


<b>INTER PLANT STANDARD – STEEL INDUSTRY</b>		
 <b>IPSS</b>	<p align="center"><b>SAFETY STANDARD ON LOCO OPERATION IN STEEL INDUSTRY</b></p>	<p align="center"><b>IPSS: 1-11-033-17</b></p>
	<p align="center">Corresponding IS does not exist</p>	

## **0. FOREWORD**

0.1 This Inter Plant Standard prepared by Standards Committee on Safety appliances and Procedures, IPSS 1:11, with the active participation of the representatives of all the steel plants, consultants was adopted in January, 2017.

0.2 Objective of this Standard is to provide a safety guideline for operating Locos for train movement or Loco movement inside the plants of steel industries in India.

## **1.0 SCOPE**

1.1 To provide a safety guideline for operating locos for train and loco movements inside plants. This is applicable for all steel industries in India.

1.2 Overall responsibility for implementation of this standard lies with office In-charge of departments of loco operation. Implementation responsibility lies on concerned loco operators.

## **2.0 GENERAL SAFETY PRECAUTIONS**

Following precautions shall be taken during operation of a loco :

1. Use safety boots, helmets as a part of the dress. In rainy season and winter season come duly equipped for the situation.
2. Check for the presence of firm railings, stairs and couplers of the locomotive.
3. Check that the locomotive floor is clean. If it is oily, wipe with cotton or spray saw dust on it for absorption.
4. Ensure that the brakes, lights and horn are working properly.
5. Ensure that 2-4 scotch blocks are available on the loco and that the Shunting Porter (S/P) places scotch blocks under the wheels of the wagon, next to the loco, to prevent rolling of wagons and accidents.

6. Ensure the date of checking of the fire extinguishers inside the cabin.
7. At least three of the crew [1 loco operator & two shunting porters ] must be present in the locomotive at all times.
8. Maintain speed of train about 5-7 kmph & sudden braking must be avoided.
9. Loco to stop before level crossing, S/P will get down, caution the road traffic and signal the loco operator to move the loco. Auto drop gate to be provided where road traffic is more.
10. Operator must ensure that the S/P is in front of the train with signal flag / signal lamp/ Walkie-Talkie and is following the signals & keeps a sharp lookout for overhead traveling cranes.
11. Never start, or couple with, a loco or train suddenly. After getting clearance / signal, first blow a long horn as a warning and then gradually start the motion.
12. Shunting Porter will check that points are set properly in the desired direction of movement. Permissible gap in tongue rail on hand points is 5 mm max & for motorized points, it is 3 mm max.
13. Move loco carefully in fire / spark prone areas like BF, SMS and any other identified unit .
14. While driving, observe control panel and other equipment of the loco to ensure safety and to avoid accidents / delays.
15. Be well conversant with the wagon handling capacity of loco.
16. If the loco fails on a gradient, immediately stop by braking and put adequate scotch blocks for blocking the wheels of loco and train. (Block at least 4 wagons)
17. Handle walkie-talkie with care as sometimes it is the only mode of communication.
18. Avoid using mobiles during critical movement of loco.
19. When approaching any point keep a sharp look out for another train coming from its loop line and moving in the same direction to avoid side collision.
20. In case of fire use the fire extinguisher available on the loco, if not adequate, inform fire services giving your exact location.
21. Never allow unknown persons on the locomotive.
22. Shunting Porter to be positioned at both end of the locomotive (front side) in movement direction.
23. Shunting Porter to wear retro – reflective Jackets for easy identification.
24. Retro-reflective strips to be provided in loco body.
25. Shunting Porter should not move between couplers.

26. Shunting Porter to be given the "On the job training"
27. To prevent rolling, tracks or rack should in over break condition 5 to 7 wagons from loco end.
28. Shop floor must be cleaned and free from oily substances.
29. One S/P on front side, second S/P at rear side of locomotive to be present during operation.
30. In case of Track Maintenance :
  - Take written permission of CA from respective departments to block the rail track within their battery limit.
  - Permit to work on rail track memo to be given to shop in-charge who in-turn intimate concerned personnel.
  - Written block memo for the track to be given to Y/M.
  - Display red banner flag 30 – 50 mtrs away on both ends of working areas of the track.

### **3.0 PRE-START CHECKS FOR LOCO OPERATOR**

- 3.1 Visually check the presence and fitness of various critical loco parts mentioned below before boarding the loco.
- 3.2 At the loco end check Buffers with their holding bolts, Train brake hose pipes (Both air and vacuum), valve, Universal couplings with washer, dummy carriers, Centre buffing coupler (with all its components), railings and footsteps.
- 3.3 At the sides of the loco check Brake cylinder, its holding bolts, brake linkage, brake adjusting screw, brake shoe, axle box cover, Equalizer bar, saddle, coil springs, side bearer, condensate drainage valve, safety valve on the main air reservoir, traction motor cable holding clamps, side bearer, Bogie hose and its valve, J-Filter, C-2 valve, Gear Box cover with its bolts.
- 3.4 Loco operator should check the loco as per the checklist of SOP.

