

BHARAT HEAVY ELECTRICALS LIMITED, TIRUCHIRAPPALLI – 620014
LOGISTICS



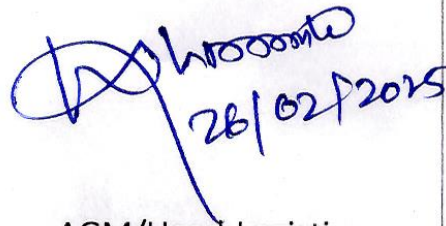
LOG:WI:018:REV:00
Dt:26.02.2025

Page 1 of 10

WORK INSTRUCTIONS FOR
SAFE LOADING AND LASHING OF
FINISHED GOODS (NON-PRESSURE PARTS)
AT LOGISTICS AND VENDOR LOCATIONS

RECORD OF REVISIONS

REV. NO:	DATE	DETAILS OF REVISION
00	26.02.2025	Initial issue

Prepared by	Reviewed by	Approved by
 ANU M PILLAI Sr. Engineer Logistics BHEL, Trichy - 620 014	 26.02.2025 B. KARTHICKEYAN Manager Logistics BHEL, Trichy - 620 014	 26/02/2025 V. SIVAKUMAR AGM/Head-Logistics

V. SIVAKUMAR
Addl. General Manager (Logistics)
Bharat Heavy Electricals Limited
Tiruchirappalli - 620 014.

1.0 SCOPE

This work Instruction details out the activities to be performed for safe loading and lashing of non-pressure parts at Logistics areas.

2.0 CATEGORIES OF NON-PRESSURE PARTS AND VEHICLES

- 2.1 Structural members such as Columns, Buck Stay Beams, Built-up Beams, Girders, Duct walls, Guide Vanes, Flow meters, Expansion Joints etc. are falling under non-pressure part category.
- 2.2 Vehicle categories are as given as below

Check the load capacity of the vehicle before stacking any materials to ensure that it can handle the weight and size of the materials.

SL	Veh. Cat.	Vehicle Type	Approximate Consignment Weight Range **	Basic Dimensions of the consignments L X W X H (in meters)		
				Length	Width	Height
1	T2A	Smalls & Part Load (LCV / Lorry Category)	Up to 5.5 MT	5.50	2.00	2.00
	T2B	Smalls & Part Load (Trailer Category)	Up to 5.5 MT	12.20	2.40	2.20
2	T3	LCV / Lorry / Trucks	Up to 9 MT	5.50	2.00	2.20
3	T4	Taurus / Multi Axle trucks	Up to 21 MT	6.50	2.20	2.20
4	T5	Mechanical Trailer Non ODC & ODC	Up to 41 MT	Non ODC: 12.20 ODC : > 12.20 to 15.00	Non ODC: 2.40 ODC: >2.40 to 4.00	Non ODC: 2.20 ODC: >2.20 to 3.00
5	T7	Mechanical Low Bed / Semi Low Bed Trailer	Up to 41 MT	12.20	>4.00 to 6.00	> 3.00 to 5.50
6	T8	Mechanical Long Bed Trailer	Up to 41 MT	>15.00 to 24.5	4.00	3.00
7	T9	Hydraulic Axles	> 41 MT	As per no. of axle	4.50	4.20

3.0 GENERAL LOADING AND LASHING INSTRUCTIONS

- 3.1 Items that are to be loaded in the vehicle are to be identified and segregated based on the weight and volume.
- 3.2 Items that are weighing less than 10Kg (or dimensions upto 1.5 metres (approx.), depending upon the nature of load) are to be bundled/packed in boxes/crated to make it convenient for handling, loading, transportation, and safe unloading at customer end.
- 3.3 **Selection of lifting tools and tackles** - Appropriate Lifting tools like chains, ropes, slings and belts, D-clamp/shackles and Tandem are to be made available for safe loading and unloading.
- While unloading, the unloading personnel should be able to lift the entire consignment in one single sling (using a higher capacity crane), or in multiples of 2 to 5 MTs loads. The packing woods shall have to be provided wherever necessary so that the consignments will be unloaded properly. Necessary gap shall have to be provided between the loose FGs/Bundles/wooden boxes/crates so that slings can be put without any difficulty.
- 3.4 **Packing wood and scantlings** - Appropriate wooden boxes, scantlings and curved blocks are to be made available for proper packing of materials.

- 3.5 **Stacking Order** - Plan the stacking order of the materials beforehand to ensure that they won't shift during transport. Place the heavier and larger items on the bottom, and the lighter and smaller items on top.
- 3.6 **Accessibility of materials** - Consider the order in which you'll need to unload the materials and stack them accordingly to make sure the materials you need first are easily accessible.
- 3.7 Loose items which are getting loaded must be incorporated with layer by layer lashing so that safe unloading at site shall be ensured. This will be done in such a way that if lashing of one set of FGs is removed for unloading, the other items which are lashed in the vehicle will stay intact and will not fall off the vehicle to the ground, thus maintaining safe unloading activity.

