INTER PLANT STANDARD – STEEL INDUSTRY		
IPSS	**GUIDELINES FOR STORING MATERIALS IN SAFE MANNER AT OPEN YARDS AND OTHER STORAGE PLACES IN STEEL INDUSTRY**	**IPSS: 1-11-024-16**
	Corresponding IS does not exist	

0. FOREWORD

0.1 This Inter Plant standard, prepared by the Standards Committee on Safety Appliances and Procedures IPSS 1:11, with the active participation of the representatives/ experts of all member steel plants and associated organizations in the field, was adopted in October, 2016.

0.2 This standard has been prepared to introduce a guideline for storing materials in safe manner at open yards and other storage places.

1. SCOPE

To provide a guideline for storing materials in safe manner at open yards and other storage places for reducing hazards situation like Toppling of Heavy Spares, falling of materials during handling, damage to equipment, bodily injury.

2. PROCEDURE

2.1 General Requirements:

2.1.1 Planning of Storage Layout

For any site, there should be proper planning of the layout for stacking and storage of different materials, components and equipments with proper access and proper maneuverability of the vehicles carrying the material. While planning the layout, the requirements of various materials, components and equipments to be stored shall be considered.

2.1.2 Following points should be taken into consideration for storing the material:

i. Materials stored at site shall not obstruct fire& smoke detectors and fire detection panels, fire extinguishers, fire hydrant points, first-aid equipment, lights, electrical switches, gas line drip pots, water seals and other emergency items/ equipments.

ii. All spares shall be placed in such a manner so that leaving clear access of at least 1 meter from such emergency items/ equipments.

iii. All spares shall be segregated and stored at designated places.

iv. Storage areas shall be kept free from accumulation of materials that constitute hazards from tripping, fire or explosion.

v. The permanent material storage area shall be hard barricaded and material stored temporarily may have indicative barrication provided the stored material are stable and fully secured. No material shall protrude beyond the barricade.

vi. No material shall be stored or lie on the pathway, to avoid tripping hazards. Aisles and Passage-ways shall be kept clear to provide for the free and safe movement of Material handling equipment and people.

vii. Any pipe line (water supply, gas etc.) or electrical installation should not be used for Supporting any material or hanging load.

viii. All material stored in tiers shall be stacked, racked, blocked or otherwise secured to prevent sliding, falling or collapse, toppling.

ix. Incompatible material shall be stored in segregated manner so as not to cause fire/ other emergency situation.

x. Combustible materials such as packing boxes, fuel, lubrication and gunny bags are to be kept separately on designated areas for disposal, away from any ignition source to prevent fire.

xi. All materials shall be stacked tidily, firmly and maximum up to man height to prevent them from falling or causing some other pile to fall. In case of big material (more than man height), extra precaution should be taken like restriction of unauthorized entry, securing of material for preventing it from displacing

xii. Power lines & Emergency equipment: Do not store materials under power lines or where materials may block access to emergency equipment.

xiii. Barricading: Spare yard should be barricaded, named and gates should be provided with locking provision. Only authorized person will allow entry of materials for unloading and loading in the Storage place. The storage place should be under lock & key rest of the times.

xiv. SOP’s for material handling: All Storage places/ yards should have approved SOP for handling and storage of materials.

xv. Training: Only trained person on material handling SOP’s should be allowed to handle the material.

xvi. Test certificates of tools & tackles: All the material handling equipment e.g. sling, D shackles, hook of the crane etc. should have valid test certificate readily available at the site for verification.

xvii. Location for Spares: All the spares should be kept only at their designated locations with UI numbers/ name of the spares mentioned on a tag. An inventory register to be maintained for each storage place.

