उत्तर रेलवे
NORTHERN RAILWAY
विद्युत विभाग
ELECTRICAL DEPARTMENT

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No:230-Elect./TRS/92/2/5 Dated: 19.02.16

Chief Electrical Loco Engineer

- Central Railway , Mumbai CST-400001
- North Central Railway, Allahabad-211001.
- Eastern Railway , Fairlie Place, Kolkata-700001.
- East Central Railway, Hazipur-844101
- East Coast Railway, Chandrashekharpur , Bhubaneshwar-751016.
- Southern Railway , ParkTown , Chennai-600003.
- South Central Railway , Secunderabad -500371.
- South Eastern Railway , Garden Reach , Kolkata-700043.
- South East Central Railway , Bilashpur-495004.
- Western Railway , Churchgate , Mumbai-400020.
- West Central Railway , Jabalpur-482001.

Sub: Lifting of axle of WAG9/WAP7 & WAP5 locos.
Ref: (i) RDSO TC no ELRS/TC/0090 (Rev.'0') dated 13.02.2006.
(ii) Rly Board letter no -2006/Elect (TRS)/440/7 (3-phase) dated 17.08.12

Three phase locos are running over Indian Railways hauling a number of Prestigious Mail/Express trains. In the event of wheel set getting locked due to failure of Bearings of Axle Box /Gear Case /MSU & Traction Motor, the axle need to be lifted for loco movement to the nearest shed. In this connection , RDSO has issued a technical circular no ELRS/TC/0090(Rev 0) dated 13.02.06 for procedure of movement of WAG9 / WAP7 and WAP5 locomotives for clearing blocked section by floating / lifting the locked axle in the event of axle getting locked on line, copy is enclosed for ready reference please. The experience of such cases on Northern Railway is given below:

1. In case hot axle (abnormal temperature)/ high TM Temperature is reported, attempt is made to clear the block section and the loco to be placed in loop line/ siding at the earliest before the affected axle become totally locked/jam.

2. In case of axle getting locked, lifting of middle axle is done with the help of links between axle box cover and bogie frame.

3. For lifting of end axle of WAP-7, WAG-9 & any axle of WAP-5, wheel set trolley is used.

4. On Northern Railway, wheel set trolley and the equipment have been made part of ART based at DLI, FZR & MB as per Rly Board's instructions above at reference (ii).

5. Proper training to the shed staff as well as ART staff has been imparted for this purpose.

6. Further, there have been few cases where in, axle got locked in the block section. In order to reduce the disruption to the traffic, the block section was cleared by lubricating the wheel tread and rail track continuously with the help of grease and the loco is moved at slow speed so as to clear the block section. This operation is carried out with utmost precaution and at dead slow speed under the supervision of officer / competent supervisor.

7. Movement of locked axle is generally avoided on points and crossings.

8. For lifting the bogie frame and locked axle, Hydraulic Jack of capacity 30 ton and 50 ton respectively have been used.

It is being circulated for kind information and action in case of need arises.

19.2.16.

(R.K. Saxena)
Chief Electrical Loco Engineer

Copy to:

1. EDEE/RS/Rly Board- for kind information please.
2. Sr. DEE/TRS/GZB & LDH }
3. Sr. DEE/RSO/NDLS } For information & necessary
4. Sr.DEE/TRD/MB,LKO,FZR & UMB } action please on the above lines.
5. DEE/TRS/SRE }

टेलैक्स : 0535-2424 RDSO-IN
फैक्स : 91-0522-458500
तार : 'रेलमानक' लखनऊ
Telegram : 'RAILMANAK', Lucknow
टेलीफोन/Tele : 451200 (PBX)
450115 (DID)

सत्यमेव जयते

भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226 011
Government of India-Ministry of Railways
Research Designs & Standards Organisation
LUCKNOW - 226 011

No. EL/3.1.35/2 Date: 13.02.2006

Chief Electrical Engineers,

1. Central Railway, Chhatrapati Shivaji Terminus, Mumbai-400001.
2. Eastern Railway, Fairlie Place, Kolkata-700001.
3. Northern Railway, Baroda House, New Delhi-110001.
4. Southern Railway, Park Town, Chennai-600003.
5. South Central Railway, Rail Nilayam, Secunderabad-500071.
6. South Eastern Railway, Garden Reach, Kolkata-700043.
7. Western Railway, Churchgate, Mumbai-400020.
8. East Coast Railway, Chandrashekharpur, Bhubaneshwar-751023
9. North Central Railway, Hasting Road, Allahabad-211001.
10. East Central Railway, Hajipur-844101.
11. South Western Railway, Hubli-580023.
12. West Central Railway, Jabalpur-482001.
13. South East Central Railway, Bilaspur-495004.