Sample photos are given below.

Loose Components loading (Mixed DUs)



Loose Components loading (Structural DUs)



Lashing with rubber pad

Wooden planks for stable stacking

Movement arresters

Loose Components loading (Ducts)



Lashing with rubber pad

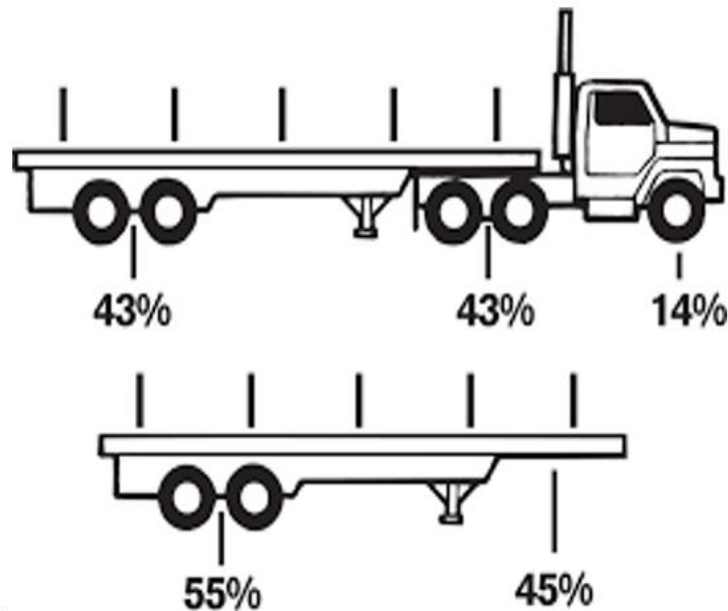
Movement arresters

Pipe loading



- 3.8 **Weight distribution-** Weight of the materials must be evenly distributed across the vehicle to prevent overloading on one side or end of the vehicle. This can cause stability issues during transportation, especially when turning or braking.

Fig-1



Enclosed Cargo Carriers (Lorry and Taurus)- An enclosed cargo carrier should be loaded with 60% of the cargo weight in the front half of the carrier, with the heaviest items loaded in the front. Lighter items should be placed near the top and in the rear of the carrier. Material should be packed closely and firmly, and tied down to secure it.

Open Trailers (40ft, 70ft and Low bed)- Open trailers should be loaded heavier in the front of the box – up to 60% of the cargo weight. Loading should be in the same manner as an enclosed cargo carrier, but small items should not be loaded above the height of the sides of trailer box. Use tie-downs to secure the cargo.

