Environment, Health & Safety Manual

SPML
Engineering Life

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Fire Fighting & First Aid

Safety Management

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1. Environment, Health & Safety Policy

SPML Infra Limited is committed to be environment friendly and health conscious by following safety practices in compliance with applicable legal requirements.

In its endeavor to meet these objectives, SPML affirms its commitment to create, maintain and spread a culture of continual improvement that involves all employees located in its offices & sites across the globe so as to ensure safe and hazard free work conditions.

SPML will ensure compliance with the applicable laws relating to Environment, Health and Safety by setting up effective procedures and regularly monitoring the same for continual improvement.

SPML will ensure enhanced awareness of this policy through various means so as to reach all our stakeholders, i.e. employees, customers, suppliers, contractors and other associates.

Date : 15th April 2017

Subhash Sethi
Chairman

2A. List of Abbreviations

HOD	Head of Department
LTI	Lost Time Injury
PNM	Plant and Machinery
PPE	Personal Protective Equipment
ELCB	Earth Leakage Circuit Breaker
GFCI	Ground Fault Circuit Interrupter
HT	High Tension
DCP	Dry Chemical Powder
RCCB	Residual Current Circuit Breaker
BARC	Bhabha Atomic Research Centre
IC	Internal Combustion
HRC	High Rupturable Cartridge
AFFF	Aqueous Film – Forming Foam
MSDS	Material Safety Data Sheet

2B. Definitions

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.

Competent Authority
A statutory 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.

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 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.

Manhour Worked
The total number of employee-hours worked by all employees working in the premises. It includes managerial, supervisory, professional, technical, clerical and other workers (including contractor labours, security personnel & other casuals) Manhours worked shall be calculated from the pay roll or time office record including overtime if applicable. When this is not

applicable, the same shall be estimated by multiplying the total mandays worked for the period covered by the number of hours worked per day. The total number of mandays for a period is the product of the number of persons engaged multiplied by the mandays worked.

Mandays Lost
The day on which the injury occurred and the day injured person returned to the work are not to be included as mandays lost, but all intervening calendar days (including Sundays or days off or days of plant shutdown) are to be included if after resumption of work, the person injured is again disabled for any period arising out of the injury which caused his earlier disablement, such subsequent disablement is also to be included in the mandays lost.

According to the schedule of charges, a loss of 6000 mandays is taken for death of a person.

Accident
An unintended occurrence arising out of and in the course of employment of a person resulting in injury.

Reportable Lost Time Injury
An injury causing death or disablement of the injured person for 48 hours or more excluding the day of the shift on which the accident occurred

Confined Space
A workplace having limited openings for ingress or egress making it difficult for the person inside the confined space to escape freely at will this workplace could be oxygen deficient (less than 19.5%) or oxygen enriched (more than 23.5%) & could have (i) Restricted flow of fresh air, (ii) or contain (a) inflammable gases / vapors (b) or toxic gases (c) or other specified physical hazards which could overcome those working inside the confined space and physically or mentally immobilize the affected person.

Dangerous Occurrence
An unplanned event, whether or not it is attended by personal injury or disablement, which results in –

a) Bursting of a plant used for containing or supplying steam under pressure greater than atmospheric pressure.
b) Collapse or failure of a crane, derrick, winch, hoist, or other appliance used in raising or lowering persons or goods, or any part thereof, or the overturning of a crane.
c) Explosion or fire or bursting out, leakage or escape of any hot substance (molten metal, liquid or gas) causing injury to any person or any room or place in which persons are employed.
d) Explosion of a receiver or container used for the storage at a pressure greater than atmospheric pressure of any gas or gases (including air) or any liquid or solid resulting from the compression of gas.
e) Collapse or subsidence of any floor, gallery, roof, bridge, tunnel, chimney, wall, building, excavation or any other structure or formwork or scaffold.

Near Miss Case
An incident that had the potential to cause personal injury, property damage or both

Hazard
Hazard is any existing or potential physical condition in the workplace that by itself or by interacting with other variables can result in death, injuries, property damage and any other losses.

Risk
Risk is the likelihood that the hazard will result in an accident risk also considers how serious the resultant injury would be

Frequency Rate
Number of Reportable lost time injuries per million manhours worked

$$\text{Frequency Rate} = \frac{\text{Number of Reportable Lost Time Injuries X } 10^6}{\text{Manhours worked}}$$

Severity Rate
Number of mandays lost due to reportable lost time injuries per million manhours worked

$$\text{Severity Rate} = \frac{\text{Mandays Lost due to Reportable Injuries X } 10^6}{\text{Manhours worked}}$$

Fatality Rate
Number of fatalities per Lakh manpower engaged

$$\text{Fatality Rate} = \frac{\text{Number of fatalities X } 10^5}{\text{Number of Workmen engaged}}$$

Incidence Rate
Ratio of number of reportable lost time injuries to the number of persons during the period under review. It is expressed as number of injuries per 1000 persons employed

$$\text{Incidence Rate} = \frac{\text{Number of Reportable Lost Time Injuries X 1000}}{\text{Average Number of Persons Employed}}$$

3. Duties/Responsibilities

a. Site In-charge

i. To accept prime responsibility for the prevention of accident in his site and implementation of Health & Safety Policy at Sites of the Company.
ii. To enforce all general and section safety rules and regulations.
iii. To inspect working area regularly along with site safety committee's members.
iv. To report accidents and near misses and its investigation as per the clients requirements and under the guidelines of safety department.
v. Use only tested lifting tools & tackles.
vi. To maintain good housekeeping in their respective area.
vii. To follow the work permits system (Hot/Cold/Electrical Work/ Confined Space) at site.
viii. To ensure the use of Personal Protective Equipment as per the nature of the job.
ix. To coordinate with client requirements of procedures for safety and certify area/equipment etc. for safe working, after thorough checking as necessary and as required by client.
x. To stop work in case of imminent danger to man, machine or material observed and resumed only after corrective measures.
xi. To ensure that work statement made and safety precaution implement before start of work.
xii. To be familiar with state and statutory legislations and client safety guidelines.
xiii To attend training and ensure participation of his workers for training as per schedule arrange by safety department and client and keep himself updated.
xiv To organize safety committee (Appendix-18 Ref-IJ-18-Rev-00) and conduct a safety meeting on regular basis.
xv Provide the corporate safety department with the necessary information required to evaluate the effectiveness of the safety and health programme.
xvi Establish within their project that motivation which results in the maintenance of high safety and health on projects.
xvii Work in close cooperation with the site safety officer to eliminate and correct all practices and conditions that are deemed to be unsafe.
xviii Accompany corporate safety representative on site audits.

b. Safety Officer (Corporate Office)

i. Will ensure that central, state, local safety laws, regulation codes and rules are observed.
ii. Will ensure that legal record keeping and reporting requirements are made.
iii. Will assist top manager in preparing safety policy and then ensure that they are carried out. Any non-compliance with policy should be reported to the manager concerned who is capable of directing the corrective action.
iv. Will carry out site safety Inspection in order to observe the physical conditions of work, work practices and procedures followed by workers and render advise to concerned department on measures to be adopted for removing the physical conditions and preventing unsafe actions by workers.

v. Will assist in the formation of safety committees and arrange meeting.
vi. Will maintain accidents record.
vii. Will prepare safety check list and safety permit along-with concerned Supervisor as per requirement of the concerned department.
viii. Will arrange safety training of supervisors, engineers and workmen in coordination with training & development department.
ix. Will organize safety competitions, campaign and other activities in association with the concerned department.
x. Will arrange and ensure the availability of personnel protective equipments.
xi. Will maintain liaison with safety officers of near by factories and institutions to keep him well known with latest technology.

c. Site Safety Officer

i. Will be responsible for all safety programmes in the department or concerned area and he will be reported to corporate safety department.
ii. Will train all employees for safe working methods, hazards related with job, usage of personal protective equipment and so on.

iii. Will conduct monthly departmental safety meeting in co-ordination with Site In-charge and submit minutes of the meeting to all concerned persons.
iv. Will inspect department or the concerned area regularly for correction of unsafe conditions and unsafe acts and bring the same to the notice of safety officer.
v. Will investigate all accidents and near misses and prepare complete injury report. All injury reports must be sent to the corporate safety department.
vi. Will check and ensure that all records related with safety are being maintained at site.
vii. Will check the availability & quality of personal protective equipment's provided for safety to the workmen and ensure its proper usage at sites.
viii. Try to eliminate all unsafe acts and unsafe conditions at site.
ix. Tool box talk before start of shift.

d. Supervisors

(Supervisory responsibility is indicated, but not limited by the following activities)

i. Each supervisor shall exercise close supervision over those employees who report or are assigned to him. He shall ensure that the persons working under him are competent to perform their work safely. He must enforce safety rules and procedures.
ii. Supervisors must take immediate corrective action whenever unsafe condition practices are discovered.
iii. The supervisor shall explain in details the particular hazards where the employee is working and the precautions to be taken to ensure his safety.
iv. Supervisors shall develop safety awareness in the minds of all employees.

v. Supervisors shall ensure that the safe practices and regulation are understood, that all hazards are eliminated wherever possible and all means of entrance exists stairways and similar means of escape are clear, workable and thoroughly known to all his men.
vi. He must set a good example in knowing and observing all safety rules and precautions.
vii. Supervisors shall report and investigate the root cause of all accidents to be prescribed by the company and immediately take / suggest such actions so that similar accidents do not reoccur.
viii. Supervisors are required to make contacts with persons working in isolated places.
ix. Be regular and systematic inspection, supervisor shall ensure that all tools, equipments, machineries and premises are in safe and operative condition.
x. Supervisors must take corrective action whenever rules are not observed because a single violation may become a source of major accident and may put the safety of an individual or a group in jeopardy.

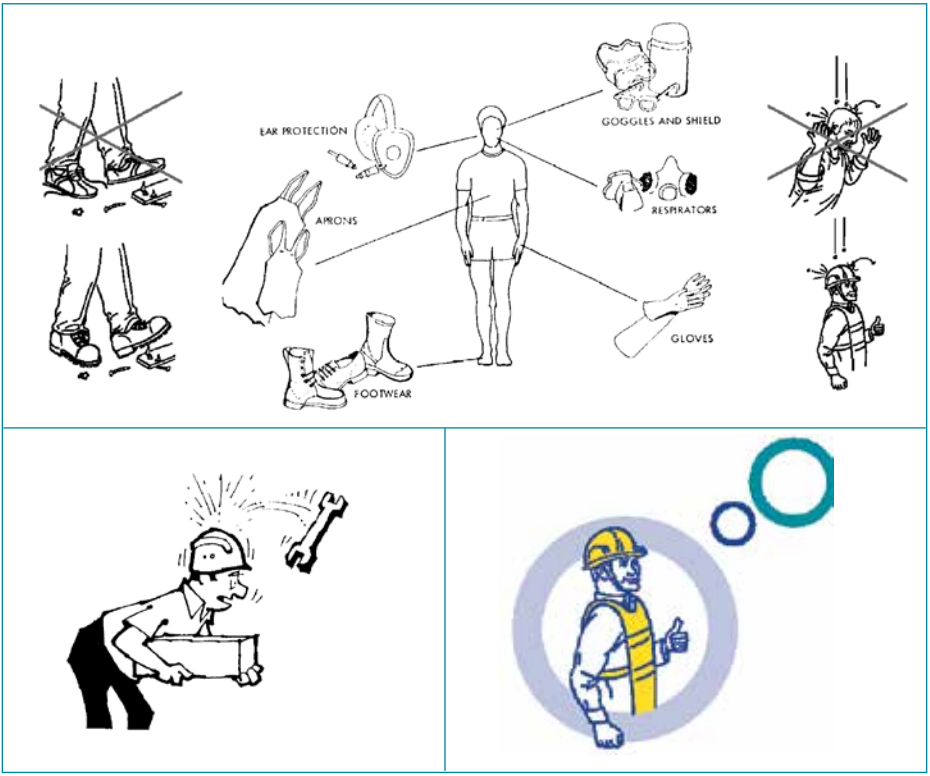
e. Employee

i. Every individual employee has to take care for own safety and his colleagues, use safety appliances, inform unsafe conditions, follow standard operating practices, attend training programmes, and suggest safety measures.
ii. Every employee should insist on the observance of safety rules by fellow employees.
iii. Every employee should consider it as a part of his duty to take an active part in all safety works and follow safety rules.
iv. When any dangerous/unsafe condition is observed. It should be immediately reported to the concerned supervisor and/or fire and safety section.
v. Employee should be careful to clean the job area as soon as work is completed. Good house keeping will eliminate many unnecessary hazards causing accidents.
vi. All stairways, platforms and walkways must be kept clean at all times.
vii. Do not attempt to operate or set in motion any machine or equipment, which you are not assigned.
viii. Do not hesitate to suggest any additional guard or improvements to existing guards for additional safety.
ix. Compressed air must not be used for blowing dust out of clothing.
x. Never look directly into the arc produced while welding without proper eye protection.
xi. Keep clear of suspended loads at all times.
xii. Do not use defective equipment of any kind.
xiii. Keep the fires fighting equipment free of obstructions, as these are required to be used in emergencies?
xiv. Any injury, no matter however slight, must be reported to concerned supervisor immediately and treatment obtained. Even a small accident becomes a potential source of permanent disability.
xv. No maintenance or other type of work should be started at the site without obtaining safety work permit from the safety department.

4. Personal Protective Equipment (PPE)

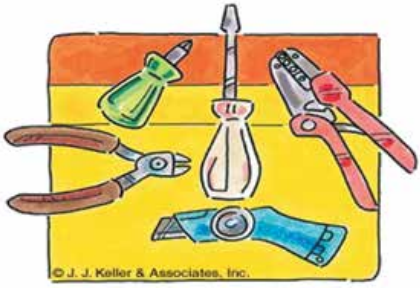
The person should be worn adequate personal protective equipment for example safety helmet, safety goggles, safety shoes and shall at all times keep and maintain an adequate supply of suitable personal protective equipment which shall be readily available for use at all times on the sites, and would include amongst others the following items:

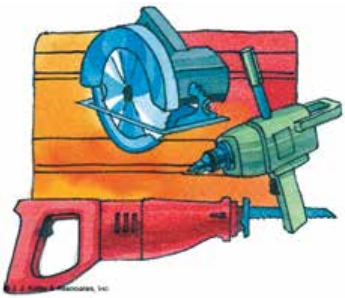
a) Safety Helmets.
b) Hearing Protection.
c) Respiratory Protection.
d) Eye Protection.
e) Protective Gloves.
f) Safety Footwear.
g) High Visibility Clothing.



5. Plant & Machinery, Equipments and Hand Tools

a) Plant, machinery and equipment including hand tools, both manual and power driven, should be free from any defect.
b) Be of proper design and construction, taking into account health, Safety and ergonomic principles.
c) Be maintained in good working order.
d) Be used only for work for which they have been designed.
e) To be operated only by workers who have been authorised and given appropriate training.
f) To be provided with protective guards, shields or other devices as required.
f) Adequate instructions for safe use should be provided.
g) Safe operating procedures should be established and used for all plant, machinery and equipment.

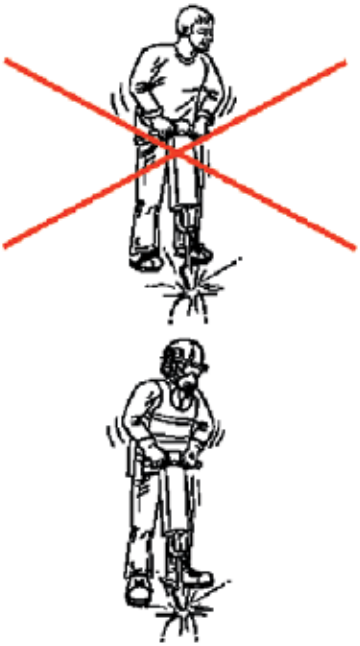




h) Operators of plant, machinery and equipment should not be distracted while work is in progress.
i) Plant, machinery and equipment should be switched off when not in use and isolated before any adjustment, clearing or maintenance is done.
j) Where trailing cables or hose pipes are used they should be kept as short as practicable and not allowed to create a hazard.
k) All moving parts of machinery and equipment should be provided with adequate means, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it form being started again inadvertently.
l) Every power-driven machine and equipment should be provided with adequate mean, immediately accessible and readily identifiable to the operator, of stopping it quickly and preventing it from being started again inadvertently.
m) Operators of plant, machinery, equipment and tools should be provided with PPE's including where necessary, suitable ear protection.

Hand Tools

a) Hand tools should be repaired by competent persons.
b) 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.
c) When not in use and while being carried or transported sharp tools should be kept in sheaths, shields, chests or other suitable containers.
d) Only insulated or non-conducting tools should be used on or near live electrical installations.
e) Only non-sparking tools should be used near or in the presence of flammable or explosive dusts or vapors.



Pneumatic Tools

i) Operating triggers on portable pneumatic tools should be:
a) So placed as to minimize 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.
c) Hose and hose connections for compressed air supply to portable pneumatic tools should be:
d) Designed and tested for the pressure and service for which they are intended.
e) Fastened securely on the pipe outlet and equipped with the safety chain, as appropriate.
ii) Pneumatic shock tools should be equipped with safety clips or retainers to prevent dies and tools from being accidentally expelled from the barrel.
iii) Pneumatic tools should be disconnected from power and the pressure in hose lines released before any adjustment or repair is made.

Electrical Tools

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

6. Scaffolding, Platforms & Ladders

a. 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.

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

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

d. Every scaffold and part there of should be constructed :-

   i. In such a way so as not to cause hazards for workers during erection and dismantling.

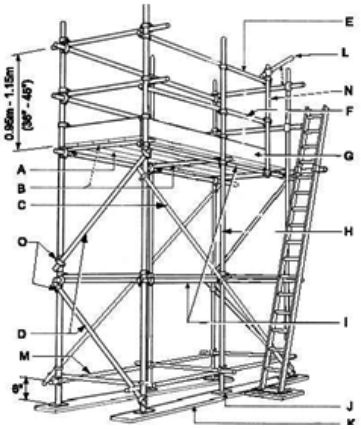
   ii. In such a way so as guard rails and other protective devices, platforms, ladders, stairs or ramps can be easily put together.

   iii. 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.

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

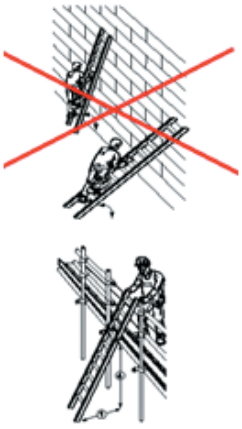
"...are there effective barriers or warning notices in place to stop people using an incomplete scaffold?"