2.2 **Specific Requirements**

2.2.1 Pipes and Conveyor pulley

i. Pipes and Conveyor pulley shall preferably be stored on appropriately designed sills or racks, and must be safely blocked to prevent rolling or spreading.

ii. Alternately, pipes of diameter higher then 300mm may be stored on ground with maximum two layers high and with proper use of choker block and Dunnage, in order to prevent rolling. When stacked in such fashion, the top most pipes are to be taken out first for use.

iii. When many small diameter pipes/rods are stored on ground, the pipes/rods are to be bundled into 3-4 units. Proper guards are to be provided to arrest any accidental rolling of the pipes.

iv. Stopping of rolling or sliding of pipes or Conveyor pulley with hands or feet is strictly prohibited.

2.2.2 Fabricated items:

i. Fabricated material shall be checked for stability at ground level. It is to be ensured that there is no chance of tilting, falling or rolling or slipping of material.

ii. The ground shall have sufficient strength to bear weight of the fabricated items.

iii. Fabricated items shall not be placed on loose soil.

iv. The storage area must be properly barricaded.

2.2.3 Sheet material:

All bundles shall be separated by strips of wood to facilitate handling, to minimize chances of shifting or sliding of the piles of material.

2.2.4 Scaffolding Materials:

i. All Material and parts of scaffold, when not in use shall be kept under good condition at designate place.

ii. Good Scaffold materials should not be mixed with scrap materials and parts.

2.2.5 Scrap Materials

i. Scarp shall be removed from Storage Yard and disposed off promptly. Before Removal, scrap storage area shall be kept under barrication.

ii. Packaging material should be disposed off quickly and shall not be allowed to remain at storage yard.

iii. Wooden material with projected nail shall not be stored for future use. If the wooden materials are needed, all nails are to be removed, by appropriate means.

2.2.6 Fabrication Debris

i. Debris shall not be thrown from upper stories, but be removed either by machinery or enclosed tilted passage / enclosed chutes. Accumulated debris shall be appropriately barricaded.

ii. All waste material and rubbish shall be removed from the immediate work area as the work progresses.

iii. All solvent waste, oily rags and flammable liquids shall be kept in metal containers with lid. These wastes shall be kept away from other combustible material (such as wood, papers, tyres etc.)& ignition source

iv. Waste bins shall be kept at designated places for collection of different categories of wastes (ferrous / non- ferrous / other waste.

2.2.7 Slab/ Coils

The maximum safe height of stacking is up-to 2 meters.

2.2.8 Impeller Fan with its Shafts

Fan with Shaft should be kept at a rigid frame with saddle to avoid bending & rolling of the impeller fan shaft.

2.2.9 Heavy structure / Spares:

Stair should be provided for climbing on the spares more than 6 feet height for mounting of sling during lifting & lowering the heavy structures / spares in the yard/storage place.

2.2.10 Handling and Storage of Conveyor belts :

2.2.10.1 Handling:

i. Conveyor belts are generally supplied in cylindrical wooden or steel reels and in cases of overseas transportation, in fully enclosed steel reels, racetrack or similar.

ii. The reels are always equipped with a square center to take each company's winder shaft.

iii. Insert the shaft and make sure that it is protruding at least 200mm from each side to accommodate the slings or the forklifts. To avoid damaging belt edges you should use a spreader bar.

iv. The best practice for running out the belt is to use a braked stand. Small roll can be pulled from a freewheeling stand; however care should be taken to avoid the belt from running away.

v. If the belt is to be dragged along the ground, then care should be taken to ensure that no objects are blocking the area and the dragging area should be barricaded with indicative barrication tape.

vi. In cases there is a headroom limitation it may be necessary to remove the belt from its reel and store it in a flat position. If that happens make sure that large loops are maintained to prevent carcass fracture.

2.2.10.2 Storage

i. In any case the conveyor belts have to be stored upright in the factory package until used, protected from direct sun light and permanent water. The storage area shall be prepared for stable putting down of the reels and preventing the belts from being damaged by foreign parts. A cool dry warehouse, free from direct sunlight, oil, or corrosive fumes is recommended.