Fig-2

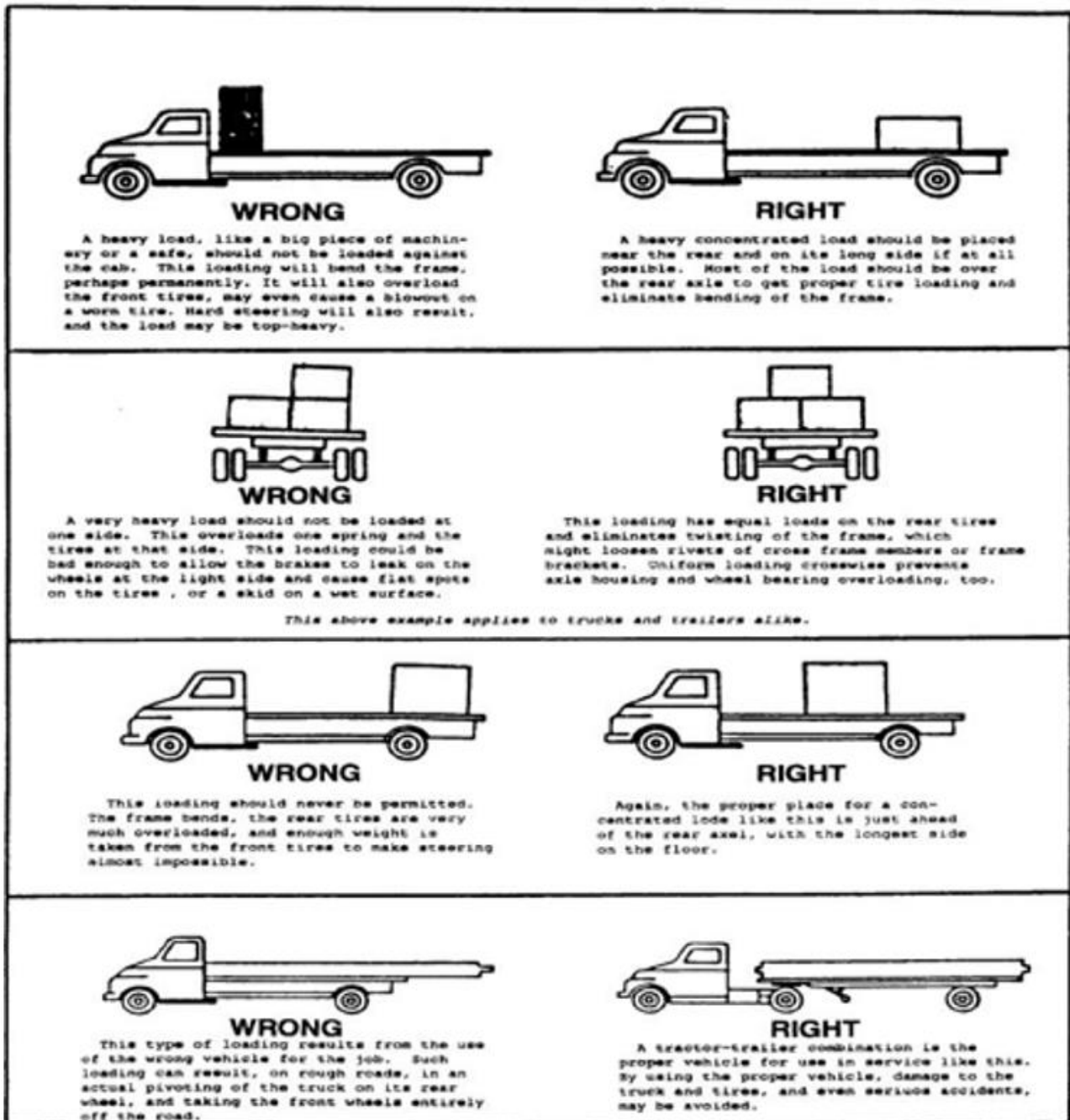
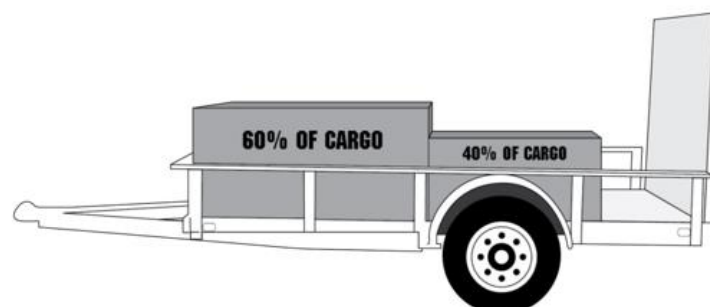




Fig-3 (Load distribution)



- 3.9 **Securing the materials-** Use ropes, straps, or tie-downs to secure the materials to the vehicle to prevent them from falling or shifting during transport. The purpose of Lashing is to arrest the freedom of movement (moving due to jerks, continual vibrations during shunting of wagons), in all the three directions and hold the component in position during transport by Rail or by Road.

4.0 SPECIFIC INSTRUCTIONS FOR LOADING OF DUCT WALLS

- 4.1 Segregation of ducts is to be done based on the volume and weight.
- 4.2 Before loading, the duct walls which are available in stock are to be stacked in the working area in such a way that the maximum length duct walls are placed as the bottom most layer, and subsequently lesser dimension duct walls are stacked over them like pyramid shape.
- 4.3 Stacking of the duct walls in the trailer itself may be avoided to prevent unwanted happenings. It is recommended to stack the duct walls in the ground and then loaded as no. of lots in the trailer
- 4.4 Stacking of duct walls should be intact without swaying by proper stacking using suitable sizes of wooden planks. Refer Fig.4 & Fig.5 below.
- 4.5 Height of the duct wall loading should not go beyond 2 metres
- 4.6 Point loading should be avoided over any duct walls

Wrong stacking (Fig-4)	Correct stacking (Fig-5)
	

