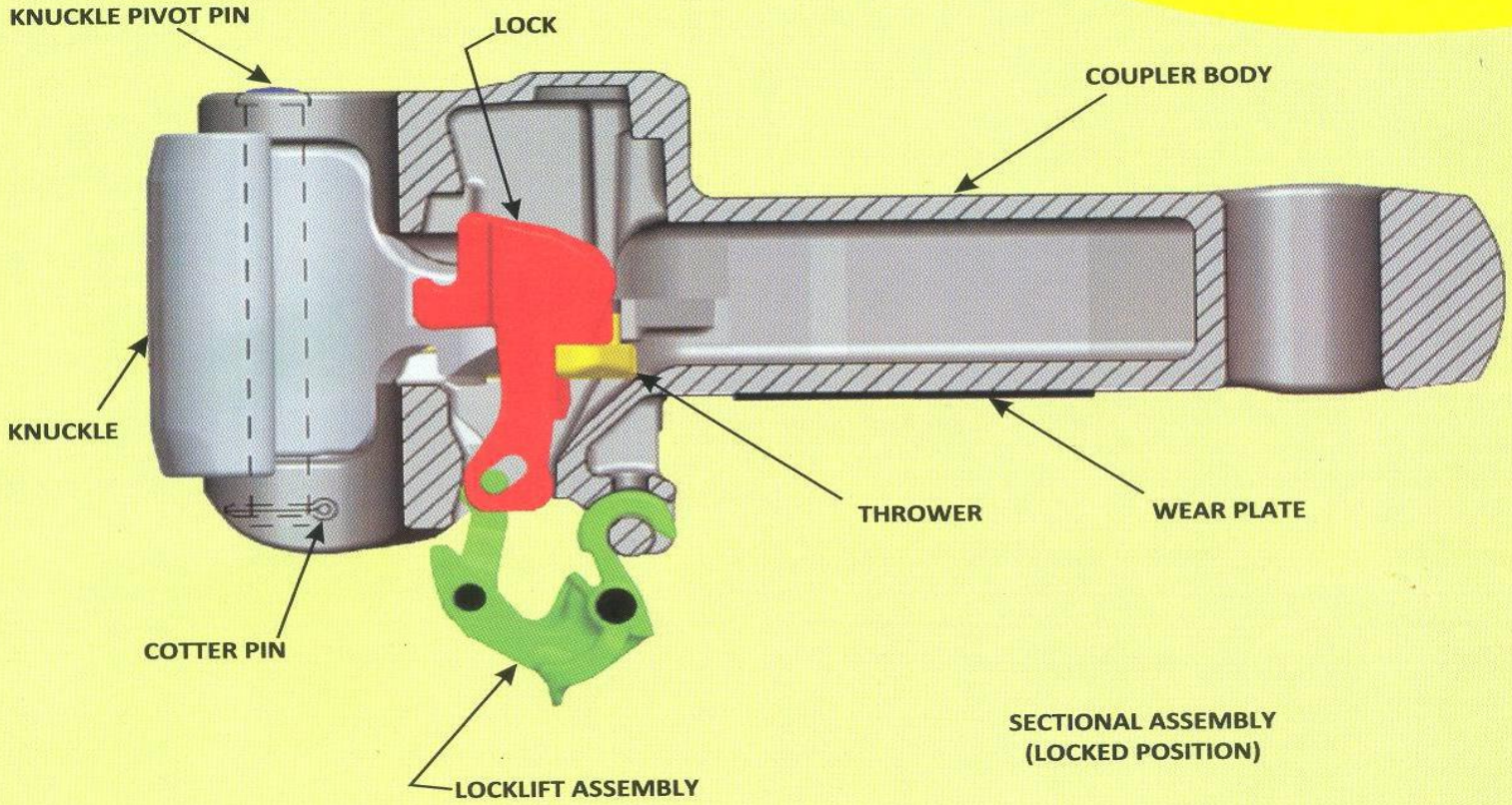
Supervisors' Training Centre, Jhansi

WELCOME

All Participants

PRESENTATION ON

CBC TRAIN-PARTING



CBC Train-Parting

PRESENTED BY: D.N.Verma

Chief Instructor

STC/JHS

Objective

- Awareness about CBC fitted in wagon and coaching stock.
- Prevention of Train Parting fitted with CBC stock.

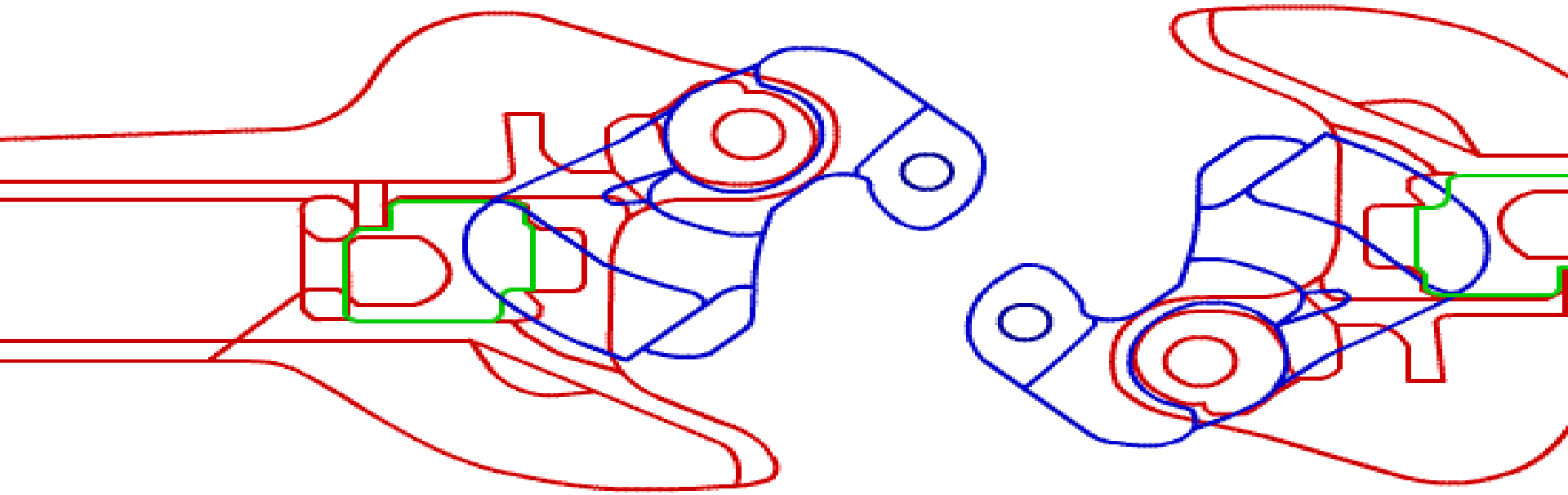
TRAIN PARTING IN CBC STOCK

Train Parting:- Any train divided in two or more portion is known as a train parting.

Note:- 1. A set of Vehicle attached with engine or any self propelled vehicle or light engine is known as train.

2. It is treated as an accident as per accident manual under category “J”

COUPLER



It is a mechanical device used to interconnect rolling stock to form a train and to transmit draft and buffing forces

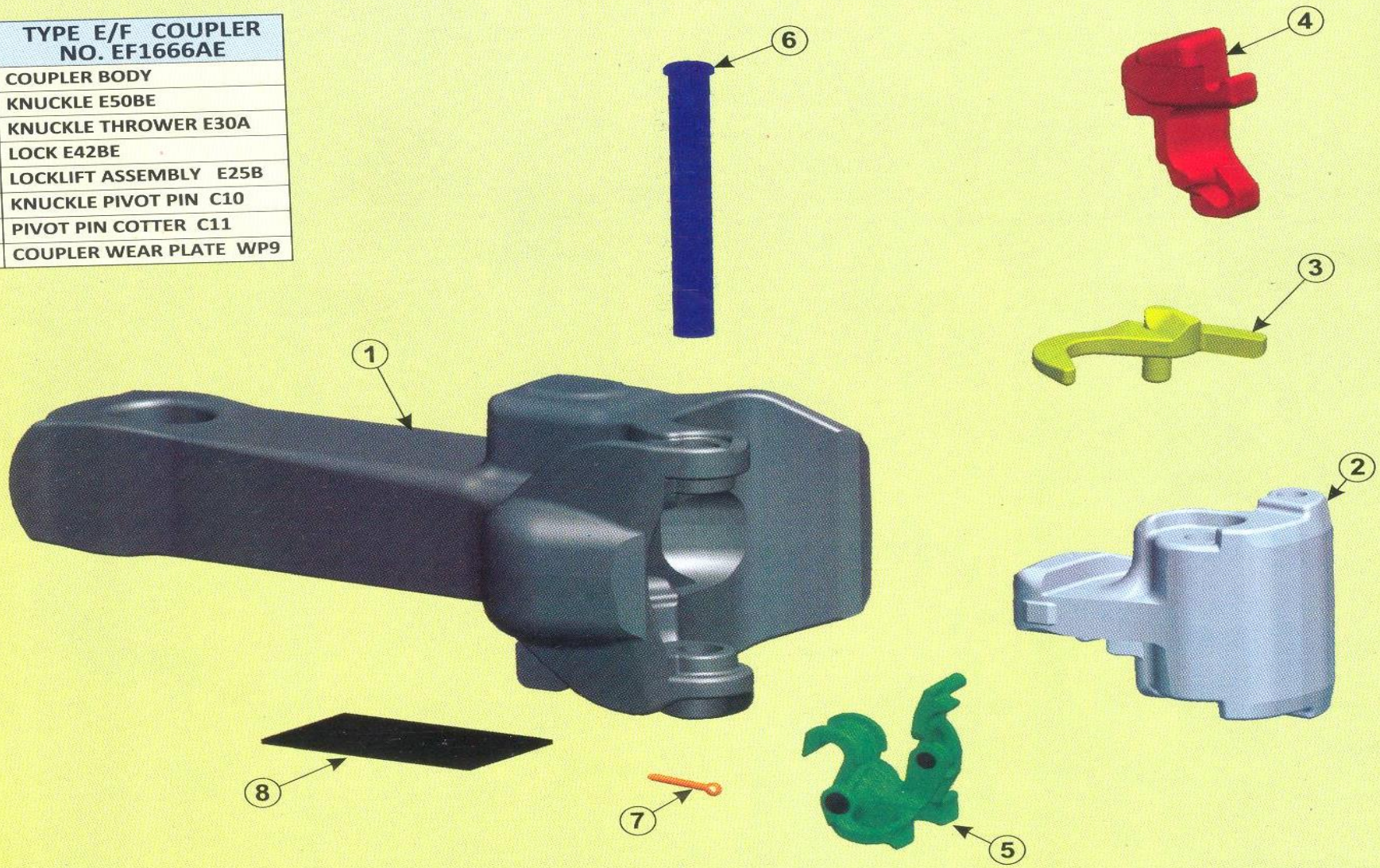
CBC COUPLERS

ALLIANCE II CBC	→	FOUR WHEELER GOODS STOCK (NOW REPLACED WITH AAR)
ABC COUPLER	→	ALL MG STOCK
SCHAKU COUPLER	→	DEMU/EMU
STANDARD AAR COUPLER	→	WAGON STOCK
AAR MODIFIED 'H' TYPE COUPLER	→	LHB COACHES & ICF COACHES

