Centre buffer couplers

COUPLERS

Coupler is a mechanical device fitted on either ends of the headstock of the rolling stock to connect them with the others to form a train.

TYPES OF COUPLER

TYPES OF COUPLING	USED
SCREW COUPLING	4-WHEELER WAGONS
CENTER BUFFER COUPLER	WAGONS
TIGHT LOCK COUPLER WITH ANTICLIMBING FEATURE	LHB COACHES, HYBRID COACHES AND ICF COACHES
SCHAKU COUPLERS	DEMU/EMU COACHES
SLACK FREE COUPLERS	BLC WAGONS

WHAT IS CBC?

- The CBC stands for Centre Buffer Coupler.
- The coupling in CBC is automatic whereas the uncoupling is being done manually without entering in between the wagons
- CBC is combined unit of Draw and Buffing Gear, located at the centre of Body Head Stock.
  i. Used as Draw Gear.
  ii. Used to transmit buffing force

A COMPARISION BETWEEN SCREW COUPLING AND CBC

SCREW COUPLING	CBC
1. It only acts for drawing forces applied by Loco and for buffing forces, a separate provision of Buffer is provided.	1. It deals with both draft as well as buffing forces
2. The coupling and uncoupling work of this had to be done manually	2. The coupling is done automatically and uncoupling is easily done from out side by lifting operating handle
3. Due to more play in screw coupling, there are more chances of breakage of this coupling	3. There is no such chance.
4. For locking, the operator has to inter and lock the coupling.	4. There is no such need and it has automatic feature of locking.

ADVANTAGES OF CBC

- Coupler and buffing gear are both located together at the centre of the Coach/Wagon.
- Coupling action between Coach/Wagon is automatic so that more safer for operation.
- If leading wagon is derailed due to some reason the CBC prevents to derail next wagon.
- Hauling capacity is increased.
- Maintenance cost is less than conventional Draw gear.

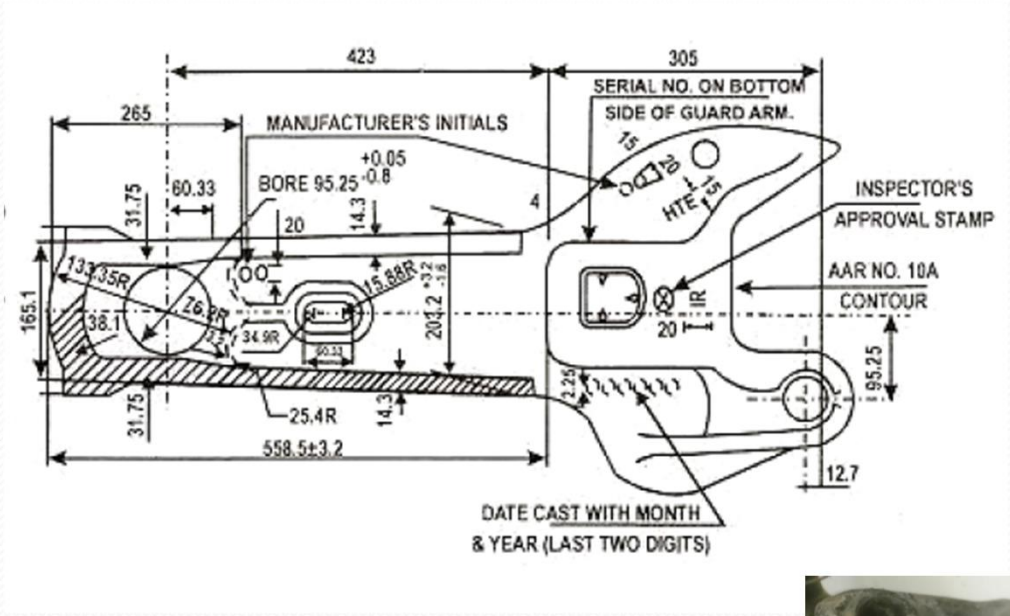
TYPES OF CBC

- Alliance CBC- used in four wheelers like CRT wagons
- AAR- used in other 8wheelers wagons like boxn,bcns
- Tight lock coupler- used in LHB coaches & ICF coaches too

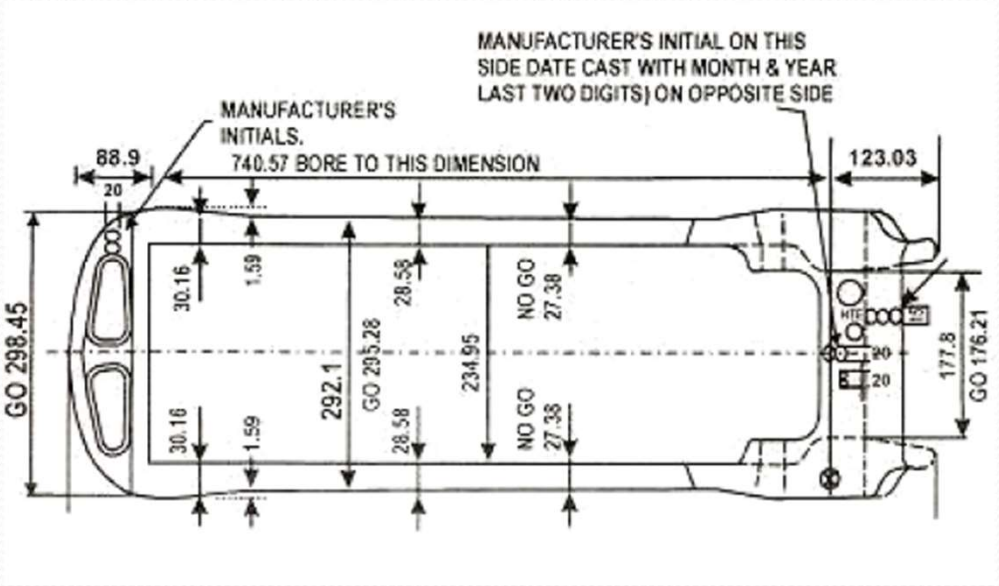
PARTS OF MOST COMMONLY USED AAR CBC

1. Coupler Body
2. Knuckle
3. Knuckle pivot pin with washer
4. Lock piece
5. Knuckle thrower (Kicker in alliance CBC)
6. Toggle
7. Universal lock lift lever connector
8. Lock lift lever
9. Lock lift hook
10. Lock lift lever rivet
11. Top lifter hole cap
12. Yoke
13. Yoke pin
14. Yoke pin support
15. Striker casting
16. Striker casting wear plate
17. Shank
18. Shank wear plate
19. Yoke support plate
20. Draft gear arrangement with front follower
21. Safety bracket with anchor plate
22. Uncoupling gear arrangement
23. Back stop
24. Clevis with transition type coupler body
25. Baby screw coupling for transition only

COUPLER BODY



YOKE


MANUFACTURER'S INITIAL ON THIS SIDE DATE CAST WITH MONTH & YEAR LAST TWO DIGITS) ON OPPOSITE SIDE
MANUFACTURER'S INITIALS.
740.57 BORE TO THIS DIMENSION
88.9
20
123.03
GO 298.45
30.16
1.59
292.1
GO 295.28
28.58
234.95
NO GO 27.38
177.8
GO 176.21
20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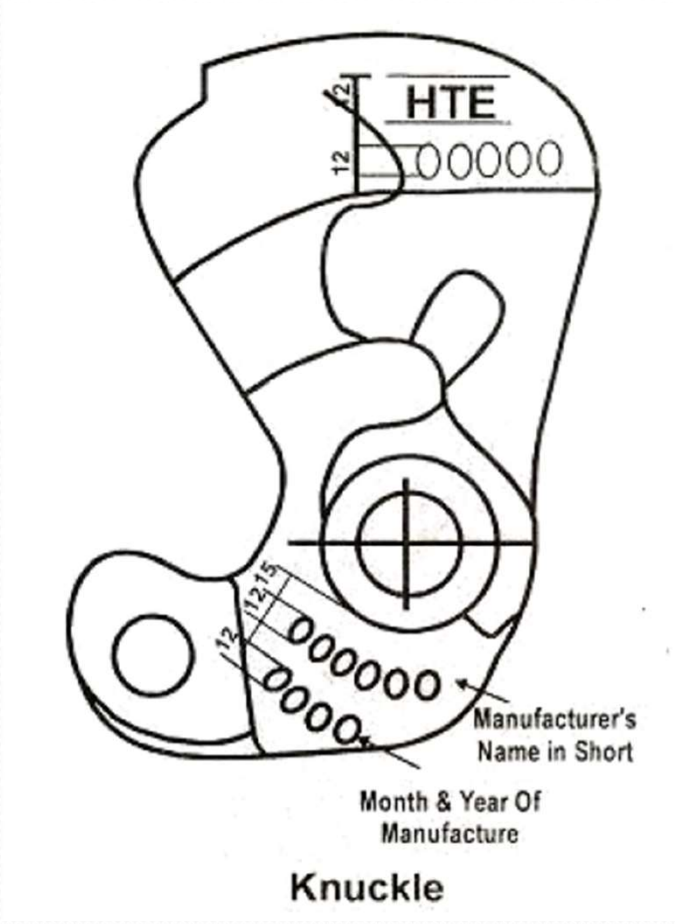
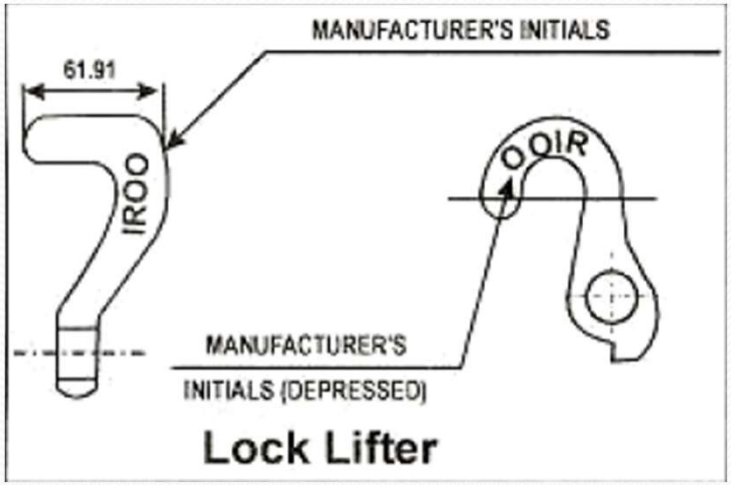
KNUCKLE