Technical Circular No. ELRS/TC/0090 (Rev.'0').

Sub: Procedure for movement of WAG9 / WAP7 and WAP5 locomotives for clearing blocked section by floating / lifting the locked axle in the event of axle getting locked on line.

There are instances when locomotive axle gets locked in the mid section thus blocking the Railway traffic movement on the affected section. Under such eventuality, it becomes the top priority to move the locomotive to the nearest station and restore the traffic.

This technical circular states the procedure for movement of WAG9 / WAP7 and WAP5 locomotives in the event of axle getting locked for clearing the blocked section while observing the extant norms / instructions in vogue from Railway Board vide letter no. 2001/M(L)/466/2305 dated 22.08.2003 and various concerned departments to maintain safe movement of the locomotive.

For lifting the end axles of WAG9 / WAP7 and any axle of WAP5, Wheel Set Trolley as per RDSO Drawing Nos. SK.VL-215 to 218 will be required. Earlier, RDSO drg. Nos. SKVL 129 - 132 were issued for use on WAP5 only. Whereas RDSO Drawing Nos. SK.VL-215 to 218 are suitable for WAG9 / WAP7 as well as WAP5.

Annexure "A" describes the procedure for WAG9/WAP7 locomotive. Annexure "B" describes the procedure for WAP5 locomotive

Encl: Annexure "A" with 05 sketches
Annexure "B" with 02 sketches

(N.K.Sinha)
For Director General (Elect.)

Copy to:-

Secretary/Elect.Engg.(RS), Railway Board, Rail Bhawan, New Delhi-110 001

(N.K.Sinha)
For Director General (Elect.)

ANNEXURE "A"

Procedure for Movement of WAG9 / WAP7 Locomotives by Lifting / Floating the Locked Axle in the Event of Axle Getting Locked on Line.

The schematic Arrangement of bogie of WAG9 / WAP7 locomotive is shown in Sketch 1. An axle of the locomotive may get locked under the following circumstances:

- Traction Motor Roller Bearing seizure.
- Traction Motor Suspension Bearing seizure.
- Axle Box Roller Bearing seizure.

While it may be possible to free the Traction Motor from the axle in case of Traction motor bearing seizure, the other cases require floating / lifting of the affected wheel for movement of the locomotive. Floating / lifting of the affected wheel may become necessary in case of wheel flats & heavy skidding of wheels also.

1.0 Procedure when Traction Motor Roller Bearing gets Seized

In case of traction motor roller bearing seizure, the pinion of the affected motor should be removed and all the traction motors of the affected bogie should be electrically isolated. The locomotive should be worked as light engine on its own power to the nearest Electric Locomotive Shed for attention.

However, where removal of the pinion is not possible due to any reason, the locked axle should be floated following the procedure given at Para 2.0 below for clearing the section.

2.0 Procedure for Floating / Lifting the Locked Axle:

In case when Axle gets locked due to Axle Roller Bearing Seizure, Traction Motor Suspension Bearing Seizure, Wheel Flat or Heavy Skidding of Wheels, the affected axle should be floated/lifted (depending on the axle number) after electrically isolating all the motors of affected bogie. The locomotive should be worked as a light engine on its own power with a maximum restricted speed of 25 km/h under escort by maintenance staff. In such case, a close watch is necessary while passing over curves and turnouts.

2.1 Items required for Lifting of Axle

The following items are required for lifting the locked axle:

i. Two hydraulic jacks having minimum capacity of 15 tonnes each.

ii. The distance pieces i.e. "wooden blocks" to raise the hydraulic jacks, if required, to compensate the gap between the jack & axle box / bogie frame.

iii. Two numbers of steel plates of size 300mm x 300mm x 30mm, which may be required for making the foundation firm and leveled for jacks.

iv. Wooden wedges (at least 6 nos.) for application at the wheels for preventing rolling of locomotive while applying jacks.

v. Resilient Block of thermoplastic polyurethane elastomer material (04 Nos.) as per the material, dimension and design conforming to Sketch 2.

vi. Wheel Set Trolley to RDSO Drawing Nos. SK.VL-215 to 218 (When end axle i.e. Axle No. 1, 3, 4 or 6 is locked)

vii. Short link as per the material, dimension and design conforming to Sketch 3 (02 Nos. each) (When Middle Axle i.e. Axle No. 2 or 5 is locked).

viii. Toolbox with appropriate tools, Nuts, Bolts, Washers and Wrenches / Spanners.

