INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**SAFETY STANDARD FOR INSPECTION, REPAIR & PAINTING OF CHIMNEY AT HEIGHT** Corresponding IS does not exist	**IPSS: 1-11-036-20**

0.0 **Forward**

0.1 This Inter Plant Standard prepared by Standards Committee on Safety Appliances and Procedures, IPSS 1:11, with the active participation of the representatives of all major steel plants and consultants of Indian Steel Industry. This standard was adopted in **June, 2020.**

0.2 Objective is to provide a safety standard for Inspection, Repair and Painting of Chimney at height.

1.0 **Scope**

1.1 To ensure safety while Inspection, Repair, and Painting of Chimney in Indian steel industry. This standard is applicable at all locations in the steel plants.

1.2 Responsibility for implementation of this standard lies with all concerned executing agencies including Contractors & Consultants.

2.0 **Associated Hazards**: Fall of person from height, Fall of material, Structural collapse, Gas exposure, Fire, Heat, Chemical, Electrical, Health etc.

3.0 **Definitions:**

Anchorage – A secure point of attachment, may or may not be part of the work structure, to which lifelines, drop lines, or lanyards are affixed. Each anchorage must be capable of supporting for one person with a minimum dead weight of **2000 kilograms** attached to it. There should be minimum two anchorage points in each working platform of the chimney. An anchorage is often a beam, girder, column, cleats or floor.

Travel restraints - Travel restraint systems physically prevent a person from approaching an unprotected edge. The user is totally restrained from reaching a position where a fall is possible.

Anchorage Connector – A component or device that is installed on an anchorage and is specifically intended for attaching a fall-arrest system to the anchorage. Anchorage connection straps, carabineers, and girder grips rated to support minimum dead weight of 2000 kilograms can be purchased from fall-protection equipment manufacturers.

Carabiner – A trapezoid or oval-shaped connector component with a gate or similar arrangement that remains closed until it is intentionally opened for connection or disconnection.

Deceleration Device – Any mechanism, such as a rope grab, rip-stitch lanyard, specially- woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on a workman during fall arrest.

Descent Device – A device or piece of equipment used to escape from an elevated structure such as a work platform, tower, column, or an overhead crane cab.

Personal Fall-Arrest System – A system used to arrest a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, a body harness, and may include a lanyard with a locking snap hook, deceleration device, lifeline or suitable combination of these.

Fall Hazard – A condition or situation that could result in a fall.

Fallout – An unintentional separation of a person from a body-support component during or after fall arrest.

Fall Prevention – Eliminating fall hazards during all phases of work at heights, including access and egress. Examples of fall prevention measures include using complete scaffolds, aerial lifts, and secured ladders.

Free Fall – An un-arrested fall.

Harness (Full-Body) – A device with straps that can be attached to a personal fall-arrest system. The straps are fastened around a person's body to contain the torso and distribute fall- arrest forces over at least the upper thighs, pelvis, chest, and shoulders.

Leading Edge – The edge of a floor, deck, or grating that changes location as

additional floor or deck sections are placed.

Lifeline – A flexible vertical or horizontal line, secured to an anchorage or between two anchorages, to which a lanyard or harness may be attached. A catenary lifeline is a lifeline used in a horizontal position that is secured between two anchorages. A lanyard can be attached to a catenary lifeline by using a sliding connection or by tying off.

Positioning Device System – Equipment that allows a person to work with both hands free while standing in such a way (for example, leaning backwards) that a fall could result. Positioning device systems are often used on framework construction and concrete rebar placement.

Retractable Lifeline – A fall-arrest device that allows free travel without slack rope, but locks instantly when a fall begins. Retractable lifelines may be used when vertical movement is required but must be limited, such as in tanks, manholes, and pressure vessels, or on roofs.

Rollout – A process by which a snap hook or carabineer unintentionally disengages from another connector or object.

Rope Grabs (Fall-Arrester) – Automatic lifeline devices that act by inertia to grab the lifeline if a fall occurs. Rope grabs are used when vertical movement is required, such as work from boatswain chairs or suspended scaffolds.

Self-Locking Snap Hook – A hook-shaped connector with a gate or similar arrangement that remains closed and locked until it is intentionally opened for connection or disconnection. When the gate is released, it automatically closes.

Shock-Absorbing Lanyard – A flexible line that secures a person wearing a harness to an anchorage, anchorage connector, lifeline, or drop line, with an integral energy shock absorber that limits shock load forces on the body. Most energy shock absorbers are made of a webbing material with tear-away stitching designed to gradually absorb the fall-arrest load. A lanyard must have a nominal breaking strength of **2000 kilograms** and may be nylon or Dacron® rope, flexible aircraft steel cable, or webbing.

Competent person – A person/ engineer of the executing department performing the job , executing contractor ,& consultant if any, who is capable of identifying existing and

predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees, plant and who can take prompt, corrective measures to eliminate them.

Qualified person – A person / engineer of the executing department performing the job, executing contractor & consultant if any, who by possession of a recognized degree certificate or professional standing or who by extensive knowledge, training , and experience , has successfully demonstrated his or her ability to solve or resolve problems related to the subject matter, the work or the project.

4.0 Further reading and Toolbox meeting references

Standards and Code of Practices:

- IS :3521:1999 Industrial Safety Harnesses Selection, Use and Maintenance
- EN 354/365: 2010 Industrial Safety Harness lanyards and Specification
- EN 355 :2002 Industrial Safety Harness energy absorbers and Specification and maximum allowed length of absorber + lanyard
- EN 353-1:2002 Industrial Safety fall arresters on a rigid anchorage line
- EN 341/365:1993 Descended devices, plus **A, B**, **C** or **D** - device class, according to descent energy. (A is highest, D is lowest)
    1. Maximum descent height
    2. Maximum descent load.
    3. Short version of instruction for use
- EN 360:2002 Retractable type fall arresters intended orientation for use (vertical, horizontal, inclined)

Note: EN 365**:** For marking requirement

5.0 **Procedure:**

General-: The system, devices, tools & tackles as defined above , other measures like scaffolds, mechanized climbers, hoist system, Rope access system, Winch

system, rope ladders, Man lifters, hanging scaffolds, Safe Working Mobile Platforms (SWMPs), and cranes etc. are intended to provide safe working at heights. Therefore all adequate tools tackles, system related to height work shall be designed, erected, accessed and used to ensure safety of the people working for height work as well as workforce around. As the system are erected and dismantled by manual means , safety of the workmen engaged for erection and dismantling shall also to be ensured. The pre-inspection of existing staircase/ Ladder/ platform and all the means of access to be ensured for its integrity and soundness.