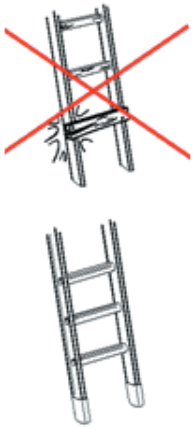
a) Scaffold Planks (Boards)
b) Bearer (Transom)
c) Longitudinal (Façade) Bracing
d) Transverse (Sectional) Bracing
e) Toprail
f) Midrail
g) Toeboard
h) Post (Standard)
i) Runner (Ledger)
j) Base Plate
k) Sill (Sole Board)
l) Self-closing Drop Bar (inside Posts)
m) Base Lift (Kicker Lift)
n) False Upright (Puncheon)
o) Coupler

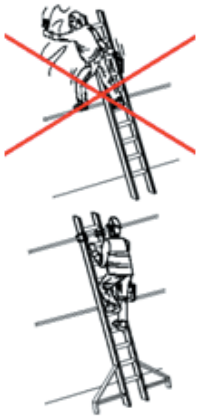


d. Materials used in the construction of scaffolds should be stored under good conditions and apart from any material unsuitable for scaffolds.

e. Couplers should not cause deformation in tubes. Couplers should be made of drop forged steel or equivalent material.
f. 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.
g. Scaffolds should be designed for their minimum load as per relevant code.
h. Scaffolds should be adequately braced.
i. Scaffolds which are not designed to be independent should be rigidly connected to the building at designated vertical and horizontal places.

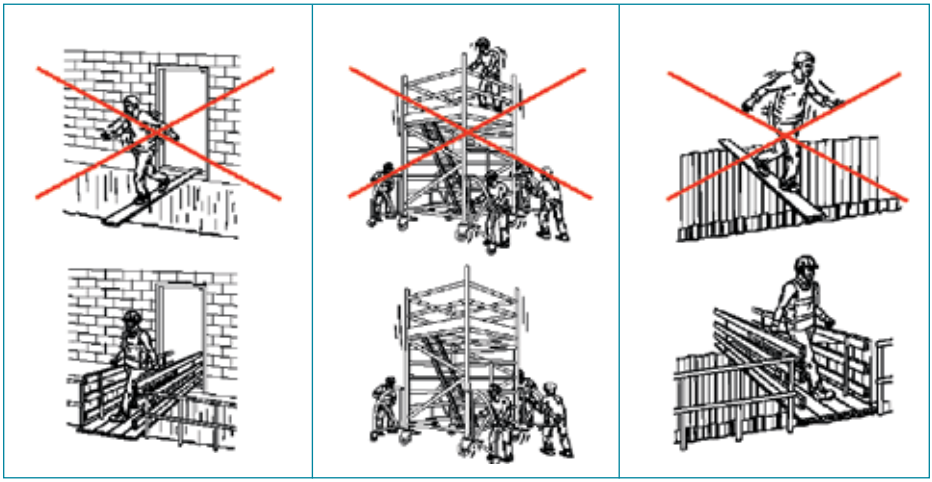






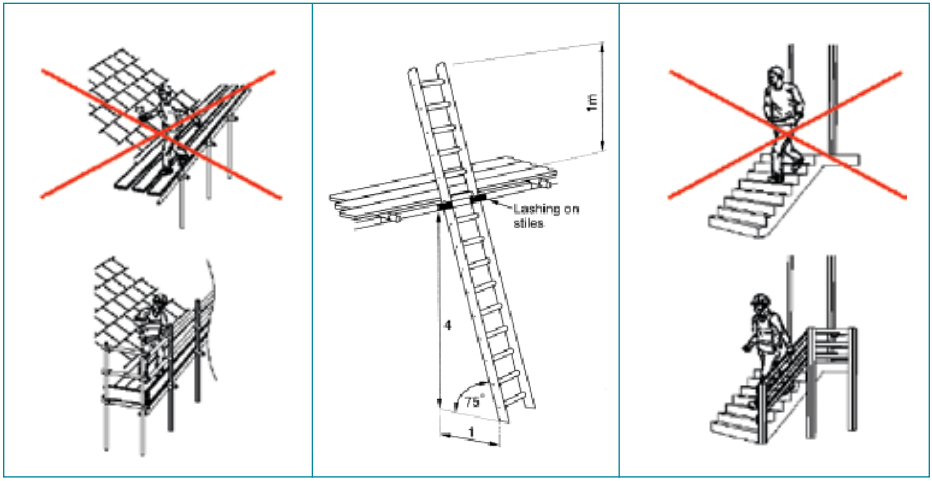
j. A scaffold should never extend above the highest anchorage to an extent which might endanger its stability and strength.

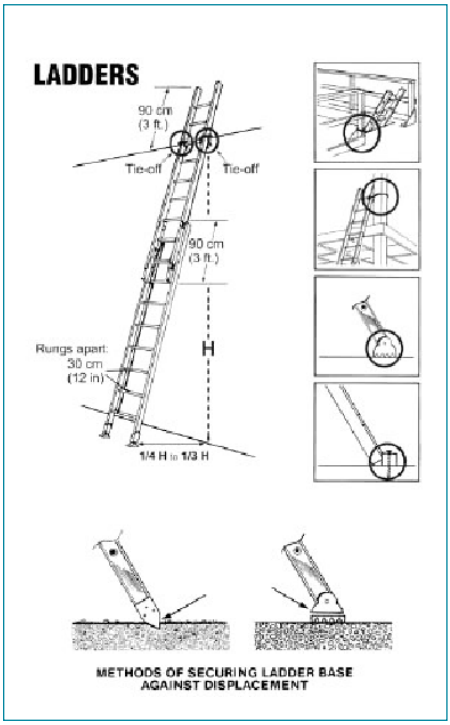
k. Loose bricks, drainpipes, chimney-pots or their unsuitable material should not be used for the construction or support of any art of a scaffold.



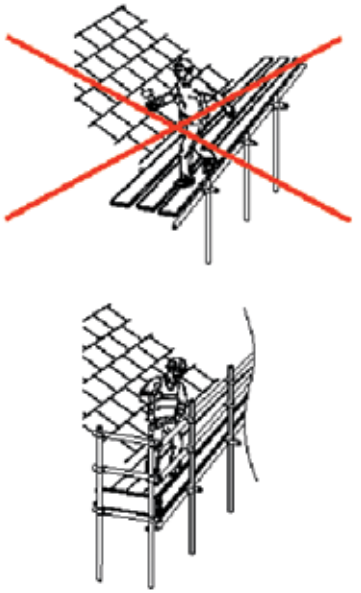
l. Scaffolds should be inspected and certified:-
   i. Before being taken into use.
   ii. At periodic intervals thereafter as prescribed for different types of scaffolds.
   iii. After any alternation, interruption in use, exposure to weather or seismic conditions or any other occurrence likely to have affected their strength or stability.
   iv. Green colour tag permitting the use of scaffold in the bottom level shall be displayed with inspector signature and period allowed.

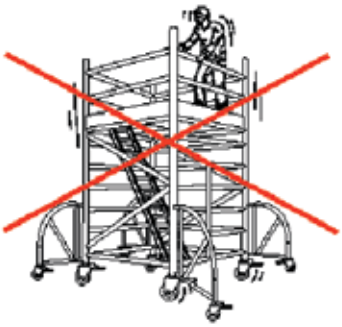
m. Inspection should more particularly ascertain that :-
   i. The scaffold is of suitable type and adequate for the job.
   ii. Materials used in its construction are sound and of sufficient strength.
   iii. It is of sound construction and stable.
   iv. That the required safeguards are in position.

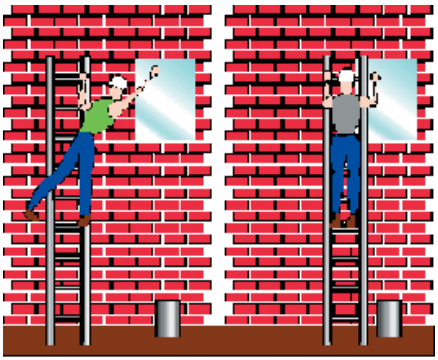




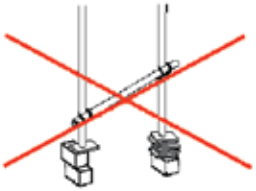
n. A Scaffold should not be erected, substantially altered or dismantled except by or under the supervision.

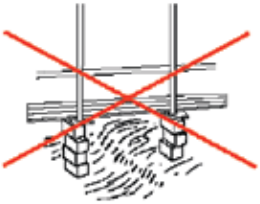






o. Every scaffold should be maintained in good and proper condition, and every part should be kept fixed or secured so that no part can be displaced in consequence of normal use.
p. If out-rigger scaffolding is to be used, it should be specifically designed and inspected before putting in use.





Lifting appliances on scaffolds

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.

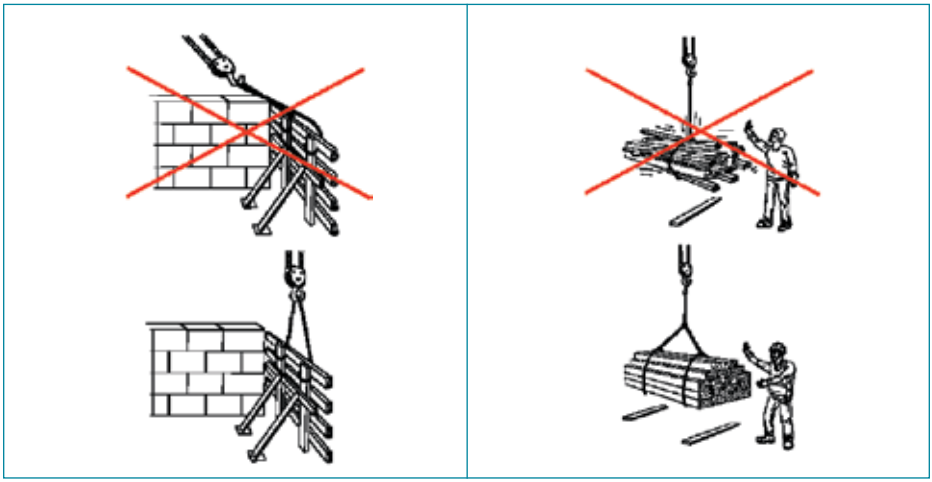
Prefabricated scaffolds

a. In the case of prefabricated scaffold systems, the instructions provided by the manufactures or suppliers should be strictly adhered to. Prefabricated scaffolds should have adequate arrangements for fixing bracing.
b. Frames of different types should not be intermingled in a single scaffold.
c. Scaffolding shall be erected on firm and level ground.
d. All members of metal scaffolding shall be checked periodically to screen out defective / rusted members. All joints should be properly lubricated for easy tightening.
e. Entry to scaffolding should be restricted.
f. Erection, alteration and removal shall be done under supervision of experienced personnel.
g. Use of barrels, boxes, loose bricks etc., for supporting platform shall not be permitted.
h. Each supporting member of platform shall be securely fastened and braced.
i. Where planks are butt-joined, two parallel putlogs shall be used, not more than 100m apart, to give support to each plank.
j. 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.
k. The platform edges shall be provided with 150mm high toe board to eliminate hazards of tools or other objects falling from platform.
l. Erect ladders in the “four up-one out position”.
m. Lash ladder securely with the structure.
n. 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.
o. 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.”
p. 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.
q. The width of ladder shall not be less than 300mm and rungs shall be spaced not more than 300mm.
r. Every platform and means of access shall be kept free from obstruction.
s. If grease, mud, gravel, mortar etc., fall on platform or scaffolds, these shall be removed immediately to avoid slippage.
t. 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.
u. Don’t overload the scaffolding. Remove excess material and scrap immediately.
v. Dismantling of scaffolds shall be done in a pre-planned sequential manner.

7. Handling and Lifting Equipment

Following are the General guidelines to be followed with regard to all types of handling and lifting equipment.

a. 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;
b. All lifting appliances shall be examined by competent persons at frequencies as specified in "The Factories act".
c. 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.
d. 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.
e. Check periodically the oil, brakes, gears, horns and tyre pressure of all moving equipments like cranes, forklifts, etc as per manufacture's recommendations.
f. Check the weights to be lifted and accordingly decide about the crane capacity, boom length and angle of erection.
g. Allow lifting slings as short as possible and check packing at the frictions points.
h. While lifting /placing of the load, no unauthorized person shall remain within the radius of the boom and underneath the load.
i. While loading, unloading and stacking of pipes, proper wedges shall be placed to prevent rolling down of the pipes.
j. Control longer jobs being lifted up from both ends.



k. 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.
l. 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 singling. Also proper illumination should be there.
m. Allow crane to move on hard, firm and leveled ground.
n. When crane is in idle condition for long periods or unattended, crane boom should either be lowered or locked as per manufacturer's guidelines.
o. Hook and load being lifted shall remain in full visibility of crane operators, while lifting, to the extent possible.
p. Don't allow booms or other parts of crane to come within 3 meters reach of overhead electrical cables.
q. 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.

8. Lifting Ropes

a. Only ropes with a known safe working capacity should be used as lifting ropes.
b. Lifting ropes should be installed, maintained and inspected in accordance with manufacturer's instructions.
c. Repaired steel ropes should not be used on hoists.
d. 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.

9. Housekeeping

(Appendix-4 Ref-Ij-04-Rev-01)

i. Don't leave rubbish lying about.
ii. Keep all gangways, passages, aisles and stairways clear.
iii. Wipe up spilt oil, grease or liquids.
iv. Use metal containers for oily or greasy rags and waste.
v. Stack goods and materials clear of gangways.
vi. Store your tools safely when not in use.
vii. Keep benches and work tops uncluttered.
viii. Don't accumulate scrap or waste.
ix. Don't leave loose tools on running machines.
x. Ensure that access to fire extinguisher is not obstructed.
xi. Keep all fire doors and exits clear of obstructions.
xii. Keep dedicated man power for housekeeping.

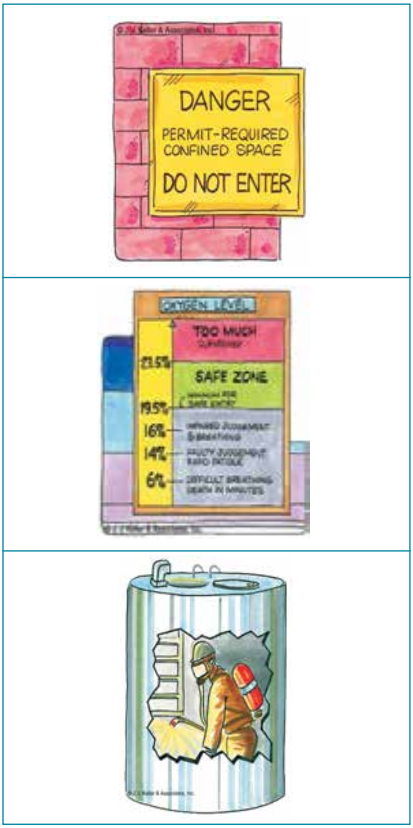
10. LIGHTING

a. 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.
b. Emergency lighting should not produce glare or disturbing shadows.
c. Lamps should be protected by guards against accidental breakage.
d. The cables of portable electrical lighting equipment should be of adequate size and characteristics for the power requirements and of adequate mechanical strength to withstand severe conditions in construction operations
e. Hand Lamps should be of 24Volt only.

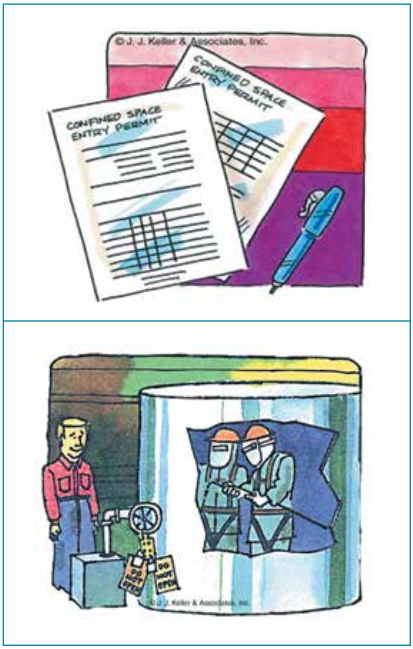
11. WORKING IN CONFINED SPACES

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. :-

a. Entry inside the Confined Space and to carry out any job should be done after issuance of valid work permit (Appendix-12-Ref-IJ-12-Rev-01) only.



b. Ensure proper and accessible means of exit before entry inside a confined space.
c. The number of persons allowed inside the Confined Space should be limited to avoid overcrowding.
d. When the work is going on in the confined space, there should always be one man standby at the nearby man way.
e. Ensure requisite O2 level before entry in the confined space and monitor level periodically or other wise use respiratory devices.
f. Check for no hydrocarbon or toxic substances before entry and monitor level periodically or use requisite Personal Protective Equipment.

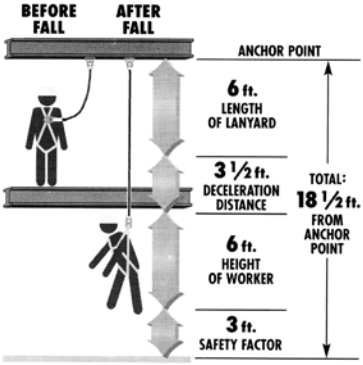


g. Ensure adequate ventilation or use respiratory devices.
h. Depending upon need, necessary respirator system, gas masks and suit shall be worn by everyone entering confined space. In the confined area where there is a possibility of toxic inert gas masks shall be everyone while entering.
i. Barricade the confined spaces during hoisting, radiography, pressure testing etc.
j. Use 24V flameproof lamp fittings only for illumination.
k. Use tools with air motors or electric tools with maximum voltage of 24V.
l. House keeping shall be well maintained.
m. Safety helmet, safety shoes and safety belt shall be worn by everyone entering the confined space.
n. Don't wear loose clothing while working in a confined space.
o. The cutting torches should also be kept outside the confined space immediately after the cutting.
p. The gas cylinders used for cutting / welding shall be kept outside.
q. 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.
r. To the extent possible sludge shall be cleared and removed from outside before entering.
s. 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.

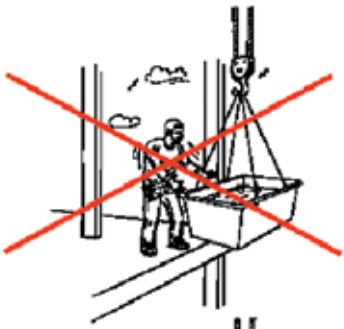
12. Working at Heights

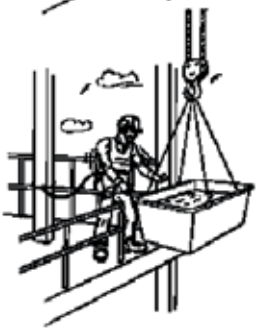
a. While working at a height of more than 3 meters, ISI approved full body safety harness shall be used. And work at height checklist (Appendix-9 Ref-IJ-09-Rev-01) should be maintained.

