oil Industry Safety Directorate is annexed hereto as Appendix III.

10.0.3.0 In the event of any irreconcilable conflict between the “Safety Practices During Construction” prescribed by the Oil Industry Safety Directorate and the Safety provisions set out herein, the "Safety Practices During Construction" established by the Oil Industry Safety Directorate shall prevail to the extent of the irreconcilable conflict.

10.0.4.0 In this Section any reference to the Refinery shall wherever applicable include any existing Plant, Unit or Installation (other than a Refinery) in or adjacent to which the job site or any part thereof is located.

10.1.0.0 **FIRST AID AND INDUSTRIAL INJURIES**

10.1.1.0 The CONTRACTOR shall maintain first aid facilities for its employees and those of its sub-contractors.

10.1.2.0 The CONTRACTOR shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Names of those providing these services shall be furnished to the Engineer-in-Charge prior to start of construction, and their telephone numbers shall be prominently posted in CONTRACTOR's field office.

10.1.3.0 All critical industrial injuries shall be reported promptly to the Engineer-incharge, and a copy of CONTRACTOR's report covering each personal injury requiring the attention of a physician shall be furnished to the OWNER.

10.2.0.0 **GENERAL RULES**

10.2.1.0 Carrying/Striking of matches, lighters inside the Refinery area, smoking within the refinery, tank, farm, or dock limits are strictly prohibited. Violators of the "No Smoking" rules shall be discharged immediately. Within the operationcarea, no hot work shall be permitted without valid gas safety/fire permits. ThecCONTRACTOR shall be held liable and responsible for all lapses of his subcontractors/ employees in this regard.

10.3.0.0 **CONTRACTOR'S BARRICADES**

10.3.1.0 The CONTRACTOR shall erect and maintain barricades required in connection with his operation to guard or protect :

(i) Excavation

(ii) Hoisting areas

(iii) Areas adjudged hazardous by the CONTRACTOR's or the OWNER's inspectors.

(iv) OWNER's existing property liable to damage by CONTRACTOR's operations, in the opinion of Engineer-in-Charge.

(v) Railroad unloading spots.

10.3.2.0 The CONTRACTOR's employees and those of its sub-contractors shall become acquainted with the OWNER's barricading practices and shall respect the provisions thereof.

10.3.3.0 Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked by red flasher lanterns at nights.

10.4.0.0 **SCAFFOLDING**

10.4.1.0 Suitable scaffolding shall be provided for workmen for all works that cannot safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra person shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal 4 vertical)

10.4.2.0 Scaffolding or staging more than 12' above the ground floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise rewinded at least 3' high above the floor or platform of scaffolding or staging andexte nding along the entire length of the outside and ends thereof with onlycsuch openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

10.4.3.0 Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or the gangway or the stairway is more than 12' above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in Clause 10.4.2.0 above.

10.4.4.0 Every opening in the floor of a building or in a working platform shall be provided with suitable fencing or railing whose minimum height shall be 3 feet to prevent the fall of persons or materials by providing.

10.4.5.0 Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 30' in length while the width between the side rails in rung ladder shall in no case be less than 11.5" for ladder up to and including 10' in length. For longer ladders this width would be increased by at least ¼" for each additional foot of length. Uniform step spacing shall not exceed 12". Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any site of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The CONTRACTOR shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defence of every suit, action or other proceedings, that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay damages and costs which may be awarded in any such suit or action or proceedings to such person, or which may with the consent of the CONTRACTOR be paid to compromise any claim by any person.

10.5.0.0 **EXCAVATION AND TRENCHING**

10.5.1.0 All trenches 4’ or more in depth, shall at all times be supplied with at least one ladder for each 100' length or fraction thereof.

10.5.2.0 The Ladder shall be extended from bottom of the trench to at least 3' 3’’ above the surface of the ground. The site of the trenches which is 5’ or more in depth shall be stepped back to give suitable slope, or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated material shall not be placed within 5’ of the edge of the trench or half of trench depth whichever is more. Cutting shall be done from top to bottom. Under no circumstances shall undermining or undercutting be done.

10.6.0.0 **DEMOLITION**

10.6.1.0 Before any demolition work is commenced and also during the process of such work all roads and open areas adjacent to the work site shall either be closed or suitably protected.

10.6.2.0 No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.

10.6.3.0 All practical steps shall be taken to prevent danger to persons employed, from risk of fire or explosion or flooding. No floor, or other part of the building shall be so overloaded with debris or material as to render it unsafe.

10.7.0.0 **SAFETY EQUIPMENT**

10.7.1.0 All necessary personal safety equipment as considered adequate by the Engineer-in-charge should be made available for the use to the persons employed on the site and maintained in a condition suitable for immediate use, and the CONTRACTOR should take adequate steps to ensure proper use of equipment by those concerned.

10.7.2.0 Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

10.7.3.0 Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eyes shall be provided with protective goggles.

10.7.4.0 Those engaged in welding and cutting works shall be provided with protective face and eyeshields, and gloves, etc.

10.7.5.0 Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.

10.7.6.0 When workers are employed in sewers and manholes, which are in use, the CONTRACTOR shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the manholes, and the manholes so opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident.

10.7.7.0 The CONTRACTOR shall not employ men below the age of 18 years and women on the work of painting or products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken:

10.7.7.1 No paint containing lead product shall be used except in the form of paste or readymade paint.

10.7.7.2 Suitable face masks shall be supplied for use by the workers when paint is applied in the form of spray or if a surface having lead paint dry rubbed and scrapped.

10.7.7.3 Overalls shall be supplied by the CONTRACTOR to workmen and adequate facilities shall be provided to enable the working painters to wash during and on cessation of work.

10.8.0.0 **RISKY PLACES**

10.8.1.0 When the work is done near any place where there is a risk of drowning, all necessary safety equipments shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

10.9.0.0 **HOISTING EQUIPMENT**

10.9.1.0 Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions:

10.9.1.1 These shall be of good mechanical construction, sound materials and adequate strength and free from patent defect and shall be kept in good condition and in good working order.

10.9.1.2 Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.

10.9.1.3 Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21years should be in charge of any hoisting machine including any scaffolding winch or to give signals to the operator.

10.9.1.4 In case of every hoisting machine and of every chain, ring, hook, shackle, swivel and pulley block used in hoisting or lowering or as a means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

10.9.1.5 In case of departmental machines, the safe working load shall be notified by the Engineer-in-Charge. As regards CONTRACTOR's machines, the CONTRACTOR shall notify the safe working load of the machine to the Engineer-in-charge, whenever he brings any machinery to site of work and get it verified by the Engineer-in-charge concerned.

10.10.0.0 **ELECTRICAL EQUIPMENT**

10.10.1.0 Motor, Gearing, Transmission, wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum, the risk of accidental descent of the load. Adequate precautions shall be taken to reduce to the minimum the risk of any part of a suspended load becoming

accidentally displaced. When workers are employed on electrical installations which are already energised, insulating mats, wearing apparel, such as gloves and boots as may be necessary shall be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

10.11.0.0 **MAINTENANCE OF SAFEY DEVICES**

10.11.1.0 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near the place of work.

10.12.0.0 **DISPLAY OF SAFETY INSTRUCTIONS**

10.12.1.0 These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at the job site. The person responsible for compliance of the safety code shall be named therein by the CONTRACTOR.

10.13.0.0 **ENFORCEMENT OF SAFETY REGULATIONS**

10.13.1.0 To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the CONTRACTOR shall be open to inspection by the Welfare Officer, Engineer-in-charge or Safety Engineer of the OWNER or their representatives.

10.14.0.0 **NO EXEMPTION**

10.14.1.0 Notwithstanding anything provided in Clauses 10.0.0.0 to 10.13.0.0, the CONTRACTOR shall be bound by the provisions of any other Act or rules in force in the Republic of India, with a view that the provisions hereof shall be in addition thereto and not in lieu thereof.

10.14.2.0 The works throughout including any temporary works shall be carried on in such a manner as not to interfere in any way whatsoever with the traffic on any roads or footpaths at the site or in the vicinity thereof or with any existing works whether the property of the OWNER or of a third party.

10.14.3.0 In addition to the above, the CONTRACTOR shall abide by the safety code provision as per CPWD Safety Code framed from time to time.

10.14.4.0 The CONTRACTOR shall also arrange to obtain valid gate passes for his men and equipment from the concerned authorities of the Refinery/Project

10.14.5.0 No man/material/equipment not covered by valid passes shall be permitted within the Refinery/ Project area and no material/equipment shall be permitted to be taken out of the Refinery/Project area, unless authorised by the concerned authorities of the Refinery/Project. The CONTRACTOR shall be held fully responsible for any or all delays/ losses/ damages that may result consequent on any lapse(s) that may occur on the part of his subcontractors/ employees in this regard.

10.15.0.0 **ENTRY PASSES**

10.15.1.0 The CONTRACTOR has to apply for photo Entry Passes for his workers and staff and the workers and staff of his sub-Contractors in a prescribed proforma provided by the OWNER. The Application shall be accompanied by a Statement and Declaration in the form prescribed by the OWNER signed by the employees for whom the Entry Passes are sought and confirmed by the employer. The photo Entry Passes shall be issued by the OWNER for a maximum period of 3 (three) months, which will be extendable upon the CONTRACTOR's application. As a special case, Temporary Passes may be issued for a maximum period of 7 (seven) days.

10.15.2.0 Unutilized/expired Entry Passes/Identity Cards shall have to be immediately surrendered to the OWNER.

10.15.3.0 In case of the loss of an Entry Pass/Identity Card, the CONTRACTOR shall immediately lodge an FIR with the local police station and inform the Engineer-in-Charge of the loss and shall pay a charge of Rs.150/- against Entry Pass/Identity Card lost. The CONTRACTOR is required to keep an account and track of all Entry Passes issued and surrendered. Gate Passes/Identity Cards issued by the Security Section should always be displayed by the CONTRACTOR’s or Sub-contractor’s employees while working inside the Plant.

10.16.0.0 **GATE PASSES**

10.16.1.0 To bring materials, equipment, tools and tackle and other things inside the Refinery for construction Work, the CONTRACTOR has to produce proper documents of title or authority relative thereto for inspection by the OWNER's personnel at the gate. These shall be checked thoroughly by the OWNER's personnel at the Gate and recorded in their Register before permitting the same to be brought inside the Refinery limits. It is the CONTRACTOR's responsibility to see that the entry is duly recorded in the Register with proper Entry Number, date and signature of OWNER's authorised representative and that the supporting challans/documents are stamped and signed by the OWNER's personnel at the gate at the time of entry.

10.16.2.0 Those materials which need repairing/ replacement as per site condition will be allowed to move beyond OWNER’s battery limit only after exchange of good equivalent material.

10.17.0.0 **WORK PERMIT**

10.17.1.0 In order to keep the OWNER informed of the various jobs being undertaken within the Refinery and to enable the OWNER to regulate the same to ensure the observance of safety regulations relative thereto, when Work is to be carried out in hazardous areas, a Hot Work Permit is to be obtained by the CONTRACTOR from the OWNER before start of Work on jobs which are capable of generating a flame, spark or heat e.g., gas cutting, grinding, welding, use of any electrical, diesel, petrol or battery operated prime mover, machine, tool or equipment or generator set, mixer machine, drilling machine, pump, crane, fork lift or hand truck or trailer or chipping or breaking of rocks or concrete or hacksaw cutting and drilling. Similarly the CONTRACTOR shall

obtain a Cold Work Permit from the OWNER for jobs which do not come under the category of hot work and in respect of which there is no risk of fire, e.g., transportation, backfilling of ordinary soil by manual process, pile testing, hydrotesting, shuttering, fixing of reinforcement, hand mixed concreting, plastering and brickwork.

10.17.2.0 Depending on the nature of the Work and the equipments and tools involved, the CONTRACTOR shall apply for Cold/Hot Permit in a prescribed format atleast 7(seven) days before the Work is planned to start. No Work Permit shall be issued by the OWNER unless proper arrangement is made by the CONTRACTOR to ensure safe performance of the Work inside the Refinery limit. Job-wise and area-wise permits shall be issued to the CONTRACTOR and for Work against each permit the CONTRACTOR shall post at site atleast one Construction Supervisor and one Safety Supervisor of required level to ensure the due observance of all safety requirements.

10.18.0.0 **VEHICLE PERMIT**

10.18.1.0 Permits are to be obtained separately for entry/use of vehicles/trailers and other mobile equipment inside the Refinery limits. All the CONTRACTOR's vehicles should have a valid 'PUC Certificate'. The following requirements are to be met to obtain vehicle permit :

i. Vehicle/Equipment shall be in good condition and fitted with spark arrestor.

ii. Vehicles should carry, wherever applicable, valid Road Tax Certificate and Fitness Certificate from the Competent authority and insurance policy.

iii. Valid operating/driving license of driver/operator.

10.18.2.0 **VALIDITY OF THE PERMIT**

(i) Any Hot or Cold Work Permit issued is valid only for 24 hours.

(ii) Thereafter the validity of the Permit must be renewed for each shift (morning & evening) by the shift in-charge/ shift representative of the OWNER.

(iii) The permit may be renewed for a maximum period of one month from the date of issue and if extension is required, the CONTRACTOR has to apply for a fresh permit.

(iv) A permit is not valid for Work on holidays unless special permission of the OWNER is obtained for the purpose.

10.19.0.0 **SPECIAL SAFETY REGULATIONS**

10.19.1.0 **REGARDING WORK PERMIT**

10.19.1.1 The Work shall be carried out inside the Refinery limits to conform to the OWNER's safety section and in accordance with any instructions of the Engineer-in-Charge issued from time to time. Sometimes working hours may be drastically reduced or increased to satisfy safety requirements and the CONTRACTOR shall meet these requirements without any time and cost implications. No claim for idling of machinery, plant, manpower or equipment shall be entertained for reason of delay in the issue of a Work Permit and it

shall be the exclusive responsibility of the CONTRACTOR to apply for, pursue and obtain the requisite Work Permit(s) well in advance of the relative requirement(s).

10.19.1.2 The CONTRACTOR shall abide by all safety regulations of the Plant and ensure that safety equipment for specific jobs as stipulated in the Factories Act Safety Handbook is issued to all employees during the execution of Work, failing which all the works at site shall be suspended.

10.19.1.3 HSE specifications, OISD and other requirements shall be followed in totality.

10.19.2.0 **REGARDING HOT WORK**

10.19.2.1 When doing hot work inside the plant, the CONTRACTOR must ensure that the fire hose i s hooked up with the fire water system and extended to the work site. In addition, at least one fire extinguisher must be kept near the working spot. The area around and below the place of hot work must be adequately protected from sparks and hot metals by a booth made of asbestos cloth/sheet and by wetting with water. In addition, depending on the location and hazard of the work, the CONTRACTOR shall at its own cost arrange sufficient number of additional fire hoses and such fire fighting equipment of approved quality as may be required to carry out hot job inside the plant.

10.19.2.2 Welding & electrical cables should be of approved quality and no jointing or loose connection shall be permitted.