5.1 **Steps to take before working at height**

- Check availability of safe means of access and egress from the work area.
- Decide what particular equipment will be suitable for the job and the conditions on site.
- Make sure condition of working platform are safe and sound. Any edges from which people are likely to fall have guard rails and toe boards or other barriers.
- Due considerations to be given for scaffolding and ladder standards. For this refer BIS Safety standard (IS- 3696 Part-1 & Part-2) for Scaffolding. However as per site requirements and based on height & type of building/ structures proper sketch / scheme to be made. It is to be approved by a competent / qualified Engineer of the execution department performing the job. Make sure that the equipment needed is delivered to site in good time and that the site has been prepared for it.
- Check that the equipment and Full Body Harness with double lanyard are in good condition and make sure that whoever puts the equipment together is trained and knows what they are doing.
- Make sure those who use the equipment are supervised so that they use it properly. The more specialized the equipment (for example, boatswain's chairs and rope access equipment or system), the greater the degree of training and supervision required to ensure safety.
- Check any equipment provided by another company is safe on site before using it.
- Any defect to be reported to concerned person and remedied before putting to use.

- Make sure that tested equipment, systems etc. are used and the relevant test certificate are made available as per the applicable legal requirements.

When selecting a means of access, remember:

- Only when it is not practicable to provide a work platform with guard rails should other safe means of access (for example, boatswain's chairs or rope access techniques) be used;
- Only when no other method is practicable, or risk assessment shows other methods are safer when work platforms cannot comply with all requirements for safe work (e.g. a guard rail has to be removed to land materials), should a way of arresting falls (for example, a harness and lines or nets) be relied upon;
- Since Full Body Harnesses are used, a method must be available to enable people to be rescued from fall and be left suspended in their harness.
- Ladders whereever used should always be secured if possible both laterally & longitudinally at the ends. They should be primarily used for access and only to be used as workplaces to do light work of short duration, and only if it is safe to do so. It is generally safer to use a stable tower scaffold or MEWP, Man lifter even for short-term work. Heavy work activity such as drilling or carrying heavy loads should never be carried out from a ladder. When using a ladder ensure that the ladder is as per standard drawings and the person on the ladder always has three points of contact, i.e. two legs and a hand. People should never have to lean sideways when up a ladder.
- When selecting a safe system of work at heights in chimney, all the risks have to be considered before one method is selected. For example, If harnesses are used, is there sufficient clearance from the ground to allow the shock absorbing lanyard or inertia reel to fully extend?
- Before any work at height, check that there is adequate clearance for equipment. For example, overhead power lines can be a risk when erecting scaffolds or using MEWPs; there can be a risk of crushing against nearby structures when mobile access platforms are maneuvered.
- Work permit for working at height shall be issued as per IPSS 1-11-007-20 or its revision.

- Any work at height shall be carried out only in close supervision.
- Only trained persons shall be allowed to work at height.
- If working at height in chimney includes gas cutting and welding, working in gaseous hazardous area, near electrical installation, work permit should be obtained from authorized agencies separately for each hazard.

5.2 Continuous Fall Protection

5.2.1 General

Fall protection can be achieved through eliminating fall hazards, preventing falls, and controlling falls. Eliminating fall hazards is the most desirable of these three, but it is also difficult. If fall hazards cannot be entirely eliminated, potential falls must be controlled by using fall-arrest systems.

All components of fall-arrest systems must meet the appropriate statutory & relevant government standards.

5.2.2 Systematic Approach to Continuous Fall Protection

Every site must take a three-step, systematic approach to protecting people from falls.

5.2.2.1 Eliminate Fall Hazards – The first step in this approach is to assess carefully the workplace and the work itself in the earliest design/engineering stages of project work and during the planning stages of all work. The objective is to eliminate all fall hazards. Ask “who, what, when, where, why, how, and how much” questions about each possible risk of fall. This assessment of the site and the work not only helps eliminate hazards, but also identifies alternative approaches to the work that can measurably enhance productivity. Addressing fall protection in the early phases of a project means that safety can be designed into the work process, not added as an afterthought to an inherently unsafe work procedure. For example, the project can be designed so that structural steel can be assembled at ground and then raised as a “module,” thus eliminating a significant amount of work at heights.

5.2.2.2 Prevent Falls – The second step in continuous fall protection also requires assessing the workplace and work processes. If fall hazards cannot be completely eliminated during the first step, try to prevent falls by improving the workplace. Avoid relying on a worker's behavior or fall-arrest equipment to prevent injuries. Early installation of stairs, guardrails, barriers, and travel restriction systems can

ensure a safe work environment.

5.2.2.3 Use the Proper Fall-Arrest Equipment – The third step, the last line of defense against falls, is to use fall-arrest equipment. Use fall-arrest equipment, however, **only** after determining that potential falls cannot be eliminated by changing work procedures or the workplace. Equipment such as harnesses, lanyards, shock absorbers, fall arresters, lifelines, anchorages, and safety nets can reduce the risk of injury if a fall occurs. Carefully assess the workplace and work processes to select the most appropriate equipment and to install and use it correctly. Refer Attachment-1 for fall arrest system check list.

5.2.3 **Preparing Written Fall-Protection Plans**

Prepare fall-protection plans for elevated work if fall hazards exist. Where fall hazards are significant, the plans should be in writing. Site manager/ supervisor are responsible for determining which jobs require written plans. The requirement for written plans should be included in all applicable contracts. The plan must be approved by executing authority or his designate officer.

5.2.4 **Training**

Provide a training program for all workmen who will be exposed to fall hazards. Workers must be trained to recognize the hazards of falling from heights and to avoid falls to lower levels through holes or openings in walking or working surfaces and walls. Training programs should include prevention, control, and fall-arrest systems. Make sure that appropriate fall arrest systems are installed and that employees know how to use them before beginning any work that requires fall control. As far as practicable training program by OEM (Orignal Equipment Manufacturer) or Domain experts/ certified agencies may be arranged.

5.2.5 **Eliminating Fall Hazards and Preventing Falls**

Engineers and designers may require special training to recognize fall hazards, to understand fall prevention techniques, and to become familiar with fall-arrest equipment and procedures. It is critical that they consider fall protection design for the safety of workmen who must work at heights, including workmen safety during access and egress from elevated work sites. Use the following guidelines when

planning work at heights:

- Safety specialists may be involved early in the job planning so that they can recommend appropriate fall-protection measures and equipment.
- Use the expertise of fall-protection equipment manufacturers and distributors.
- Be specific in dealing with fall hazards when developing contracts. Contractors are required to prepare written fall-protection plans and get it approved from designer/ executing authority.
- Make sure temporary perimeter protection is provided and is effective.
- Use complete scaffolds and aerial lifts to provide safe work platforms, wherever applicable.

5.2.6 **Controlling Falls**

When fall hazards cannot be eliminated through design and engineering or through the techniques discussed in Section 7.2.4, the fall-arrest systems discussed in this section must be used to control falls. An automatically controlled descent device that limits descent speed to 1.8 meters per second for a 136-kilogram person should be used in all situations that require emergency egress.

5.2.6.1 **Personal Fall-Arrest System** – A personal fall arrest system consists of an anchorage, connectors, a full-body harness, and may include a lanyard with locking snap hook, deceleration device, lifeline or suitable combination of these.

- Before using a personal fall arrest system, the supervisor and the user must adhere to all the points given in check list attachment-1.
- Refer Attachment-1 for detail check list for fall arrest systems.

5.3 Safe working platforms

Working platforms are the parts of structures, Mobile Elevating Work Platforms (MEWPs), cradles/cages etc upon which people stand while working. As well as being adequately supported and provided with guard rails or barriers, working platforms should be:

- Width of working platform should be in accordance with provision of IS–3696 Part-1
- Free of openings and traps through which people's feet could pass, causing

them to trip, fall or be injured in any other way;

- Constructed to prevent materials from falling. There shall be toe boards or similar protection at the edge of the platform, The platform itself should be constructed to prevent any object which may be used on the platform from falling through gaps or holes, causing injury to people working below. For scaffolds, a platform without any gap shall be provided. If MEWPs or cradles are used and they have meshed platform floors, the mesh should be fine enough to prevent materials, especially nails and bolts, from slipping through; and
- kept free of tripping and slipping hazards. Where necessary, provide handholds and footholds. Keep platforms clean and tidy. Do not allow mud to build up on platforms.

5.4 Mobile and suspended access equipment

A wide range of appropriate capacity & stable mobile access equipment like man lifters, scissor lifts, Mechanized climbers, including mobile elevating work platforms (MEWPs), suspended cradles, mast climbing work platforms (MCWPs), appropriate rope access technique /system are to be used for carrying persons with tools & tackles for height work. In case of man lifters with operator on the cage, other operator may also be there on the base equipment to take care of emergency and controlling requirements.

In case of non-availability / justified non suitability of above, it is to be made possible to work from the existing structure and to use a scaffold & working platform.

In case of justified non suitability of above, boatswain's chairs or seats, rope ladders and rope access equipment can be used.

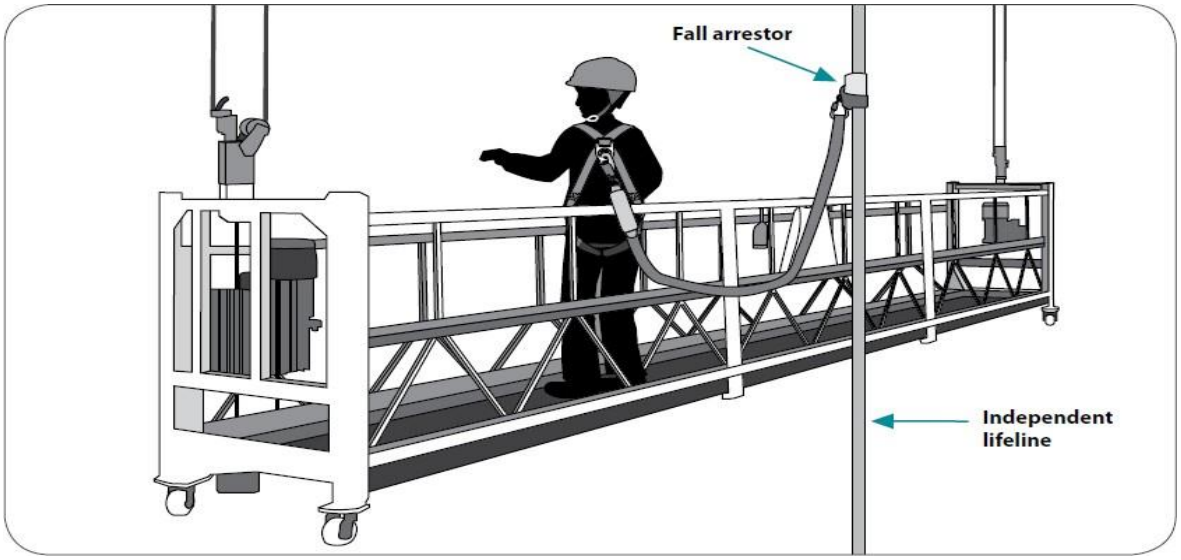
Those using mobile and suspended access equipment should be trained and competent to operate it. They should learn emergency and evacuation procedures so that they know what to do, for example, if the power to the platform fails, or fire breaks out. With many pieces of equipment, more than one person will be needed to ensure safe operation.

Before work starts check that:

- Equipment is installed, modified and dismantled / removed only by trained personnel
- There is a current report of thorough examination for the equipment;
- Area of the site where people may be struck by the platform or falling materials have been barricaded;
- Suitable precautions to be taken to prevent the moving platform/ working person coming in contact with the projected Chimney structure.
- Supports are protected from damage (for example, by being struck by passing vehicles or by interference from vandals);
- The equipment can be protected from adverse weather. High winds can tilt platforms and make them unstable. Do not work during storm, rains, thunder and lightening etc. Storms and snow falls can also damage platforms, so they should be inspected before use after severe weather.
- Inspection, repair & Painting of Chimney at height work to be carried out in day hours only.

At the end of each day check that:

- The platform is cleared of tools and equipment;
- All power has been switched off and, where appropriate, power cables have been secured and made dead;
- The equipment is secured where it will not be accessible to vandals or trespassers;
- Notices are attached to the equipment warning that it is out of service and must not be used. Check the shift report for warnings of malfunction etc.



A suspended scaffold is mainly used for performing work on the sides of chimney
Workers should be protected by a personal fall arrest system with an independent vertical lifeline anchored from the top of the chimney

5.5 Mobile elevating work platforms (MEWPs)

Mobile elevating work platforms (MEWPs) can provide excellent safe access to high level work. When using a MEWP make sure that:

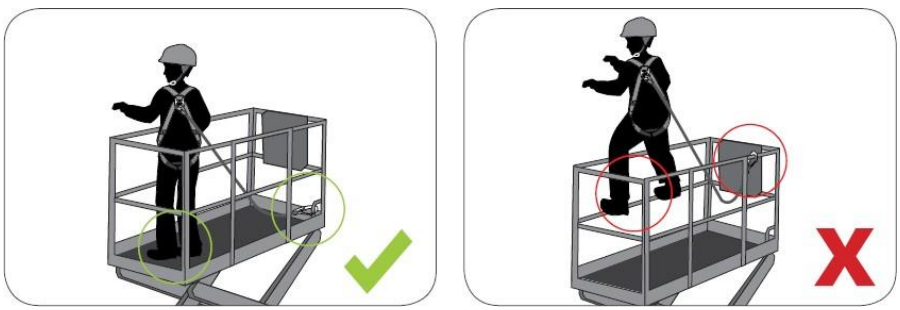
- Whoever is operating it is fully trained and competent;
- The work platform is provided with guard rails and toe boards or other suitable barriers;
- It is used on firm and level ground. The ground may have to be prepared in advance;
- Its wheels are properly inflated;
- The working platform is sufficiently away from electric lines.
- Any outriggers are extended and chocked as necessary before raising the platform; and
- Everyone knows what to do if the machine fails with the platform in the raised position.

Do not:

- Operate MEWPs close to overhead cables or other dangerous machinery;
- Allow a knuckle, or elbow, of the arm to protrude into a traffic route when working near vehicles;

Move the equipment with the platform in the raised position unless the equipment is designed to allow this to be done safely (check that Some MEWPs are described as suitable for 'rough terrain'. This usually means that they are safe to use on some uneven or undulating ground - but check their limitations in the manufacturer's handbook before taking them onto unprepared or sloping ground).

Wearing a harness with a fall restraint lanyard attached to the platform can provide extra protection against falls, especially while the platform is in motion.



Correct method of working in an MEWP (left) and unsafe practices (right).

5.6 **Boatswain's chairs/seats**

Boatswain's chairs and seats can be used for light, short-term work. They should only be used where it is not practicable to provide a working platform. In general, use a chair which consists of a seat with a back, a central suspension point and a carrying point for tools.

Whether a chair or seat is used, the user should be attached to the suspension system by a harness and lanyard to protect against falls. See also the general advice about mobile and suspended access equipment. Don't use Boatswain's chair for heat producing process and where welding gas cutting jobs are done.

The Boatswain Chairs shall be operated as per the manufactures and its competent installer's guidelines. Competency to be developed by OEM (Original Equipment Manufacturer) and plants needs to develop their own mechanism of developing competency.

5.7 **Rope access techniques**

Rope access system is a safe method of working at height, where ropes and associated equipment are used to gain access to and egress from the workplace, and to be supported at it.

Industrial rope access techniques is a specialized techniques for which IRATA International Code of practice for Industrial rope access is to be followed. Only specialized agency following the IRATA rope access guidelines are to be engaged.

Reference Standard Source: www.irata.org.

The detailed planning, management, guidelines, risk mitigation & equipment etc, to be prepared based on IRATA International Code of Practice before its use.

This technique can be used for inspection and some short-term light-duration construction work and other work etc. It should only be used where access from a working platform is not practicable. Check that:

- The equipment is erected under the supervision of a competent person and then a pre-check is carried out;
- Anyone using the technique has been trained and is competent;

- Safe descent does not depend upon a single suspension point. Wherever possible the main rope and safety rope should be attached to separate suspension points;
- All the equipment are checked carefully before each use and maintained to a high standard;
- Any tools which are needed for the work are attached to the operator with suitable ropes or chains, so that they cannot be dropped; and where a risk of dropped tools or falling materials remains the area beneath the work should be fenced off or protected by fence, covered walkways or similar.

For all the above system, stable, firm, adequate anchoring points / locations of a structure to be identified and used. The anchoring points & anchorage capacity shall be as per number of persons accessing with the system. For each person the anchoring capacity is to be 2000 Kg. For multiple persons, the number of anchorage points are to be increased correspondingly. The system is to be adopted only when a competent agency already practicing the system is being involved. The anchorage point & its capacity is to be approved by competent & qualified Engineer of the executing department performing & supervising the job, in consultation with the installer of the rope access system.

- The rope access vendor must have IRATA (international rope access trade association) certified L1, L2, L3 working personnel on rope. For every working site one L3 is mandatory as supervisor to be deployed in addition to L1 and L2.
- Inspection, testing, certification, & calibration of rope access equipment will be the responsibility of vendor as per IRATA norms.
- As per the IRATA norms, all the rope access kits should comply with the EN standard. All rope access items should be numbered & vendor should maintain record of all the rope access kit which can be produced as & when audited. Checklists for maintaining quality of these items need to be certified by L3 level persons. All such items need to be verified before use and once in a

quarter.

- Since all the rope access jobs are high risk/ high hazard job hence agency should comply all the IRATA guidelines.
- Fitness certification for all working person as per the working at height guideline should be furnished to executing department before starting the job.
- Agency should prepare and submit the SOP with risk mitigation plan for doing the job well in advance to the executing department & follow the SOP.

5.8 **Painting work / Repair / modification / strengthening work at Height :**

For painting / Repair /modification/ strengthening work at height, various methods or system may be adopted based on site requirements and availability. These methods or systems are as specified below.

(i) Scaffolding General Specification as per relevant IS – 2750 / IS -1160. Approval of the existing support system and for the strengthening / temporary support system to be taken from a competent and qualified person as defined in this standard.

(ii) Use of existing staircases & plat-forms after inspection & ascertain their suitability and their strengthening or replacement as required.

(iii) Use of appropriate & adequate man lifters.

(iv) Use of appropriate & adequate MEWP like scissors type MEWP etc.

(v) Use of hanging scaffolds / in line with drawings / sketches.

(vi) Use of rope access system with specialized workforce.

(vii) Use of mechanized climber system supplied by authentic manufactures & its Installation & operation as per Operational Equipment Manual .

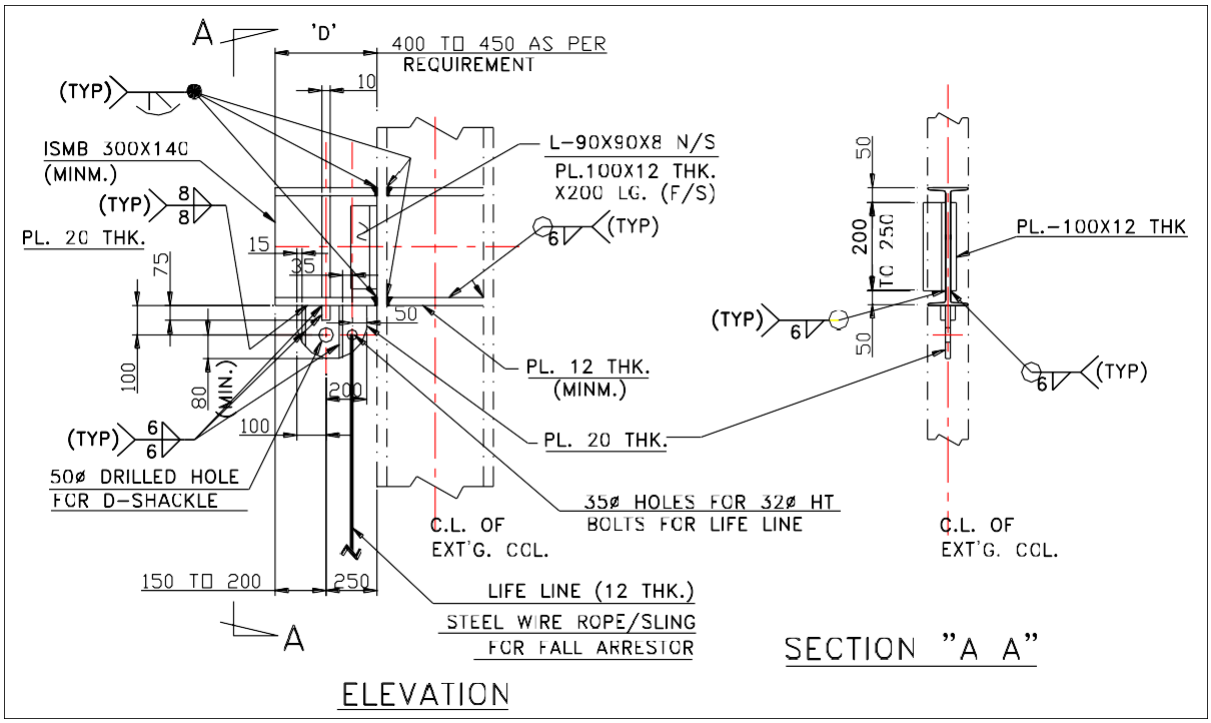
5.8.1 **Anchorage support system:**

- The Anchored support for cages for one or two persons must be strong enough to resist Minimum 5000 Kg of loads. For more persons different cage with changed anchoring capacity & support to be used and the system to be approved by a competent and qualified person/Engineer of the Executing department performing & supervising a job..
- The anchorage support for cages is to be checked and approved by a

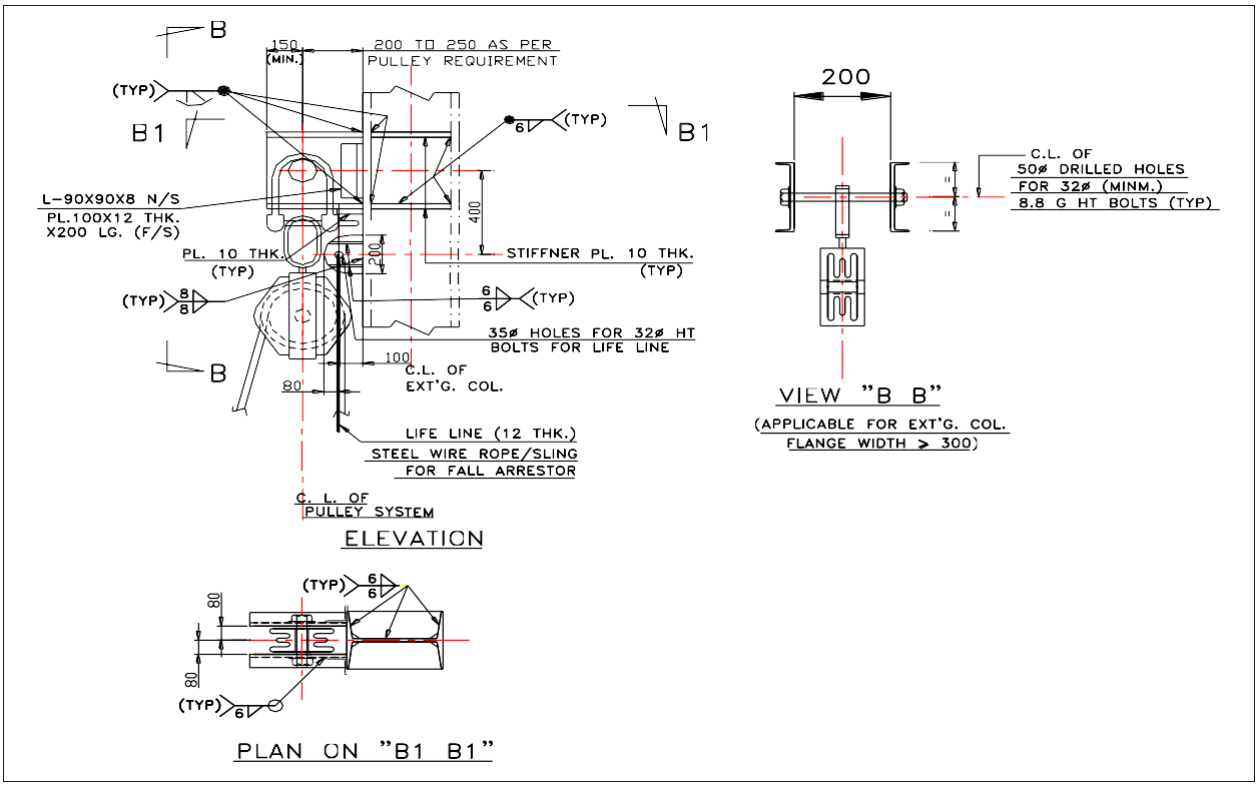
competent and qualified Engineer of the Executing department performing & supervising a job..

- Pulley supporting arrangement may be in line with sketches SUPPORT TYPE-1, SUPPORT TYPE -2 , SUPPORT TYPE-3, SUPPORT TYPE-4 and to be approved by a Competent & qualified Engineer of the executing department performing & supervising a job , depending on the site condition before start of work. For other type approval to be taken from the competent & qualified Engineer as per definition of his standard.

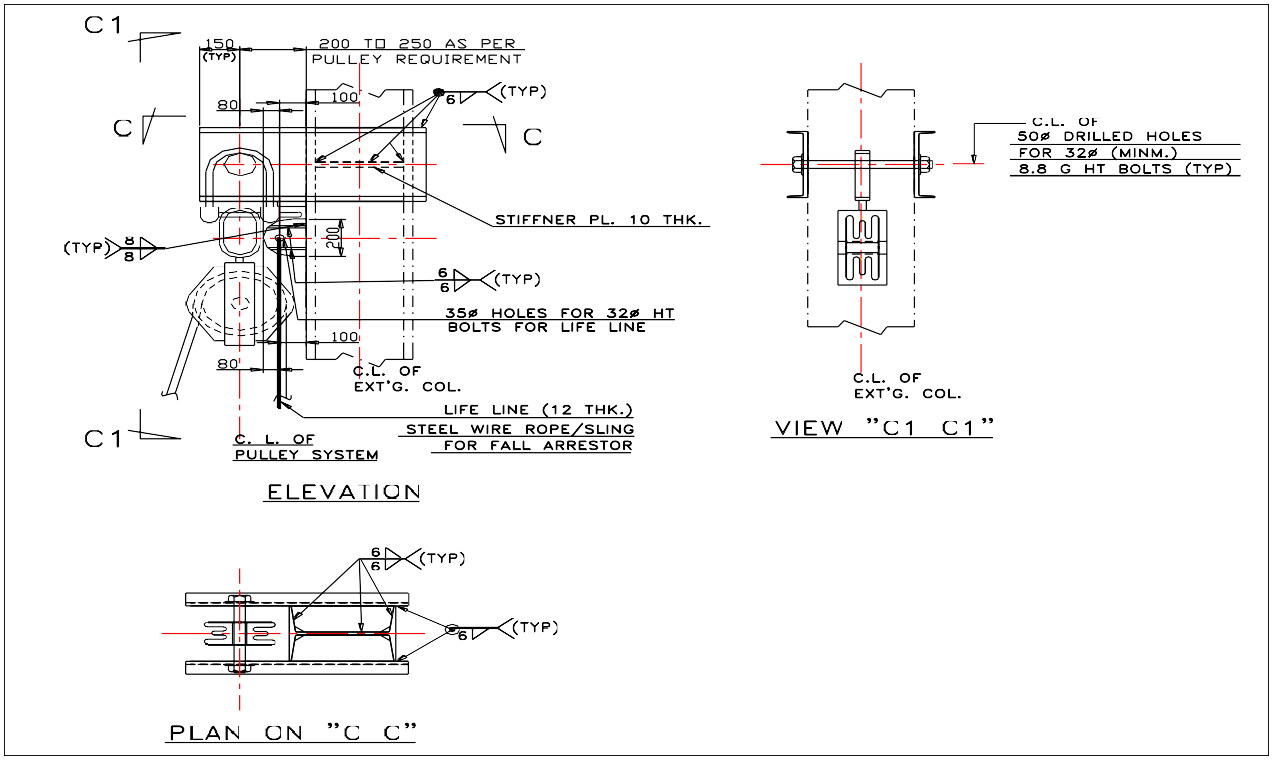
SUPPORT TYPE-1 (I-beam connected to flange of a column)



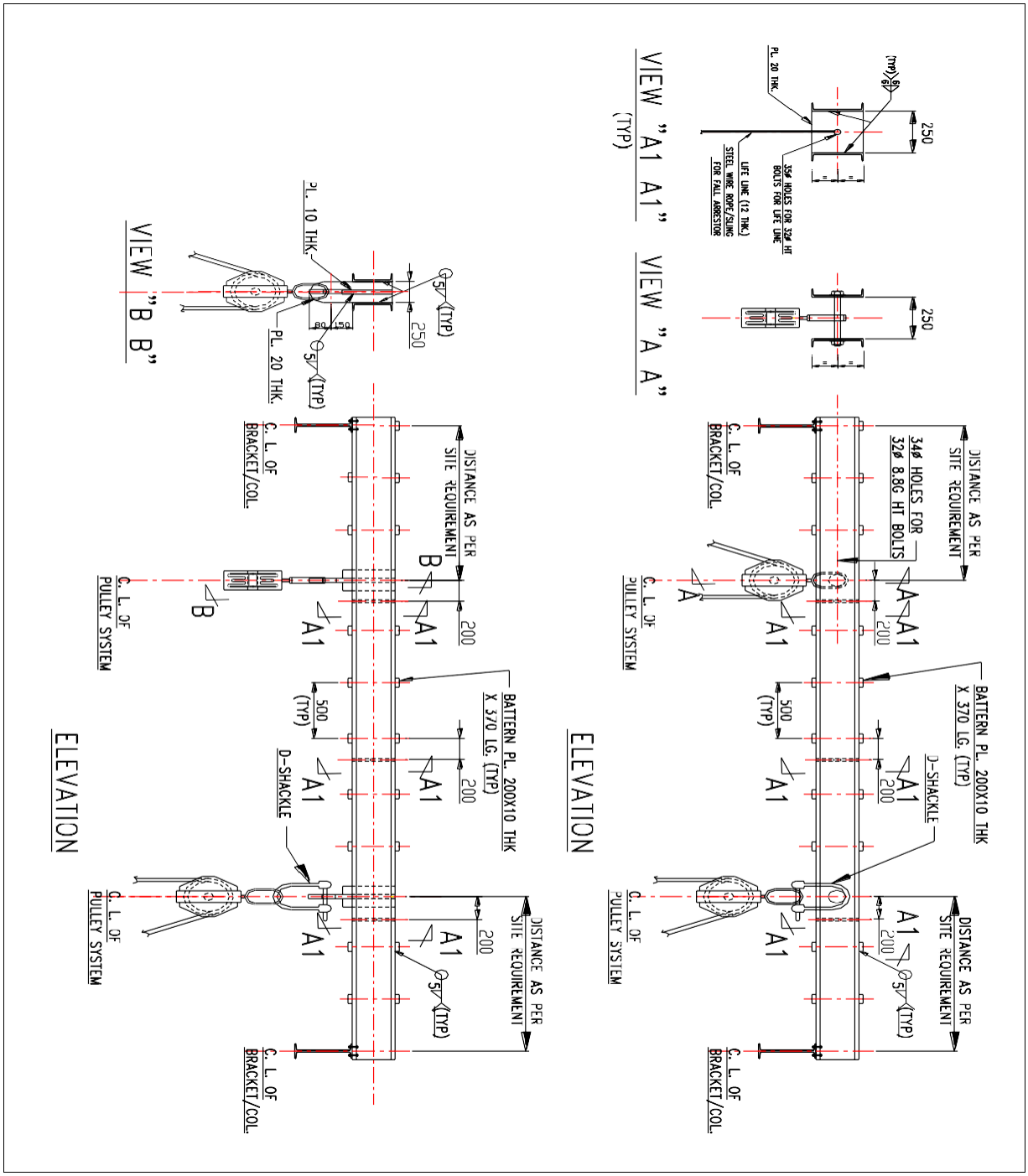
SUPPORT TYPE-2 (Two channels connected to flange of a column)



SUPPORT TYPE -3 (Two channels connected at the edges of flanges of a Column)

