| INTER PLANT STANDARD IN STEEL INDUSTRY | | |
|---|---|---|
| IPSS | **METHOD OF RECONDITIONING OF SINTER PLANT PALLETS** | **IPSS:3-02-002-18** |
| | Corresponding IS does not exist | Formerly : IPSS:3-02-002-00 |

## 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 IPSS was prepared by the standard committee on Operation & Maintenance, IPSS 3:2 and firstly published in 1994. Lastly, this has been revised by the standards committee in July 2018 with the active participation of the representatives of Indian major steel plants and leading consultants.

0.2 This revision is an updated version to take care of the latest procedural requirements.

0.3 This standard is intended to provide guidelines to assess the general defects / deteriorations, as experienced in pallets of cast steel design arising out of use in direct heat and load over a period of time in sinter plant and enunciate the guideline of their remedial measures of reuses.

## 1. SCOPE

1.1 This Inter Plant Standard covers the range of normal defects in sinter plant pallets of cast steel design, specifies the methodology for reconditioning, facilities needed and adequate precautions to be adhered to.

## 2. MATERIALS OF CONSTRUCTION

2.1 The material of construction of sinter plant pallets (frame) should be S G Iron of suitable grade.

## 3. METHODOLOGY OF RECONDITIONING

### 3.1 Common Defects on Pallet Frames

The common defects are :

a) Wear of pallet frame sides

b) Bend and change in shape of the frame

c) Cracks in the pallets.

d) Damage of middle frame.

e) Frequent loosing of side wall bolts.

**3.2 Wear of pallet frame sides**

3.2.1 The repair of wear of frame sides (above 5mm & upto 10mm) shall be done by rebuilding worn out areas of frame sides with suitable low hydrogen electrodes, then by normalizing (to allow relief of built-in stress) and proper machining.

**3.3 Bend and change in shape of the frame**

3.3.1 The pallet of single piece design consists of three main parts namely two side wall and one middle frame. Bending occurs on the middle frame during operation.

3.3.2 The middle frame is to be disconnected from the side walls and sealing plates. The bent middle frame shall be straightened by adopting one of the following options :

i) Heating in a furnace upto 400 deg C and straightened under a pressure in a press.

ii) Heating in a furnace upto 850 deg C and straightened under a suitable load preferably inside the furnace with proper packing underneath the frame.

Repeated heating for straightening should be avoided.

3.3.3 After the pallet middle frame is straightened by the above method, check the diagonal lengths of the frame. The allowable variation in diagonal lengths of the frame shall be + or –5 mm.

3.3.4 Also check the length of the straightened frame. The shrinkage in length shall not exceed 5 mm.

3.3.5 The reversible pallets shall be turned upside down to reverse the bending process, after dismantling all accessories/mounting such as side plates, seal bars/bottom packing plate, tooth packet wear bars, grate bars, etc. All mountings shall then be refixed at desired positions after critically checking and replacing the damaged ones wherever necessary.

3.3.6 Also in the cases where the pallets are in more than one part, bolted and welded together, they will be subjected to the same treatment as at 3.3.2 for straightening.

However, if the process has disturbed the joint, its weld, bolt fitting etc, they will be separated, refixed and welded after eliminating any gap by machining.

**3.4 Cracks in the pallets.**

3.4.1 The cracked portion shall be gouged to full depth of crack and atleast 5mm beyond the length of crack with gouging electrodes, ground smooth for a proper `V' and then welded with low hydrogen electrodes, with adequate peening on each layer of deposit of weld, to avoid any further crack or bend. The weld joint then shall be ground flush.

**3.5 Damage of Middle Frame**

3.5.1 Old & rejected pallets, whose middle frames, have bend/change of shape & cracks and cannot be repaired by para 3.1(b) & (c) fall under this category.

3.5.2 These sinter cars are reclaimed/reconditioned by changing the middle frame with fabricated new middle frame with boiler quality plates.

3.5.3 For repairs old sinter car is placed over a leveled rail bed and the side frames are secured firmly.

3.5.4 The middle frame to be removed is marked at about 200 to 450 mm approximate depending on the extent of wear from the top end of pallet on either sides. From this point the cutting line is marked at 45o towards the centre of the car. All plates of middle frame are marked like this.

3.5.5 The damaged middle frame is then gas cut at the markings and taken out.

3.5.6 The new fabricated middle frame is then marked by taking dimensions from the old frame.

3.5.7 The new middle frame ends are chamferred and matched and secured properly before welding the joints.

3.5.8 All control dimensions are checked before commencement of welding.

3.5.9 Supercito or equivalent electrodes are used for welding.

3.5.10 To avoid loosening of side wall bolts self locking washers to be used in place of normal washers. HT bolts with proper torque shall be used

**3.6 Seal Bar / Bottom packing Plate**

3.6.1 The seal bar / bottom packing plate shall be replaced if :

a) it has bent, cracked for undergone uneven wear

b) it has worn out more than 5 mm

c) the mounting bolts have become loose or exposed from the surface of the seal bar / bottom packing plate.

3.6.2 To prevent failure of sealing bar, proper functioning of centralize lubrication system of slide track should be ensured. Grease suitable for high temperature application to be used.

**3.7 Grate Bar**

3.7.1 The total slack (expansion allowance) shall not be less than 16 mm and more than 29 mm. It shall be replaced if it has undergone wear, distortion, crack or broken tongs.

3.7.2 Material for grate bar shall be S G Iron for physical property. Please refer IS : 8850 & 2500 – 1992 (Part1) for internal defects.

**3.8 Side Plate**

3.8.1 The centre bolts shall be hard tight and the outer bolts shall be firm tight, to allow for the differential expansion. The retaining bolts shall be checked once a week. Side plates cracked from top to bottom shall be replaced.

**3.9 Pallet Haunches**

3.9.1 The pallet haunches which come in contact with each other round the sinter machine drive at discharge end, shall be provided with weld deposit not less than 3 mm in 2 or 3 layers by suitable hard facing electrode. Such electrodes

must provide a hardness of RC 49 at 400 deg C and must be capable of wear resistance at elevated temperatures. Selection of such electrodes should be made as per IPSS:1-07-SP1-96 “Guide on selection of welding electrodes”.

The profile will be maintained by hand grinding using a suitable template.

**3.10 Finishing**

3.10.1 The reconditioned pallets shall be painted with the primer in case it is to be stored for future use.

**3.11 Precautions**

3.11.1 In all processes of welding, except in hard facing, the composition of the electrode should be compatible with that of the parent metal.

**3.12 Inspection of repaired pallets shall include the following :**

a) Quality of welding and quality of hard face weld deposit by visual & Dye Penetrant tests as per relevant ASTM code.

b) Dimensional accuracy.

c) Any surface cracks as a result of neutralization of bend.