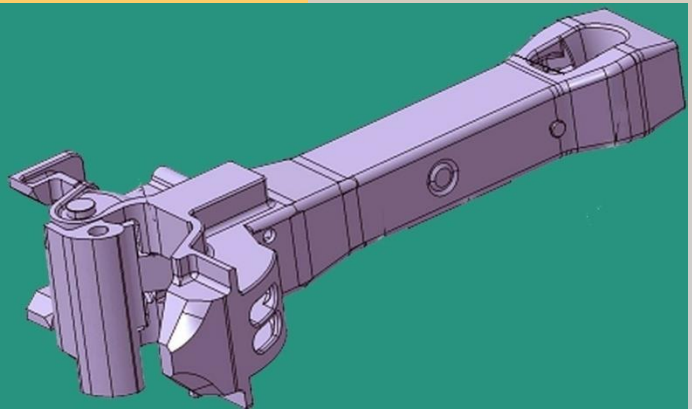
CBC

IN

LHB COACHES



Presented By:
STC/NBQ

Introduction:

- The Center Buffer Couplers used on LHB coaches are tight lock CBC of AAR type H.
- They can be coupled with AAR type “E” center buffer couplers fitted on Locomotives.
- The tight lock coupler by its special design, hinders the climbing of the vehicles in case of an accident.