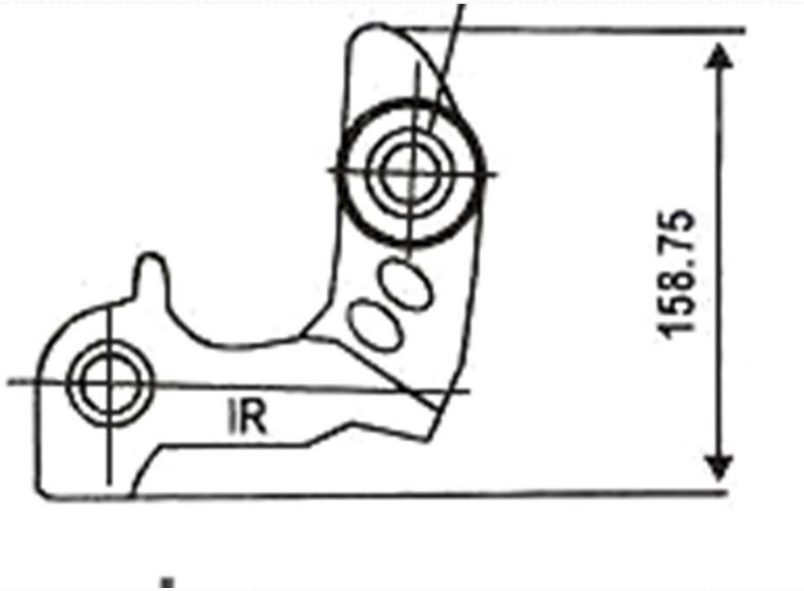


Knuckle

LOCK LIFTER



TOGGLE

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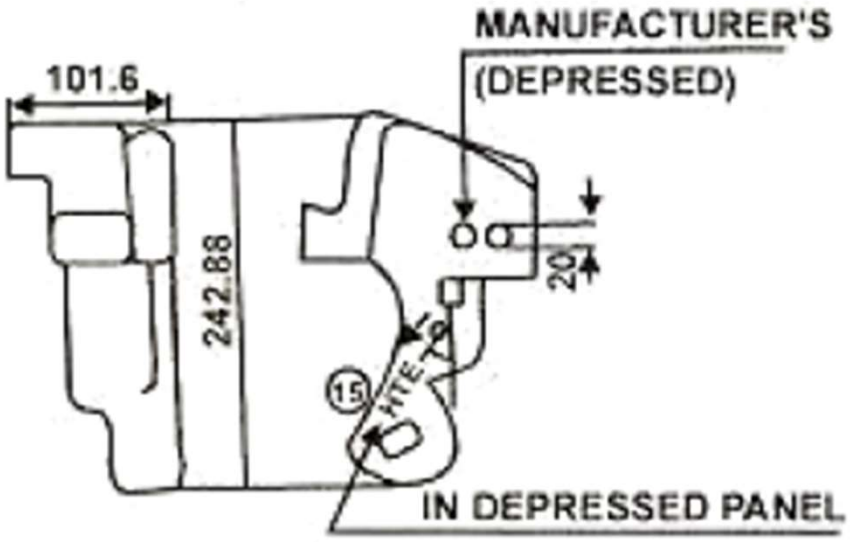
LOCK PIECE

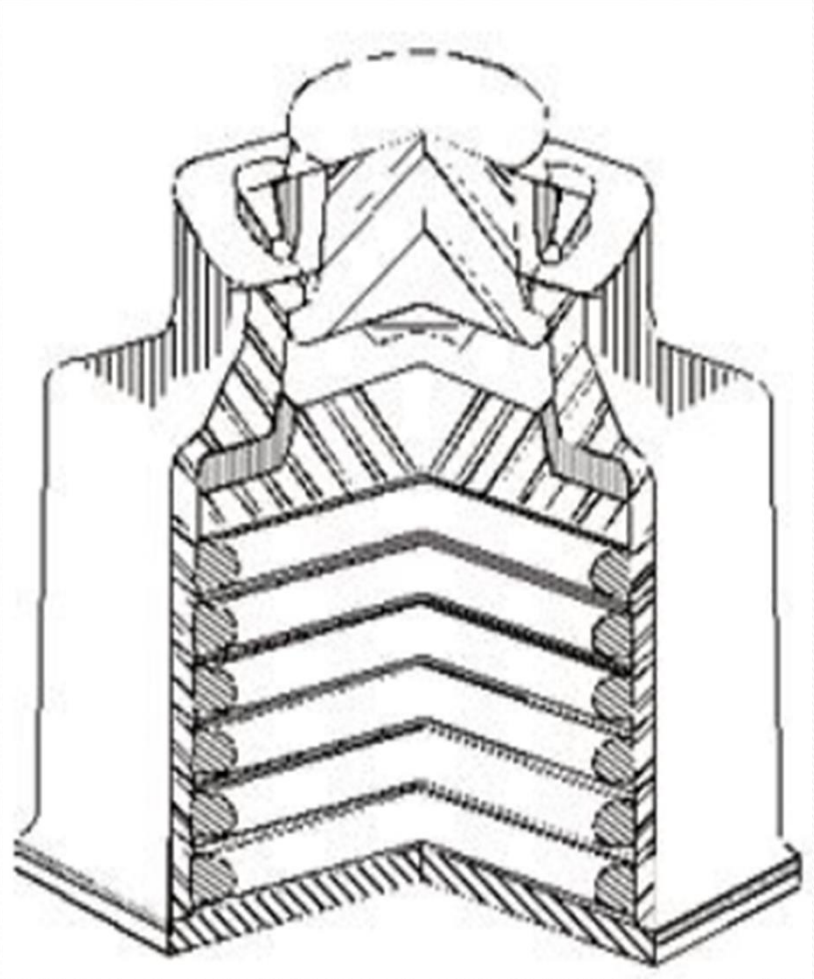


Lock Piece

DRAFT GEAR

MOST COMMONLY USED DRAFT GEAR OF CBC ARE:

- MK-50
- RF-361 &
- SL-76



TYPES OF CBC ON THE BASIS OF OPERATION

(i) Straight type CBC.

(ii) Transition type CBC.

