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 of all member steel plants and associated organizations in the field, was first adopted in June 2003. The standard was again revised in February, 2015 in the presence of experts from Member organization.

1. SCOPE

1.1 This Inter Plant standard covers the procedure of placement of wagons, de-coupling, tilting and empty collection with respect to Wagon Tipplers of steel plants.

2. PROCEDURE

2.1 Sequence of Wagon tippling: Concerned Shop & Traffic Department shall follow the sequence of operations as mentioned below.

Sl. No.	Description
1.	Placement of wagon in pre-tippling line by loco/Transfer Car
2.	De-coupling of loco/Transfer Car
3.	Withdrawal of loco/Transfer Car
4.	On getting brake release O.K. by traffic, attach Train Car Pusher (TCP)/ Side Arm changer (SAC)
5.	Placement of a wagon on tippler table with the help of TCP/SAC
6.	De-coupling of the wagon placed on tippler table
7.	Pulling back the train with the help of TCP/SAC to a safe distance
8.	Ensuring the exit side O.K. for tippling and hopper condition O.K. Then giving permission for tippling.
9.	Tippling of wagons
10.	Pushing the empty wagon with the help of train to empty side
11.	Repeat Sl.No. 5-10 for every wagon
12.	After placing the last empty wagon in tippler, the TCP/SAC is pulled back to dead end
13.	Inform Traffic Deptt for empty collection by memo/token/ signalling
14.	Making rake of empty wagons by coupling the wagons
15.	Pulling out the rake of empty wagon from the empty line
16.	Job safety analysis.
17.	HIRA

- Non standard / bulged out wagons shall be isolated before placing the rake for wagon tippling.
- The responsibility clauses can have changes depending on the practices existing in different plants.

3. JOB SAFETY ANALYSIS

3.1 Job Safety Analysis of tippling operation consisting of basic job steps, hazards, risk and recommended safety procedure are made, based on actual experience, for wagon tippling operation and is mentioned below.

Basic Job Steps	Hazards	Risks	Recommended Safe Procedure
1. Placement of wagon in pre-tippling line by loco	Hit by loco	1. Human injury 2. Property damage	1. Signaling system should be proper and duly followed 2. Loco speed to be maximum 5 Kmph in tippler area 3. Brake to be applied gently while entering TCP /SAC area 4. TCP/SAC to be at dead end / parking observation. 5. All wagon doors to be closed
2. De-coupling of loco	1. Press between couplers 2. Hit by loco/ wagon	1. Crush injury/ amputation 2. Fatality	1. De-coupling to be done by operating handle from outside. In case outside handle is not operative, operation to be carried out only after immobilizing the wagon. 2. Proper supervision by shunting staff of Traffic Deptt 3. Proper signalling by Yard porter 4. Check wagon's brakes

3. Withdrawal of loco	1. Hit by loco 2. Struck by point changing lever 3. Slip & Fall	Injury or loss of limb or life	1. Area 2 meters on both sides of track shall be level and clear of debris, grass, bushes etc 2. No scrap between tippler cabin and track 3. Proper yard illumination 4. Drain covers firmly placed
4. Release of brake	1. Roll down of train 2. Hit by wagon 3. Slip & fall	Injury or loss of limb or life	1. Fix skid on track 2. To start after TCP/SAC power off and token is received from tippler operator 3. One person from Traffic/Oprn deptt to watch and to ensure safety
5. Attach TCP/SAC after brake release clearance	1. Press between TCP/SAC & wagon 2. Hit by TCP/SAC or wagon	Crush injury, amputation, fatality	1. Use operating handle for coupling 2. Examine coupler condition before pushing begins 3. Maintain contact with TCP/SAC dead end and tippling cabin 4. Pre-tippling yard and dead end of TCP/SAC shall be in workable condition i.e. free from grease, foreign material and other burden material 5. Illumination at TCP/SAC dead end and yard shall be proper 6. Check proper attachment by forwarding & reversing the TCP/SAC 7. Check all limit switches at tippler area

6. Place wagon on tippler table with the help of TCP/SAC	1. Derailment 2. Slip & fall 3. Hit by wagon 4. Press between wagon and side pad 5. Hit by door of wagon	1. Loss of limb or life 2. Serious injury 3. Equipment damage	1. Do not operate if track is not aligned 2. No one to stand in tippler track or pit 3. Maintain clear walkway between cabin & track 4. Check TCP/SAC brake condition before start of operation
7. De-couple Wagon before tippler table	1. Slip & fall during locking of coupler 2. Press between wagon and side pad 3. Failure of TCP/SAC brake 4. Communi-cation gap 5. Constricted working space	Crush injury, fracture, fatality	1. De-coupling platform to be strong 2. Adequate illumination 3. Decouple wagon from outside tippler table 4. Push wagon gently 5. Ensure proper communication between de-coupler & tippler operator 6. Entry in tippler cabin shal be restricted to avoid disturbance to operators
8. Retract remaining wagons to designated position	Slip & fall during locking of coupler	Serious body injury	1. Never lock by leg, use hand only 2. Pulling back only after clearance from de-coupler 3. Lock the knuckle and fix the coupler
9. Get exit side checked before start of tippling	Caught by tippler table or tippler roller	Serious injury, loss of limb or life	1. Keep tippler operation handle in “Zero” position 2. Ensure no one on tippler table 3. Ensure no one in hopper area 4. Empty wagons at least 6 m away, put a safe limit board 5. Tippler’s motor drive coupling shall be properly guarded