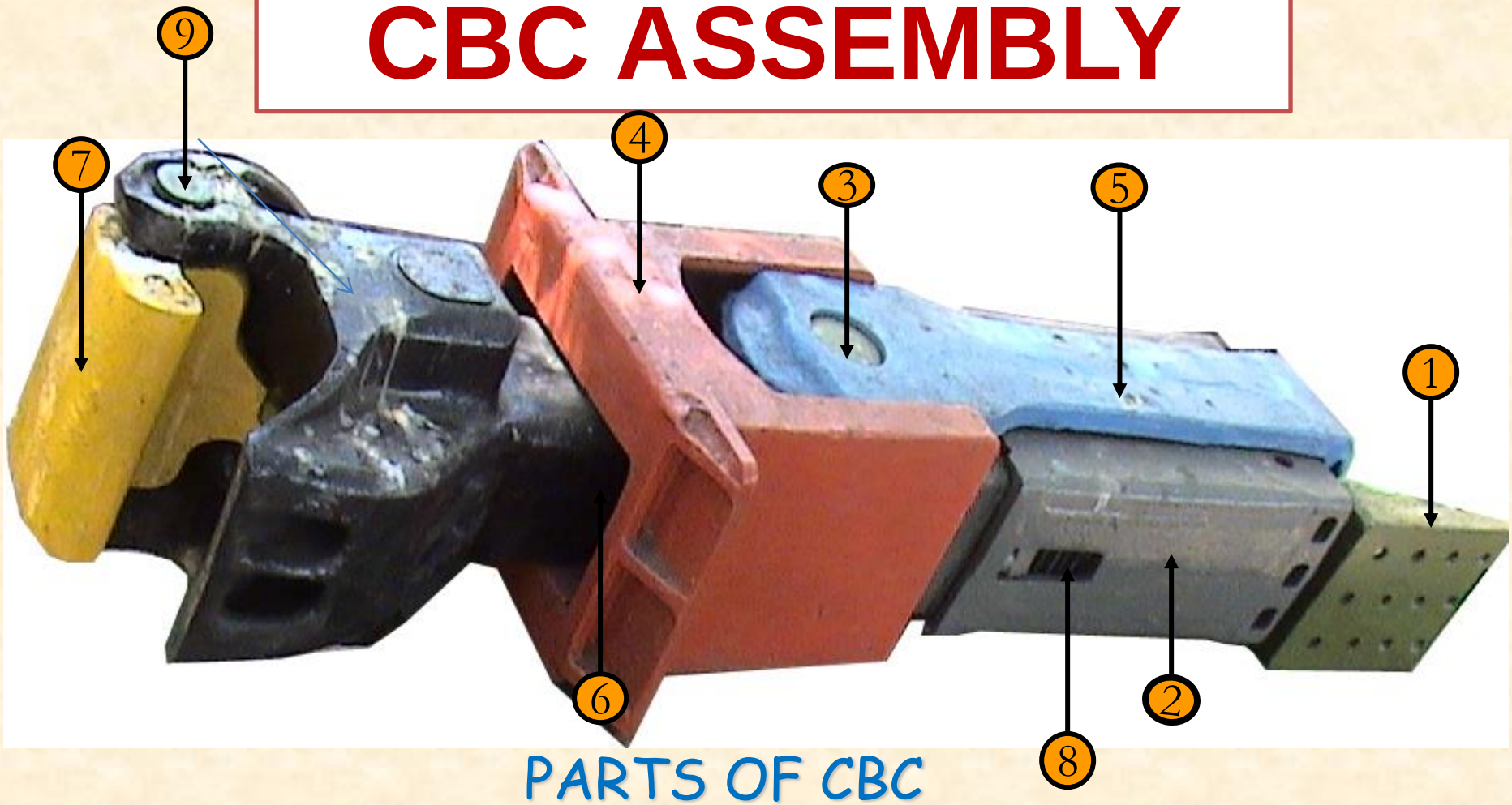
Main Component of Wagon CBC

Exploded Assembly

ITEM	TYPE E/F COUPLER NO. EF1666AE
1	COUPLER BODY
2	KNUCKLE E50BE
3	KNUCKLE THROWER E30A
4	LOCK E42BE
5	LOCKLIFT ASSEMBLY E25B
6	KNUCKLE PIVOT PIN C10
7	PIVOT PIN COTTER C11
8	COUPLER WEAR PLATE WP9

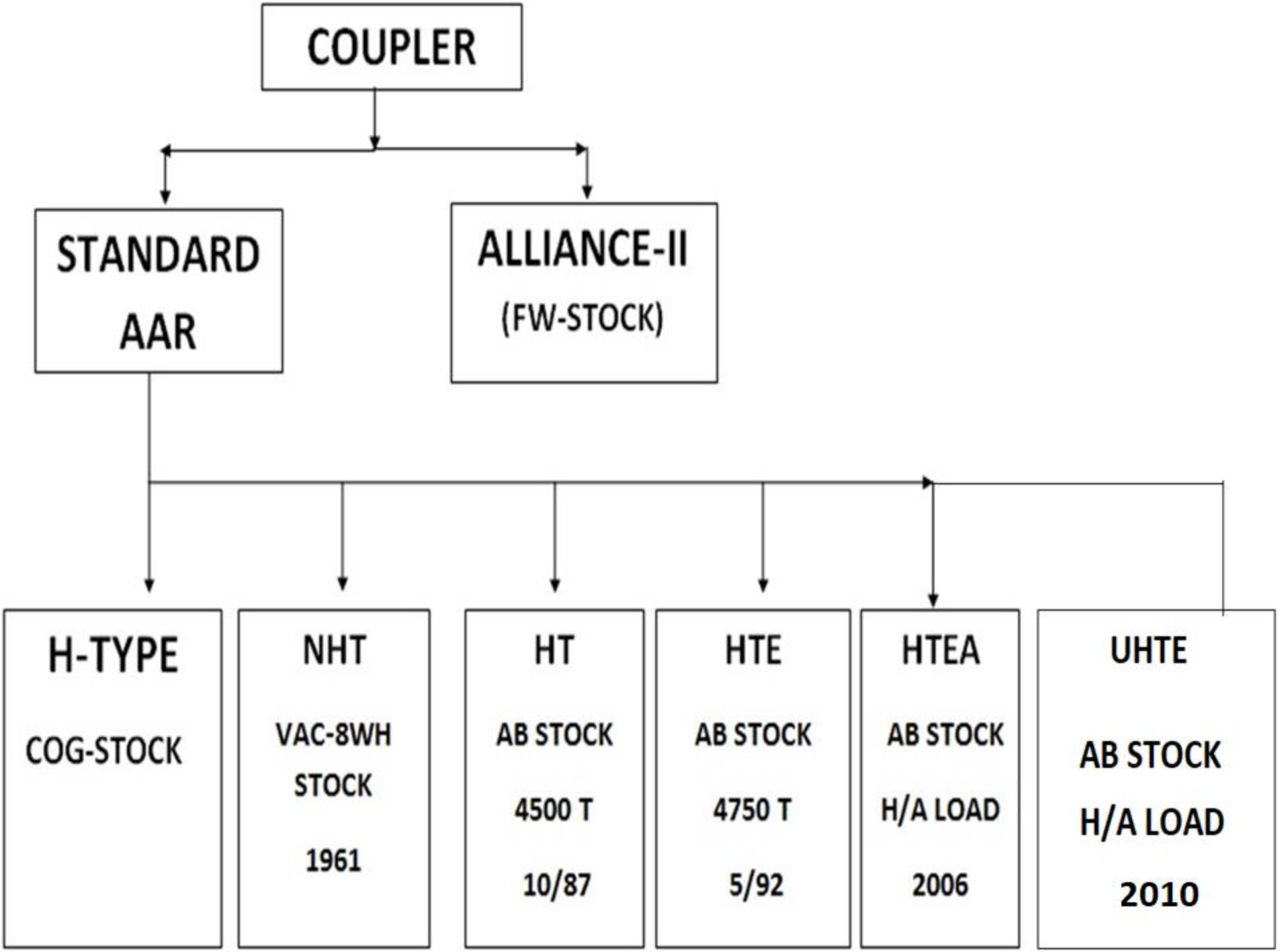


CBC ASSEMBLY



PARTS OF CBC

1. REAR/BACK STOPPER
2. DRAFT GEAR
3. YOKE PIN
4. STRIKER CASTING
5. YOKE
6. COUPLER BODY
7. KNUCKLE
8. DRAFT GEAR PADS
9. KNUCKLE PIN


COUPLER
STANDARD AAR
ALLIANCE-II (FW-STOCK)
H-TYPE
COG-STOCK
NHT
VAC-8WH STOCK
1961
HT
AB STOCK
4500 T
10/87
HTE
AB STOCK
4750 T
5/92
HTEA
AB STOCK
H/A LOAD
2006
UHTE
AB STOCK
H/A LOAD
2010

Comparative Data of Different Type's Couplers

Sr. No	Specification	NHT	HT	HTE	HTEA	UHTE
1	Working Capacity	85.T	120 T	120 T	120 T	120 T
2	Proof Load	132 T	170 T	170 T	170 T	180 T
3	Hauling Cap	6500 - 7000 T	9000 T	9000 T	9000 T	9000 T
4	Draft Gear	HR-40-1	MK-50, RF-361 & SL -76	MK-50, RF-361 & SL -76	MK-50, RF-361 & SL -76	F-325 G & SL -76, Mark-325

TRAIN PARTING TAKES PLACE DUE TO FOLLOWING FAILURES

- Mechanical Failure
- Crew Failure
- Operating
- Commercial
- Engineering failure
- Miscellaneous

MODE OF TRAIN PARTING

1. Both knuckle in closed condition

a. Horizontal slipping of knuckle
b. Vertical slipping of knuckle

a. HORIZONTAL SLIPPING OF KNUCKLE

I. Stretch of knuckle
II. Knuckle nose wear.
III. Expansion of Guard arm

b. VERTICAL SLIPPING OF KNUCKLE

Due to abnormal variation in CBC height

FACTOR AFFECTING CBC HEIGHT

1. **Improper Size of Axle Box Crown Packing**
2. **Due to Excessive wear in Coupler Shank/Striker Casting Wear plate**
3. **Due to Suspension Spring Breakage/ Weak**
4. **Due to Sole bar Sagging.**
5. **Due to excessive Pivot Wear.**
6. **Over and un even Loading.**
7. **Wrong Marshalling.**
8. **Un Even Track Joint.**
9. **Muddy Track.**

2. Automatic opening of knuckle

a. locking piece not seated properly
b. In effective of anti creep function
c. wear of locking piece and knuckle lock face.
d. dis location of knuckle thrower.
e. CBC operating handle bent
f. CBC operating handle bearing piece slot elongated
g. Damage / Deficiency of rotary lever assembly

3. Damage of CBC component

1. Breakage of knuckle
2. Breakage of coupler body
3. Breakage of yoke
4. Shearing of yoke pin support plate rivets
5. Perished draft gear pads/weaker springs

WEAR LIMIT & DIMENSIONAL FEATURE OF CBC COMPONENT

1. Knuckle Nose Wear Limit- 10 mm
2. Distance Between bottom of the Coupler Head and liver connector nose - 25 mm
3. Standered Distance Between Knuckle Nose and Guard Arm – 127
4. Permissible Distance Between Knuckle Nose and Guard Arm – 130
5. Wear in Locking Piece/Knuckle Lock Face – 1.5 mm each
6. Wear Allowed in Shank Wear Plate 3 mm
7. CBC Slack fitted with new draft Gear – 12 mm
8. CBC Slack fitted Off POH draft Gear – 19 mm
9. CBC Slack allowed in service fitted draft Gear – 25 mm

DETAILS OF MANUFACTURES FROM WHOM THE COUPLER AND DRAFT GEARS, AS PER WD-66-BD-06, ARE AS UNDER

Item	Name of Manufacturer	Model	Marking Code (marked on the left side of the head stock in two letters: first for coupler and second for draft gear)
Coupler	ASF-Keystone, USA	E/F	K
Coupler	McConway Torley, USA	E/F	M
Draft Gear	Wabtec USA	MK-325	X
Draft Gear	ASF-Keystone, USA	F325G	B
Draft Gear	MINOR	SL-76	L

METALLURGICAL

- The metallurgical report of failed knuckles has revealed the following manufacturing defects :
  - 1. Material specification is not as per AARM grade E
  - 2. Castings are found with blow holes and slag inclusions
  - 3. Improper heat treatment such as it should be quenched and tempered, as against which it is normalized.
  - 4. Cross sectional dimensions not maintained as per drawing.
- Non availability of spares for maintenance also contributed for failures particularly for fatigue failures.

