



AIR BRAKE SYSTEM
of
LHB COACHES

COMPONENTS OF BRAKE SYSTEM

- ▶ Mainly Brake Equipment's are placed at four locations:

- ▶ Pressure tanks (Air reservoirs):

- ▶ Main reservoir

- One 125L for brake application
(Protected by check valve)

- ▶ Auxiliary reservoir

- One 75L for toilets & brake

- (Capacity of Both 125L and 75L available for brake application)**

- ▶ Controlled reservoir

- One 6L

CONSTITUENTS OF BRAKE SYSTEM

Brake control panel

Test fittings

Feed Pipe

Brake Pipe

Control Reservoir

Brake Cylinder

Pressure switch to operate WSP (connected to FP):

At 1.3 Bar-Off

At 1.8 Bar-On

Filters for BP and FP

Isolating cocks for:

1. Feed pipe
2. Toilet
3. Bogie-1 and Bogie-2
4. Isolating cock for emergency brake (ACP system).



Choke -2mm in Brake indicator line:

(Fitted in connection to the brake indicators to minimize the loss of brake cylinder pressure in the event of indicator failure)



▶ **Distributor Valve with intermediate flange:**

- ▶ Relay valve is directly mounted.
- ▶ It has a quick release device mounted to the valve body.

▶ Equipment's on Bogies:

▶ Hose connections:

- ▶ 4 Nos (To Connect BC line to each axle)
- ▶ 8 Nos (Bifurcates BC to each brake cylinder)

▶ Brake caliper unit:

- ▶ Qty required: 8 Nos (4 nos per bogie-2 LH and 2 RH)
- ▶ Suitable for fitting UIC type 200x2 pads of thickness 35 mm
 - ▶ Calipers shall give effective brake radius of 247mm
- ▶ Lever Ratio: 2.17 for all except 2.48 for ACCN/SG and Power car

▶ Brake cylinder :

- ▶ Compact construction
- ▶ Auto slack adjuster - Brake shoe clearance due to wear corrected automatically by single acting slack adjuster.
- ▶ No manual adjustment to make after brake pad replacement.
- ▶ Piston travel: 21 mm (max)
- ▶ Slack capacity: 160mm (max)
- ▶ Cylinder size: 10 inches
- ▶ Max BC pressure: 3.0 kg/cm²

▶ Brake pads -35mm thick and 200 Cm²
(Composite type):

- ▶ Quantity per coach: 32 Nos. (16 LH - 16 RH)
(16 on each bogie-2 on each caliper)
- ▶ Wear limit -28mm max.

▶ Brake Disc:

- ▶ Quantity per coach -8 Nos (two per axle)
- ▶ Disc dimensions -640X110
- ▶ Material: Grey cast iron

▶ Speed sensor cable with pole wheel (80 teeth):

- ▶ 4 Nos. -One per axle)
- ▶ Gap between speed
Sensor and pole wheel - 0.9 to 1.4 mm

Emergency Brake system

- ▶ In each compartment emergency pull boxes are installed, which operates through emergency brake valve.
- ▶ If handle of pull box moved then the brake valve exhaust the BP via a large orifice up to 2 bar after this it stop to vent.
- ▶ Emergency brake light outside the coach will be activated by using the pull box, which is equipped with an electrical switch.

▶ Equipment on car body:

- ▶ Angle cocks 8 Nos. (Old), 4 (New)
(At coach ends on BP and FP Pipes-FP and BP bifurcated into two branches to make coupling between two adjacent coaches)
- ▶ Brake and feed pipe coupling 8 Nos. (4BP and 4 FP) Old
4 Nos. (2BP and 2 FP) New
- ▶ Brake application and release indicators 4 Nos (2per Bogie-2 on each side of the coach)
- ▶ Antiskid valve /Dump valve 4 Nos
 - ▶ 2 per Bogie or One per Axle
- ▶ Terminal Box for speed sensor cable - 4 Nos
- ▶ Terminal Box for Antiskid valve - 4 Nos



- ▶ Emergency Brake accelerator -1 Nos.

- ▶ Mounted on brake pipe. If the BP drop rate is 1.5 kgf/sq. cm or more within 3 seconds, brake accelerator activates.

- ▶ Brake accelerator designed to operate during emergency brake application and ACP only.

- ▶ Two 28mm pipes running through the coach for BP and FP

- ▶ DV is activated by BP pressure increase or reduction for brake application and release

PIPES AND PIPE FITTINGS

▶ Pipes used:

- ▶ 28mm for BP and FP
- ▶ 10mm for emergency and pressure gauges
- ▶ 18mm for brake cylinder pipes (BC line)

Thickness = 1.5mm

Thickness = 1mm

Thickness = 1.5mm

PIPE FITTINGS-BITE TYPE

- ▶ Cutting ring ensures sealed joint.
- ▶ Designed for metric tubes i.e. OD of pipe is important





▶ Precautions:

- ▶ Fittings are to be handled with care. Bite edge to be protected
- ▶ Do not use hand cutters. Edge of should be straight
- ▶ Fix pipes line with clamps.
- ▶ Non standard materials or tolerances lead to incorrect fittings.
- ▶ The tools & lubricants recommended by EO ensure safe assembly.



▶ Advantages:

- ▶ Sealing capability
- ▶ High pressure resistance
- ▶ Durability
- ▶ Bite control
- ▶ Assembly cost
- ▶ Integrated preassembly tool
- ▶ Reliability
- ▶ Make-up
- ▶ No phantom leaks

ADDITIONAL EQUIPMENT FOR HAND BRAKE

- ▶ Hand brake indicators 2 Nos (One on side of Power car/Guard van)
- ▶ Cheek valve 1 Nos. (In feed pipe)
- ▶ 6 Ltrs. Air cylinder- 1 Nos. (Mounted on ABP)
- ▶ Flexi ball cable- 1 Nos.

ADDITIONAL EQUIPMENT FOR HAND BRAKE

▶ Pressure gauges- 3 Nos.

▶ FP

▶ BP

▶ BC

▶ Brake caliper units- 2 Nos.