- The “Coupler System” allows a vertical angle of deflection of ± 7 deg. and horizontal angle of deflection of ± 17 deg.

IR Adopted AAR Type `H' Coupler

Main Reasons :

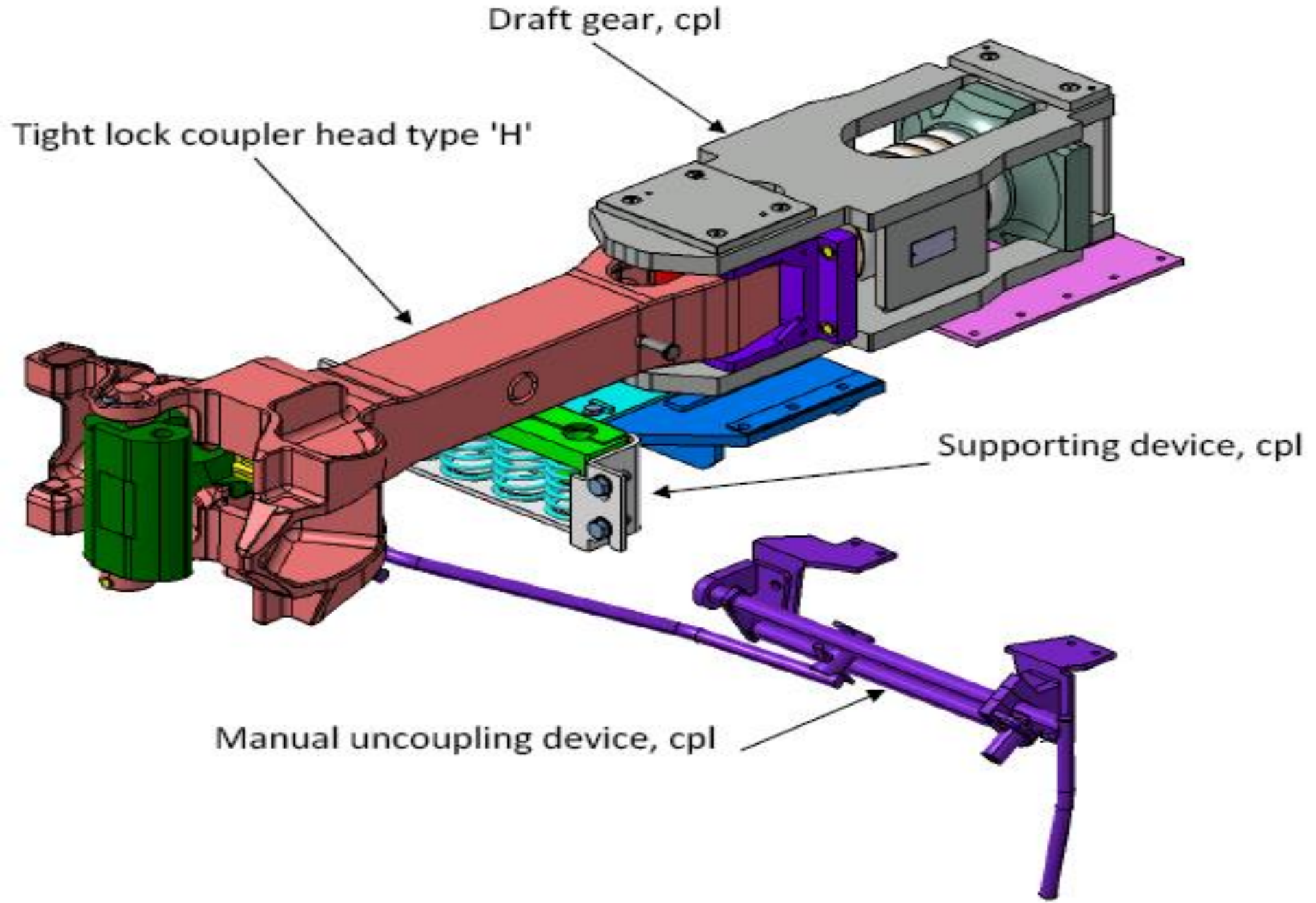
- Couplability with Type- E Coupler fitted on IR Locomotives
- Anti-climbing Feature-in built
- Strength Suitable for Operation of 26-coach Train
- Low Cost