MISCELLANEOUS

1. Miscreant activities play major role in train parting. During halt of train CBC operating handle operated by some miscreant resulting into train parting.
2. Start the train with given push and pull jerk.
3. After full service application of brake allow sufficient time for creation of Air Pressure.
4. When taking a turn out or loop should be steady speed.
5. Send Gear must be in good working order and filled with clean send.
6. Controller should avoid to stop train out side station where there is rising gradient.
7. Bad Engine man should be avoided.

POINTS TO BE CHECKED IN YARD TO AVOID TRAIN PARTING

Locking peices not seated properly → *Check gap between bottom of the coupler head and leaver connector node should be more than 25 mm.*

Cracks in coupler body & shank → *If found mark sick*

Critical area

Near knuckle pin, guard arm shank near striker casting

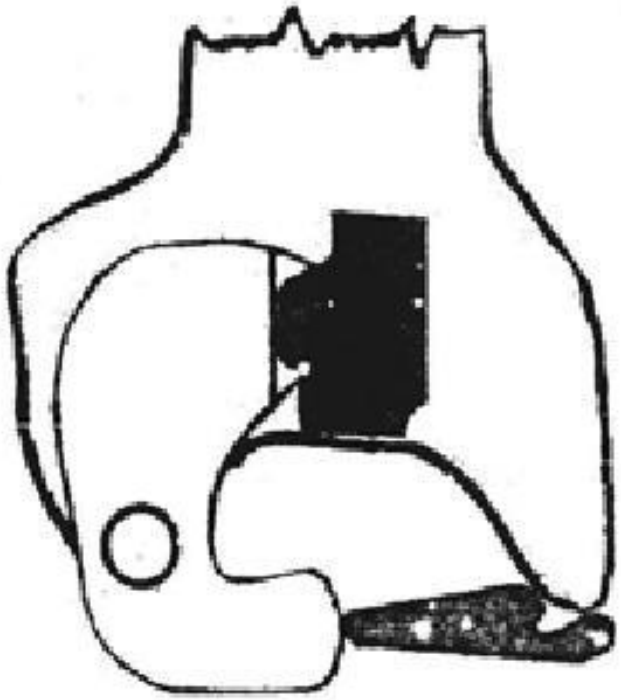
More gap between coupler body & striker casting → *Check draft gear, yoke & yoke pin for wear & breakage*

CBC Operating handle bent → *Check and replace bent operating handle*

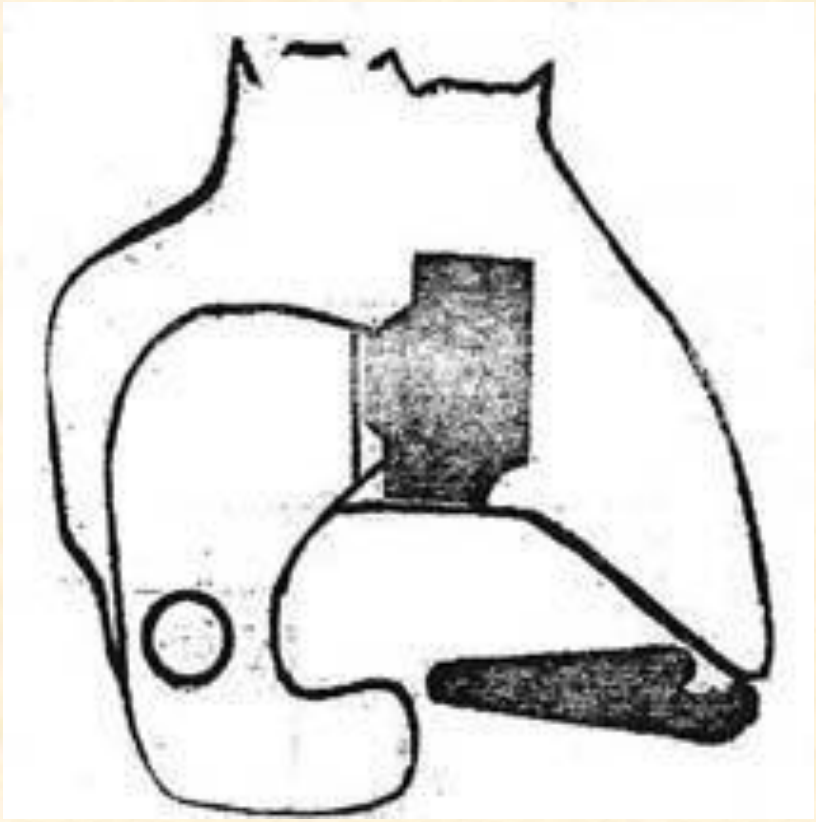
POINTS TO BE CHECKED IN SICK LINE/ROH TO AVOID TRAIN PARTING

All items of yard examination	→	*Check & Attend*
Examination on Knuckle	→	*Replaced by New one during ROH*
Worn out Shank & Sticker casting wear plate	→	*Near knuckle pin, guard arm shank near striker casting*
More gap between coupler body & striker casting	→	*Check draft gear, yoke & yoke pin for wear & breakage*
Excess Slack in coupler draft gear	→	*Check Slack of draft gear it should be given limit.*