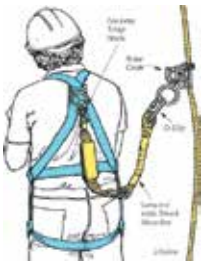
b. Worker should be well trained on usage of full body safety belt including its proper usage at the time of ascending / descending.
c. All tools should be carried in tool kits to avoid their falling.
d. If the job is on fragile / sloping roof, roof walk ladders shall be used.
e. Provide lifeline wherever required.
f. Additional safety measures like providing fall arrestor type safety belt, safety net should be provided depending upon site conditions, job requirements.



d. Keep working area neat and clean. Remove scrap material immediately.
h. Don't throw or drop material / equipment from height.
i. Avoid jumping from one member to another. Use proper passageway.
j. Keep both hands free while climbing don't try to bypass the steps of the ladder.
k. Try to maintain calm at height. Avoid over exertion.
l. Avoid movements on beam.
m. Elevated workplaces including roofs should be provided with safe means of access and egress such as stairs, ramps or ladders.







13. Vehicle Movement
(Appendix-7 Ref-IJ-07-Rev-01)

a. Park vehicles only at designated places. Don't block roads to create hindrance for other vehicles.
b. Don't overload the vehicle.
c. Obey speed limits and traffic rules.
d. Always expect the unexpected and be a defensive driver.
e. Drive carefully during adverse weather and road conditions.
f. Read the road ahead and ride to the left.
g. All vehicles used for carrying workers and construction materials must undergo predictive / preventive maintenance and daily checks.
h. Driver with proper valid driving license shall only be allowed to drive the vehicle.
i. 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.
j. While reversing the vehicles, help of another worker should be ensured at all times.
k. An unattended vehicle should have the engine switched off.
l. Wherever possible one-way system shall be followed.
m. Barriers / fixed stops should be provided for excavation / openings to prevent fall of vehicle.
n. Load should be properly secured.
o. The body of the tipper lorry should always be lowered before driving the vehicle off.
p. Signs / signals / caution boards etc. should be provided on routes

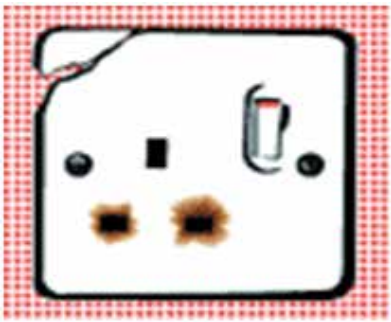
14. Excavation

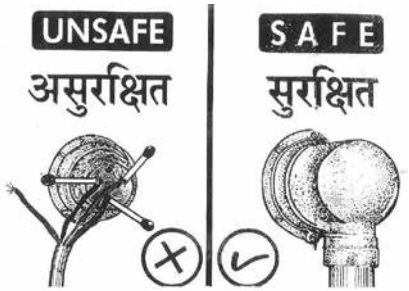
a. All excavation work should be planned and the method of excavation and the type of support work required should be decided considering the following :-
i. The stability of the ground.
ii. The excavation will not affect adjoining buildings, structures or roadways.
iii. To prevent hazard, the gas, water, 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.
b. Before digging begins on site, all excavation work should be planned and the method of excavation and the type of support work required decided.
c. All excavation work should be supervised by an experienced person.

15. Electrical

(Appendix-6 Ref-IJ-06-Rev-01) & (Appendix-8 Ref-IJ-08-Rev-01)

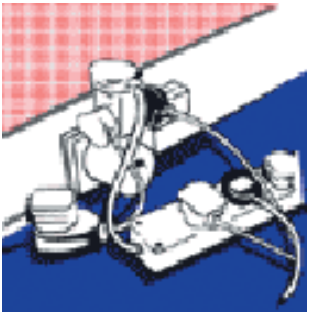
a. Only persons having valid licenses should be allowed to work on electrical facilities.
b. No person should be allowed to work on live circuit. The same, if unavoidable, special care and authorization need to be taken.\
c. Treat all circuits as “LIVE” ensured otherwise.
d. Electrical “Tag Out” procedure “MUST” be followed for carrying out maintenance jobs.
e. Display voltage ratings prominently with “Danger” signs.
f. Put caution / notice signs before starting the repair works.
g. All electrical equipment operating above 250V shall have separate and distinct connections to earth grid.
h. Proper grounding to be ensured for all switch boards and equipment including portable ones prior to taking into service.

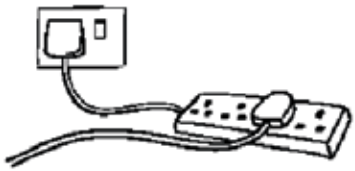


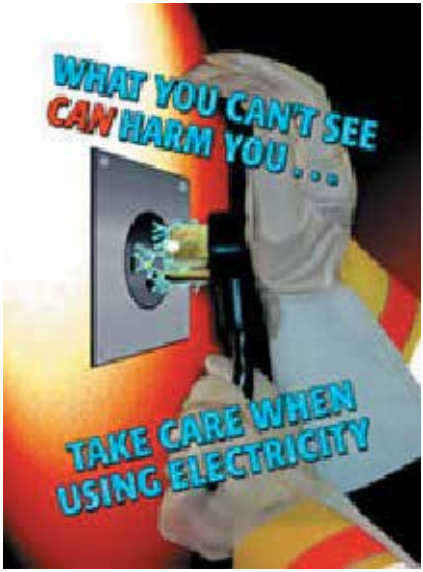


i. Make sure that electrical switch boards, portable tools, equipments (like grinding machine etc.) don't get wet during their usage. If it happens, stop the main supply, make the tools dry and then only use them. Check proper earthing.

j. All temporary switch boards 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.







k. Don't work wet on electrical system.
l. Don't overload the electrical system.
m. Use only proper rated HRC fuses.
n. Industrial type extension boards and plug sockets are only to be used.
o. ELCB for all temporary connections must be provided. Use insulated 3-pin plug tops.
p. 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
q. All power cables to be properly terminated using glands and lugs of proper size and adequately crimped.
r. Use spark-proof / flame proof electrical fittings in fire hazard zones
s. Check installations of steel plates/pipes to protect underground cables at crossings.
t. 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 4.5m.
u. Maintain safe overhead distance of HT cables as per Indian Electricity Rules and relevant acts.
v. Don't connect any earthing wire to the pipelines/structures.
w. Don't make any unsafe temporary connections, naked joints / wiring etc.
x. Ensure that temporary cables are free from cuts. Damaged insulation, kinks or improper insulated joints.
y. Check at periodic intervals that pins of sockets and joints are not loose.
z. Protect electrical wires / equipments from water and naked flames.
aa. Illuminate suitable all the work areas.
ab. All switchboards should be of MS structure only and incoming source should be marked.
ac. Hand lamps should not be of more than 24V rating.
Ad. 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.
ae. Insulating mats shall be provided in the front and back end of switch boards.
af. All parts of electrical installations should be so constructed, installed and maintained as to prevent danger of electric shock, fire and external explosion.
ag. 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.
ah. A notice displaying following, should be kept exhibited at suitable places.
ai. Prohibiting unauthorized person from entering electrical equipment rooms or from handling or interfering with electrical apparatus.
aj. 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.
ak. Specifying the person to be notified in case of electrical accident or dangerous occurrence, and indication how to communicate with him.

al. No other cables / pipes to be laid in trench used for electrical cables.
am. Utmost care should be taken while excavating earth from cable trench to avoid damage or any accident.

Inspection and maintenance

a. All electrical equipment should be inspected before taking into use to ensure suitability for its proposed use.
b. 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.
c. Work on or near live parts of electrical equipment should be forbidden.
d. Before any work is begun on conductors that do not have to remain live.
e. The current should be switched off by a responsible authorized person.
f. Precautions should be taken to prevent the current from being switched on again.
g. The conductors or the equipment should be tested to ascertain that they are dead:-
i. The conductors and equipment should be earthed and short-circuited.
ii. Neighbouring live parts should be adequately protected against accidental contact.
h. 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.
i. Electricians should be provided with approved and tested tools, and personal protective equipment such as rubber gloves, mats etc.
j. All conductors and equipment should be considered to be live unless there is a proof of the contrary.
k. 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.

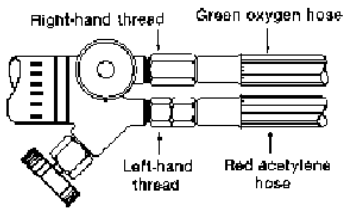
Testing

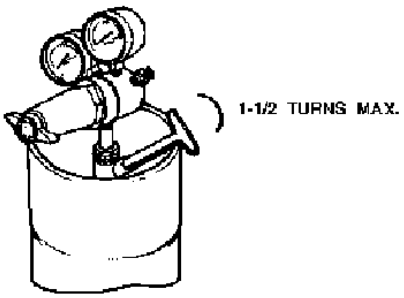
a. Electrical installations should be inspected and tested and the results recorded.
b. Periodic testing of the efficiency of the earth leakage protective devices should be carried out.
c. Particular attention should be paid to the earthing of apparatus, the continuity of protective conductors, polarity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

16A. CUTTING / WELDING

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

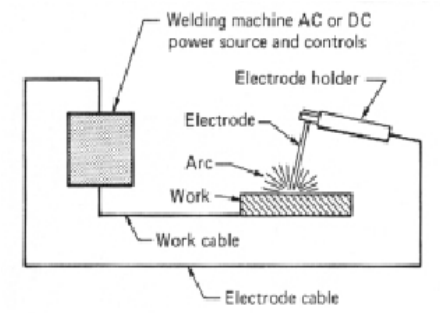
a. A dry chemical type fire extinguisher shall be made available in the work area.
b. Adequate ventilation shall be ensured by opening manholes and fixing a shield or forced circulation of air etc, while doing a job in confined space,
c. Ensure that only approved and well-maintained apparatus, such as torches, manifolds, regulators or pressure reducing valves, and acetylene generators, be used.



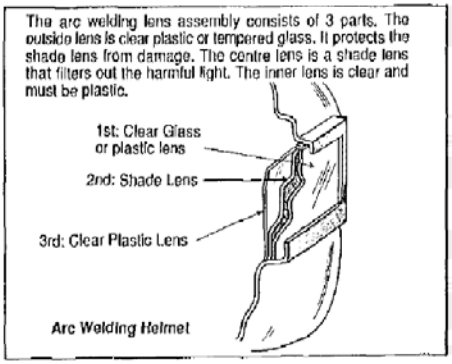


d. All covers and panels shall be kept in place, when operation an electric Are welding machine.
e. The work piece should be connected directly to Power supply, and not indirectly through pipelines / structures / equipments etc.
f. The welding receptacles shall be rated for 64 suitable for 415V, 3-Phase system with a scraping earth. Receptacles shall have necessary mechanical interlocks and earthing facilities.

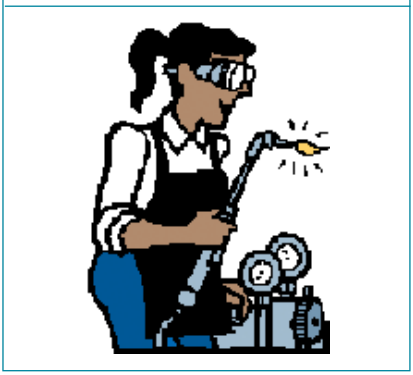
g. All cables, including welding and ground cables shall be checked for any worn out or cracked insulation before starting the job. Ground cable should be separate without any loose joints.



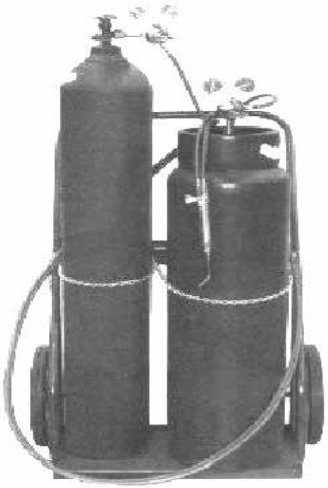
h. Cable coiling shall be maintained at minimum level, if not avoidable.
i. An energized electrode shall not be left unattended.
j. The power source shall be turned off at the end of job.
k. All gas cylinders shall be properly secured in upright position.



l. Acetylene cylinder shall be turned and kept in such a way that the valve outlet points away from oxygen cylinder.
m. 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.
n. When not in use, valves of all cylinders shall be kept closed.
o. All types of cylinders, whether full or empty, shall be stored at cool, dry place under shed.



p. Forced opening of any cylinder valve should not be attempted.
q. Lighted gas torch shall never be left unattended.
r. Store acetylene and oxygen cylinders separately.
s. Store full and empty cylinders separately.
t. Avoid cylinders coming into contact with heat.
u. Cylinders that are heavy or difficult to carry by hand may be rolled on their bottom edge but never dragged.
v. If cylinders have to be moved, be sure that the cylinder valves are shut off.
w. Before changing torches, shut off the gas at the pressure reducing regulators and not by crimping the hose.
x. Do not use matches to light torches. Use a friction lighter.
y. Move out any leaking cylinder immediately.
z. Use trolleys for oxygen & acetylene cylinder and chain them.



aa. Always use Red hose for acetylene and other fuel gases and Blue for oxygen, and ensure that both are in equal length.
bb. Ensure that hoses are free from burns, cuts and cracks and properly clamped.
cc. Avoid dragging hoses over sharp edges and objects.
dd. Do not wrap hoses around cylinders when in use or stored.
ee. Protect hoses from flying sparks, hot slag, and other hot objects.
ff. Lubricants shall not be used on Ox-fuel gas equipment.
gg. During cutting/welding, use proper type goggles/face shields.

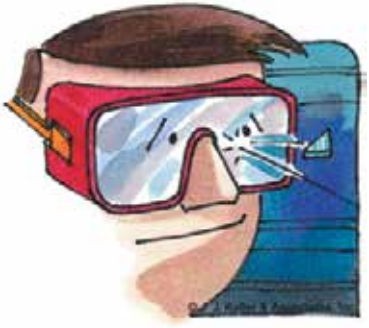


FIGURE 1
Typical equipment used in oxy/acetylene gas welding and similar processes

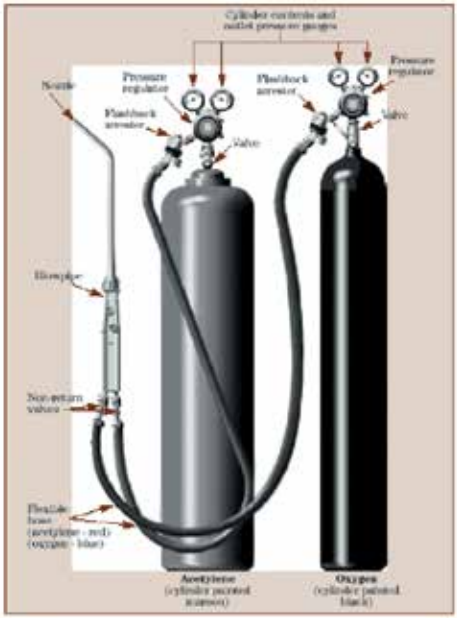
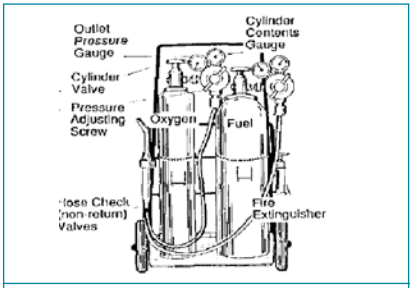
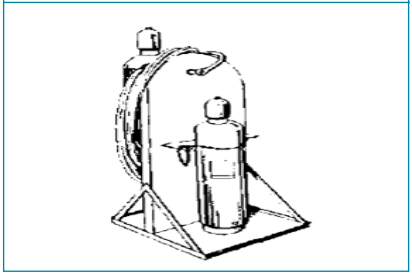


Figure 1 Typical equipment used in oxy/acetylene gas welding and similar processes

16B. SAFE STORING OF CYLINDERS

a. Cylinders should be stored in a cool, dry and well ventilated area, under cover, away from any potential source of ignition.
b. Full and empty cylinders should be stores separately and areas should be designated properly.
c. Cylinders containing flammable gases and toxic gases shall be kept separately by providing adequate distance or suitable partition wall. Other gas cylinders also should be kept separated from these cylinders.

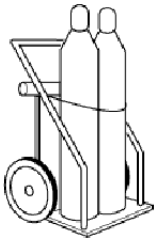




a. The storage room should be of fire resistant construction with suitable explosion relief system.
b. The storage room where cylinders containing flammable gases are stores should be provided with flameproof light fittings and other electrical equipment.
c. Cylinders, especially those for liquefied gas and dissolved gas, should be stored upright, unless it is designed to store horizontally.
d. Do not store cylinders in such a way that they become part of an electric circuit.
e. Cylinders should be secured, while store, to prevent tipping or falling
f. Warning notice to be displayed in appropriate manner, near the storage area
g. Adequate slope and drainage should be given to the floor so that cylinders do not come in contact with water and get corroded

16C. SAFE HANDLING OF CYLINDERS

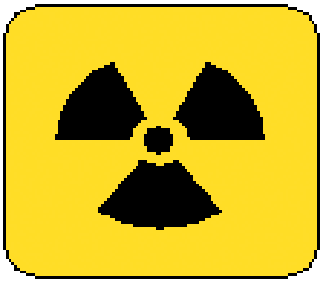
a. Gas cylinders should be handled carefully. Do not slide, roll or drop the cylinders.
b. Suitable trolleys or cradles with securing arrangements should be used for moving the cylinders.
d. Liquefiable gas cylinders and dissolved acetylene cylinders should always be kept in upright position unless they are designed to use in horizontal position.



e. Cylinders designed to use in horizontal position should be so secured that they do not roll.
f. All potential sources of ignition and situations which may lead to overheating of cylinders should be prohibited from the area where the cylinders are used.
g. While using gas cylinders, precautions should be taken to protect the cylinders from sun and rain.
h. When the cylinders are not in use or being charged, valve caps / guards should be kept on the cylinders.
i. Gas cylinders should not be used as supports for earthing or for any other purpose.
j. Do not weld or strike an arc on any gas cylinder because such activity can reduce the wall strength.
k. Without emptying the gas, do not attempt to repair a valve or relief device attached to a gas cylinder.
l. Do not use gas from a cylinder which is not provided with clear identification.
m. Cylinders with damaged valves should be returned to the supplier at the earliest.
n. Do not handle the cylinders with lifting magnets. Cylinders should be lifted with devices specifically designed for such activity.
o. Before drawing gas from the cylinder, make sure that the connections are leak proof. Soap solution may be used for detecting leak, if any.
p. Do not draw gas from the cylinder directly, without using pressure reducing devices.
q. While transporting cylinders in trucks, fasten cylinders secured in upright position. There shall not be any sharp projections inside the truck and cylinders should not project beyond the side or ends of the vehicle.
r. Cylinder valves should be closed daily at the close of the work by a responsible person.
s. During transportation, if any cylinder containing flammable or toxic gas starts leaking, it should be shifted to an isolated place away from any potential source of ignition and any leak should be arrested using the emergency leak arresting kit, if available. Simultaneously, inform the supplier and consign or for necessary advice.
t. If a leak on the cylinder valve cannot be arrested by tightening the gland nut or the spindle, the cylinder should be removed to an open area where it poses least danger to life and property and the supplier should be informed.