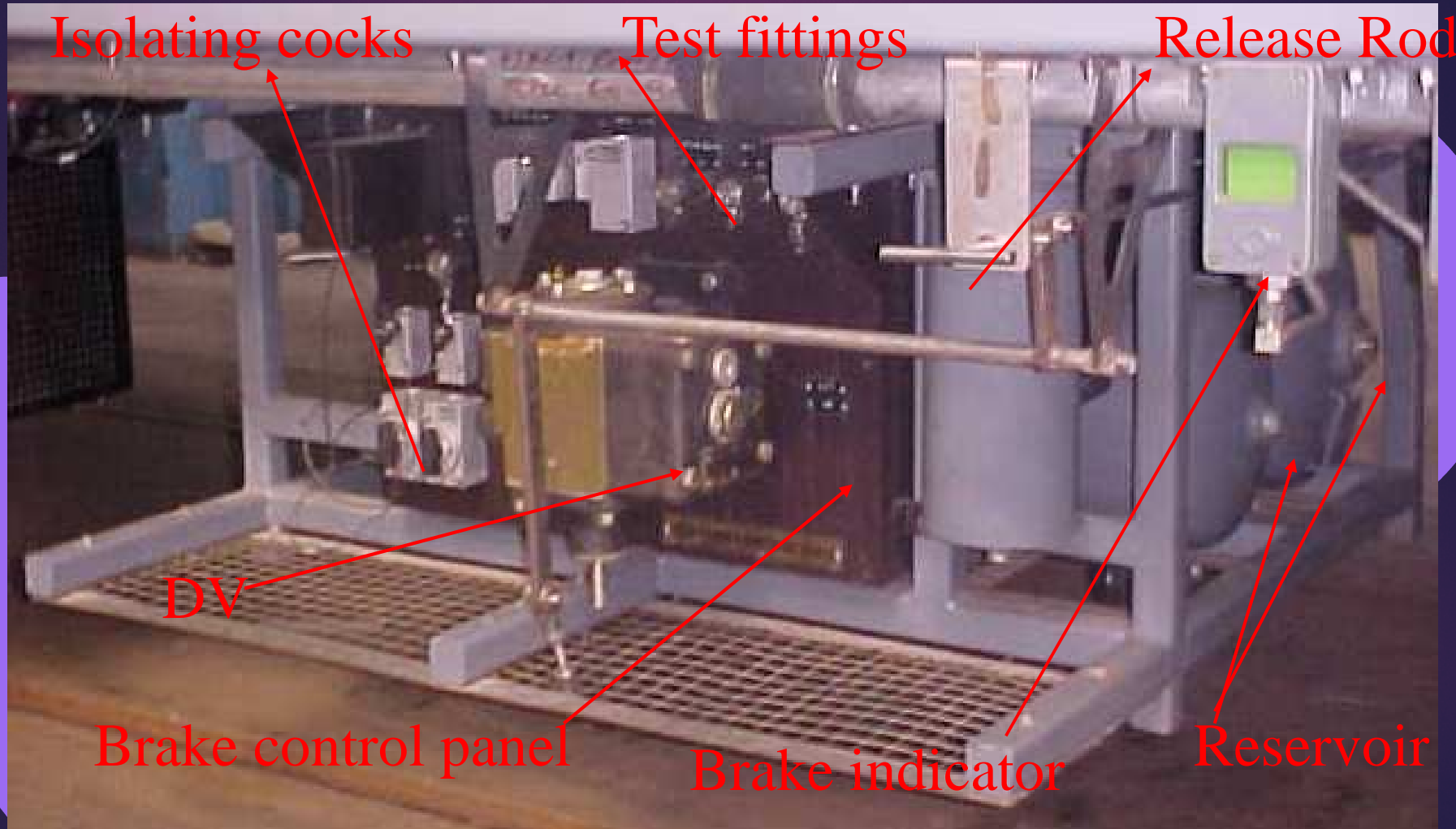
(of different type suitable for hand brake flexible connections)

▶ Connecting part for flexible ball- 2 Nos.

Feature of axle mounted disc brake system with WSP (compared with conventional brake system)

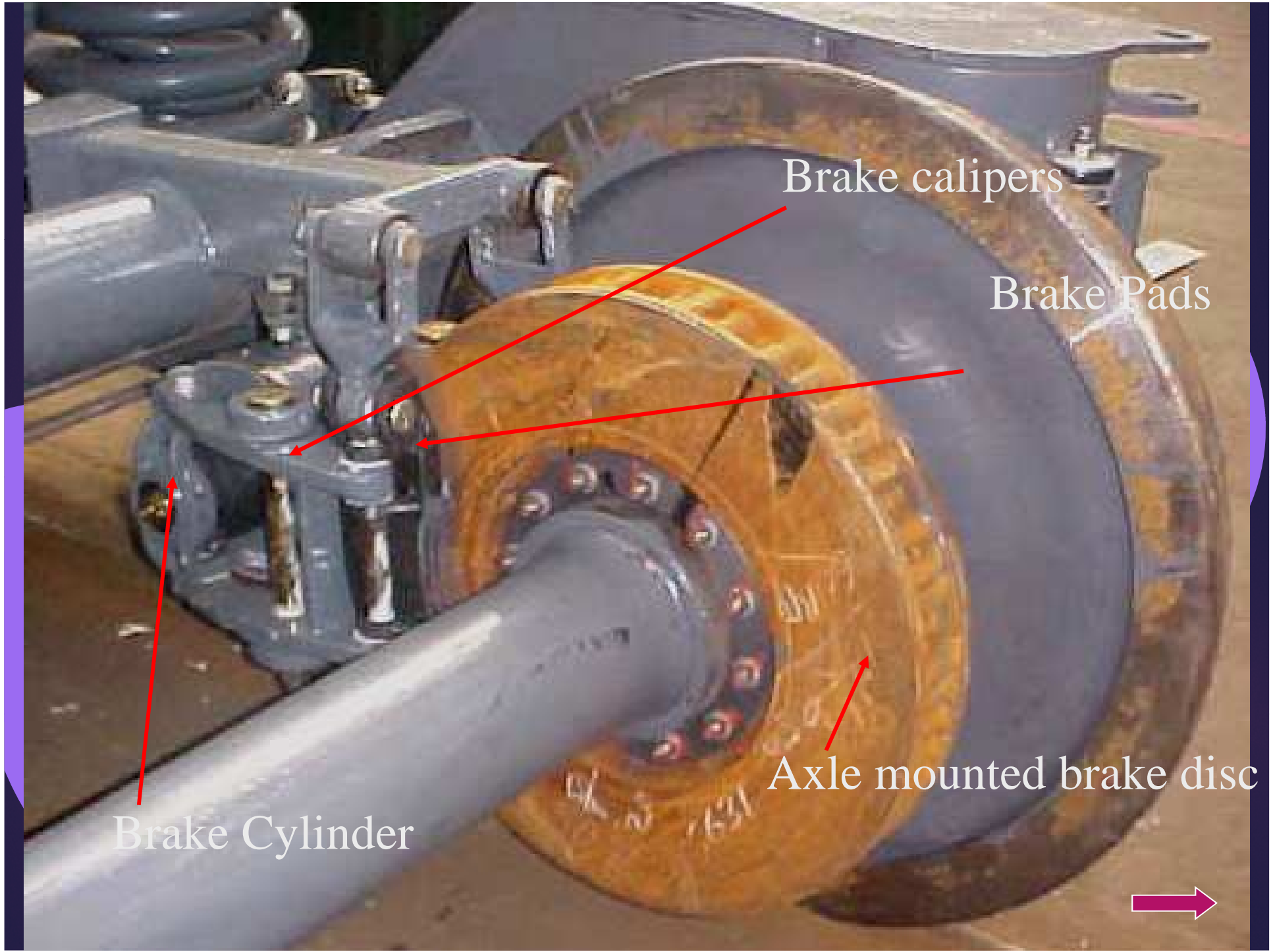
- ▶ Less thick stainless steel pipes (Metric pipes).
 - ▶ No threads/Flange joints
 - Bite Type fittings used.
- ▶ No brake rigging
- ▶ Wheel slide protection unit
 - Take care wheel flattening
 - Complete coach.
- ▶ Centralized control
- ▶ Braking on Axle mounted disc
 - No wheel wear due to braking.
- ▶ Brake accelerator
 - for sharp reduction of BP pressure in complete train set.
 - Ensures brake application time and release.
- ▶ DV with relay
 - Ease for maintenance.
- ▶ All Pipes below under frame
 - Improved design (Properly supported
- ▶ Release rod
 - RED means brake applied
 - Green means brake released
- ▶ Brake Indicators