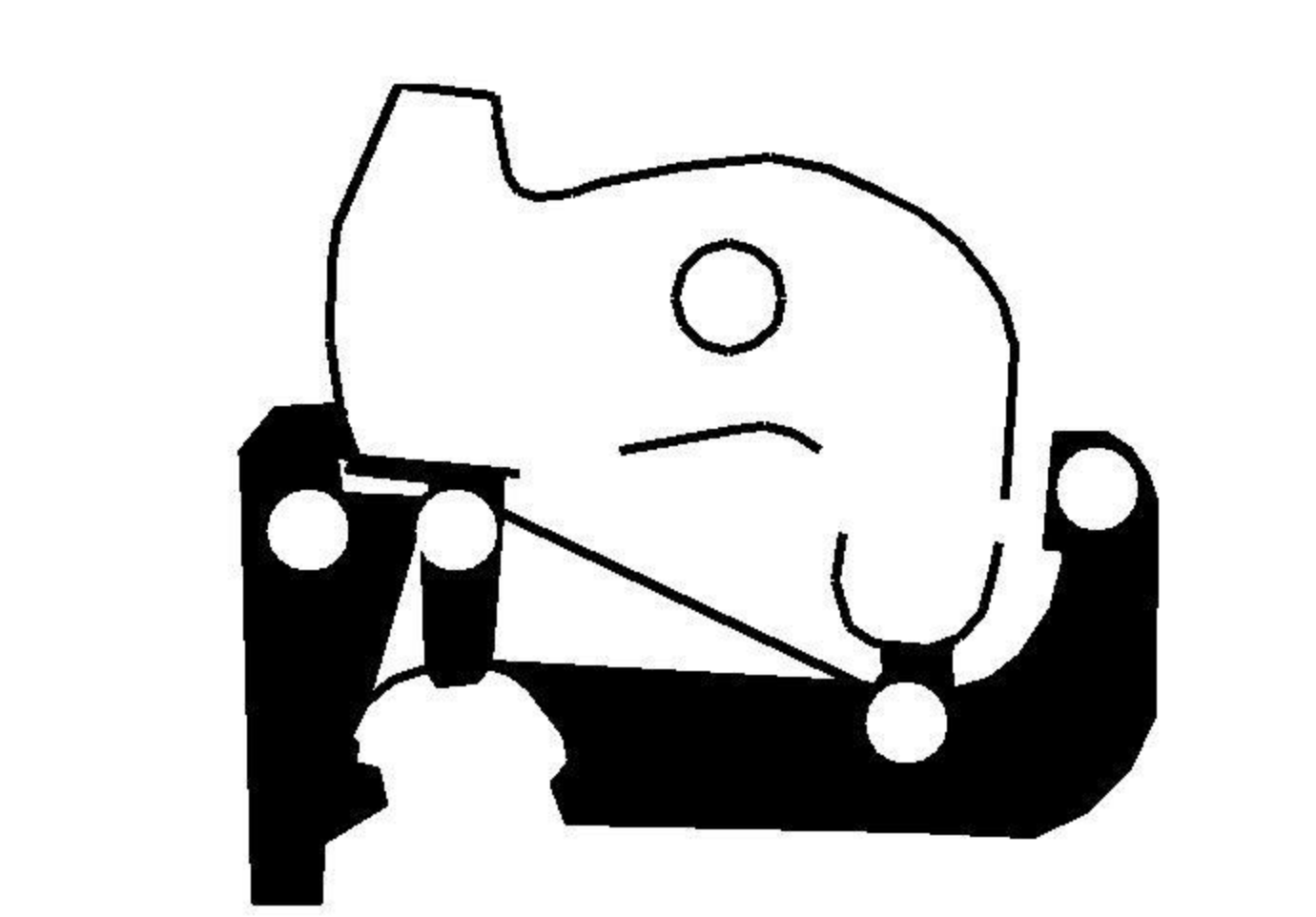
APPLICATION OF GAUGES



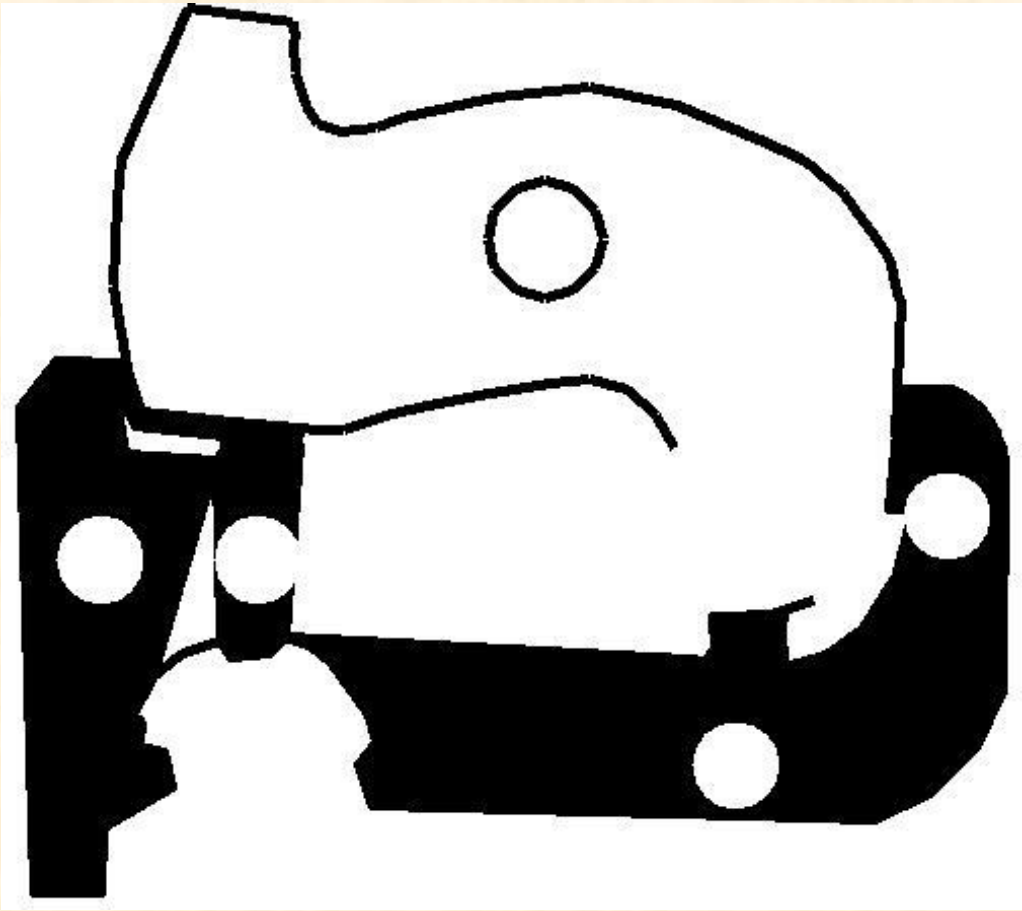
•Apply the gauge no. 1 as shown.
•If gauge no. 1 passes, renew
1) Knuckle 2) Knuckle pin 3) Lock

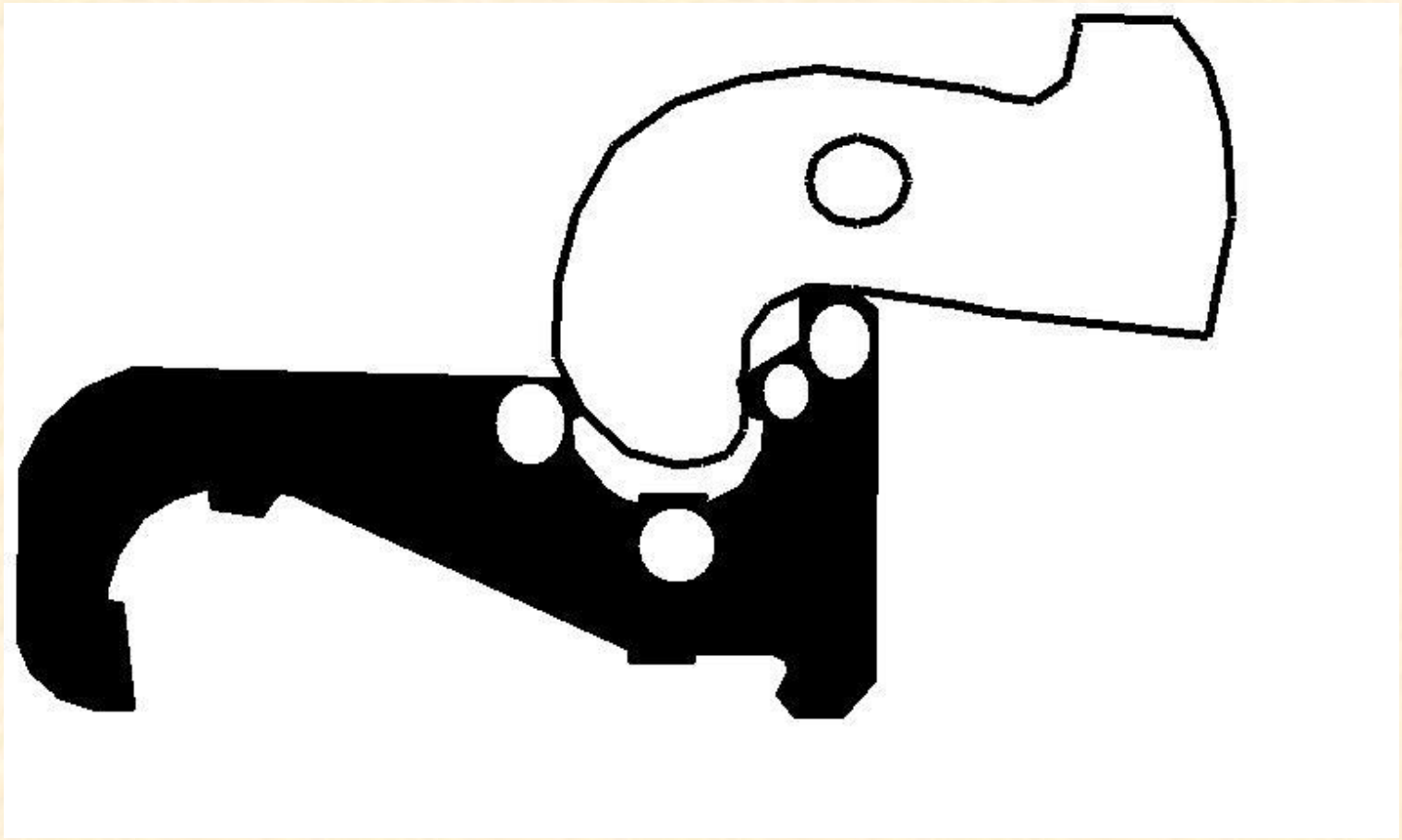


- After replacing the above, if gauge no. 2 passes, renew the coupler body.
- Reason - Guard arm expanded.

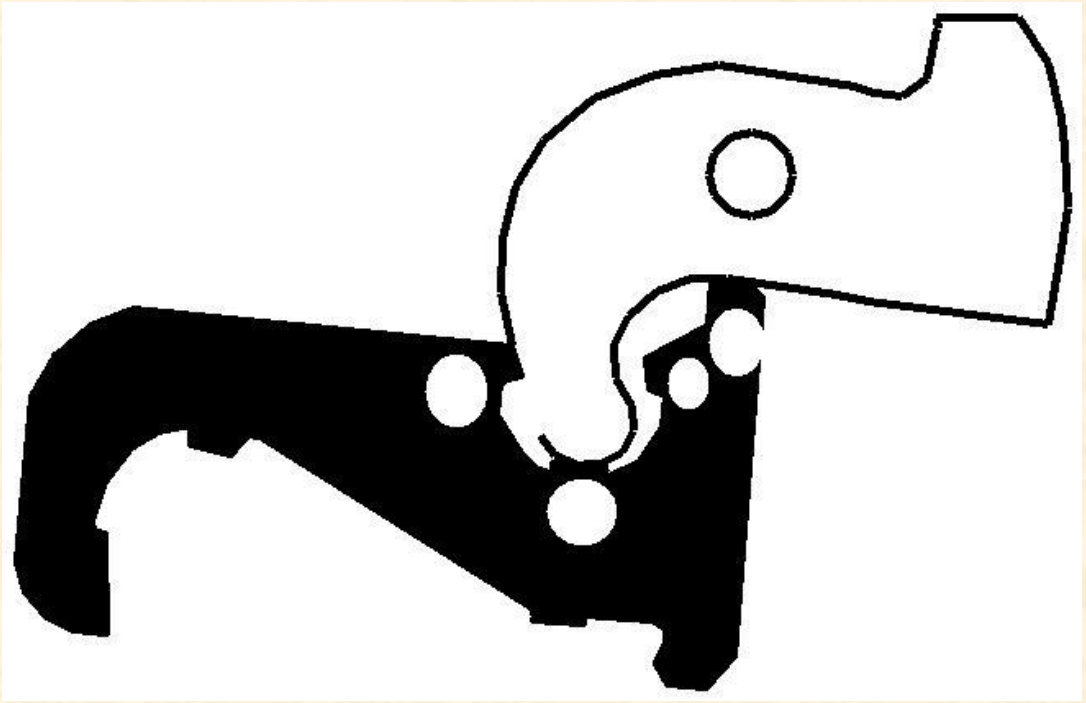


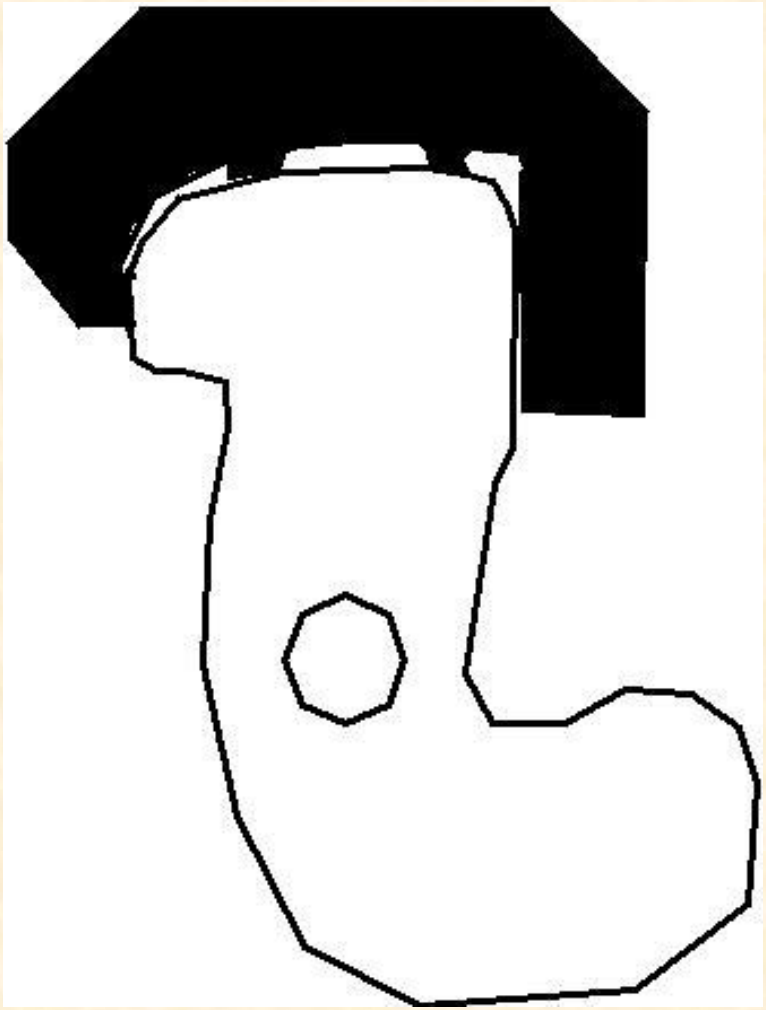
•Apply the gauge no. 4 as shown above.



