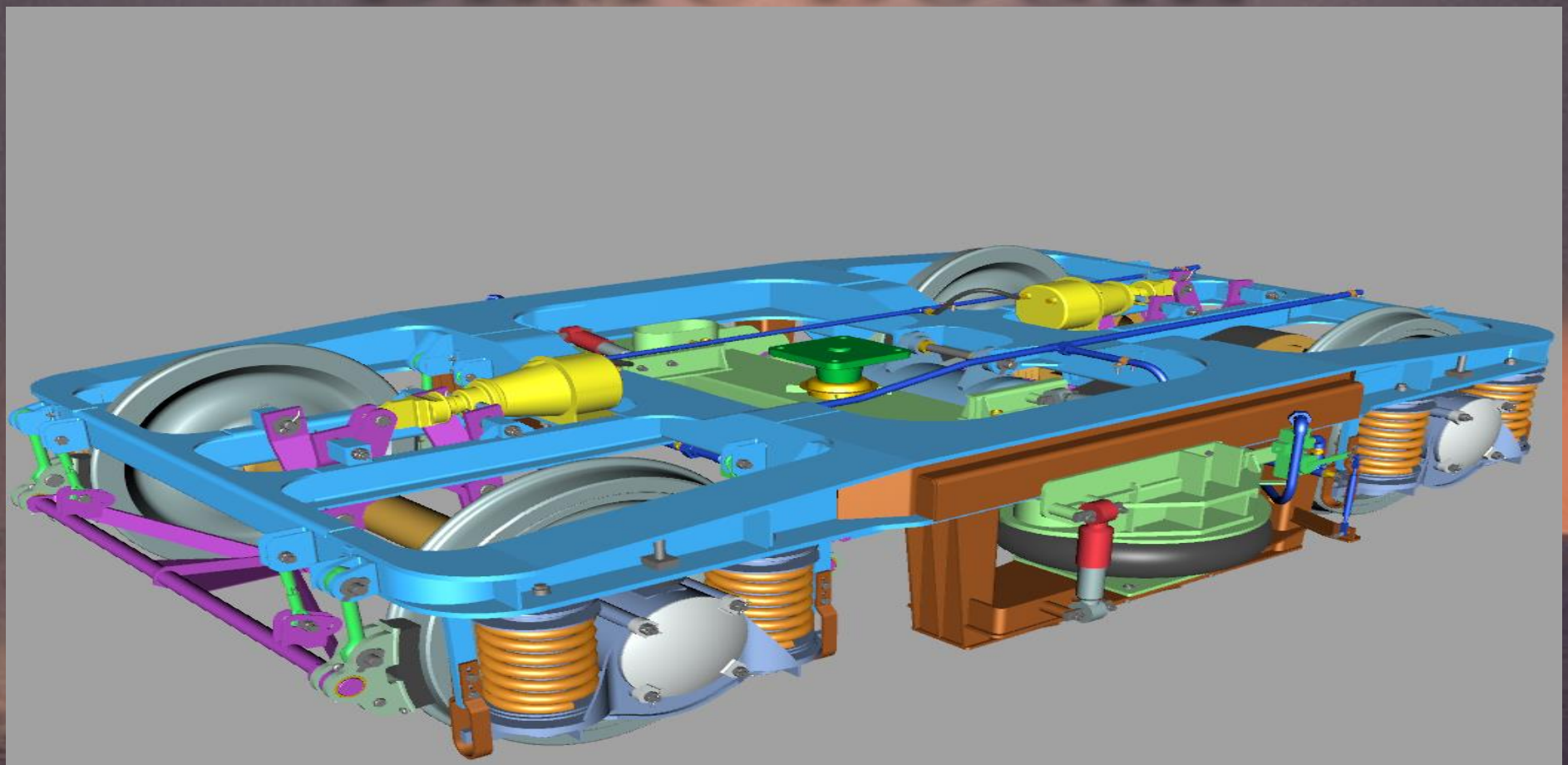