2.2 Precautions to be taken

Before attempting the lifting of locked axle of the locomotive, the steps given below should strictly be followed to avoid damage to equipment or any mishap:

i. Apply wooden wedges at wheels to prevent rolling of locomotive.

ii. Release all TBUs (brakes) of the affected bogie, which requires lifting.

iii. Before application of jacks for lifting, ensure that the ground below the lifting jacks is firm and leveled. Due care must be taken to avoid slipping of the jacks.

iv. Isolate all the traction motors of the affected bogie.

v. Remove all primary vertical dampers of the affected bogie to avoid their damage.

vi. Remove links between axle box and bogie frame from middle axle of the affected bogie.

2.3 When One of the End Axles (i.e Axle Nos. 1, 3, 4 or 6) gets Locked

i. Dismantle the slack adjuster of the locked end axle wheels.

ii. Clamp the vertical brake hanger levers of locked axle at appropriate place with the bogie frame to prevent fouling of these levers with the wheel set trolley during movement.

iii. Dismantle the sand box pipes. Remove footsteps, if required.

iv. Remove the vertical dampers between the bogie frame and axle boxes of locked end axle of the affected bogie.

v. Lift frame of the affected bogie from the end at the other side of the locked axle (eg. from the end near Axle No. 3 if Axle No.1 is locked) to obtain a clearance of 75 to 80 mm between axle box top and bottom of the bogie frame at both sides by simultaneously applying two jacks of minimum 15t capacity each below the axle guide bracket / bogie end beam.

vi. Place the Resilient Block between axle box top and bottom of the bogie frame at both the sides and release the jacks.

vii. Now lift the locked end axle of the affected bogie simultaneously from both sides by applying two jacks of minimum 15t capacity each under the bogie end beam / axle guide bracket. The bogie frame should be lifted to obtain sufficient clearance between axle box top and bottom of the bogie frame at middle axle.

viii. Place the Resilient Block between axle box top and bottom of the bogie frame at both the sides at middle axle location and release the jacks.

ix. While releasing the jacks, it must be ensured that the springs are properly seated.

x. Now, lift the locked end axle by 55 to 60 mm by simultaneously applying two jacks of minimum 15t capacity each below the axle box housings at both sides.

xi. Assemble the wheel set trolley below the locked end axle over the track in such a way that the wheels of locked axle rest over the supporting rollers. Refer Procedure given below for Assembly of Wheel Set Trolley.

xii. Sketch 4 shows the locations of the application of jacks for lifting and arrangement of wheel set trolley under the affected end axle.

xiii. Release the jacks from both sides of the locked end axle ensuring that the locomotive wheels of the locked axle rest properly on the rollers of the wheel set trolley.

xiv. Remove the wooden wedges placed at wheels of the locomotive.

xv. Locomotive with effected wheel set placed on the wheel set trolley can now be moved dead at a restricted speed not exceeding 25 km/h to clear the blocked section.

2.3.1 Procedure For Assembly Of Wheel Set Trolley

i. The locked wheel set has to be lifted up approximately by 55 mm to 60 mm.

ii. Push both the Inner Longitudinal Frames (Item No. 1 of Drg. No. SK.VL-215) of trolley under the locomotive.

iii. Place both the Steel Tubes (Item no. 32 of Drg. No. SK.VL-218) in position.

iv. Lift up the frame along with the steel tubes, push in and fasten the running Wheel Arrangements (Item no.3 of Drg. No. SK.VL-215), Supporting Roller Arrangements (Item No. 4 of Drg. No. SK.VL-215) with keys and bolts.

v. Push the outer Longitudinal Frames (Item No. 2 of Drg. No. SK.VL-215) of the trolley under the locomotive; lift the frame, push in Outer Steel Tubes / Sleeves (Item no. 33 of Drg. No. SK.VL-218) and fasten the frames with keys and nuts.

vi. To facilitate easy assembly of wheel set trolley, suitable markings as shown in the drawing must be provided to identify the matching parts.

vii. Lower the locked wheel set of the locomotive gradually on the supporting rollers.

viii. After lowering the wheels on trolley, it is essential to ensure that the wheel flanges of the lifted wheel set are sufficiently clear from the rails, to avoid hitting / infringement during movement of the locomotive.