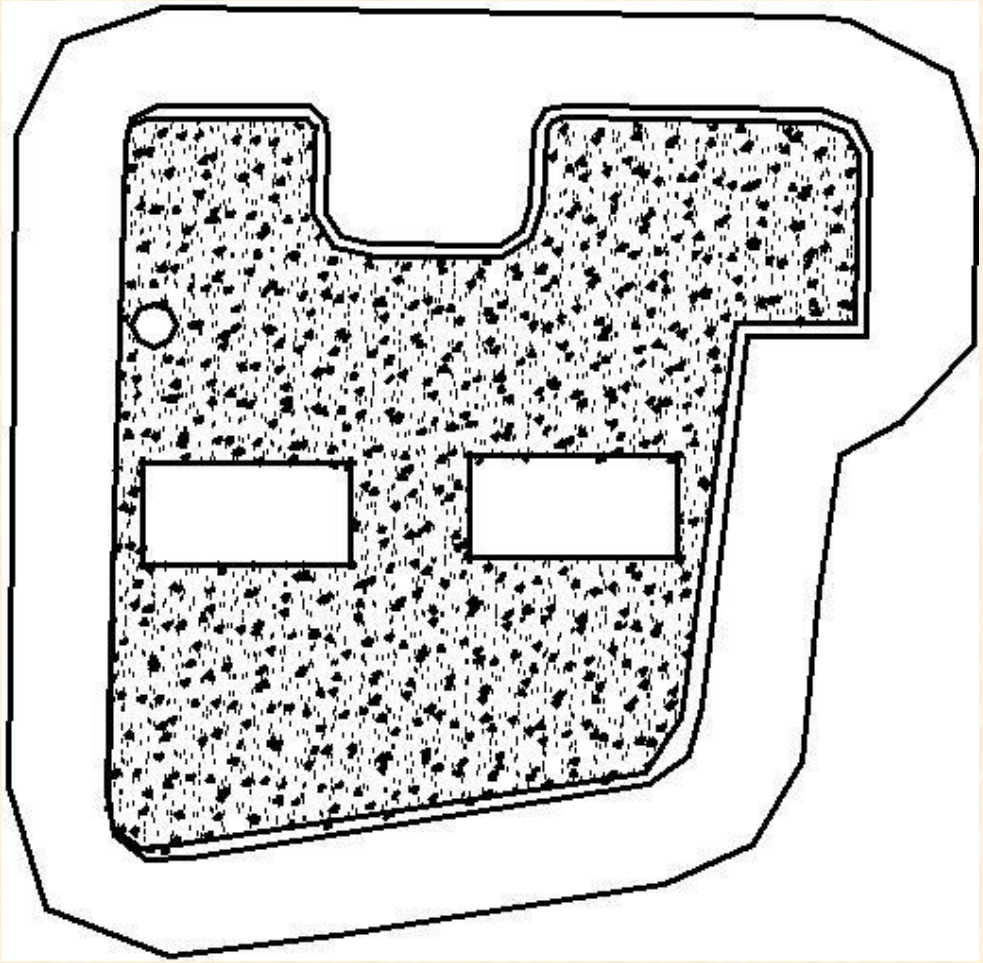


•Apply the gauge no. 4 (alliance-II) as shown above.





•Apply the gauge no. 5 as shown above.
•The gauge must not pass through vertically.
•If passes, renew the knuckle .
•Reason : Excessive wear at locking face of the Knuckle.



•Apply the gauge no. 8 as shown above.

PRESENTATION
ON
COUPLING & UNCOUPLING
(H TYPE CBC)

INDEX

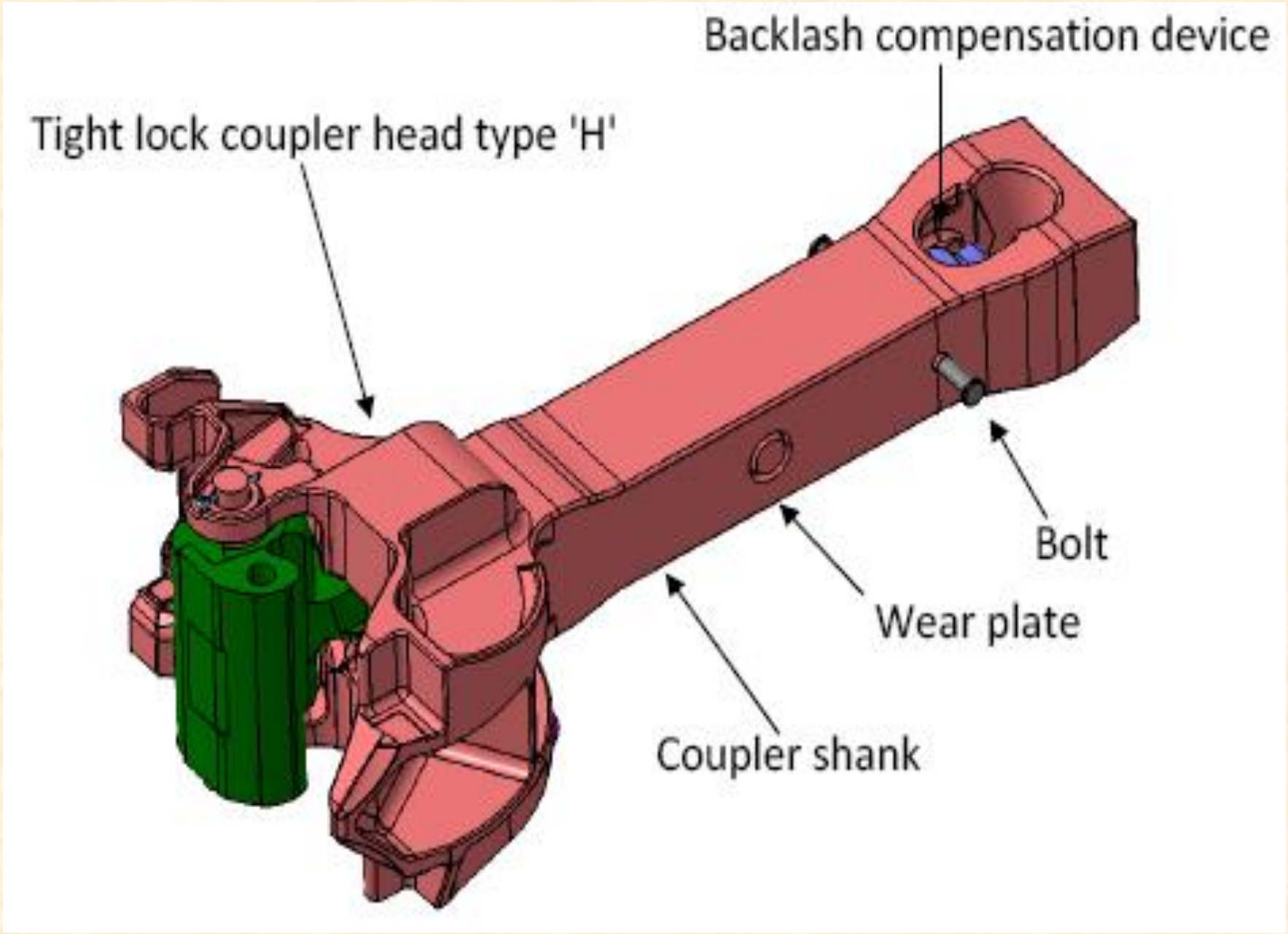
INTRODUCTION

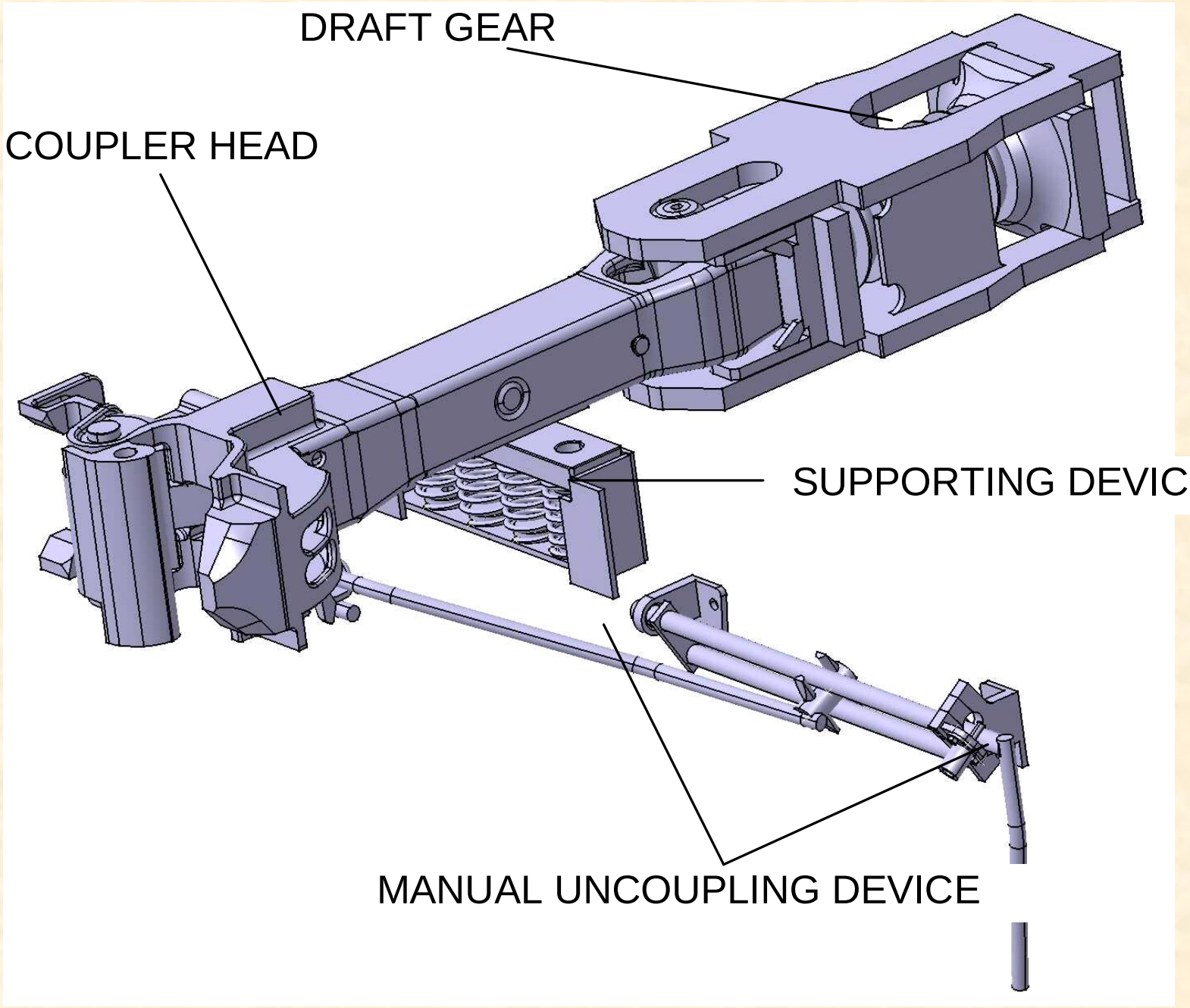
- To connect two adjacent vehicle is done by the mechanical device is known as coupler.
- CBC stands centre buffer coupler. It is fitted on both the end of vehicle.
- CBC is a combination of draw as well as buffing gear in a single unit.
- It has some special features like anti climbing, automatic coupling in straight line

- Coupler head is a standard AAR ‘H’ type with backlash compensation device.
- ‘H’ type coupler provided with anti climbing feature.
- Coupling is possible under angular misalignment both horizontally & vertically.
- The coupler permits coupled trains to negotiate vertical and horizontal curves and allows rotational movement.
- Uncoupling can be achieved manually from track side by means of a combination of rod & levers.
- Draw Gear ensures cushioning effects in both buff & draft.