10. Tipple the wagon	- do -	- do -	1. Same as above 2. Receive signal for tippling 3. Start tippling
11. Push the empty wagon by remaining train & TCP/SAC	Hit/struck by empty wagon	- do -	1. Ensure no one is on the track 2. "Do not cross track" board to be displayed 3. Inspect illumination at exi side 4. Skid to be provided over the hump to avoid rolling down
12. Pull back TCP/SAC to dead end after completion of tippling	Hit/struck by TCP/SAC	Serious injury	1. Ensure no one is on the TCP/SAC track 2. TCP/SAC to move only after receiving signal from de-coupler 3. Get the TCP/SAC checked at pit before empty collection
13. Empty collection	Hit/struck by wagon	1. Serious injury 1. Equipment damage	1. Switch "ON" indication light (point to be changed towards escape line for traffic) to start empty collection 2. Forbid work on tippler or TCP/SAC during empty collection till empty collection is over 3. No maintenance on tippler or TCP/SAC
14. Cleaning of jammed hopper/ grills/cradle pit	Fall	Serious injury	1. Pit area lighting shall be adequate 2. Tippler limit switch to be operated before entering pit area/hopper 3. Grills of hopper to be intact 4. All boulders/scraps to be removed from grill

4. HAZARD ANALYSIS

4.1 Hazard analysis of wagon tippling is as follows**.**

Sl. No.	Hazard	Cause	Activity	Risk	Risk Rating	Control Measures
1.	Run over	Pusher car	Starting/ Running/ Stopping the pusher Car	Serious injury	High risk	• Hooters to be blown • Existence of bell on each TCP/SAC to be ensured • Caution board to be displayed
2.	Run over	Wagon	During coupling and de-coupling of wagon	Serious injury	High risk	• Cut coupler when wagons are in steady condition • Indicating lights shall glow on both sides in pre & post tippling areas • Place wagons firmly on the track • Detach wagons by operating handles • Do not cross the tippler track when wagons are close to tippler • Push wagon inside tippler when tippler is in its zero position & firm • Use cross over bridge when crossing several tracks
3.	Run over	Wagon	Empty collection	Serious injury	High risk	• Point on pre-tippling side to be set on engine escape line • Hooters to be blown before pushing of empty wagons • Do not push empty wagons through tippler towards pre-tippling line

4.	Fall from height	Damaged railing & grate bars	During operation/ Maintenance/ Inspection	Serious injury	Moderate risk	• Keep railing in healthy condition • Keep grating of bunkers in sound condition
5.	Fall in tunnel	Missing/ Damaged cover	- do -	Serious injury	Moderate risk	• Check tunnel cover periodically
6.	Electrical	Charged line/loose wiring	- do -	Serious injury	Substantial risk	• Take electrical shutdown • Check periodically all electrical points • Check earthing of all equipment as per Indian Electricity Rules • Use rubber mats & PPE's
7.	Mechanical	Sudden rotation of tippler	During maintenance	Serious injury	High risk	• Check/tighten the brakes of tippler • Insert mechanical stopper in between rack and pinion • Fasten/support the tippler properly • Fix responsibility
8.	Slip & fall	Slippery conditions	During operation/ maintenance/ inspection	Injury	Moderate risk	• Cut bushes & grasses and keep the area clean • Keeps steps free from any material and keep railing & steps firm • Keep area properly illuminated • Keep floor clean

4.2 Hazards identified during job safety analysis have been rated and remedial measures have been identified for various activities like operation, maintenance, inspection and empty collection in the area including pusher car/ side arm changer and wagon tippler.

5. CHECKLIST

5.1 Empty Collection Checklist for Wagon Tippling is given below.

Sl. No.	Points	Yes	No
1.	Is the TCP/SAC placed at safe position during empty collection?		
2.	Have the loaded wagons of next lot been placed on load line at a safe distance away from fouling mark?		
3.	Have the fouling points been set towards escape line?		
4.	Is the tippler in “Zero” position?		
5.	Is a Traffic personnel available to collect token for removal of empty wagons from post tippling tracks?		
6.	Did he collect the token from the tippler operator and ensure tippler interlock with token?		
7.	Did the “Yellow” light signal glow as soon as the token is issued to permit entry of loco for empty collection?		
8.	Is the point of derailment switch set in entry point of loco near the signal post?		
9.	Did the loco horn blow intermittently during empty collection?		
10.	Is the collection over?		
11.	Is the token returned after empty collection?		
12.	Is it ensured that no wagon passes through the tippler from empty side to load side during empty collection?		
13.	Is the derailment switch made “OFF” after the empty collection is over?		
14.	Did the red light glow after empty collection?		