2.4 When Middle Axle (i.e. Axle No. 2 or 5) gets Locked

i. Lift the bogie frame of the affected bogie from one end by applying two jacks of minimum 15t capacity each simultaneously at both sides (RHS & LHS) below the axle guide bracket / bogie end beam to obtain a clearance of 105 to 110 mm between axle box top and bottom of the bogie frame.

ii. Place the Resilient Block at the top of axle box in centre position at both the sides (RHS & LHS) of this end axle and release the jacks gradually till the bogie frame rests on the resilient blocks. While releasing the jacks it must be ensured that the springs are properly seated.

iii. Now lift the bogie frame of the affected bogie from the other end axle from both the sides (RHS & LHS) simultaneously by applying two jacks of minimum 15t capacity each under the bogie end beam / axle guide bracket to obtain a clearance of 105 to 110 mm between axle box top and bottom of the bogie frame at this end.

iv. Place the Resilient Block at the top of axle box in centre position at both the sides (RHS & LHS) of this end axle and release the jacks gradually till the bogie frame rests on the resilient blocks. While releasing the jacks it must be ensured that the springs are properly seated.

v. Now, lift the locked middle axle simultaneously by applying two jacks of minimum 15t capacity each below the axle box housings at both sides (RHS & LHS).

vi. Mount short links between axle box cover and bogie frame at both sides (RHS & LHS) as shown in Sketch 5 using existing pins of middle axle links.

vii. It can be seen that the wheel flanges of the affected axle are lifted approximately by 40 to 45 mm from rail level.

viii. Remove wooden wedges placed at wheels of the locomotive.

ix. The locomotive with effected wheel set lifted can now be moved on its own power at a restricted speed not exceeding 25 km/h to clear the blocked section after isolating all the motors of the affected bogie.

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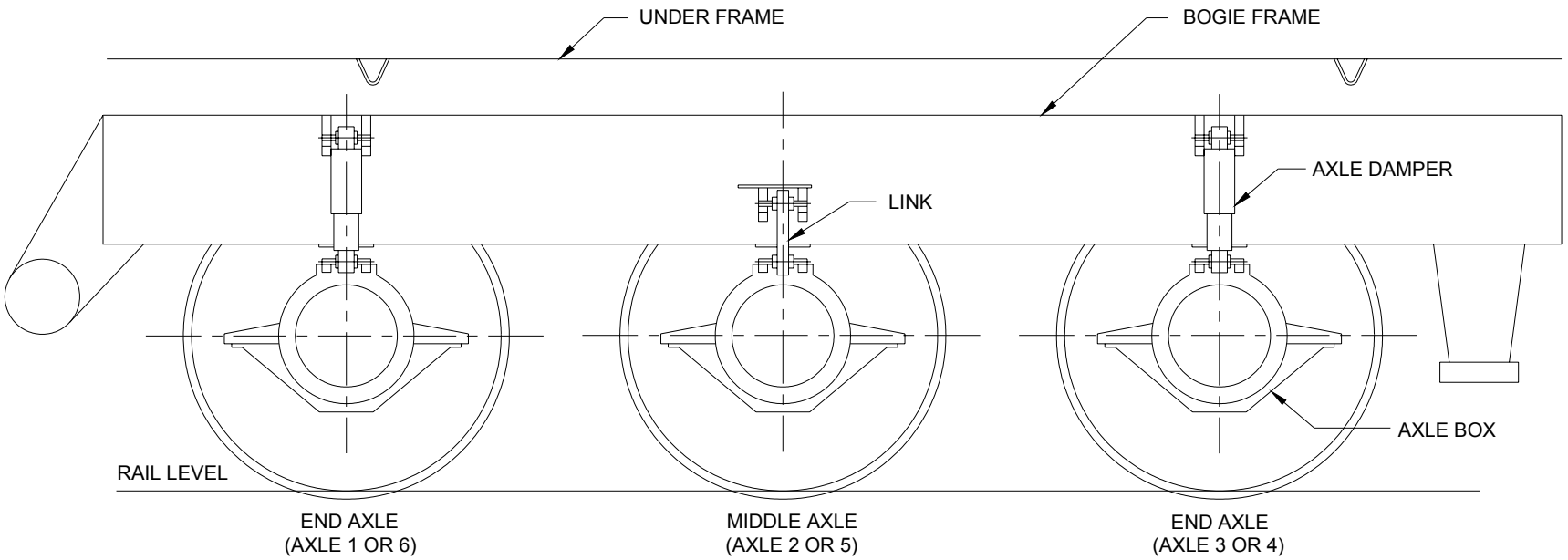
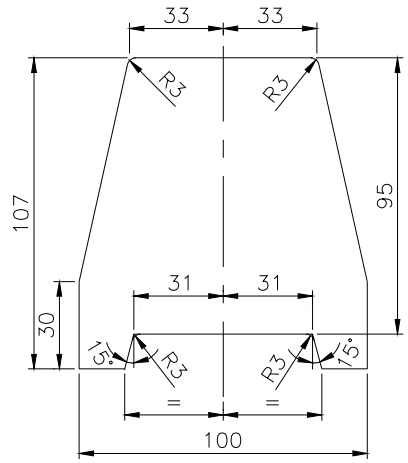
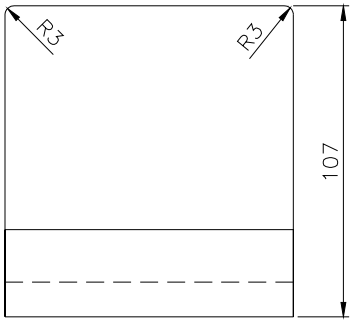
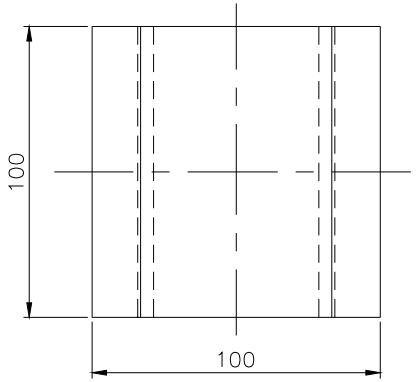