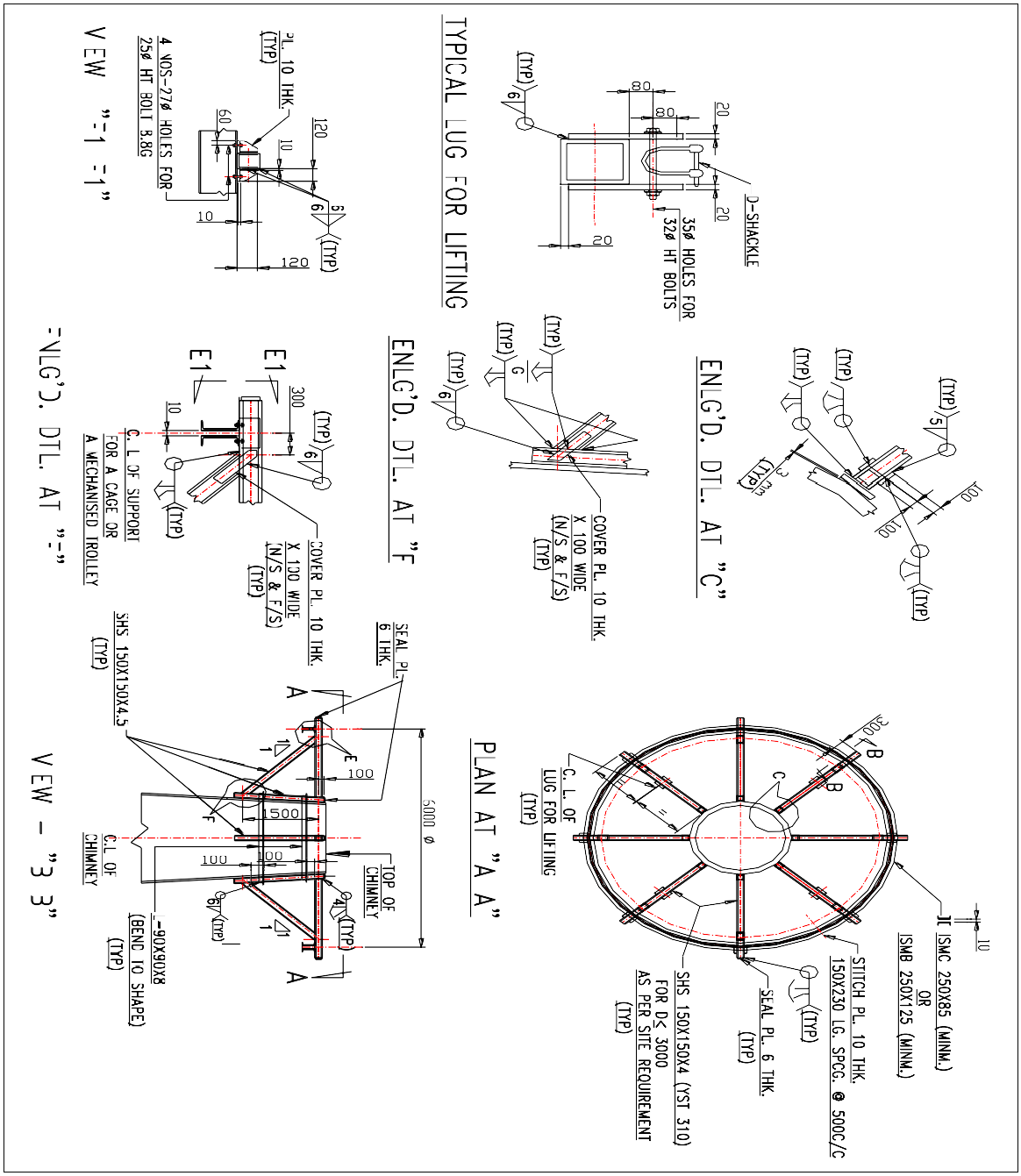


SUPPORT TYPE-4 (Between Column spacings ≤ 8 Meter)



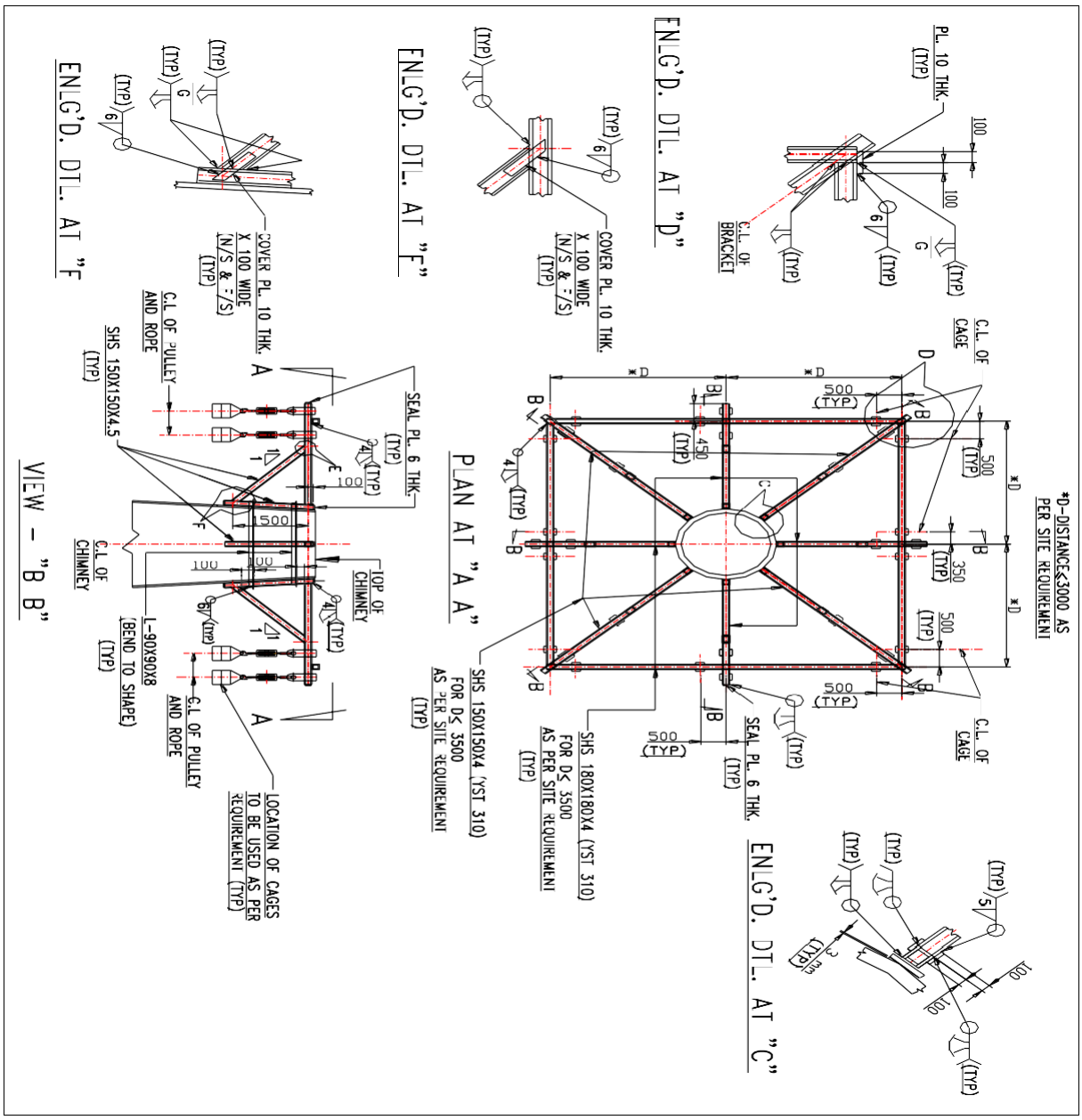
STRUCTURAL SUPPORT MAY BE MOUNTED AS PER FEASIBILITY, AT TOP OF CHIMNEY FOR PAINTING OF CHIMNEY HEIGHT GREATER THAN THE REACH OF LONGEST AVAILABLE MANLIFTER- OPTION-1

(For guideline purpose, The support system / or a part of it may be similar or in line with the below)



STRUCTURAL SUPPORT MAY BE MOUNTED AS PER FEASIBILITY AT TOP OF CHIMNEY FOR PAINTING OF CHIMNEY HEIGHT GREATER THAN THE REACH OF LONGEST AVAILABLE MANLIFTER- OPTION-II

(For guideline purpose, The support system /or a part of it may be similar or in line with the below)



1. General guidelines:

- Before commencing job, Pulley set up & D-Shackle of minimum 5000 Kg Capacity, or any other mechanized system must be tested.
- Any alternative arrangement adopted depending on site condition shall be validated with Minimum 5000 Kg anchoring / lifting load as part of load test.