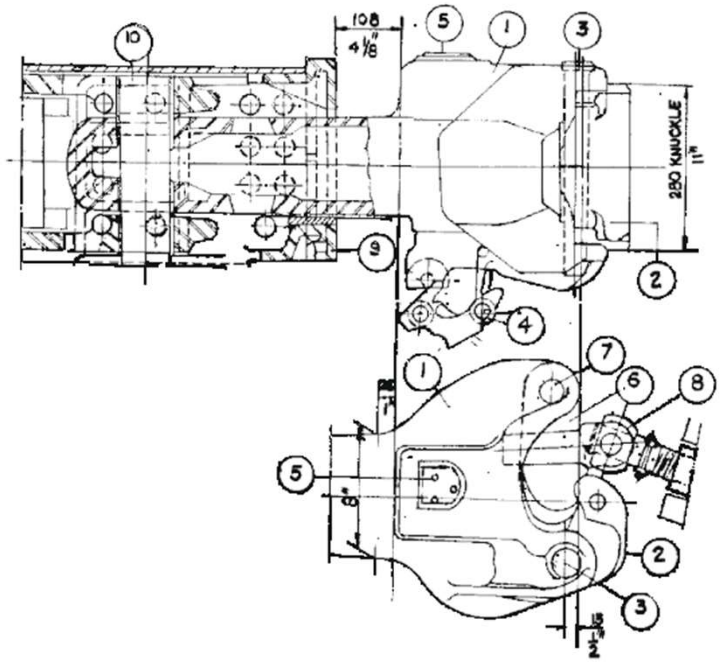


FIG 9.1 : TRANSITION COUPLER

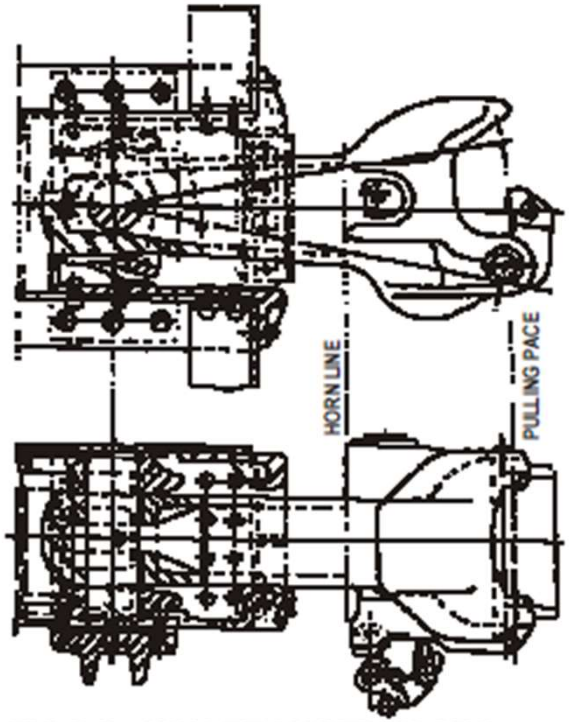


FIG 9.2 : NON-TRANSITION CBC

INSPECTION OF CBC AT SICK LINE

1. Operating rod
2. Coupler operating mechanism
3. Locking of coupler
4. Buffer height
5. Permissible wear of components
6. Free slack of CBC
7. Anti creep mechanism protection
8. CBC contour condition
9. Knuckle stretch and nose wear

OPERATING ROD:

- Operating rod should not be bent and it is fitted in bearing piece of under frame properly with creeper plate

COUPLER OPERATING MECHANISM:

- The operating mechanism of the CBC should be in such a way that when we lift the operating handle knuckle should be open

COUPLER LOCKING

- After opening the knuckle fully when we push the knuckle gradually the CBC lock should fall and there is a gap of 25mm between coupler body and CBC toggle

BUFFER HEIGHT

- It should be within **1105mm-1030mm** and measured from middle of striker casting/coupler body.

PERMISSIBLE WEAR OF COMPONENTS

- Knuckle nose wear: Max. **9.5 mm**
- Shank wear plate: new-**6mm** / condemned- **1mm**
- Knuckle pin: new-**41mm** / condemned-**38mm**
- Clevis pin: new- **38mm** / condemned – **36mm**
- Striker casting : new- **8mm** / condemned – **6mm**

FREE SLACK OF CBC

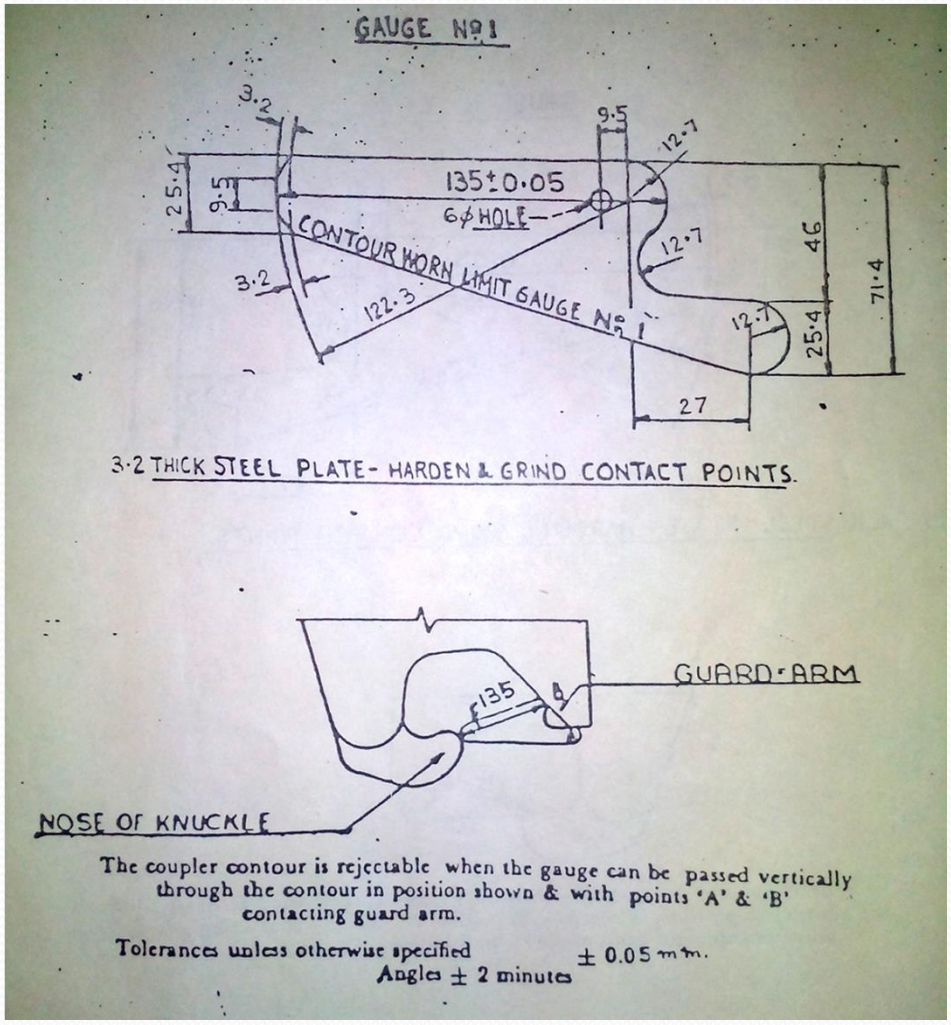
- Max. permissible free slack is **25mm**.
- It should occur only when draft gear broken or defective or headless yoke pin have a groove of more than **12.5mm** radius.

ANTI CRIP MECHANISM PROTECTION

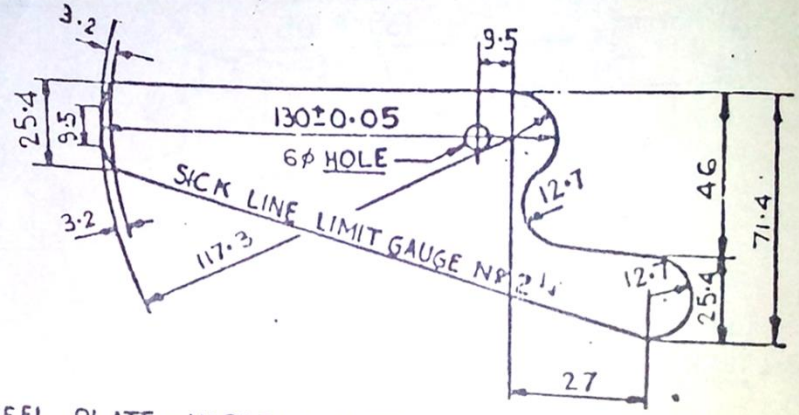
- a. Close the knuckle.
- b. Insert a bar between the lock and the knuckle tail shelf and lift the lock

  upwards and at the same time push the lug rearward by inserting a screw driver between the coupler body and the front of the lock hole.
- c. If the lock can be raised enough to permit the opening of the knuckle, the anti-creep mechanism is defective.
- d. Replace the lock lift assembly. (Toggle, Lock lift lever and Lock lift lever hook).
- e. Check again.
- f. Even after replacing the above, if the lock can be raised, the Anti-creep mechanism is found defective due to excessive wear on the lug of the coupler body.
- g. In such a case, replace the coupler body.