Sketch 1

Schematic Bogie Arrangement







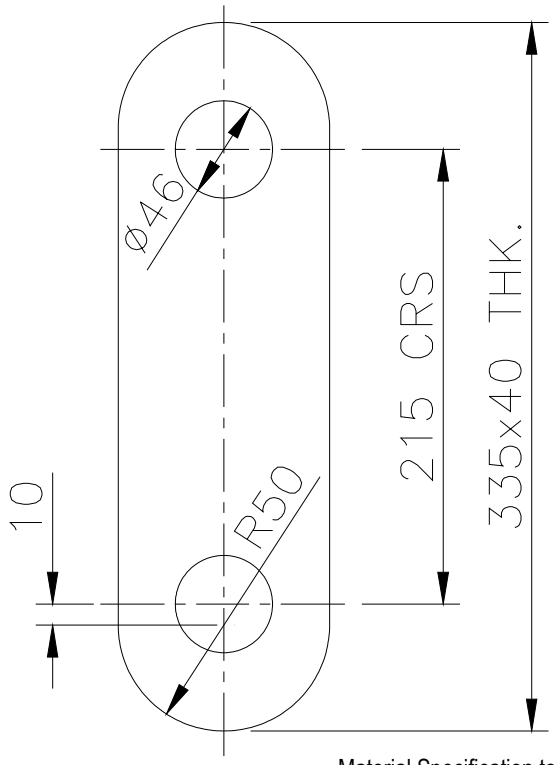
MATERIAL SPECIFICATION OF RESILIENT BLOCK

Material : Thermo Plastic Polyurethane Elastomer

Sl.	Property	Specified Value	Test Method
1.	Specific Gravity	1.15 to 1.25	ASTM D – 792
2.	Hardness	70 to 75 Shore 'D'	ASTM D – 2240
3.	Tensile Strength	300 kg/cm^2 (min.)	ASTM D – 412
4.	Elongation at Break	400% (min.)	ASTM D – 412