- Working area shall be barricaded at least 4 m from the high rise structures face. Additional barricading may be provided suit to site condition to prevent any injury from falling object.
- Lifting / hoisting mechanism/ plan shall be jointly approved by the competent Engineers of the executing department and safety officer of respective area.
- For hanging of working cage, sling of steel wire rope of min 12mm shall be used at four lifting lugs locations.

2. Fall Arrestor:

Separate vertical lifeline with 19 mm (¾") steel rope/sling for anchoring of fall arrestor attached with cage and with human full body harness shall be used. The lifeline rope shall be suitable for matching fall arrestor.

This mechanism shall be load tested at 4000 Kg load for max two persons lift

5.8.2 Entire hoist system shall be properly maintained, thoroughly examined by a competent person/ engineer & qualified person engineer of the executing department at least once in every period of six months and register shall be kept containing the prescribed particulars of every such examination.

5.8.3 Arrangement to be made so as to prevent any person or thing being trapped between any part of lift cage with any fixed structures or moving part.

5.9 **Staircase**

All the staircases in the Chimney should be provided with hand-railing made of structures as per standard. The steps and the stairs must be properly maintained and kept free from obstructions and substances likely to cause persons to slip. All are required to use railing while climbing up and getting down through stairs.

The staircases and ladders must be as per the relevant IS Standard.

5.10 **Protection against falling materials**

5.10.1 The risk of falling materials causing injury should be minimized by keeping platforms clear of loose materials. In addition, provide a way of preventing materials or other objects rolling, or being kicked, off the edges of platforms. This may be done with toe boards, solid barriers, brick guards, or similar at open edges.

5.10.2 Strength of the holding structures / bracket and load carrying capacity of holding structures shall be ensured by authorized person of the department executing &

supervising the job.

6.0 **Records:**

- Concerned Sectional In-charge shall maintain record of work permit for working at height for at least one year.
- Records for incident/accident are to be maintained at the department and also made available to Safety Department for monitoring the same at least for five years.
- Records of tests for the equipment, slings, cage, rope ladders etc. being used for working at height

7.0 **Attachment-1**

FALL ARREST SYSTEM CHECKLIST

Sl. No.	Question	Y/N
Anchorage Points		
1	Do workers know appropriate anchorage points for each task that requires a fall- arrest or restraint system?	
2	Are all anchorage points capable of supporting at least 2000 kilograms per person attached and supervised by a qualified person?	
3	Are all anchorage points for body harnesses located at shoulder height and are anchorage points for self-retracting lifeline systems located overhead?	
4	Are anchorage points independent of the working surface?	
5	Can a worker move from one station to another or climb up and down without exposure to a fall?	
6	If the lifeline, lanyard, or self-retracting lifeline is not permanently attached to an anchorage point at the elevated work area, is the first worker up or the last worker down protected while climbing and traversing?	

Vertical Lifelines		
1	Does the lifeline have a minimum breaking strength of 2000 kilograms)?	
2	Is the lifeline protected from abrasive or cutting edges?	
3	Does the system provide fall protection as the worker connects to and releases from the lifeline?	
4	Is the lifeline arranged so workers never have to hold it for balance? (A lifeline should never be used for balance.)	
5	Is the vertical segment integrated with the horizontal segment to provide continuous fall protection?	

Sl. No.	Question	Y/N
Fall Arresters (Rope Grabs)		
1	Is the fall arrester compatible with the lifeline on which it is to be installed or operated?	
2	Is the fall arrester in operational condition?	
3	Is the fall arrester equipped with a changeover lever that allows it to become a stationary anchor on the lifeline?	
4	Is the fall arrester equipped with a locking mechanism that prevents unintentional opening of the device and subsequent disengagement from the lifeline?	
5	Is the fall arrester's “up” direction marked properly so the equipment can be attached to the line correctly?	
6	Is the fall arrester included in a regular maintenance program?	
Lanyards		
1	Is the lanyard length as short as necessary and in no cases greater than 6 feet (1.8 meters)?	
2	Are manually adjustable lanyards used when it is desirable to be able to take slack out of the lanyard?	
3	Have you prohibited tying of knots from the lanyard to the lifeline? (Mechanical rope grabs or fall arresters must be used.)	
4	Are double lanyards with shock absorber provided ?	
Retractable Lifeline (RL)		
1	Are workers properly trained to use an RL?	
2	Is the RL under a regular maintenance and inspection program?	
3	Is the end of the cable properly spliced? (thimble eye, Flemish eye-spliced, and swaged fitting/ferrule?)	
Full Body Harnesses		
1	Are full-body harnesses selected for a particular job equipped with all necessary attachment points (for fall arresting, work positioning, descent control, rescue, or ladder fall-protection systems)?	
2	Are body harnesses inspected regularly for wear, abrasion, broken stitching, and missing hardware?	
3	Have workers been instructed in the use and care of body harnesses/body belts?	
Other Considerations		
1	Has the free-fall distance been considered so that a worker will not strike a lower surface or object before the fall is arrested?	
2	Have pendulum-swing fall hazards been eliminated?	
3	Have safe methods to retrieve fallen workers been planned?	
4	Is all of the fall-arrest equipment free of potential damage from welding, chemical corrosion, or sandblasts?	
5	Are all components of the system compatible according to the manufacturer's instructions?	
6	Have employees been properly trained in the following issues?	

SUPPORTS SYSTEM & PROCEDURE CHECKLIST

Sl. No.	Question	Y/N
	– Manufacturer's recommendations, restrictions, instructions, and warnings	
	– Location of appropriate anchorage points and attachment techniques	
	– Problems associated with elongation, method of use, inspection, and storage	
7	Are all regular inspections performed by trained inspectors?	
8	Are written reports maintained?	
9	Is adequate method of rescue of persons working at height worked out depending on the situation before starting of job? Is it documented?	
10	Are person trained at carryout identified method of rescue?	
11	Are names of rescuers are displayed at site and communicated to all concerned?	

Sl. No.	Question	Y/N
Anchorage / support fixing Points		
1	Do location of the anchoring / support fixing points inspected for proper location of the support system?	
2	Do the new support system for access/lifting system like winch , pully, climber system, rope access system, cradles/cages etc. as per manufactures Manual ?	
3	In case of other support system, whether sketches are in line with Standard Drawings / method / procedure defined in the safety standards ?	
4	Whether the life line posts are adequately & rigidly connected to the supports?	
Painting Work		
1	Whether the existing ladders /staircases are adequate and inspected for wellness?	
2	Suitability of a option of various methods or system studied ?	

Sl. No.	Question	Y/N
Rope Access system		
1	Rope Access System as per the IRATA STANDARDS	