10.19.2.3 At the end of the working day the CONTRACTOR must inform the electrical section to switch off power at sub-station end.

10.19.2.4 The CONTRACTOR must provide cotton clothes, safety shoes, safety helmet, safety belt, and hand gloves of approved quality to his workers to meet the safety requirement of various jobs to be carried out inside the Plant.

10.19.3.0 **REGARDING USE OF VEHICLE**

10.19.3.1 Vehicle must not ply on any road within the Refinery limit at a speed exceeding 20 KM/hr.

10.19.3.2 Mobile cranes, loaded trucks and trailers must not exceed the speed limit of 15 KM/hr inside the plant.

10.19.3.3 No crane is allowed to move inside the plant with load.

10.19.3.4 No vehicle is allowed to be parked inside the plant.

10.19.3.5 Limited number of vehicles will be permitted inside the battery area due to security reasons.

10.20.0.0 **DEDUCTIONS FROM LUMPSUM PRICE**

10.20.1.0 In addition to price reduction and deductions as provided for, the OWNER shall be entitled to deduct from any payment due to the CONTRACTOR, any amount claimed by the OWNER under the Contract and any costs, damages or expenses for which the CONTRACTOR is liable under the Contract.

10.20.2.0 In addition to price reduction and deductions as provided for in the Contract, the OWNER shall be entitled to deduct from any payment due to the CONTRACTOR, for violations of safety provisions, as per details given below:

(i) Violation of applicable safety, health and environment related norm, a price reduction of Rs.5000/- per occasion

(ii) Violation as above resulting in :

(a) Any physical injury - a price reduction of 0.5% of the Lumpsum Price (maximum of Rs.2,00,000) per injury in addition to Rs. 5,000/-

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(b) Fatal accident - a price reduction of 1% of the Lumpsum Price (maximum of Rs.10,00,000) per fatality in addition to Rs. 5,000/-

10.21.0.0 **SPECIAL CONTRIBUTIONS**

10.21.1.1.1 With a view to ensure the formulation and enforcement of a safety code by the CONTRACTOR, it is stipulated that in the event of any act, omission or accident at the job site which results in the death of a person, the CONTRACTOR shall contribute a sum of Rs.5,00,000/- (Rupees five lakh only), or which results in the permanent disablement of a person, the CONTRACTOR shall contribute a sum of Rs.3,00,000/- (Rupees three lakh only) in addition to any other sum(s) required to be paid by the CONTRACTOR under any law or other contract, to a welfare fund to be established by the OWNER for, inter alia, such contributions, and until such fund is established, to a charity nominated by the OWNER.

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APPENDICES

The following documents listed in Appendices hereto shall be deemed to form part of these General Conditions of LSTK Contracts:

(i) CONTRACTOR's LABOUR REGULATIONS (APPENDIX-I)

(ii) MODEL RULES FOR LABOUR WELFARE (APPENDIX-II)

(iii) SAFETY PRACTICES DURING CONSTRUCTION (APPENDIX-III)

(iv) FORM OF CONTRACT (APPENDIX-IV)

(iv) FORM OF BANK GUARANTEE TO COVER EARNEST MONEY DEPOSIT (EMD) (APPENDIX-V)

(vi) FORM OF BANK GUARANTEE TO COVER LUMPSUM ADVANCE (MOBILISATION) (APPENDIX-VI)

(vii) FORM OF BANK GUARANTEE TO COVER SECURITY DEPOSIT (APPENDIX-VII)

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APPENDIX-I

CONTRACTORS' LABOUR REGULATIONS

1. These regulations may be called Model Contractors Labour Regulations.

2. **Definition :** In these regulations, unless otherwise expressed or indicated, the following words and expressions shall have the meaning hereby assigned to them :

   (a) "Labour" means workers employed by a contractor, directly or indirectly through a sub-contractor, or by an agent on his behalf to do any skilled, semi-skilled or unskilled manual, supervisory, technical or clerical work.

   (b) "Fair Wage" means wages, which shall include wages for weekly day of rest and other allowances, whether for time or piece work, after taking into consideration prevailing market rates for similar employments in the neighbourhood but shall not be less than the minimum rates of wages fixed under the payment of Minimum Wages Act.

   (c) "Wages" shall have the same meaning as defined in the Payment of Wages Act.

   (d) "Contractor" for the purpose of these regulations shall include an agent or subcontractor employing labour on the work taken on the contract.

   (e) "Inspecting Officer" means any Labour Enforcement Officer or Assistant Labour Commissioner of the Chief Labour Commissioner's Organisation.

   (f) "Prescribed" means prescribed under the Contract Labour (Regulation and Abolition) Act, 1970 and Rules framed thereunder.

3. **Notice of commencement :** The Contractor, shall within SEVEN days of commencement of the work, furnish in writing, to Inspecting Officer of the area concerned the following information:

   (a) Name and Situation of the work.

   (b) Contractor's name and address.

   (c) Particulars of the Department for which the work is undertaken.

   (d) Name and address of sub-contractors as and when they are appointed.

   (e) Commencement and probable duration of the work.

   (f) Number of workers employed and likely to be employed.

   (g) "Fair wages" for different categories of workers.

   (i) Number of hours of work to constitute a normal working day : The number of hours which shall constitute a normal working day for an adult shall be NINE hours. The working day of an adult worker shall be so arranged that it is inclusive of intervals, if any, for rest, it shall not spread over more than twelve hours on any day. When a worker is made to work for more than NINE hours on any day or for more than FORTY EIGHT hours in a week, he shall, in respect of overtime work, be paid wages at double the ordinary rate of wages.

   (ii) Weekly day of rest : Every worker shall be given a weekly day of rest which shall normally be a Sunday unless otherwise fixed and notified at least TEN days in advance. A worker shall not be required or allowed to work on the weekly rest day unless he has or will have a substituted rest day, on one of the five days immediately before or after the rest day, provided that no substitution shall be made which will result in the worker working for more than ten days consecutively without a rest day for a whole day.

4. Where, in accordance with the foregoing provisions, a worker works on the rest day and has been given a substituted rest day, he shall be paid wages for the work done on the weekly rest day at the overtime rate of wages.

(NOTE : The expression "ordinary rate of wages" means the fair wage the worker is entitled to.)

5. **Display of notice regarding Wages, Weekly Day of Rest etc. :** The contractor shall, before the commencement of his work on the Contract, display and correctly maintain and continue to display and correctly maintain in a clean and legible condition in conspicuous places on the works, notice in English and in the local Indian language, spoken by majority of workers, giving the rate of fair wages, the hours of work for which such wages are payable, the weekly rest days workers are entitled to and name and address of the Inspecting Officer. The Contractor shall send a copy each of such notices to the Inspecting Officers.

6.1 **Fixation of Wage Periods :** The Contractor shall fix wage periods in respect of which wages shall be payable. No wage period shall normally exceed one month.

6.2 **Payment of wages :**

(i) Wages due to every worker shall be paid to him direct. All wages shall be paid in current coins or currency or in both. The wages shall be paid without deductions of any kind except those specified by Central Government by General Order or Special Order in this behalf or permissible under the Payment of Wages Act.

(ii) Wages of every worker employed as contract labour in an establishment or by Contractor are less than one thousand, such workers shall be paid within SEVEN days from the end of the Wage period; and before the expiry of the 10th day from the end of the wage period accordingly as the number of workers exceed 1,000.

(iii) When employment of any worker is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before expiry of the second working day from the date on which his employment is terminated.

(v) All payment of wages shall be made at the work site on a working day except when the work is completed before expiry of the wage period, in which case final payment shall be made at the work site within 48 hours of the last working day and during normal time.

(NOTE : The term "working day" means a day on which labour is employed, and the work is in progress)

7. **Register for Workmen :** A register of workmen shall be maintained in the prescribed form and kept at the work site or as near to it as possible, and the relevant particulars of every workmen shall be entered therein within THREE days of his employment.

8. **Employment Card :** The Contractor shall issue an employment card in the Form appended to these regulations to each worker on the day of work or entry into his employment. If a worker already has any such card with him issued by the previous employer, the Contractor shall merely endorse that Employment Card with relevant entries. The Contractor may, alternatively, issue an attendance-cum-wage slip to each worker in the form appended. This card shall be valid for a wage period. The Contractor shall mark attendance on the cards twice each day and again after the rest interval, before he actually starts the work. On termination of employment, the Employment Card shall again be endorsed by the Contractor, service certificate issued and returned to the Worker.

9. **Register of Wages etc.:**

(i) A register of Wages-cum-Muster Roll in the prescribed Form shall be maintained and kept at the work site or as near to it as possible.

(ii) A wage slip in the prescribed Form shall be issued to every worker employed by the Contractor at least a day prior to disbursement of wages.

10. **Fines and deductions which may be made from Wages :**

(i) Wages of a worker shall be paid to him without any deduction of any kind except the following:

(a) Fines ;

(b) Deduction for absence from duty, i.e. from the place of his employment he is required to work. The amount of deductions shall be in proportion to the period for which he was absent ;

(c) Deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money which he is required to account for, where such damage or loss is directly attributable to his neglect or default ;

(d) Deductions for recovery of advances or for adjustment of overpayment of wages. Advance granted shall be entered in a register ; and

(e) Any other deduction which the Corporation may from time to time allow.

(ii) No fines shall be imposed on any worker say in respect of such acts and omissions on his part as have been approved by the Chief Labour Commissioner or Competent Authority.

(iii) No fine shall be imposed on a worker and no deductions for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.

(iv) The total amount of fines which may be imposed in any one wage period on a worker shall not exceed an amount equal to three paise in a rupee of the wages payable to him in respect of that wage period.

(v) No fine imposed on a worker shall be recovered from him in installments, or after expiry of sixty days from the date on which it was imposed. Every fine shall be deemed to have been imposed on the day of the act or commission in respect of which it was imposed.

(vi) The Contractor shall maintain both in English and the local Indian language, a list approved by the Chief Labour Commissioner or Competent Authority clearly stating the acts and commissions for which penalty or fine may be imposed on a workman and display it in good condition in a conspicuous place on the work site.

(vii) The Contractor shall maintain a register of fines and the register of deductions for damage or loss in the prescribed Forms which should be kept at the place of work.

(viii) The Contractor shall display in a conspicuous place of work the list of acts and comissions for which the fines can be imposed. They are as under :

1. Willful insubordination or disobedience, whether alone or in combination with other.
2. Theft, fraud or dishonest in connection with the Contractors beside a business or property of Corporation.
3. Taking or giving bribes or any illegal gratification.

4. Habitual late attendance.
5. Drunkenness, fighting, riotous or disorderly or indifferent behaviour.
6. Habitual negligence.
7. Smoking near or around the area where combustible or other materials are locked.
8. Habitual indiscipline
9. Causing damage to work in the progress or to property of the Corporation or of the Contractor.
10. Sleeping on duty.
11. Malingering or slowing down work.
12. Giving of false information regarding name, age, father's name etc.
13. Habitual loss of wage cards supplied by the employers.
14. Unauthorised use of employer's property of manufacture or making of unauthorised articles at the work place.
15. Bad workmanship in construction and maintenance by skilled workers which is not approved by the Corporation and for which the Contractor is compelled to undertake rectification.
16. Making false complaints and/or misleading statements.
17. Engaging trade within the premises of the establishments.
18. Any unauthorised divulgence of business affairs of the employers.
19. Collection or canvassing for the collection of money within the premises of an establishment unless authorised by the employer.
20. Holding meeting inside the premises without previous sanction of the employers.
21. Threatening or intimidating any workmen or employer during the working hours within the premises.
22. Non-observance of Safety norms/practices applicable to the Worksite.

11. **Register of Accidents :** The Contractor shall maintain a register of accidents in such form as may be convenient at the work place but the same shall include the following particulars :

(a) Full particulars of the labourers who met with accident.
(b) Rate of wages.
(c) Sex
(d) Age
(e) Nature of accident and cause of accidet
(f) Time and date of accident
(g) Date and time when admitted in hospital
(h) Date of discharge from the hospital
(i) Period of treatment and result of treatment
(j) Percentage of loss of earning capacity and disability as assessed by Medical Officer.
(k) Claim required to be paid under Workmen's Compensation Act.
(l) Date of payment of compensation
(m) Amount paid with details of the person to whom the same was paid.
(n) Authority by whom the compensation was assessed
(o) Remarks

12. **Preservation of Registers :** The Register of Workmen and the Register of Wages - cum-Muster Roll required to be maintained under these Regulation shall be preserved for 3 years after the date on which the last entry is made therein.

13. **Enforcement :** The Inspecting Officer shall either, on his own motion or on a complaint received by him, carry out investigations and send a report to the Engineer-in-charge specifying the amounts representing Workers' dues and amount of penalty to be imposed on the Contractor for breach of these Regulations, that have to be recovered from the Contractor, indicating full details of the recoveries proposed and the reasons therefor. It shall be obligatory on the part of the Engineerin- charge on receipt of such a report to deduct such amounts from payments due to the Contractor.

14. **Disposal of amounts recovered from the Contractor :** The Engineer-in-charge shall arrange payment to workers concerned within FORTY FIVE days from receipt of a report from the Inspecting Officer. In cases where there is an appeal, payment of workers dues would be arranged by the Engineer-in-charge wherever such payments arise, within THIRTY days from the date of receipt of the decision of the Regional Labour Commissioner (RLC).

15. **Appeal against decision of Inspecting Officer :** Any person aggrieved by a decision of the Inspecting Officer may appeal against such decision to the RLC concerned within THIRTY days from the date of decision, forwarding simultaneously a copy of his appeal to the Engineer-in-charge. The decision of the RLC shall be final and binding upon the Contractor and the workmen.

16. **Representation of parties :**

    (i) A workman shall be entitled to be represented in any investigation or enquiry under these Regulations by an officer of a registered trade union of which he is a member or by an officer of a Federation of Trade Unions to which the said trade union is affiliated or where the workman is not a member of any registered trade union, by an officer of a registered trade union, connected with, or by any other workman employed in the industry in which the worker is employed.

    (ii) A contractor shall be entitled to be represented in any investigation of enquiry under these Regulations by an officer of an Association of Contractors of which he is a member or by an officer of a Federation of Association of Contractors to which the said association is affiliated or where the Contractor is not a member of any Association of Contractors, by an officer of association of employers, connected with, or by any other employer engaged in the industry in which the Contractor is engaged.

    (iii) No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these Regulations.

17. **Maternity benefits for female employees :** The Contractor shall extend the leave, pay and other benefits as admissible to the female employees. No maternity benefits shall be admissible to a female worker unless she has been employed for a total period of not less than 6 months immediately proceeding the date on which she proceeds on leave. The Contractor shall maintain a register of maternity benefits in prescribed form, and shall be kept in all places of work.

18. **Inspection of Books and other documents :** The Contractor shall allow inspection of the Registers and other documents prescribed under these Regulations by Inspecting Officers and the Engineer-in-Charge or his authorised representative at any time and by the worker or his agent on receipt of due notice at the convenient time.

19. **Submission of Returns :** The Contractor shall submit periodical returns as may be specified from time to time.