Sketch 2

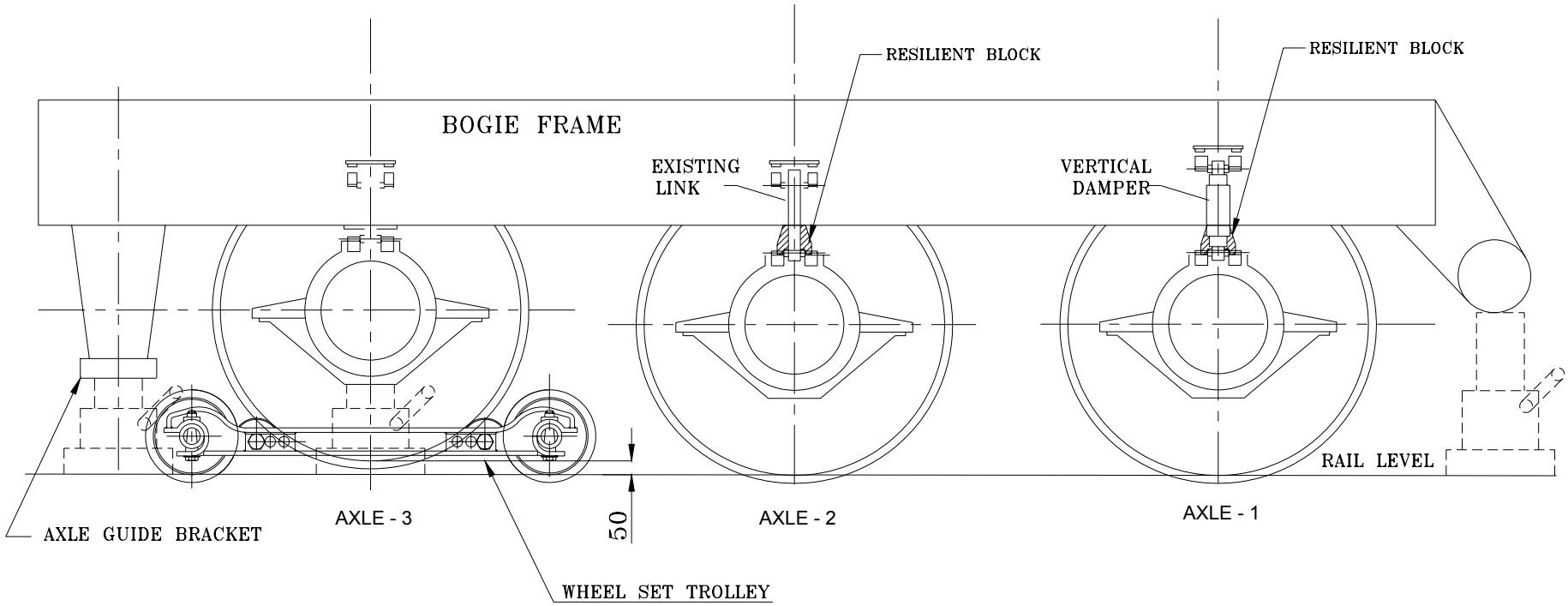
Resilient Block



Material Specification to IS:2062

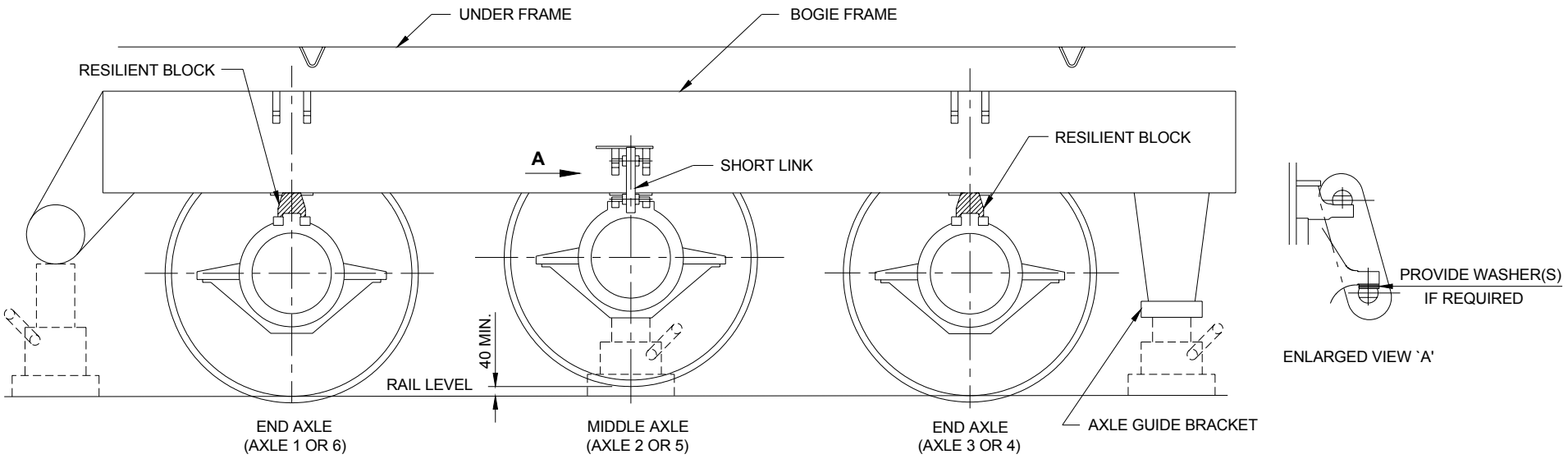
Sketch 3

Short Link



Sketch 4

Locations For Application of Lifting Jacks
and
Arrangement of Wheel Set Trolley for Lifting of End Axle in WAG9/WAP7 Locomotives



Sketch 5

Locations For Application of Lifting Jacks
and
Arrangement for Lifting of Middle Axle using short links in WAG9/WAP7 Locomotives

ANNEXURE "B"

Procedure for Movement of WAP5 Locomotives by Lifting the Locked Axle in the Event of Axle Getting Locked on Line

The Schematic Arrangement of WAP5 locomotive bogie is shown in Sketch 1. An axle of the locomotive may get locked under the following circumstances:

- Traction Motor Roller Bearing seizure.
- Axle Box Roller Bearing seizure.

While it may be possible to free the Traction Motor from the axle in case of Traction motor bearing seizure, the other case requires lifting of the affected wheel for movement of the locomotive. Lifting of the affected wheel may become necessary in case of wheel flats & heavy skidding of wheels also.

