

LHB COACH



Presented by

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***ADVANTAGES
OF
LHB COACHES***

HOW IT BENEFITS
RAILWAY

A LONGER COACH

LHB coaches are approximately 2-meters longer than the conventional ICF type coaches.

This means “more travel space” “increased seating capacity”, “wider bays and doorways” etc.

A LIGHTER COACH

Per meter length, weight of LHB coach is approximately “10%” lesser than the conventional coach.

This not only means lower haulage costs but also less wear and tear of the coaches and track.

A HIGHER SPEED COACH

- **LHB coaches are designed to run at a maximum speed of 160 kmph.**
- **For speeds of 200 kmph, minor changes are required.**

LESSER MAINTENANCE

- \$ Use of superior materials with longer life.**
- \$ Superior braking with WSP.**
- \$ Bogie with less moving parts.**
- \$ Items of wear & tear shall not require replacement/renewal before 10lakh kms.**

LESSER MAINTENANCE

- \$ Use of stainless steel and less bogie moving parts shall reduce maintenance requirements.**
- \$ Entrance doors flush with side wall allowing automatic car washing.**

**HOW IT
BENEFITS THE
PASSENGER**

BETTER RIDE QUALITY

- ▣ Improved ride comfort - ride index reduced from over 3.0 to 2.5 at a speed of 160 kmph.
- ▣ Plush interiors of international standards.
- ▣ Improved air-conditioning through better duct designing & humidity control.
- ▣ Bigger size sealed windows filled with “argon” gas for a panoramic view & heat insulation.

BETTER RIDE QUALITY

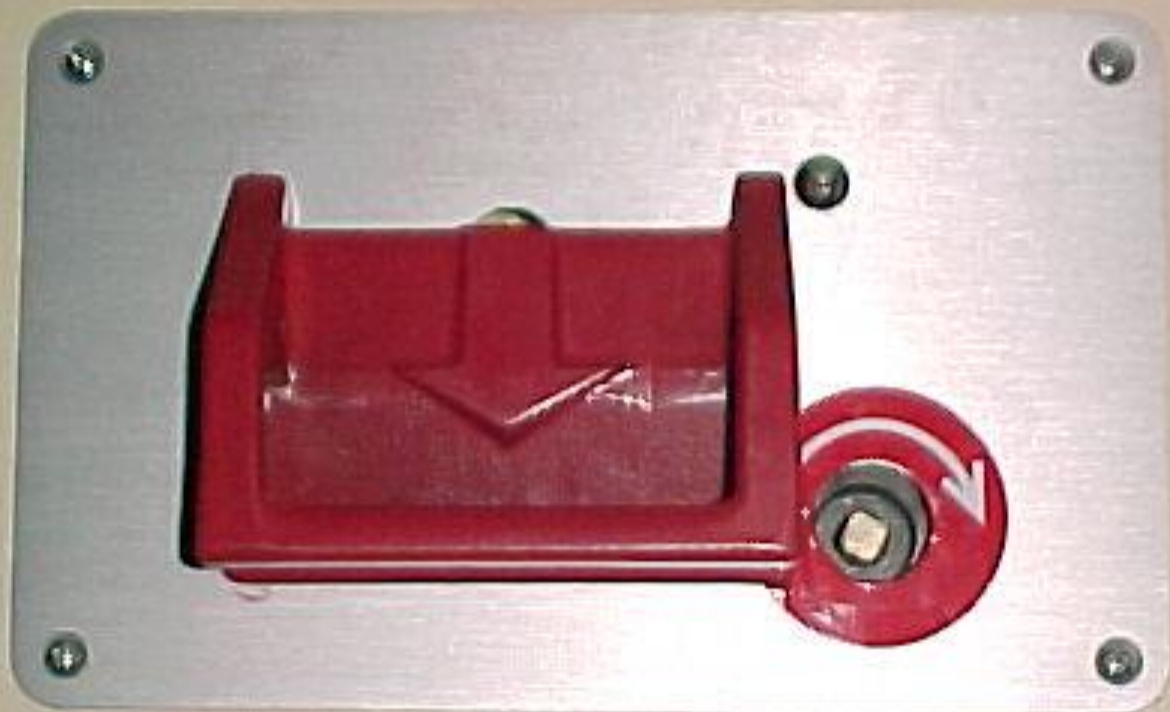
- ▣ Modular “oriental” & “western” style toilets with “cdts” & “Bio Toilets” to avoid soiling of station premises.**
- ▣ Well equipped pantry with hot cases, deep freezer, bottle coolers etc.**
- ▣ Flush type swiveling berth reading light.**
- ▣ Polycarbonate transparent centre tables.**

MORE SAFE

- ❑ Safety of passengers is of paramount importance, so a number of precautionary measures have been adopted in LHB design coaches , like :-**
- ❑ Four emergency exit windows for faster passenger evacuation during emergencies.**
- ❑ Wider vestibule design for smooth inter coach movement.**

MORE SAFE

- ❑ Convenient to operate emergency alarm pull operation and fire- retardant furnishing.**
- ❑ Tight lock center buffer coupler makes coaches anti-climbing.**
- ❑ Crashworthiness.**



गाड़ी खड़ी करने के लिए हंडिल खींचें

उचित एवं पर्याप्त कारण के बिना हंडिल खींचने पर सजा
1000 रुपये तक जुर्माना और / या दस दिनों के कैद ।

