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भारतीय मानक मसौदा

वैगन पुलर/पुशर की सामान्य अपेक्षाएं

(पहला पुनरीक्षण)

DRAFT Indian Standard

GENERAL REQUIREMENTS OF WAGON PULLER/PUSHER

(First Revision)

ICS 45.060.20

**Earth Moving Equipment and Material
Handling Sectional Committee, MED 07**

**Last date for receipt of comments
is 13 Jan 2023**

FOREWORD

(Formal clause to be added later)

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Earth Moving Equipment and Material Handling Sectional Committee had been approved by the Mechanical Engineering Division Council.

This standard may be used by the manufacturers and the purchasers for selection and use of wagon puller/pusher IS 10464 may serve as an adjunct to this standard. In this revision, the following major changes have been made:

- a) A reference clause **2** has been added mentioning the latest version of the referred standards;
- b) A clause **9.2** regarding BIS certification marking has been added; and
- c) Editorial changes have been done.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

DRAFT Indian Standard

GENERAL REQUIREMENTS OF WAGON PULLER/PUSHER

(First Revision)

1 SCOPE

1.1 This Indian standard covers general and safety requirements, field of application, types and limiting dimensions of the wagon pullers/pushers for hauling/spotting broad gauge top open railway wagons.

1.2 This standard is not applicable to hopper type wagons.

1.3 Wagons suitable only for mechanical handling shall be handled by the wagon pullers/pusher covered by this standard.

1.4 The maximum gross load of rake of wagons to be hauled by the wagon puller/pusher shall be limited to 2 000 tonnes.

2 REFERENCE

The standard listed below contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. The standard is subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standard listed below.

| <i>IS No.</i> | <i>Title</i> |
|---------------|---|
| 10464 : 1983 | Data sheet for selection of wagon puller/pusher |

3 TYPES OF WAGONS

3.1 Broad gauge wagons shall be classified on the basis of gross weight as follows:

| <i>Type</i> | <i>Gross Weight in Tonnes</i> |
|-------------|-----------------------------------|
| O | 32.5 |
| OZ | 40.6 |
| BOI | 81.3 |
| BOX | 81.3 |
| BOY | 91.4 |
| BOZ | 81.3 |
| BOXN | 81.3 |

3.2 Types of Wagon Puller/Pusher

3.2.1 *Continuous Wire Rope Type* — Wagons hauled by means of a winch driven wire rope looked to foremost wagons of the rake at the centre buffer coupler to be hauled. The wire rope forming a closed loop runs parallel to and outside both rails of the railway track.

3.2.2 Trolley Type — Wagons hauled by means of a winch driven trolley running over its own rail track inside the main rail track and having extending and retracting lever arms fitted with rollers. In extended condition, the rollers get engaged with rims of rearmost pair of the wheels of nearest wagon in the rake and propel these wheels resulting in the haulage.

4 LIMITING BOUNDARY DIMENSIONS

The limiting boundary dimensions of various types of railway wagons relevant to the wagon puller/pusher shall be in accordance with Fig. 1 of IS 10464.

5 BASIC DESIGN PARAMETERS/FEATURES

5.1 The wagon puller/pusher shall be designed for hauling a maximum gross load of 2 000 tonnes taking into consideration a loaded wagon with a maximum axle load of 22.5 tonnes.

5.2 For optimum utilization, wagons are placed on and removed from the placement location with the help of wagon puller of the continuous wire rope type. These machines operate either in between main rail tracks or by the side of rail track.

5.3 In order to avoid damage to the railway rolling stock and/or to the wagon puller/pusher, it is essential that the wagon puller/pusher is designed and installed in a manner that it does not interfere with the movement of rolling stock on the railway tracks.

6 FIELD OF APPLICATION

6.1 Continuous Wire Rope Type

- a) Rake of wagons required to be hauled in a particular zone of the rail track;
- b) Wagons to be spotted at a predetermined point; and
- c) Wagon loading installations.

6.2 Trolley Type

Wagons of trolley type to be hauled. Individual wagon to be spotted and empty wagon which in pushed out or can be objected by the equipment called 'ejector' by the next incoming loaded wagon.

7 GENERAL REQUIREMENTS

7.1 The design and construction of components of wagon puller/pusher coming in contact with any part of wagon shall be such that no damage whatsoever is caused to the wagon or any of its parts and/or infringes with the clearances specified by statutory or any other rules and regulations.

7.2 Rake of wagons shall be placed on the rail track within the reach of the inhaul trolley by means of a shunter/wagon hauler.