17. RADIOGRAPHY

All radiography jobs shall be carried out as per BARC Safety Regulations.



a. During field radiography, nearby area around the radiation source should be cordoned off.
b. 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.
c. Special permission / permit should be taken for radiography from area-in-charge.

"So, Foster! That's how you want it, huh? . . . Then take THIS!"

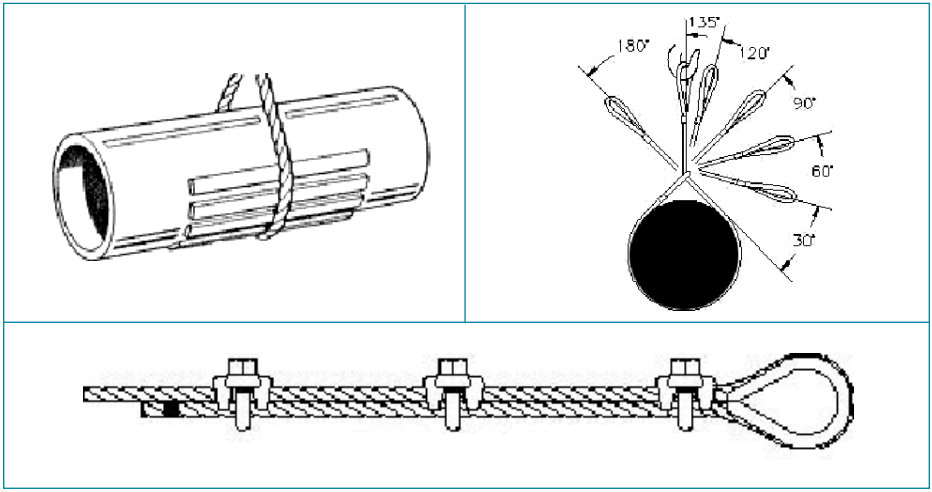
d. As far as possible, field radiography should be done only during night time when there is little or no occupancy there.
e. Radiation warning signals should be pasted all along the cordoned off area.
f. Entry into the restricted area by unauthorized persons should be strictly prohibited during exposure.
g. The radiation level along with the cordon should be monitored by a suitable and well-calibrated radiation survey meter.
h. All personnel working with radiography sources should wear appropriate protective equipment and film badges issued by BARC.
i. 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.
j. The radiography source shall never be touched or handled directly with hands.
k. The package containing radiography cameras and sources should never be carried by public transport like bus, train etc.
l. 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.
m. 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.

18. SAND / SHOT BLASTING / SPRAY PAINTING

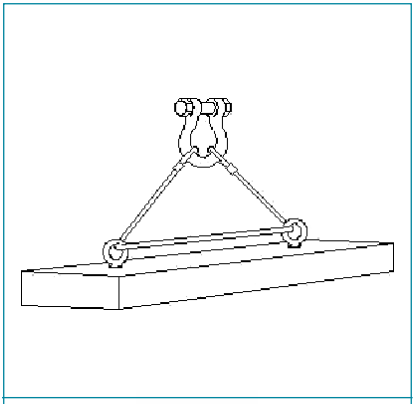
a. Sand blasting should be used only after approval from competent person.
b. Air Compressor used for sand / shot blasting / painting should have guard and positioned away from the work place.
c. Exhaust of the prime mover, if IC engine is used, should be directed away from the work place.
d. In case of motor driven compressor, the body of the motor as well as the compressor to be properly earthed.
e. The hoses used for compressed air should be of proper quality, and health of the same to be ensured through regular check / test.
f. The operator of sand / shot blasting/ painting should wear suitable PPE's including mask.
g. Adequate measures to be taken to suppress dust / spray particle.
h. Sand used for sand blasting should be suitable covered & protected from to rain/moisture.
i. When these activities are done in confined places, adequate measure to be taken for proper ventilation.

19A. SLINGS AND RIGGING

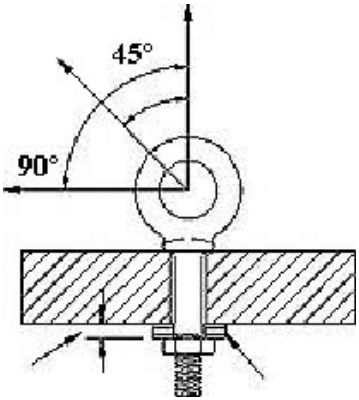
a. Employees will be properly and thoroughly trained in the use of slings and rigging.
b. The entire length of the sling must be visually inspected prior to use, at regular intervals, and after any incident. Clean the sling before inspecting it. Dirt and grime can hide damage, especially on chain and wire rope. Slings will be relaxed when you inspect them. Damaged or defective slings must be discarded. When disposing of a defective or damaged sling, cut the sling in half or otherwise destroy it so there is no danger of it being reused
c. When inspecting steel alloy chain slings, pay special attention to nicks, gouges, cracks, corrosion pits, stretching, and distorted or worn fittings. Replace the entire sling if any part is damaged, has more than 10% wear or 5% stretch, and if the hook is twisted more than 10 degrees or opened up more than 15% at the throat.
d. Wire rope slings must be replaced if there is severe corrosion, localized wear (shiny worn spots),a 1/3 reduction in outer wire diameter, excessive stretching, damage or displacement of end fittings, more than 10 broken wires in one lay, or evidence of damage to the rope structure such as kinking, crushing, bird caging, or other distortion.
e. Do not use synthetic web slings that have burns, broken or worn stitches, excessive stretch, exposed warning stitches (usually red yarn), snags, punctures, tears or cuts, or distorted fittings.
f. Inspect for broken wires in metal mesh slings, lack of sling flexibility, kinks or twists in the edge, 25% reduction in wire diameter due to abrasion, and broken brazed joints or welds on the edge.



g. Store slings vertically on a rack of wall to minimize the risk of damage and for easy access

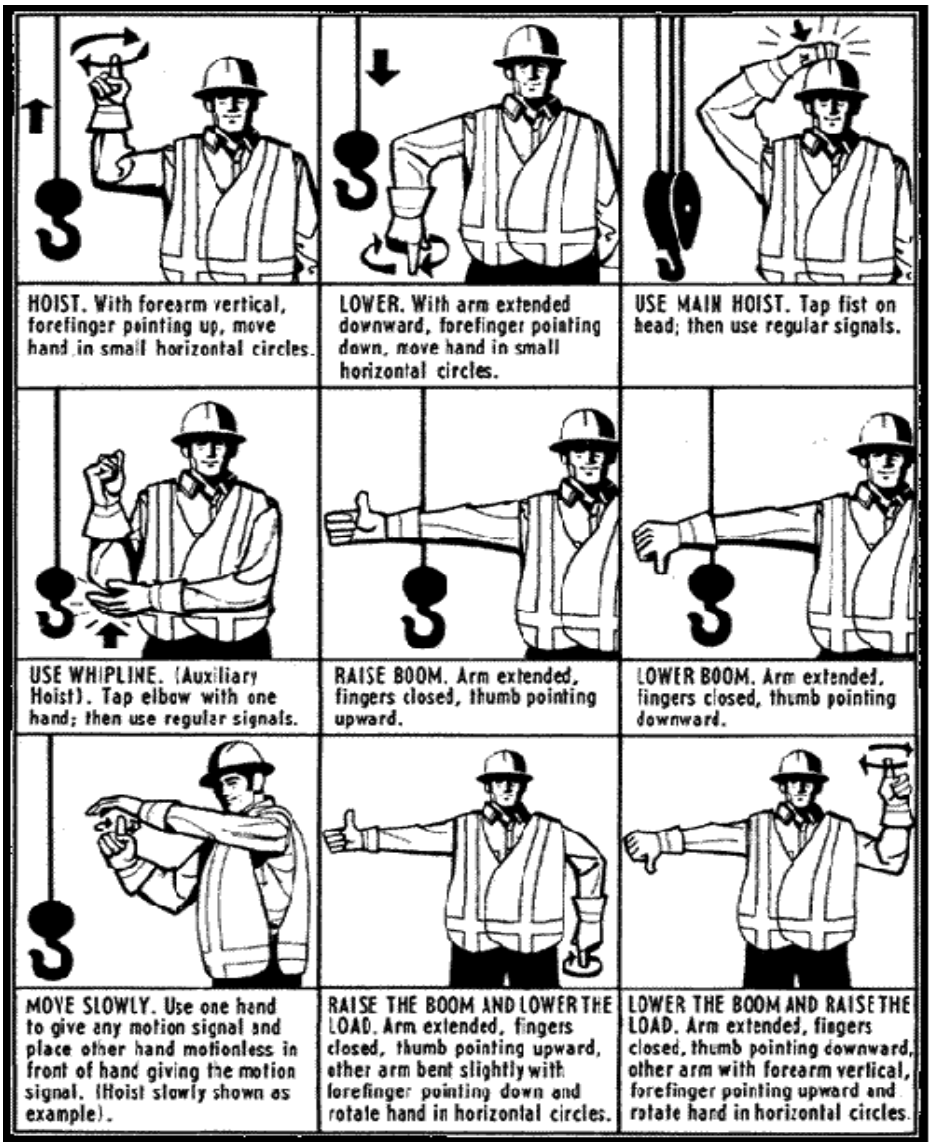


h. Lift only from solid attachment points.

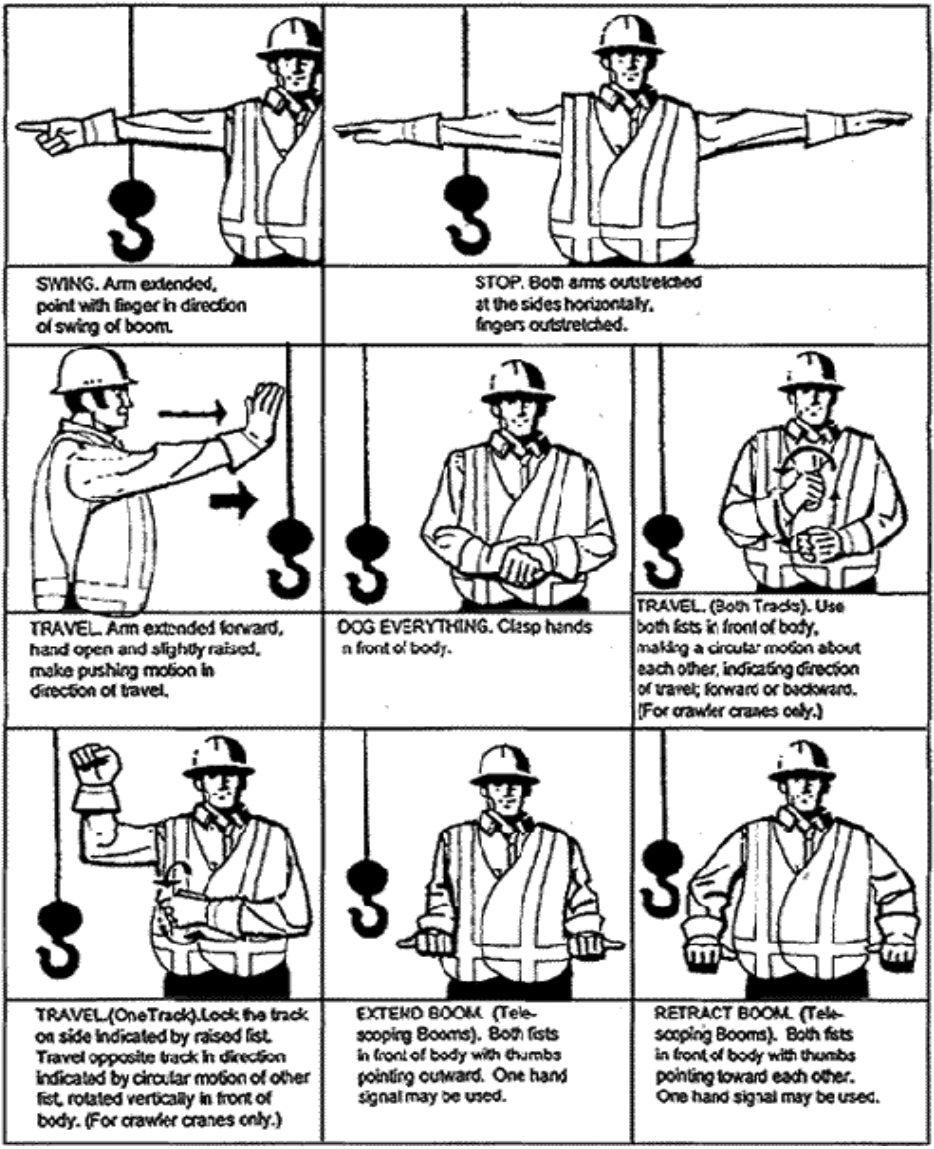


i. Before making the lift, make sure the weight and balance of the load are known and the sling is securely positioned around the load.
j. Guard against shock loading by taking up slack in the sling slowly.
k. Operators must know and must not exceed the working load limit (rated capacity) of the sling. The working load limit is calculated by dividing the breaking strength of the sling by five.
l. Do not lift items that exceed the working load limits of the sling.
m. Lifting tools and tackles should be tested by competent authority once in a year.

CRANE SIGNAL CHART



HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circles.	LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circles.	USE MAIN HOIST. Tap fist on head; then use regular signals.
USE WHIPLINE. (Auxiliary Hoist). Tap elbow with one hand; then use regular signals.	RAISE BOOM. Arm extended, fingers closed, thumb pointing upward.	LOWER BOOM. Arm extended, fingers closed, thumb pointing downward.
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example).	RAISE THE BOOM AND LOWER THE LOAD. Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down and rotate hand in horizontal circles.	LOWER THE BOOM AND RAISE THE LOAD. Arm extended, fingers closed, thumb pointing downward, other arm with forearm vertical, forefinger pointing upward and rotate hand in horizontal circles.



SWING. Arm extended, point with finger in direction of swing of boom.

STOP. Both arms outstretched at the sides horizontally, fingers outstretched.

TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.

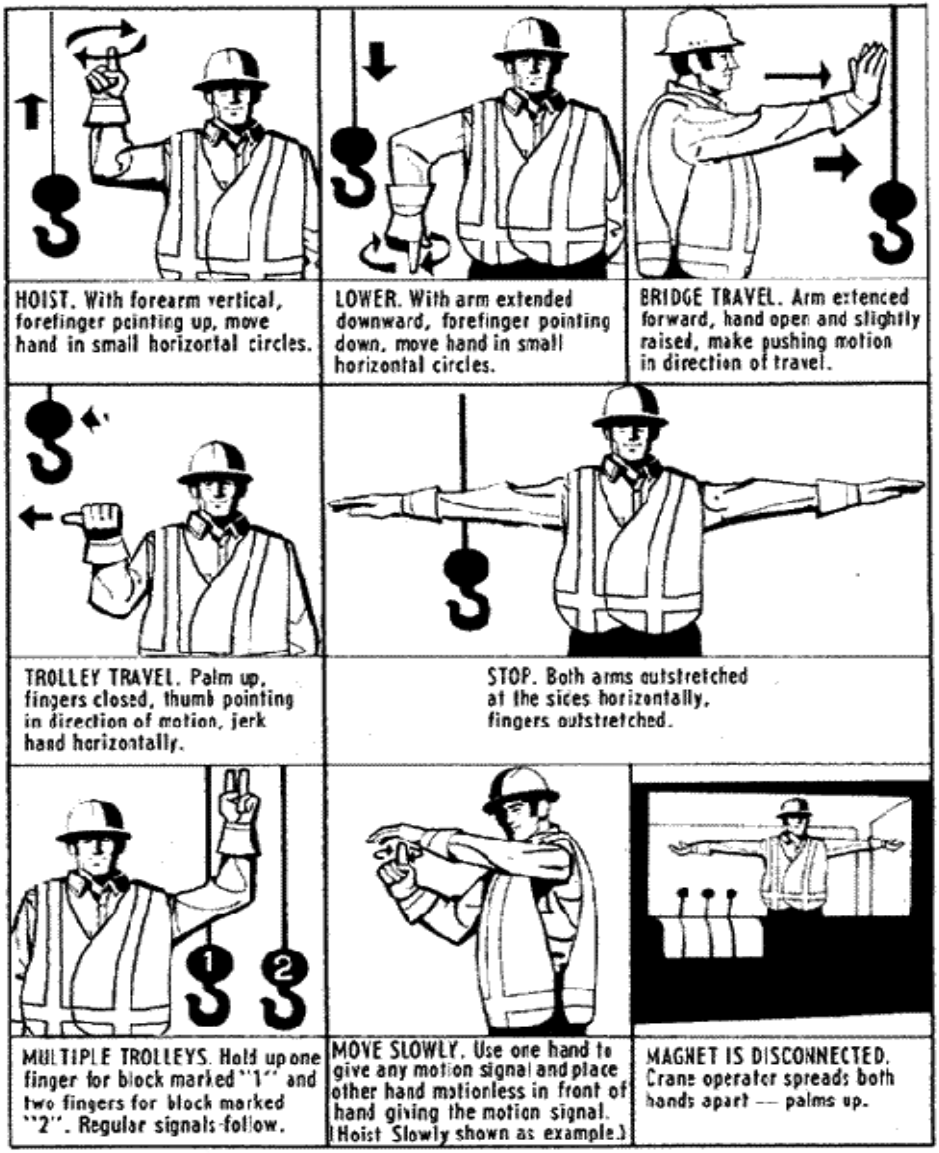
DOG EVERYTHING. Clasp hands in front of body.