### **4.0 STARTING OF ENGINE**

Operation shall be checked as per Standard Operating Practices (SOP) of respective plant.

### **5.0 PROCEDURE TO START THE ENGINE**

Operation shall be checked as per Standard Operating Practices (SOP) of respective plant

**6.0 FORWARD MOVEMENT OF LOCO:**

**(Hauling Capacity of Locos given at the end)**

- 6.1 Ensure both sides of the loco (Operator and attendant) are clear and blow a long horn.
- 6.2 Set the reverser in the direction of movement, push the brake lever to release the brake and after the brake piston goes into the cylinder (Brake pressure zero) set the throttle to a higher notch. (In GE loco the engine picks up speed as the throttle is opened but in WDS-6 loco the engine takes 10 – 20 seconds to start picking up speed).
- 6.3 When making the first movement in the shift, after the loco comes into motion, check the brakes by putting the throttle to zero and pulling the brake lever.

**7.0 COUPLING OF WAGONS:**

- 7.1 Stop the loco a little away from the wagon / loco and let the S/P go and set the coupler of the wagon.
- 7.2 After getting signal from the S/P, slowly inch the loco forward till the loco gently comes into contact with the wagon / loco.
- 7.3 Check by pulling a little, after getting signal from the S/P, that coupling is complete.
- 7.4 Direct the S/P to remove the Scotch block before proceeding.
- 7.5 Coupling Handle to be covered.

**8.0 DECOUPLING OF WAGONS:**

- 8.1 Stop the loco and make sure that the full train has come to a standstill within the fouling marks of the siding.
- 8.2 Shunting Porter should ensure that scotch blocks are placed tightly under the wheels of the wagon to be decoupled on the downward side on a gradient. (If gradient is not known, he should block wheels from both sides)
- 8.3 After getting signal from S/P, move loco backward slightly to bring the couplers together and then stop so that couplings are separated.
- 8.4 Move the loco away slightly and then stop to see that the detached train is stable.
- 8.5 After making sure that no rolling of the decoupled wagons takes place, proceed for the next program.

**9.0 SAFETY PRECAUTIONS FOR 7 & 8**

- 9.1 Both the S/P to be positioned at the Stop where coupling / decoupling is to be done.
- 9.2 One S/P will communicate with the loco operator and other S/P will do the coupling/ decoupling or either S/P is required to go to the other side of the wagon depending on the position of Loco Operator' cabin or line curve or any other obstacle.
- 9.3 More automatic light signal system may be explored between loco operator and S/P.
- 9.4 S/P will go under the coupler but not between the coupler with all PPEs.
- 9.5 S/P will ensure placement of scotch block on both sides of detached Wagon wheels at both ends for ensuring stability of detached wagons and to prevent accidental rolling towards lower gradient.
- 9.6 S/P will ensure removal of scotch block after coupling with Loco is done.

**10.0 MOVEMENT ON LEVEL CROSSINGS, BUSY AREA OR CURVED TRACK**

- 10.1 Ensure S/P in front of the loco / train with communication device and a signaling flag .
- 10.2 Keep speed of the loco around 5 kmph by bringing throttle to lower notch or by braking.
- 10.3 Blow horn to alert the staff in the vicinity of the tracks.
- 10.4 Stop the loco / train 8 – 10 feet from the level crossing and direct S/P to walk up to the road.
- 10.5 After the S/P has cautioned the road traffic by Red Flag / Red Light and when the level crossing is clear, slowly move forward, blowing horn.
- 10.6 Direct the S/P to get on the loco / wagon after the level crossing is cleared by the loco / first wagon.
- 10.7 In busy areas ensure presence of the S/P in front of the loco, move slowly and cautiously blowing horn to warn the staff working in the vicinity of the tracks.
- 10.8 On a curved track ensure S/P in front of Loco / Train with communication device, move forward slowly (Below 5 kmph), blow horn continuously till end of curve and keep a sharp lookout for any obstacle on the track or train coming on the same track from the other direction.

**11.0 MOVEMENTS INSIDE THE SHOPS: -**

- 11.1 Stop loco / train just outside covered shed and visually check clearance of the track. Inform the Shop I/C. Set clearance from upper side for empty loco and inform this to loco operator.
- 11.2 After getting signal from the S/P proceed with speed below 5 kmph & blowing horn. Watch out for overhead cranes.
- 11.3 Blow horn while entering inside the shop.
- 11.4 In pushing mode S/P will lead the wagons by walking inside the shop.
- 11.5 Possibility to be explored for putting red light blinker at the last wagon for making in conspicuous and distinctly visible.

