INTER PLANT STANDARD IN STEEL INDUSTRY		
IPSS	**GUIDELINES FOR SAFETY IN E O T CRANES**	**IPSS: 2-02-007-18 (First Revision)**
	Corresponding IS does not exist	Formerly: IPSS: 2-02-007-01

0. FOREWORD

0.1 Interplant standardization in steel industry has been initiated under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). This Interplant Standards is prepared by the Standard Committee on E O T Cranes, IPSS 2:2 with the active participation of the representatives of all the steel plants and leading consultants and was adopted in June, 2001. Thereafter, standard was first revised by the Standard Committee in March, 2018.

0.2 Interplant standardization for steel industry primarily aims at achieving rationalization and unification of parts and assemblies used in steel plant equipment and accessories and provides guidance in indenting stores for existing equipment by individual steel plants. It is not desirable to make deviations in technical requirements.

0.3 E O T Cranes in steel plants are used for handling hot metal, liquid steel, red hot ingots and slabs etc. Any failure or malfunctioning of the crane, therefore, results in serious accident causing loss of life and big breakdowns. As there is no Indian Standard on safety of E O T Cranes, need for making as Inter Plant Standard on this subject is considered of utmost importance. This standard deals with safety aspects related to E O T Cranes.

0.4 Many of the safety aspects relating to E O T Cranes have already been covered in the following Interplant standards.

a. IPSS: 2-02-001-18 : Design parameters for E O T Cranes.

b. IPSS: 2-02-002-18 : Acceptance norms for E O T Cranes.

c. IPSS: 2-02-003-18 : General code of practice for design parameters for E O T Cranes (mechanical aspects).

d. IPSS: 2-02-004-18 : Code of practice for design parameters for E O T Cranes (electrical aspects).

e. IPSS: 2-02-005-18 : Code of practice for selection of electric cables for use on E O T Cranes.

f. IPSS: 2-02-006-18: Code of practice for laying of electric cables on E O T Cranes.

0.5 Various Indian and IPSS Standards referred to in this standard, have undergone revision over a period of time. This revision has been carried out to incorporate these changes.

1. SCOPE

This interplant standard covers the safety in the design layout and general safety arrangements required in E O T Cranes for use in steel industries.

2. SAFETY FOR HOIST MECHANISM

For cranes handling hot metals, there shall be two motors. Each input line shall have two brakes, each independently capable of holding the full load. Adequate provision shall be inbuilt in design to arrest the fall of the load in case of failure of any component like gearing, output and rope drum shafts. Hydraulically operated emergency disc brake shall be provided on rope drum flanges of main hoist in Ladle crane.

3. SAFETY RELATING TO CRANE STRUCTURE

3.1 Safety access for maintenance and removal of all mechanical and electrical parts shall be ensured without any additional scaffolding or necessitating dismantling of other equipment or structures.

3.2 Safe access to the crane bridge and trolley from the LT walkway platform shall be provided. Access to the cabin from the bridge girder platform shall be via a staircase. Minimum width of staircase shall be 600mm and inclination to the horizontal shall not be more than 60 Degree. Staircase shall be provided in place of monkey ladder at inside landing from end carriage to platform.

3.3 Full length chequered plate platforms with hand railing wherever possible shall be provided on the top for both bridge girders in order to have easy access to the operator's cabin, long travel drive, current collectors, trolleys etc. The width of the chequered plate covering shall not be less than 500 mm.

In case of lattice construction, at least 500 mm wide full length chequered plate platforms shall be provided at the bottom chord level of all the bridge girders for periodical checking of all rivets, bolts, lamps etc. Full length toe boards shall be provided along with the chequered plate platforms.

3.4 All opening in the foot walks flooring for access to the bottom chord platform and inspection platforms shall be provided with full length strong hinged covers. These covers in the maximum open position shall be inclined at an angle slightly more than 90 deg. To the horizontal. They shall be so located that they do not foul in their open position with any moving part of the crane. Minimum size of the opening shall be 600 mm x 600 mm.