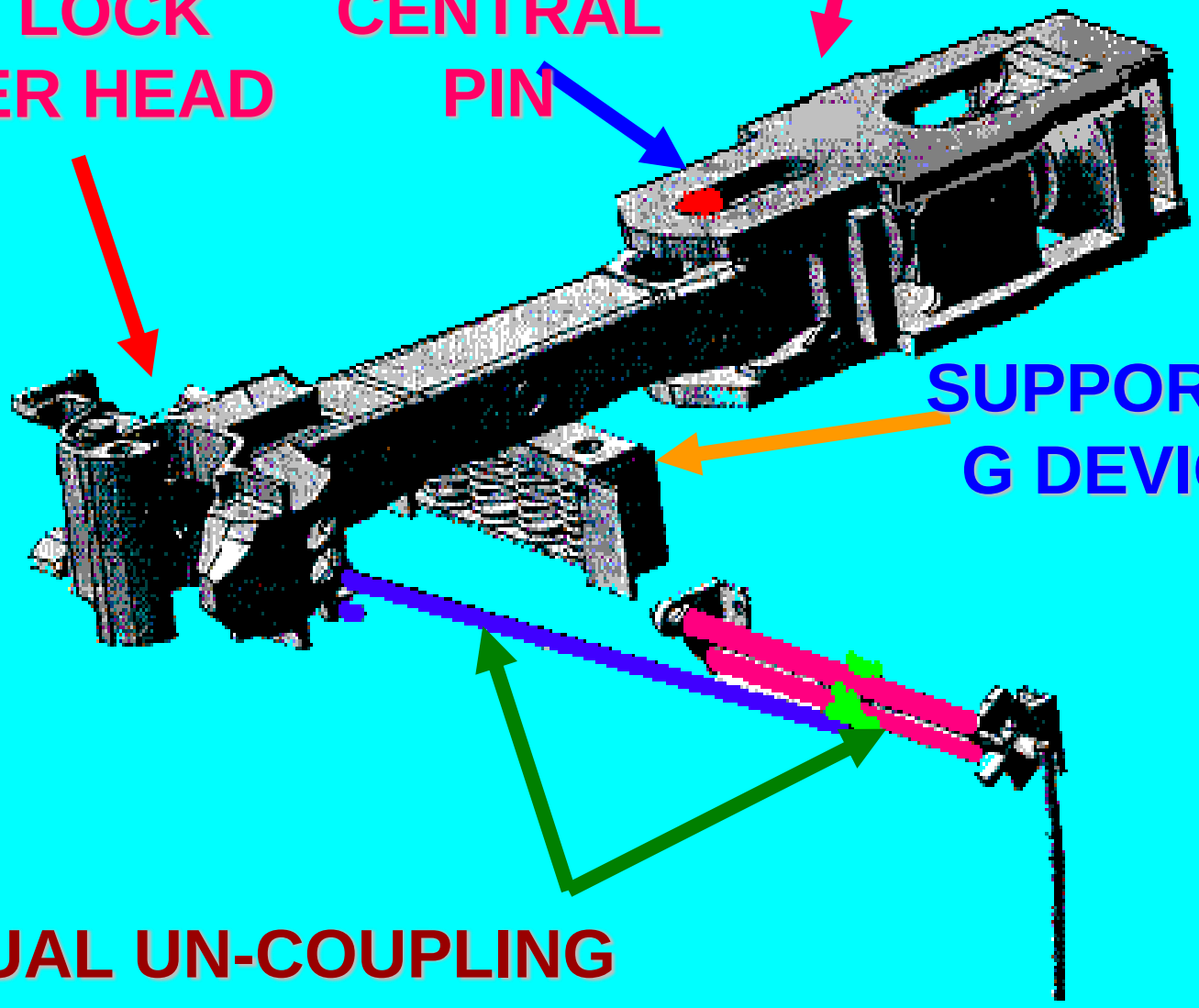
CBC COACH IDENTIFICATION

Description of the Components:

Main components of the Coupler system are:

- Tight lock coupler head (AAR type H) with drawbar.
- Drawbar guide (Support)
- Draft Gear
- Manual uncoupling device.


Draft gear, cpl
Tight lock coupler head type 'H'
Supporting device, cpl
Manual uncoupling device, cpl

