TRANSNET ENGINEERING

SPECIFICATION

SPECIFICATION FOR THE HANDLING AND TRANSPORTATION OF RAIL ROLLING STOCK WHEELS

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Document Availability	SAPDocman
Related Policy Documents	-
Supporting Procedure	BBC8782: Specification for heavy maintenance of wheelsets for tractive and trailing stock

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1.0 AMENDMENT RECORD

The following revisions have been made in this version:

Change	Description
10.1.1	When lifting wheelsets the prescribed lifting equipment are to be used: a) Diesel, electric, 5M2A, 5M2AR (and wagon and coach) wheelsets - see ***Drawing TWK13171*** or ***TWK16219*** and photo in Figure 1.
10.1.2	Wheelsets may only be transported with a fork lift if it has the approved forklift transportation cradle attached to it (see drawing TWK12229 for a 3ton forklift and TWK19377 for a 4 ton+ forklift and photo in Figures 4). However, the forklift transportation cradle is not suitable for traction wheelsets (diesel, electric, 5M2A, 5M2AR) -The prescribed lifting device as per par. 10.1.1 a) has to be used for these wheelsets.
10.2.3	Reclaimable and new wheel centres packed horizontally shall be stored under roof with no exposure to rain or moisture. For in-land areas where corrosion is not a major concern, wheels will be allowed to be stored outside in the vertical position for a maximum period of 3 months i.e. wheel standing on the rim flange and packed against each other. These wheels will be standing on a solid concrete, tar, steel or wooden floor.
10.2.4	Pallets of wheels will not be stacked on top of each other.
10.3.6	Axle storage racks and axle forklift transportation cradles shall be lined with rubber or wood to prevent metal to metal contact. The loading capacity of the racks and cradles shall not be exceeded.
11.3.1	The handling procedure as set out in this specification is applicable to all wheel plants, depots, stores and external customers.
11.3.2	Traction wheelsets are to be stored in a secure, safe, clean, dry and covered area in the Depot and stores where they will be fully protected and out of the way of being accidentally damaged. Carriage and wagon wheels with bearings fitted may be stored in the open.
11.3.3	Staggered parking of wheel sets are not allowed in-process or at any waiting or storage area, as axle or bearing damage can be caused (see Figure 9). Wheelsets must therefore be stored rim-to-rim on a rail or on square bar mounted on a concrete or tar floor.
11.3.4	Wheelsets staged on a rail or floor shall be secured with stoppers to prevent uncontrolled rolling of the wheelsets.
11.3.5	AP roller bearings fitted on wheels must be hand turned at least once in 3 months for all new or refurbished wheels in storage areas.

2.0 PURPOSE

2.1 The purpose of this specification is to ensure that wheelsets are handled, stored, packaged, preserved and transported to and from the Transnet Engineering wheel repair facilities, in such a manner as to ensure wheelsets reach their destination without any damage. This specification addresses the ISO 9001-2008 requirements with regard to handling, storage, packaging, preservation and delivery of wheelsets.

3.0 SCOPE

3.1 This specification is compiled to ensure that wheelsets will be handled and transported with the appropriate care and in a manner set out in this specification and agreed upon by the Supplier and the Wheelset and Materials Technology section of Transnet Freight Rail. The specification includes the lifting and handling of wheelsets at all destinations. The wheelsets relevant to this specification are:

- Carriage and wagon wheels - Wheels with AP roller bearings
  - Wheels with plane bearing journals
  - Mainline, luxury and trailer coach wheels

- Traction wheels - Motor coaches (5M2A- plane suspension bearings;
  - 5M2AR – Cannon box with roller suspension bearings)
  - Electric locomotives (U-tube with roller suspension bearings)
  - Diesel locomotives (plane suspension bearings)

4.0 ABBREVIATIONS AND DEFINITIONS

4.1 Abbreviations

BS	British Standard
ISO	International Standards Organisation
OEM	Original Equipment Manufacturer
COE	Centre of Excellence