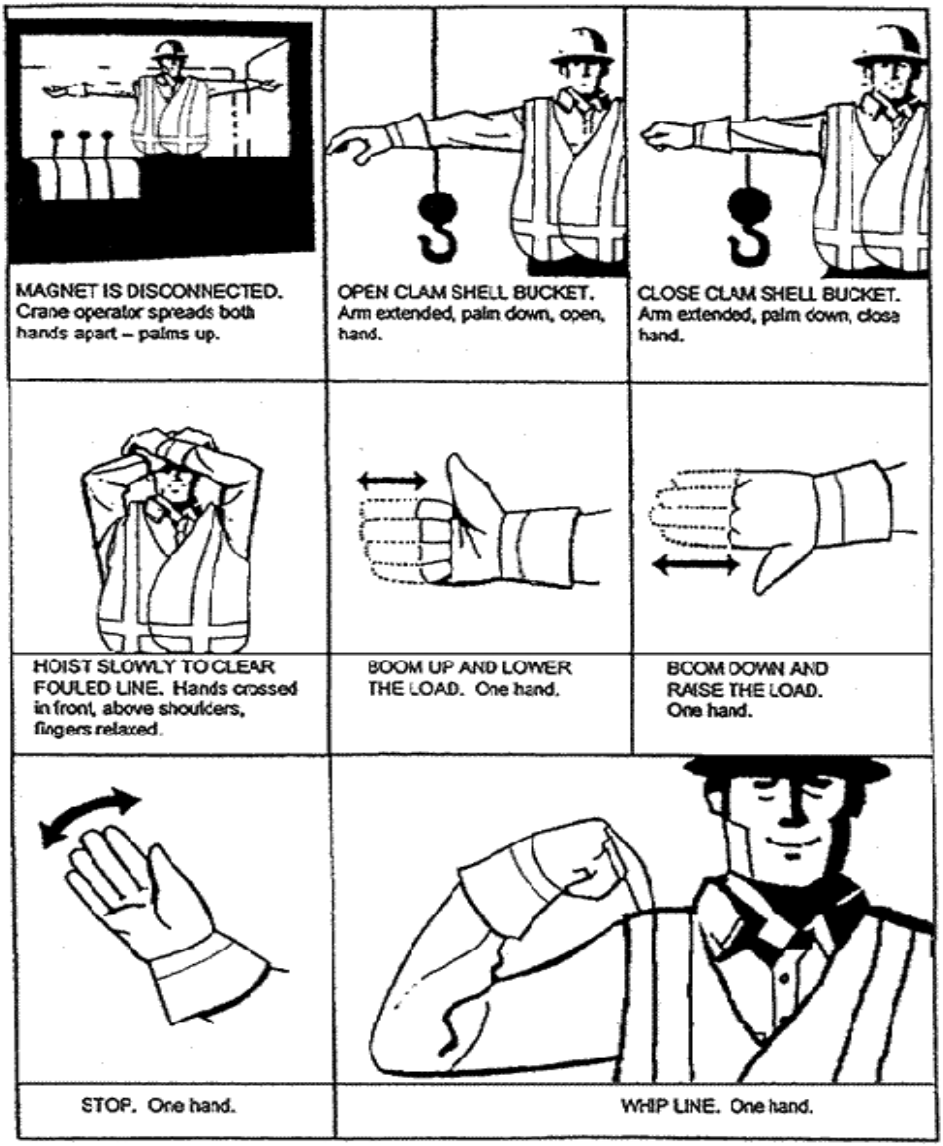
TRAVEL. (Both Tracks). Use both fists in front of body, making a circular motion about each other, indicating direction of travel; forward or backward. (For crawler cranes only.)

TRAVEL (One Track). Lock the track on side indicated by raised fist. Travel opposite track in direction indicated by circular motion of other fist, rotated vertically in front of body. (For crawler cranes only.)

EXTEND BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing outward. One hand signal may be used.

RETRACT BOOM. (Telescoping Booms). Both fists in front of body with thumbs pointing toward each other. One hand signal may be used.


HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circles.
LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circles.
BRIDGE TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.
TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.
STOP. Both arms outstretched at the sides horizontally, fingers outstretched.
1
2
MULTIPLE TROLLEYS. Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.
MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist Slowly shown as example.)
MAGNET IS DISCONNECTED. Crane operator spreads both hands apart — palms up.


MAGNET IS DISCONNECTED. Crane operator spreads both hands apart – palms up.
OPEN CLAM SHELL BUCKET. Arm extended, palm down, open, hand.
CLOSE CLAM SHELL BUCKET. Arm extended, palm down, close hand.
HOIST SLOWLY TO CLEAR FOULED LINE. Hands crossed in front, above shoulders, fingers relaxed.
BOOM UP AND LOWER THE LOAD. One hand.
BOOM DOWN AND RAISE THE LOAD. One hand.
STOP. One hand.
WHIP LINE. One hand.

19B. SAFE PRACTICES FOR USING CHAINS:

a. Chains

i. Take up slack slowly and see that every link in the chain seats properly. Never put strain on a kinked chain. If the links do not slide freely within each other, the chain is damaged and must be removed from service.

ii. Do not use a hammer to force a hook over a chain link.

iii. See that the load is always properly set in the bowl of the hook.

iv. Never attempt to repair the welded components on a sling. A broken chain must not be spliced with a bolt or any other type of coupling.

b. Wire Rope Slings

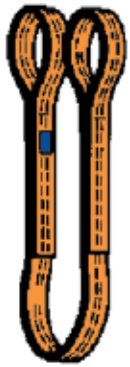
i. Lubricate the chain for longer service life. Before applying lubricant, make sure the sling is as dry and clean as possible. Lubricating a dirty or damp sling promotes corrosion.

ii. Avoid bending wire rope around small radius bends

c. Safe Practices for Synthetic Web Slings.

i. Synthetic web slings cannot be repaired; damaged slings must be discarded.

ii. Do not join slings by knotting. Stretching is the only accepted method of attaching end fitting or forming eyes.



20. PROOF / PRESSURE TESTING

i. Review test procedure before allowing testing with water or air or any other fluid.
ii. Provide relief valves of adequate size while testing with air or other gases.
iii. Ensure compliance of necessary precautions, step wise loading, tightening of fasteners, grouting etc. before and during testing.
iv. Inform all concerned in advance of the testing.
v. Keep the vents open before opening any valve for filling / draining of liquid used for hydro testing. The filling / draining should not exceed the designed rate for pressure testing.
vi. Provide separate gauges of suitable range for pressurizing pump and the equipment to be tested.
vii. Provide gauges at designated locations for monitoring of pressures.
viii. Check the calibration of all pressurizing equipment and accessories and maintain records.
ix. Take readings at pre-defined intervals.

21. SAFE PRACTICES FOR ERECTION

a. Safety Rules for Erection

i. Workmen should wear full body harness with double lanyard for works above 3m height.
ii. On vertical movements to height the lanyard is hooked to the fall arrestor (rope grab) fitted to a 5/8" synthetic rope.
iii. On horizontal movements the lanyard is hooked to the static line. Static line is of above 8mm wire rope or above 1" Polypropylene rope.
iv. In a situation where a worker has to unhook his lanyard, etc in crossovers he hooks the other lanyard to a reliable anchorage and then the former one is unhooked. Thus 100% of fall protection is ensured.
v. Workers shall carry the bolts, nuts and tools in a bag. They are not to keep these materials on any structure directly.
vi. The erection area will be cordoned and caution boards – STEEL ERECTION IN PROGRESS – MEN WORKING ABOVE. NO ENTRY shall be displayed to prevent trespassers.
vii. The Signalman shall wear the fluorescent jacket to identify himself.
viii. Workers who have acrophobia are proscribed from going to height works.

B. Preassembly of Columns

i. A specified crew is deployed for assembly of the columns.
ii. Wooden sleepers will be placed level at a sufficient height so that there is enough room for a worker to work below the structure where required. This is for bolting purposes.
iii. Stable and sufficient wooden sleepers shall be given for the assembling steel structures.
iv. The wooden sleepers should extend a minimum of 100mm away from the steel at either side. This to avoid the changes of pinching injury
v. After lifting the assembled structures, the wooden sleepers should be removed and stacked at a designated location; unless the next assembly is to be done on it.

c. Structural Steel Erection

i. An erection scheme and the Job Safety Analysis (JSA) Appendix -15 Ref-IJ-15-Rev-00 are made before the task is taken up.
ii. Screened, oriented and trained workmen shall be deployed on the job.
iii. The foreman assigns the role and responsibility of each member of the gang for the erection operation.
iv. Before the start of each erection, the foreman explains the erection gang the erection sequence and the Job Safety Analysis.
v. Only the assigned crew would do the specific job. Any changes made the new comer should be briefed the safe work procedure Safety Engineering Department should also be intimated.
vi. The sling, D shackle or any other material shall not be dropped from height. They shall be lowered either through the crane hook or through a rope.

b. Column Erection

i. Guy ropes, platform, rope for fall arrestor and ladders are tied to the columns before erecting them. The erection engineer / foreman ensures the right slinging method and fills the erection checklist. A tag line is tied just above the base of the column to control the movement.

ii. The foundation should be clean, the bolt vertical, and greased. The required packing plate is placed before the column is lifted. When the column has come to position, the workers should hold the column above the base of it while inserting it into the foundation bolts. Do not crowd too many persons near the erection ground. After erection, the bolts are tightened; the four guy ropes are secured to a reliable anchorage. The selected riggers, who go to the top of the column to release the slings, hook their belt to the fall arrestor and climb up.

c. Beam Erection

i. Two tag lines are tied, either end of the beam, to guide them to the position. Proper access is provided to reach the work spot. Two workers stand on a platform at each column, to bolt the beam to the column. The workers keep the required tools, bolts and nuts in a bag and these materials are not kept on the beam.

ii. After securing the beam to the column, the workers hook their belt to the beam and crawl on it to reach the spot for releasing the slings. They should not walk on it.

d. Stair Case Erection

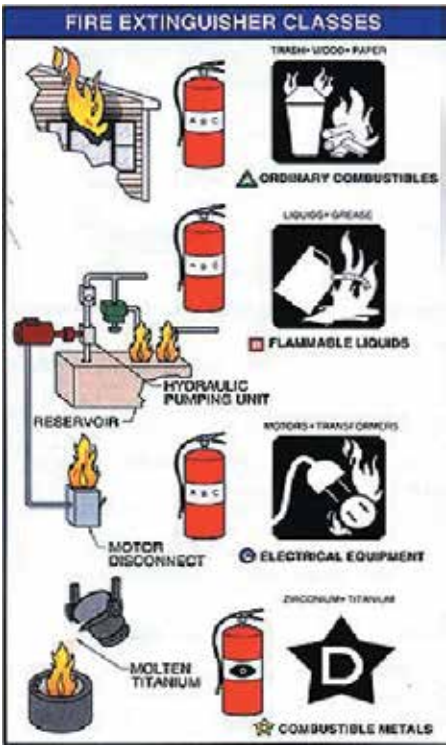
The staircase is assembled at ground level and erected in module form on to the holding down bolts and tightened. Foreman ensures proper slinging method.

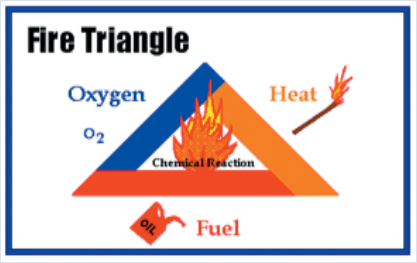
e. Grating Erection

A scheme for placing the gratings for the floors is made and followed. Workmen shall anchor their lanyards to the static line while spreading and securing the gratings to the floor beams. Loose gratings shall not be left at the end of the day. Partially covered floors with gratings are more dangerous than an uncovered floor. So, it is better the job is planned such that the floor is totally covered on the same day. Else the floor shall be blocked for entry by any other employees.

22. FIRE PREVENTION AND FIRE FIGHTING

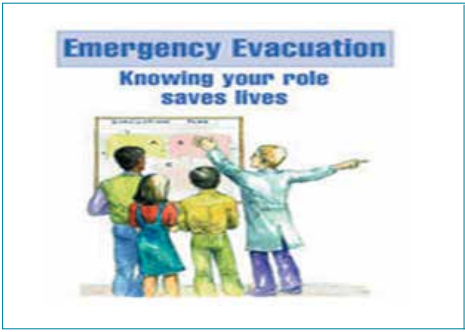
i. Provision is made for safe handling and storage of dirty gags, trash, and waste oil. Flammable liquids and chemicals applied on platform should be immediately cleaned.
ii. Paint containers and hydrocarbon samples, gas cylinders for welding and cutting should be stored properly. Cylinders should be 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 is controlled in working area water spraying, CO2 flooding, DCP and sprinkler system.
vi. Foaming agent is applied for controlling fire in liquid hydrocarbon.
vii. The system is not effective in gas fire.
viii. Light weight breathing system should be used.
ix. Fire fighting equipment should be maintained in ready to use condition.
x. DON'TS AND DO'S IN CASE OF FIRE

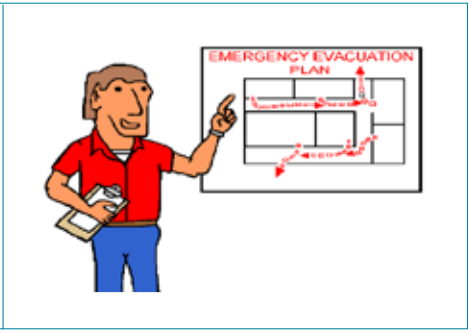


DON'TS	DO'S
1. Don't run in panic 2. Don't take undue risk 3. Don't tamper with any machinery during fire fighting. Leave them for authorized handling. 4. Don't argue or discuss on the scene of fire. 5. Don't linger with the equipment. If you don't know its operation, keep away or ask some one nearby 6. Don't throw sand on machinery parts. Use CO2 or dry powder instead 7. Don't flood the affected area with water unless required. 8. Don't crowd the scene of fire 9. Don't close the valve of a flammable gas cylinder on fire. 10. Don't resort to breaking, cutting unless required 11. Don't use all types of extinguishers on one fire. 12. Don't use water on oil, electrical and metal fires.	1. Raise alarm or shout 'FIRE' at the peak of you r tone, if you notice a fire within your vicinity. 2. Approach the scene within the quickest possible time. 3. Try to attract others attention as far as possible on your way to the scene of fire. 4. If you are first to reach make sure that no life is trapped. 5. Try to put off the fire with the nearest appropriate type of extinguisher. 6. As others rush to the scene, tell them what the type of fire is and which extinguisher to use. 7. Do arrange to put off the supply in case of electrical fires. 8. Do not take any chance. Dial security Phone numbers and give exact location. 9. Open all doors and windows after the fire is completely extinguisher to avoid inhalation of any fumes. 10. Keep yourself posted with information from time to time.
	

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

xii. 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.





TYPES OF PORTABLE FIRE EXTINGUISHER AND WHAT TO USE THEM ON

Note : Make yourself aware of the instruction on the fire extinguisher before using it

Class	Substances, materials, etc.	Water (red)	Foam (cream)	Carbon dioxide (CO2) (black)	Vaporizing liquid (green)	Dry powder (blue)
A	Wood, paper, rag, textile, card-board, common plastics, laminates, foam etc.	YES	YES	YES	YES	YES
B	Flammable liquids, petrol, oil, fats, adhesives, paint, varnish etc.	NO	YES If liquid is not flowing	YES	YES	YES
C	Flammable gas: LPG, butane, propane, methane, acetylene etc.	YES Will cool the area and put out secondary	YES If in liquid form	YES	YES	YES
D	Metal, molten metal, reactive metal powder etc.	NO	NO	NO	NO	YES Trained person- if no explosive risk
Electrical	Electrical installations, Welding Machines, Motors, Distribution Boards, computers, photocopiers etc.	NO	NO	YES	YES	YES Special powders are available, but DRY sand may be used Or switch off electricity and deal with as an ordinary fire

Notes: Vaporizing liquid. Dry Power may not penetrate spaces or behind equipment
Light water foam (AFFF) may be used instead of water or foam

23. FIRST AID

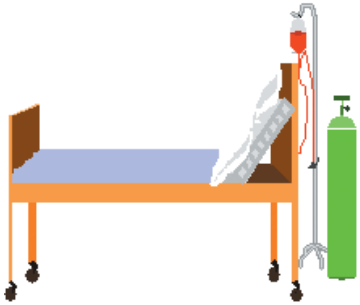
First aid facilities should be provided in line with various statutory regulations like factory act etc. However following care should be taken:-

a. 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.

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

c. 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.

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



e. 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.
f. Where the work involves risk of drowning, asphyxiation or electric shock, first-aid personnel should be proficient in the use of resuscitation and other life saving techniques and in rescue procedures.
g. Emergency telephone numbers of nearby approved local Hospitals (approved by client), Police, Fire Station and Administration shall be prominently displayed at site and for attending any emergency medical cases shall be lineup with approved local hospital.
h. All own employee & worker shall be medically examined (by client approved local hospital) prior to joining the work.

24. SAFETY AWARENESS & TRAINING

Safety awareness to all section of personnel ranging from Site Incharge 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 following safety material and same shall be provided by Safety Department with the help of Corporate Communication Department.

a. **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, and affection curiosity or human aspects. These should be displayed in prominent location(s).
b. **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.
c. **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.
d. **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.
e. **Competitions:** Organize competition(s) between the different departments/ categories of workers. The sense of reward/recognition also will improve safety awareness and result in enhancing safety levels.
f. **Exhibitions:** Exhibitions also make the workers acquainted with hazards and means of preventive measures.

g. **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.

h. **Safety Drives:** From time to time, an intensive safety drive by organizing a safety day or a safety week etc. should be launched.

i. **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.

j. **TBM:** TBM shall be given by safety officer / supervisors on weekly / fortnightly basis. Site in-charge shall review the TBM records on fortnightly basis and records shall be sent to corporate & client office.