3.5 (a) When down shop leads are located below the runway rails, a guard shall be provided on the crane to prevent the hoist ropes from coming in contact

with down shop leads. When the crane cabin is located by the side of the down shop leads, it shall be protected by providing suitable guards/ wire mesh structure for safety of the crane operator or cabin people.

(b) Suitable wire mesh guard shall be provided on down shop leads inspection cage to protect the maintenance personnel.

3.6 Operator cabin mounting shall be sufficiently strong with gusset plate design for ensuring operator cabin to be vibration free. Enclosed cabins shall have a water light plate roof slopping to the rear and provided with sliding or hinged windows on three sides and door. The window shall be provided with toughened safety glass of minimum 6 mm thickness and installed from inside so that it can be changed easily. The glasses shall be installed in such a way that the crane operator has sufficient view for safe operation of the crane.

3.7 Crane cabin subjected to heat from below shall have 5 mm thick bright steel plate shield suitable bolted 150 mm below the bottom of the double walled construction in case of air conditioned cabins.

3.8 Operator's cabin shall be provided with suitable warning signal device and shall be so installed that it is easily accessible by the operator and maintenance personnel.

3.9 Adequate means, independent of controlled brakes shall be provided for securely anchoring the crane to the gantry when not in use for locking of outdoor cranes.

3.10 Minimum head room of 2100 mm shall be provided on all walkways, trolley platform and inside the operator's cabin.

3.11 If glasses are provided at the bottom in the cabin for better visibility, it is essential to fix removable steel grating over the glasses to support the weight of the personnel.

3.12 Bridge drive floating shafts shall be provided with platforms below it.

3.13 End carriage shall have a minimum clearance of 450 mm for walking when trolley is in extreme end position, provided the hook approach is not critical.

3.14 The painted letters and figures indicating the safe working load of the crane and other data of the crane shall always be prominently displayed.

3.15 Proper type of fire extinguisher shall be provided in the crane operator's cabin as well as in trolley and E-room.

3.16 Coupling guards on the drives should be provided.

3.17 Insulating rubber mats shall be provided on the cabin floor and in front of all electrical panels.

3.18 Proximity Sensing / Anti-Collision Devices shall be fitted to the bridge of the crane to give warning of the approach to danger, or another crane.

4. SAFETY RELATING TO ELECTRICAL SYSTEM

4.1 All the electrical cables shall be so laid that they can be easily inspected or maintained.

4.2 A space of 500 mm in front of the panel and resistors shall be provided. Similar space shall be provided at the back in case of panels requiring maintenance from the back. A space of 500 mm in front and back of the panels shall be provided for d c cranes.

4.3 The arrangements for disconnecting the cranes from the main power supply shall be provided by means of either an isolator on the bridge or a switch lockable in open position. Warning indication shall also be provided on 4 sides of cranes when crane is under maintenance.

4.4 Safety switches shall be provided on four corners of the crane which can be operated from either gantry or bridge platform. In addition, one such switch shall be provided in the cabin also.

4.5 Indication lamps (red and green) shall be provided in the operator's cabin.

4.6 Incoming 415V ac terminal fixed in crane cabin shall be properly insulated and shrouded for electrical safety.

4.7 Emergency stop and reset device shall be provided

4.8 Electrically operated audio warning device, audible at minimum distance of 30 m

5. LIGHTING

5.1 Cabin shall be provided with light fitting in such a way that operator can see properly the controls and the inside of the cabin but the light shall not obstruct the vision of the man below giving signal to the operator.

5.2 The crane shall be provided with sufficient lights, hung from the girder of the crane so that the working area under the crane is properly illuminated.

5.3 There shall be more than two plug points of 24 V ac fitted on the girder of the crane to provide hand lamp for maintenance jobs.

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