BRAKE CONTROL PANEL AND INDICATOR UNIT



SAB WABCO CONTROL PANEL





Brake calipers

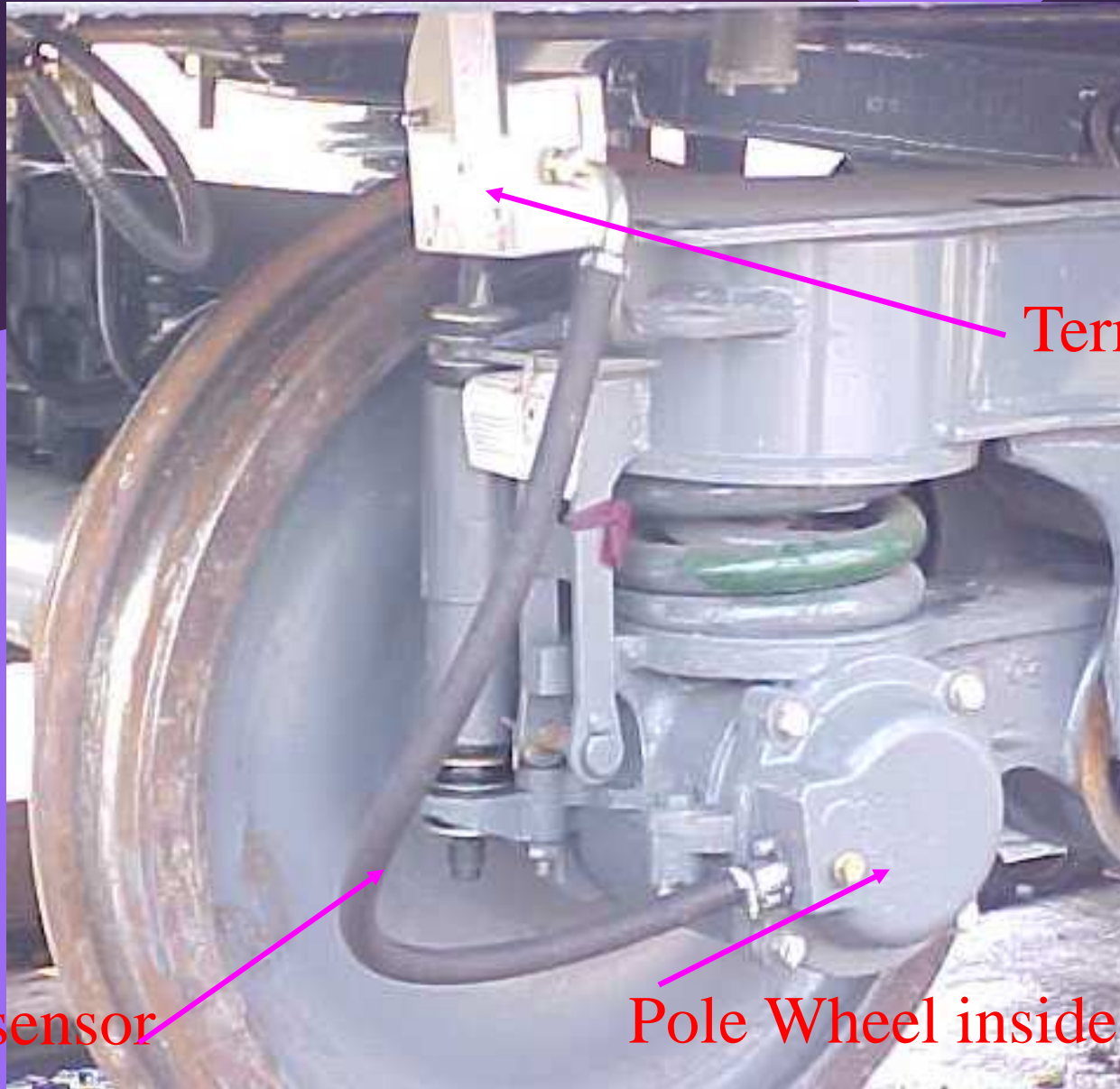
Brake Pads

Axle mounted brake disc

Brake Cylinder