5.0 LASHING

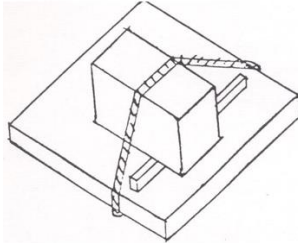
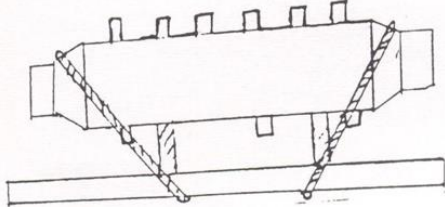
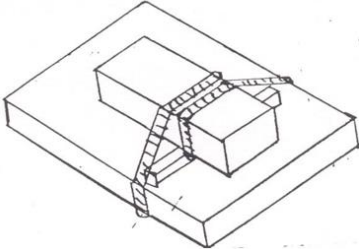
- 5.1 The Ropes and Chains used for Lashing shall be in good condition. The Lashing points shall be in such a way that it will not damage the component. The Lashing Rope/Chains shall come exactly in the support area. (Fig-6).
- 5.2 The cylindrical shaped Components like Headers, Pipes, etc., shall be placed on wedge shaped supports.
- 5.3 During lashing, direct contact between the Rope/Chain and Components shall be avoided by providing Rubber Pads and the lashing of crates to be checked before dispatch.
- 5.4 Rope tightening shall be ensured using turn buckles/ "u" clamps
- 5.5 Wooden Boxes and Crates loaded in Lorries are lashed preferably using Ropes only to ensure proper tightening
- 5.6 Wood shall be used for supporting the Components (because of the property to give good friction at the contact area)
- 5.7 Minimum two lashing shall be done for each Component/Consignment

- 5.8 All Steel Chains / Ropes shall be provided with non-metallic sleeves to avoid metal to metal contact
- 5.9 All side support Pipes shall be provided with Rubber Sleeves.

LASHING INSTRUCTIONS

Sl. No	Type of Product (Weight in MT)	Size of Wire Rope (in mm)	Size of Bulldog Clamp (in mm)	Size of Turn Buckle (in mm)	Type and number of Lashing
1	Structural 10 to 25MT	12	12	20	Press-3
	15 to 25 MT	16	16	20	Press -2 & Pull -2
2	Ducts Elbows 2 to 5 MT	12	12	20	Press-2
3	Duct Wall 10 to 15 MT	16	16	20	Press-2
4	Gates and Dampers 5 to 10 MT	12	12	20	Press-2

TYPE OF LASHING

Fig-6	
PRESS LASHING	
PULL LASHING	
BASKET / ½ HITCH LASHING	

- 6.0 **Proper packaging-** Ensure that the materials are packaged properly and securely to prevent them from shifting or falling during transport.
- 7.0 **Dunnage-** Use dunnage, such as foam, cardboard, or wood, to fill empty spaces between materials to prevent shifting and damage during transport.

- 8.0 Visibility-** Ensure that the driver has clear visibility through the mirrors and that the materials are not blocking any lights, number plates, or indicators.
- 9.0 Unloading Equipment-** Ensure that you have the right equipment, such as pallet jack, or forklift, Hydra, EOT, Gantry cranes, to unload the materials safely and efficiently.
- 10.0 Height of the load-** Ensure that the height of the load does not exceed the maximum height limit set by regulations. Over-height loads can be a safety hazard and may require additional permits and escorts.
- 11.0 Adequate Space-** Ensure that there is enough space in the vehicle to accommodate the materials without overcrowding. Overcrowding can cause the materials to shift and may make it difficult to unload them safely and efficiently.
- 12.0 Goose pipes & Wooden scantlings-** Wherever applicable, only nylon belts/rubber sleeved chains should be used for lashing and Goose pipes should be sleeved with rubber, to avoid metal to metal contact.

GOOD LOADING PRACTICES (Fig-7)

1. Proper Stacking of Materials

Ensure that materials are stacked securely and uniformly on the trailer. Heavier items should be placed at the bottom, and lighter materials should be stacked on top. Use tie-downs, straps, or other load-securing methods to prevent shifting during transportation and ensure that the materials are stable and balanced on the trailer. Conduct a thorough inspection of the stacked materials before transport to make sure there are no loose items or unstable stacking practices.

2. Provide Side Support up to Material Height

Provide side supports or barriers that extend to the full height of the material stack. These should be strong enough to contain and secure the load, preventing it from shifting or falling sideways. Ensure the side supports are adjustable or appropriately sized for different types of loads and are regularly checked for stability and wear.

3. Proper Packing and Clearance for Rigging:

Ensure that materials are packed in a way that allows for easy rigging and safe unloading. Provide enough clearance for slings and rigging equipment to be properly positioned and securely attached. Avoid blocking or obstructing areas where rigging needs to be positioned to ensure safe and efficient unloading. Consider using packaging materials (e.g., dunnage, padding) to create a stable base and prevent materials from shifting during transport, while also facilitating easier rigging during unloading.

By implementing these recommendations, the risk of slippage, instability, and accidents during the lifting and unloading of heavy and large-diameter pipes will be significantly reduced. Proper lugs, lifting beams, and correct loading orientation will ensure that the pipes are securely handled and that workers are protected during the process.

Structural loading with additional ratchet belt in each layer



Pipe loading with additional ratchet belt in each layer and wedged wooden supports



Curved blocks for packing