25. EMERGENCY PRE-PAREDNESS PLANS

a. Emergency Situations

i. Formulate an Emergency Preparedness Plan for each of sites. These plans will address foreseeable emergencies that may arise during the construction activities Examples of activities for which plans should be prepared include amongst other things.
ii. An Accident Which Results In Death or Major Injury.
iii. A Serious Fire That Threatens Life.
iv. A Flood That Threatens Life.
v. Leakage of Any Dangerous Materials or Chemicals.
vi. Leakage / Short Circuit of any Electrical supply.

b. Major Engineering Failures such as

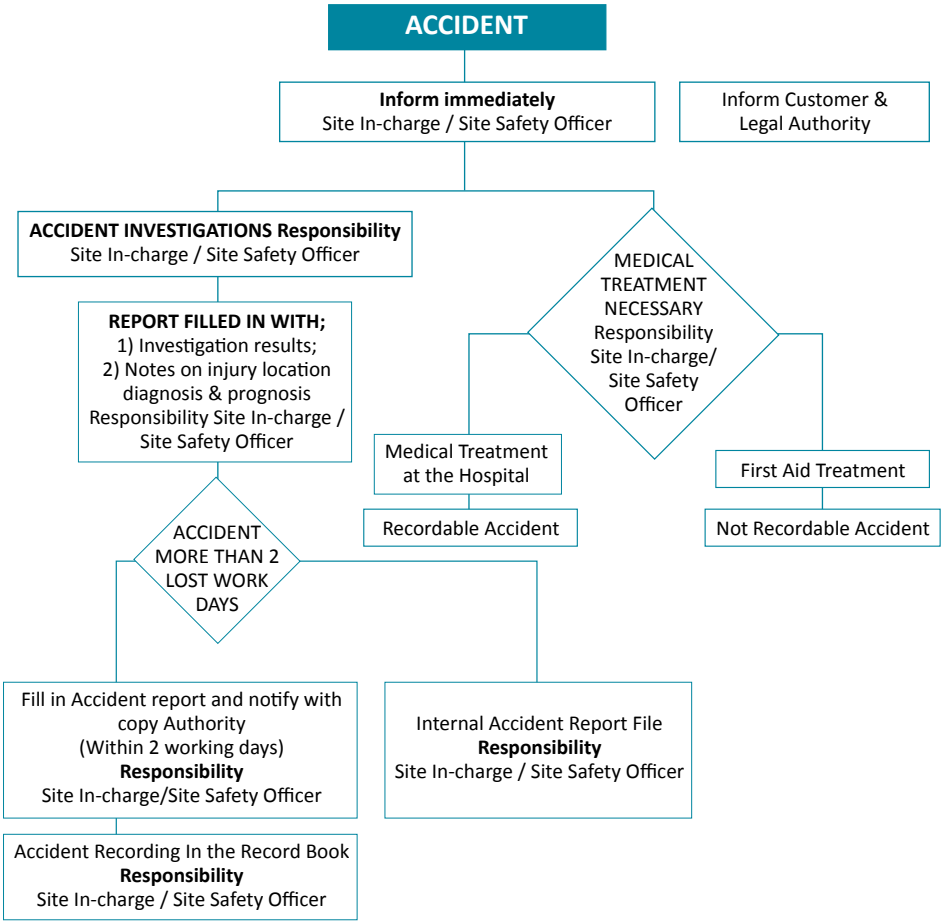
i. unintended explosions
ii. subsidence causing damage to structures or services

c. An Emergency Preparedness plan should include details of following;

i. The name, locations and phone number of the Emergency Co-ordinates.
ii. Designated Personnel with locations and phone numbers.
iii. Details of the Emergency Response Team with locations and phone numbers.
iv. Functions of the Emergency Response Team.
v. The means of escape.
vi. Communication with the Emergency Services.
- Police.
- Fire Services.
- Ambulance and Hospital Services.

Remarks:

Emergency preparedness plans shall be prepared at site according to the client specified guidelines. It will effective by client cooperation and direction.



Accident Recording Procedure

HOW TO HANDLE ACCIDENTS AT EPC SITES (Appendix B)

ACCIDENT

SITE INCHARGE

i. In case minor injury, first aid shall be given to the victim immediately.
ii. In case of major injury, arrange for the transport facilities to the injured and the victim shall be send to nearest hospital immediately for necessary medical treatment.
iii. To Co-ordinate with HR & Administration Head for any help.
iv. To inform immediately to Head Construction & Customer about accident.
v. To inform Chief Factory Inspectorate of concern area to comply the legal obligations.
vi. If the injury serious in nature then fill up the form-16 and send to the ESI.
vii. Find the causes of accident & make corrective measures and same to be implemented.
viii Keep evidence intact for fact finding and inquiry purpose.
ix. Determine extent of damage to equipment, materials.
x. Take actions that will prevent or minimize the risk of further accidents, injury or property damage.
xi. Restore the conditions in accident spot & reactivate the construction work.
x. Site Incharge will inform to victim's family about this accident.

DEPARTMENT HEAD AT GURGAON/ REGIONAL OFFICE

i. He shall inform to Unit Head, Divisional Head, HR & Administration Head & Safety Department.
ii. Head of the Department shall coordinate with site incharge for better medical treatment to the injured employee immediately.
iii. Head of the Department shall coordinate with site incharge for fulfill of all statutory provisions regarding accidents.
iv. Find the causes of accidents and make corrective measures alongwith safety deptt and take actions that will prevent or minimize the risk of further accidents, injury or property damage.
v. Giving necessary instructions to all site incharge for avoiding reoccurrence of accident at work place.

HR & ADMINISTRATION HEAD

i. Inform to Unit Head immediately of accident indicating the measures taken
ii. He shall ensure to comply all statutory provision regarding accident in Co-ordinate with Site Incharge & Safety Deptt. He shall ensure that proper medical treatment is given to the injured employee

SAFETY DEPARTMENT

(i) Carry out accident investigation of serious accident and prepare a report and send to concern authority action for avoiding reoccurrence of accident.
(ii) To fulfill of all legal requirements about accident, in Co-ordinate with HR Department & Site Incharge.
(iii) Maintain safety record at site for inspection of Concerned Authority.
(iv) To advise and assist site management in the implementation of the corrective measures of accident to maintain a safe working environment at sites.
(v) To communicate the accident causes and corrective measures to all sites so that such an accident is not repeated in future

26. Reporting procedure to the government authority after minor injury/serious injury/or in case of fatality:-

According to rule 210 of BOCWR, notice of any accident to a worker at the building or construction site that:

a) causes loss of life; or
b) disables a worker from working for a period of 48 hours or more immediately following the accident;
c) shall forthwith be sent by telegram, telephone, fax, or similar other means including special messenger within four hours in case of fatal accidents and 72 hours in case of other accidents, to:

   i) the Regional Labour Commissioner (central), wherein the contractor has registered the firm/work
   ii) the board with which the worker involved was registered as a beneficiary;
   iii) Director General and
   iv) the next of kin or other relative of the worker involved in the accident;

Further, notice of accident shall be sent in respect of an accident which

a) Causes loss of life; or
b) disables the injured worker from work for more than 10 days to

   i) the officer-in-charge of the nearest police station;
   ii) the District Magistrate or, if the District Magistrate by order so desires, to
   iii) the Sub-Divisional Magistrate

In case of an accident causing minor injury, first-aid shall be administered and the injured worker shall be immediately transferred to a hospital or other place for medical treatment. Where any accident causing disablement that subsequently results in death, notice in writing of such death, shall be sent to the authorities mentioned above within 72 hours of such death.

Reporting of dangerous occurrences: -

The following classes of dangerous occurrences shall be reported to the Inspector having jurisdiction, whether or not any disablement or death caused to the worker, namely:

a) collapse or failure of lifting appliances, or hoist, or conveyors, or similar equipment for handling of building or construction material or breakage or failure of rope, chain or loose gears; or overturning of cranes used in construction work;
b) falling of objects from height;
c) collapse or subsidence of soil, tunnel, pipe lines, any wall, floor, gallery, roof or any other part of any structure, launching

girder, platform, staging, scaffolding or means of access including formwork;

d) explosion of receiver or vessel used for storage of pressure greater than atmospheric pressure, of any gas or gases or any liquid or solid used as building material;
e) fire and explosion causing damage to any place on construction site where building workers are employed;
f) spillage or leakage of any hazardous substance and damage to their container;
g) collapse, capsizing, toppling or collision of transport equipment;
h) leakage or release of harmful toxic gases at the construction site;

In case of failure of launching girder, lifting appliance, loose gear, hoist or building and other construction work, machinery and transport equipment at a construction site, such appliances, gear, hoist, machinery or equipment and the site of such occurrence shall, as far as practicable, be kept undisturbed until inspected by the Authorities;

Every notice given for fatal accidents or dangerous occurrences shall be followed by a written report to the concerned Authorities under Section 39 of BOCWA and the Director General in the specified Form XIV of BOCWR

27. REFERENCES

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**

Annexure – I

Formats & Checklists

Contents

Sr. No.	Subject	Document No.	Rev	Total Pages	Responsi-bilities	Form Filling Frequency	Report to
1	Safety Statistics Form	Appendix -1 Ref-IJ-01- Rev-01 Date : 01.03.2012	01	1	Site Safety Officer	Once in a month	Corporate Safety Deptt.
2	Accident Investigation Report	Appendix -2 Ref-IJ-01-Rev-01 Date : 01.03.2012	01	3	-do-	After the Accident	-do-
3	General Safety Inspection Checklist	Appendix -3 Ref-IJ-03-Rev-01 Date : 01.03.2012	01	3	-do-	Weekly	-do-
4	Housekeeping Checklist	Appendix -4 Ref-IJ-04-Rev-01 Date : 01.03.2012	01	2	-do-	Weekly	Record Keep at Site
5	Crane Inspection Checklist	Appendix -5 Ref-IJ-05-Rev-01 Date : 01.03.2012	01	1	-do-	Monthly	-do-
6	Electrical Safety Inspection Report	Appendix -6 Ref-IJ-06-Rev-01 Date : 01.03.2012	01	1	-do-	Weekly	-do-
7	Vehicle Inspection Checklist	Appendix -7 Ref-IJ-07-Rev-01 Date : 01.03.2012	01	1	-do-	Monthly	-do-
8	Electrical Safety Inspection Checklist	Appendix -8 Ref-IJ-08-Rev-01 Date : 01.03.2012	01	2	-do-	Weekly	-do-
9	Working at Height Checklist	Appendix -9 Ref-IJ-09-Rev-01 Date : 01.03.2012	01	2	-do-	For depends upon activity	-do-
10	Erection Safety Checklist	Appendix -10 Ref-IJ-10-Rev-01 Date : 01.03.2012	01	1	-do-	Fortnightly	-do-
11	Pep Talk Report Form	Appendix -11 Ref-IJ-11-Rev-01 Date : 01.03.2012	01	2	-do-	Daily	-do-

Sr. No.	Subject	Document No.	Rev	Total Pages	Responsi-bilities	Form Filling Frequency	Report to
12	Confined Space Entry Permit	Appendix – 12 Ref-IJ-01-Rev-01 Date : 01.03.2012	01	2			
13	Permit To Work – Electrical	Appendix -13 Ref-IJ-13-Rev-01 Date : 01.03.2012	01	1	-do-	As per Work Activity	-do-
14	Permit To Work – Hot Work	Appendix -14 Ref-IJ-14-Rev-01 Date : 01.03.2012	01	1	-do-	As per Work Activity	-do-
15	Job Safety Analysis	Appendix -15 Ref-IJ-15-Rev-01 Date : 01.03.2012	01	2	-do-	As per Work Activity	-do-
16	Performa for Screening Workmen	Appendix -16 Ref-IJ-16-Rev-01 Date : 01.03.2012	01	2	-do-	Form should be filled before joining of workmen	-do-
17	Monthly Evaluation of Sub-contractor on safety	Appendix -17 Ref-IJ-17-Rev-01 Date : 01.03.2012	01	1	-do-	Once in a month	Corporate Safety Deptt.
18	Formation of Site Safety Committee	Appendix -18 Ref-IJ-18-Rev-01 Date : 01.03.2012	01	3	Site Incharge	Once in a month	Record Keep at Site & Concern Person & Corporate Safety Deptt.
19	Analysis of First Aid Cases	Appendix -19 Ref-IJ-19-Rev-01 Date : 01.03.2012	01	1	Site Safety Officer	Once in a month	-do-
20	Site Safety Compliance Report	Appendix -20 Ref-IJ-20-Rev-01 Date : 01.03.2012	01	1	-do-	Once in a month	-do-

Sr. No.	Subject	Document No.	Rev	Total Pages	Responsi-bilities	Form Filling Frequency	Report to
21	Site Safety Inspection Report	Appendix -21 Ref-IJ-21-Rev-01 Date : 01.03.2012	01	2	Site Incharge/ Site Safety Officer	Weekly	-do-
22	Near Miss Report	Appendix -22 Ref-IJ-22-Rev-01 Date : 01.03.2012	01	1	Site Safety Officer	After the Near Miss	Corporate Safety Deptt.
23	Daily Site Safety Observations Register	Appendix -23 Ref-IJ-23-Rev-01 Date : 01.03.2012	01	1	Site Safety Officer	Daily	Record Keep at Site
24	Industrial Radiography – Work Permit	Appendix – 24 Ref-IJ-24-Rev-01 Date : 01.03.2012	01	2	Site Safety Officer	For activity	Record Keep at Site
25	Weekly ELCB's	Appendix – 25 Ref-IJ-25-Rev-01 Date : 01.03.2012	01	1	Site Safety Officer	Weekly	
26	Safety Material Status at Site	Appendix – 26 Ref-IJ-26-Rev-01 Date : 01.03.2012	01	1	Site Incharge / Site Safety Officer	Monthly	Record Keep at Site
27	Tools and Tackles Records at Site	Appendix – 27 Ref-IJ-27-Rev-01 Date : 01.03.2012	01	1	Site Incharge / Site Safety Officer	Monthly	Record Keep at Site
28	Tower Crane Safety Inspection Weekly Checklist	Appendix – 28 Ref-IJ-28-Rev-01 Date : 01.03.2012		2	Site Incharge / Site Safety Officer	Weekly	Record Keep at Site

APPENDIX-1

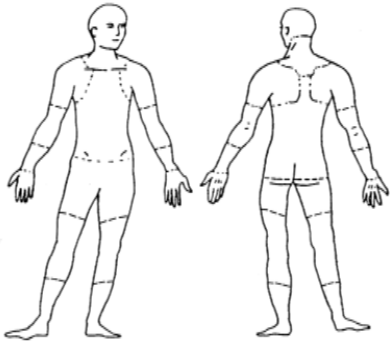
Ref- IJ- 01-Rev-01
Date :

SAFETY STATISTICS FORM			
Name of the site		:	
Project code		:	
Name of Contractor		:	
REPORT FOR MONTH ENDING:			
COMMENCEMENT DATE:		SCHEDULED COMPLETION DATE:	
S.No.	ACCIDENT STATISTICS SUMMARY	FOR MONTH	CUMULATIVE
1.	Number of Manhours Worked		
2.	Number of Mandays Worked		
3.	Number of Reportable Fatal Accidents		
4.	Number of Reportable Non-Fatal Accidents		
5.	Number of Dangerous Occurrences		
6.	Number of Manhours Lost		
7.	Number of Mandays Lost		
8.	Number of Reportable Accidents per 101,010 Manhours Worked = [(3) +(4)] x 101,010 = Accident Frequency Rate		
9.	Average Number of Worker Daily		
REMARKS:			
Signed:	Safety Officer:	Date: / /	
Signed:	Site Incharge:	Date: / /	

APPENDIX-2

Ref-IJ-02-Rev-01
Date :

ACCIDENT INVESTIGATION REPORT							
1. Details of the Project							
Name of the Site				Name of the Site Incharge			
Job No				Name of Immediate Supervisor			
Name of Subcontractor				Name of Witness			
2. Category of Accident							
☐ Near miss case		☐ Reportable Loss Time Injury		☐ Dangerous Occurrence		☐ Fatality	
3. Details of the Accident (Write N.A if not applicable)							
3.1)	Name of the person	Age	Sex	Designation	Date	Time	Working Since
3.2) Exact Location where the Accident occurred:							
3.3) Nature of Injury:							
3.4) Name / identity of the Plant & Machinery / Equipment:							
3.5) Describe briefly how the accident occurred (Add sketches and additional sheets to support the description) :							

4. Causes of the Accident
4.1) Direct Causes :
4.2) Proximate Causes :
5. Indicate the Injured part of the body in figure

6. Precautionary Measures
6.1) What are the precautions taken / being taken to prevent similar occurrence?

(Signature of Site Safety Officer)

(Signature of Site Incharge)

APPENDIX-3

Ref-IJ-02-Rev-01
Date :

GENERAL SAFETY INSPECTION CHECKLIST

Name of Site :
Project code :
Area Inspected :
Inspected By :
Date :

S.No	Activities	Observation	Measures
	LADDERS		
1	Check placed on level ground		
2	Position at an angle of 1:4		
3	Adequately secured		
4	No damage, check welds		
5	Extent 4 rungs above stepping off point		
6	Uniform and proper spacing of rung		
	WORKING PLATFORM		
1	Should not be less than 601mm wide		
2	Guard rails adequate check		
	(i) Top rail atleast 910mm height		
	(ii) No gap greater than 470mm.		
3	Boards free of defects check.		
	(i) No gaps		
	(ii) Adequate supports		
	(iii) No risk of trips		
	(iv) Properly secured / tied		
	(PPE)		
1	Helmet and Footwear worn		
2	Safety harnesses as required & secured above shoulder level		
3	Use of safety belt while working at height		
4	Safety Goggles during welding/gas cutting/grinding etc.		
5	Condition / Maintenance of safety appliances		
6	Use of body guards, gloves etc.		