SPEED SENSOR CABLE WITH TERMINAL BOX



Terminal Box

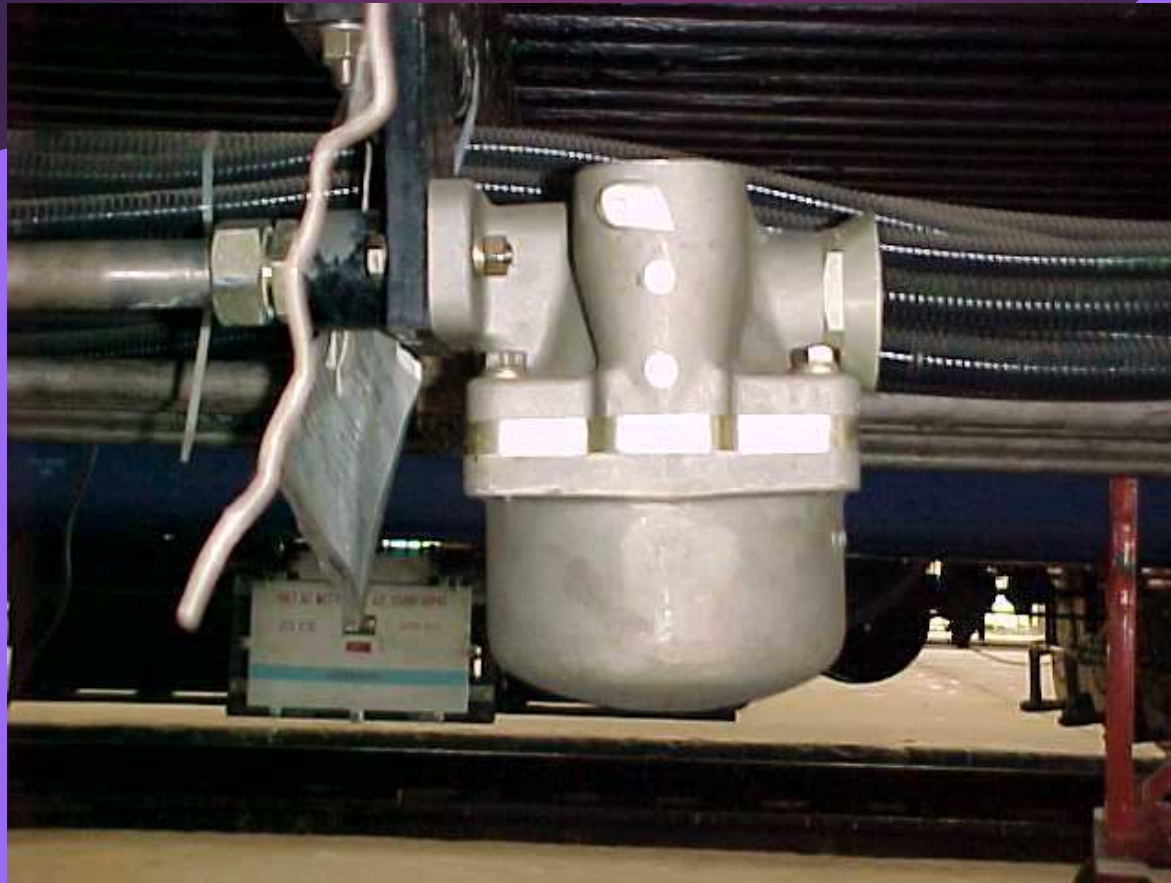
Cable sensor

Pole Wheel inside the cover

EMERGENCY PULL BOX



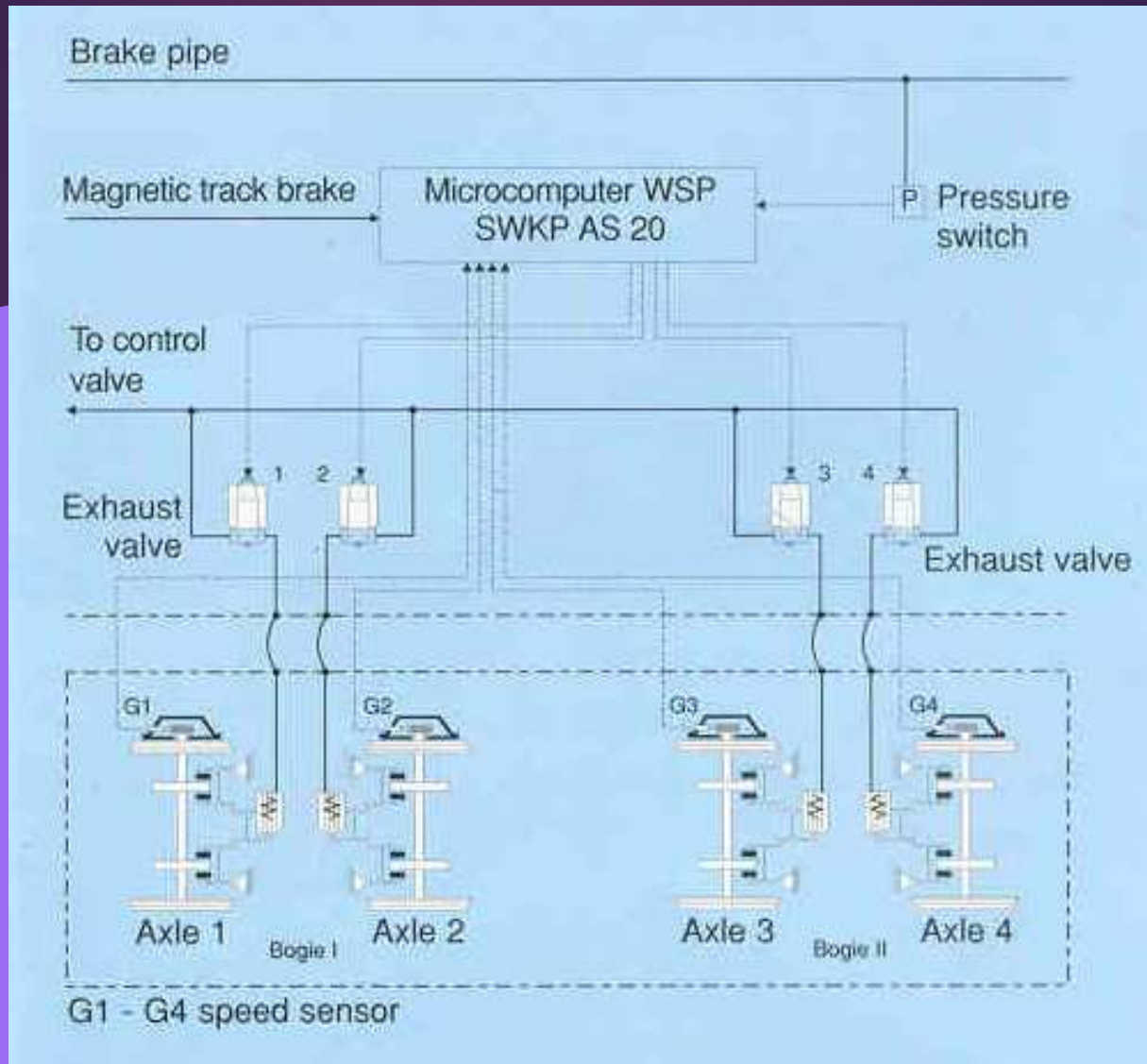