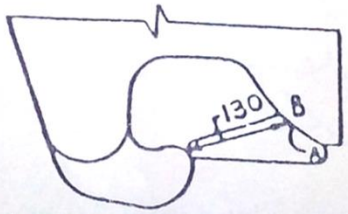
CBC CONTOUR CONDITION



GAUGE NR. 2

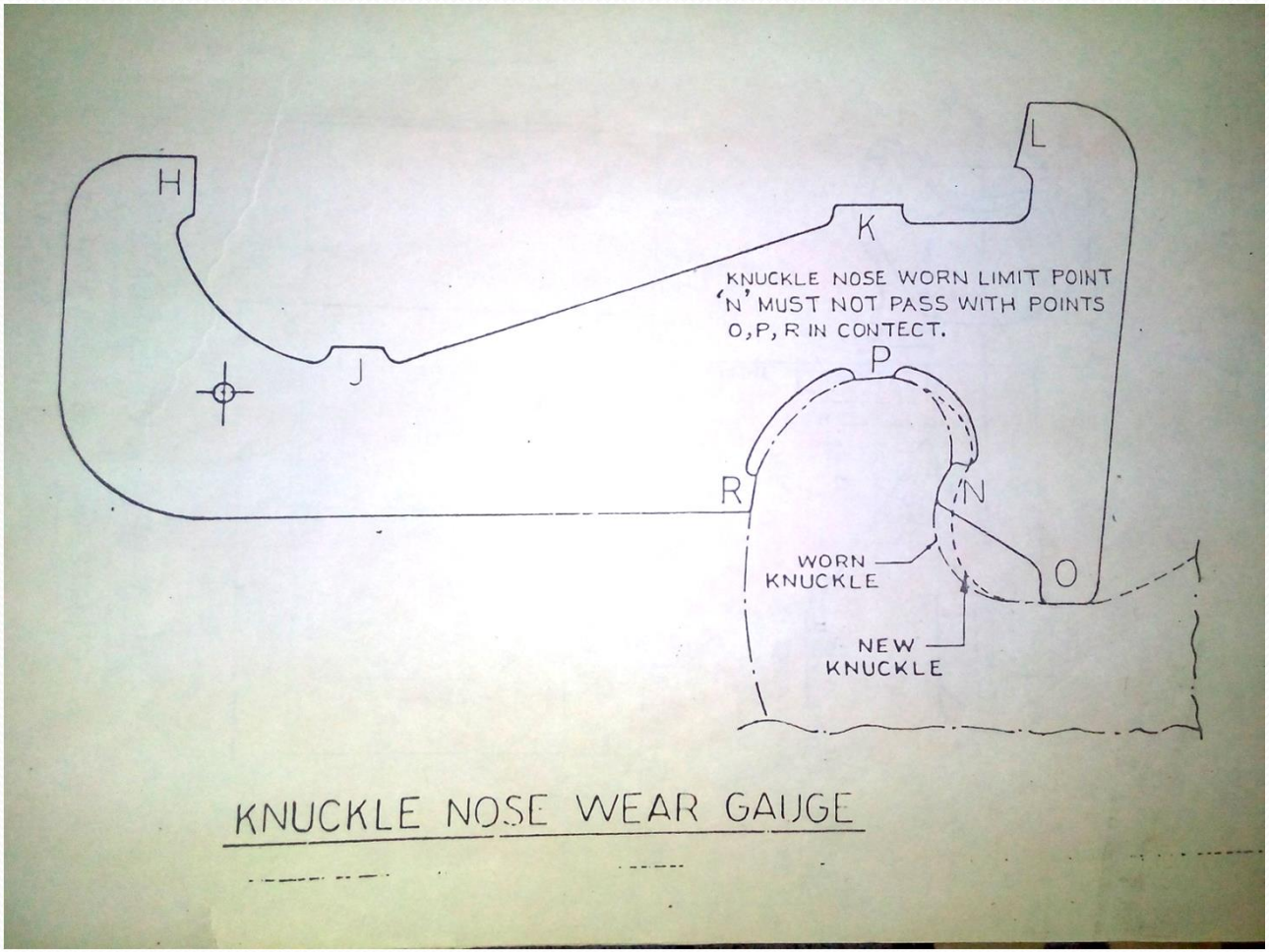


3·2 THICK STEEL PLATE – HARDEN & GRIND CONTACT POINTS.

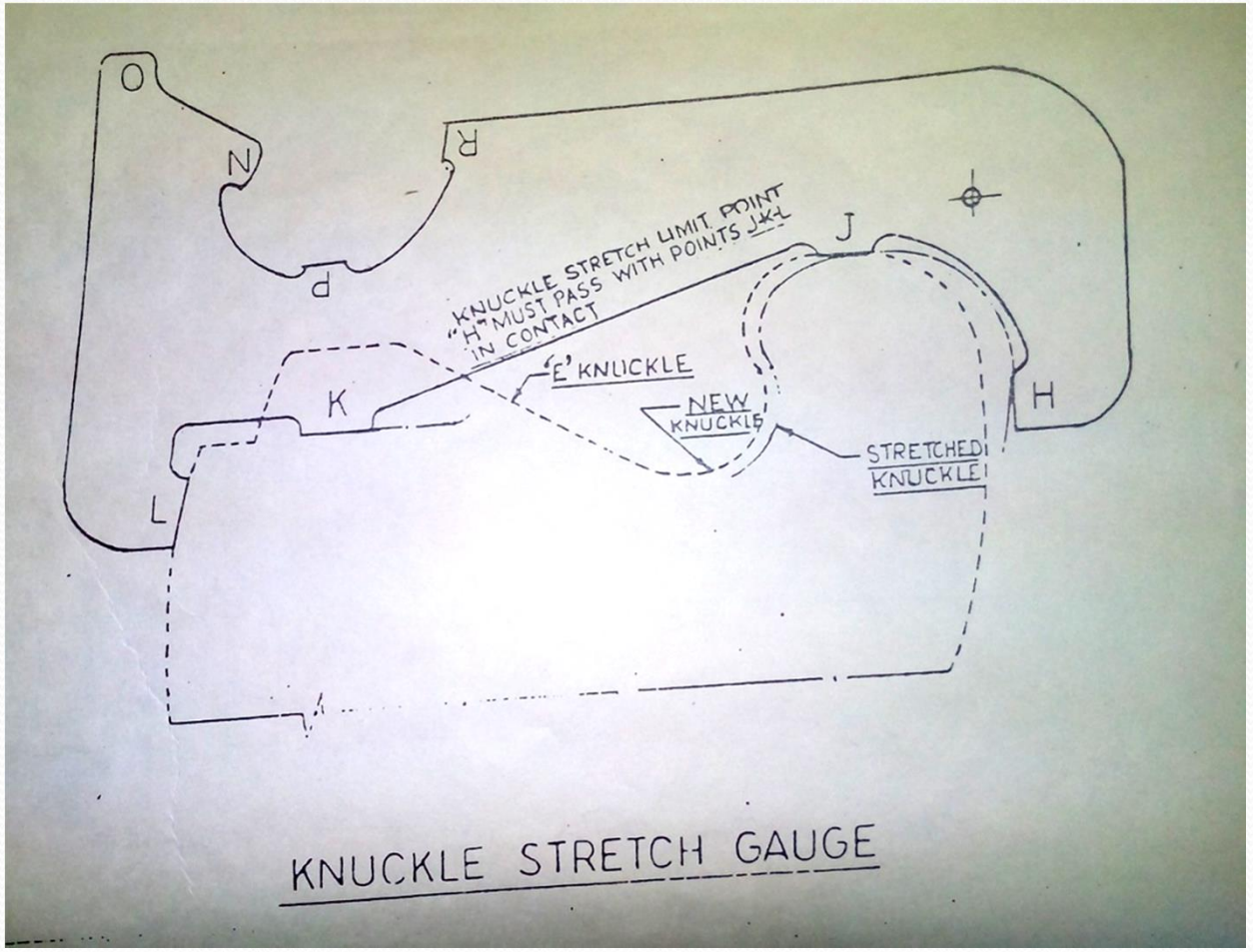


The coupler contour is rejectable when the gauge can be passed vertically through the contour in position shown & with points "A" & "B" contacting guard arm, indicates complete head needs reconditioning.

KNUCKLE NOSE WEAR



KNUCKLE STRETCH CHECK

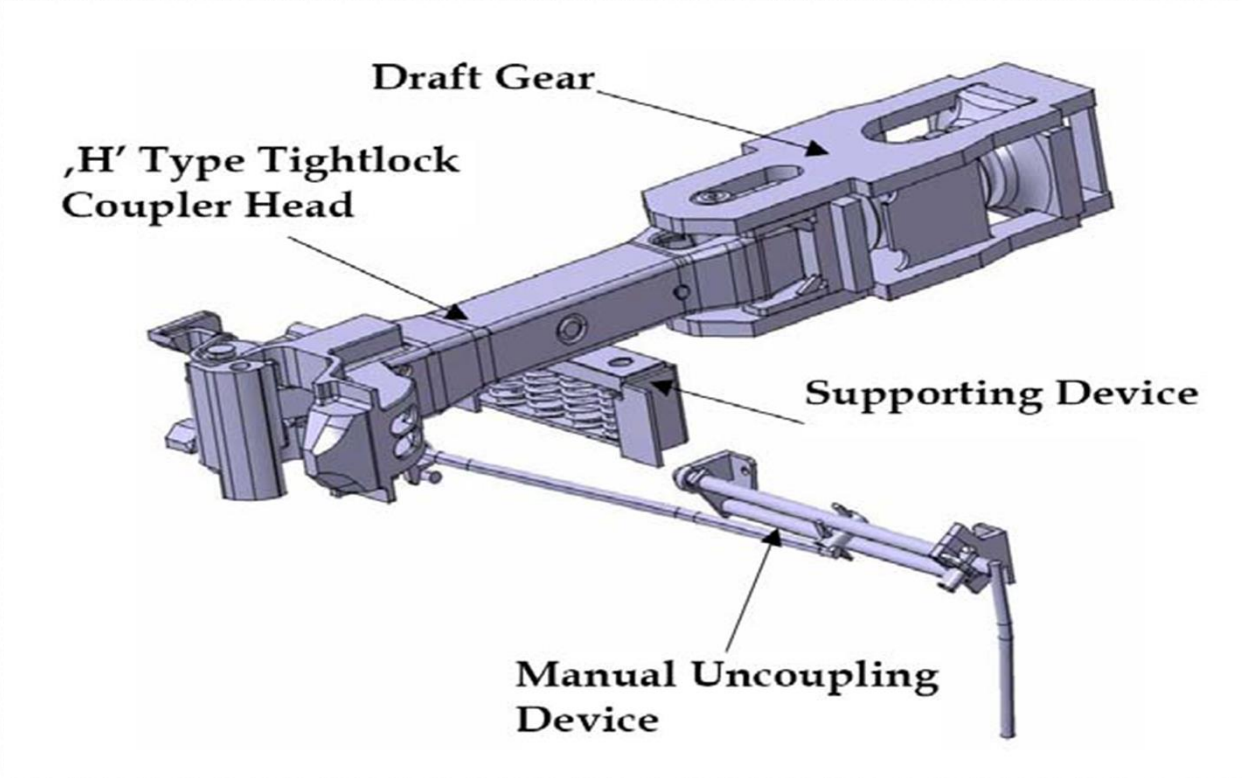


DRAWBACKS OF CENTRE BUFFER COUPLER

- Trespassers can uncouple the CBC
- If buffer height difference is more than 65 mm there is chances of uncoupling of knuckles
- If anti-creep mechanism of CBC is defective train parting may occur
- Uncoupling is difficult in case of a derailment or accident