4.2 Definitions

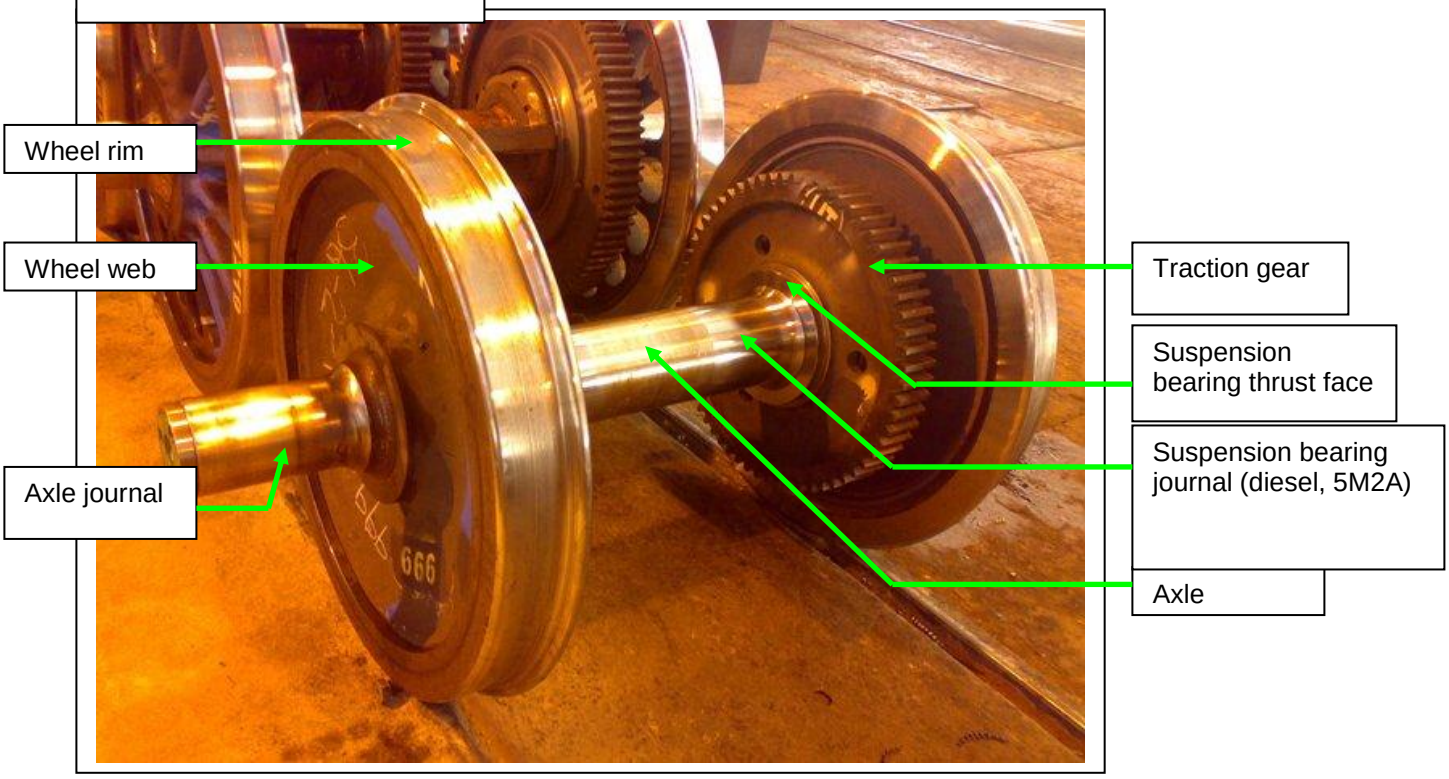
4.2.1	Wheelset and Materials Technology	This is the technology owner in Transnet Freight Rail who has been designated as the Specialist for wheelsets.
4.2.2	Centre of Excellence (COE)	Transnet Freight Rail approved Manufacturing or Refurbishing Facility. (Can be an OEM or a Transnet Engineering Workshop.)
4.2.3	Refurbish	Restore – Repair.
4.2.4	Supplier	Supplier manufacturing new wheelsets or Centre of Excellence repairing wheelsets.
4.2.5	Prescribed stands	These are stands as listed in this specification for which technical suitability and safety of the pre-production stands have been validated by Transnet Engineering-Product Development.
4.2.6	Wheelset	An assembled axle and two wheels – see wheelset terminology

below.