BRAKE ACCELERATOR



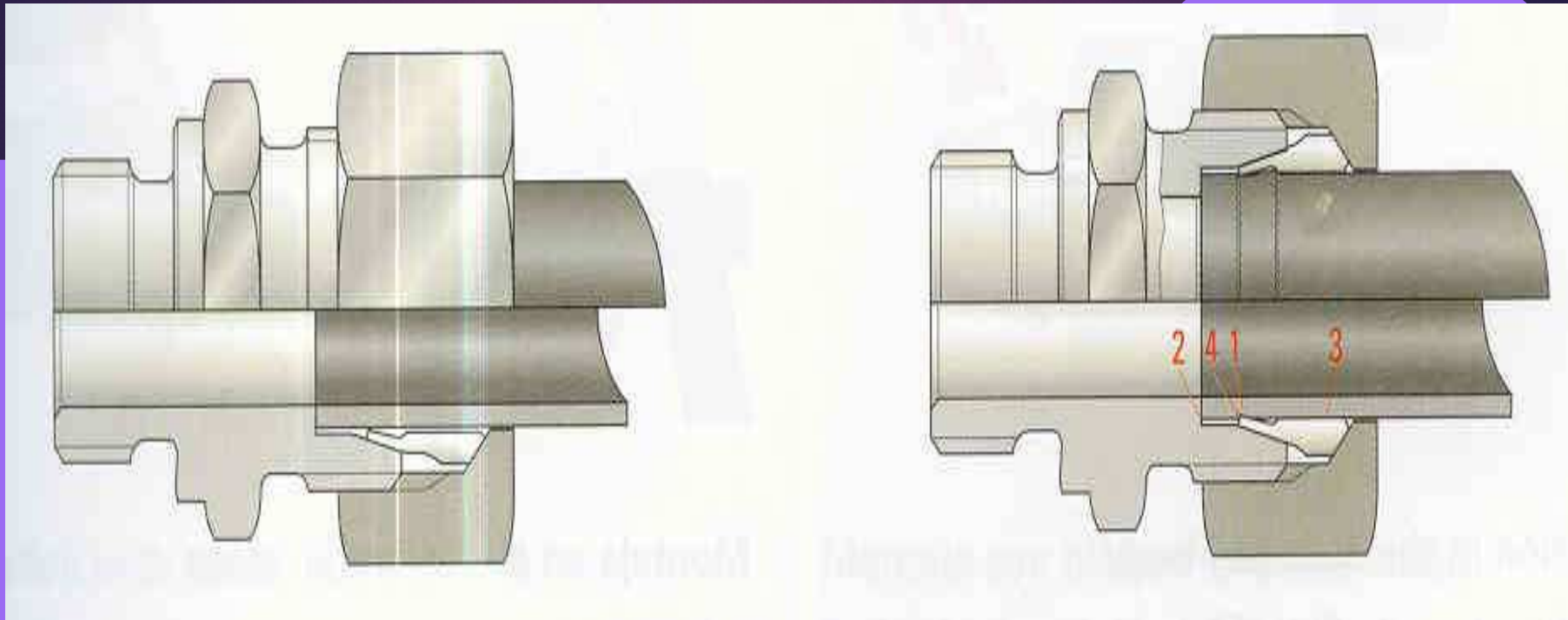
WSP ELECTRONIC UNIT



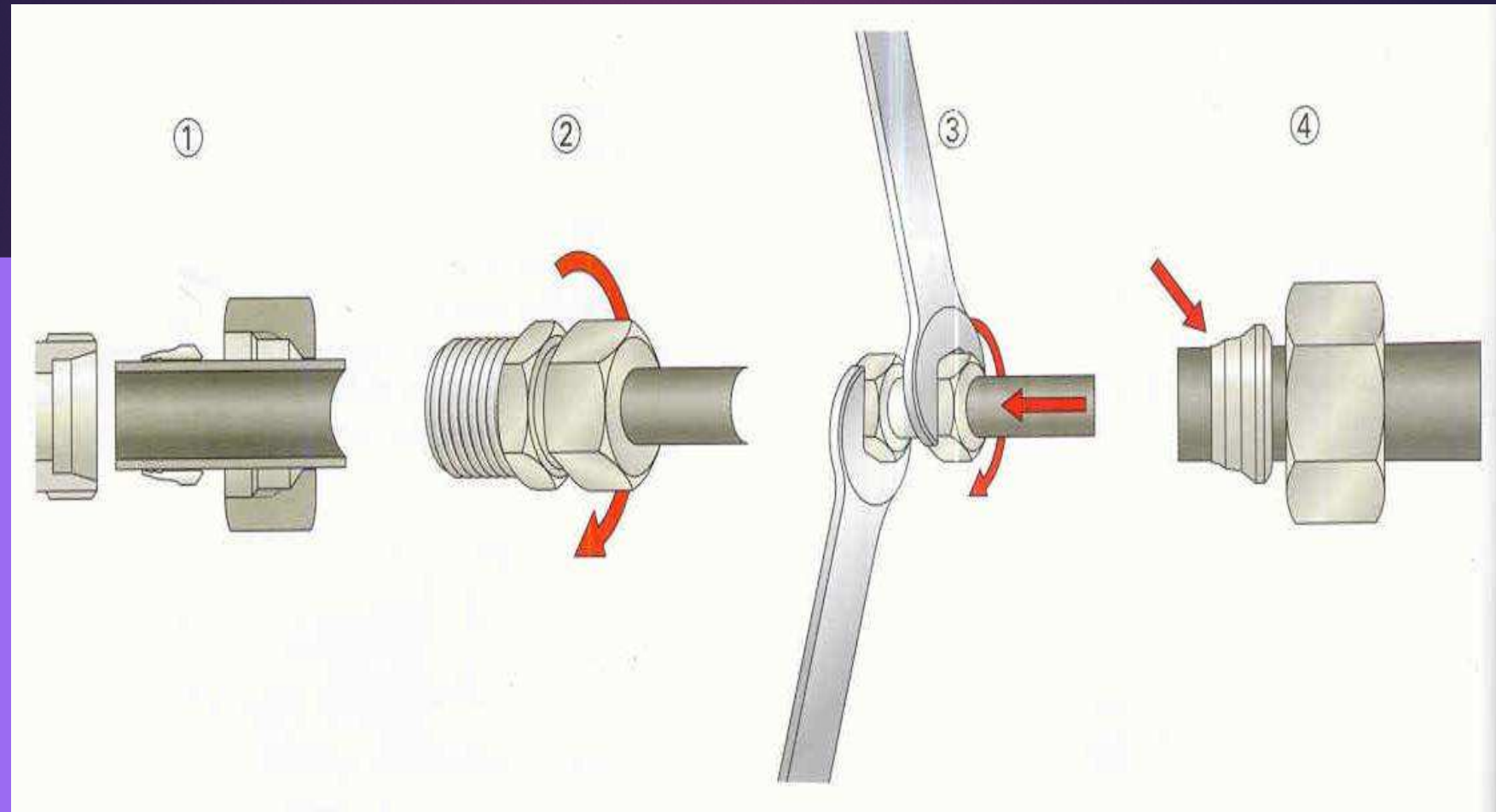
Principle of Antiskid System