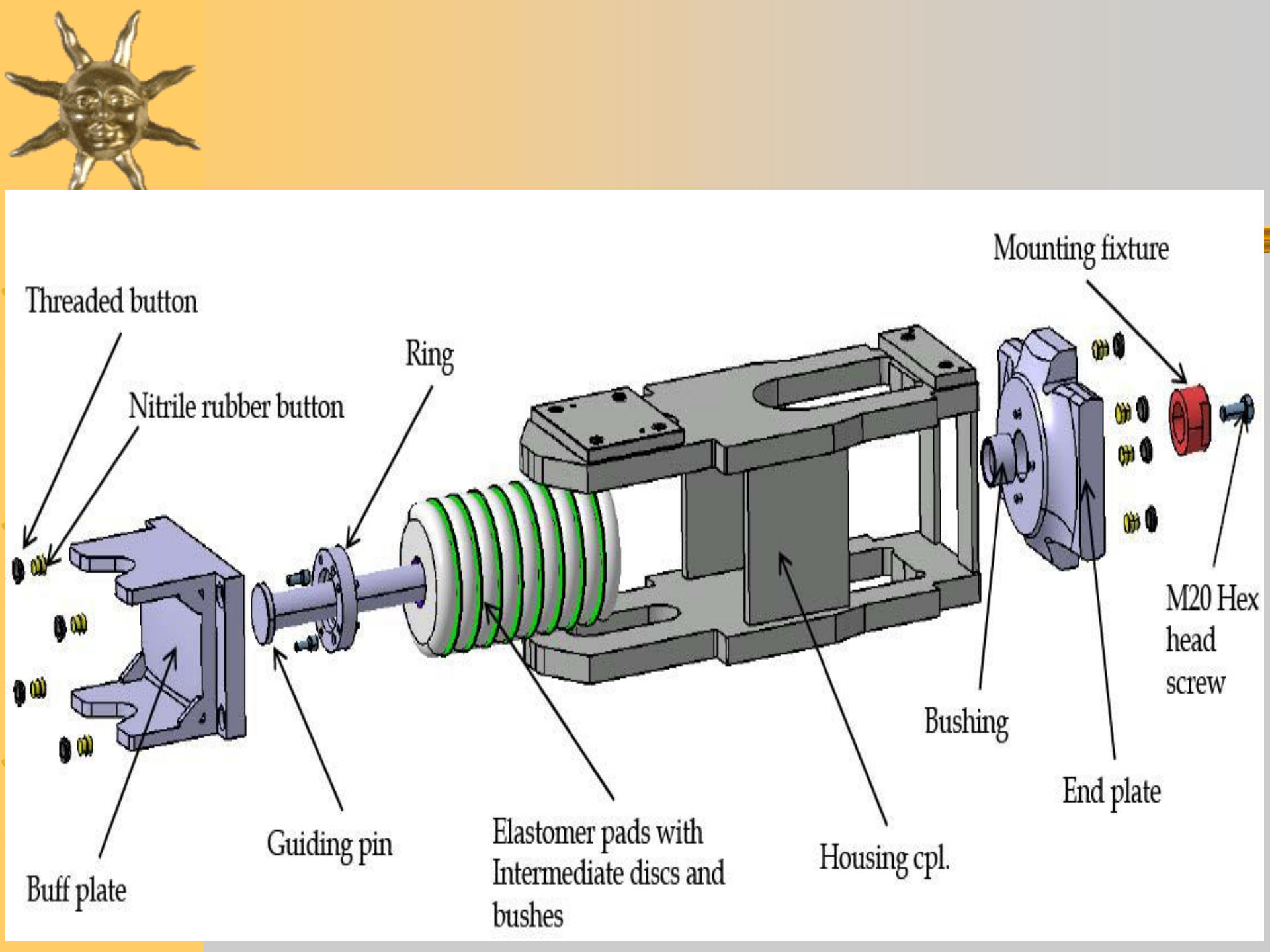

TIGHT LOCK COUPLER HEAD
CENTRAL PIN
DRAFT GEAR
SUPPORTIN G DEVICE
MANUAL UN-COUPLING DEVICE

Tight lock coupler head Type "H"