1.0 Procedure when Traction Motor Roller Bearing gets Seized

In case of traction motor roller bearing seizure, the Hurth coupling connection of the affected traction motor should be removed / uncoupled and both the traction motors of the affected bogie should be electrically isolated. The locomotive should be worked as light engine on its own power to the nearest Electric Locomotive Shed for attention.

However, where removal of Hurth coupling connection is not possible due to any reason, the locked axle should be floated following the procedure given at Para 1.2 below for clearing the section.

2.0 Procedure for Lifting the Locked Axle

In case when Axle gets locked due to Axle Roller Bearing Seizure or there is Wheel Flat or Heavy Skidding of Wheels, the affected axle should be lifted after electrically isolating both the motors of affected bogie. The locomotive should be worked as a light engine on its own power with a maximum restricted speed of 25 km/h under escort by maintenance staff. In such case, a close watch is necessary while passing over curves and turnouts.

2.1 Items required for Lifting of Axle

The following items are required for lifting the locked axle:

ix. Two hydraulic jacks having minimum capacity of 15 tonnes each.

x. The distance pieces i.e. "wooden blocks" to raise the hydraulic jacks, if required, to compensate the gap between the jack & axle box.

xi. Two numbers of steel plates of size 300mm x 300mm x 30mm, which may be required for making the foundation firm and leveled for jacks.

xii. Wooden wedges (at least 4 nos.) for application at the wheels for preventing rolling of locomotive while applying jacks.

xiii. Wheel Set Trolley to RDSO Drawing Nos. SK.VL-215 to 218.

xiv. Toolbox with appropriate tools, Nuts, Bolts, Washers and Wrenches / Spanners.

2.2 Precautions to be taken

Before attempting the lifting of locked axle of the locomotive, the steps given below should strictly be followed to avoid damage to equipment or any mishap:

vii. Apply wooden wedges at wheels to prevent rolling of locomotive.

viii. Release all brakes of the affected bogie, which requires lifting.

ix. Before application of jacks for lifting, ensure that the ground below the lifting jacks is firm and leveled. Due care must be taken to avoid slipping of the jacks.

x. Isolate both the traction motors of the affected bogie.

xi. Remove all primary vertical dampers of the affected bogie to avoid their damage.

2.3 Procedure for lifting of Axle when it gets locked

xvi. Dismantle the sand box pipes. Remove footsteps, if required.

xvii. Remove the vertical dampers between the bogie frame and axle boxes of locked axle of the affected bogie.

xviii. Now, lift the locked axle by 55 to 60 mm by simultaneously applying two jacks of minimum 15t capacity each below the axle box housings at both sides.

xix. Assemble the wheel set trolley below the locked axle over the track in such a way that the wheels of locked axle rest over the supporting rollers. Refer Procedure given below for Assembly of Wheel Set Trolley.

xx. Sketch-2 shows the locations for application of jacks for lifting and arrangement of wheel set trolley under the affected axle.

xxi. Release the jacks from both sides of the locked axle ensuring that the locomotive wheels of the locked axle rest properly on the rollers of the wheel set trolley.

xxii. Remove the wooden wedges placed at wheels of the locomotive.

xxiii. Locomotive with effected wheel set placed on the wheel set trolley can now be moved dead at a restricted speed not exceeding 25 km/h to clear the blocked section.

2.3.1 Procedure For Assembly of Wheel Set Trolley

ix. The locked wheel set has to be lifted up approximately by 55 mm to 60 mm.

x. Push both the Inner Longitudinal Frames (Item No. 1 of Drg. No. SK.VL-215) of trolley under the locomotive.

xi. Place both the Steel Tubes (Item no. 32 of Drg. No. SK.VL-218) in position.

xii. Lift up the frame along with the steel tubes, push in and fasten the running Wheel Arrangements (Item no.3 of Drg. No. SK.VL-215), Supporting Roller Arrangements (Item No. 4 of Drg. No. SK.VL-215) with keys and bolts.

xiii. Push the outer Longitudinal Frames (Item No. 2 of Drg. No. SK.VL-215) of the trolley under the locomotive; lift the frame, push in Outer Steel Tubes / Sleeves (Item no. 33 of Drg. No. SK.VL-218) and fasten the frames with keys and nuts.

xiv. To facilitate easy assembly of wheel set trolley, suitable markings as shown in the drawing must be provided to identify the matching parts.

xv. Lower the locked wheel set of the locomotive gradually on the supporting rollers.

xvi. After lowering the wheels on trolley, it is essential to ensure that the wheel flanges of the lifted wheel set are sufficiently clear from the rails, to avoid hitting / infringement during movement of the locomotive.