'H' TYPE TIGHTLOCK COUPLERS

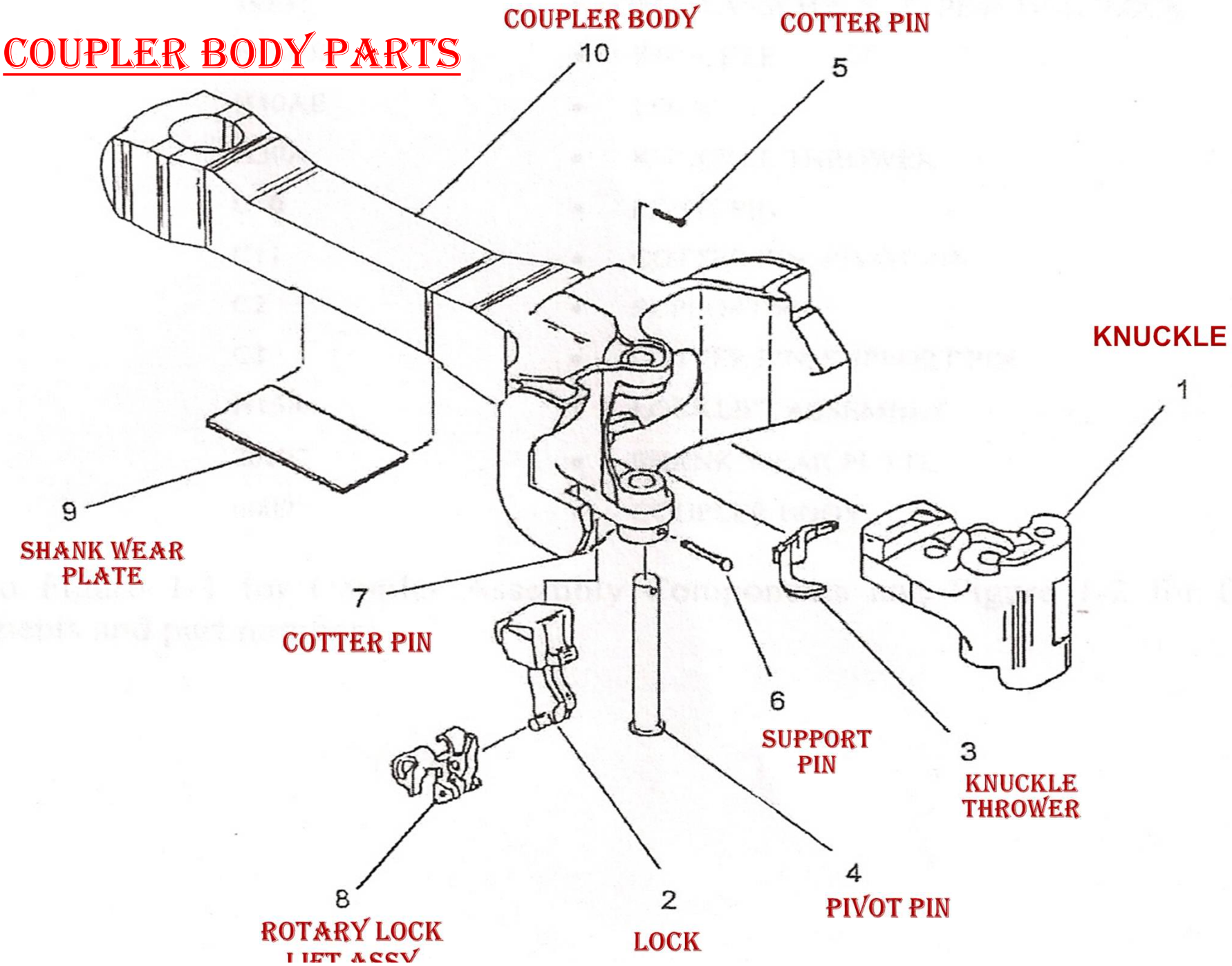
- In coaching stock like LHB coaches , hybrid coaches and even in ICF coaches a modified center buffer coupler has been introduced which is known as tight lock coupler with anti climbing feature.



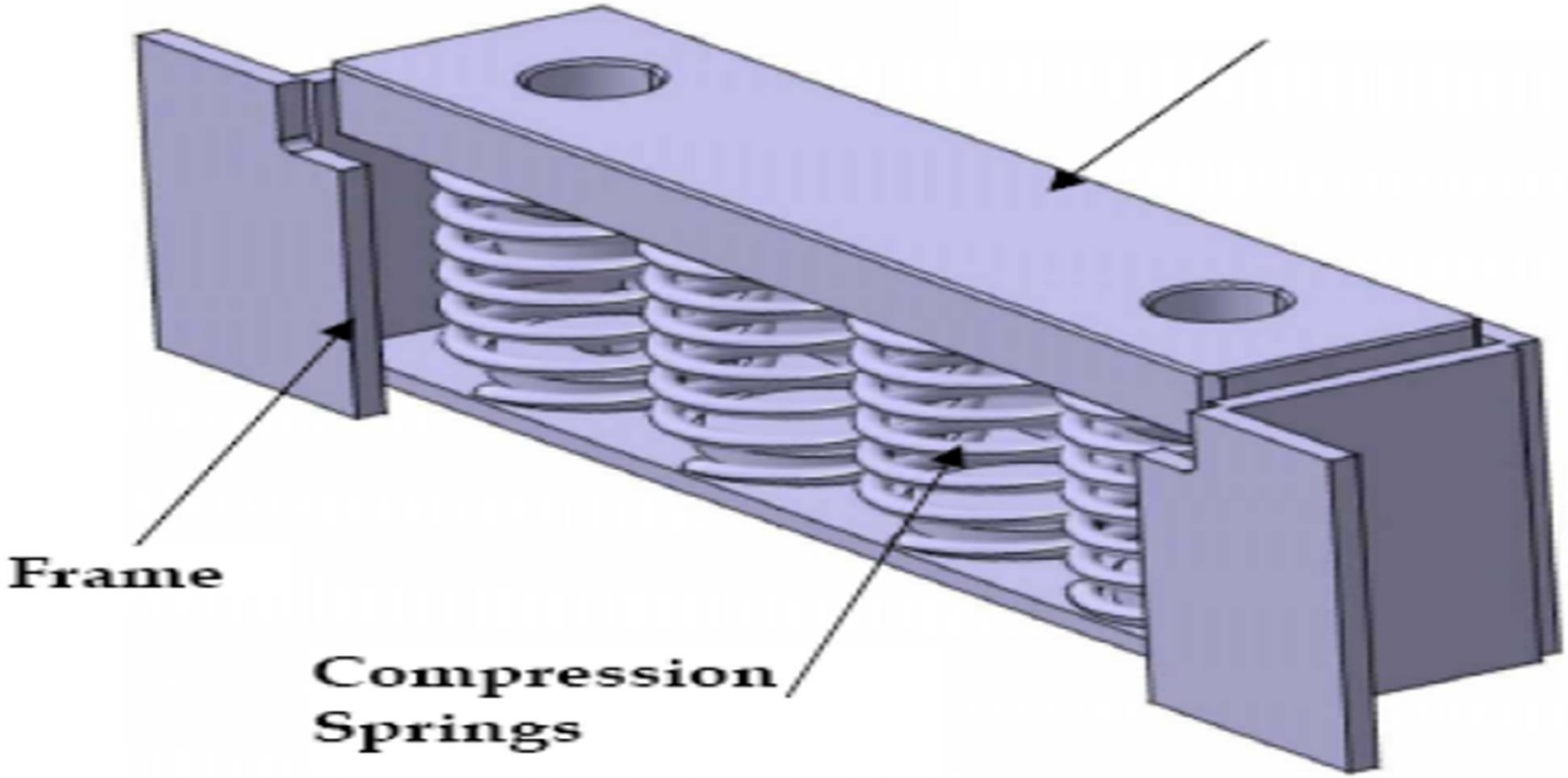
SPECIAL FEATURES OF TIGHT LOCK COUPLER

- The centre buffer coupler combines the draw and buffing gear in one. It is able to transmit both the tensile and the compressive forces. Further the tight lock coupler by its ANTICLIMBING FEATURE, hinders the climbing of the vehicles in case of an accident.
- There is a lock in operating handle mechanism so no trespassers can operate it.
- There is no chance of knuckle opening due to anti climbing feature too. Because the adjacent coaches are connected to each other with a gathering range of **90**mm and the shank of the tight lock coupler rest on a supporting device which consist of compression spring. It means both coupler after coupling will move together vertically.