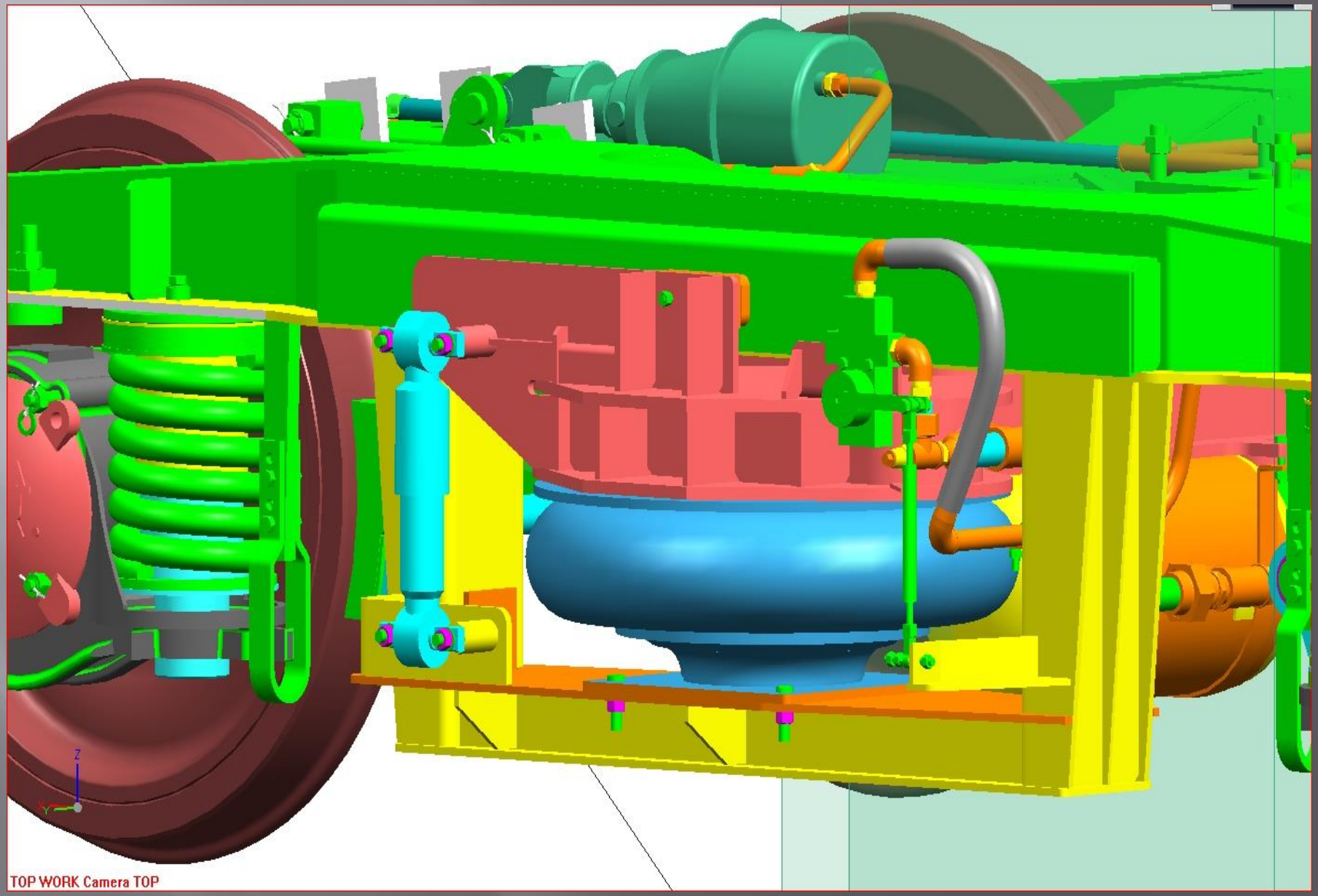
DEMU BOGIE