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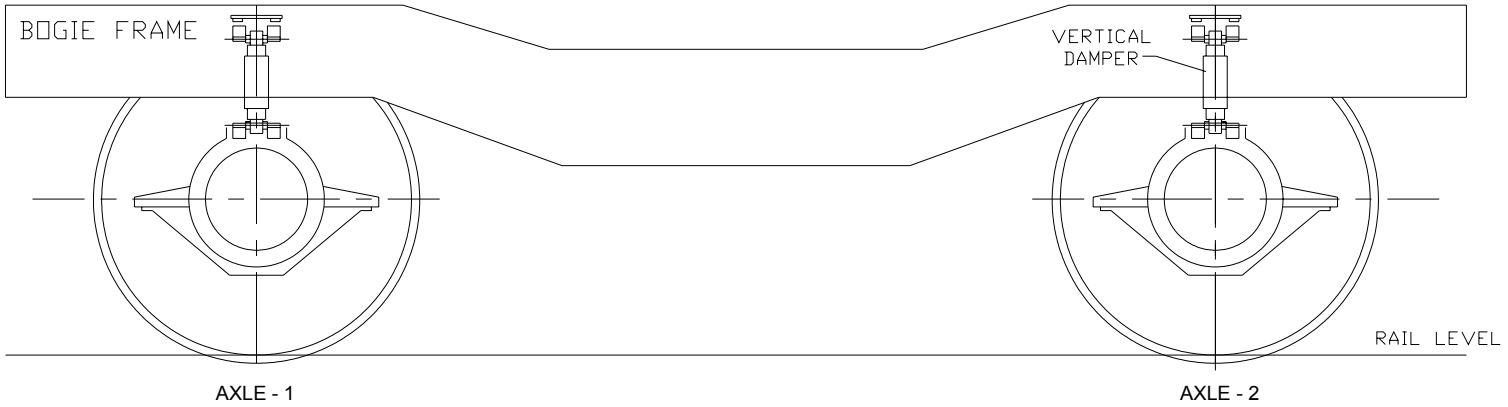
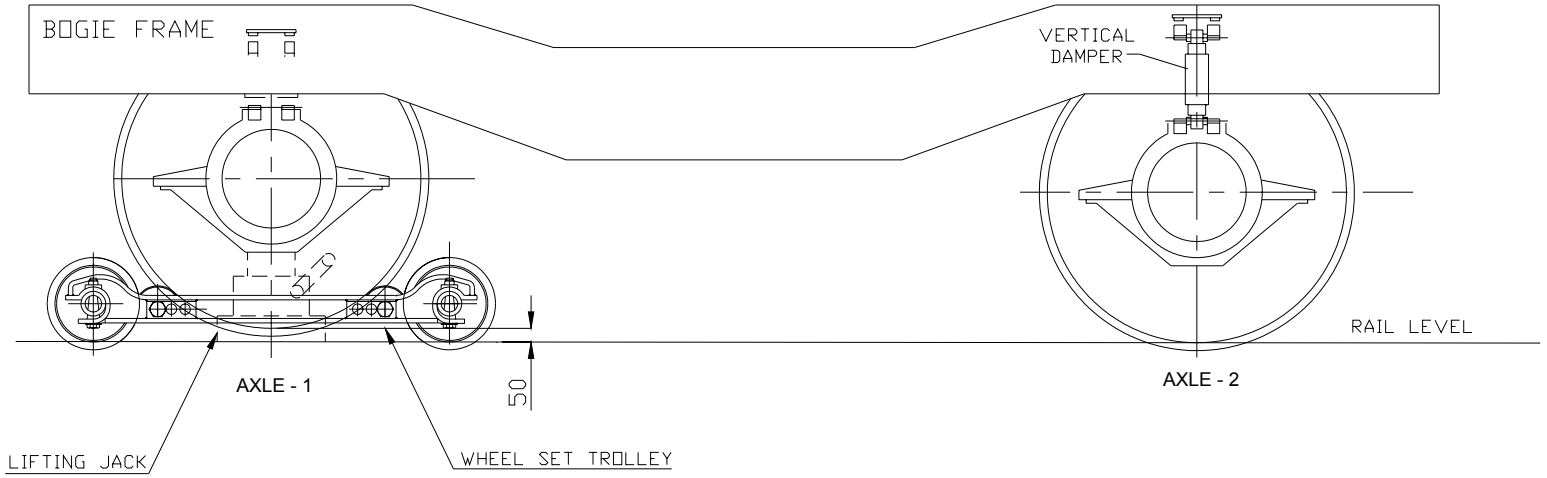


Sketch 1

Schematic Bogie Arrangement of WAP5 Locomo-



Sketch 2

Locations for Application of Lifting Jacks
and
Arrangement of Wheel Set Trolley for Lifting of Locked Axle in WAP5 Locomotives