S.No	Activities	Observation	Measures
	STRUCTURAL FABRICATION & ERECTION		
1	All electrically operated equipment has proper earthing and connected through ELCB.		
2	Safety guards for drilling & grinding machine are in position		
3	Use of scotch block / wedge on wheels of trailors during unloading of material		
4	End stoppers fixed and maintained for rail mounted gantry cranes and limit switches are in operating condition.		
5	Checking lifting tool & tackles before use		
6	Precaution during slinging on sharp edges		
7	Signalling to crane operators by one person at a time		
8	Withdrawal of persons beneath suspended load		
9	Cordoning on all sides displaying Red Flags / Tape / Light and warning signs.		
10	Load to be lifted is properly ascertained to identify centre of gravity etc.		
11	Clear passages of men, posts, material etc. and easy access for cranes to move with suspended loads		
12	Proper tag line is used for guiding lifting loads		
13	Proper sequence of erection is followed		
14	Guy ropes are used and secured during and after erection of heavy lift		
15	Wire ropes are maintained and its safe working load inscribed		
16	Adequate illumination provided		
	GAS CUTTING AND WELDING		
1	Storing of gas cylinder like DA, Oxygen full & empty etc		
2	Proper handling of gas cylinder		
3	Condition of regulator, hose, torch etc		
4	Welding generators / transformers condition and its proper earthing		
5	Condition of welding cable and joints		
6	Electrode holder		

S.No	Activities	Observation	Measures
7	Area free from combustible material		
8	Cordoning when Welding/Gas cutting is in progress at height		
9	Provision of fire extinguishers		
10	Smouldering fires are religiously extinguished after day's job		
11	Stacking of cylinders not near live wires, battery charging rooms / oil rooms.		
	MEANS OF ACCESS		
1	Platform, toe board and railings		
2	Scaffolding – its condition and maintenance		
3	Staircase and railing		
4	Ladder & fixing		
5	Safe access to and from means of access		
	ELECTRICAL WORKS		
1	Earthing of electrically operated equipment		
2	Provision of shed / canopy / cover of distribution board and sub-distribution board.		
3	Insulation of cables and joints.		
4	Cable laying above 7' from ground level		
5	Fire extinguishers and main distribution board room		
6	Periodical checking of portable tools		
7	Use of ELCB's		
8	Men working don't switch on board and other related warning boards and tags		
9	Insertion of loose wire and sockets		
10	Job safety analysis for shutdown jobs and its proper action		
11	Use of proper plug and sockets		
12	Permit to work		
	HOUSEKEEPING		
1	Material stocking and storing		
2	Working / moving area clean		

S.No	Activities	Observation	Measures
3	Access / main approach / passages free form obstacles		
4	Cordoning / covering of pit, vat, machine foundation etc.		
5	Displaying of red flags / tape / light.		
6	Removal of unwanted materials like debris, scrap etc		
	FIRE PREVENTION / PROTECTION		
1	Combustible material away from source of heat / fire		
2	Provision of fire extinguishers and its maintenance		
3	No smoking Board / Caution Board displayed		
4	Stacking / storing of different type of combustible materials		
	ROAD SAFETY		
1	Driving by authorised person		
2	Loading of material on truck, dumper securely		
3	Material falling from vehicle While transporting		
4	Speed limit		
5	Going up and coming down from moving vehicle		
6	Indulging in horse play on job		
7	Reverse horn		
8	Location of overhead lines identified and precautions taken.		
	MISCELLANEOUS		
1	First Aid box with proper medicine and its maintenance		
2	Validity date of medicine		
3	Illumination		
4	Safety board and safety promotional materials (i) Posters (ii) Stickers		
5	Accident report form		
6	Form for details of factors for Safety Rolling Trophy		
7	Reporting system with regional office		
8	Arrangement of drinking water and sanitation		
9	Provision of emergency vehicle		

APPENDIX-4

Ref-IJ-04-Rev-01
Date :

HOUSEKEEPING CHECKLIST

Name of Site :
Project code :
Area Inspected :
Inspected By :
Date :

S. No.	Point	Observation	Measures
	STRUCTURAL FABRICATION / ERECTION SITE		
1	Walkways, passages kept clear of material		
2	Area and roads kept clear for maneuvering of cranes and material handling equipment.		
3	Scrap, cut pieces, welding electrode stubs, hand tools kept tidy in work area and disposed suitably.		
4	Scrap-bin available at site		
5	Welding cables, power cables routed properly to avoid run-over by vehicle or tripping hazards and obstruction to personnel movement.		
6	Compressed gas cylinders and hoses kept away from hot work and grinding work		
7	Floor kept clear of water, oil spillage / accumulation.		
8	Nails removed from wooden planks / timber and not protruding out.		
9	Saw dust, wood chips and scrap wood cleared from site and disposed suitably		
	ELECTRICAL INSTALLATIONS & BOOTHS		
1	Approach to distribution board (DB's), Panels, Switches kept clear		
2	Fire extinguishers installed at an easy accessible location		
3	Welding cables and power cables are routed separately		
4	Routing of cables are done properly to avoid obstruction & tripping hazards		
5	Floor of electrical booths kept dry		
6	Rubber mats are in place at electrical panels		

S. No.	Point	Observation	Measures
	STORES		
1	Walkways, entry and exits kept clear		
2	Materials placed on racks are safely accessible		
3	Compressed gas cylinders are segregated as full or empty and type of gas.		
4	Vertically stored cylinders are secured / chained to avoid toppling and horizontal once guarded against rolling down		
5	Flammable storage areas are isolated from store, office and work areas		
6	Corrosive material (e.g. acids, alkalies) are stored away from other material and kept on collection trays to safeguard against accidental leakage		
7	Storing area for lifting tools & tackles, ropes, wire ropes, and personal protective equipment is dry, clean and free of corrosive material		
	GENERAL		
1	Separate scrap yard is allocated for the site		
2	Approaches to workstations, offices, time offices, stores, Machinery are well laid and demarcated		
3	Site roads are kept clear of stacked material for free and safe vehicular movement		
4	Heavy materials stacking are taken care of to prevent slips, collapse and rolling		
5	For housekeeping at elevated workplaces refer to Ref-IJ-09-Rev-01 (working at height checklist)		

APPENDIX-5

Ref-IJ-05-Rev-01
Date :

CRANE INSPECTION CHECKLIST

Name of Site :
Project code :
Area Inspected :
Inspected By :
Date :

S.No	Activities	Observation	Measures
1	Hook & Hook Latch		
2	Over-Hoist Limit Switch		
3	Boom-Limit Switch		
4	Boom Angle indicator		
5	Boom-Limit cut off switch		
6	Condition of boom		
7	Condition of Ropes		
8	Size and condition of the Sling		
9	Stability of crane		
10	Soil Condition		
11	Swing Brake & Lock		
12	Hoist Brake & Lock		
13	Boom Brake & Lock		
14	Main clutch		
15	Leakage in hydraulic cylinders		
16	Out riggers fully extendible		
17	Tyre Pressure		
18	Condition of Battery and Lamps		
19	Guards of moving & rotating parts		
20	Load chart provided		
21	Reverse Horn		
22	Load test details		
23	Operators Fitness		
24	Fire Extinguisher in operators cabin		

APPENDIX-6

Ref-IJ-06-Rev-01
Date :

CRANE INSPECTION CHECKLIST

Name of Site :
Inspected by :
Project code :
Area / location Inspected :
Date :

S.No	Activities	Observation	Measures
1	Earthing		
2	Neutral earthing		
3	ELCB		
4	Insulation		
5	Cable Layout		
6	Protection from Water		
7	Lightning Arrestor		
8	Plug Tops & Cable Joints		
9	Installation Cover & Seals		
10	Electrical safety at installations containing Inflammable & Explosive substances		
11	Safety guards		
12	Others (Specify)		

APPENDIX-7

Ref-IJ-07-Rev-01
Date :

VEHICLE INSPECTION CHECKLIST

Name of Site :
Project code :
Inspected By :
Date :

S.No	Activities	Observation	*Measures*
1	Engine condition		
2	Clutch / brake		
3	Hydraulic System		
4	Guards / Covers / Doors		
5	Fastener lock pins / Keys		
6	Horn / Reverse horn / Lights		
7	Indicators / Wiper Blades		
8	Operators fitness		
9	Tyre pressure		
10	Condition of Battery and Lamps		
11	Operating levers / steering		
12	Gauges & warning devices		
13	Fire extinguisher provided		
14	Seat Belt		
15	Any Other Points		

APPENDIX-8

Ref-IJ-08-Rev-01
Date :

ELECTRICAL SAFETY INSPECTION CHECKLIST

Name of Site :
Inspected by :
Project code :
Inspected date :
Sub – Contractor's Name :

S.No	Activities	Observation	Measures
	CABLES		
1	Whether the condition of cable is checked?		
2	Are Cables received from other site checked for Insulation Resistance before putting them into use?		
3	Are all main Cables, taken either underground / Overhead?		
4	Are Welding Cables routed properly above the Ground?		
5	Are welding & Electrical Cables overlapping?		
6	Is any improper jointing of Cables wires prevailing at Site?		
	DB's / SDB's		
1	Is earth conductor continued upto DB / SDB ?		
2	Whether DB's & extension boards are protected from rain / water?		
3.	Is there any overloading of DB's / SDB's ?		
4	Are correct / proper fuses & circuit breaker provided at main boards & sub-boards?		
5	Is energised wiring in junction boxes, circuit breaker panels & similar places covered all times?		
	ELCB		
1	Whether the connections are routed through ELCB?		
2	Is ELCB sensitivity maintained at 30 mA?		
3	Are the ELCB numbered & tested periodically & test results recorded in a logbook countersigned by competent person?		

S.No	Activities	Observation	Measures
	EARTHING		
1	Is neutral earthing ensured at the source of power (Main DB at Gen. or Transformer)?		
2	Whether the continuity & tightness of earth conductor are checked?		
3	Mention the gauge of earth conductor used at site		
4	Mention the value of Earth Resistance		
	ELECTRICALLY OPERATED MACHINES / ACCESSIORIES		
1	Whether the plug top provided everywhere?		
2	Are all metal parts of electrical equipment's & light fittings / accessories grounded?		
3	Is there any shed / cover for welding machines?		
4	Are Halogen lamps fixed at proper places?		
5	Are portable power tools maintained as per norms?		
6	Any other information		

APPENDIX-9

Ref-IJ-09-Rev-01
Date :

WORKING AT HEIGHT CHECKLIST

Name of Site :
Project code :
Inspected By :
Date :
Sub-Contractor's Name :

S.No	Activities	Observation	Measures
1	All the workers have been explained safe work-procedures?		
2	An established communication system have been established and explained to the workers		
3	Adequate illumination has been ensured		
4	Work-area inspected prior to stating of the job		
5	Area below the workplace barricaded, especially below hot-works		
6	Workmen provided with bag / box to carry bolt, nuts and hand tools		
7	Arrangement for fastening hand tools made		
8	All working platforms ensured to be of adequate strength. And ergonomically suitable		
9	Fabricated make shift arrangements are checked for quality and type of material welding, anchoring etc		
10	Work at ensure than one elevation at the same segment is restricted		
	ACCESS / EGRESS		
1	Walkways provided with hand-rail mid-rail & toe guard?		
2	All chequered plates, grating properly welded / bolted?		
3	Are ladders inspected and whether they are maintained in good condition		
4	Are ladders spliced		
5	Are ladders properly secured to prevent slipping, sliding or falling		
6	Do side-rails extent 36" above top of landing		

S.No	Activities	Observation	Measures
7	Are built up ladders constructed of sound materials		
8	The distance between rungs of ladder not more than 300 mm		
9	Metal ladders not used around electrical hazards		
10	Proper maintenance and storage		
11	Ladders placed at right slope		
12	Ladders staircases welded / bolted properly		
13	Any obstruction in the stairs		
14	Are landings provided with handrails, knee-rails, toe-boards etc		
	HOUSEKEEPING		
1	Walkways, aisles and all overhead workplaces cleared of loose material		
2	Flammable material, if any, are cleared		
3	All scrap materials are removed after job is done		
4	Platforms and walkways free of oil / grease or other slippery spillage		
5	Collected scrap are brought down or lowered down and not dropped from height		
	PPE AND SAFETY DEVICES		
1	Use of safety helmets, safety belts ensured for all workers		
2	Anchoring point provided at all places of work		
3	Common life-line provided wherever linear movement at height is required		
4	Safety nets are in use wherever required		
5	Proper fall arrest system is deployed at critical work places		
6	Crawler boards / Safety system for work on fragile roof are used		

APPENDIX-10

Ref-IJ-10-Rev-01
Date :

ERECTION SAFETY CHECKLIST

Name of site :
Project code :
Area Inspected :
Inspected By :
Date :
Sub-contractors Name :
Material to be lifted :
Approx. Weight :

S.No	Activities	Observation	Measures
1	Determination of position of centre of gravity		
2	Is suitable sling / 'D' shackle selected		
3	Are bull dog grips being provided in correct manner for wire ropes / slings		
4	Are the required number of 'U' clamps fastened		
5	Are all the signal men provided whistle/ suitable communication device		
6	Are all the workmen at higher elevation wearing safety belt with their life line hooked		
7	Whether precautions have been taken In case of obstructions for load as well as tag line		
8	Whether any suspension involved, if 'yes', Whether the condition of the suspension method is checked		
9	Inspection by D.P. test		
10	Any standby lifting tools & tackles required and arranged		
11	Any safety net required		
12	Adequate illumination is arranged		
13	Availability of guy rope		
14	Protection against sharp edge		

APPENDIX-11

Ref-IJ-11-Rev-01
Date :

PEP TALK REPORT FORM

Identity / Name of the Site :

Project Code :

Location :

Name of the Site Incharge :

Name of the Sub – Contractor / Dept. :

Number of workmen present :

Date & Time with Duration :

Topics discussed :

Response of workmen :

Remark/
Any significant problem identified :

Signature & Name: Site Safety Officer Site Engineer

Note: - Attendance sheet (HR/T & E/9121/OCT 2010) duly signed by workers should be attached

HR/T & E/9121/OCT 2000

TRAINING ATTENDENCE REGISTER

Title of Training Programme :
Name of Faculty :
Duration :
Date :

SL. No.	Name of Participants	Department	Division	Signature

APPENDIX-12

Ref-IJ-12-Rev-01
Date :

CONFINED SPACE ENTRY PERMIT

(A)

(1) Identity of the confined space _____

(2) Location _____

(3) Purpose of Entry _____

(4) Date and Time _____

(5) Validity of confined Space Permit

From (Time) _____ Date _____

To (Time) _____ Date _____

(6) Description of work to be performed

_____

_____

(7)	Have all the Electrical / Air / Hydraulic equipment / Drives / other energy sources been disconnected	Yes / No
(8)	Have the persons required to enter the confined space been trained in dealing with the specified hazards	Yes / No
(9)	All necessary PPE's provided	Yes / No
(10)	Has a rescue team equipped with engineering rescue devices put on standby	Yes / No
(11)	Has 24 Volt hand lamp been provided	Yes / No
(12)	Exhaust/fresh air flow fan been provided	Yes / No
(13)	Method of communication	Yes / No
(14)	Has the vessel/drum/equipment/space been cleaned, purged, isolated..	Yes / No
(15)	Has any supervisor deployed at confined space entry point for continuous monitoring	Yes / No

(16) Air quality test required

a) Oxygen level	
b) Carbon Monoxide Level	
c) Carbon dioxide Level	
d) Explosibility	
e) Temperature	
f) Air Flow	
g) Steam condensate	
h) Others	

(17) Any heating material to be removed from confined space Yes / No

I have checked the above points and found conditions suitable to undertake the work

_____	_____	_____
Name of Permittee Site Incharge / Site Engineer	Designation	Signature

(B)

The person giving permit (issuing authority) to fill up

The precautions and safe conditions mentioned above have been verified and the work can be started

Name and signature of issuing authority _____
(Site Safety Engineer of ISGEC)

(C)

Date_____time _____ at which the permit closed and filed

Name of Site Safety Engineer with signature _____

White copy: Issuing Authority
Green copy: Permittee copy

APPENDIX-13

Ref-IJ-13-Rev-01
Date :

PERMIT TO WORK – ELECTRICAL	
NAME OF CONTRACTOR	Project Code
PREMIT NO :	Date

Part 1 : Issue

Issue to _____

I hereby declare that it is safe to work on the
Following apparatus which is dead, is isolated
From all live conductors and is connected to earth } _____ _____ _____

The apparatus is efficiently connected to earth
At the following points } _____ _____

All other apparatus is dangerous

The following is the work to be carried out on the
Apparatus. } _____ _____

Caution Notices are posted at _____

Special Keys required for access to enclosures

Special Precautions to be taken _____

This permit is valid only for the specified period which must not exceed 24 hours

Signed _____ being an Authorized Person
Possessing authority to issue a Permit for the work specified above.

Time of Issue _____ Date _____ Time of Enquiry _____

Part 2 : Receipt

I hereby declare that I accept responsibility for carrying out the work on the apparatus detailed on this permit, and that no attempt will be made by me, or by the men under my control, to carry out work on any other apparatus.

Part 3 : Clearance Certificate

I hereby declare that the work for which this permit was issued is now suspended / completed and that all men under my charge have been withdrawn, and warned that it is no longer safe to work on the apparatus specified on this permit

I acknowlede return of authorised Key Nos _____

Signature of person responsible for issue of permit _____

Time _____ Date _____

Part 4 : Cancellation

This permit is hereby cancelled by the undersigned who is authorised to issue such permits

Signed _____ Time _____ Date _____

List :
Original (White) : Displayed at work location
1st Copy (Pink) : Retained by Authorised person
2nd Copy (Green) : Site Safety Officer

APPENDIX-14

Ref-IJ-14-Rev-01
Date :

PERMIT TO WORK – HOT WORK	
NAME OF CONTRACTOR	Project Code
PERMIT NO. HW :	Date

Part 1 : Issue

Issue to (Name of person) _____Section _____
Details of Hot Work_____
Location_____
Work to be carried out _____

I hereby declare that the above Hot Work is safe to carry out and that all appropriate fire precautions are in place including the issue of additional 5kg Dry Powder Extinguisher or site and that all Company Safety Rules have been observed.

Date :_____Time of Issue _____Time of Expiry_____
This permit is valid only for the period specified which must not exceed 24 hours

Signed : _____Time _____Date_____
Being the Authorised Person (Hot Work)

Part 2 : Receipt
I hereby declare that the work by myself, or by any person under my control or the above Hot Work shall be carried out in accordance with the conditions of this certificate and the requirements of the company Safety rules. All persons permitted to work on this Hot Work have been or will be informed of when the safe period for entry will expire.

Signed : _____Time _____Date_____
Being the Authorised Person (Hot Work)

Part 3 : Clearance
I declare that all Hot Work under my control has now been stopped and the area has been checked out found clew of any risk of fire and that all tools and other equipment have been removed.

Signed : _____Time _____Date_____
Being the Authorised Person (Hot Work)

Part 4 : Cancellation
I acknowledge receipt of the clearance of this Certificate.
This certificate is now Cancelled
Signed Being the Authorised Person (Hot Work) _____ Time _____ Date _____

APPENDIX-15

Ref-IJ-15-Rev-01
Date :

JOB SAFETY ANALYSIS

NAME OF SITE :

ASSESSMENT BY: _____ DATE : _____ ACTIVITY : _____

HAZARDS Others Site Work: - Site Conditions___Fuel / Lubricants___ Hazardous Chemicals___Mobile Plant / Vehicles___ Deep Excavation___ Demolition Noise___Vibration___ Explosion__ Work Near Water___ Falls From Height__ Trips / Falls___ Fall of Material__ Fumes / Gas__ Lifting Operations___ Flying Particles__ Collapse of Structure___ Contaminated Ground___ Soft Ground___ Poor Light / Visibility___ Overhead Services___ Buried Services___ Manual Handling___Vehicle Overturning___ Adverse Weather Dust___ Heat__ Eye Hazard__ Ear Hazard__ Respiratory Hazard__ Head Hazard__ Hand Hazard__ Foot Hazard__ Radiation Hazard__ Electrical Hazard__ Fire Hazard__ Other Hazards___

S. No.	ACTIVITY	HAZARD	RISK Level (H-M-L)	Controls to Be Introduced to Reduce the Risks	Control Measures Done By

S. No.	ACTIVITY	HAZARD	RISK Level (H-M-L)	Controls to Be Introduced to Reduce the Risks	Control Measures Done By

SIGNATUARE BY: SITE SAFETY OFFICER

SIGNATUARE BY: SITE INCHARGE

APPENDIX-16

Ref-IJ-16-Rev-01
Date :

PROFORMA FOR SCREENING WORKMEN ENGAGED BY CONTRACTORS/ SUB – CONTRACTORS

Name of the Contractor / Sub – Contractor: _____

Full Name of the workmen: _____

Father / Husband's Name: _____

Permanent Address: _____

_____

Present Address: _____

_____

- Date of birth: _____ Age_____ Years _____

Married / Single / _____Number of Children _____

Mother Tongue _____ Other Languages Known _____

In case of emergency person to be contacted _____
(With address and Telephone Number if any)

_____

Signature or left hand Thumb impression
of the workmen for identification
Any other identification mark:

Weight: _____ Height:_____

Vision: _____

_____

Education:

Examination Passed	Year	School / Board

- Please obtain photocopy of birth certificate issued by School or Gram Panchayat as required under Workmen's Compensation Act, 1923

PREVIOUS WORK EXPERIENCE

SL NO.	Name of the Contractor Organisation	Project Site	Category	Period		Salary / Wage Rate
1.						
2.						
3.						
4.						
5.						
6.						

Referred by / References
Screened by me Certificates / Details verified / not verified

_____

Referred to Mr. _____ for on the job trial

Suitable for employment as _____

Site Incharge / Site Engineer

_____

TRIAL REPORT

Seen and briefed the Safety Rules of the Site

Safety Engineer / Safety Officer

Approved for employment by M/s _____

Project Site _____

Site Incharge

Employment Card issued and details entered into Register of workmen

Time Keeper_____

APPENDIX-17

Ref-IJ-17-Rev-01
Date :

MONTHLY EVALUATION OF SUB - CONTRACTOR ON SAFETY

Name of Site :
Project Code :

Month :

Sl. No.	SUB-CONTRACTOR / SAFETY ATTRIBUTES										
1	Housekeeping										
2	Compliance of PPE's										
3	Innovative idea and implementation to save losses										
4	Workmen discipline and Safety systems compliance										
5	Non-repetition of non-conformity										
6	Participation towards Safety related programme										
7	Implementation of corrective action within target date and time										
8	Drive towards control of misuse/wastage										
9	Reporting and information										
10	Safety education and follow-up										
	Total Points										
11	Incidence Rate (All injuries including First Aid cases)										

1 Sub-contractors to be evaluated on 0 - 10 scale for each attribute.

2 The above record is maintained as per periodical Safety Inspection.

3 Any sub-contractor scores less than 50% marks, will come under unsafe Sub-contractor.

4 Incidence Rate = $\frac{\text{No. of injuries X 1010}}{\text{Average no.of workmen}}$

Name & Signature of Site Safety Officer

Date:

APPENDIX-18

Ref-IJ-18-Rev-01
Date :

FORMATION OF SITE SAFETY COMMITTEE

Name of the Site:
Project Code :

CIRCULAR

Committee
The following safety Committee is constituted with immediate effect:

Chairman :
Members :
1)
2)
3)
4)
5)
Secretary :

Periodicity
The committee will meet at least once in a month on the day (specify date)

Agenda
Secretary will circulate agenda of the meeting at least two days in advance of the schedule date of the meeting.

Circulation
Gist of the meeting will be minuted in the standard format and circulated to the following under the signature of the secretary ---

1. Chairman
2. Members
3. Invitees
4. Safety department Noida office
5. Others concerned

Date:

Signed By: _____
CHAIRMAN

MINUTES OF SAFETY MEETING

Name of the Site: Project code: Purpose of Meeting: Site Safety Meeting		Meeting No. Date of meeting Location of Meeting
MEMBERS PRESENT (SPML)	INVITEES	MEMBERS ABSENT (SPML)

REPORT SENT TO

No. of Copies	Name / Dept.	No. of Copies	Name / Dept.	No. of Copies	Name / Dept.

Prepared By: **Location:** **Date:**

MINUTES OF SAFETY MEETING

Sr. No.	Description of Discussion	Action By	Target date	Remarks

Next meeting is scheduled on :

Signature of Site Safety Officer

Signature of Site Incharge

APPENDIX-19

Ref-IJ-19-Rev-01
Date :

TRAINING ATTENDENCE REGISTER

Name of the Site: Month:
Project Code:

SL. No.	GROUPING OF CASES BASED ON CAUSATIVES	NUMBER OF CASES
1	Fall from height	
2	Slip & fall on level	
3	Fall into depth	
4	Fall of materials	
5	Pressed between objects	
6	Hit by objects	
7	Breaking of Grinding wheel	
8	Contact with moving Grinding wheel	
9	Contact with moving parts of the machinery	
10	Soil subsidence	
11	Struck against object	
12	Road accident (Vehicle / Equipment)	
13	Electric Shock	
14	Electric Burn	
15	Contact with hot objects	
16	Burn injury due to Fire	
17	Chemical burns	
18	Foreign body in Eye	
19	Welding Flash in eye	
20	Gas poisoning	
21	Asphyxia (suffocation)	
22	Explosion	
23	Blasting of Detonator	
24	Defective tools / wrong tools	
25	Drowning	
26	Others	

INCIDENCE RATE* OF FIRST AID CASES :

Name & Signature of Site Safety Officer

* INCIDENCE RATE = $\frac{\text{No. of Injuries x 1000}}{\text{Average No. of workmen}}$

Name & Signature of Site Incharge

APPENDIX-20

Ref-IJ-20-Rev-01
Date :

SITE SAFETY COMPLIANCE REPORT

Name of Site :
Project code :
Inspected by :
Date :

Sl. No.	Unsafe Act Observed in Numbers	Unsafe Conditions Observed in Numbers	% Compliance of Unsafe Acts	%Compliance of Unsafe Conditions	Remarks

Name & Signature of Site Safety Officer

Name & Signature of Site Incharge

APPENDIX-21

Ref-IJ-21-Rev-01
Date :

SITE SAFETY INSPECTION REPORT

Name of Site :
Job No. :
Area / Location of Site Inspected :

TO, SITE INCHARGE	DATE	MEMBERS PRESENT	MEMBERS ABSENT		
SL. NO.	UNSAFE CONDITIONS/UNSAFE ACTS OBSERVED	ACTION REQUIRED	ACTION BY	CLOSE OUT DATE	REMARKS

TO, SITE INCHARGE	DATE	MEMBERS PRESENT	MEMBERS ABSENT		
SL. NO.	UNSAFE CONDITIONS/UNSAFE ACTS OBSERVED	ACTION REQUIRED	ACTION BY	CLOSE OUT DATE	REMARKS
Name & Signature of Site Safety Officer:	DATE	Report Sent to :			Signature of Site Incharge

APPENDIX-22

Ref-IJ-22-Rev-01
Date :

This Report Form should be used to report events that, under slightly different circumstances, could have resulted in injury to personnel, and/or damage to property, plant, materials or the environment. The reporting and completion of this form may assist in the prevention of future accidents.

Name of Site:	Job Code:

1. Staff/Worker's Name _____Designation_____Age _____ M/F____

2. Date of Near Miss Witnessed : _____ Time _____

3. Location of Near Miss Witnessed: _____

_____

4. Was any Plants & Machinery involved Yes/No if Yes give details _____

_____

5. Circumstances of Near Miss: _____

_____

_____

CAUSE OF INCIDENT (Tick wherever applicable			
UNSAFE ACTS	√	**UNSAFE CONDITIONS**	√
Acting without proper instruction		Lack of housekeeping	
Wrong use of tool		Unattended tool/equipment	
Checking of running machine		No supervision	
No use of PPE		Unsafe tool/equipment	
Improper use of PPE		Unguarded tool/ equipment/platform	
Wrong behaviour/horse play		Congested work area	
Improper position/ ergonomics		Unsafe/uneven floor, ramp, stairs, etc.	
Wrong work sequence		Inadequate warning system	
Lack of knowledge & training		Improper material storage	
Busy/focused concentration		Inadequate ventilation	
Knew, but did not take action		Inadequate lighting	
Improper working practice		Hazardous gases, substance, dust, etc	
Other (Specify):		Other (Specify):	

UNSAFE ACTS		**UNSAFE CONDITIONS**	
Fall from height	√	Handling	√
Slip / Trip		Ascending	
Falling objects		Descending	
Collision		Electrical	
High temperature		Welding	
Toxics		Cutting	
Electrical shock		Grinding	
Reaction		Carpentry / Shuttering	
Fire / Explosion		Driving	
Traffic accident		Rebar work	
Others (Specify :-		Concreting	
Improper working practice		Painting	
Other (Specify):		Blasting	
		Lifting	
		Others (Specify :-	

6. Under the following circumstances _____

_____

_____

NEAR MISS REPORT

7. This may have injured/damaged : _____

_____

THIS SECTION TO BE COMPLETED BY SITE SAFETY OFFICER ON COMPLETION OF THE INVESTIGATION OF THE NEAR MISS

8. The following actions are recommended for implementation : _____

_____

_____

_____

Signed: _____Name_____Site Safety Officer Date : ___/___/___

Signed:_____Name_____Site Incharge Date : ___/___/___

SKETCH / PHOTOGRAPHS

APPENDIX-23

Ref-IJ-23-Rev-01
Date :

DAILY SITE SAFETY OBSERVATIONS REGISTER

Sl. No.	Unsafe Act/ Unsafe Conditions	Corrective Measure	Location	Responsibility	Sign/ Remarks

APPENDIX-24

Ref-IJ-24-Rev-01
Date :

INDUSTRIAL RADIOGRAPHY – WORK PERMIT

(This form to be filled by the concerned Radiography agency and submitted to the site safety officer two days before Radiography date)

1. Radiography work to be done for (Name of Contractor)

   M/s _____

2. Name of Radiography agency

   M/s _____

3. Name of the Site Incharge (Certified by BARC) of Radiography agency with emergency phone number

   _____

   Date & Time of Starting _____ Expected time of completion _____

   Exact location of work (Welding joint details as per enclosed sheet _____

   Area demarcated & cordoned -off _____
   (Sketches & Distance to be provided)

4. (a) Type of source _____

   (b) Source strength _____ on _____ (date _____

5. Following measurement of control on radiation exposure are available (Please tick on appropriate box)

(a) Radiation survey meter	☐	Yes	☐	No
(b) Film badges	☐	Yes	☐	No
(c) Pocket Dosimeter	☐	Yes	☐	No
(d) Alarm for starting the job / Red Lamp for caution	☐	Yes	☐	No

6. Number of Persons involved in Radiation work and their name _____

7. Following additional PPE to be used in addition to standards PPE (Helmet, Safety shoes, Hand gloves, Boiler suit) (Tick the relevant items)

Face shields		Dust Respirator		Lifeline		Compressed air set		Film badges/ Dosimeter	
Goggles		Fresh Air Mask		Safety Harness		Ear Muff		Others	

8. Whether the Radiography work is in confined space if yes, please take confined space entry permit also for carry out the work safely

9. Any other special precautions taken _____

_____

_____

Signature _____ Signature _____
Site Incharge of Radiography agency Site Incharge of Contractor

Signature _____ Signature _____
Site Incharge / Site Engineer of ISGEC Site Safety Engineer (ISGEC)

Special instructions

1. This permit must be available at work site at all times
2. This work permit is to be made in triplicate White, Blue, and Green. Blue copy is issued to Executor / Permittee. The White copy is to be retained by issuing authority. Green copy is to be retained by contractor.
3. On completion of job, area to be cleared and copies of permit to be returned to the issuer after closing of permit. The same shall be closed by issuer and kept as record.
4. All the columns in the form should be filled properly. No columns should be left blank.
5. Announcement to be made and removal of non essential persons are to be ensured from cordoned off area before commencement of job. The barricading is to be done with warning tape with display of radiation hazard symbol at site by the site radiographer after carrying out the radiation survey.
6. The radiography should preferably be carried out at a time when occupancy is least.
7. Radiation source movement within the site is to be maintained as per BARC norms.
8. The supervisor (Permittee) must be available at site during the radiography work.

White copy : Issuing Authority
Green copy : Contractor
Blue copy : Executor / Permittee

APPENDIX-25

Ref-IJ-25-Rev-01
Date :

Weekly ELCB's Inspection Report

Name of site :
Project code :
Inspected by :
Date :
Name of Site In charge :
Location :

Sl. No.	Date	Identification Name	ELCB Specification			OK / NOT OK	Electrician	Site Safety Engineer	Remarks
			Rating (Amp.)	Fall trip current (mA) (I Δn)	Make				
1			63A	30 mA					
2			63A	30 mA					
3			63A	30 mA					
4			63A	30 mA					
5			63A	30 mA					
6			63A	30 mA					
7			63A	30 mA					
8			63A	30 mA					

Signature of site safety engineer

Signature of site incharge

APPENDIX-26

Ref-IJ-26-Rev-01
Date : 01.03.2012

Safety Material Status at Site

S.No.	Description of item	Quantity	Unit	Received from site / office on dated	Condition of safety material	Remarks
1	Safety Net 6'x4"	4	Nos	Noida office - 4th March, 11	OK	
2	Full Body Harness Double Lanyard	12	Nos	Received Dalmia Arayalur - 15th March, 11	2 Belts found damage, rest are OK	
3	Safety Posters 4'x3"	8	Nos	Noida office - 5th Feb, 11	2 Damage, rest are OK	
4	First Aid Box with all medicines	1	Nos	Locally purchase at site	OK	

APPENDIX-27

Ref-IJ-27-Rev-01
Date :

Tools and Tackles Records at Site

Name of Site Incharge : xyz
Name of Site : abc

Sl. No.	Description	Identification mark	SWL	Test Certificates	Tested Person Name	Inspection Date	Expired date	Colour Coding	Colour Coding Period	Moblized from other site	Status	Contractor name	Remarks
1	D-shakles Bow type	DEE 129	10 Ton	Provided	Mr xyz approved by Bihar	04.01.2011	04.01.2012		Jan to Mar	Bpcl kochi	OK	United fabricator	
2	Wire rope 6X19 left lay IWRC	WP 169	40 Ton	Not provided	Mr xyz approved by Bihar				April to June		Defective		Remove from site on 02.04.11
3													
4													
5													
6													
7													

Sl. No.	Description	Identification mark	SWL	Test Certificates	Tested Person Name	Inspection Date	Expired date	Colour Coding	Colour Coding Period	Moblized from other site	Status	Contractor name	Remarks
8													
9													
10													
11													
12													
13													
14													

APPENDIX-28

Ref-IJ-28-Rev-01
Date :

TOWER CRANE SAFETY INSPECTION WEEKLY CHECKLIST

Name of Site :
Inspected By :
Make & Model :
Height :

Job No. :
Date :
Identification Code :
Jib Length :

Sl. No.	Description	Observation	Measures
I	**Foundation – Stability**		
II	**Mast section**		
1.	Check the Mast & Fasteners		
2.	Check the climbing ladder mountings and platforms		
3.	Check the tie-collar mounting and Pins		
4.	Check the climbing gauge mounting pins		
5.	Load Chart Displayed on crane mast		
6.	Check on the mast anchorages		
7.	Is the lightening arrestor available		
III	**Swing Unit**		
	Check on the Cat Head		
1.	Check the revolving bolts for tightness		
2.	Check the Cabin Mounting Pin and Collar pins		
3.	Check the counter jib tie and main Jib tie Connecting Pins		
4	Check the Swing Brake, Limit switch & Alarm		
5.	Operator Visibility & Wind screen		
6.	Is the Anemometer functional		
7.	Is the aviation lamp is functional (Reqd. for 30mt and above)		
8.	Fire Extinguisher installed at operators cabin and ground level		
9.	Emergency Stop button is functional		

Sl. No.	Description	Observation	Measures
IV	**Counter Jib**		
1.	Check the Counter Jib Mounting Pins and Cotter Pins		
2.	Check the Platform mounting pins, handrail etc		
3.	Check the counter weight placement and pins		
4.	Check the mounting of the hoist winches		
5.	Check the Pins and cotter pins of the Tie Rod		
6.	Structural stability of platform & counter weight		
V	**Main Jib**		
1.	Check the Mounting Pins and Cotter Pins		
2.	Check the Tie rod pins and cotter pins.		
3.	Check Jib Inserts connecting pins and cotter pins		
4.	Check the light fitting mounting for tightness		
5.	SWL displayed on main jib for various operating radius		
VI	**Hoist**		
1.	Check the condition of wire rope		
2.	Check over hoist limit switch		
3.	Check the break pads for excessive wear		
4.	Check the rope swiel for free rotation		
5.	Check the Moment Cut off Limit Switch		
6.	Check the break Cylinder for proper function and leakage		
VIII	**Trolley**		
1.	Check the Trolley rope, break and lock arrangement		
2.	Check the working platform, extreme end limit switches		

(Execution Engineer) (HSE Engineer)

IMPORTANT POINTS REGARDING TOWER CRANE

1. **Rope Checking :**
   The hoisting and Trolley rope must be checked for wear & tear or damaged at every 7 days of working.

2. **Level checking:**
   The foundation level must be checked at every 15 days of working. If the level is out by 4mm or above, them immediately an additional anchor support to be fitted between 12-20 mtrs of height. And while dismantling :- The tower crane should be dismantled above this anchor support and then remove this support & then remove the support & balance masts.

3. **Greasing (grade EPL-2 only):**
   Greasing of the following points must be done at every 6 days of working and cross check by a supervisor. Any excess grease on machine parts must be cleaned immediately.

   a. Hoisting rope, trolley rope and hoist rope arresting point (rotating assy.) at jib end.
   b. Hoisting pulley, guide pulley, winch bearing.
   c. Trolley pulley, trolley rollers and hook block pulleys.
   d. Slewing gear internal and external
   e. Climbing frame rollers when height increasing or decreasing

4. **Oil Changing:**
   a. The hoist gear box oil must be replaced (gear oil EP-220 Grade) at every 2000hrs of working.
   b. The slew gear box oil must be replaced (gear oil EP-220 Grade) at every 2000hrs of working.
   c. The hoist break cylinder oil must be replaced (Hydraulic oil Grade-46) at every 2000hrs of working.

5. **Brake Checking:**
   a. Hoisting brake must be checked every day for functioning and liner clearance. The liner clearance 2-3mm) must be adjusted if required and the check nut must be tightened.
   b. Trolley brake must be checked every 15 days of working for functioning liner clearance (1-1.5mm) and check nut tightness.

6. **Electrical:**
   a. All electrical connectors must be checked for tightness and proper insulation at every 15 days of working.
   b. 2 Nos. good earthing must be done at lower mast and must be checked at every 15 days.
   c. Slew battery condition at charging must be checked at every 15 days

Notes:

SPML
Engineering Life

SPML Infra Limited

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