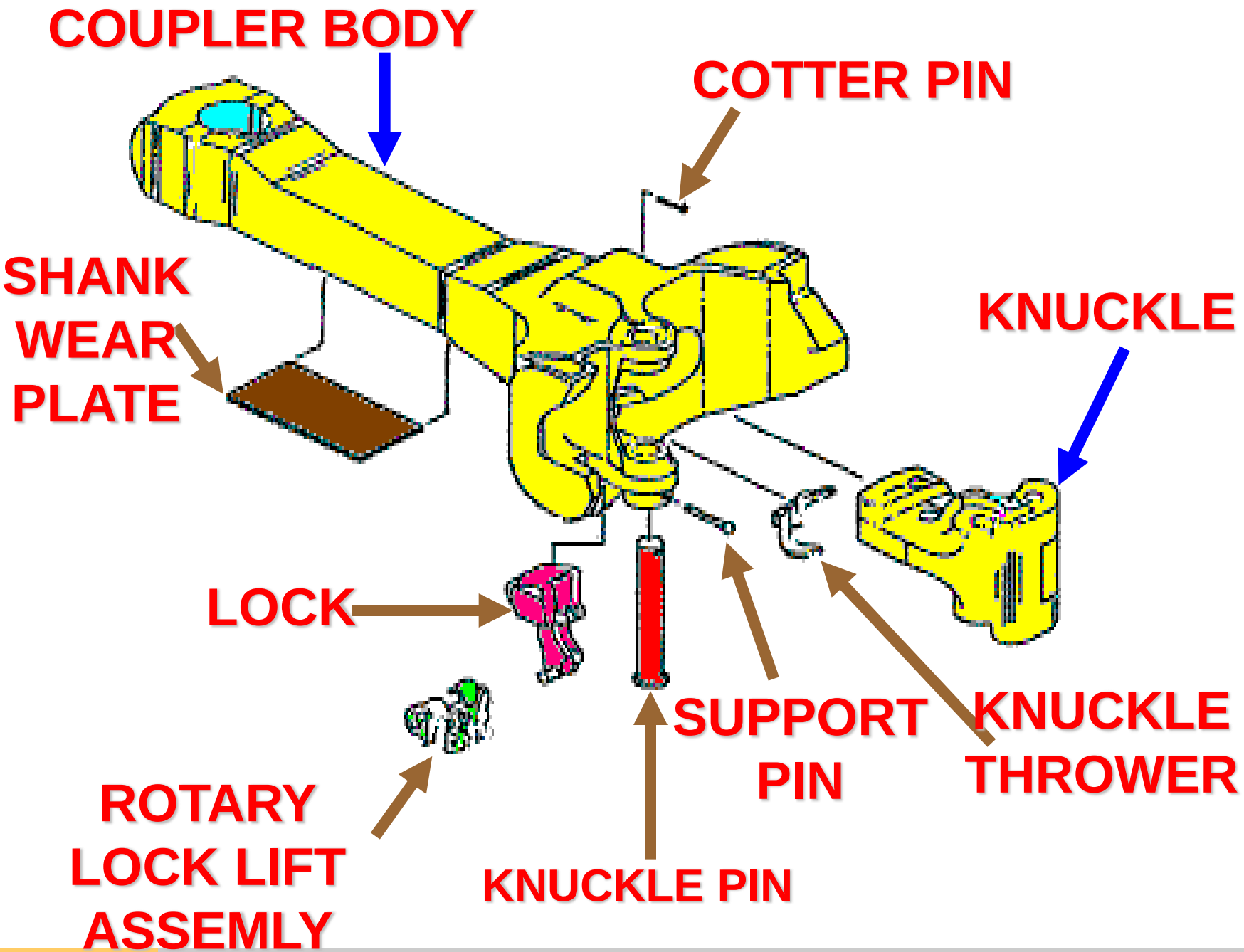
- **Coupler head is facilitated with manual un-coupling device that can be easily operated from outside the coach end. Parts like knuckle, knuckle thrower, lock, rotary lock lifting assembly, cotter pin, support pin, pivot pin etc. which enable coupling & uncoupling of the CBC assembly.**
- **The coupler head tail end is provided with a UIC *stabilizing link* and is connected to the draft gear through central pin.**
- **Height between center of shank and bottom of CBC pocket in head stock 260 mm**