Description of components
Main parts of CBC

- Tight lock ‘h’ type coupler head.
- Supporting device
- Draft gear.
- Manual uncoupling device.


Backlash compensation device
Tight lock coupler head type 'H'
Bolt
Wear plate
Coupler shank


DRAFT GEAR
COUPLER HEAD
SUPPORTING DEVICE
MANUAL UNCOUPLING DEVICE

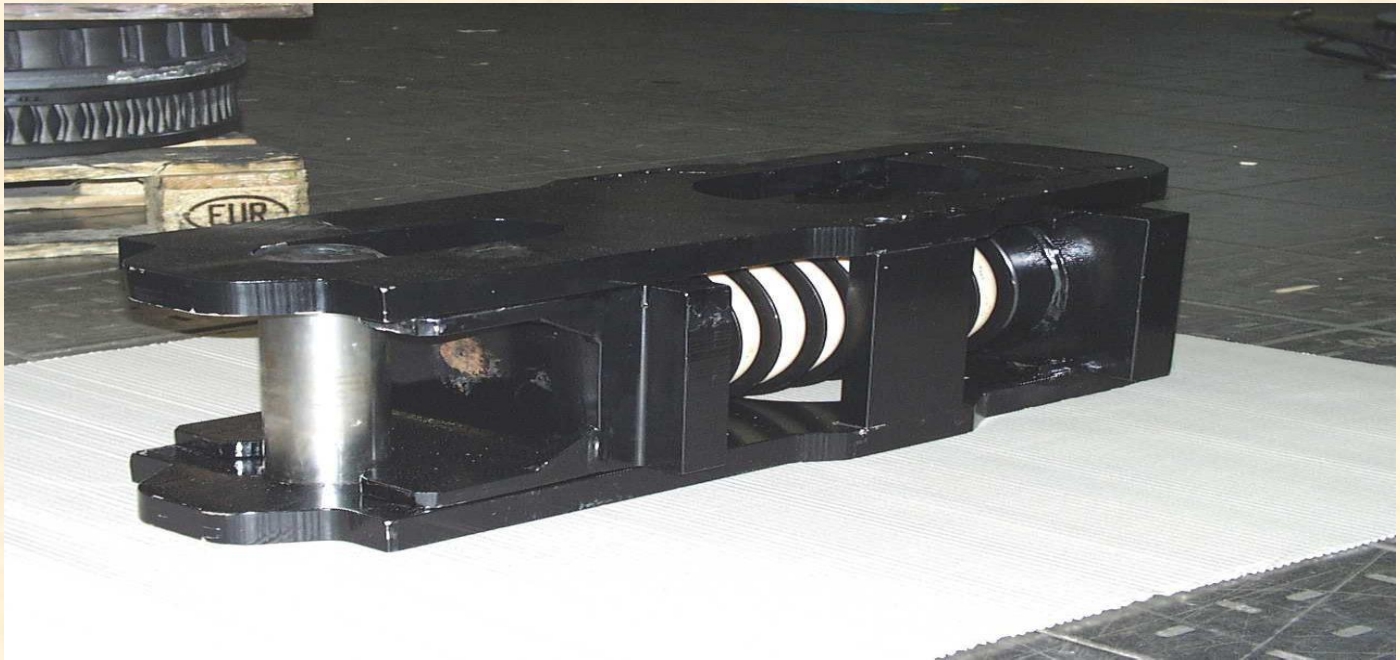

CAVITY
HORN

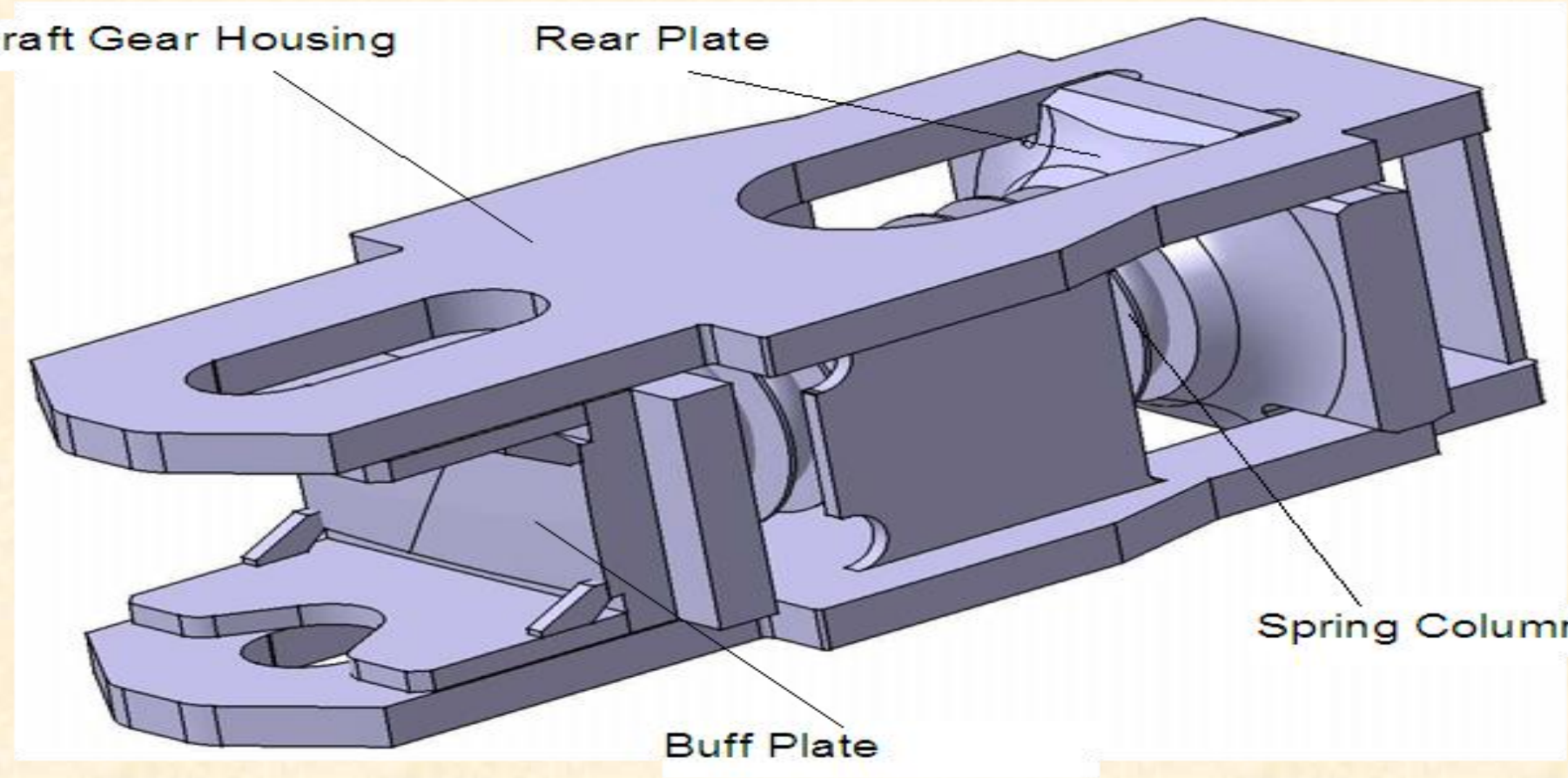
Supporting device

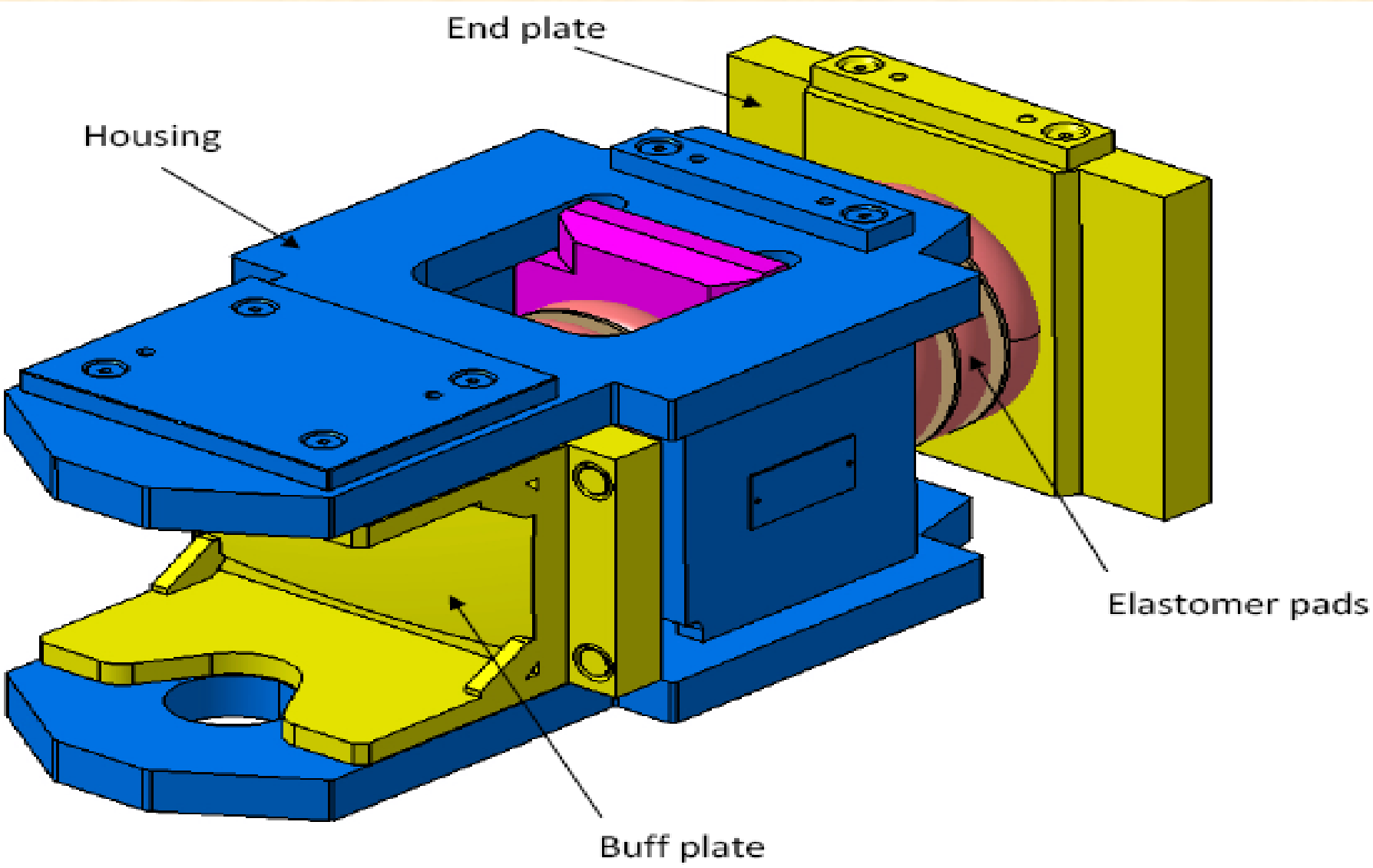
- It has four preloaded compression spring and bolted to the car body structure.
- The coupler shank rest on the top wear plate of supporting device to support the coupler weight.