20. **Amendments :** The Corporation may, from time to time, add to or amend these Regulations, and issue such directions as it may consider necessary for the proper implementation of these Regulations or for the purpose of removing any difficulty which may arise in the administration thereof.

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APPENDIX-II

MODEL RULES FOR LABOUR WELFARE

1. **Definitions**

(a) "Workplace" means a place at which, on an average, twenty or more workers are employed on any day during which the Contract work is in progress.

(b) "Large Workplace" means a place at which, on an average 500 or more workers are employed.

2. **First Aid**

i) At every workplace, there shall be provided and maintained in a readily accessible place First Aid appliances including an adequate supply of sterilized dressings and sterilized cotton wool as prescribed in the Factory Rules of the State in which the work is carried on. The appliances shall be kept in good order and in large work places, they shall be placed under the charge of a responsible person who shall be trained in First Aid treatment and who shall also be readily available during working hours. The First Aid boxes at the rate of not less than one box for 150 contract labour or part thereof shall be ordinarily employed. Adequate arrangement shall be made for immediate recoupment of items/equipment when necessary.

ii) At large work places, where hospital facilities are not available within easy distance of the Works, First Aid posts shall be established and be run by a trained compounder.

Where large work places are remotely situated far away from regular hospitals, an indoor ward shall be provided with one bed for every 250 employees.

Where large work places are situated in cities, towns or in their suburbs and no beds are considered necessary owing to proximity of city or town hospitals, suitable transport shall be provided to facilitate removal of urgent cases to these hospitals. At other workplaces, some conveyance shall be kept readily available to take injured person or persons suddenly taken seriously ill to the nearest hospital.

At large work places, there shall be provided and maintained an ambulance room of the prescribed sizes, containing the prescribed equipment and in the charge of such medical and nursing staff as may be prescribed. For this purpose, the relevant provisions of the Factory Rules of the State Government area where the work is carried on may be taken as the prescribed standard.

3. **Accommodation for labour** : The Contractor shall during the progress of the Works, provide, erect and maintain necessary temporary living accommodation and ancillary facilities for labour at his own expense and to standard and scales as approved by the Engineer-in-charge. However, following specifications shall be followed :

(a) (i) The minimum height of each hut at the eaves level shall be 2.10m (7ft) and the floor area to be provided will be at the rate of 2.7 sq.m (30sq.ft.) for each member of the worker's family staying with the labourer.

(ii) The Contractor shall in addition construct suitable cooking places having a minimum area of 1.80mX 1.50m (6' x 5') adjacent to the hut for each family.

(iii) The Contractor shall also construct temporary latrines and urinals for the use of the labourers, each on the scale of not less than four per each one hundred of the total strength. Separate latrines and urinals shall be provided for women.

(iv) The Contractor shall construct sufficient number of bathing and washing places, one unit for every 25 persons residing in the camp. These washing and bathing places shall be suitably screened.

(b) (i) All the huts shall have walls of sun-dried or burnt-bricks laid in mud mortar or other suitable local material as may be approved by the Engineer-in-Charge. In case of sun-dried bricks, the walls should be plastered with mud gobri on both sides. The floor may be katcha, but plastered with mud gobri and shall be at least 15cm. (6") above the surrounding ground. The roofs shall be laid with thatch or any other materials as may be approved by the Engineer-in-Charge and the Contractor shall ensure that throughout the period of their occupation, the roofs remain water-tight.

(iii) The Contractor shall provide each hut with proper ventilation.

(iv) All doors, windows and ventilators shall be provided with suitable leaves for security purposes.

(iv) There shall be kept an open space at least 7.2m (8 yards) between the rows of huts which may be reduced to 6m (20ft) according to the availability of site with the approval of the Engineer-in-charge. Back to back construction will be allowed.

4. **Drinking Water :** In every workplace, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.

Where drinking water is obtained from an intermittent public water supply, each workplace shall be provided with storage where drinking water should be stored.

Every water supply storage shall be at a distance of not less than 15 meters from any latrine, drain or other source of pollution. Where water has to be drawn from an existing well, which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and water proof.

A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. **Washing and Bathing Places :** Adequate washing and bathing places shall be provided separately for men and women. Such places shall be kept in clean and drained conditions.

6. **Scale of accommodation in latrines and urinals :** There shall be provided within the precincts of every workplace, latrines and urinals in an accessible place and the accommodation separately for each of these, shall not be less than at the following scales :

No. of seats

(a) Where number of persons does not exceed 50 – 2

(b) Where number of persons exceeds 50 but does not exceed 100 – 3

(c) For additional persons (per 100 or part thereof) – 3

In particular cases, the Engineer-in-Charge shall have the power to increase the requirement, where necessary.

7. **Latrines and Urinals :** Except in workplaces provided with water-flushed latrines connected with a water-borne sewage systems, all latrines shall be provided with receptacies on dry earth system which shall be cleaned at least four times daily and at least twice during working hours and kept in strictly sanitary condition. Receptacies shall be tarred inside and outside at least once a year.

If women are employed, separate latrine and urinals screened from those for men and marked in the vernacular in conspicuous letters "For Women Only" shall be provided on the scale laid down in Rule 6. Those for men shall be similarly marked "For Men Only". A poster showing the figure of a man and a woman shall also be exhibited at the entrance to latrines for each sex. There shall be adequate supply of water close to latrines and urinals.

8. **Construction of latrines :** Inside walls shall be constructed of masonry or other non-absorbent materials and shall be cement-washed inside and outside at least once a year. The dates of cement washing shall be noted in a register maintained for the purpose and kept available for inspection. Latrines shall have at least thatched roof.

9. **Disposal of excreta :** Unless otherwise arranged for by the local municipal authority, arrangement for proper disposal of excreta by incineration at the workplace shall be made by means of a suitable incinerator approved by the local medical, health and medical or cantonment authorities. Alternatively, excreta may be disposed off by putting a layer of night soils at the bottom of pucca tank prepared for the purpose and covering it with a 15 c.m. Layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn into manure).

The Contractor shall, at his own expense, carry out all instructions issued to him by the Engineer-i n-charge to effect proper disposal of soil and other conservancy work in respect of Contractor's work people or employees at the site. The Contractor shall be responsible for payment of any charges which may be levied by municipal or cantonment authority for execution of such work on his behalf.

10. **Provision of shelters during rest :** At every workplace shall be provided, free of cost, four suitable sheds, two for meals and two others for rest, separately for use of men and women labour. Height of each shelter shall not be less than 3 meters from the floor level to lowest part of roof. Sheds shall be kept clean and the space provided shall be on the basis of at least 0.5 sq.m per head.

11. **Creches :** At a place at which 20 or more women workers are ordinarily employed, there shall be provided at least one hut for use of children under the age of 6 years belonging to such women. Huts shall not be constructed to a standard lower than that of thatched roof, mud floor and wall with wooden planks spread over mud floor and covered with matting.

Huts shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean. There shall be two dais in attendance. Sanitary utensils shall be provided to the satisfaction of local medical, health and municipal or cantonment authorities. Use of huts shall be restricted to children, their attendants and mothers of children.

Where the number of women workers is more than 25 but less than 50, the Contractor shall provide at least one hut and one Dai to look after the children of women workers.

Size of creche(s) shall vary according to the number of women workers employed. Creche(s) shall be properly maintained and necessary equipment like toys etc. provided.

12. **Canteen :** A cooked food canteen on a moderate scale shall be provided for the benefit of workers wherever it is considered necessary.

13. Planning, setting and erection of the above mentioned structures shall be approved by the Engineer-in-charge and the whole of such temporary accommodation shall at all times during the progress of the works be kept tidy and in a clean and sanitary condition as per requirements of the local bodies and to the satisfaction of the Engineer-in-charge and at the Contractor's expense. The Contractor shall conform generally to sanitary requirements of local medical, health and municipal or cantonment authorities and at all time adopt such precautions as may be necessary to prevent soil pollution of the site.

    On completion of the Work, the whole of such temporary structures shall be cleared away, all rubbish burnt, excreta or other disposal pits or trenches filled in and effectively sealed off and the whole of site left clean and tidy to the entire satisfaction of the Engineer-in-Charge and at the Contractor's expense.

14. **Anti-malarial precautions :** The Contractor shall, at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge, including filling up any burrow pits which may have been dug by him.

15. **Enforcement :** The Inspecting Officer mentioned in the Contractors' Labour Regulations or any other officer nominated in his behalf by the Engineer-in-charge shall report to the Engineer-in-charge all cases of failure on the part of the Contractor and or his sub-contractors to comply with the provisions of these Rules either wholly or in part and the Engineer-in-charge shall impose such fines and other penalties as are prescribed in the conditions.

16. **Interpretations etc :** On any question as to the application, interpretation of effect of these Rules, the decision of the Chief Labour Commissioner or Deputy Chief Labour Commissioner (Central) shall be final and binding.

17. **Amendments :** Government/Corporation may, from time to time, add to or amend these rules and issue such directions as it may consider necessary for the proper implementation of these Rules or for the purpose of removing any difficulty which may arise in the administration thereof.

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APPENDIX-III

SAFETY PRACTICE DURING CONSTRUCTION

CONTENTS

SAFETY PRACTICES DURING CONSTRUCTION

1.0 INTRODUCTION

Safety in Construction Management deserves utmost attention especially in the hydrocarbon industry, such as Exploration, Refineries, Pipelines and Marketing installations, Gas Processing units etc. Construction is widely recognised as one of the accident-prone activities. Most of the accidents are caused by inadequate planning, failure during the construction process and/or because of design deficiencies. Besides property loss, accidents also result in injuries and fatalities to the personnel; same needs to be prevented.

The reasons for accidents during construction activities are related to unique nature of the industry, human behaviour, difficult work-site conditions, extended odd duty hours, lack of training & awareness and inadequate safety management. Unsafe working methods, equipment failure and improper housekeeping also tend to increase the accident rate in construction.

Ensuring good quality of materials, equipment and competent supervision along with compliance of standard engineering practices shall go a long way to in built safety in the system.

The objective of this standard is to provide practical guidance on technical and educational framework for safety and health in construction with a view to:

(a) prevent accidents and harmful effects on the health of workers arising from employment in construction;
(b) ensure appropriate safety during implementation of construction;
(c) provide safety practice guidelines for appropriate measures of planning, control and enforcement.

2.0 SCOPE

This document specifies broad guidelines on safe practices to be adhered to during construction activities in oil industry. However, before commencing any job, specific hazards and its effects should be assessed and necessary corrective/preventive actions should be taken by all concerned. The document is intended only to supplement and not to replace or supersede the prevailing statutory requirements, which shall also be followed as applicable. For Personal Protective Equipment (PPE's), OISD-STD-155 (Part I&II) shall be referred to. The scope of this document does not include the design aspects and quality checks during construction.

3.0 DEFINITIONS

Definitions of various terminology are given below:

- **Adequate, appropriate or suitable** are used to describe qualitatively or quantitatively the means or method used to protect the worker.

- **Brace:** A structural member that holds one point in a fixed position with respect to another point; bracing is a system of structural members designed to prevent distortion of a structure.

- **By hand:** The work is done without the help of a mechanised tool.
- **Competent Authority:** A stautory agency having the power to issue regulations, orders or other instructions having the force of law.

- **Competent person:** A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill for the safe performance of the specific work. The competent authorities may define appropriate criteria for the designation of such persons and may determine the duties to be assigned to them.

- **Execution agency:**

  Any physical or legal person, having contractual obligation with the owner, and who employs one or more workers on a construction site

- **Owner:**

  Any physical or legal person for whom construction job is carried out. It shall also include owner's designated representative/consultant/nominee/agent, authorised from time to time to act for and on its behalf, for supervising/ coordinating the activities of the execution agency.

- **Hazard:** Danger or potential danger.
- **Guard-rail:** An adequately secured rail erected along an exposed edge to prevent persons from falling.
- **Hoist:** A machine, which lifts materials or persons by means of a platform, which runs on guides.
- **Lifting gear:** Any gear or tackle by means of which a load can be attached to a lifting appliance but which does not form an integral part of the appliance or load.
- **Lifting appliance:** Any stationary or mobile appliance used for raising or lowering persons or loads.
- **Means of access or egress:** Passageways, corridors, stairs, platforms, ladders and any other means for entering or leaving the workplace or for escaping in case of danger.
- **Scaffold:** Any fixed, suspended or mobile temporary structure supporting workers and material or to gain access to any such structure and which is not a lifting appliance as defined above.
- **Toe-board:** A barrier placed along the edge of a scaffold platform, runway, etc., and secured there to guard against the slipping of persons or the falling of material.
- **Worker:** Any person engaged in construction activity.
- **Workplace:** All places where workers need to be or to go by reason of their work.

4.0 GENERAL DUTIES

4.1 GENERAL DUTIES OF EXECUTION AGENCIES

4.1.1 Execution agency should:

i) provide means and organisation to comply with the safety and health measures required at the workplace.

ii) provide and maintain workplaces, plant, equipment, tools and machinery and organise construction work so that, there is no risk of accident or injury to health of workers. In particular, construction work should be planned, prepared and undertaken so that:

(a) dangers, liable to arise at the workplace, are prevented;
(b) excessively or unnecessarily strenuous work positions and movements are avoided;
(c) organisation of work takes into account the safety and health of workers;
(d) materials and products used are suitable from a safety and health point of view;
(e) working methods are adopted to safeguard workers against the harmful effects of chemical, physical and biological agents.

iii) establish committees with representatives of workers and management or make other arrangement for the participation of workers in ensuring safe working conditions.

iv) arrange for periodic safety inspections by competent persons of all buildings, plant, equipment, tools, machinery, workplaces and review of systems of work, regulations, standards or codes of practice. The competent person should examine and ascertain the safety of construction machinery and equipment.

v) provide such supervision to ensure that workers perform their work with due regard to safety and health of theirs as well as that of others.

vi) Employ only those workers who are qualified, trained and suited by their age, physique, state of health and skill.

vii) satisfy themselves that all workers are informed and instructed in the hazards connected with their work and environment and trained in the precautions necessary to avoid accidents and injury to health.

viii) Ensure that buildings, plant, equipment, tools, machinery or workplaces in which a dangerous defect has been found should not be used until the defect has been rectified.

ix) Organise for and remain always prepared to take immediate steps to stop the operation and evacuate workers as appropriate, where there is an imminent danger to the safety of workers.

x) establish a checking system by which it can be ascertained that all the members of a shift, including operators of mobile equipment, have returned to the camp or base at the close of work on dispersed sites and where small groups of workers operate in isolation.

xi) provide appropriate first aid, training and welfare facilities to workers as per various statutes like the Factories Act, 1948 etc. and, whenever collective measures are not feasible or are insufficient, provide and maintain personal protective equipment and clothing in line with the requirement as per OISDSTD- 155 (Vol. I& II) on Personnel Protective Equipment. They should also provide access to workers to occupational health services. xii) Educate workers about their right and the duty at any workplace to participate in ensuring safe working conditions to the extent of their control over the equipment and methods of work and to express views on working procedures adopted as may affect safety and health.

xiii) Ensure that except in an emergency, workers, unless duly authorised, should not interfere with, remove, alter or displace any safety device or other appliance furnished for their protection or the protection of others, or interfere with any method or process adopted with a view to avoiding accidents and injury to health.

xiv) Ensure that workers do not operate or interfere with plant and equipment that they have not been duly authorised to operate, maintain or use.

xv) Ensure that workers do not sleep, rest or cook etc in dangerous places such as scaffolds, railway tracks, garages, confined spaces or in the vicinity of fires, dangerous or toxic substances, running machines or vehicles and heavy equipment etc.

xvii) Obtain the necessary clearance/permits as required and specified by owner xviii) As per the Govt. circular as amended from time to time all contractors who employ more than 50 workers or where the Lumpsum Price exceeds Rs. 50 crores, the following facilities are to be provided by contractor at site :

- Arrangement for drinking water
- Toilet facilities
- A creche where 10 or more women workers are having children below the age of 6 years
- Transport arrangement for attending to emergencies

xix) should deploy a safety officer at site

4.2 **GENERAL DUTIES OF OWNERS**

4.2.1 **Owners should:**

i) co-ordinate or nominate a competent person to co-ordinate all activities relating to safety and health on their construction projects;

ii) inform all contractors on the project of special risks to health and safety;

iii) Ensure that executing agency is aware of the owner's requirements and the executing agency's responsibilities with respect to safetry practices before starting the job.

5.0 SAFETY PRACTICES AT WORK PLACES

5.1 **GENERAL PROVISIONS**

5.1.1 All openings and other areas likely to pose danger to workers should be clearly indicated.

5.1.2 Workers & Supervisors should use the safety helmet and other requisite Personal Protective Equipment according to job & site requirement. They should be trained to use personal protective equipment.

5.1.3 Never use solvents, alkalis and other oils to clean the skin.

5.1.4 Lift the load with back straight and knees bent as far as possible. Seek the help in case of heavy load.

5.1.5 Ensure the usage of correct and tested tools and tackles. Don't allow the make shift tools and tackles.

5.1.6 No loose clothing should be allowed while working near rotating equipment or working at heights.

5.2 **MEANS OF ACCESS AND EGRESS**

Adequate and safe means of access (atleast two, differently located) to and egress from all workplaces should be provided. Same should be displayed and maintained.

5.3 **HOUSEKEEPING**

5.3.1 **Ensure:**

i) proper storage of materials and equipment;
ii) removal of scrap, inflammable material, waste and debris at appropriate intervals.

5.3.2 Removal of loose materials, which are not required for use, to be ensured. Accumulation of these at the site can obstruct means of access to and egress from workplaces and passageways.

5.3.3 Workplaces and passageways, that are slippery owing to oil, grease or other causes, should be cleaned up or strewn with sand, sawdust, ash etc.

5.4 **PRECAUTIONS AGAINST THE FALL OF MATERIALS & PERSONS AND COLLAPSE OF STRUCTURES**

5.4.1 Precautions should be taken such as the provision of fencing, look-out men or barriers to protect any person against injury by the fall of materials, or tools or equipment being raised or lowered.

5.4.2 Where necessary to prevent danger, guys, stays or supports should be used or other effective precautions should be taken to prevent the collapse of structures or parts of structures that are being erected, maintained, repaired, dismantled or demolished.

5.4.3 All openings through which workers are liable to fall should be kept effectively covered or fenced and displayed prominently.

5.4.4 As far as practicable, guardrails and toe-boards should be provided to protect workers from falling from elevated workplaces.

5.5 PREVENTION OF UNAUTHORISED ENTRY

5.5.1 Construction sites located in built-up areas and alongside vehicular and pedestrian traffic routes should be fenced to prevent the entry of unauthorised persons

5.5.2 Visitors should not be allowed access to construction sites unless accompanied by or authorised by a competent person and provided with the appropriate protective equipment.

5.6 FIRE PREVENTION AND FIRE FIGHTING

5.6.1 All necessary measures should be taken by the executing agency and owner to:

i) avoid the risk of fire;
ii) control quickly and efficiently any outbreak of fire;
iii) bring out a quick and safe evacuation of persons.
iv) Inform unit/fire station control room, where construction work is carried out within existing operating area.

5.6.2 Combustible materials such as packing materials, sawdust, greasy/oily waste and scrap wood or plastics should not be allowed to accumulate in workplaces but should be kept in closed metal containers in a safe place.

5.6.3 Places where workers are employed should, if necessary to prevent the danger of fire, be provided with:

i) suitable and sufficient fire-extinguishing equipment, which should be easily visible and accessible;
ii) an adequate water supply at sufficient pressure meeting the requirements of various OISD standards.

5.6.4 To guard against danger at places having combustible material, workers should be trained in the action to be taken in the event of fire, including the use of means of escape.

5.6.5 At sites having combustible material, suitable visual signs should be provided to indicate clearly the direction of escape in case of fire.

5.6.6 Means of escape should be kept clear at all times. Escape routes should be frequently inspected particularly in high structures and where access is restricted.

5.7 LIGHTING

5.7.1 Where natural lighting is not adequate, working light fittings or portable hand-lamps should be provided at workplace on the construction site where a worker will do a job.

5.7.2 Emergency lighting should be provided for personnel safety during night time to facilitate standby l ighting source, if normal system fails.

5.7.2 Artificial lighting should not produce glare or disturbing shadows.

5.7.3 Lamps should be protected by guards against accidental breakage.

5.7.4 The cables of portable electrical lighting equipment should be of adequate size & characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations.

5.8 **PLANT, MACHINERY, EQUIPMENT AND HAND TOOLS**

5.8.1 **General Provisions**

i) Plant, machinery and equipment including hand tools, both manual and power driven, should:
   a) be of proper design and construction, taking into account health, Safety and ergonomic principles.
   b) be maintained in good working order;
   c) be used only for work for which they have been designed.
   d) be operated only by workers who have been authorised and given appropriate training.
   e) be provided with protective guards, shields or other devices as required.

ii) Adequate instructions for safe use should be provided.
iii) Safe operating procedures should be established and used for all plant, machinery and equipment.
iv) Operators of plant, machinery and equipment should not be distracted while work is in progress.
iv) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.
v) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.
vi) All moving parts of machinery and equipment should be enclosed or adequately guarded.
vii) Every power-driven machine and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.
ix) Operators of plant, machinery, equipment and tools should be provided with PPEs, including where necessary, suitable ear protection.

5.8.2 **Hand tools**

i) Hand tools should be repaired by competent persons.
ii) Heads of hammers and other shock tools should be dressed or ground to a suitable radius on the edge as soon as they begin to mushroom or crack.
iii) When not in use and while being carried or transported sharp tools should be kept in sheaths, shields, chests or other suitable containers.
iv) Only insulated or nonconducting tools should be used on or near live electrical installations.
v) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapours.

5.8.3 **Pneumatic Tools**

i) Operating triggers on portable pneumatic tools should be:

   a) so placed as to minimise the risk of accidental starting of the machine.
   b) so arranged as to close the air inlet valve automatically when the pressure of the operator's hand is removed.

ii) Hose and hose connections for compressed air supply to portable pneumatic tools should be:

a) designed and tested for the pressure and service for which they are intended;
b) fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.

iii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.

iv) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

5.8.4 **Electrical Tools**

i) Low voltage portable electrical tools should generally be used.
ii) All electrical tools should be earthed, unless they are "all insulated" or "double insulated" tools which do not require earthing.
Iii) All electrical tools should get inspected and maintained on a regular basis by a competent electrician and complete records kept.

5.8.5 **Engines**

i) Engines should:

a) be installed so that they can be started safely and the maximum safe speed cannot be exceeded.
b) have controls for limiting speed.
c) have devices to stop them from a safe place in an emergency.

ii) IC engines should not be run in confined spaces unless adequate exhaust ventilation is provided.

Iii) When IC engines are being fuelled:
a) the engine should be shut off.
b) care should be taken to avoid spilling fuel;
c) no person should smoke or have an naked light in the vicinity.
d) a fire extinguisher should be kept readily available.

iv) Secondary fuel reservoir should be placed outside the engine room.

6.0 CONSTRUCTION ACTIVITIES

The various common activities in construction are as under:

· Excavation
· Scaffolding, Platforms & Ladders
· Structural Work, Laying of Reinforcement & Concreting
· Road Work (Laying of roads)
· Cutting/ Welding
· Working in Confined Space
· Proof/Pressure Testing
· Working at Heights
· Handling & Lifting Equipments
· Vehicle Movement
· Electrical

- Offshore
- Demolition
- Radiography
- Sand/shot blasting/ spray painting
- Work above water

The safe practices to be followed during the implementation of above constructionact ivities are given below:

6.1 EXCAVATION

6.1.1 All excavation work should be planned and the method of excavation and the type of support work required should be decided considering the following:

i) the stability of the ground;
ii) the excavation will not affect adjoining buildings, structures or roadways;
iii) to prevent hazard, the gas, water, electrical and other public utilities should be shut off or disconnected, if necessary;
iv) presence of underground pipes, cable conductors, etc.,
v) the position of culvert/bridges, temporary roads and spoil heaps should be determined;

6.1.2 Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required decided.

6.1.3 All excavation work should be supervised.

6.1.4 Sites of excavations should be thoroughly inspected:

i) daily, prior to each shift and after interruption in work of more than one day;
ii) after every blasting operation;
iii) after an unexpected fall of ground;
iv) after substantial damage to supports;
v) after a heavy rain, frost or snow;
vi) when boulder formations are encountered.

6.1.5 Safe angle of repose while excavating trenches exceeding 1.5m depth upto 3.0m should be maintained. Based on site conditions, provide proper slope, usually 45o,and suitable bench of 0.5m width at every 1.5m depth of excavation in all soils except hard rock or provide proper shoring and strutting to prevent cave-in or slides.

6.1.6 As far as possible, excavated earth should not be placed within one meter of the edge of the trench or depth of trench whichever is greater.

6.1.7 Don't allow vehicles to operate too close to excavated area. Maintain atleast 2m distance from edge of excavation. No load, plant or equipment should be placed or moved near the edge of any excavation where it is likely to cause its collapse and thereby endanger any person unless precautions such as the provision of shoring or piling are taken to prevent the sides from collapsing.

6.1.8 Adequately anchored stop blocks and barriers should be provided to prevent vehicles being driven into the excavation. Heavy vehicles should not be allowed near the excavation unless the support work has been specially designed to permit it.

6.1.9 If an excavation is likely to affect the security of a structure on which persons are working, precautions should be taken to protect the structure from collapse

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6.1.10 Barricade at 1m height (with red & white band/self glowing caution board) should be provided for excavations beyond 1.5m depth. Provide two entries/exits for such excavation.

6.1.11 Necessary precautions should be taken for underground utility lines like cables, sewers etc. and necessary approvals/clearances from the concerned authorities shall be obtained before commencement of the excavation job.

6.1.12 Water shall be pumped/bailed out, if any accumulates in the trench. Necessary precautions should be taken to prevent entry of surface water in trenches.

6.1.13 During rains, the soil becomes loose. Take additional precaution against collapse of side wall.

6.1.14 In hazardous areas, air should be tested to ascertain its quality. No one should be allowed entry till it is suitable for breathing.

6.1.15 In case of mechanised excavation, precaution shall be taken to not to allow anybody to come within one meter of extreme reach of the mechanical shovel. The mechanised excavator shall be operated by a well-trained experienced operator. When not in operation, the machine shall be kept on firm leveled ground with mechanical shovel resting on ground. Wheel or belt shall be suitably jammed to prevent any accidental movement of the machine. Suitable precautions as per manufacturer guidelines should be taken for dozers, graders and other heavy machines.

6.1.16 In case of blasting, follow strictly IS:4081-1986 & Indian Explosive Act and rules for storage, handling and carrying of explosive materials and execution of blasting operation.

6.2 SCAFFOLDING, PLATFORMS & LADDERS

6.2.1 Metal as material of construction

i) A scaffold should be provided and maintained or other equally safe and suitable provision should be made where work cannot safely be done on or from the ground or from part of a building or other permanent structure.

ii) Scaffolds should be provided with safe means of access, such as stairs, ladders or ramps. Ladders should be secured against inadvertent movement.

iii) Every scaffold should be constructed, erected and maintained so as to prevent collapse or accidental displacement when in use.

iv) Every scaffold and part thereof should be constructed :
   (a) in such a way so as not to cause hazards for workers during erection and dismantling;
   (b) in such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together;
   (c) with sound material and of requisite size and strength for the purpose for which it is to be used and maintained in a proper condition.

v) Boards and planks used for scaffolds should be protected against splitting.

vi) Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.

viii) Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.

ix) Tubes should be free from cracks, splits and excessive corrosion and be straight to the eye, and tube ends cut cleanly square with the tube axis.

ix) Scaffolds should be designed for their maximum load as per relevant code.

x) Scaffolds should be adequately braced.

xi) Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.

xii) A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.

xiii) Loose bricks, drainpipes, chimney-pots or other unsuitable material should not be used for the construction or support of any part of a scaffold.

xiv) Scaffolds should be inspected and certified:
- (a) before being taken into use;
- (b) at periodic intervals thereafter as prescribed for different types of scaffolds;
- (c) after any alteration, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.

xv) Inspection should more particularly ascertain that:
- (a) the scaffold is of suitable type and adequate for the job;
- (b) materials used in its construction are sound and of sufficient strength;
- (c) it is of sound construction and stable;
- (d) that the required safeguards are in position.

xvi) A scaffold should not be erected, substantially altered or dismantled except by or under the supervision.

xvii) Every scaffold should be maintained in good and proper condition, and every part should be kept fixed or secured so that no part can be displaced in consequence of normal use.

xviii) If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.

6.2.2 **Lifting appliances on scaffolds**

i) When a lifting appliance is to be used on a scaffold:

(a) the parts of the scaffold should be carefully inspected to determine the additional strengthening and other safety measures required;

(b) any movement of the scaffold members should be prevented;

(c) if practicable, the uprights should be rigidly connected to a solid part of the building at the place where the lifting appliance is erected.

6.2.3 Prefabricated scaffolds

i) In the case of prefabricated scaffold systems, the instructions provided by the manufacturers or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.

iii) Frames of different types should not be intermingled in a single scaffold.

iv) Scaffolding shall be erected on firm and level ground.

iv) All members of metal scaffolding shall be checked periodically to screen out defective/ rusted members. All joints should be properly lubricated for easy tightening.
v) Entry to scaffolding should be restricted.
vi) Erection, alteration and removal shall be done under supervision of experienced personnel.
vii) Use of barrels, boxes, loose bricks etc., for supporting platform shall not be permitted.
viii) Each supporting member of platform shall be securely fastened and braced
ix) Where planks are butt-joined, two parallel putlogs shall be used, not more than 100mm apart, to give support to each plank.
x) Platform plank shall not project beyond its end support to a distance exceeding 4 times the thickness of plank, unless it is effectively secured to prevent tipping. Cantilever planks should be avoided.
xi) The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.
xii) Erect ladders in the "four up-one out position"
xiii) Lash ladder securely with the structure.
xiv) Using non-slip devices, such as, rubber shoes or pointed steel ferules at the ladder foot, rubber wheels at ladder top, fixing wooden battens, cleats etc.
xv) When ladder is used for climbing over a platform, the ladder must be of sufficient length, to extend at least one meter above the platform, when erected against the platform in "four up-one out position."
xvi) Portable ladders shall be used for heights not more than 4mt. Above 4mt flights, fixed ladders shall be provided with at least 600 mm landings at every 6mt or less.
xvii) The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.
xviii) Every platform and means of access shall be kept free from obstruction.
xix) If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.
xx) Workers shall not be allowed to work on scaffolds during storms or high wind. After heavy rain or storms, scaffolds shall be inspected before reuse.
xxi) Don't overload the scaffolding. Remove excess material and scrap immediately.
xxii) Dismantling of scaffolds shall be done in a pre-planned sequential manner.

6.2.4 **Suspended scaffolds/boatwain's chair**

i) In addition to the requirements for scaffolds in general as regards soundness, stability and protection against the risk of falls, suspended scaffolds should meet the following specific requirements.

(a) platforms should be designed and built with dimensions that are compatible with the stability of the structure as a whole, especially the length;

(b) the number or anchorage should be compatible with the dimensions of the platform;

(c) the safety of workers should be safeguarded by an extra rope having a point of attachment independent of the anchorage arrangements of the scaffold;

(d) the anchorage and other elements of support of the scaffold should be designed and built in such a way as to ensure sufficient strength;

(e) the ropes, winches, pulleys or pulley blocks should be designed, assembled, used and maintained according to the requirements established for lifting gear adapted to the lifting of persons according to national laws and regulations;

(f) Before use, the whole structure should be checked by a competent person.

6.2.5 **Bamboo Scaffolding**

i) In general, it should be avoided as far as possible. It should not be used in the unit/off-site areas and where hot work is to be done.

ii) For construction and maintenance of residential and office buildings, situated outside explosive licensed area, bamboo scaffold, if used, should conform to provisions given in IS-3696 (Part 1)-1987.

6.3 STRUCTURAL WORK, LAYING OF REINFORCEMENT & CONCRETING

6.3.1 General provisions

i) The erection or dismantling of buildings, structures, civil engineering works, formwork, falsework and shoring should be carried out by trained workers only under the supervision of a competent person.

ii) Precautions should be taken to guard against danger to workers arising from any temporary state of weakness or instability of a structure.

iii) Formwork, falsework and shoring should be so designed, constructed and maintained that it will safely support all loads that may be imposed on it.

iv) Formwork should be so designed and erected that working platforms, means of access, bracing and means of handling and stabilising are easily fixed to the formwork structure.

6.3.2 Erection and dismantling of steel and prefabricated structures

i) The safety of workers employed on the erection and dismantling of steel and prefabricated structures should be ensured by appropriate means, such as provision and use of:

(a) ladders, gangways or fixed platforms;
(b) platforms, buckets, boatswain's chairs or other appropriate means suspended from lifting appliances;
(c) safety harnesses and lifelines, catch nets or catch platforms;
(d) Power-operated mobile working platforms.

ii) Steel and prefabricated structures should be so designed and made that they can be safely transported and erected.

iii) In addition to the need for the stability of the part when erected, the design should explicitly take following into account:

(a) the conditions and methods of attachment in the operations of transport, storing and temporary support during erection or dismantling as applicable;
(b) Methods for the provision of safeguards such as railings and working platforms, and, when necessary, for mounting them easily on the structural steel or prefabricated parts.

iv) The hooks and other devices built in or provided on the structural steel or prefabricated parts that are required for lifting and transporting them should be so shaped, dimensioned and positioned as:

(a) to withstand with a sufficient margin the stresses to which they are subjected;

(b) Not to set up stresses in the part that could cause failures, or stresses in the structure itself not provided for in the plans, and be designed to permit easy release from the lifting appliance. Lifting points for floor and staircase units should be located (recessed if necessary) so that they do not protrude above the surface;

(c) To avoid imbalance or distortion of the lifted load.

v) Storeplaces should be so constructed that:

(a) there is no risk of structural steel or prefabricated parts falling or overturning;

(b) storage conditions generally ensure stability and avoid damage having regard to the method of storage and atmospheric conditions;

(c) racks are set on firm ground and designed so that units cannot move accidentally.

v) While they are being stored, transported, raised or set down, structural steel or prefabricated parts should not be subjected to stresses prejudicial to their stability.

vii) Every lifting appliance should:

(a) be suitable for the operations and not be capable of accidental disconnection;

(b) be approved or tested as per statutory requirement.

viii) Lifting hooks should be of the self-closing type or of a safety type and should have the maximum permissible load marked on them.

ix) Tongs, clamps and other appliances for lifting structural steel and prefabricated parts should:
(a) be of such shape and dimensions as to ensure a secure grip without damaging the part;
(b) be marked with the maximum permissible load in the most unfavourable lifting conditions.

x) Structural steel or prefabricated parts should be lifted by methods or appliances that prevent them from spinning accidentally.

xi) When necessary to prevent danger, before they are raised from the ground, structural steel or prefabricated parts should be provided with safety devices such as railings and working platforms to prevent falls of persons.

xii) While structural steel or prefabricated parts are being erected, the workers should be provided with appliances for guiding them as they are being lifted and set down, so as to avoid crushing of hands and to facilitate the operations. Use of such appliances should be ensured.

xiii) A raised structural steel or prefabricated part should be so secured and wall units so propped that their stability cannot be imperiled, even by external agencies such as wind and passing loads before its release from the lifting appliance.

xiv) At work places, instruction should be given to the workers on the methods, arrangements and means required for the storage, transport, lifting and erection

of structural steel or prefabricated parts, and, before erection starts, a meeting of all those responsible should be held to discuss and confirm the requirements for safe erection.

xv) During transportation within the construction area, attachments such as slings and stirrups mounted on structural steel or prefabricated parts should be securely fastened to the parts.

xvi) Structural steel or prefabricated parts should be so transported that the conditions do not affect the stability of the parts or the means of transport result in jolting, vibration or stresses due to blows, or loads of material or persons.

xvii) When the method of erection does not permit the provision of other means of protection against fall of persons, the workplaces should be protected by guardrails, and if appropriate by toe-boards.

xviii) When adverse weather conditions such as snow, ice and wind or reduced visibility entail risks of accidents, the work should be carried on with particular care, or, if necessary, interrupted.

xix) Structures should not be worked on during violent storms or high winds, or when they are covered with ice or snow, or are slippery from other causes.

xx) If necessary, to prevent danger, structural steel parts should be equipped with attachments for suspended scaffolds, lifelines or safety harnesses and other means of protection.

xxi) The risks of falling, to which workers moving on high or sloping girders are exposed, should be limited by all means of adequate collective protection or, where this is impossible, by the use of a safety harness that is well secured to a strong support.

xxii) Structural steel parts that are to be erected at a great height should as far as practicable be assembled on the ground.

xxiii) When structural steel or prefabricated parts are being erected, a sufficiently extended area underneath the workplace should be barricaded or guarded

xxiv) Steel trusses that are being erected should be adequately shored, braced or guyed until they are permanently secured in position.

xxv) Load-bearing structural member should not be dangerously weakened by cutting, holing or other means.

xxvi) Structural members should not be forced into place by the hoisting machine while any worker is in such a position that he could be injured by the operation.

xxvii) Open-web steel joists that are hoisted singly should be directly placed in position and secured against dislodgment.

6.3.3 **Reinforcement**

i) Ensure that workers use Personnel Protective equipment like safety helmet, safety shoes, gloves etc.
ii) Don't place the hand below the rods for checking clear distance. Use measuring devices.
iii) Don't wear loose clothes while checking the rods.
iv) Don't stand unnecessarily on cantilever rods.
v) To carry out welding/cutting of rods, safety procedures/precautions as mentioned in Item No. 6.5 to be followed.
vi) For supplying of rods at heights, proper staging and/or bundling to be provided.

vi) Ensure barricading and staging for supplying and fixing of rods at height.

viii) For short distance carrying of materials on shoulders, suitable pads to be provided.

ix) While transporting material by trucks/trailers, the rods shall not protrude in front of or by the sides of driver's cabin. In case such protrusion cannot be avoided behind the deck, then it should not extend 1/3rd of deck length or 1.5M which ever is less and tied with red flags/lights.

6.3.4 **Concreting**

i) Ensure stability of shuttering work before allowing concreting.
ii) Barricade the concreting area while pouring at height/depths.
iii) Keep vibrator hoses, pumping concrete accessories in healthy conditions and mechanically locked.
iv) Pipelines in concrete pumping system shall not be attached to temporary structures such as scaffolds and formwork support as the forces and movements may effect their integrity.
v) Check safety cages & guards around moving motors/parts etc. provided in concreting mixers.
vi) Use Personal Protective Equipment like gloves, safety shoes etc. while dealing with concrete and wear respirators for dealing with cement.
vii) Earthing of electrical mixers, vibrators, etc. should be done and verified.
viii) Cleaning of rotating drums of concrete mixers shall be done from outside. Lockout devices shall be provided where workers need to enter.
Ix) Where concrete mixers are driven by internal combustion engine, exhaust points shall be located away from the worker's workstation so as to eliminate their exposure to obnoxious fumes.
x) Don't allow unauthorised person to stand under the concreting area.
xi) Ensure adequate lighting arrangements for carrying out concrete work during night.
xii) Don't allow the same workers to pour concrete round the clock. Insist on shift pattern.
xiii) During pouring, shuttering and its supports should be continuously watched for defects.

6.4 **ROAD WORK**

6.4.1 Site shall be barricaded and provided with warning signs, including night warning lamps at appropriate locations for traffic diversion.

6.4.2 Filled and empty bitumen drums shall be stacked separately at designated places.

6.4.3 Mixing aggregate with bitumen shall preferably be done with the help of bitumen batch mixing plant, unless operationally non-feasible.

6.4.4 Road rollers, Bitumen sprayers, Pavement finishers shall be driven by experienced drivers with valid driving license.

6.4.5 Workers handling hot bitumen sprayers or spreading bitumen aggregate mix or mixing bitumen with aggregate, shall be provided with PVC hand gloves and rubber shoes with legging up to knee joints.

6.4.6 At the end of day's work, surplus hot bitumen in tar boiler shall be properly covered by a metal sheet, to prevent anything falling in it,

6.4.7 If bitumen accidentally falls on ground, it shall be immediately covered by sprinkling sand, to prevent anybody stepping on it. Then it shall be removed with the help of spade.

6.4.8 For cement concrete roads, besides site barricading and installation of warning signs for traffic diversion, safe practices mentioned in the chapter on "Concreting", shall also be applicable.

6.5 CUTTING/WELDING

6.5.1 Common hazards involved in welding/cutting are sparks, molten metal, flying particles, harmful light rays, electric shocks etc. Following precautions should be taken: -

i) A dry chemical type fire extinguisher shall be made available in the work area.

ii) Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space.

iii) Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.

iv) All covers and panels shall be kept in place, when operating an electric Arc welding machine.

v) The work piece should be connected directly to Power supply, and not indirectly through pipelines/structures/equipments etc.

vi) The welding receptacles shall be rated for 63 A suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.

vii) All cables, including welding and ground cables, shall be checked for any worn out or cracked insulation before starting the job. Ground cable should be separate without any loose joints.

viii) Cable coiling shall be maintained at minimum level, if not avoidable.

ix) An energised electrode shall not be left unattended.

ix) The power source shall be turned off at the end of job.

x) All gas cylinders shall be properly secured in upright position.

xi) Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.

xii) Acetylene cylinder key for opening valve shall be kept on valve stem, while cylinder is in use, so that the acetylene cylinder could be quickly turned off in case of emergency. Use flash back arrestors to prevent back-fire in acetylene/oxygen cylinder.

xiii) When not in use, valves of all cylinders shall be kept closed.

xiv) All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed

xv) Forced opening of any cylinder valve should not be attempted.

xvi) Lighted gas torch shall never be left unattended.

xvii) Store acetylene and oxygen cylinders separately.
xix) Store full and empty cylinders separately.
xx) Avoid cylinders coming into contact with heat.

xxi) Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.

xxii) If cylinders have to be moved, be sure that the cylinder valves are shut off.

xxiii) Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.

xxiv) Do not use matches to light torches, use a friction lighter.

xxv) Move out any leaking cylinder immediately.

xxvi) Use trolleys for oxygen & acetylene cylinder and chain them.

xxvii) Always use Red hose for acetylene and other fuel gases and Black for oxygen, and ensure that both are in equal length.

xxviii) Ensure that hoses are free from burns, cuts and cracks and properly clamped.

xxix) Avoid dragging hoses over sharp edges and objects

xxx) Do not wrap hoses around cylinders when in use or stored.

xxxi) Protect hoses from flying sparks, hot slag, and other hot objects.

xxxii) Lubricants shall not be used on Ox-fuel gas equipment.

xxxiii) During cutting/welding, use proper type goggles/face shields

6.6 **WORKING IN CONFINED SPACES**

6.6.1 Following safety practices for working in confined space like towers, columns, tanks and other vessels should be followed in addition to the safety guidelines for specific jobs like scaffolding, cutting/welding etc.

i) Shut down, isolate, depressurise and purge the vessel as per laid down procedures.
ii) Entry inside the vessel and to carry out any job should be done after issuance of valid permit only in line with the requirement of OISD-STD-105.
iii) Ensure proper and accessible means of exit before entry inside a confined space.
iv) The number of persons allowed inside the vessel should be limited to avoid overcrowding.
v) When the work is going on in the con fined space, there should always be one man standby at the nearby manway.
vi) Before entering inside the vessels underground or located at lower elevation, probability of dense vapours accumulating nearby should also be considered in addition to inside the vessel.
vii) Ensure requisite O2 level before entry in the confined space and monitor level periodically or other wise use respiratory devices.
viii) Check for no Hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.
ix) Ensure adequate ventilation or use respiratory devices.
x) Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In case of sewer, OWS or in the confined area where there is a possibility of toxic or inert gas, gas masks shall be used by everyone while entering.

xi) Barricade the confined spaces during hoisting, radiography, blasting, pressure testing etc.

xii) Use 24V flameproof lamp fittings only for illumination.

xiii) Use tools with air motors or electric tools with maximum voltage of 24V.

xiv) House keeping shall be well maintained.

xv) Safety helmet, safety shoes and safety belt shall be worn by everyone entering the confined space.

xvi) Don't wear loose clothing while working in a confined space.

xviii) In case of the vessels which are likely to contain pyropheric substances (like Iron Sulphide), special care need to be taken before opening the vessel. Attempt should be made to remove the pyropheric substances. Otherwise, these should be always kept wet by suitable means.

xviii) The cutting torches should also be kept outside the vessel immediately after the cutting.
xix) The gas cylinders used for cutting/welding shall be kept outside.

xx) All cables, hoses, welding equipment etc., shall be removed from confined space at end of each work day, even if the work is to be resumed in the same space the next day.
xxi) To the extent possible sludge shall be cleared and removed from outside before entering.

xxii) No naked light or flame or hot work such as welding, cutting and soldering should be permitted inside a confined space or area unless it has been made completely free of the flammable atmosphere, tested and found safe by a competent person. Only non-sparking tools and flameproof hand lamps protected with guard and safety torches should be used inside such confined space or area for initial inspection, cleaning or other work required to be done for making the area safe.

xxiii) Communication should be always maintained between the worker and the attendant.

6.7 **PROOF/PRESSURE TESTING**

6.7.1 Review test procedure before allowing testing with water or air or any other fluid.

6.7.2 Provide relief valves of adequate size while testing with air or other gases.

6.7.3 Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.

6.7.4 Inform all concerned in advance of the testing.

6.7.5 Keep the vents open before opening any valve for filling/draining of liquid used for hydrotesting. The filling/draining should not exceed the designed rate for pressure testing.

6.7.6 Provide separate gauges of suitable range for pressurising pump and the equipment to be tested
.
6.7.7 Provide gauges at designated locations for monitoring of pressures.

6.7.8 Check the calibration of all pressurising equipment and accessories and maintain records.

6.7.9 Take readings at pre-defined intervals.

6.8 WORKING AT HEIGHTS

6.8.1 General Provision

i) While working at a height of more than 3 meters, ISI approved safety belt shall be used.

ii) While working at a height of more than 3 meters, permit should be issued by competent person before commencement of the job.

iii) Worker should be well trained on usage of safety belt including its proper usage at the time of ascending/descending.

iv) All tools should be carried in tool kits to avoid their falling.

v) If the job is on fragile/sloping roof, roof walk ladders shall be used.

vi) Provide lifeline wherever required.

vii) Additional safety measures like providing Fall Arrestor type Safety belt, safety net should be provided depending upon site conditions, job requirements.

vii) Keep working area neat and clean. Remove scrap material immediately.

ix) Don't throw or drop material/equipment from height.

x) Avoid jumping from one member to another. Use proper passageway.

xi) Keep both hands free while climbing. Don't try to bypass the steps of the ladder.

xii) Try to maintain calm at height. Avoid over exertion.

xiii) Avoid movements on beam.

xiv) Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.

6.8.2 Roof Work

i) All roof-work operations should be pre-planned and properly supervised.
ii) Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.
iii) Work on roofs shouldn't be carried on in weather conditions that threaten the safety of workers.
Iv) Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.
v) Roofing brackets should fit the slope of the roof and be securely supported.
vi) Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.
vii) On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.
viii) All covers for openings in roofs should be of substantial construction and be secured in position.
ix) Roofs with a pitch of more than 10 should be treated as sloping.
x) When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured in position.
xi) During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off the roof.

xii) Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and when spanning across the supports for the roof covering to support those workers.

xiii) A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

6.8.3 **Work on tall chimneys**

i) For the erection and repair of tall chimneys, scaffolding should be provided. A safety net should be maintained at a suitable distance below the scaffold.

ii) The scaffold floor should always be at least 65 cm below the top of the chimney.

iii) Under the working floor of the scaffolding the next lower floor should be left in position as a catch platform.

iv) The distance between the inside edge of the scaffold and the wall of the chimney should not exceed 20 cm at any point.

v) Catch platforms should be erected over:

(a) the entrance to the chimney;
(b) Passageways and working places where workers could be endangered by falling objects

vi) For climbing tall chimneys, access should be provided by:

(a) stairs or ladders;
(b) a column of iron rungs securely embedded in the chimney wall;
(c) Other appropriate means.

vii) When workers use the outside rungs to climb the chimney, a securely fastened steel core rope looped at the free end and hanging down at least 3 m should be provided at the top to help the workers to climb on to the chimney.

viii) While work is being done on independent chimneys the area surrounding the chimney should be enclosed by fencing at a safe distance.

ix) Workers employed on the construction, alteration, maintenance or repair of tall chimneys should not:

a) work on the outside without a safety harness attached by a lifeline to a rung, ring or other secure anchorage;
b) put tools between the safety harness and the body or in pockets not intended for the purpose;
c) haul heavy materials or equipment up and down by hand to or from the workplace on the chimney;
d) fasten pulleys or scaffolding to reinforcing rings without first verifying their stability;
e) work alone;
f) climb a chimney that is not provided with securely anchored ladders or rungs;
g) Work on chimneys in use unless the necessary precautions to avoid danger from smoke and gases have been taken.

x) Work on independent chimneys should not be carried on in high winds, icy conditions, fog or during electrical storms.

6.9 HANDLING AND LIFTING EQUIPMENT:

6.9.1 General Provisions

Following are the general guidelines to be followed with regard to all types of handling and lifting equipment in addition to the guidelines for specific type of equipments dealt later on.

i) There should be a well-planned safety programme to ensure that all the lifting appliances and lifting gear are selected, installed, examined, tested, maintained, operated and dismantled with a view to preventing the occurrence of any accident;

ii) All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".

iii) Check thoroughly quality, size and condition of all lifting tools like chain pulley blocks, slings, U-clamps, D-shackles etc. before putting them in use.

iv) Safe lifting capacity of all lifting & handling equipment, tools and shackles should be got verified and certificates obtained from competent authorities before its use. The safe working load shall be marked on them.

iv) Check periodically the oil, brakes, gears, horns and tyre pressure of all moving equipments like cranes, forklifts, trailers etc as per manufacturer's recommendations.

vi) Check the weights to be lifted and accordingly decide about the crane capacity, boom l ength and angle of erection.

viii) Allow lifting slings as short as possible and check packing at the friction points.

ix) While lifting/placing of the load, no unauthorised person shall remain within the radius of the boom and underneath the load.

ix) While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.

x) Control longer jobs being lifted up from both ends.

xi) Only trained operators and riggers should carry out the job. While the crane is moving or lifting the load, the trained rigger should be there for keeping a vigil against hitting any other object.

xii) During high wind conditions and nights, lifting of heavy equipments should be avoided. If unavoidable to do erection in night, operator and rigger should be fully trained for night signaling. Also proper illumination should be there.

xiii) Allow crane to move on hard, firm and leveled ground.

xiv) When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.

xiv) Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.

xv) Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.

xvii) No structural alterations or repairs should be made to any part of a lifting appliance, which may affect the safety of the appliance without the permission and supervision of the competent person.

6.9.2 Hoists

i) Hoist shafts should be enclosed with rigid panels or other adequate fencing at:

(a) ground level on all sides;
(b) all other levels at all points at which access is provided;
(c) all points at which persons are liable to be struck by any moving part.

ii) The enclosure of hoist shafts, except at approaches should extend where practicable at least 2mt above the floor, platform or other place to which access is provided except where a lesser height is sufficient to prevent any person falling down the hoistway and there is no risk of any person coming into contact with any moving part of the hoist, but in no case should the enclosure be less than 1mt in height.

iii) The guides of hoist platforms should offer sufficient resistance to bending and, in the case of jamming by a safety catch, to buckling.

iv) Where necessary to prevent danger, adequate covering should be provided above the top of hoist shafts to prevent material falling down them.

v) Outdoor hoist towers should be erected on firm foundations, and securely braced, guyed and anchored.

vi) A ladderway should extend from the bottom to the top of outdoor hoist towers, if no other ladderway exists within easy reach.

vii) Hoisting engines should be of ample capacity to control the heaviest load that they will have to move.

viii) Hoists should be provided with devices that stop the hoisting engine as soon as the platform reaches its highest stopping place.

ix) Winches should be so constructed that the brake is applied when the control handle is not held in the operating position.

x) It should not be possible to set in motion from the platform a hoist, which is not designed for the conveyance of persons.

xi) Winches should not be fitted with pawl and ratchet gears on which the pawl must be disengaged before the platform is lowered.

xii) Hoist platforms should be capable of supporting the maximum load that they will have to carry with a safety factor.

xiii) Hoist platforms should be equipped with safety gear that will hold the platform with the maximum load if the hoisting rope breaks.

xiv) If workers have to enter the cage or go on the platform at landings there should be a locking arrangement preventing the cage or platform from moving while any worker is in or on it.

xv) On sides not used for loading and unloading, hoist platforms should be provided with toe-boards and enclosures of wire mesh or other suitable material to prevent the fall of parts of loads.

xvi) Where necessary to prevent danger from falling objects, hoist platforms should be provided with adequate covering.

xvii) Counterweights consisting of an assemblage of several parts should be made of specially constructed parts rigidly connected together.

xviii) Counterweights should run in guides.

xix) Platforms should be provided at all landings used by workers.

xx) Following notices should be posted up conspicuously and in very legible characters:

(a) on all hoists:

- on the platform: the carrying capacity in kilograms or other appropriate standard unit of weight;
- on the hoisting engine: the lifting capacity in kilograms or other appropriate standard unit of weight;

(b) on hoists authorised or certified for the conveyance of persons:
- on the platform or cage: the maximum number of persons to be carried at one time;

(c) on hoists for goods only:
- on every approach to the hoist and on the platform: prohibition of use by persons.

xxi) Hoists intended for the carriage of persons should be provided with a cage so constructed as to prevent any person from falling out or being trapped between the cage and any fixed part of the structure when the cage gate is shut, or from being struck by the counterbalance weight or by articles or materials tailing down the hoistway.

xxii) On each side in which access is provided, the cage should have a gate fitted with devices which ensure that the gate cannot be opened except when the cage is at a landing and that the gate must be closed before the cage can move away from the landing.

xxiii) Every gate in the enclosure of the hoist shaft which gives access from a landing place to the cage should be fitted with devices to ensure that the gate cannot be opened except when the cage is at that landing place, and that the cage cannot be moved away from that landing place until the gate is closed.

6.9.3 **Derricks**

Stiff-leg derricks

i) Derricks should be erected on a firm base capable of taking the combined weight of the crane structure and maximum rated load.

ii) Devices should be used to prevent masts from lifting out of their seating.

iii) Electrically operated derricks should be effectively earthed from the sole plate or framework.

Iv) Counterweights should be so arranged that they do not subject the backstays, sleepers or pivots to excessive strain.

v) When derricks are mounted on wheels:

a) a rigid member should be used to maintain the correct distance between the wheels;
b) they should be equipped with struts to prevent them from dropping if a wheel breaks or the derrick is derailed.

v) The length of a derrick jib should not be altered without consulting the manufacturer.

vii) The jib of a scotch derrick crane should not be erected within the backstays of the crane.

Guy derricks

i) The restraint of the guy ropes should be ensured by fitting stirrups or anchor plates in concrete foundations.
ii) The mast of guy derricks should be supported by six top guys spaced approximately equally.
iii) The spread of the guys of a guy derrick crane from the mast should not be more than 450 from the horizontal.
iv) Guy ropes of derricks should be equipped with a stretching screw or turnbuckle or other device to regulate the tension.
v) Gudgeon pins, sheave pins and fool bearings should be lubricated frequently.
vi) When a derrick is not in use, the boom should be anchored to prevent it from swinging.

6.9.4 **Gin poles**

i) Gin poles should:

(a) be straight;
(b) consist of steel or other suitable metal;
(c) be adequately guyed and anchored;
(d) be vertical or raked slightly towards the load;
(e) be of adequate strength for the loads that they will be required to lift/move.

ii) Gin poles should not be spliced and if a gin pole is composed of different elements, they should be assembled in conformity with their intrinsic material strength.

iii) Gin poles should be fastened at their feet to prevent displacement in operation.

iv) Gin poles, which are moved from place to place and re-erected, should not be taken into use again before the pole, lifting ropes, guys, blocks and other parts have been inspected, and the whole appliance has been tested under load.

v) When platforms or skips are hoisted by gin poles, precautions should be taken to prevent them from spinning and to provide for proper landing.

6.9.5 **Tower cranes**

i) Where tower cranes have cabs at high level, persons, capable and trained to work at heights, should only be employed as crane operators.

ii) The characteristics of the various machines available should be considered against the operating requirements and the surroundings in which the crane will operate before a particular type of crane is selected.

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ii) Care should be taken in the assessment of wind loads both during operations and out of service. Account should also be taken of the effects of high structures on wind forces in the vicinity of the crane.

iv) The ground on which the tower crane stands should have the requisite bearing capacity. Account should be taken of seasonal variations in ground conditions.

v) Bases for tower cranes and tracks for rail-mounted tower cranes should be firm and level. Tower cranes should only operate on gradients within limits specified by the manufacturer. Tower cranes should only be erected at a safe distance from excavations and ditches.

vi) Tower cranes should be sited where there is clear space available for erection, operation and dismantling. As far as possible, cranes should be sited so that loads do not have to be handled over occupied premises, over public thoroughfares, other construction works and railways or near power cables.

vii) Where two or more tower cranes are sited in positions where their jibs could touch any part of the other crane, there should be direct means of communication between them and a distinct warning system operated from the cab so that one driver may alert the other of impending danger.

viii) The manufacturers' instructions on the methods and sequence of erection and dismantling should be followed. The crane should be tested before being taken into use.

Ix) The climbing operation of climbing tower cranes should be carried out in accordance with manufacturers' instructions. The free-standing height of the tower crane should not extend beyond what is safe and permissible in the manufacturers' instructions.

x) When the tower crane is left unattended, loads should be removed from the hook, the hook raised, the power switched off and the boom brought to the horizontal. For longer periods or at times when adverse weather conditions are expected, out of service procedures should be followed. The main jib should be slewed to the side of the tower away from the wind, put into free slew and the crane immobilised.

xi) A windspeed measuring device should be provided at an elevated position on the tower crane with the indicator fitted in the drivers' cab.

xii) Devices should be provided to prevent loads being moved to a point where the corresponding safe working load of the crane would be exceeded. Name boards or other items liable to catch the wind should not be mounted on a tower crane other than in accordance with the manufacturers' instructions.

xiii) Tower cranes should not be used for magnet, or demolition ball service, piling operations or other duties, which could impose excessive loading on the crane structure.

6.9.6 **Lifting ropes**

i) Only ropes with a known safe working capacity should be used as lifting ropes.
ii) Lifting ropes should be installed, maintained and inspected in accordance with manufacturers' instructions.
iii) Repaired steel ropes should not be used on hoists.
iv) Where multiple independent ropes are used, for the purpose of stability, to lift a work platform, each rope should be capable of carrying the load independently.

6.10 **VEHICLE MOVEMENT**

6.10.1 Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.

6.10.2 Don't overload the vehicle.

6.10.3 Obey speed limits and traffic rules.

6.10.4 Always expect the unexpected and be a defensive driver.

6.10.5 Drive carefully during adverse weather and road conditions.

6.10.6 Read the road ahead and ride to the left.

6.10.7 Be extra cautious at nights. Keep wind screens clean and lights in working condition.

6.10.8 All vehicles used for carrying workers and construction materials must undergo predictive/preventive maintenance and daily checks

6.10.9 Driver with proper valid driving license shall only be allowed to drive the vehicle

6.10.10 Routes shall be leveled, marked and planned in such a way so as to avoid potential hazards such as overhead power lines and sloping ground etc.

6.10.11 While reversing the vehicles, help of another worker should be ensured at all times

6.10.12 An unattended vehicle should have the engine switched off

6.10.13 Wherever possible one-way system shall be followed
6.10.14 Barriers/fixed stops should be provided for excavation/openings to prevent fall of vehicle
6.10.15 Load should be properly secured
6.10.16 The body of the tipper lorry should always be lowered before driving the vehicle off.
6.10.17 Signs/signals/caution boards etc. should be provided on routes.

6.11 **ELECTRICAL**

6.11.1 General Provisions

i) Only persons having valid licenses should be allowed to work on electrical facilities.

ii) No person should be allowed to work on live circuit. The same, if unavoidable, special care and authorisation need to be taken.

iii) Treat all circuits as "LIVE" unless ensured otherwise.

iv) Electrical "Tag Out" procedure "MUST" be followed for carrying out maintenance jobs.

v) Display voltage ratings prominently with "Danger" signs.

vi) Put caution/notice signs before starting the repair works.

vii) All electrical equipment operating above 250V shall have separate and distinct connections to earth grid.

viii) Proper grounding to be ensured for all switch boards and equipment including Portable ones prior to taking into service.

ix) Make sure that electrical switchboards, portable tools, equipments (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry and then only use them. Check proper earthing. All temporary switch boards/ KIOSKS put up at work site should be suitably protected from rain and the level of same should be high enough to avoid contact with water due to water logging.

x) Don't work wet on electrical system.

xi) Don't overload the electrical system.

xii) Use only proper rated HRC fuses.

xiii) Industrial type extension boards and Plug sockets are only to be used.

xiv) ELCB for all temporary connections must be provided. Use insulated 3-pin plug tops.

xv) All power supply cables should be laid properly and neatly so that they don't cause hindrance to persons working and no physical damage also takes place to the cables during various construction activities.

xvi) All Power cables to be properly terminated using glands and lugs of proper size and adequately crimped.

xvii) Use spark-proof/flame proof type electrical fittings in Fire Hazard zones as per area classification under OISD-STD-113.

xviii) Check installations of steel plates/pipes to protect underground cables at crossings.

xix) Don't lay unarmored cable directly on ground, wall, roof or trees. All temporary cables should be laid at least 750 mm below ground and cable markers should be provided. Proper sleeves should be provided at road crossings. In case temporary cables are to be laid on wooden poles/steel poles, the minimum cable heights should be 4.5 M.

xx) Maintain safe overhead distance of HT cables as per Indian Electricity Rules and relevant acts.

xxi) Don't connect any earthing wire to the pipelines/structures.

xxii) Don't make any unsafe temporary connections, naked joints/wiring etc.

xxiii) Ensure that temporary cables are free from cuts, damaged insulation, kinks or improper insulated joints.

xxiv) Check at periodic intervals that pins of sockets and joints are not loose.

xxv) Protect electrical wires/equipments from water and naked flames.

xxvi) Illuminate suitably all the work areas.

xxvii) All switchboards should be of MS structure only and incoming source should be marked.

xxviii) Hand lamps should not be of more than 24V rating.

xxix) Fire extinguishers (DCP/CO2/Sand buckets) should be kept near temporary switch boards being used for construction purposes. Don't use water for fighting electrical fires.

xxx) Insulating mats shall be provided in the front and back end of switch boards.

xxxi) All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and external explosion. Periodic checking/certification of electrical safety appliances such as gloves, insulating mats, hoods etc. to be done/witnessed along with maintaining a register at site signed by competent authority.

xxxii) A notice displaying following, should be kept exhibited at suitable places:
- a) prohibiting unauthorised persons from entering electrical equipment rooms or from handling or interfering with electrical apparatus;
- b) containing directions as to procedures in case of fire, rescue of persons in contact with live conductors and the restoration of persons suffering from electric shock;
- c) specifying the person to be notified in case of electrical accident or dangerous occurrence, and indicating how to communicate with him.

xxxiii) No other cables/pipes to be laid in trench used for electrical cables.

xxxiv) Utmost care should be taken while excavating Earth from cable trench to avoid damage or any accident.

xxxv) Sub-station floor cut-outs meant for switch board installations to be covered wherever installation is incomplete.

NOTE: A Residual Current Operated Circuit Breaker (RCCB) or Earth Leakage Circuit Breaker (ELCB), when installed, protects a human being to the widest extent. RCCB or ELCB should be provided as per Indian Electricity Rules

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6.11.2 **Inspection and maintenance**

i) All electrical equipment should be inspected before taking into use to ensure suitability for its proposed use.

ii) At the beginning of every shift, the person using the electrical equipment should make a careful external examination of the equipment and conductors, especially the flexible cables.

iii) Apart from some exceptional cases, work on or near live parts of electrical equipment should be forbidden.

iv) Before any work is begun on conductors or equipment that do not have to remain live:
- a) the current should be switched off by a responsible authorised person;
- b) precautions should be taken to prevent the current from being switched on again;
- c) the conductors or the equipment should be tested to ascertain that they are dead;
- d) the conductors and equipment should be earthed and short-circuited;

e) neighboring live parts should be adequately protected against accidental contact.

v) After work has been done on conductors and equipment, the current should only be switched on again on the orders of a competent person after the earthing and short-circuiting have been removed and the workplace reported safe.

vi) Electricians should be provided with approved and tested tools, and personal protective equipment such as rubber gloves, mats etc.

vii) All conductors and equipment should be considered to be live unless there is a proof of the contrary.

viii) When work has to be done in dangerous proximity to live parts the current should be cut off. If for operational reasons this is not possible, the live parts should be fenced off or enclosed by qualified staff from the sub-station concerned.

6.11.3 **Testing**

i) Electrical installations should be inspected and tested and the results recorded.
ii) Periodic testing of the efficiency of the earth leakage protective devices should be carried out.
Iii) Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity and insulation resistance, protection against mechanical damage and condition of connections at points of entry.

6.12 **OFFSHORE**

6.12.1 **General**

The isolated nature of offshore installations are hazardous. They call for greater need for safety and survival at offshore. Safety at offshore is safety of installations and safety of personnel. Safety problems and accidents at offshore have high risks due to limited space, helicopter operation, sea transport etc. Following are the general safety guidelines to be followed in addition to the safety guidelines stipulated for specific jobs dealt later on:

i) Workers should be well trained to do their job independently with high degree of self-control and self-discipline.

ii) On arrival at offshore, everyone should be briefed about the safety rules to be followed at offshore, evacuation system etc. All personnel should wear overall (dangri), helmet and shoes for personnel protection.

iii) In case of emergency, workers should follow instruction of Field Production Superintendent (F.P.S.) In certain cases instructions may be given to abandon the offshore installation and evacuate the persons to safe location.

iv) To overcome above problems, offshore personnel must receive training for using life saving appliances and other personal survival techniques.

v) Any person working at offshore should have one person as standby for any eventuality.

6.12.2 **Drilling Rigs**

i) Location of jack up rigs should not be less than 5 Kms from shipping route. Orientation of the rig, wind direction etc are required for safe landing of helicopter. Information w.r.t. sea currents, wind speed, Hi-lo tide etc are required for mooring of supply vessels.

ii) Sea bed condition at every location should be ensured for safety of rig.

iii) Radio and other communication facilities should be such to maintain contact with base all times.

iv) During toeing of rig, the rig deck should be clear of load, toeing lines should be in good condition and tensions in various toeing lines should be constantly monitored.

v) Few steps during toeing are:
   a) crane booms should be secured to their vesta,
   b) all hatches and water tight doors should be closed,
   c) number of personnel on board should be restricted,
   d) evacuate in case of emergency and operation should be completed preferably in day light.

6.12.3 **Drilling**

i) In view of CO2 and H2S gas cut from well, effective ventilation should be provided where drilling is in progress.

ii) Safety alarm shall be checked in advance in view of failure of ventilation system.

iii) Suitable sensors for H2S and Methane should be function tested time to time and suitable colour code should be given.

iv) Working areas of the crane should be illuminated during night to avoid accident.

v) Clear space should be available for despatch and receipt of load and, in particular, basket transfer of passengers. Persons engaged in loading/unloading of materials should be protected from falling into the sea.

vi) Signal light should be fitted at the top of the jib.

vii) Crane hook should be fitted with safety latches.

viii) Experienced person should be engaged in operation of specific equipment like winches, cranes etc.

ix) At least three cable turns shall always be there on the winch drum.

x) Adequate communication like walkie talkie, round robin phone should be available between the crane operator, supervisor and helper.

xi) Crane operation should be completely stopped during helicopter landing/taking off.

xii) Except for helicopter landing deck, all decks, platforms, bridges, ladders should have rigid and fixed guard rails atleast one meter high and should have one intermediate rail midway between the handrail and 100 mm toe board.

xiii) Wooden ladders shall not be used at offshore.

xiv) Flow sensor in the flow line should be ensured for safe working and to avoid blow out.

xv) Hydrogen sulphuide gas In offshore is of great risk and at 10 ppm (0.001%) concentration in air, a person should not be exposed for more than 8 hours, If concentration is more, then breathing apparatus should be used. Corrosion of equipment is also caused by H2S.

xvi) Portable H2S gas detector should be continuously used.

6.12.4 **Production Platforms**

i) In case hydrocarbon is released due to overpressure, leak, overflow, gas blow etc., shut down process to stop flow of hydrocarbon. Prevent ignition of released hydrocarbon and in case of fire shut in the process complex and follow emergency contingency plan.

ii) Sub surface safety valve (SSSV)) below the well head should be actuated during uncontrolled well -flow and they should be regularly checked.

iii) Surface safety valve or SDV should be checked for no gas leakage from bleed port/ flange etc., in the well head area. It should not be in "mechanical override" or bypassed from panel.

iv) High pressure gas lift lines - blowdown system should be O.K.

v) Auto actuation of SDVs in the inlet of pressure vessels should be O.K. and in "normal position" from shutdown panels. A record of status of switches normal/bypassed in auto-con* panels (PSH, PSL, LSL, ILSL) should be maintained.
* Shut Down Panels

vi) Welders rectifier set and electrical connections to it should be checked and approved by electrical-in- charge for proper electrical safely.

vii) "SCADA" telementry system if available should be operational for remote opening and closing of wells at unmanned platforms (through RPMC).

viii) Local ESD/FSD (near the work site) should be provided for jobs of very critical nature, so that the persons working can access it immediately in emergency for safety. Safety officer should judge the requirement & inform FPS for the same.

ix) Railings and Gratings etc. in and around work area should be O.K. and inspected to avoid slippage of man into sea.

x) Emergency shut down (ESD) system is initiated when an abnormal condition is detected. ESD should be checked once in six months.

xi) Platform should be manned round the clock.

xii) Welding and cutting work should be regulated by hot work permit.

xiii) All detectors should be calibrated as per recommendation of the manufacturer.

xiv) No system should be by-passed which affects the system of platform.

xv) In H2S field platforms, due care shall be taken as per recommendations.

xvi) Follow the instructions of F.P.S. during stay at platform

6.12.5 **Fire Prevention And Control**

i) Provision be made for safe handling and storage of dirty rags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.
ii) Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be transported in hand-cart.
iii) Smoking should be restricted and no smoking area should be identified.
iv) Special attention should be given to crude oil pump seals, diesel and gas engines which are potential source of ignition in the event of failure.
v) Fire and smoke detectors i.e. ultraviolet heat, thermal and smoke detector should be function tested once in three months.

vi) Fire is controlled in offshore by water spraying, Halon, CO2 flooding, DCP and sprinkler system.

vii) Foaming agent is applied for controlling fire in liquid hydrocarbon. The system is not effective in gas fire.

viii) Light weight breathing system should be used.

ix) The fire control plan at offshore should reveal control station, fire alarms and fire detectors, deluge valves and sprinkler, fire extinguishing appliances, fireman outfit and ventilation system.

x) Fire fighting equipment should be maintained in ready to use condition.

6.12.6 **Life Saving Appliances**

i) Life boats with a speed of 6 knots and carrying capacity upto 50 persons are used in offshore.

ii) No. of life boats on one installation should have a capacity to accommodate twice the number of persons onboard installation.

iii) Launching appliances and life boat equipment should be checked every week.

iv) Boat landing areas should be adequately illuminated.

v) Life raft has no power and they rely on drift.

vi) Life jacket lifts the wearer after entering water.

vii) Life buoys are used to rescue persons if any person accidentally falls in the sea.

viii) All life saving appliances should be inspected by the MMD surveyor/ sr. Officials once a year.

ix) Every life boat shall be inspected once a week.

x) Every life boat and life raft should be serviced once a year by a competent authority,

6.12.7 **Safety Precautions during Helicopter Transportation**

i) Passenger briefing regarding safety rules while travelling in helicopter should be carried out before boarding the helicopter.

ii) Emergency procedure should be briefed to all the passenger In case helicopter is to ditch into the sea.

iii) Heli-pad should have a non-skid surface. Nylon rope net should be stretched on the deck.

iv) Proper drainage should be available on helideck.

v) There should be no obstruction on the helideck itself and within 3 meters of its parameter. Closest super structure above the helideck should have red obstruction light.

vi) While landing fire crew of two persons should be standby adjacent to helideck.

vii) Heli-deck should be properly illuminated for night landing.

viii) During switching off helicopter, persons should not be allowed to go out/ towards helicopter

6.13 **DEMOLITION**

6.13.1 **General provisions**

i) When the demolition of any building or structure might present danger to workers or to the public:

   (a) necessary precautions, methods and procedures should be adopted, including those for the disposal of waste or residues;
   (b) the work should be planned and undertaken only under the supervision of a competent person.

ii) Before demolition operations begin:

   (a) structural details and builders' drawings should be obtained wherever possible;
   (b) details of the previous use should be obtained to identify any possible contamination and hazards from chemicals, flammables, etc.;
   (c) an initial survey should be carried out to identify any structural problems and risks associated with flammable substances and substances hazardous to health. The survey should note the type of ground on which the structure is erected, the condition of the roof trusses, the type of framing used in framed structures and the load-bearing walls;
   (d) a method of demolition should be formulated after the survey and recorded in a method statement having taken all the various considerations into account and identifying the problems and their solutions;

iii) All electric, gas, water and steam service lines should be shut off and, as necessary, capped or otherwise controlled at or outside the construction site before work commences.

iv) If it is necessary to maintain any electric power, water or other services during demolition operations, they should be adequately protected against damage.

v) As far as practicable, the danger zone round the building should be adequately fenced off and sign posted. To protect the public a fence 2m high should be erected enclosing the demolition operations and the access gates should be secured outside working hours.

vi) The fabric of buildings contaminated with substances hazardous to health should be decontaminated. Protective clothing and respiratory devices should be provided and worn.

vii) Where plant has contained flammable materials, special precautions should be taken to avoid fire and explosion.

viii) The plant to be demolished should be isolated from all other plant that may contain flammable materials. Any residual flammable material in the plant should be rendered safe by cleaning, purging or the application of an inert atmosphere as appropriate.

ix) Care should be taken not to demolish any parts, which would destroy the stability of other parts.

x) Demolition activities should not be continued under adverse climatic conditions such as high winds, which could cause the collapse of already weakened structures.

xi) To prevent hazards parts of structures should be adequately shored, braced or otherwise supported.

xii) Structures should not be left in a condition in which they could be brought down by wind pressure or vibration.

xiii) Where a deliberate controlled collapse technique is to be used, expert engineering advice should be obtained, and:

(a) it should only be used where the whole structure is to come down because it relies on the removal of key structural members to effect a total collapse;

(b) it should only be used on sites that are fairly level and where there is enough surrounding space for all operatives and equipment to be withdrawn to a safe distance.

xiv) When equipment such as power shovels and bulldozers are used for demolition, due consideration should be given to the nature of the building or structure, its dimensions, as well as to the power of the equipment being used.

xv) If a swinging weight is used for demolition, a safety zone having a width of at least one-and-a-half times the height of the building or structure should be maintained around the points of impact.