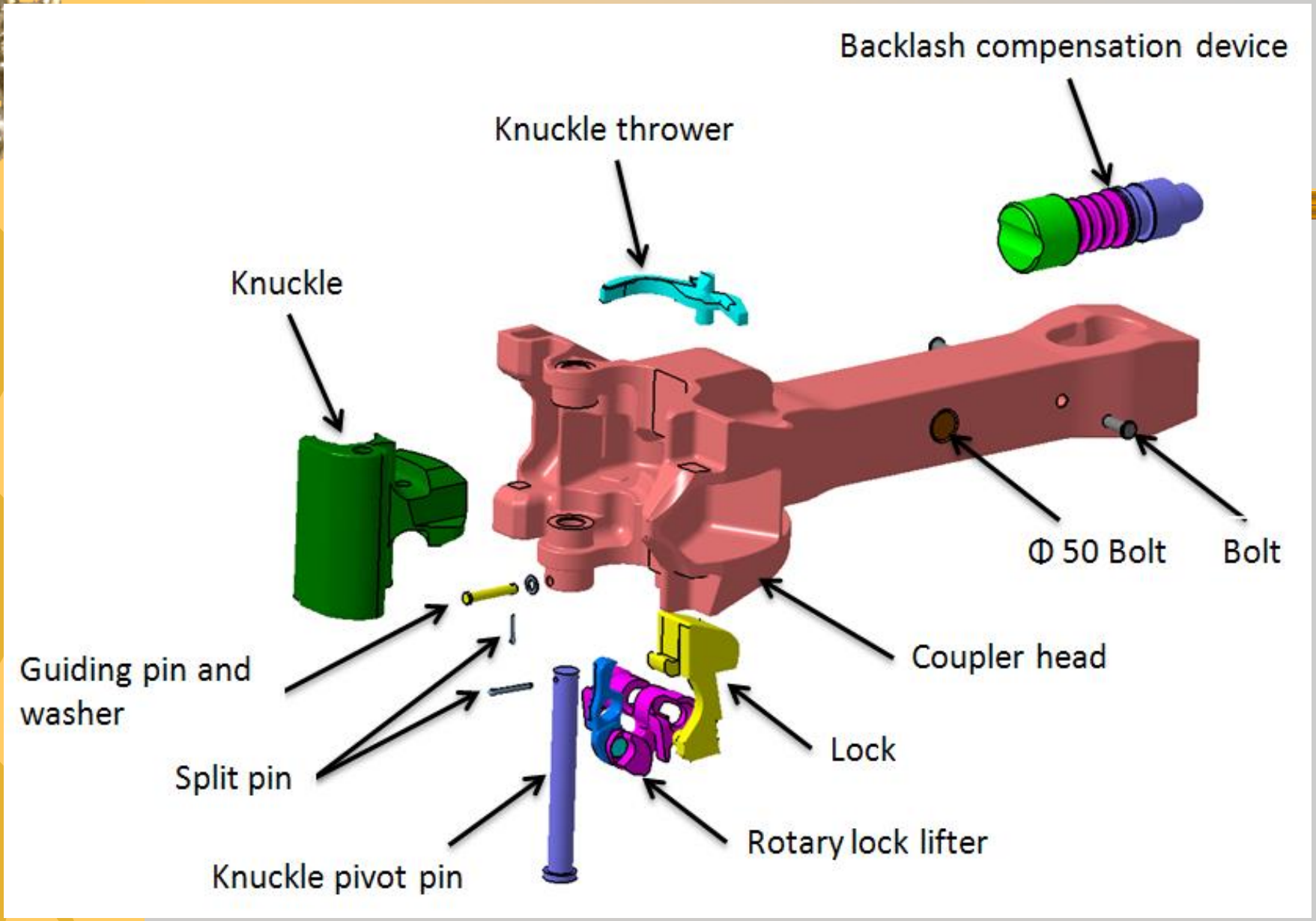
Parts List of Tight Lock Coupler Head

Item No	Description	Quantity
1	Coupler Head Body	1
2	Knuckle	1
3	Bush	4
4	Lock	1
5	Knuckle Thrower	1
6	Telltale	1
7	Bolt	1
9	Lock Lift Lever	1
10	Rotor	1
11	Knuckle Spring	1
12	Split Pin	1
13	Split Pin (2 mm)	1
14	Knuckle Pivot Pin	1