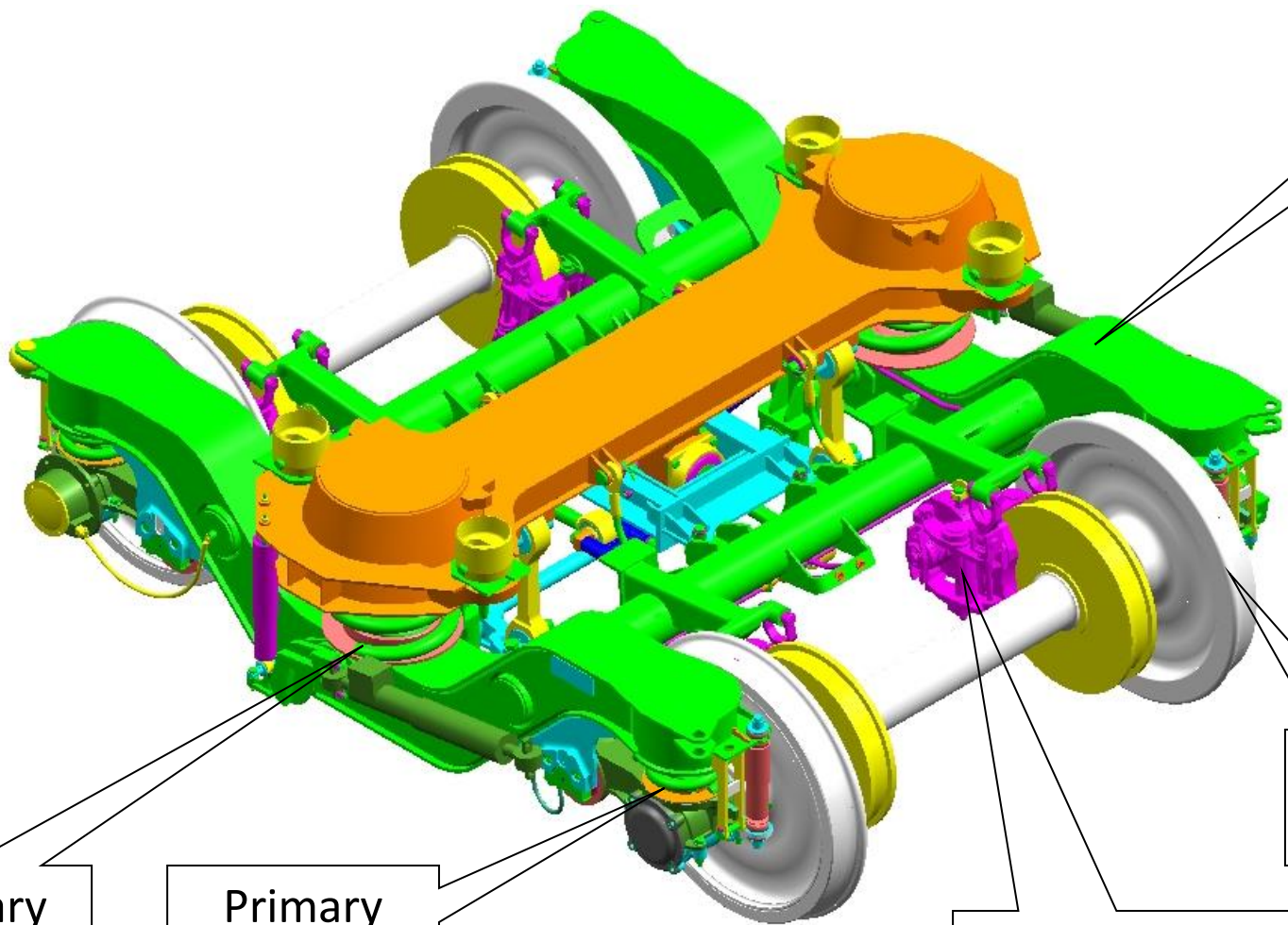
TO STOP TRAIN PULL HANDLE

**PENALTY FOR USE WITHOUT REASONABLE AND SUFFICIENT
CAUSE FINE UPTO Rs. 1000 AND / OR IMPRISONMENT UPTO ONE YEAR**

आपात निकास
EMERGENCY EXIT

FIAT BOGIE

(Complete Assembly)



Bogie
Frame

Wheel
& Axle

Disc Brake unit

Secondary
Suspension

Primary
Suspension

BOGIE FRAME

- **Solid welded frame -steel sheets and forged, steel cast parts .**
- **Two side frames connected by two cross beams –support brake units. Various brackets on frame.**

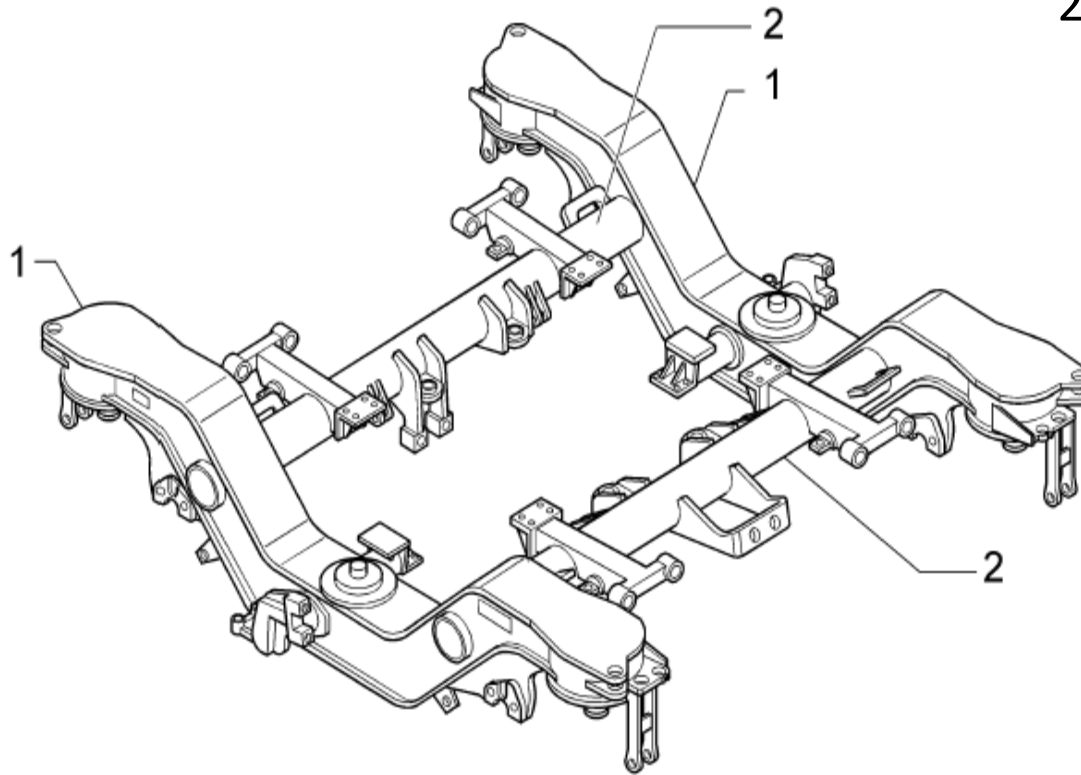
BOGIE FRAME

- **The bogie frame rests on the primary suspension spring units and supports the vehicle body by means of a bolster beam.**
- **The bolster beam is connected to the bogie frame by secondary suspension.**

BOGIE FRAME

1.-SIDE FRAME

2.-CROSS BEAM



- **Primary suspension**

- Two coil springs, one vertical damper, articulated control arm, elastic joints connecting the axle bearing to the bogie frame

- Better curve negotiation

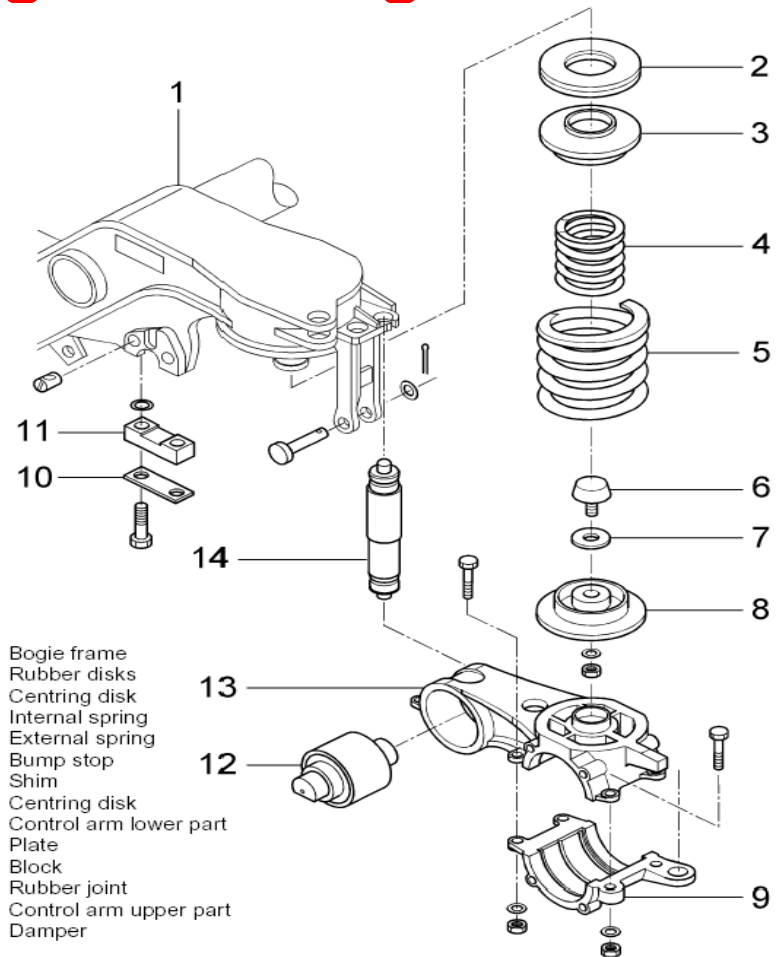
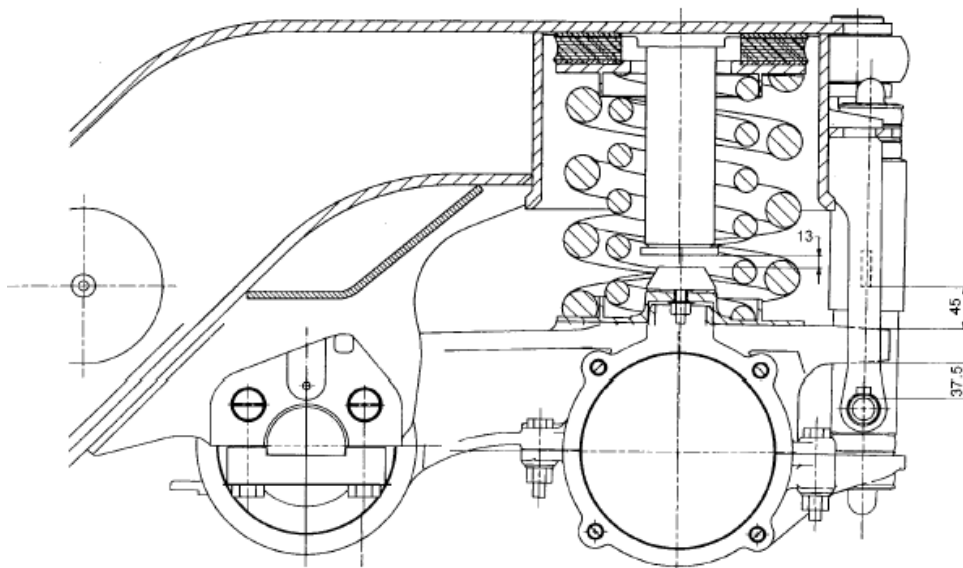
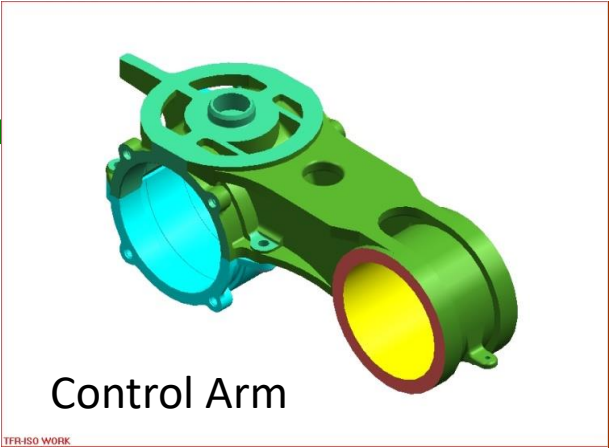
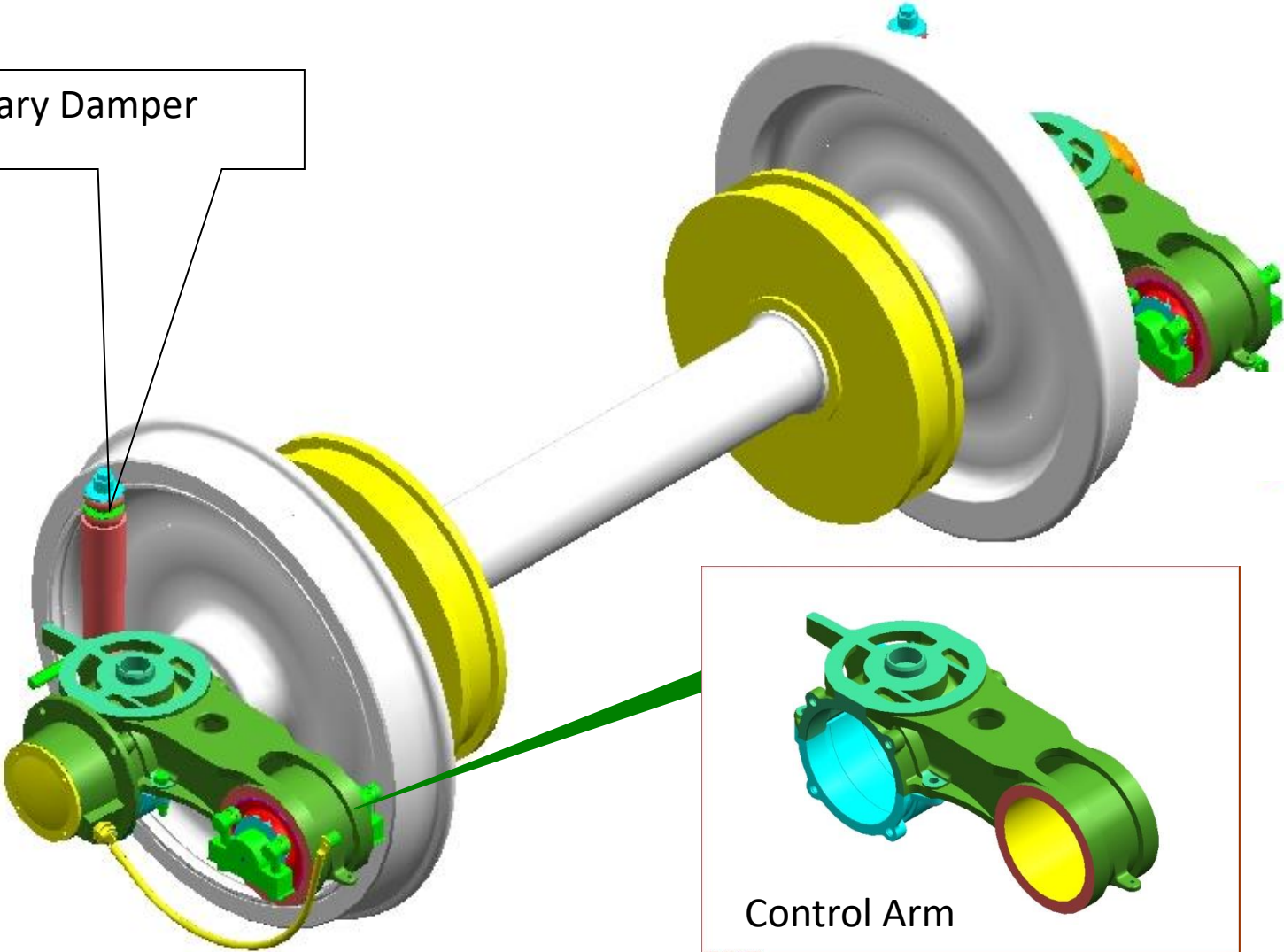


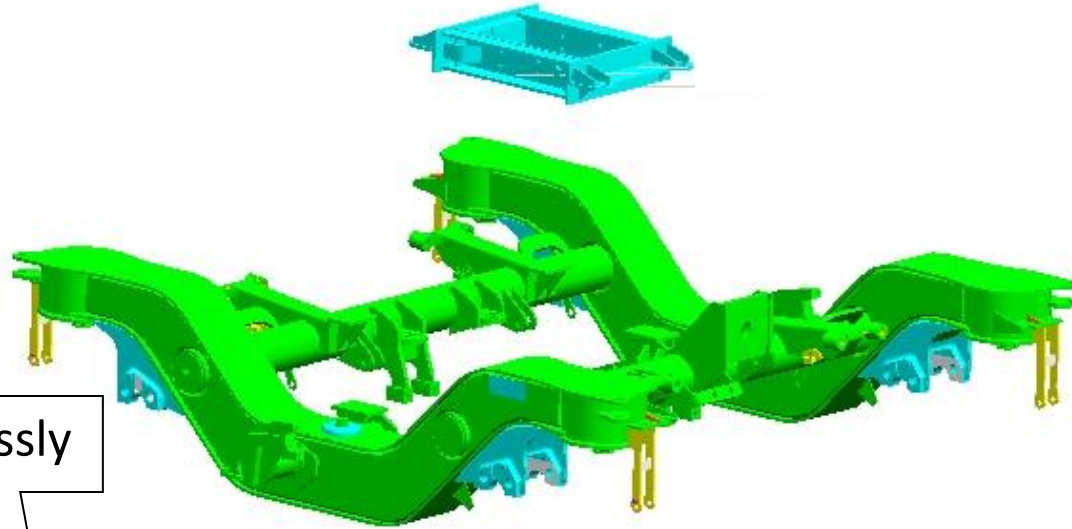
FIG. 1-8 PRIMARY SUSPENSION

(Wheel set with Primary springs removed)

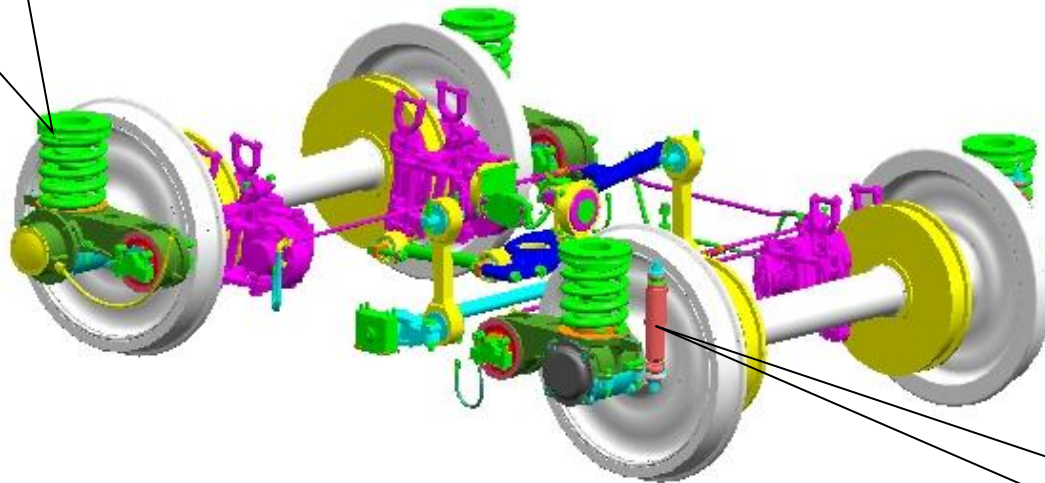
Primary Damper



(Bogie frame lifted)



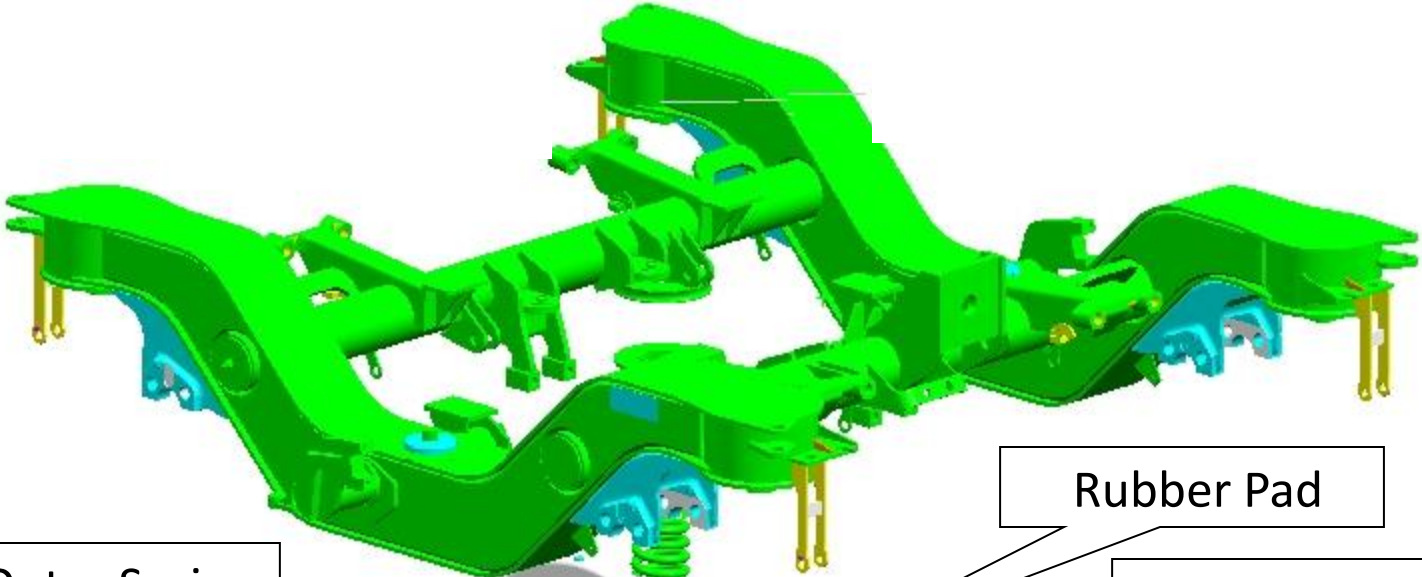
Primary Spring assly



Primary Damper



(Primary exploded)



Outer Spring

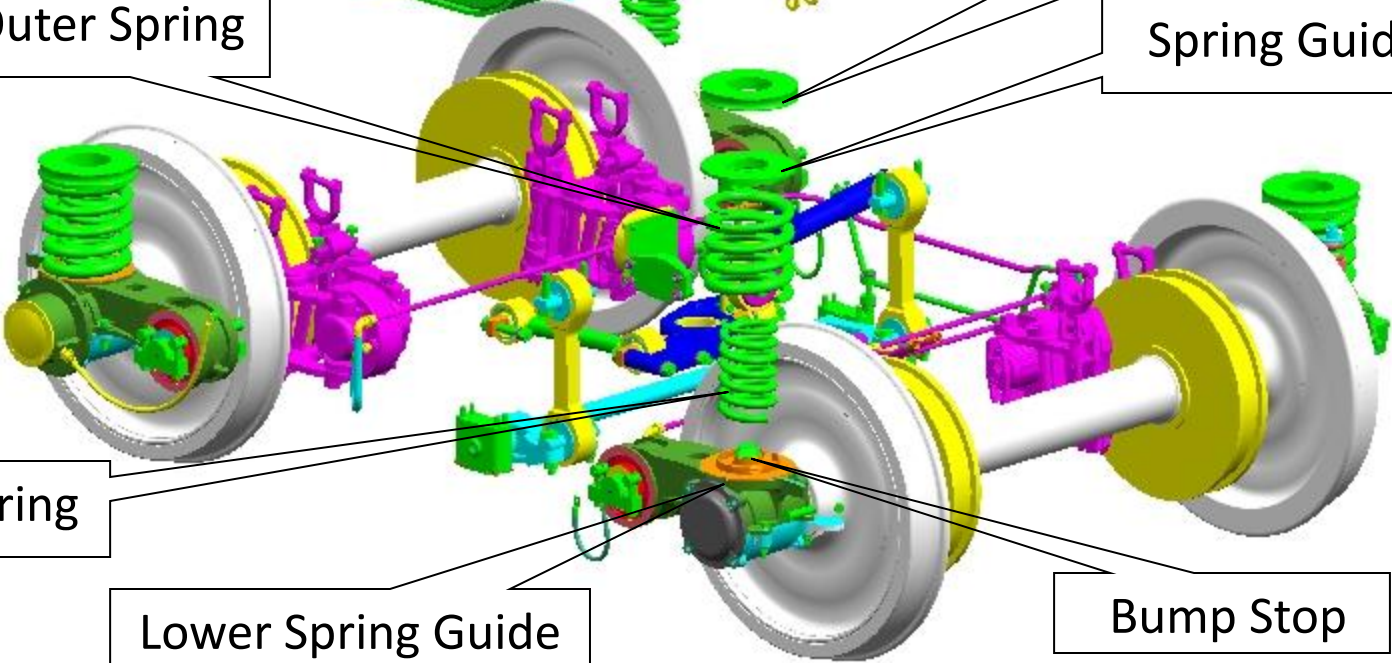
Rubber Pad

Spring Guide

Inner Spring

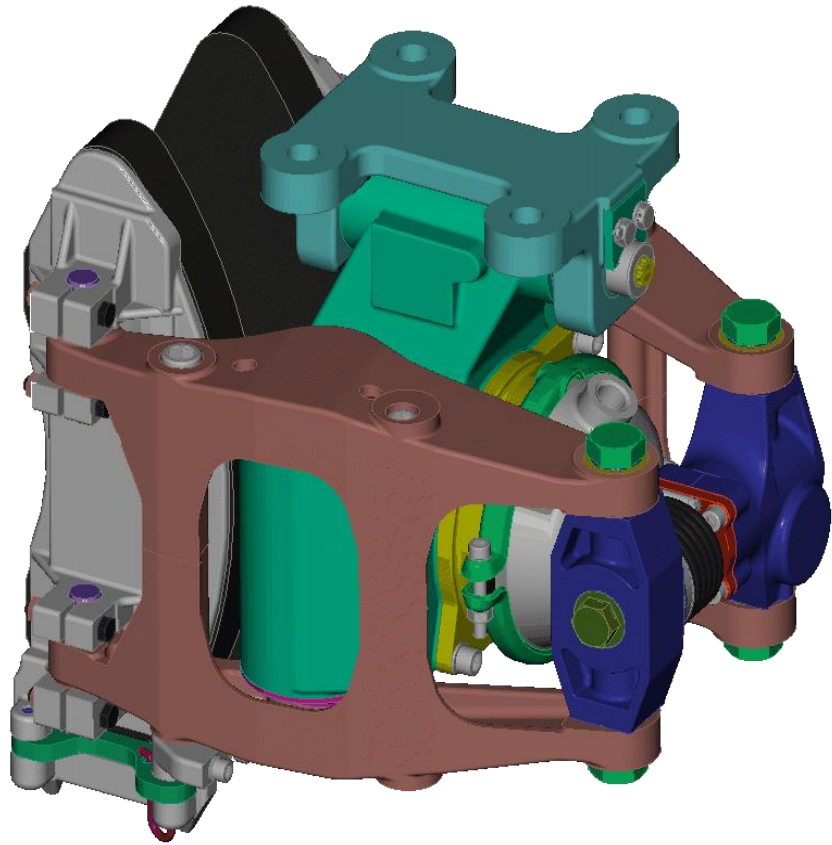
Lower Spring Guide

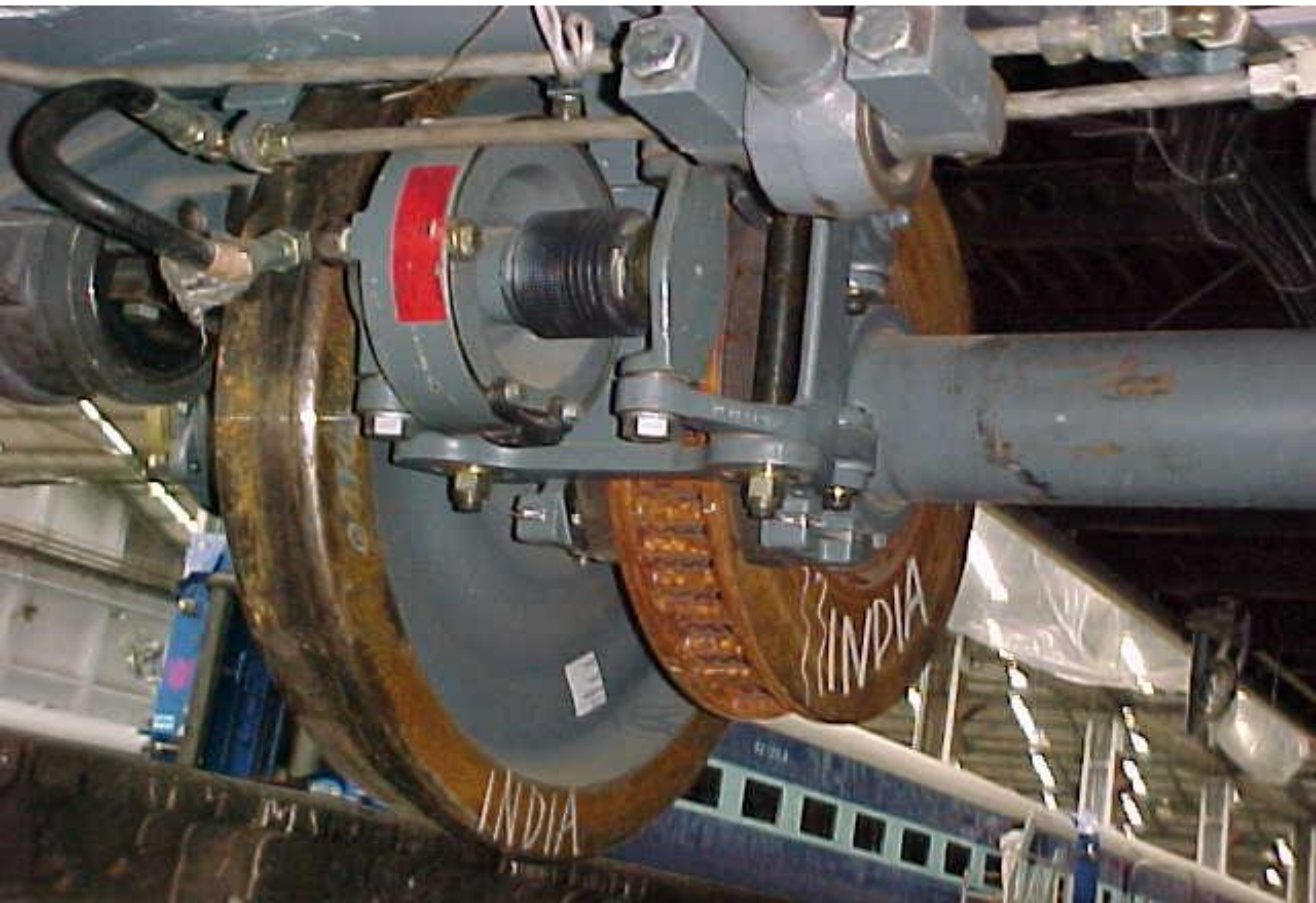
Bump Stop



DISC BRAKE SYSTEM

- Axle mounted disc brake.
- Two discs per axle of dia. 640 mm.
- Inbuilt slack adjuster in brake cylinders.
- 35 mm Brake pads.

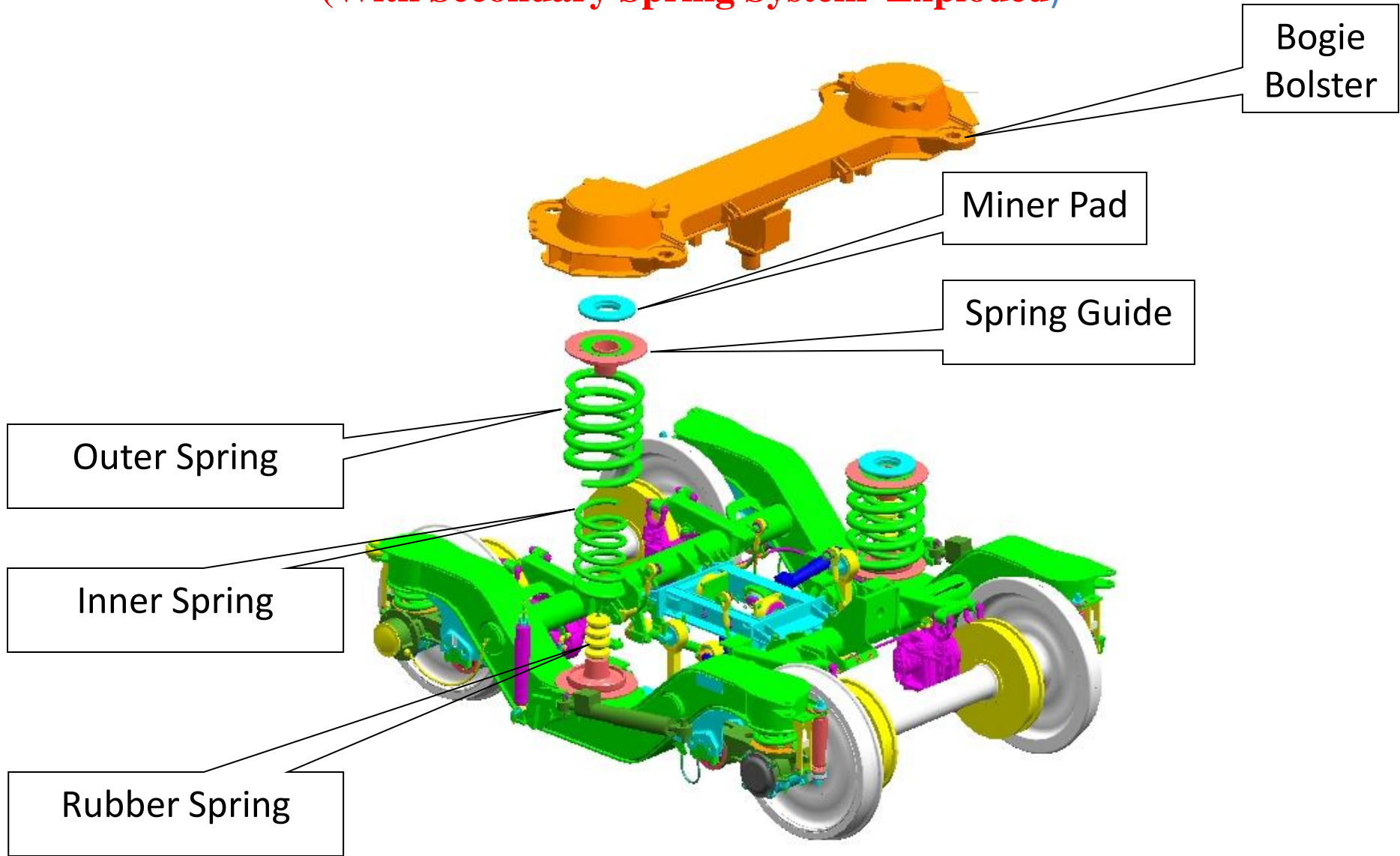




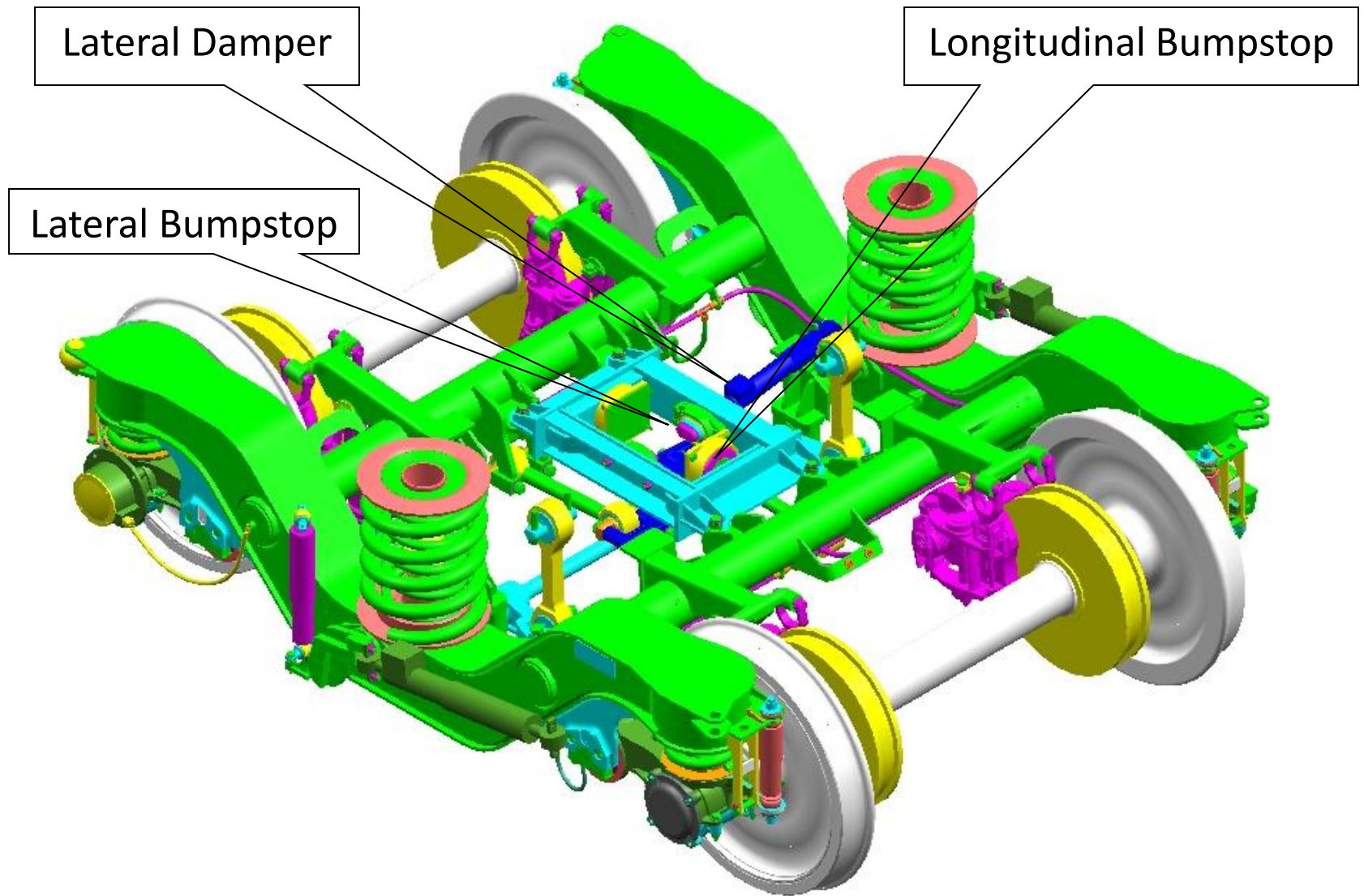
SECONDARY SUSPENSION

- Nest of flexi-coil springs inner and outer, rubber spring and secondary pad
- Vertical dampers
- Lateral dampers
- Yaw dampers
- Anti-roll bar
- Anchor links

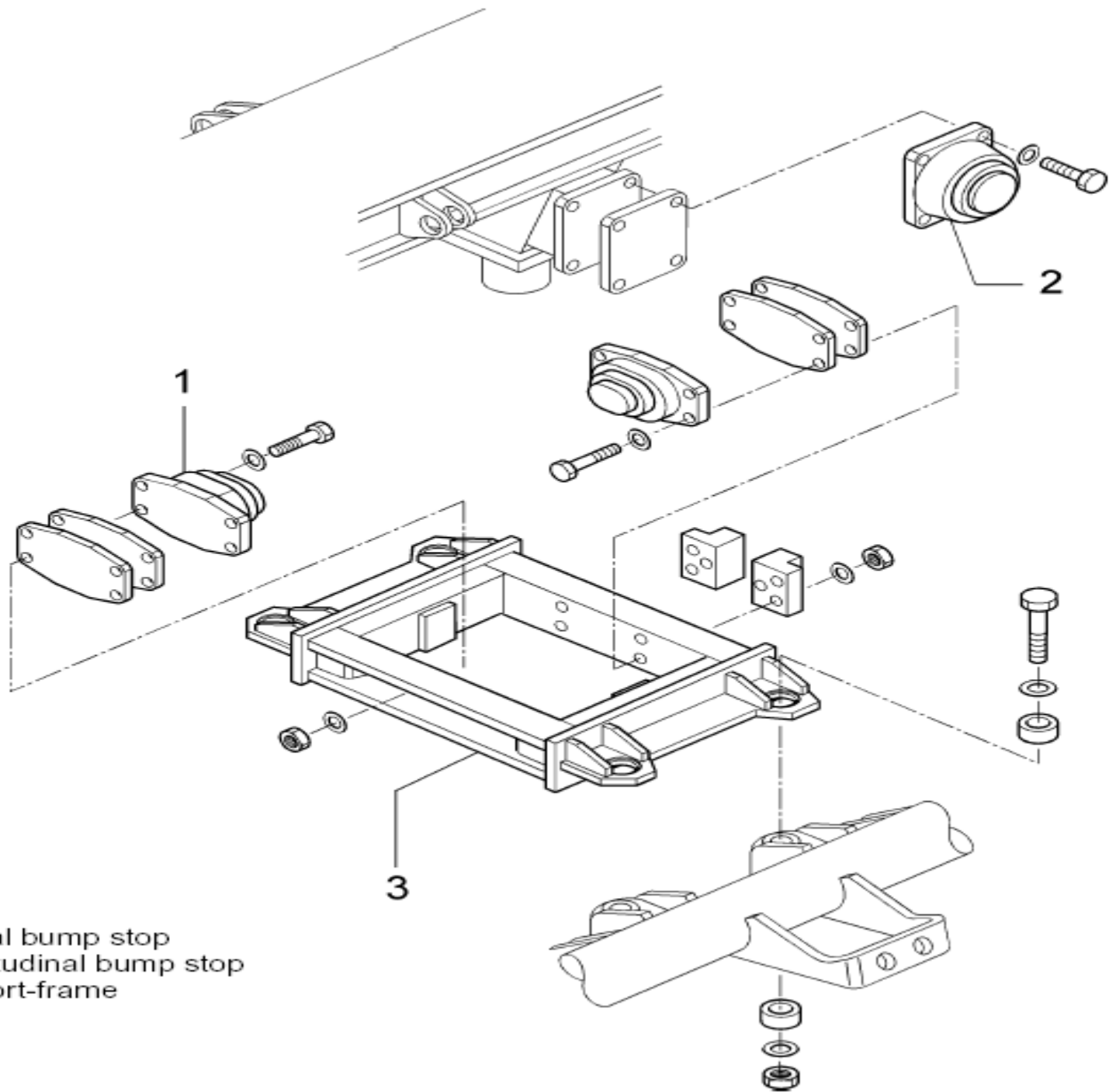
(With Secondary Spring System Exploded)



(Bolster removed)



THANK YOU



1. Lateral bump stop
2. Longitudinal bump stop
3. Support-frame

LHB COACH MAINTENANCE SCHEDULES

- **Coaching Depot Schedule**
- Schedule D1 : Every Trip/Weekly
- Schedule D2 : Monthly \pm 3 days
- Schedule D3 : Half Yearly \pm 15 days
- **Shop Schedule**
- Shop Schedule I : 18 months/ 6 lakh Kms whichever is earlier
- Shop Schedule II : 36 months/ 12 lakh Kms whichever is earlier
- Shop Schedule III : 72 months/ 24 lakh Kms whichever is earlier
- The details of activities to be carried out during these schedules are given below .

SCHEDULE D1 : TRIP/WEEKLY

(on rake at nominated primary depot)

- **1. Coach**
- Coach should be washed both from outside & inside.
- Disinfect and spray at corner and crevices of coaches after washing all coaches.

- **2 .Shell**

- Visually check body panels/end walls for damages
- Visually inspect destination boards brackets.
- Visually inspect window bars for damage/missing
- Examine body side doors for working/ damages
- Inspect door handles for damages/missing
- Inspect vestibule and its Rubber fittings for damages/missing, repair if necessary
- Visually check vestibule fall plate, mounting brackets, pins and lock lever for ease of operation, damages/ deficiency

- **3. Bogie Frame and Bolster Assembly**
- Perform a visual check on longitudinal beams, cross beams & bolster for cracks, damages and corrosion.
- Perform a visual check on brake supports, damper supports, traction center supports and anti roll bar.
- supports for cracks, damages and corrosion.
- Check bogie bolster sub assembly and brackets for cracks, damages and corrosion.

- **4. Brake Equipment**

- Check functionality of brake equipment and Hand brake equipment.
- Perform a visual check on Brake cylinders/ brake levers and Hand brake equipment for damage, cracks and corrosion.
- Perform a functional test on pneumatic brake system. Make sure that no leaks are present.
- Perform a visual check on hoses.
- Visually inspect steel piping for cracks/ damages/ ballast hitting. Repair/ replace as necessary.

- **5. Axle Bearing Instruments**

- Perform a visual check on all grounding cables & WSP equipment cables for breaks/ damages.
- Visually check equipment for absence of damages, cracks, and corrosion marks.
- Check functioning of WSP equipment.

- **6. Primary & Secondary Suspension**
- Visually check springs for broken & damages,
- Visually check safety cables for damages, cracks and corrosion.

- **7. Primary/Secondary/Yaw dampers**
- Perform a visual check on dampers for damage, cracks and oil leaks.
- Perform a visual check on all fixings for loosening and/or missing components.
- Perform a visual check on rubber elements for cracks and ageing.

- **8. Bearings**

- Carry out bearing feeling for detection of hot bearing.

- Check Axle box for grease leakage.

- **9. Wheel & Axle**

- Check axle for cracks and signs of corrosion .

- **10. Control Arm**

- Perform a visual check on all fixings for loosening and / or missing components.
- Visually check control arm parts for damages, cracks or corrosion marks.
- Inspect the rubber joint until it is visible for, damages and ageing.

- **11. Anti Roll bar assembly**

- Perform a visual check on Anti roll bar, links and Brackets for cracks, damages and corrosion.
- Visually inspect for grease oozing out of anti-roll bar bearings, which may result in bearing failure.
- Perform visual check on all fixing for loosening/missing fittings.

- **12. Traction Centre**

- Perform a visual check on the traction center lever and on the rods for cracks, damages and corrosion.
- The assembly should be free to move, and not blocked by any foreign objects.
- Perform a visual check on all fixings for loosening.
- Perform a visual check on rubber joints for cracks/damages.

- **13. Rotation Limiter**

- Perform a visual check of rotation limiter, components.

- **14. Draw & Buffing Gear -**
- **(Ref: CMI No: RDSO/2006/CG/CMI/01 Re v No: Nil)**
- Visual Inspection of coupler head for damage.
- Checking of coupler operating mechanism for damage, loose, bolts etc.
- Greasing of glide rod of coupler operating mechanism.
- Checking tell tale recess for ensuring proper coupling.
- Inspection of coupler carriers/supporting device & its spring for cracks & breakage.
- Inspection of loose/broken/missing nuts & bolts (M-16) of coupler pin support plate & draft gear support plate.

- **15. Corridor Connections -**
- Check corridor connections for external damage & foreign bodies.
- Check vestibule connection for external damage & foreign bodies.

- **16. Pressure Air Equipment**
- Safety valve check for correct function.

- **17. Interior fitting passenger accommodation**
- General visual check for damage .
- Check for regulation provision of rubbish bins & operational fire extinguishers.
- Check hand rails, sliding door, shutters, toilet doors, vestibule doors, functioning.
- Check bath room fitting (visual) .
- Clean top & bottom guide rails of luggage doors of power cars & greasing of guide bearing.
- 1-leaf sliding door - general function check (ease of movement, how it shuts).
- 2-leaf connection door - general function check (ease of movement, how it shuts) .

- **18. Passenger Doors**

- General function checks (ease of movement)

- **19. Water supply system**

- Check tanks pipes for leakage.
- Check tank mountings.

- **20. Pantry**

- Check for damages & deficiencies in the pantry construction & fittings.
- Check water supply & drainage of the pantry area.

- **21. Sanitary Equipment**

- Check functioning of toilet system.

SCHEDULE D2 : MONTHLY 30 ± 3 DAYS (On rake at nominated primary depot)

- **1. All items of Schedule D1**
- **2. Coach**
 - Disinfect and spray insecticide at corner and crevices of coaches after washing all coaches.
(AC & Pantry Car – 15 Days)
 - Intensive cleaning of coach.
- **3. Bogie Frame and Bolster Assembly**
 - Wash the bogie frame thoroughly with water jet.

- **4. Brake Equipment**

- Perform a visual check on brake discs.
- Check wear of brake pads/ brake discs.
- Lubricate the brake levers, fixings and all moving parts.

- **5. Axle Bearing Instruments**

- Monthly / Quarterly inspection of WSP equipment to be carried out as per schedule given by OEM.

- **6. Wheel & Axle**

- Perform a visual check on wheels for cracks.
- Check by wheel profile gauge .
- Check tread diameter and wear of wheel profile.
If necessary, perform re-profiling.

- **7. Rubber and Rubber/Metal Bonded parts**

- Perform a visual check on Rubber and Rubber - Metal bonded parts for cracks, damages and ageing.

- **8. Pins and bushes**
- Lubricate all pins and Bushes.

- **9. Body works -**
- General inspection of Vehicle body work (paint work, glazing).

- **10. Pressure Air Equipment**
- Dry out air - filter
- Clean air - filter
- Clean airline - filter

- **11. Interior fitting passenger accommodation**
- Inspect seats & check for completeness.
- Inspect luggage racks & check for completeness.
- Check handrails manually for fitment of fixing.
- Inspect floors.
- Checks stick-on notices and directions for condition & completeness.

- **12. Passenger Doors**
- Clean & lubricate door mechanisms.

- **13. Water supply system**
- Rinsing the pipes & water tanks.

SCHEDULE D3 : HALF YEARLY 6 MONTHS ± 15 DAYS

(On rake at nominated primary depot)

- **1. All items of Schedule D2**
- **2. Shell**
- Thoroughly clean and remove dust, rust accumulated at pillars with coir brush and compressed air.
- Examine for corrosion of sole bar and other under frame members with torch light or inspection lamp.
- Touch up damaged paint both inside & outside.
- Check roof ventilator for damages.

- **3. Bogie Frame and Bolster Assembly**

- Examine the bogie frame for corrosion / damages, especially at critical locations.
- Carry out paint touch up with high built epoxy primer and paint as per RCF specifications MDTS – 166.

- **4. Brake Equipment**

- Verify that the clearance between each pad and disc surface is 1-1.5 mm.

- **5. Axle Bearing Instruments**
- Inspect the Earthing equipment for wear of slip assembly / carbon bars.

- **6. Primary & Secondary Suspension**
- Check miner pads for cracks, damages and ageing.

- **7. Wheel & Axle**
- Check wheels offset on axle (1600 ± 1 mm)

- **8. Anti Roll bar assembly**
- Perform a visual check on rubber joints for cracks, damage and ageing.
- **9. Body works -**
- Replenish supplies.
-
- **10. Passenger Doors**
- Lubricate door seals with silicone paste.

THANK YOU

Comparison of FIAT with ICF Bogie



Features	FIAT	ICF
Speed Potential (kmph)	160	140
Ride Index (max.)	2.75 at 180kmph	3.5 at 140kmph
Weight (t)	6.5	5.72 (13t) 6.5(16.25t)
Wheel base(mm)	2560	2896
Inner axle distance (m)	12.34	11.89
Wheel dia new (mm)	915	915
Wheel dia wom (mm)	845	814
Axle box guidance	Articulated	Rigid
Dampers – Primary	Hydraulic damper	Dashpot