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BOGIE

- It is an independent unit used under a long vehicle.
- It is usually mounted on two pairs of wheels.
- In exceptional cases, such as special purpose stocks or high capacity vehicles of well Wagons or crocodile trucks, inspection carriages etc the bogie may be mounted on three or more pairs of Wheels

BOGIE

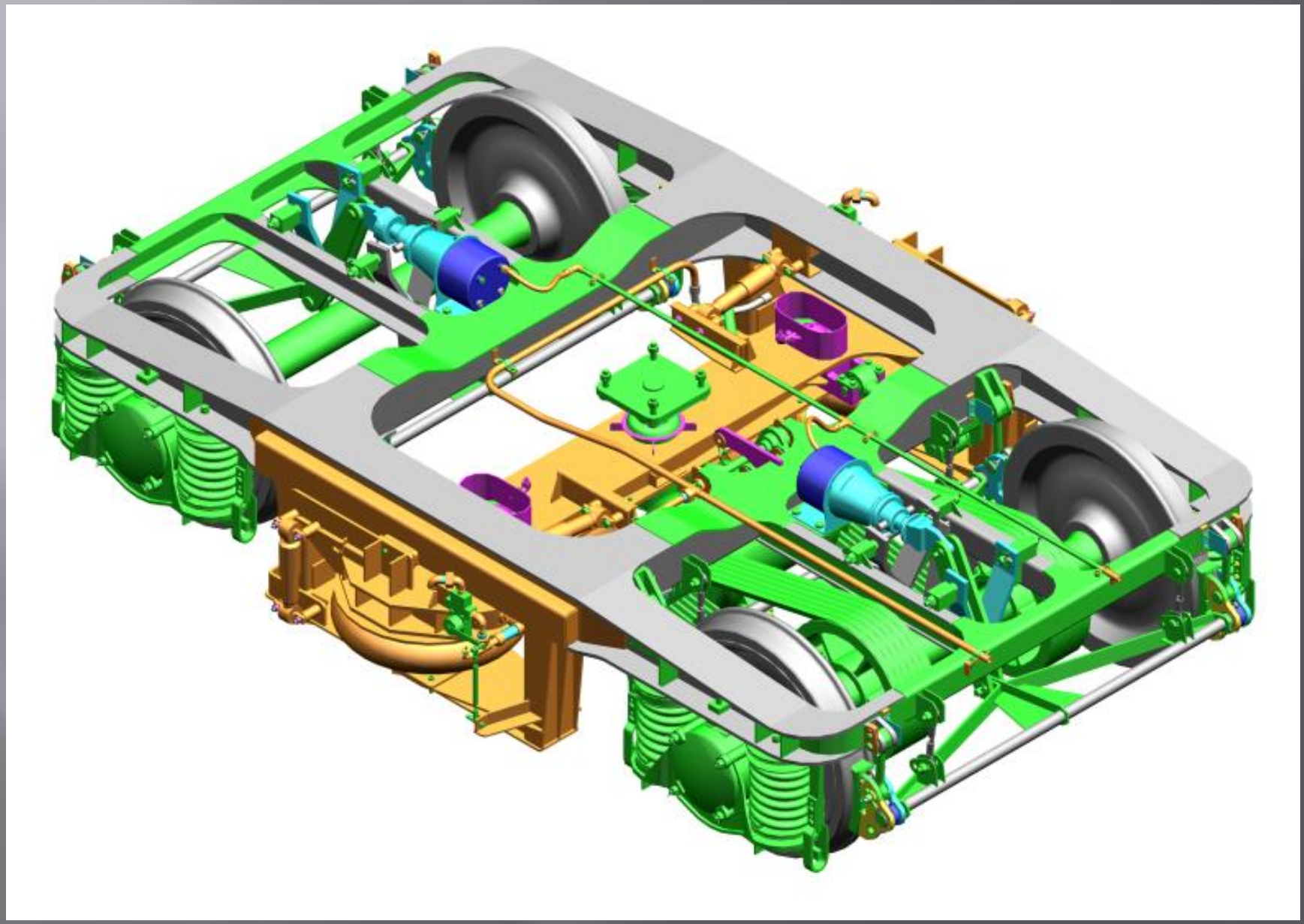
- Normally two bogies are used under a Vehicle.
- Each bogie carries half the load of the vehicle body and it’s loading.
- Each bogie is provided with a pivot on its central transom or bolster for engagement with its male counterpart provided underneath the vehicle under frame.

Version of Coaching Bogie

- IRS Bogie
- SCHLIEREN Bogie (ICF Laminated Bogie)
- MAN-HAL Bogie (BEML Bogie)
- ICF All Coiled Bogie
- Fiat Bogie

BOGIE OF 1400 HP DEMU

- Bogies of Driving Power Car (DPC) and Trailer Coaches (TC) are of all welded, light weight construction of ICF type.
- The axles, with self-aligning roller bearings
- Helical springs working in parallel with dashpots are used for primary suspension
- Coach body is supported on two side bearers
- Vertical and lateral shock absorbers are provided to damp the oscillation
- No weight is transferred through the bogie pivot, which is located in the centre of the bolster.