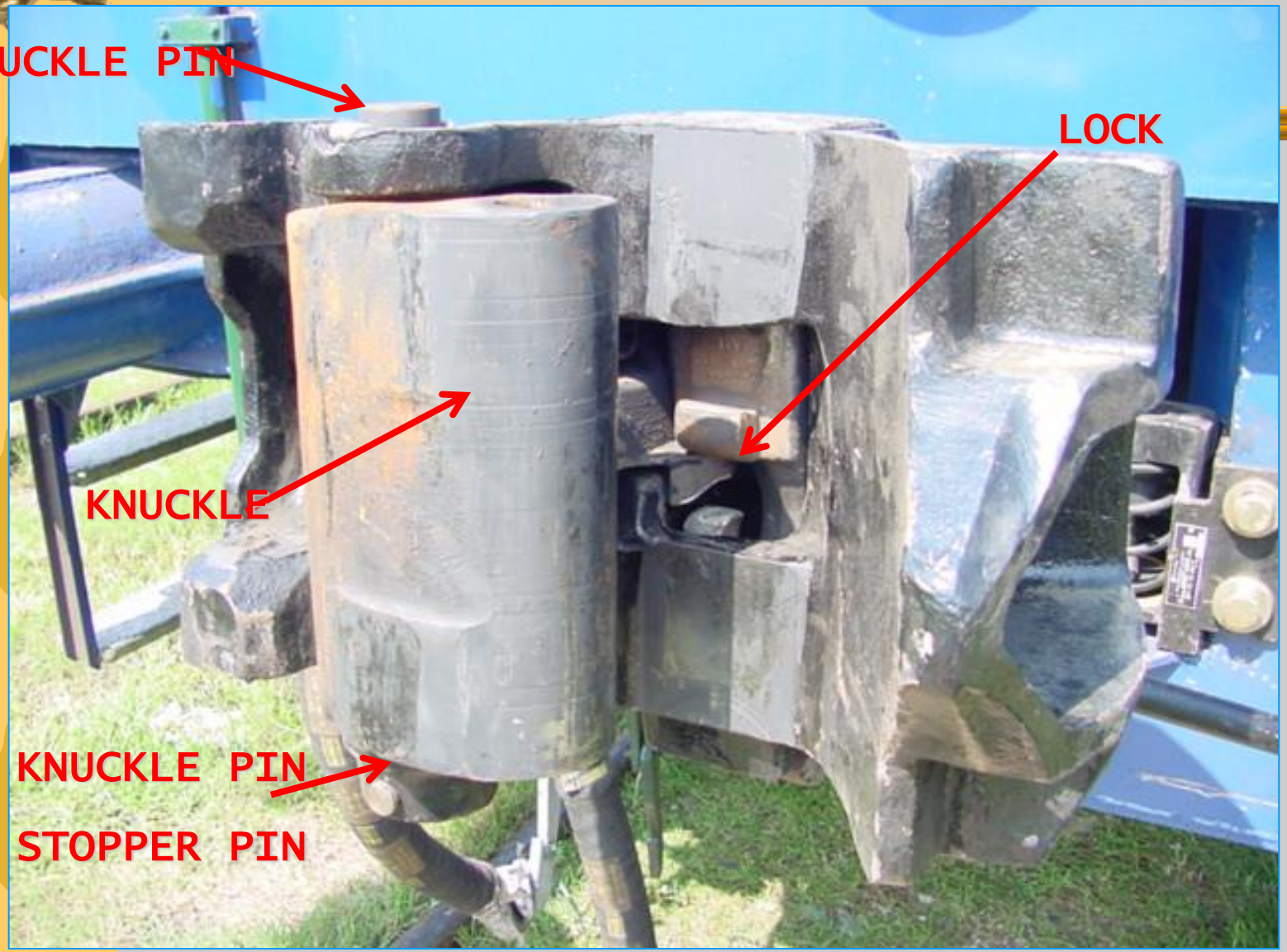

Mounting fixture
Threaded button
Ring
Nitrile rubber button
M20 Hex head screw
Bushing
End plate
Guiding pin
Elastomer pads with Intermediate discs and bushes
Housing cpl.
Buff plate