4.2.7 TRE Transnet Engineering

4.2.8 TFR Transnet Freight Rail

Wheelset terminology



5.0 REFERENCES

The reference documents listed below are referred to in this specification.

5.1	ISO 9001- 2008	Quality Management System
5.2	TRE Drawing: ***SR066C000***	Drawing design of 12m transportation cradle for flange to flange transportation of wheelsets in a 12m container.
5.3	TRE Drawing: ***TWK13658***	Drawing design of transportation cradle suitable for staggered loading for road and rail transport of wagon wheelsets.
5.4	TRE Drawing: ***TWK15428***	Drawing design of transportation cradle suitable for staggered loading for road and rail transport of F– type wagon wheelsets.
5.5	TRE Drawing: ***TWK14478***	Drawing design of transportation cradle suitable for staggered loading for road and rail transport of Locomotive wheelsets.
56	Transnet Engineering Drawing: ***CME 343/12-C99***	Drawing design of wagon transportation cradles suitable for rail transport of wheelsets
5.7	Transnet Engineering Drawing:	Approved lifting beam for the handling of wheelsets.

	TWK13171 to TWK13178	
5.8	Drawing: ***TWK12229***	Forklift transportation cradle
5.9	Drawing No ***CME 9076 D 000/B***	Double wheelset lifting device
5.10	Drawing No to be obtained from Config office	Wheelset lifting device
5.11	Drawing: ***MZ 0443-325***	Wheel centre lifting device – vertical clamping
5.12	Drawing No to be obtained from Config office	Wheel centre lifting device – horizontal clamping
5.13	Drawing: ***MZ 0443-315 & 317***	Axle (or wheelset) lifting device.

Note: Drawing numbers refer to the latest version.

6.0 REQUIREMENTS FOR AND MANAGEMENT OF PRESCRIBED TRANSPORTATION CRADLES

6.1 Mandatory requirements

With respect to the prescribed cradles the following mandatory requirements apply:

a) The prescribed cradles are those in the list of drawings of clause 5.0. These are the only cradles that have been approved and only these may be used.
b) Examples of wheelset and related component handling devices are listed in clause 5.0.
c) A Professional Mechanical Engineer must approve the mechanical design of all prescribed transportation cradles and lifting devices.
d) Only the specified wheel types as listed in the drawing of a particular transportation cradle may be transported.
e) All transportation cradles must comply with the dimensional and physical requirements as specified in the drawing applicable.
f) All cradles shall be fixed to the truck with a standard lock-pin system.
g) The wheelsets shall be fixed to the cradle as prescribed in the relevant drawing.
h) When a new transportation cradle is required it must be developed in consultation with the Transnet Freight Rail Technology Management (Wheelset and Materials Technology section). The transportation cradle may only be used once the Transnet Freight Rail Technology Management (Wheelset and Materials Technology section) has validated the technical suitability and safety of the pre-production transportation cradle.

6.2 Identification and marking of transportation cradles

6.2.1 As a minimum the following information must be stencilled on the base frame of the transportation cradle:

- The save working load.
- The Transnet Engineering Logo or the name TRANSNET ENGINEERING.

- The type of transportation cradle i.e. ‘locomotive’, ‘wagon’ or ‘F-type wagon’ wheels must be marked on the transportation cradle.

6.2.2 The colour of the stencilled characters must be white and the size of the characters must be not smaller than 40 mm. Stick-on labels are not permitted.