BOGIE OF 1400 HP DEMU

- The centre pivot acts merely as a centre of rotation and serves to transmit acceleration and retardation forces.
- The floating bolster in TC bogie is secured in the longitudinal direction with the bogie frame by means of two anchor links with silent block bushes, located diagonally opposite to each other
- The DPC bogie bolster is located between bogie transoms through rubbing plates fixed at the bolster ends.

POH Periodicity

- POH work of the DEMU is done in every18 months
- It would be worthwhile lifting these DMU coaches and put back immediately after thorough checking of brake rigging and brake gears once in 9 months during IOH.

Different Components of DEMU bogie

- *Bogie Bolster Suspension*:
- The bolster rests on the Air spring – one at each end, located on the lower spring beam which is suspended from the bogie side frame by means of fixed beam on either side.

Centre Pivot

- The centre pivot pin joints the body with the bogie & transmit the tractive & braking forces on the bogie.
- It does not bear any vertical load of the coach body.
- ***Function:*** Serves the purpose of a movable joint between coach body & trolley.

Anchor Link

ANCHOR LINK

- **The Anchor Link connected to the bogie bolster to bogie frame diagonally. This is fitted with silent block bushes which act like silencers.**
- **Function: The anchor links transmit the tractive and braking forces between the coach body and the bogie.**
- **Keep the trolley in alignment with the track all condition.**

Side Bearer

It consist of a machined steel wearing plate immersed in oil bath & floating bronze wearing piece with a spherical top surface kept in it. The whole arrangement provide with a cover to prevent entry of dust in the oil sump.

- Wear limit of wearing plate: 10mm (New) 8.5mm (Cond)
- Wear limit of wearing piece : 45mm (New) 42mm (Cond)
- Oil consumption : 2. lits (per side bearer)

Function :

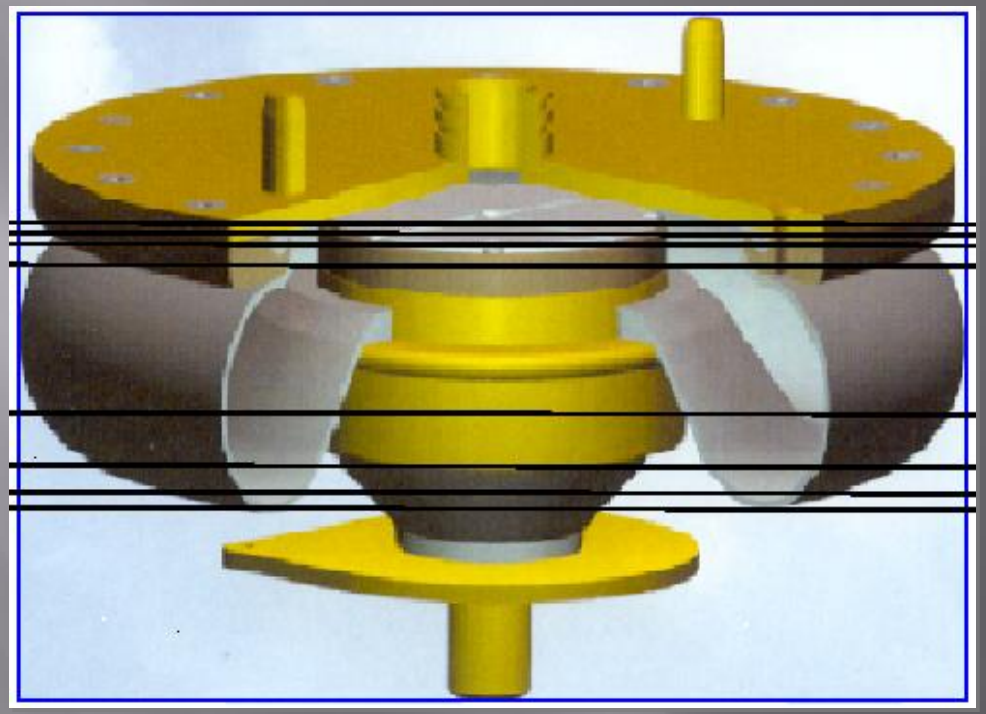
- To checking the coach body from tilting & jolting . Helps in keeping the coach body straight
- Transmit the downward shock of body on the bolster spring .