6.13.2 **Demolition of structural steelwork**

i) All precautions should be taken to prevent danger from any sudden twist, spring or collapse of steelwork, ironwork or reinforced concrete when it is cut or released.
ii) Steel construction should be demolished tier by tier.
iii) Structural steel parts should be lowered and not dropped from a height.

6.14 **RADIOGRAPHY**

6.14.1 All radiography jobs shall be carried out as per BARC Safety Regulations
6.14.2 During field radiography, nearby area around the radiation source should be cordoned off.
6.14.3 If the field radiography is to be done at the same location repeatedly, it is advisable to provide either a wire fencing around or a temporary brick enclosure.

6.14.4 Special permission/permit should be taken for radiography from area-in-charge.

6.14.5 As far as possible, field radiography should be done only during night time when there is little or no occupancy there.

6.14.6 Radiation warning signals should be pasted all along the cordoned off area.

6.14.7 Entry into the restricted area by unauthorised persons should be strictly prohibited during exposure.

6.14.8 The radiation level alongwith the cordon should be monitored by a suitable and wellcalibrated radiation survey meter.

6.14.9 All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.

6.14.10 Protection facilities such as manipulator rod, remote handling tongs, lead pots, radiation hazard placards and means of cordon off shall be available at each site.6.14.11 The radiography source shall never be touched or handled directly with hands.
6.14.12 The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.

6.14.13 Radiography sources and cameras, when not in use, should be stored inside a source pit with lock and key arrangement as approved by BARC. The storage room should preferably be located in an isolated area of minimum occupancy and radiation level outside the storage room should not exceed 0.25 mR/hr as per BARC Regulations.

6.14.14 In case of an accident (due to loss or of damage to radiography source), action should be taken in line with BARC Safety Rules/Guidelines.

6.15 SAND/SHOT BLASTING/ SPRAY PAINTING

6.15.1 Sand blasting should be used only after approval from competent person.

6.15.2 Air Compressor used for sand/shot blasting/painting should have guard and positioned away from the work place.

6.15.3 Exhaust of the prime mover, if IC engine is used, should be directed away from the work place.

6.15.4 In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.

6.15.5 The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check/ test.

6.15.6 The operator of sand/shot blasting/painting should wear suitable PPE's including mask.

6.15.7 Adequate measures to be taken to suppress dust/spray particle.

6.15.8 Sand used for sand blasting should be suitably covered & protected from to rain/moisture.

6.15.9 When these activities are done in confined places, adequate measure to be taken for proper ventilation.

6.16 WORK ABOVE WATER

6.16.1 General Provisions

i) Where work is done over or in close proximity to water & where possibility of drowning exists, provision should be made for:
   a) Preventing workers from falling nto water;
   b) The rescue of workers in danger of drowning;
   c) Safe and sufficient transport.

Ii) Provisions for the safe performance of work over or in close proximity to water should include, where appropriate, the provision and use of suitable and adequate:

   a) fencing, safety nets and safety harnesses;
   b) lifebuoys, life jackets and manned boats;
   c) protection against such hazards as reptiles and other animals.

iii) Gangways, pontoons, bridges, footbridges and other walkways or work places over water should:
   a) possess adequate strength and stability;
   b) be sufficiently wide to allow safe movement of workers;
   c) have level surfaces free from tripping hazards;
   d) be adequately lit when natural light is insufficient;
   e) where practicable and necessary, to prevent danger, be provided with toeboards, guard rails, hand ropes etc.

f) be secured to prevent dislodgment by rising water or high winds;
g) if necessary, be equipped with ladders which should be sound, of sufficient strength and length and be securely lashed to prevent slipping.

iv) All deck openings including those for buckets should be fenced.

6.16.2 **Rescue & Emergency procedures**

i) Persons who work over water should be provided with some form of buoyancy aid. Life jackets should provided sufficient freedom of movement, have sufficient buoyancy to bring persons to the surface and keep them afloat face upwards, be easily secured to the body, be readily visible by way of self luminous paint/strip.
ii) Nobody should work alone on or above water.
iii) Each worker should be trained in the procedure to be followed in the event of an emergency.

7.0 ADDITIONAL SAFETY PRECAUTION FOR UNITS WITH HYDROCARBONS

In addition to general safety precautions as outlined above for the activities in Clause 6.0, following additional safety precautions need to be taken for the sites within the operating area or nearby, where presence of Hydrocarbons cannot be ruled out.

i) No job shall be carried out without a valid permit. Permit should be in line with OISD-STD-105 "Work Permit System".
ii) Smoking should be prohibited in all places containing readily combustible or flammable materials and "No Smoking" notices be prominently displayed.
iii) In confined spaces and other places where flammable gases, vapours or dusts can cause danger, following measures should be taken:
(a) only approved type electrical installations and equipment, including portable lamps, should be used;
(b) there should be no naked flames or source of ignition;
(c) oily rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place;
(d) ventilation should be provided.

iv) Regular inspections should be made of places where there are fire risks. These include the vicinity of heating appliances, electrical installations and conductors, stores of flammable and combustible materials, welding and cutting operations.

v) Welding, flame cutting and other hot work should only be done after issuance of work permit in line with the requirement of OISD-STD-105 after appropriate precautions, as required, are taken to reduce the risk of fire. For carrying out other jobs also, OISD-STD-105 should be followed strictly.

vi) Fire-extinguishing equipment should be well maintained and inspected at suitable intervals by a competent person. Access to fire-extinguishing equipment such as hydrants, portable extinguishers and connections for hoses should be kept clear at all times.

vii) All supervisors and a sufficient number of workers should be trained in the use of fire-extinguishing equipment, so that adequate trained personnel are readily available during all working periods.

viii) Audio means to give warning in case of fire should be provided where this is necessary to prevent danger. Such warning should be clearly audible in all parts of the site where persons are liable to work. There should be an effective evacuation plan so that all persons are evacuated speedily without panic and accounted for and all plant and processes shut down.

ix) Notices should be posted at conspicuous places indicating:
(a) the nearest fire alarm;
(b) the telephone number and address of the nearest emergency services.

x) The work site shall be cleared of all combustible materials, as Sparks and molten metal coming from the welding job can easily ignite combustible materials near or below the welding site. If the combustible materials cannot be removed from the area, the same shall be properly shielded.

xi) A dry chemical type fire extinguisher shall be made available in the work area. Also fire protection facilities like running hoses etc. as per permit should be complied with.

xii) Wherever required, welding screens shall be put up to protect other equipment in adjoining areas against flying sparks. Material used should be metal/asbestos/water curtain.

xiii) Welding or cutting of vessels/ equipments used in Hydrocarbon/ hazardous chemicals shall be done after proper gas freeing and verifying the same with the explosive-meter.

xiv) The confined space/equipment shall be gas freed and cleaned.

xv) Absence of any toxic gas and any flammable gas above explosion limit shall be ensured with the help of gas detection instrument and explosive meter respectively.

xvi) Used and hot electrode stubs shall be discarded in a metal bucket.

xvii) Use approved and certified flame arrestors for vehicles.

xviii) Work permit to be obtained, if construction work is carried out within existing operating area.

8.0 FIRST AID

First aid facilities should be provided in line with various statutory regulations like factory act etc. However following care should be taken:

i) First aid, including the provision of trained personnel should be ensured at work sites. Arrangement should be made for ensuring the medical attention of the injured workers. First aid box should be as per the Factory rules.

ii) Suitable rescue equipment, like stretchers should be kept readily available at the construction site.

iii) First-aid kits or boxes, as appropriate and as per statutory requirements, should be provided at workplaces and be protected against contamination by dust, moisture etc.

iv) First-aid kit or boxes should not keep anything besides material for first aid in emergencies.

v) First-aid kits and boxes should contain simple and clear instructions to be followed, be kept under the charge of a responsible person qualified to render the first aid and be regularly inspected and stocked.

vi) Where the work involves risk of drowning, asphyxiation or electric shock, firstaid personnel should be proficient in the use of resuscitation and other life saving techniques and in rescue procedures.

vii) Emergency telephone numbers of nearby Hospitals, Police, Fire Station and Administration should be prominently displayed.

9.0 DOCUMENTATION

The intention of keeping documentation of all types of accident(s) is to prevent recurrence of similar accident(s). All accidents should be reported as per OISD Guidelines (OISD-GDN-107) and Factories act, 1948. All accidents (major, minor or near miss) should be investigated, analysed and recommendations should be documented along with implementation status. All related data should be well-documented and further analysis highlighting the major cause(s) of accidents be done. This will help in identifying thrust areas and training needs for prevention of accidents.

10.0 SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from site-in-charge to workmen helps not only preventing the risk but also build up the confidence. Time and expenditures also get saved as a result.

Safety awareness basically seeks to persuade/inform people on safety besides supplementing skill also. Awareness programme may include followings:

i) Poster: Posters with safety slogan in humorous, gruesome demonstrating manner may be used to discourage bad habits attributable to accidents by appealing to the workers' pride, self-love, affection curiosity or human aspects. These should be displayed in prominent location(s).

ii) Safety Sign Boards: Different type of message of cautioning, attention, notice etc. should be displayed at the appropriate places for learning/ awareness of the workmen while working at site.

iii) Films & Slides: Film(s) narrating the accident including the causes and possible remedial ways of preventing the recurrence of a similar accident should be displayed at regular intervals. Slides consisting main points of the film show may also be shown to workers.

iv) Talks, lectures & conferences: The success of these events would depend much on audience's understandings of the speaker (s). The speakers are to be knowledgeable and good presenter. Speakers should know to hold the attention and to influence the audiences.

v) Competitions: Organise competition(s) between the different deptts/categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.

vi) Exhibitions: Exhibitions also make the workers acquainted with hazards and means of preventive measures.

vii) Safety Publication: Safety publications including pocket books dealing with ways of investigation and prevention in the field of safety and so on, may be distributed to workers to promote the safety awareness.

viii) Safety Drives: From time to time, an intensive safety drive by organising a safety day or a safety week etc. should be launched.

ix) Training: Training for covering the hazards for different trade should be imparted. Training should also include the specific hazards related to a job in addition to the general safety training as has been dealt in various chapters and should include all workers. Reference may be drawn from OISD-STD-154.

11.0 REFERRENCES

i) Factory Act, 1948

ii) Indian Electricity Rules

iii) Safety & Health in Construction by ILO

iv) The Building & Other Construction Workers (Regulation, Employment and Conditions of Service) Act 1996

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ANNEXURE - I

LIST OF SAFETY CODES FOR CIVIL WORKS PUBLISHED BY BUREAU OF INDIAN STANDARDS

Sr. No	Code No.	Title
01.	IS : 818	Code of Practice for Safety and Health Requirements in Electric and Gas Welding and Cutting Operations – First Revision.
02.	IS : 875	Code of practice for Structural safety of buildings: Masonry walls
03.	IS : 933	Specification for Portable Chemical Fire Extinguisher, Foam Type - Second Revision.
04.	IS : 1179	Specification for Equipment for Eye and Face Protection during Welding - First Revision.
05.	IS : 1904	Code of practice for Structural safety of buildings: Shallow foundations
06.	IS : 1905	Code of practice for Structural safety of buildings: Masonry walls
07.	IS : 2171	Specification for Portable Fire Extinguishers, Dry Powder Type -Second Revision.
08.	IS : 2361	Specification for Building Grips - First Revision.
09.	IS : 2750	Specification for Steel Scaffoldings.
10.	IS : 2925	Specification for Industrial Safety Helmets - First Revision.
11.	IS : 3016	Code of Practice for Fires Precautions in Welding and Cutting Operations - First Revision.
12.	IS : 3521	Industrial safety belts and harnesses
13.	IS : 3696 - Part I	Safety Code for Scaffolds and Ladders : Part I - Scaffolds.
14.	IS : 3696 - Part II	Safety Code for Scaffolds and Ladders : Part II - Ladders.
15.	IS : 3764	Safety Code for Excavation Work.
16.	IS : 4014 -Part I & II	Code of practice for Steel tubular scaffolding
17.	IS : 4081	Safety Code for Blasting and Related Drilling Operations.
18.	IS : 4082	Recommendations on staking and storage of construction materials at site
19.	IS : 4130	Safety Code for Demolition of Buildings - First Revision.
20.	IS : 4138	Safety Code Working in Compressed Air-First Revision
21.	IS : 4756	Safety code for Tunneling works
22.	IS : 4912	Safety requirements for Floor and Wall Openings, Railings and toe Boards -First Revision.
23.	IS : 5121	Safety Code for Piling and other Deep Foundations.
24.	IS : 5916	Safety Code for Construction involving use of Hot Bituminous Materials.
25.	IS : 5983	Specification for Eye Protectors - First Revision.
26.	IS : 6922	Structures subject to underground blasts, criteria for safety and design of

27. IS : 7155	Code of recommended practices for conveyor safety
28. IS : 7205	Safety Code for Erection on Structural Steel Works.
29. IS : 7069	Safety Code for Handling and Storage of Building Materials.
30. IS : 7293	Safety Code for Working with Construction Machinery.
31. IS : 7323	Guidelines for operation of Reservoirs
32. IS : 7969	Safety code for handling and storage of building material
33. IS : 8758	Recommendation for Fire Precautionary Measures in construction of Temporary Structures and Pandals.
34. IS : 8989	Safety Code for Erection of Concrete Framed Structures.
35. IS : 9706	Code of Practices for construction of Arial ropeways for transportation of material
36. IS : 9759	Guidelines for de-watering during construction
37. IS : 9944	Recommendations on safe working load for natural and manmade fibre roap slings
38. IS : 10291	Safety code for dress divers in civil engineering works
39. IS :10386 - Part I	Safety Code for Construction, Operation and Maintenance for River Valley Projects.
40. IS :10386 - Part II	Safety Code for Construction, Operation and Maintenance of River Valley Projects.
41. IS : 11057	Code of practice for Industrial safety nets
42. IS : 13415	Code of Practice on safety for Protective barriers in and around building
43. IS : 13416	Recommendations for preventive measures against hazards at working places