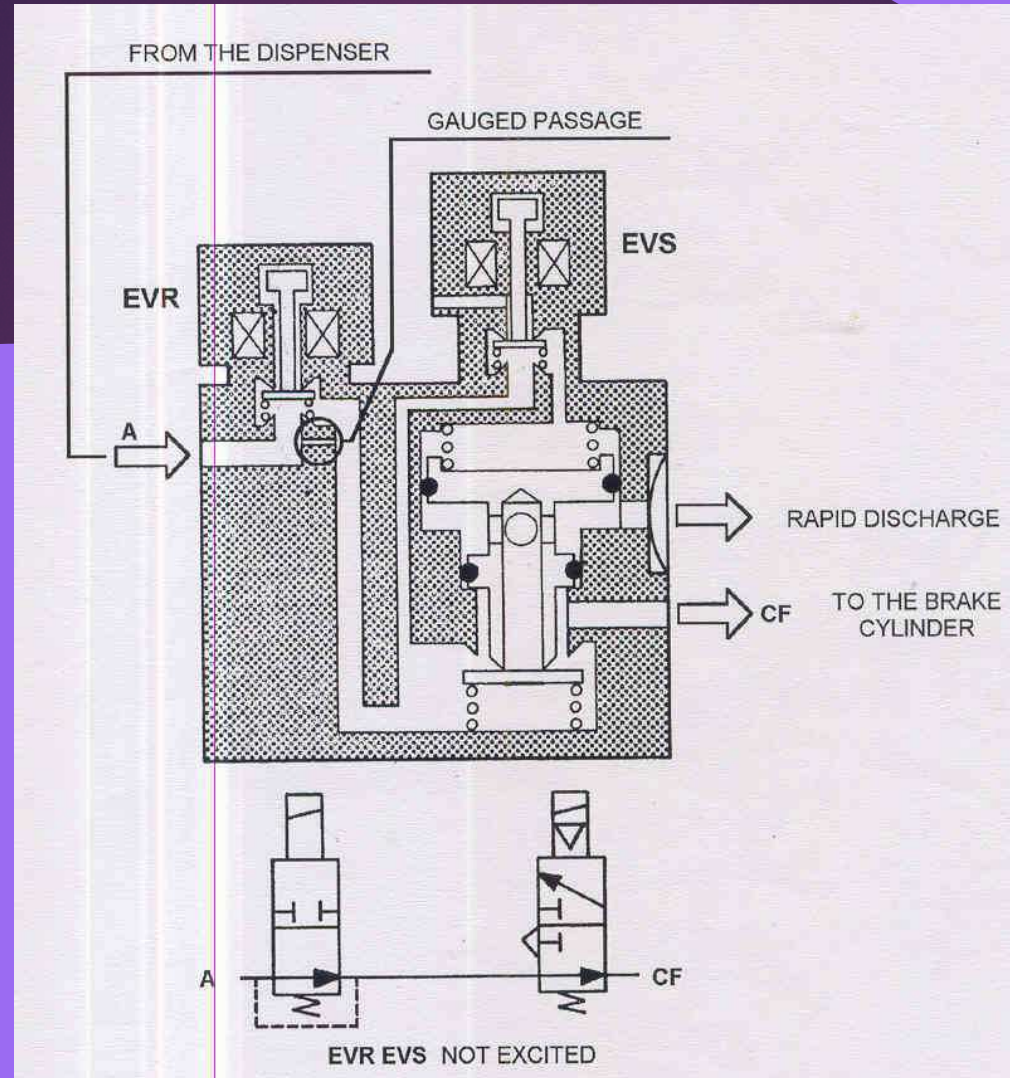
PRINCIPLE OF BITYE TYPE FITTING

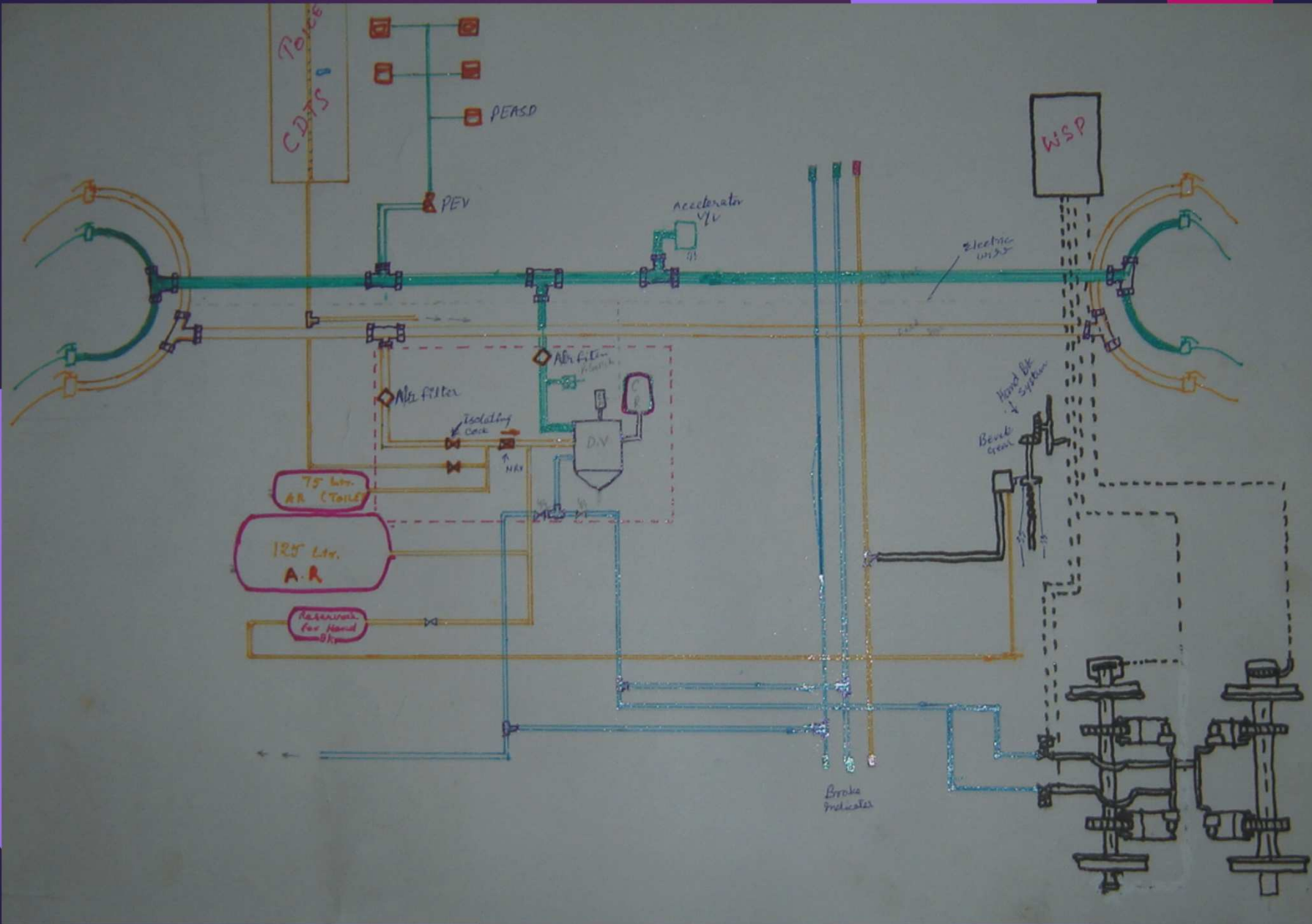


Tightening of the bite fitting



Anti skid/ Dump valve assembly design.