6.3 Control and management of transportation cradles

6.3.1 The transportation cradles are owned by the Transnet Engineering Auxiliary Business.

6.3.2 The Transnet Engineering Auxiliary Business will manage and keep record of the dispatch destinations of all transportation cradles under its control.

7.0 PACKAGING

7.1 The correct method of loading and securing of the wheels to the transport cradles are the responsibility of the dispatching depot.

7.2 In keeping with good environmental protection practices (ISO14000), good housekeeping and lean management, all gears on traction wheels must be wrapped in plastic when transported to the various Wheel Businesses. The wrapping will prevent crater from dripping from the gear until it goes through the wheel cleaning process and in so doing ensuring a cleaner and safer working environment.

8.0 DELIVERY

8.1 The delivery of the wheelsets shall be executed as set out in the relevant Contract or Order.

9.0 PROTECTION OF JOURNALS AND ELECTRIC MOTOR BRUSH CONTACT SURFACES

9.1 For protection, all axle journals (outside bearing and inside traction motor suspension plane bearings), bearing thrust faces, and electric motor brush contact surfaces must be coated under the following conditions:-

9.1.1 Within the day of disassembly of the wheelset.

9.1.2 In transport or storage

9.1.3 For reuse or return to COE

9.2 All journal surfaces and electric motor brush contact surfaces are to be coated with Ferron, Tectyl 506 or other approved coating. In the case of diesel and 5M2A wheels, the suspension bearing thrust faces and gear box seal surfaces on both sides of the gear must be coated.

9.3 Coated journals shall be cleaned not longer than 12 hours before commencing to inspect, test, machine and assemble them and kept under roof.

10.0 HANDLING SPECIFICATION

10.1 Wheelset handling

10.1.1 When lifting wheelsets the prescribed lifting equipment are to be used:

b) Diesel, electric, 5M2A, 5M2AR (and wagon and coach) wheelsets - see ***Drawing TWK13171*** or ***TWK16219*** and photo in Figure 1.

c) Wagon and coach wheelsets only - (photos in Figures 2 and 3, drawings to be obtained from Configuration management).

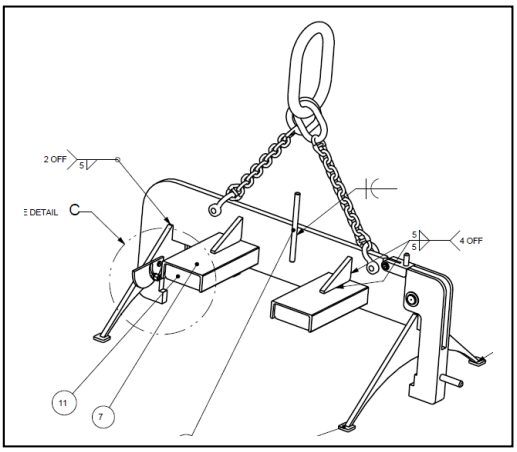


Figure 1: Wheelset lifting device as per drawing a) **TWK13171** and b) ***TWK16219***.

Figure 2: Double wheelset lifting device as per drawing.

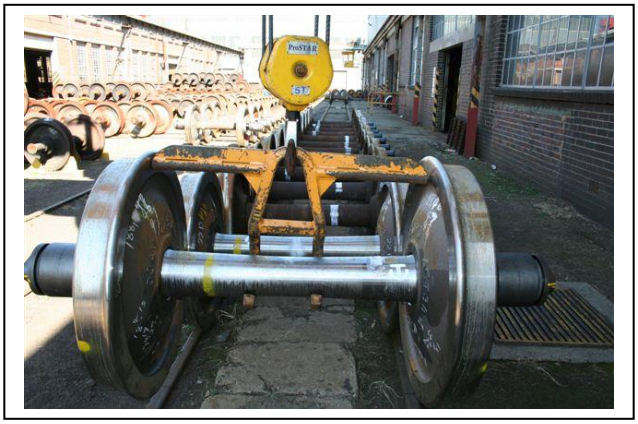


Figure 3: Wheelset lifting device as per drawing.