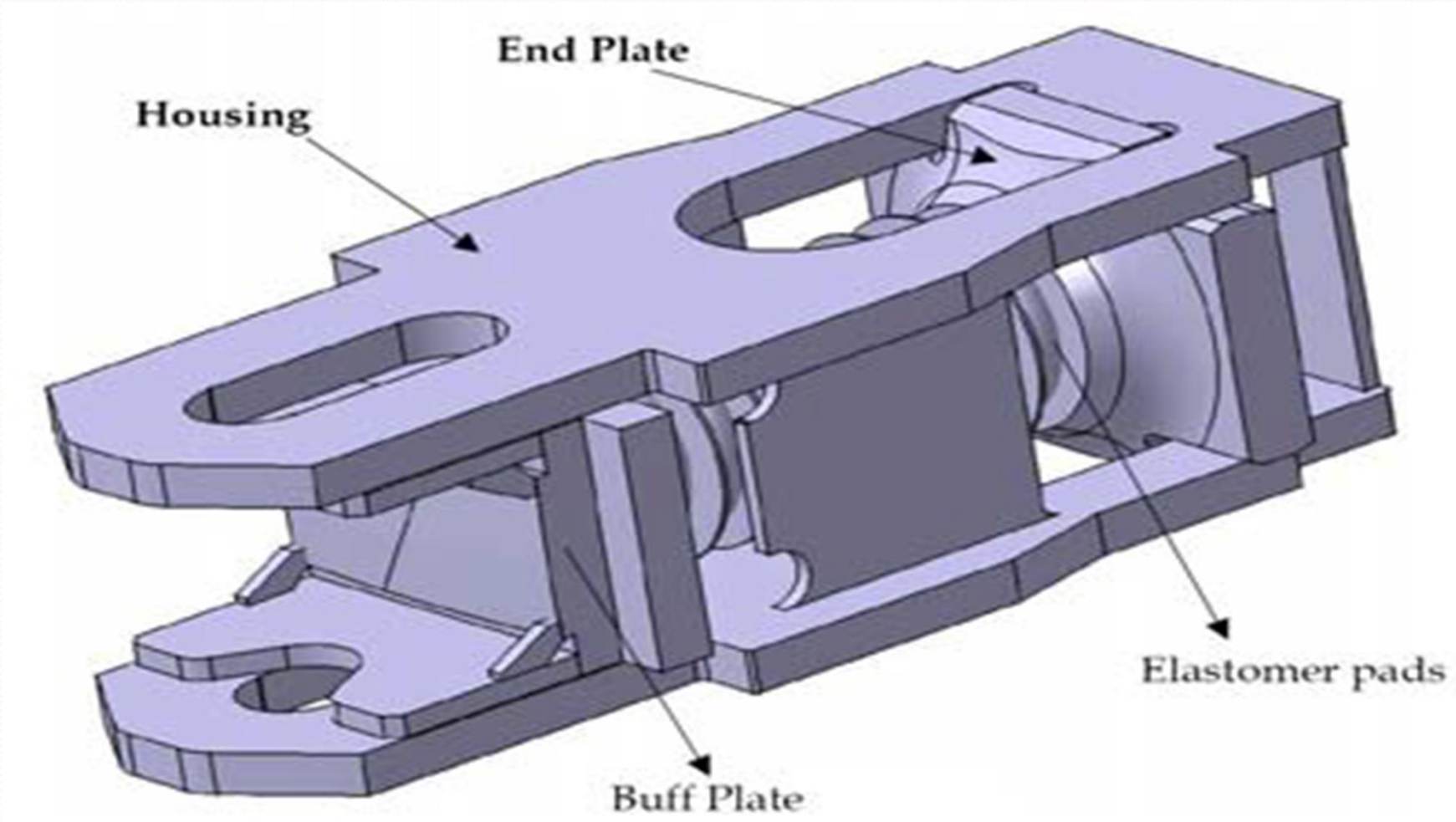
COUPLER BODY PARTS



SUPPORTING DEVICE



DRAFT GEAR



DRAFT GEAR

- The draft gear is a double acting device. This device absorbs energy during coupling & during service. This device is fitted in to the pocket of the coach where it absorbs the dynamic energy in both draw & buff modes.

- The stroke in tensile (draw) direction is limited to 58^{-5} mm while that in the compressive (buff) direction is 80 mm (max).

SUPPORTING DEVICE

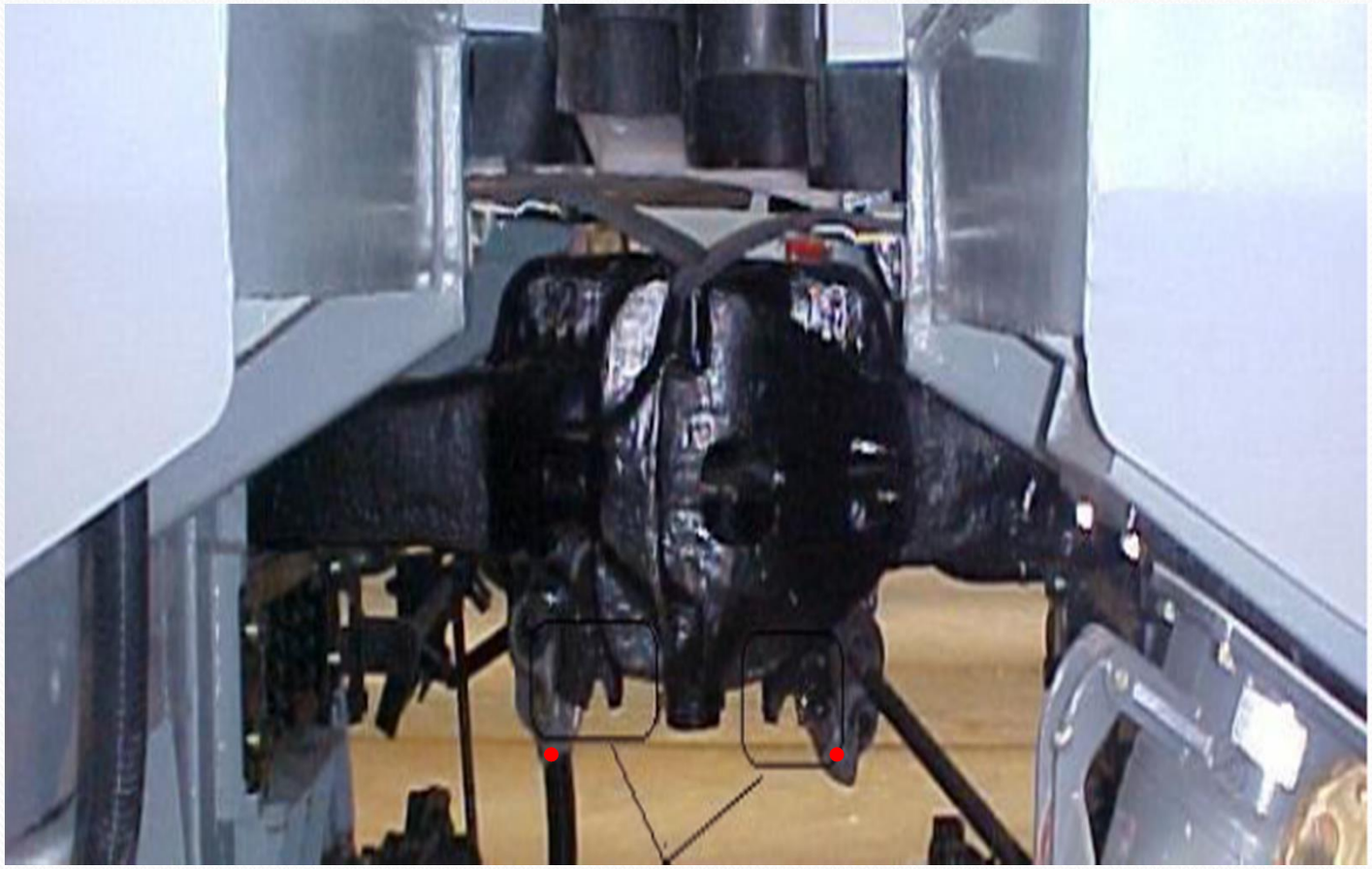
- The supporting device comprises of four preloaded compression springs. This device is fitted below the draw bar in the coach pocket & is bolted on to the body of the coach. The coupler head rests on the top wear plate of the supporting device. The complete weight of the coupler is taken by this supporting device.
- Height of supporting device including wear plate = 187.5 mm

COUPLING & UNCOUPLING PROCEDURE

Coupling:

- Keep the knuckle of coupler of coach to be attached in closed position.
- Bring the vehicle at a distance of one meter approximately.
- The position of coupler centers of both the coaches to be coupled should be aligned.
- If required pull the couplers manually towards each other & make sure that they are in the gathering range of the coupler geometry.
- Now push vehicle together slowly (approx. 3 kmph) for coupling two coaches.
- Ensure the position of tell tale device for proper coupling.
- Also make sure that the manual uncoupling device is locked properly.
- Reverse the engine to pull the vehicles apart. This pull test is to ensure positive coupling.