2.2.10.3 Points of attention:

i. Ensure the soundness of the wrapping

ii. Do not lean the belt against walls as this can cause telescoping

iii. Before lifting the belt ensure that facilities can handle the weight and the dimensions, which are always marked on the reel side.

iv. If prolonged intermediate storage is necessary, it is advisable to suspend the coiled belt with one axle in two movable stands. If this is

not feasible, the coil should be turned at intervals to change the contact surface.

v. In case of prolonged storage in the open air (for steel cord belts) the cut edge at the start and end of the belt has to be protected from moisture. It may be advisable to coat the cut edge with cold splicing cement.

Implementation checklist of material storage

Sl. No.	Description	Status	Remarks
1	Planning of the layout for stacking and storage of materials are done		
2	Proper access of the vehicles carrying the material is provided		
3	Gap between fire detectors & panels, fire extinguishers, first-aid equipment gas lines and other emergency equipments is at least one meter.		
4	Yard has designated place for stacking all kinds of materials/Spares		
5	All materials/spares are segregated and stored at designated Places		
6	Proper access has been made to reach to every material/ spare		
7	Storage areas are free from accumulation of materials that constitute hazards from tripping, fire or explosion.		
8	Material storage area is appropriately barricaded and no materials are protruded beyond the barricade.		
9	No pipe lines (water supply, gas etc.) or electrical installations have been used for supporting any material or hanging any load.		
10	All material stored in tiers are stacked, racked, blocked or otherwise secured to prevent sliding, falling or collapse, toppling.		
11	Designated disposal places and bins for scraps like packing boxes, fuel, lubrication and gunny bags are provided		
12	All materials are stacked tidily and up to a safe height to prevent them from falling or causing some other pile to fall.		
13	No materials are stored under the power lines		

14	Spare yards are barricaded with controlled access		
15	Layout/ drawing of spare/ storage yard is available		
16	Spare yard has SOPs for loading / unloading process		
17	Employees engaged in material handling at Spare yards are trained on material handling activities.		
18	All the material handling equipment used at Spare yard is tested and certified		
19	Appropriately designed sills or racks are provided to store Pipes and Conveyor pulley to prevent rolling or spreading.		
20	Pipes of dia more than 300mm is not stacked in more than two layers high		
21	All fabricated materials are tested for its stability at ground level		
22	Stacking place of fabricated material is tested for its supporting strength. During stacking the material all care of soil / ground quality has been considered		
23	There is a schedule of disposal of waste material from spare yards. Sufficient bins are provided for it		
24	All Impellers, motors, rotors, gear box etc. are stacked on rigid frame with saddle/ support stand.		
25	Proper access provided for safe access to heavy structures having height more than 6 feet		
26	Sufficient support provided to prevent falling of any unbalanced material stacked in yard		
27	Schematic diagram of the storage place is displayed at each Entry/ exit point indicating: a. 'You are here' at each entry point. b. Layout for stacking and storage of different materials, components and equipments with proper access and pathway directions. c. Location of Fire extinguishers, Fire hydrant & fire alarms & nearest First Aid Box. d. Display of "Unauthorized entry prohibited". e. Area ownership board is displayed.		

28	Relevant Standard Operating Procedures (SOPs) for handling and storage of materials, training record of the concerned employees on the SOP are available at shop floor. Visual SOP should also be displayed.		
29	MSDS is available and displayed for storage of any hazardous chemical in the stores		
30	All the electrical panels, DBs, switch board have proper nomenclature		
31	Monthly audit system of Storage places/ yards against the standard is in place		
32	Proper visuals and cautionary signage's are provided in spare yards with Emergency numbers, name of area owner.		

Signage can be used

Signage of POISIONOUS gas to be displayed wherever material is to be stored near the gas lines. Singages are from http://www.freesignage.com/osha_caution_signs.php

10.0 Some good and bad examples of keeping spares: