इस्पात निर्माण कार्य हेतु सुरक्षा सावधानियाँ

SAFETY PRECAUTIONS FOR STEEL ERECTION WORK

परिचय / Introduction

- Steel erection work is one of the most hazardous works in the construction field.
- There is a possibility of casualty or mishap because the erection of steel structure and building frames are often at height and in exposed position.
- Steel erectors perform many tasks in unintentionally created dangerous situations.
- Time spent by workers at individual work points is often relatively short, so access scaffolding is frequently not used.
- Safety should be ensured in erection work right from planning stage up to actual execution of the work.
- It is felt necessary that workers and officials must have the knowledge of precautions which are to be adopted during steel erection work.

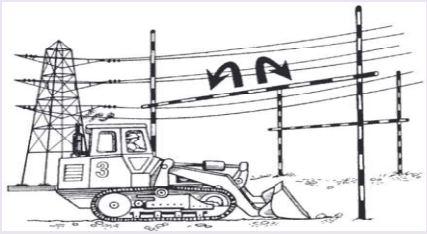
Steel erection work has following four stages:

i. Planning and supervision.
ii. Fabrication
iii. Transport
iv. Erection

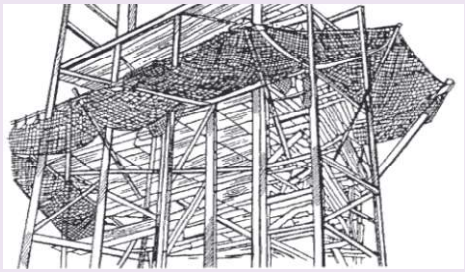
In brief, the safety precautions to be adopted for steel erection work in conformity with IS 7205:1974 are:

1. पर्यवेक्षण में सावधानियाँ / Precautions in supervisions:

- Supervisory staff should be well trained in enforcing the safety regulations and be able to distinguish safe and unsafe workmen ship.
- Newly recruits should be given an Induction Course on General Safety.
- While engaging men for job, make sure that they are skilled in the particular job they have to perform.
- Staff engaged in the job should have a medical checkup certifying that he is fit for duties he has to perform.
- Staff should be safety conscious and use all necessary safety appliances as per job requirement.
- When the work is in progress the area should be cordoned off by barricading to prevent persons from hitting against structural components or getting injured by falling objects.
- Barricading should be sufficient away from the location and necessary indicators should be provided.



- Necessary warning signs shall be displayed.
- Proper lighting arrangement should be provided for good visibility for the movement of men and vehicles.
- Where flow of traffic is to be permitted, when over head work is in progress, suitable wire netting should be used over head to catch material falling from height.



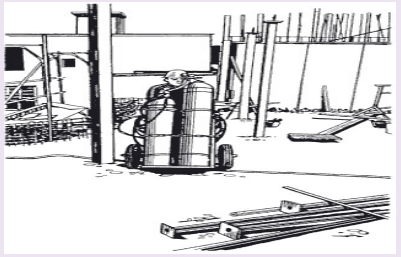
2. वेल्डिंग एवं रिवेटिंग में सावधानियाँ / Precautions in welding and riveting:

- The welders and cutters should be educated and well trained and should have valid certificate.
- Gas cylinders should be stored away from open flames and other sources of heat. Oxygen cylinders should not be stored near gas, oil, grease and similar combustible materials.
- The cylinders should marked full or empty as the case may be.
- Before a cylinder is moved, cylinder valve shall be closed.
- All cylinder valves should be closed when welding is stopped for some reason or torches are being replaced.

- The welder and gas cutters should be equipped with proper personal protective equipments like gloves, safety boots, apron, and hand shield. The filter glass of hand shield should be suitable to the eyes of the workers.



- All gas cylinders shall be used and stored in the upright position only and should be conveyed in trollies.



- Before, under taking the welding operations near combustible materials, suitable blanketing should be provided and fire Extinguishers kept nearby.
- Rivets covered with slippery material should not be used in the fabrication work.
- Gas cutting and welding torches should be lighted by means of special lighters and not with matches.
- Care should be taken while handling rivets so that they do not fall, strike, or cause injury.
- Snaps and plungers of pneumatic riveting hammers should be secured to prevent the snap from dropping out of place.
- The rivet heating equipment should be as near as possible to the place of work.
- A pail of water should always be kept ready for quenching the fire during riveting and to prevent fires when working near inflammable materials.
- Rivets, bolts, nuts or other loose articles should be kept in boxes at the working area to prevent hazard from their falling.

3. सामग्री के परिवहन में सावधानियाँ / Precautions in transportation of material:

- Transport may be done by trucks, tipper Lorries, tractors, and trailers etc.
- Each driver must have a valid Driving license.
- Route of transport should be leveled, marked and planed to avoid potential hazards such as over head power line and steeply sloping ground.
- If necessary, warning boards / barriers may be erected to prevent over head structure or over head power line.
- Un attended vehicles should have the engine switched off.
- The strength and capacity of ramps for trucks used in delivering the equipment, supplies or the steel, should be checked to prevent their failure.
- If a level trestle is being used instead of ramp for truck or cranes to operate, this should be carefully checked.
- Shipments on barges, or any other form of carrier, should be inspected for safe loading and unloading.
- Steel members should be so placed that they will not shift, slide or over turn during transit.
- The loading should be such that no pieces are liable to move and trap a man when part of the load is removed.
- When a number of trusses or deep girders are load in one truck, all but one being lifted should be tied back unless they have been tied or braced to prevent their falling over and endangering men unloading.



- Load should be within the capacity of vehicles and should be evenly distributed and properly secured and should not projected beyond the plan area of vehicles. If it is unavoidable, it should be clearly shown by the attachment of flags.

4. सामग्री के रखरखाव में सावधानियाँ / Precautions in handling of materials:

- If cranes is used on site, consider all the factors that could affect the safe use such as, the weight, size and type of the load, maximum reach or radius required and any restrictions like over head power line and ground conditions.
- Operator of cranes and other lifting appliances and the workmen engaged in slinging should be well trained in the safe use of cranes, hoists etc.
- Proper signalling system should be developed for the use of workmen and it should be strictly followed. Hand signal should be adopted and no oral signals should be given. Only one man at a time, who is allotted this specific task, should give the signals.
- Before slinging and before lifting load, it should be ensured that the load does not exceed the safe lifting capacity of the cranes.
- Cranes should always be on a level and firm ground.
- The movement of mobile cranes should be carefully watched so that the boom of the cranes does not come into contact of with any electric wires and other objects in the vicinity of work being carried out.
- Only properly tested and marked lifting tackles of adequate strength should be used. The safe working load of the tackles should never be exceed.
- The erection gang should have adequate supply of bolts, washers, rivets, pins etc of the correct size.
- Enough number of bolts should be used in connecting each piece using a minimum two bolts in a pattern to ensure that the joint will not fail due to dead load and erection load.
- All splice connections in column, wave girder etc. should be completely bolted or riveted or welded before erection.
- Slings for erecting steel work should be light and flexible enough to grip the pieces but strong enough to bear the loads.
- The slings should not slide while erecting diagonal members.

5. व्यक्तिगत सुरक्षात्मक उपकरणों का उपयोग/ Use of Personal Protective Equipments (PPE):

- Despite of all preventive measures in planning and supervision, some personal protective equipment such as helmet, hearing and eye protection, boots and gloves, is needed.
- Proper work clothes will provide protection for the skin.
- Where harmful dust, mist or gases may be present respiratory protection equipment should be used.
- All safety equipments should be in accordance with their related IS codes like IS-5983 for Goggle Shield, IS-3521 for Industrial Safety Belt and IS-2925 for Safety Helmet.

सुरक्षा बेल्ट या हार्नेस का उपयोग / Use of Safety belt or harness:

- The majority of fatal accidents in construction field are due to falls from heights.
- Where work cannot be done from a scaffold or ladder, or from a mobile access platform, the wearing of a safety harness may be the only way to prevent serious injury or casualty.
- There are many types of safety belt and safety harness available.
- The manufacturer or supplier should be asked for advice on suitable types for the intended purpose and for instructions on use and maintenance.
- Full safety harness should always be used in preference to a safety belt.

Safety harness and its lanyard must:

Limit your fall to a drop of not more than 2m by means of an inertia device.

- Be strong enough to support your weight.
- Be attached to a strong structure through a firm anchorage point above the place at which you are working.



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