TAIL TALE POSITION OF TIGHT LOCK CBC



- After coupling the Tail Tale recess should be clear.
- The pin of rotary lever should be visible.

➢ Un- Coupling :

- For un-coupling of the coupler manual uncoupling device is provided.
- First unlock the lock of the handle.
- Lift & turn the handle in clockwise direction (minimum 90°), if required.
- Then pull the vehicles apart.

CBC & BUFFER PARAMETERS

Items		Parameter
Gathering range of Coupler	Horizontal	± 110 mm
	Vertical	± 90 mm
CBC height under tare condition		1105 mm
Permissible CBC height under tare condition		1090 mm
Permissible CBC height under loaded condition		1030 mm
Permissible knuckle difference between engine & power car knuckle by measuring Tape)		75 mm
Maximum projection of side buffers		650 mm

SCHEDULE OF CBC

CBC Schedule	Interval	Atention
I	Every Trip	Visual examination of all components for proper working, loosening and damage. Greasing of sliding rod once in 3 months (in rake)
II	18 Months (SS1/IOH)	All items of Schedule- I Cleaning, gauging for wear and distortion. Anti -creep test. Height of CBC. (in workshop)
III	72 Months	All items of Schedule - I & II. Dismantling, checking, gauging, reconditioning, reassembling of all components. Greasing of coupler head with Molycot /graphite grease. (in workshop)

Above Schedules are recommended by RDSO.

Note: Greasing /Oiling of internal components of CBC is strictly prohibited.

CBC HEIGHT ADJUSTMENT

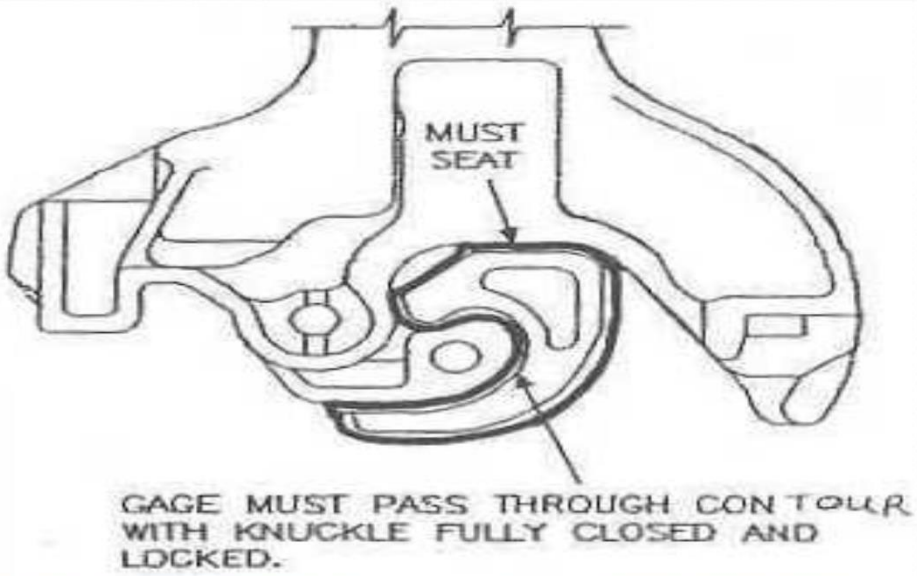
- By adding or removing shims from body/bogie connections
- Max 35 mm shims can be provided (05 mm shim per 10 mm diameter reduction)
- If still height is not adjusted Secondary Spring and miner pad to be checked and adjusted.

  Dimension of miner pad is

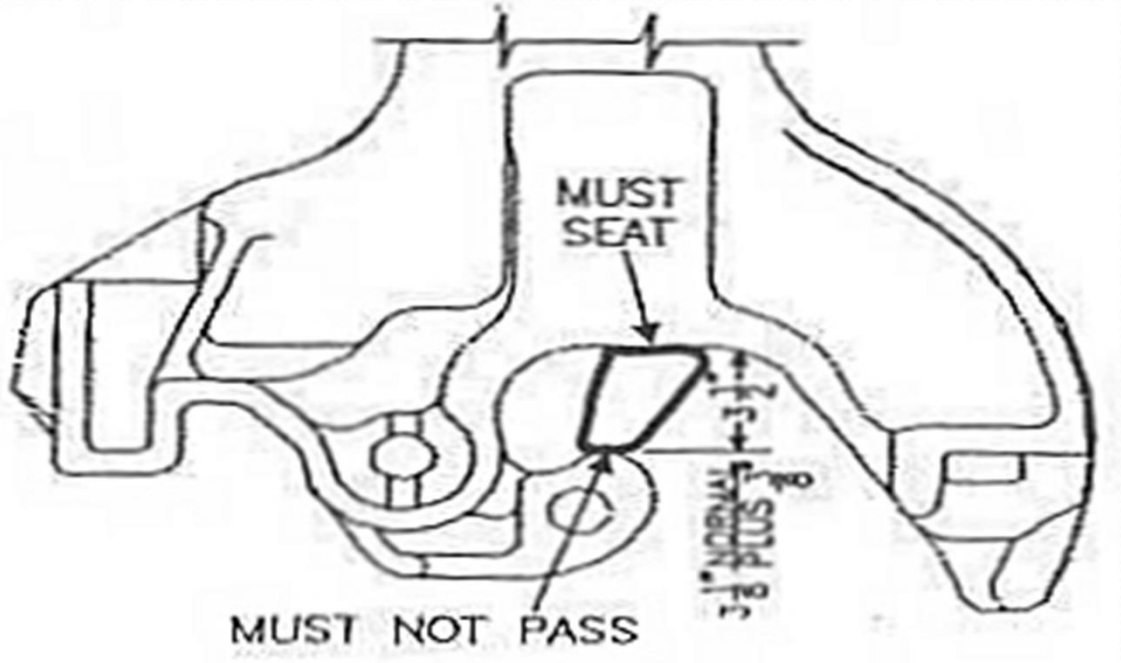
  - Free height = 90 to 95 mm
  - Inner Dia = 152 to 158 mm
  - Outer Dia = 225 to 238 mm

- Manganese wear plate of CBC shank and supporting device is to be checked and maintained.
- Shims will not be added/removed in Primary and Secondary Suspension for wheel wear compensation or buffer height adjustment.