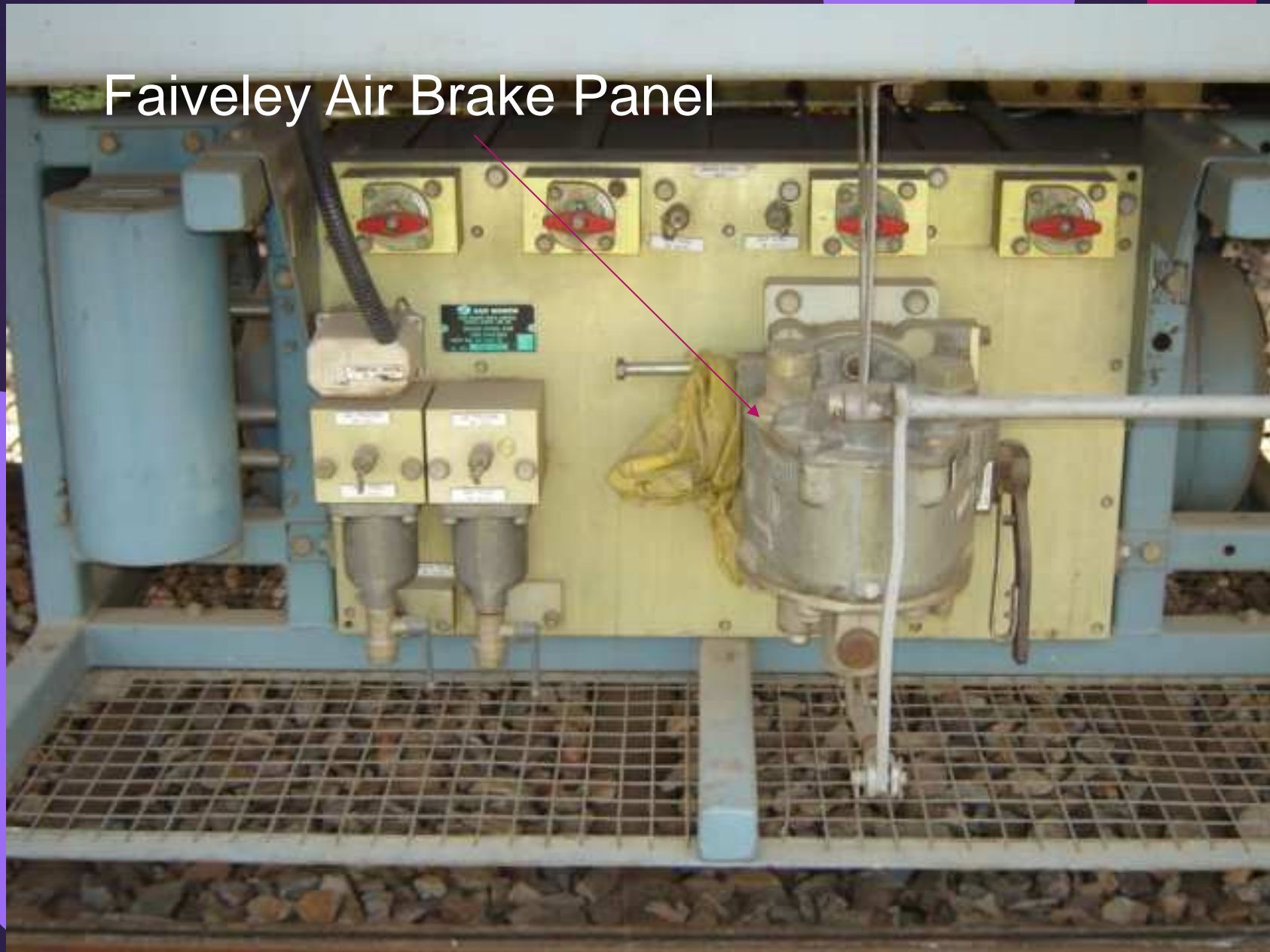




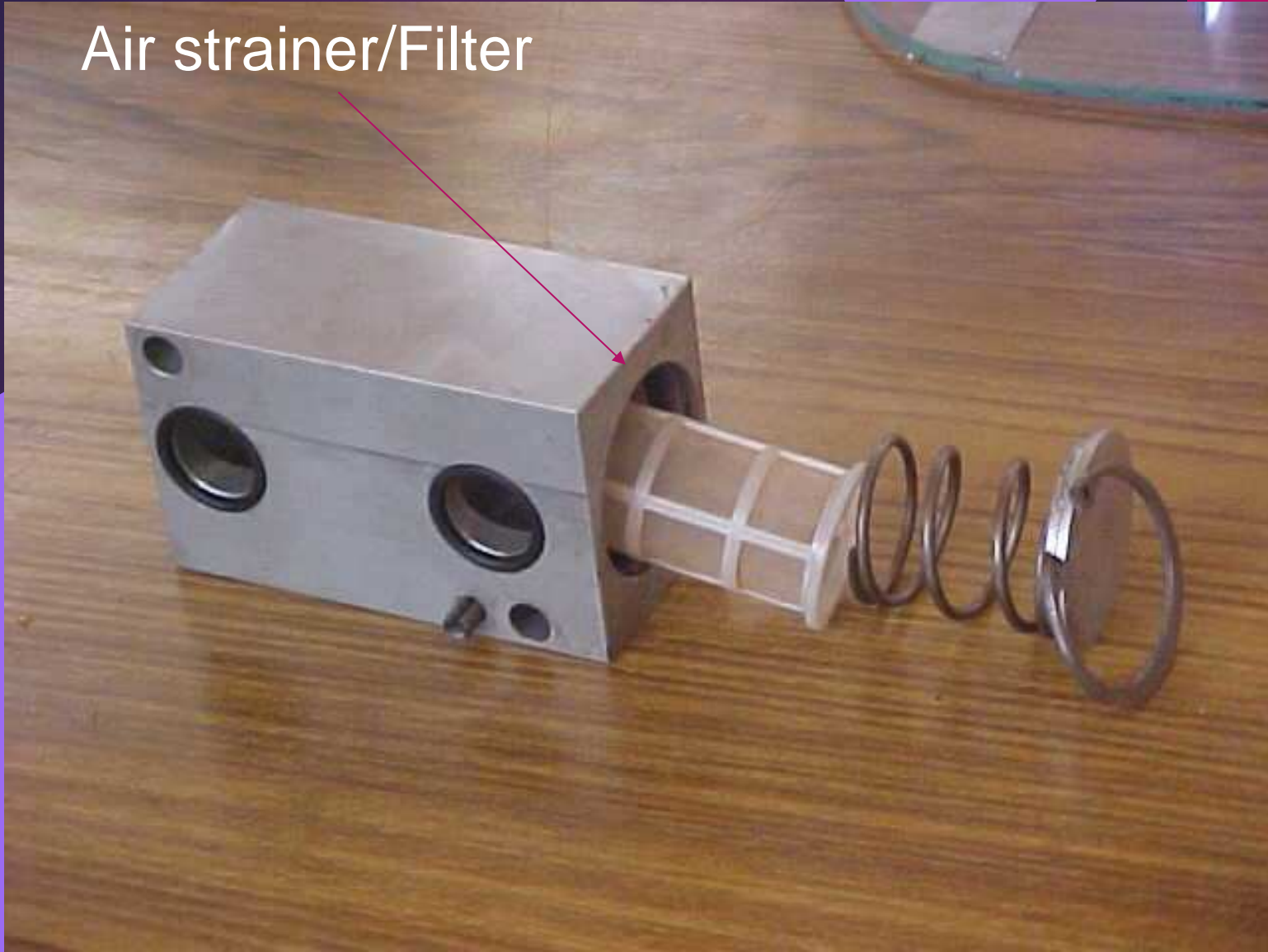
Knorr Air Brake Panel

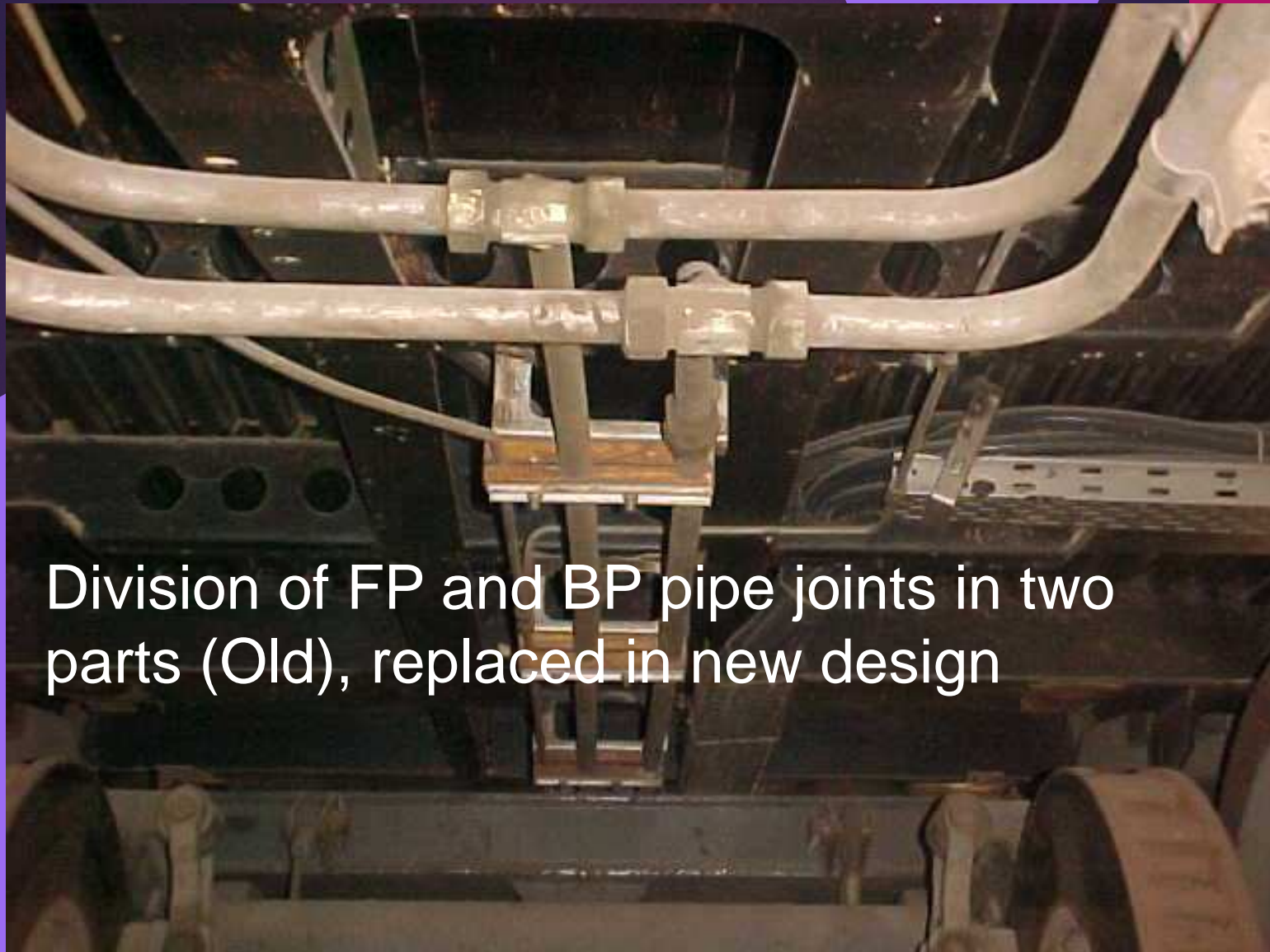


Faiveley Air Brake Panel



Air strainer/Filter