10.1.2 Wheelsets may only be transported with a fork lift if it has the approved forklift transportation cradle attached to it (see drawing TWK12229 for a 3ton forklift and TWK19377 for a 4 ton+ forklift and photo in Figures 4). However, the <u>forklift transportation cradle is not suitable for traction wheelsets (diesel, electric, 5M2A, 5M2AR</u>) -The prescribed lifting device as per par. 10.1.1 a) has to be used for these wheelsets.

Forklifts <u>may not</u> be used to push wheels on a track/rail line.

Figure 4: Forklift wheelset transportation rack as per drawing TWK12229 for a 3 ton forklift and TWK19377 for a 4 ton+ forklift.

10.1.3 For staggered loading of wheelsets for road and rail transport, the wheelsets shall be stacked in a manner whereby the flange does not come within 15 mm of the adjacent wheel axle, journal or bearing (see abstract from ***Drawing TWK13658 and photo of prohibited practice in figure 5)***. Loading of wheelsets onto trucks will only be allowed if the approved transport cradles in section 5 is secured to the truck.

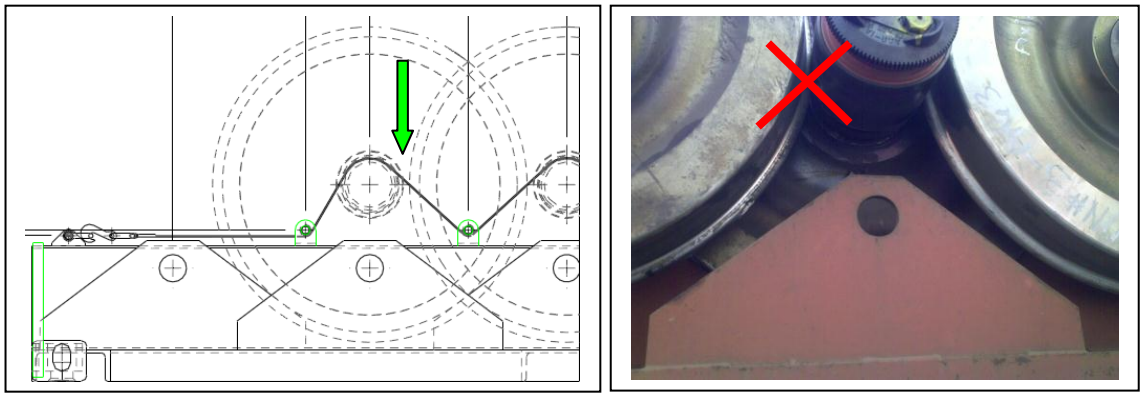


Figure 5: Staggered wheelset loading as per drawing TWK13658.

10.1.4 Wheelsets may be stacked flange to flange in a channel configuration <u>in a container</u> only when each wheel is individually secured to the channel stand with belts (see ***Drawing SR066C000***).

10.1.5 Wheelsets shall be placed carefully onto the road vehicle or rail wagon for transportation. Bumping of bearings or axle journals during loading is strictly prohibited. A loading assistant is required on the transportation vehicle to prevent wheel damage during loading and off-loading of wheelsets.

10.1.6 The wheelset transportation cradles shall be adequately secured to the road vehicle, rail wagon or container. No chains or cables shall be used for the securing.

10.1.7 Traction wheelsets shall be covered with tarpaulins when transported in inclement weather or if there is a risk that inclement weather may be encountered along the journey. This is to prevent moisture ingress in the suspension tube bearings and to prevent corrosion of the gear.

10.2 Wheel centre handling

10.2.1 Wheels centres shall be handled in such a manner that no damage are caused on the wheel web, finished rim or finished bore.