GAUGING OF TIGHT LOCK COUPLER IN SICK LINE OR SHOP



JAW GAP GAUGE



GAUGING OF TIGHT LOCK COUPLER

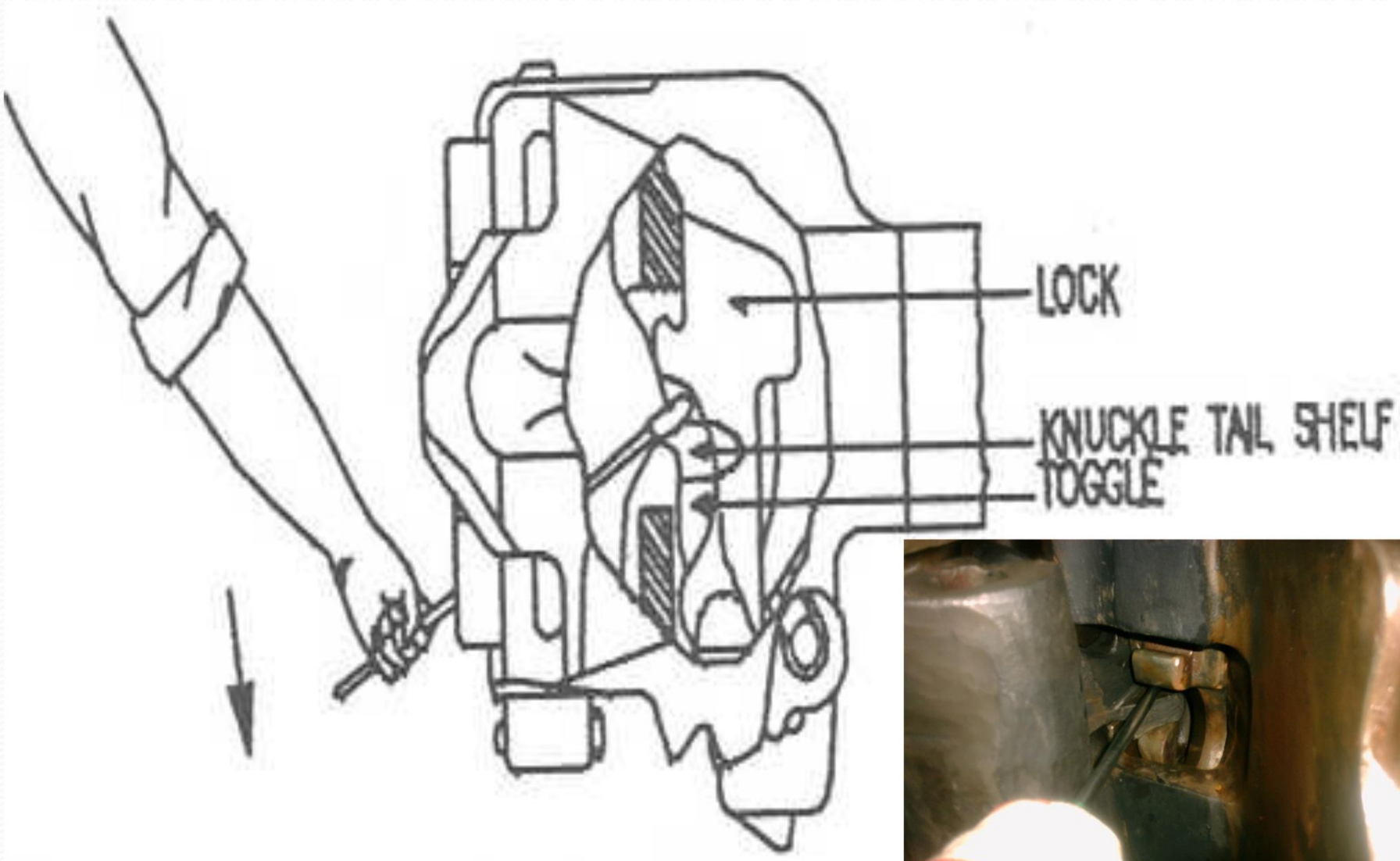
Gauging of coupler body

Gauge for knuckle in free condition

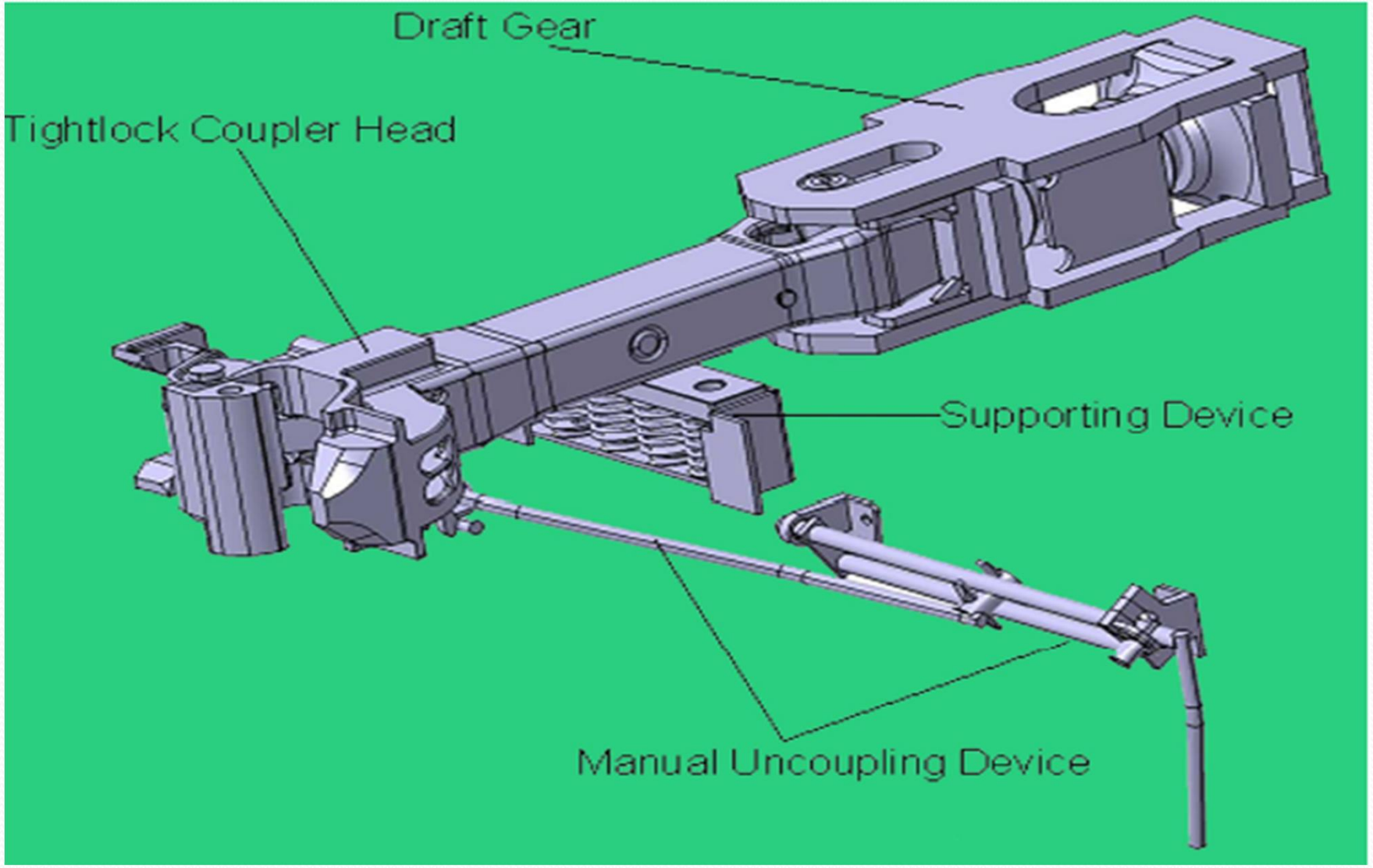
GAUGING OF COUPLER BODY

GAUGING OF MALE PORTION

ANTI-CREEP CHECK



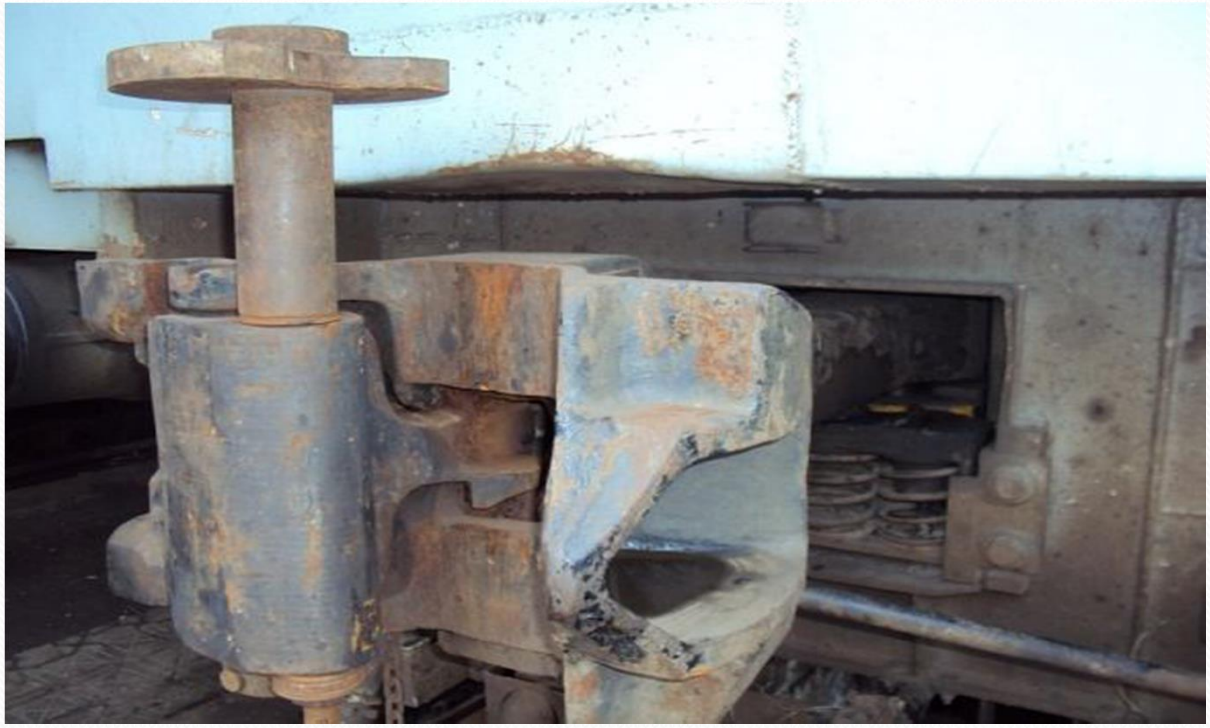
AAR Type Tight Lock Coupler Assembly



INSTRUCTION FOR EXAMINATION/SHUNTING STAFF

- Don't disturb the uncoupling device without any reason.
- Ensure proper tightening of the nut bolt of support plate of draft gear and headless pin
- Don't apply grease/oil on knuckle ,Coupler head ,lock and anti creep etc.
- Always keep open the Knuckles of both the Power cars/SLR or spare coaches if any.
- Always check rest plate ,loosening of bolts and breakage of springs etc.

- Tight lock couplers with anticlimbing features are introduced in coaches only and not in locomotives, where the rake attached with locomotives there is a coupling between tight lock coupler and ordinary transition type CBC
- If there is a buffer height difference of more than **65**mm knuckle may uncouple. To prevent this a restrictor has been provided in tight lock coupler which prevents the lifting of knuckle.



- Tight lock coupler with anti climbing feature and transition coupling has been introduced in locomotives too.