Draft gear

- It is a double acting device for energy absorption it means absorb dynamic energy in both draw and buffing modes.
- It has 7 nos. Of metallic rubber pad in two ports one consist 3 pad and other 4 pads . It is known as balance type Draft gear.



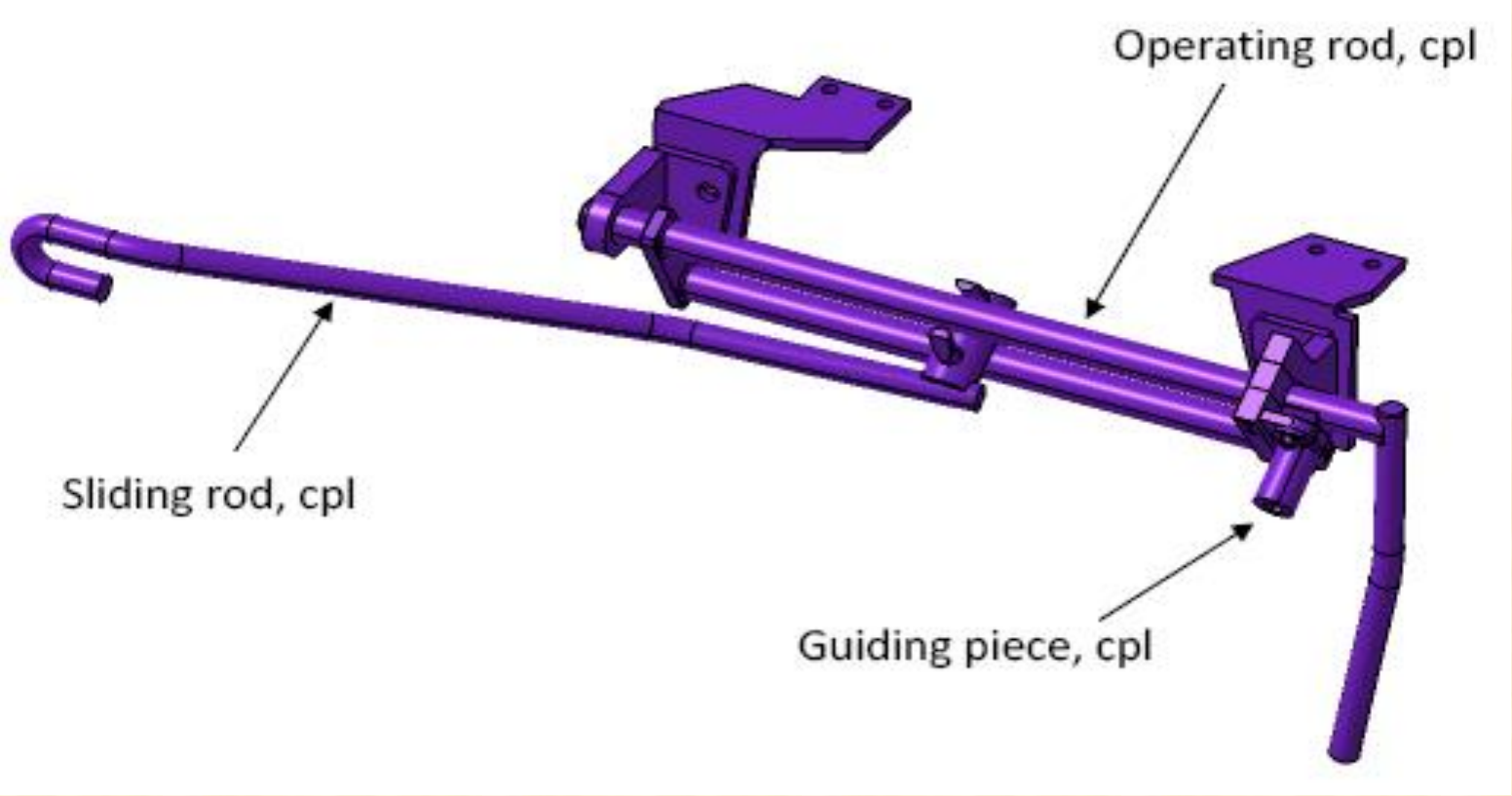

Draft Gear Housing
Rear Plate
Spring Column
Buff Plate



Draft Gear, cpl. with Floating plate, Type BC 80/45F

Manual Uncoupling device

- The manual uncoupling device is a combination of lever and sliding rod with handle.
- It is mounted on one side near end panel.



TECHNICAL DATA

- Compressive strength 2000 kN.
- Tensile strength 1000 kN.
- Total weight of CBC 500 kg.
- Coupler length 1030 ±5.
- Gathering range
- Horizontal ±110mm
- Vertical ±90mm

- Maximum swing horizontal ± 17°
  vertical ± 7°
- Maximum slack is restricted to 3.5 mm
  (which was earlier 13 mm)
- Tension stroke of draft gear 58 mm
- compression stroke 80 mm
- Pre-load capacity 30 KN
  (which was earlier 50 KN)

Advantage of CBC

- High hauling capacity with more number of vehicles
- Rake run comparatively at high speed fitted with CBC
- Separately buffing gear not required
- Avoid interlocking of buffer
- Anti-climbing properties restricts uncoupling during derailment

Coupling Procedure

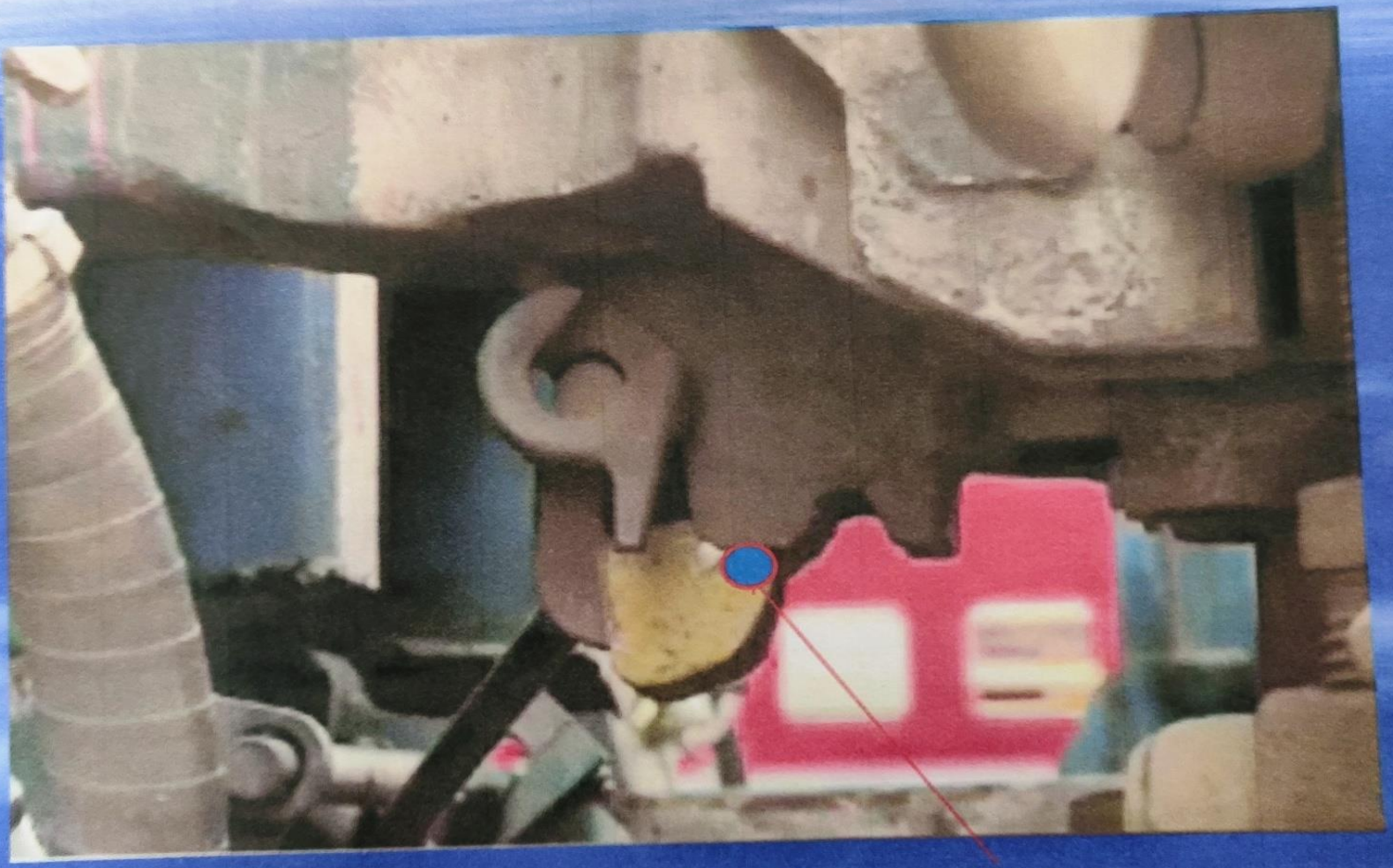
- Knuckle and coupler head face should be parallel
- Minimum one knuckle should be in open condition
- Both Coupler should be in gathering range
- Securing bolt of manual uncoupling device should be in unlocked condition
- Speed of engine for vehicle should be not more than 2-3 Kmph during coupling

CHECK POINTS TO ENSURE PROPER COUPLING.

- Tell Tale slot should be clear
- Rivet Of Lock Lifter assembly should be visible.
- Rotary lever rib should be in vertical position
- Projection of lock lifter assembly should be more than 25 mm
- Manual uncoupling device handle should be vertical.