**12.0 UNLOADING OF HOPPER WAGONS OVER BUNKERS: -**

- 12.1 Ensure that signal given by S/P through flag or signal lamp is visible. (In case of walkie-talkie, this is not needed.)
- 12.2 As per direction of the RM Charge man/Operative, the S/P must place the wagon over the specific bunker in such a way that the doors to be opened are just above the bunker.
- 12.3 Precautions to be taken for movement of S/P while going to open gates of the wagons over the platform.
- 12.4 Door closing of the wagons to be done at the empty side of bunker to prevent falling of materials in track area & also hitting persons working in close vicinity.

**13.0 STOPPING AND PARKING THE LOCO:**

- 13.1 Stop the loco at a safe, illuminated area clearing the adjacent track or road.
- 13.2 Put the switches / levers as follows:
  - Engine control switch - IDLE
  - Reverser - NEUTRAL (Central position)
  - Throttle - IDLE (Zero notch)
  - Loco brake - Applied
  - Light switches/Aux Breaker - OFF
- 13.3 Press the Engine Stop switch till the engine stops completely.

**SIGNALS FOR SHUNTING**

<b>A</b>	<b>Day time-Signal Flags</b>	a. Red Flag
		b. Green Flag
	<b>If Shunting Porter shows</b>	
	a. Green Flag	Loco to move towards signaling S/P
	b. Red Flag	Loco to stop
	c. Wave both flags (Red & Green) Slowly, above shoulder height	Slow coupling (Loco moving towards signaling Shunting Porter)
	d. Wave Green Flag towards SLO (Below waist level)	Loco to move away from signaling S/P
<b>B</b>	<b>Night Time-Signal Lamp</b>	a. Red Glass
		b. Green Glass
		c. Plain Glass (Yellow Flame)
	<b>If Shunting Porter shows</b>	
	a. Red Light	Loco to stop
	b. Green Light	Loco to move towards signaling S/P
	c. Yellow Light	Loco to move slowly away from signaling S/P
	(Slowly move up and down)	
d. Green Light	Move slowly towards signaling S/P	
e. Yellow Light (Steady)	Move away from signaling S/P	
<b>C</b>	<b>THREE LIGHT SIGNALS IN RRI SYSTEM AT OBBP &amp; HMC AREA:</b>	
	<b>NOTE: Follow the signal on the left side of the track.</b>	
	<b>ON TURN OUT</b>	
	a. Both lower lights glowing	Stop
	b. Upper light and one lower light (tilt is to the left)	Proceed (Left)
	c. Upper light and one lower light (tilt is to the right)	Proceed (Right)
	<b>ON STRAIGHT TRACK</b>	
a. Both lower lights glowing	Stop	
b. Upper light and one of the lower light	Proceed	

<b>D</b>	<b>SIGNALING WHILE CONNECTING TRAIN BRAKES</b>	
	a. Signaling for dropping vacuum for Train brake	S/P will give downward pressing movement with palm of right hand
	b. Signaling for developing / raising Vacuum for train brake	S/P will give upward pushing movement with palm of right hand.



<b><u>Wagon handling capacity of locos</u></b>				
<b>S. No</b>	<b>Location &amp; Type of Track</b>	<b>GE 80 T</b>	<b>GE 90 T</b>	<b>WDS – 6</b>
1	Level Track	10	10	36
2	Level track with sharp curves – reduced speed	10	10	30
3	Marshalling Yard - Straight track, 1:400 gradient	7	7	25
4	RM sidings – Level but jammed up to rail top	-	-	25
5	BF High line 1:80 gradient	-	-	7
6	SMS High line 1: 90 gradient	5 or 6 Charging bogies by 90 T loco		
7	SGP Pouring Line 1: 150 gradient	-	-	10
8	M/Yd to BNDM 1:400 to 1:250 gradient	-	-	20
9	BF / SMS Dumping (SSD) 1:200 gradient	5	6	10

**NOTE:**

- Each of the wagons i.e. (BOX, BOBS, FLAT, BOI and GONDOLA wagons) is assumed to have: Tare Weight = 25 T  
Carrying Capacity = 60 T  
Gross Weight = 85 T.
- For Charging Bogies; Tare Wt = 10T,  
Carrying Capacity = 20T,  
Net Weight = 30T
- Reduce the above capacities by 20 % on wet tracks or tracks covered by grass.

Increase the above capacities by 30 % when hauling Hard Coke. Bulk density of Hard Coke is less than 1 while that of other commodities like I/Ore L/Stone etc is around 2.5 or more. Since the Hard Coke carried in each wagon is less, the loco can haul more wagons.