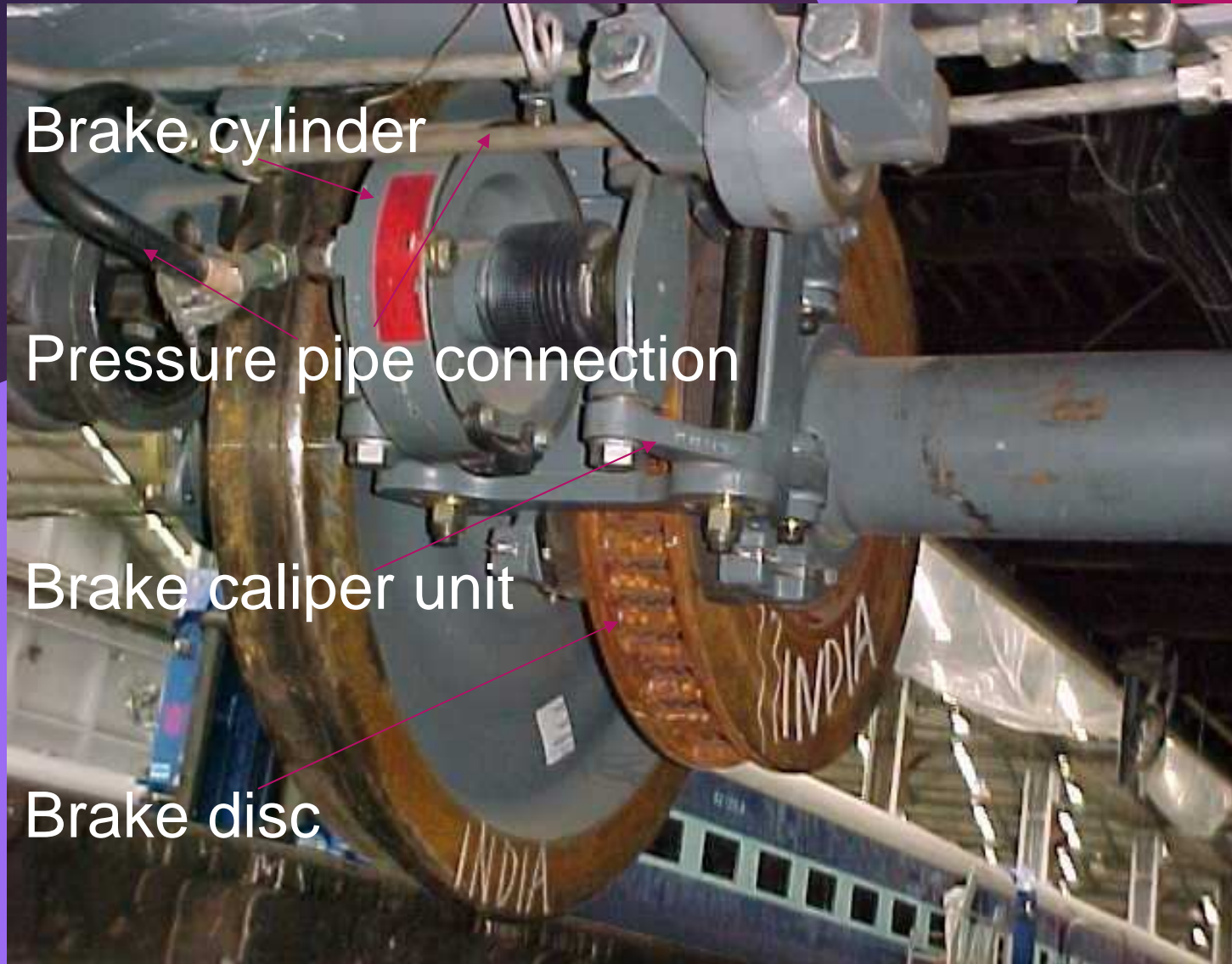


Division of FP and BP pipe joints in two parts (Old), replaced in new design



Wheel shelling marks





Brake cylinder

Pressure pipe connection

Brake caliper unit

Brake disc

