Steel Structure Erection Safety Procedure

HEALTH, SAFETY AND ENVIRONMENT PROCEDURE

Steel structure Erection Safety Procedure

DOCUMENT ID - PR-84-POGC-001
REVISION - 0.0
Steel Structure Erection Safety Procedure

<table>
<thead>
<tr>
<th>Document Authorization</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Document Type</strong></td>
</tr>
<tr>
<td>Safety Procedure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Document Author</strong></th>
<th><strong>Approved By</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HSE-S564392</td>
<td>M. Ansari</td>
</tr>
<tr>
<td>HSE-S593443</td>
<td></td>
</tr>
</tbody>
</table>
# Table of Contents

1. INTRODUCTION.................................................................................................................................................. 3  
2. PURPOSE........................................................................................................................................................................ 3  
3. SCOPE ........................................................................................................................................................................... 3  
4. RESPONSIBILITIES ....................................................................................................................................................... 3  
5. PROCEDURE ....................................................................................................................................................................... 4  
   5.1 GENERAL ..................................................................................................................................................................... 4  
   5.2 LIFTING AND RIGGING ............................................................................................................................................... 6  
   5.3 FIXATION OF STRUCTURE ......................................................................................................................................... 7  
   5.4 ERECTION AND SAFETY EQUIPMENT ...................................................................................................................... 7  
   5.5 STEEL ASSEMBLY ....................................................................................................................................................... 8  
   5.6 HOUSEKEEPING .......................................................................................................................................................... 8  
   5.7 MANAGING THE SAFE ERECTION OF STEELWORK ............................................................................................... 9  
6. APPENDIX ......................................................................................................................................................................... 10  
SUGGESTION FORM
1. INTRODUCTION

Pars Oil and Gas Company (POGC), a subsidiary of National Iranian Oil Company (NIOC), was established in 1998. POGC is a developmental and manufacturing organization that specializes in the fields of engineering and management of development projects, production, operation and integrated management of oil and gas reservoirs. POGC’s mission is to ensure sustainable and preservative production and development of Iran’s oil and gas industry in the areas under its responsibility, development of oil and gas value chain as well as optimization of energy supply processes at national, regional and international levels. POGC is also in charge of development of joint and non-joint oil and gas fields of the country including South Pars, North Pars, Golshan and Ferdowsi.

Aimed at creating superior value and boosting the level of satisfaction of the beneficiaries and with an approach focusing on sustainable, integrated and knowledge-oriented production and development, the company feels committed to comply with national and international requirements, regulations and standards in such areas as quality, safety, as well as occupational and environmental health.

2. PURPOSE

The building and construction industry as a whole has an unacceptably high accident rate and workers involved in handling and erecting steelwork are in the group which suffers one of the highest serious injury rates in the industry. The majority of the accidents are as a result of falls from heights. In addition, many serious accidents occur due to the workers being struck by falling materials. This procedure establishes the safety measures for erecting steel structures and ensuring compliance with the requirements of HSE plan.

Also it is to assist in the assessment of risks and the identification of various controls measures so that risks can be eliminated, avoided or reduced by practical measures, and not by placing sole reliance on the skill of workers.

3. SCOPE

This procedure is to be used by the members of CONTRACTORs Project Management Team, Supervisors and Subcontractors who supervise and control steel structures activities in the whole of the Project.

4. RESPONSIBILITIES

4.1 Site Manager

He is responsible to:
Ensure that the related work packages are being prepared according with the safe System of work.
Coordinate the overall activities of the contractors to be complied with the Project HSE rules.

4.2 HSE Manager
To oversee steel structure erection activities to ensure they are performed in accordance with the requirements of this procedure.
To forward all applicable oversight results to the project management.

4.3 Erection Contractor
To perform steel erection activities in accordance with this procedure and the relevant procedures.
To provide adequate safe access / egress for supporting activities, vehicles and pedestrian movement.
To make firm, properly graded, drained area for safe storage of materials and the safe operation of the equipment.
Not to leave any loose steel parts, materials and / or tools irrespectively before leaving the worksite.
To barricade the erection areas adequately with warning signs to keep noninvolved people away from the area.
To hold a Site specific Erection Plan with others, such as the relevant erection engineers and fabricator.

This plan should include the following:
- Material deliveries
- Material staging and storage
- Coordination with other contractors
- Site preparation for crane and lifting appliances
- Safe path for overhead loads
- Critical lifts, including rigging supplies and equipment Steel erection requiring temporary bracing and guying Anchor rods / bolts
- Columns, beams, connections and decking
- Fall protection
- Special procedures for hazardous and non-routine tasks
- List of qualified and competent persons
- Rescue and emergency procedures

5. PROCEDURE

5.1 GENERAL
1. Protection of others, whether public or other workers, shall be safeguarded at all times. Safety signs and barricades shall be posted where necessary to keep people out of danger areas.