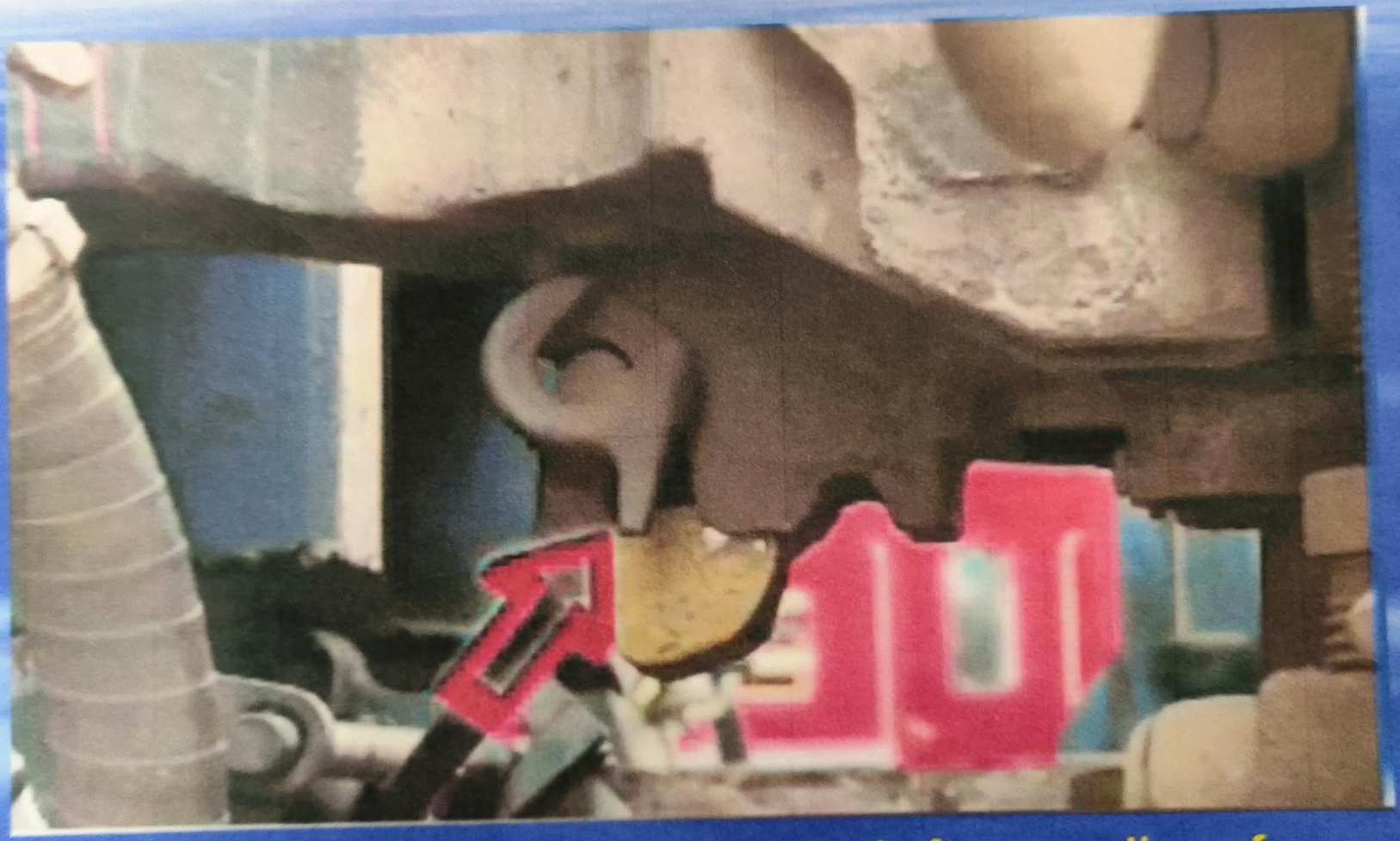
Tell Tale slot should be clear after loco/coaches as indicated to ensure proper coupling

Rivet



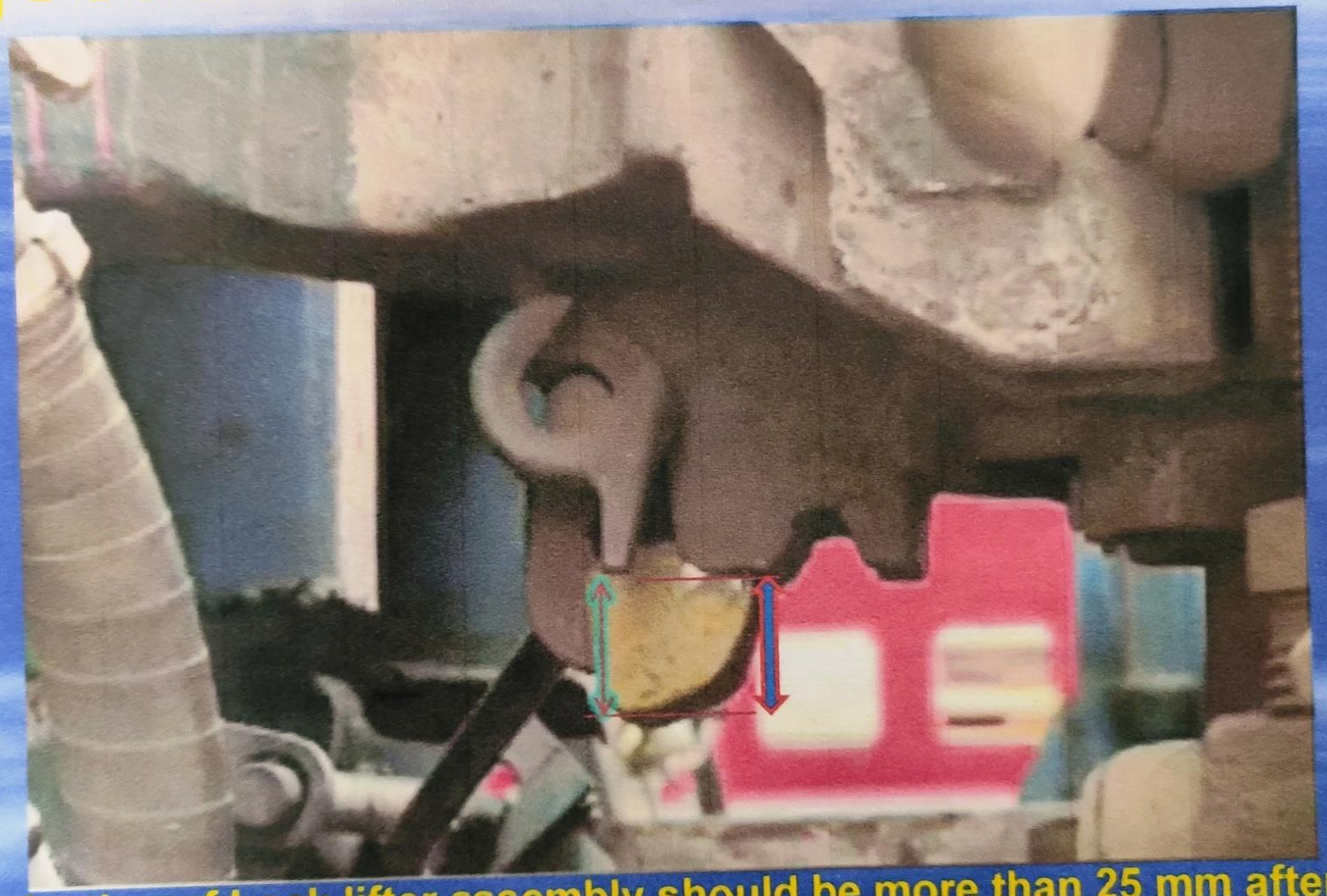
Rivet should be visible after coupling of loco/coaches as indicated to ensure proper coupling

Rotary Lever Rib

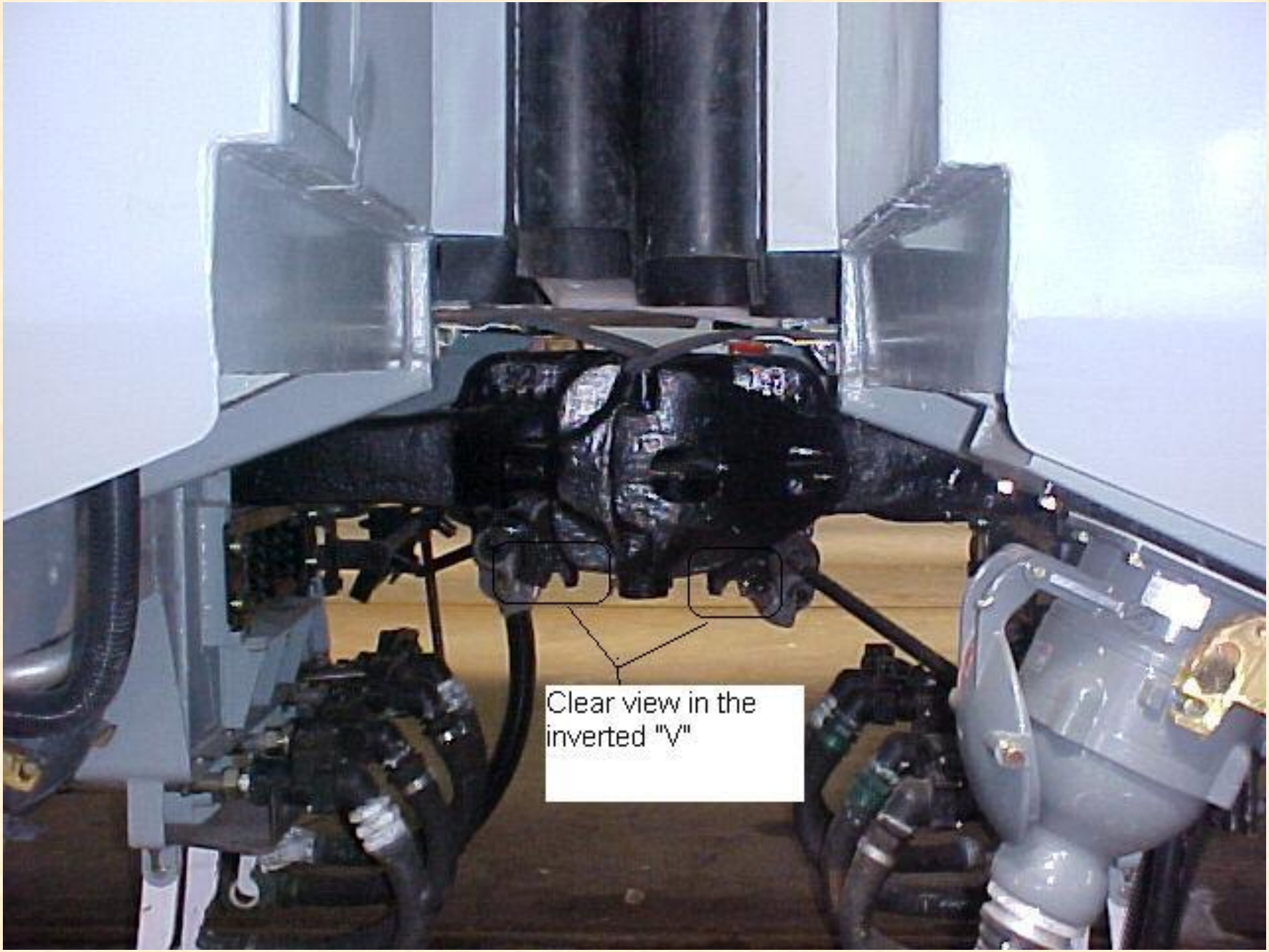


Rotary Lever Rib should be vertical after coupling of loco/coaches as indicated to ensure proper coupling

Projection of Lock lifter assembly



Projection of Lock lifter assembly should be more than 25 mm after coupling of loco/coaches as indicated to ensure proper coupling


Clear view in the
inverted "V"

CBC Operation During RUN

THANK YOU