10.2.2 Examples of approved lifting devices for wheel centre handling are shown in Figures 6 and 7. Ensure that design load capacity of cables is not exceeded.

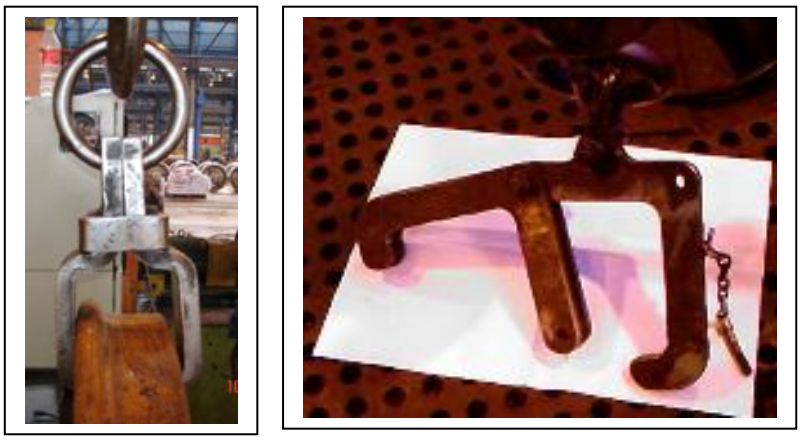


Figure 6: Wheel centre lifting devices – vertical clamping.

Figure 7: Wheel centre lifting devices – horizontal clamping.

10.2.3 Reclaimable and new wheel centres packed horizontally shall be stored under roof with no exposure to rain or moisture. For in-land areas where corrosion is not a major concern,

wheels will be allowed to be stored outside in the vertical position for a maximum period of 3 months i.e. wheel standing on the rim flange and packed against each other. These wheels will be standing on a solid concrete, tar, steel or wooden floor.

10.2.4 Pallets of wheels will not be stacked on top of each other.

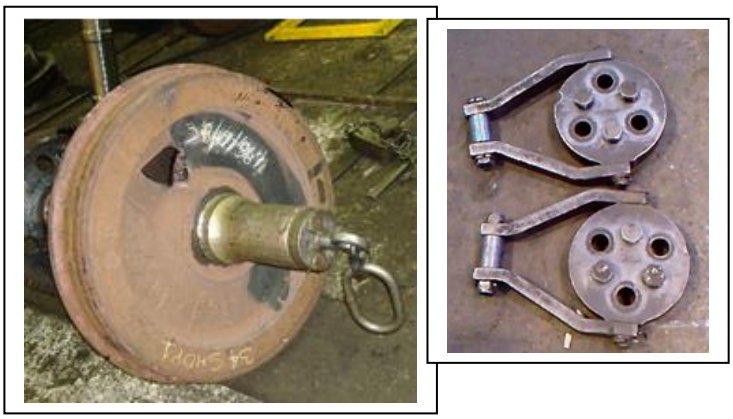
10.2.5 In areas where corrosion is a concern, corrosion of wheel centres shall be prevented by the application of an approved corrosion protection coating to exposed surfaces.

10.3 Axle handling

10.3.1 Axles shall be handled in such a manner that no damage is caused on the axle body, finished wheel seats or journal areas.

10.3.2 To avoid damage to axle journals and wheel seats, it is not allowed to transport more than one machined axle at a time with slings. An approved axle cradle will fit this purpose.

10.3.3 Examples of approved lifting devices for axle handling are shown in Figure 8. Ensure that design load capacity of cables or slings is not exceeded.



Axle (or wheelset) lifting device.

Cable covered with rubber lining to prevent journal damage, or dolly sleeve must be placed over the journal before lifting with a bare cable.

Nylon sling

Figure 8: Axle lifting devices. Ensure that design load capacity of cables and slings is not exceeded.

10.3.4 Corrosion of axle journals shall be prevented by the application of an approved protective coating.

10.3.5 Transportation of axles by road shall be done in an approved axle cradle to prevent any damage to the axle body and journals. The axle cradle shall be firmly secured to the truck floor to prevent shifting of the cradles and possible axle damage.