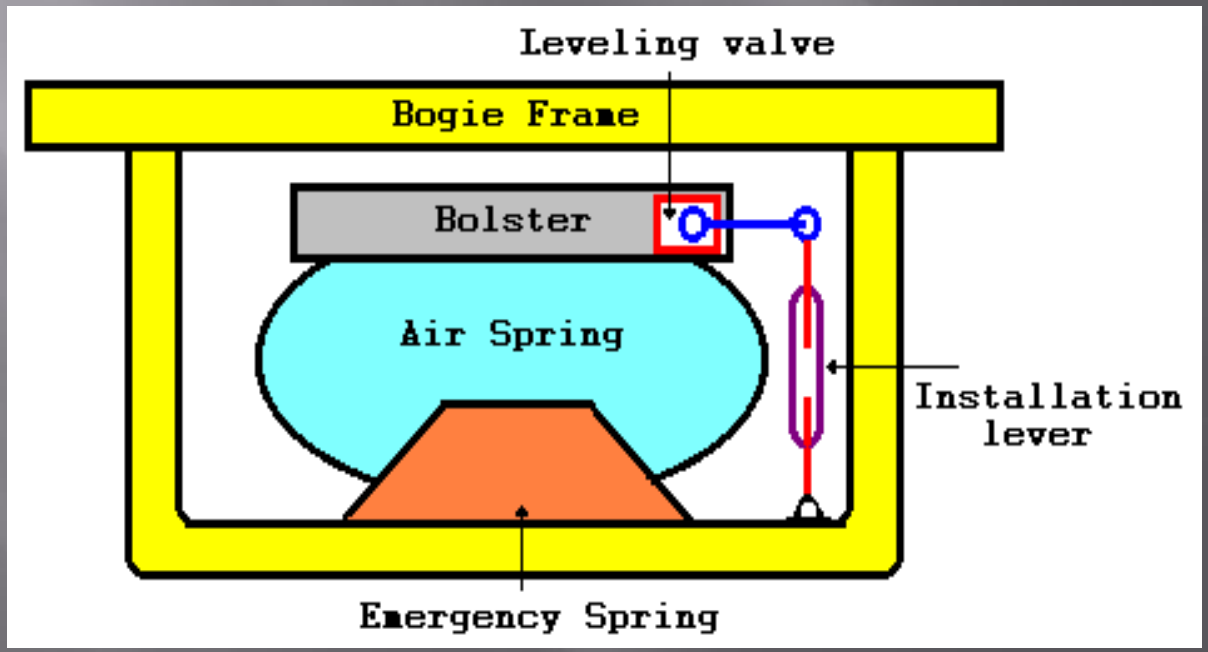
Shock Absorber

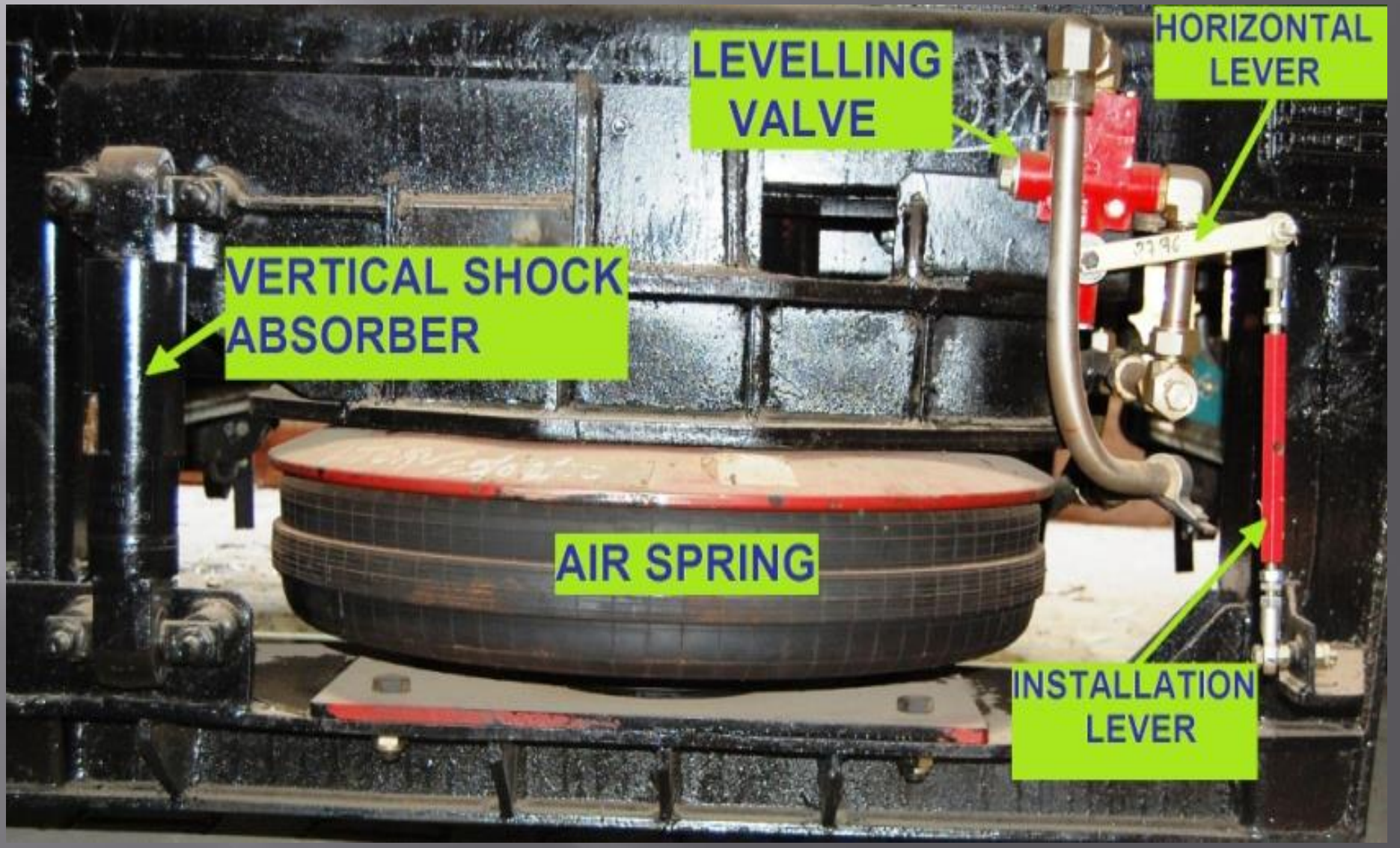
- Hydraulic shock absorber with capacity of +/- 600 Kg at a speed of 10 cm/sec. are fitted vertical and lateral direction to provide damping for oscillations.

AIR SPRING

- Air Spring is a rubber bellow containing pressurized compressed air with an emergency rubber spring providing various suspension characteristics to maintain a constant Buffer height irrespective of the loaded condition.
- Air suspension system as secondary suspension in coaching stock is far superior to conventional secondary suspension & provides –
  - Better riding comfort
  - Improved reliability and reduced maintenance
  - Capacity to sustain super dense crush load




Leveling valve
Bogie Frame
Bolster
Air Spring
Installation lever
Emergency Spring


LEVELLING VALVE
HORIZONTAL LEVER
VERTICAL SHOCK ABSORBER
AIR SPRING
INSTALLATION LEVER

Axle Box Guide

- Axle box guides for DPC and TC are of cylindrical type welded to the bottom flanges of the bogie side frame with close dimensional accuracy.
- These guides together with lower spring seats located over the axle box wings, house the axle box springs and also serve as a shock absorbers.
- These guides are fitted with guide caps having nine holes of diameter 5 mm equidistant through which oil in the lower spring seat passes under pressure during dynamic oscillation of coach and provide necessary damping to primary suspension to enhance better riding quality of coach.
- This type of rigid axle box guide arrangement eliminates any longitudinal or transverse relative movement between the axle and the bogie frame.

Air vent screws

- Air vent screws provided on the bogie side frames, directly above the dashpots.
- Tapped holes are provided for replenishing oil in the dashpots.
- Special screws with copper asbestos washers are screwed on the tapped hole to make it airtight
- **Oil Level:** Under tare condition above inner surface of guide Cap

  - BG: 80mm;
  - Above Guide Cap – 40 mm

Oil consumption : 1.6 lits (modified) BG,

- Approved brand of oil for dash pot - Servoline-100, Yantrol-100, Bharat Univol-100

ROLLING GEAR

Wheel

- The DPC coaches are provided with composite design of wheels consisting of rolled steel wheel centers with renewable tyres to IRS Specification R-15/95.
- The tyres of DPC wheels to IRS R-19/93 Part-V are secured with glut ring and 4 locking keys.
- The wheel of trailer coaches is solid wheel same as being used in BG main line stock.