2. A regular weather forecast should be obtained by the contractor in charge of the erection program. Erection should not take place where weather
conditions impose an adverse effect, such as:

- High winds
- Rain or dew
- poor visibility (fog, mist or glare)

During windy conditions, the contractor and HSE department shall evaluate the relative risk of all work performed when gusts reach 25 miles per hour. If erection work is stopped, measures should be taken to ensure that the structure remains stable. After a stoppage, due to the weather, stability of the structure should be checked before work is allowed to re-start.

3. Employees who may indicate a fear of heights or are subject to dizziness shall be kept on groundwork.

4. Employees are not permitted to ride loads or crane headache ball.

5. Employees are required to wear a safety harness and the lifeline must be tied to an object engineered to 5,000 pounds.

6. Employees working more than 2 meters high shall be provided with fall protection100% of the time.

7. Projecting or protruding reinforcing rods which create tripping or falling hazards shall be bent or covered as outlined in the Project standards.

8. Excess material should not be hoisted to a structure and stored in the working area until it is ready to be put into position and fastened.

9. Before cutting any large or heavy structural steel member, the member shall be secured or supported by wire ropes, cables, or other means to prevent dropping or uncontrolled swinging.

10. Keep working area in orderly condition with necessary equipment and materials safely arranged.

11. In setting steel, each piece shall be securely bolted before the load line is unhooked.

   The use of one-bolt connections is not appropriate.

12. After full bolted while scaffolding activities life line shall be installed upon each beam at every direction.

13. When setting steel trusses, they shall be securely tied or cross-braced until permanent braces are in place.

14. Check loads to make sure there are no sharp edges, which will cut into lifting slings.Use softeners where applicable.

15. A tag line or lines shall be attached to loads where their use will not create a greater hazard.

16. All unused openings in floors, temporary or permanent, shall be securely planked over or guarded.
17. Erector shall have full set of tools in a secure condition on the elevated area in order to insert bolts into the holes easily.

18. Worker in high-elevated area shall not to walk on the member such as beams, girder, without safety harness and hook it on the lifeline.

19. After turning off electric power, welding machine, grinders and any other electric machine, all electric cable shall be kept in one place, which is safe and secure.

20. All the workers shall clean working areas before they leave.

21. All the working and lifting areas, access ways, dangerous openings must be adequately and suitable lighted.

22. Scaffold materials, tools and other objects, must not be thrown or tripped down from a height.

23. Potentially hazardous features should be identified that will conflict with health and safety.

    If there are any overhead power lines near the proposed erection site the electrical specialist shall be consulted. Either the power lines should be made dead or suitable precautions taken to prevent the danger.

    Certain activities or processes on or adjacent to the site may have the potential to adversely affect the health and safety of workers on site. For example, noxious gases, vapors or dusts may be given off from chimneys, stacks, tank vents and ventilation ducts…etc. These may not cause a problem at ground level but may affect steelwork erectors working at a height.

24. A safety guard railing; Hard Barrier shall be installed approximately 42 inches high around the periphery of all temporary-planked floors.

5.2 Lifting and Rigging

1) Column, girder, beam and bracing to be lifted by crane shall be tied with tag line or nylon rope on both ends before lifting, transferring of location or for erection.

2) Rigger designed as the banks man shall be authorized to instruct to the crane operator before load and unload of structural members.

3) Rigger shall use suitable shackles, sling belt, wire sling with adequate capacity.

4) Where erectors have to work at height, provision must be made for safe means of access to the connecting points and any other working places. Suitable platform such as man-basket, Hydraulic ladder, and aluminum ladder shall be prepared for erection.

5) Erector, bolting team shall wear safety harness, especially if they are working in high elevated area; make sure that safety harness is attached on main hoist or
girder which was erected already.

6) Steel structure erector shall instruct the crane operator, swing direction up and down.

7) Competent people must be used to operate lifting appliances and give signals.

8) Appropriate precautions must be taken to ensure the stability of lifting appliances when used on soft, uneven or sloping ground. These could include measures such as ground leveling, use of mats, or hard standing.

9) The load must not exceed the safe working load of the lifting appliance. Suitable packing should be used to prevent the edges of the load from damaging the slings.

10) Calculating the weights of components to assist in the estimation of safe crane capacities and the location of cranes.

11) Any load that approaches the safe working load of a crane should be carefully raised a short distance and the operation stopped to check safety and stability before continuing.

12) If more than one lifting appliance is used to raise or lower a load, a competent person must supervise the operation which must be arranged so that no lifting appliance is loaded above its safe working load or is made unstable.

5.3 Fixation of Structure

1) When necessary, assembly lifting plan shall be considered by erector in order to demonstrate that proposed lifting method shall be performed safely and that assembly lifted shall remain free from distortion, undue bending and structure integrity will be maintained during lifting.