7.3 The inhaul trolley shall move towards the rake, shall go underneath the wagons and shall stop at such a place wherein its forward travel shall get engaged with the rearmost pair of wheels of the

wagon to be placed on the wagon tippler table. The rearmost pair of wheels of the wagon shall be placed at predetermined location.

7.4 After receiving the rake on the inhaul track, brakes of all the wagons shall be fully released before spotting is done. This is essential because braked wagons shall result in increased pulling force applied by the wagon puller/pusher and in such a case hauling trolley shall lift the pair of wheels engaged with the trolley rollers, thus lifting the wagon which may lead to derailment of the wagon or damage to the wagon puller/pusher.

7.5 Both manual and automatic modes of operation shall be provided in the control system of the wagon puller/pusher. Signalling system shall be provided to co-ordinate the operation between decoupling point and the operator's cabin of the complete wagon handling system.

7.6 Specified number of wagons shall be decoupled from the full rake and hauled to a predetermined point called 'decoupling point' where wagons are stopped and the forward most wagon shall be decoupled. After decoupling, a signal shall be given from the decoupling point to the operator's cabin of the control room for forward travel of the wagon puller/pusher. It shall haul one wagon and place it at a predetermined location, stop for few seconds and return back. On the return travel, the haulage trolley shall get engaged with rearmost pair of wheels of the next wagon to be spotted and cycle shall repeat.

7.7 Rotary limit switches shall be provided with the winch of the puller/pusher to limit forward and reverse travel of the trolley, to stop it at the decoupling point and to provide a pause to the trolley before it returns after placement of loaded wagon. Besides this, track limit switches shall also be provided as a back-up protection in regard to travel and over tension in the haulage rope.

7.8 In case of continuous rope type, the rake shall be hauled by means of a winch driven wire rope hooked to buffer coupler of the wagon in the rake. Alternatively, a dummy wagon with the necessary hooking arrangement may be coupled to the rake for hauling.

7.9 Control room for proper and safe operation of the hauler shall be installed near the winch house, the location of which shall depend on the travel of the wagon puller/pusher required.

7.10 Limit switches shall be provided for normal and safe operation of the puller. Arrangement shall be made for protecting the rope from over tension and back-up protection limit switches shall be provided.

8 SAFETY REQUIREMENTS

8.1 Construction Stage

8.1.1 The design of the wagon puller/pusher shall avoid, as far as possible, any heavy jerk to wagon being hauled.

8.1.2 The design shall ensure that no derailment and over-runs of wagons take place while being hauled.

8.1.3 Electrical interlocking shall be provided to prevent operation of loading/unloading device while the puller shall be spotting the wagon on the tippler and also the tippler cannot part with till the puller returns back to a predetermined safe distance away from it.

8.1.4 Sharp edges and corners in all working spaces shall be avoided.

8.1.5 Parts projecting into working spaces shall be as small as possible.

8.1.6 All the lubrication points used frequently shall be accessible without it being necessary to remove the guards.

8.1.7 The equipment shall be so designed that its maintenance and cleaning is facilitated.

8.2 Installation Stage

8.2.1 All the wagon puller/pusher installations shall be marked permanently and legibly in a clearly visible place with the following information:

- a) Maximum gross weight to be hauled;
- b) An instruction forbidding the wagon puller/pusher to be operated as long as brakes of wagons are not properly released; and
- c) Sick jammed wagons are to be taken out from the rake to the manual unloading point.

8.3 Utilization Stage

8.3.1 The inspection, adjustment, maintenance, cleaning and greasing of moving components shall be carried out regularly according to the manufacturer's instructions.

8.3.1.1 The operations specified in **8.3.1** shall not be undertaken when the wagon pullers/pushers are in motion.

8.3.2 No person, other than a qualified/trained person, so authorized, shall operate the wagon puller/pusher.

8.3.3 Normal and emergency stopping devices shall be made known to all authorized personnel and be easily accessible. All areas giving access to them shall be kept clear of obstacles. Their proper working shall be periodically checked.

9 MARKING

9.1 All the wagon pullers/pushers shall be marked permanently and legibly at a clearly visible place with the name of the manufacturer, serial number, the year of manufacture, type and capacity of the wagon puller/pusher.

9.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016*

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and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

10 INFORMATION REQUIRED FOR SELECTION OF WAGON PULLER/PUSHER

The information shall be provided by the purchaser in accordance with IS 10464 as this may help the manufacturer to supply a suitable wagon puller/pusher.