Wheel Diameter

	New	Limit dia.	Last Shop Issue Size
DPC	**952 mm**	**877 mm**	**885 mm**
TC	**915 mm**	**813 mm**	**837 mm**

AXLES

- An axle is a component of a wheel set to hold the wheel discs in position.
- The axle box is also mounted on the journal of the axle.
- For TC and DPC bogie, axles are to IRS Specification R-16/95 and R-43/92 respectively.
- Axle journals should be thoroughly cleaned for inspection to detect flaws, pitting, ovality, taper, ridges etc.
- Each axle should be ultrasonically tested for detecting internal flaws and defects.

ROLLER BEARINGS

DPC Bogies

- These bogies are fitted with direct mounted, double row, self-aligning spherical Roller Bearings similar to ICF

TC Bogies

- TC bogies of DMU stock are fitted with direct mounted double row, self-aligning spherical roller bearing similar to ICF

SPRINGS

- Primary suspension springs are of helical type manufactured from centreless ground chrome vanadium, silico manganese steel.
- Air Spring used in Indian Railway as a secondary suspension to provide comfort to the passenger by absorbing shocks and vibrations.
- Air spring is working on totally control by air (pneumatic system).
- In Indian Railway, working of air spring is based on 4-point suspension system.

RUBBING PLATE IN DPC BOGIE

- Nylon rubbing plate of Manganese steel rubbing pad complete has been fitted to the bolster, which serves as cushion between the bolster and bogie frame.
- Initial clearance of 1mm on each side has been provided between the nylon / manganese steel rubbing plate and bogie frame liner (steel / manganese
- During POH, this clearance must be maintained. During service, this clearance should not exceed 3mm on each side. Any higher clearance may cause excessive longitudinal oscillations and there by reduce riding comfort.

BOGIE MAINTENANCE

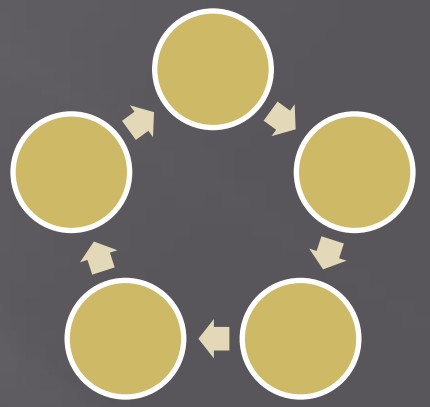
Maintenance procedure

LIFTING THE BODY OFF THE BOGIES

- Before lifting the coach body from the bogie, strip the following
- All electrical connections,
- Earth connections,
- Traction motor ventilation bellows
- Hand brake/parking brake connections
- The centre pivot cotter pin in the TC
- Securing collar in the DPC bogies must be removed.
- All the pneumatic connection between bogie & under frame should also be disconnected.
- The coach body can be lifted off the bogies by Two overhead electric cranes of 40t capacity (min.) each with suitably designed lifting tackles.

SEQUENCE OF TROLLEY MAINTANANCE

- Lifting the body off the bogies
- Washing of bogie
- Dismantling of bogie.
- Washing Of Bogie Components
- Attention to Bogie components
- Repair to components
- Bogie assembly
- Load testing and adjustment
- Lowering of Coach
- Must Change Items
- Final Adjustment



LIFTING

- Before lifting electrical fittings/ furnishing items should be stripped and batteries removed
- Before lifting a coach, the following components should be removed, disengaged or disconnected:
- Dynamo belt /disconnection of electrical connection
- Broke pull rod from bogie Brake rigging.
- Centre pivot cotter.
- Axle box safety straps.
- Dismantle vertical shock absorbers.
- Air vent screws on bogie frame

LIFTING

- Air brake fittings
- Lavatory chutes
- Under slung water tanks & WRAS, where provided.
- AC equipment in AC coaches.

WASHING OF BOGIE

- After the bogies are run out, the traction motors must be taken out
- Remove all the oil from the side bearer oil bath.
- Wash the bogie with high pressure hot water jet to remove all dust, mud, scales, grease and other muck
- After washing and drying, roll the bogies to dismantling line.

DISMANTLING OF DRIVING POWER CAR (DPC) BOGIES

- Dismantling of air spring from lower spring beam (cradle) and bogie bolster may be as following:
- Remove lateral & vertical shock absorber.
- Remove equalizing rod connection from both ends of lower spring beam if provided.
- Remove connection between arm of leveling valve & installation lever.
- Remove all 6 No. bolts and nut with the help of M12 Alen key and M12 spanner from bottom plate of air spring & lower spring beam.
- Lift bolster up to bogie frame to clear the spigot of air spring.