10.3.6 Axle storage racks and axle forklift transportation cradles shall be lined with rubber or wood to prevent metal to metal contact. The loading capacity of the racks and cradles shall not be exceeded.

11.0 DEPOT RESPONSIBILITY

11.1 Receiving at Depot

11.1.1 Ensure that wheelsets are carefully offloaded from the transportation cradles and loaded onto the transportation cradle and that wheels requiring refurbishing are sent back to the Centres of Excellence without any delay. Wheels may not be packed on any wagon or truck without the approved transportation cradles, when being transported to and from the Centre of Excellence.

11.1.2 A handling assistant is required during the loading and offloading process to avoid any damage to the axles and bearings.

11.2 Trained Personnel

11.2.1 Only personnel who have been specially trained and certified to work on wheelsets are permitted to handle the loading and offloading of wheelsets.

11.3 Storage at Depots and Stores

11.3.1 The handling procedure as set out in this specification is applicable to all wheel plants, depots, stores and external customers.

11.3.2 Traction wheelsets are to be stored in a secure, safe, clean, dry and covered area in the Depot and stores where they will be fully protected and out of the way of being accidentally damaged. Carriage and wagon wheels with bearings fitted may be stored in the open.

11.3.3 Staggered parking of wheel sets are not allowed in-process or at any waiting or storage area, as axle or bearing damage can be caused (see Figure 9). Wheelsets must therefore be stored rim-to-rim on a rail or on square bar mounted on a concrete or tar floor.

11.3.4 Wheelsets staged on a rail or floor shall be secured with stoppers to prevent uncontrolled rolling of the wheelsets.

11.3.5 AP roller bearings fitted on wheels must be hand turned at least once in 3 months for all new or refurbished wheels in storage areas.

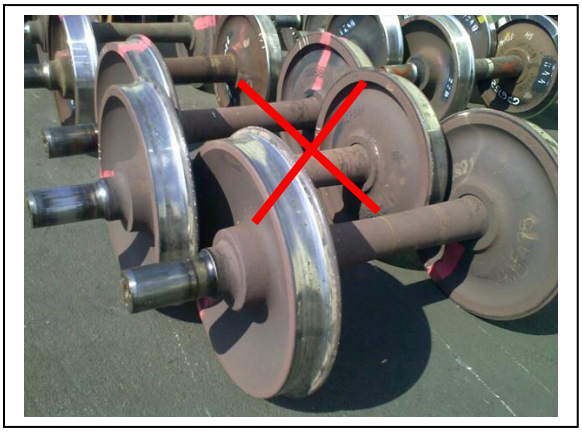


Figure 9: Staggered parking of wheel sets – prohibited practice

12.0 RETURN OF DAMAGED WHEELSETS

12.1 Damaged wheelsets returned from Depots, Scrapping sites, etc. must be returned for repair on the prescribed transportation cradles. Damaged wheelsets that cannot fit into the transportation cradles due to excessive damage may be sent for repair separately without being placed in a transportation cradle. These wheelsets must be properly stacked in a safe manner. Empty stands are to be returned to the Centre of Excellence as soon as possible.

12.2 Wheels reclaimed from derailed rolling stock must be clearly marked “DERAILED” in 50mm white stencilling on the axle.

12.3 Damaged wheelsets sent in for repair must be handled in such a way that further damage is prevented. Damaged wheelsets must not be piled in a stack.

END

DOCUMENT AUTHORITIES

RESPONSIBLE PERSON & COMPILER: **SIGNATURE:**	**Mr. R.F Kotze** Principal Engineer Product Development –Wheels Transnet Engineering  ……
APPROVED BY: **SIGNATURE:**	**Mr. J. Bonga** Acting Principal Engineer VIT Wheelset and Material Technology Transnet freight rail  …… ……