2) In case of the erection of pre-assembled member, the following data shall be considered in advance.
   The weight of pre-assembled member.
   The structural stability of the assembled members during lifting operation. Capacity verification for the crane to be utilized in the lifting. (All lifting equipment and man-baskets must be certified by TPA).
   Location and position of the crane.

5.4 Erection and safety equipment

1) Erection of column; Use man-basket to remove shackles and sling belt.

2) Girder and beam; Workers shall attach girder and beam to the main member which is connected already, using safety harness.

3) Vertical and horizontal bracing; Workers shall attach vertical and
horizontal bracing to the main member which is connected already, using safety harness or safety belt.

Safety equipment (Personal protective equipment)

Safety harness (Safety belt not acceptable). Safety helmet with chain strap.
Safety shoes. Safety goggles.
Life line for hooking safety harness.
Short belt for hooking safety harness in short distance.

5.5 Steel Assembly

1) Extreme care must be used when storing, handling, and placing steel members. Long steel members or loads shall be controlled by taglines to prevent swinging hazards.

2) Riveting shall not be done in areas where combustible materials are present unless precautions are taken to prevent fires.

3) Connections of the equipment used in plumbing-up shall be properly secured.

4) During the final placing of solid web structural members, the load shall not be released from the hoisting line until the members are secured with not less than two bolts, or the equivalent, at each connection and drawn up wrench tight.

5) When bolts or drift pins are being knocked out, means shall be provided to keep them from falling.

6) The structure must be stable at all times from when the first piece of steelwork is put into position until it is completed.

7) Marking components as an aid to identification (also to prevent costly mistakes).

8) Identifying the positions where components should be lifted.

9) Pneumatic hand tools shall be used with extreme caution with special attention to the following:
   • Power sources shall be secured and hose lines shall be bled off prior to disconnecting tools or hose sections.
   • Airline hose connections should be wired or tied together to prevent accidental separation.
   • Appropriate safety goggles or other eye protection shall be provided and used by workers using pneumatic hand tools or performing other work which is hazardous to the eyes.

5.6 Housekeeping

1) Platforms, gangways, floors and other places must not be obstructed by loose materials.
2) Projecting nails in timber must be removed or knocked down to prevent injury.
3) Materials must be stacked safely.

5.7 Managing the safe erection of steelwork

The first step in ensuring safe work practices in erection is the preparation of a method statement. This important document should detail the proposed erection scheme and should form part of the health and safety plan for the project.

The amount of detail required in a method statement will obviously depend on how big or complex the job is. However, even small erection jobs should have a method statement. It is clear evidence that attention has been given to design and planning aspects, as well as being a plan to ensure that the project is completed without risks to health and safety.

A typical method statement should include the following points:

- Details of how the project will be managed and health and safety risks eliminated, avoided or reduced.
- Information on the site, including any hazardous features, such as overhead electric power lines, and what effects these will have on the project.
- Any requirements for cranes and other lifting equipment, plant and tools for handling steelwork safely.
- Arrangements for the safe receipt, offloading, storage and handling of steelwork components on site.
- Details on where and how steelwork will be assembled prior to erection.
- The sequential method of erecting the structure and how stability will be ensured at all times.
- How activities such as slinging, lifting, un-slinging and the initial and final connecting of steelwork components will be carried out safely.
- The safety precautions to prevent fall from height. For example, arranging for as much assembling as possible to be done at ground level, minimizing the number of connections to be made at a height.
- Providing a safe means of access and a safe place of work by methods such as secured ladders, mobile towers, temporary platforms and walkways.
- Details of the correct use of scaffolds and mobile work platforms. Safety nets and safety harnesses and fall arrester devices.
- A contingency plan for dealing with any problems that may arise.
• How personnel will be protected from falling objects. For example, use of screens, and debris nets, installation of barriers and warning notices at ground level.

**Note:** for any more details see following procedure:

- Lifting and Rigging Operations (Doc No.PR-67-POGC-001)
- Scaffolding and working at height (Doc No.PR-6269-POGC-001)
- Personal Protective Equipment (Doc No.PR-75-POGC-001)

6. **APPENDIX**

Figure 1: Mobile Elevating Working Platform

Figure 2: Safety Harness with an attachment to a safe anchorage point
A MEWP is one of the best ways of providing safe access.

Figure 1: Mobile Elevating Working Platform.
Figure 2: Safety Harness with an attachment to a safe anchorage point.
SUGGESTIONS FOR THE POGC
SAFETY FOR STEEL STRUCTURE ERECTION WORK

MANAGER, HSE Department
Pars Oil & Gas Company
Tehran I.R. Iran

Please consider the following suggestion(s) relative to the POGC Safety for steel structure erection work:

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

_________________________________________________________________________

(Prepared by)

(Signature)

(Date)

(Address)

Contact Telephone Number

Contact FAX Number