DISMANTLING OF DRIVING POWER CAR (DPC) BOGIES

- Slide air spring from lower spring seat.
- The bolster may be removed from the bogie frame after removing the air spring.
- Remove the duplex check valve from bolster
- The air vent caps should be loosened to allow air to enter the dashpots.
- The safety straps should be loosened and swung away, after which the bogie frame may be lifted by means of crane till all the 8 guide bushes disengage the lower spring seats and wheels are rolled out.

DISMANTLING OF TRAILER BOGIE

- After the bogies are run out, the anchor links should be disconnected.
- Dismantling of air spring from lower spring beam (cradle) and bogie bolster.
- The bolster may be removed from the bogie frame after removing the air spring.
- Remove the duplex check valve from bolster and maintain
- The air vent caps should be loosened to allow air to enter the dashpots.
- The safety straps should be loosened and swung away, after which the bogie frame may be lifted by means of crane till all the 8 guide bushes disengage the lower spring seats and wheels are rolled out.

CLEANING OF BOGIE COMPONENTS

- Collect anchor links of TC bogie, brake rigging components and axle box springs into respective bins/pallets and send to washing for thorough cleaning.
- Send the bogie frame, bolsters and lower spring planks to washing for thorough cleaning and drying.

ATTENTION TO BOGIE COMPONENTS

Bogie Frame

- Bogie frame for DPC and for TC should be checked thoroughly after cleaning, for any cracks, particularly at places where cradle and the dashpot guide flanges are welded
- If cracks are detected, the frame should be placed on a manipulator and after proper gauging they should be repainted by welding.
- The squareness and alignment of the guides should be checked thoroughly with the help of a alignment gauge
- Axle guides found bent/cracked should also be cut out and replaced.
- Weld the new axle guides with the help of axle guide fixture, if the axle guides are damaged or worn.
- Replace the anchor link brackets if they are worn or damaged
- All bushes must be renewed at every POH.
- Bent, damaged, or worn brake hanger brackets should be replaced.
- The axle box safety brackets should be straightened or renewed if found bent or damaged.

Bolster

- Check the bolster for twist, crack, corrosion, etc. Repair or replace the bolster as required.
- Replace the anchor link bracket by holding in bolster repair fixture, if found worn or damaged.
- Replace the center pivot silent block.
- Replace the center pivot sleeve if worn, damaged, or corroded.
- Replace the rubber-sealing cap of center pivot silent block.
- Force fit between silent block and sleeve and diameter of pivot pin, i.e. 75 –0.150/-0.257 and 90-0.170/-0.267 should be maintained in every POH/IOH.
- Piping to air spring spigot hole may be checked for leakage
- New rubbing plates to be provided what so ever may be the condition of old one.

Lower Spring Beam (Cradle)

- Inspect all welding joints of the lower spring beam (cradle) and repair if required.
- Inspect air spring fixing holes of lower spring beam for elongation, if elongated build them to dia 13 mm.
- Inspect the top surface of lower spring beam for corrosion, remove the corrosion and paint with primer and black paint.

Centre Pivot

- After the coach body is Lifted and kept on trestles duly leveled the alignment of its top centre pivot fitted under the coach body should be checked. It should be removed if found bent or out of alignment for straightening / replacement as required.
- All pivots should be chalk tested either in position of when they are dropped and the pivots found cracked should be replaced.
- The silent block bushes provided in all-coil' bogies should be examined for perished rubber and loose rubber bonding.

Anchor Link

- Replace the anchor link, if worn or corroded
- Repair the anchor link, if found cracked (normally at weld joints) under magna flux testing, by re-welding after gauging.
- Refit new Silent block in every POH.
- Replace the silent block, if the rubber is perished or loose in the Anchor link housing, or the silent block pin is worn thin

Shock Absorbers

- Shock absorbers should be given a schedule overhaul when their capacities vary beyond ± 20% of their specified values, or after 4 lacs kilometres or alternate POH, which ever is earlier.
- Non schedule overhaul: Shock absorbers should also be overhauled whenever suspected to be defective, which is indicated primarily by oil leakage or when they are physically damaged.

Thanks