COUPLER BODY PARTS

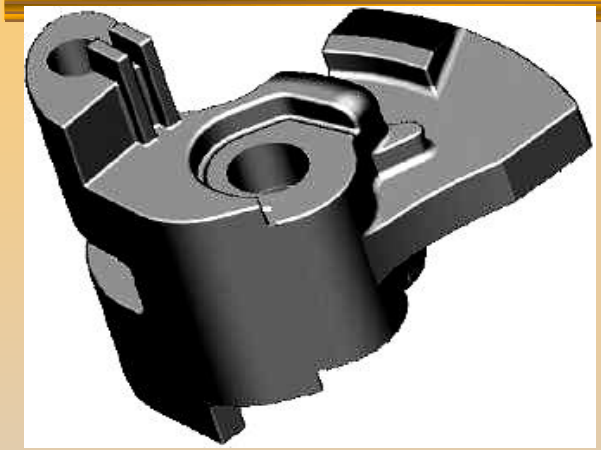



Backlash compensation device
Knuckle thrower
Knuckle
Φ 50 Bolt
Bolt
Guiding pin and washer
Coupler head
Split pin
Lock
Rotary lock lifter
Knuckle pivot pin

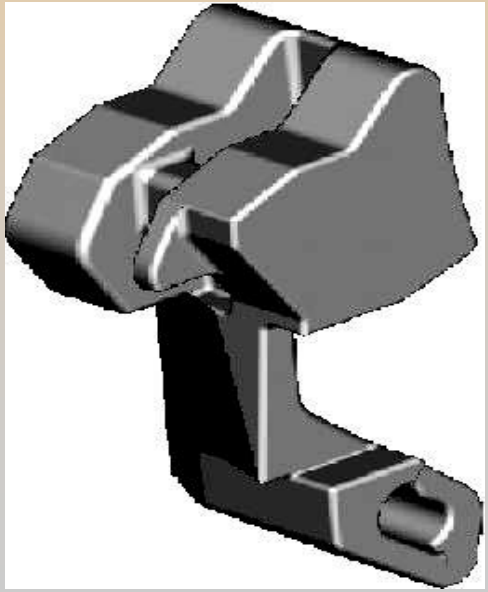
CBC-HEAD COMPONENTS



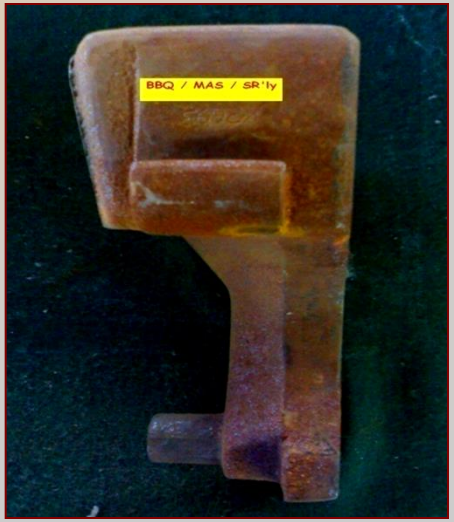
CBC-HEAD COMPONENTS



Knuckle

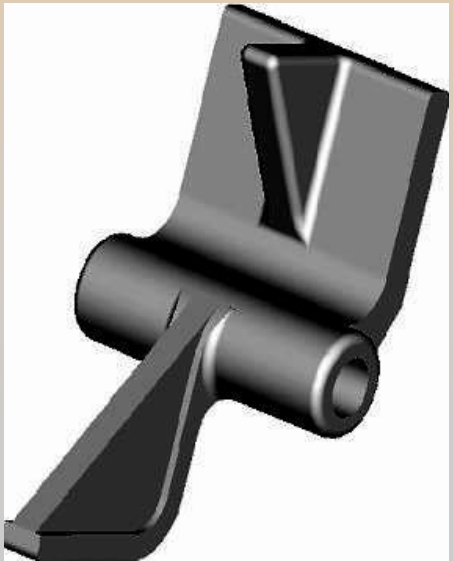


Lock



CBC-HEAD COMPONENTS

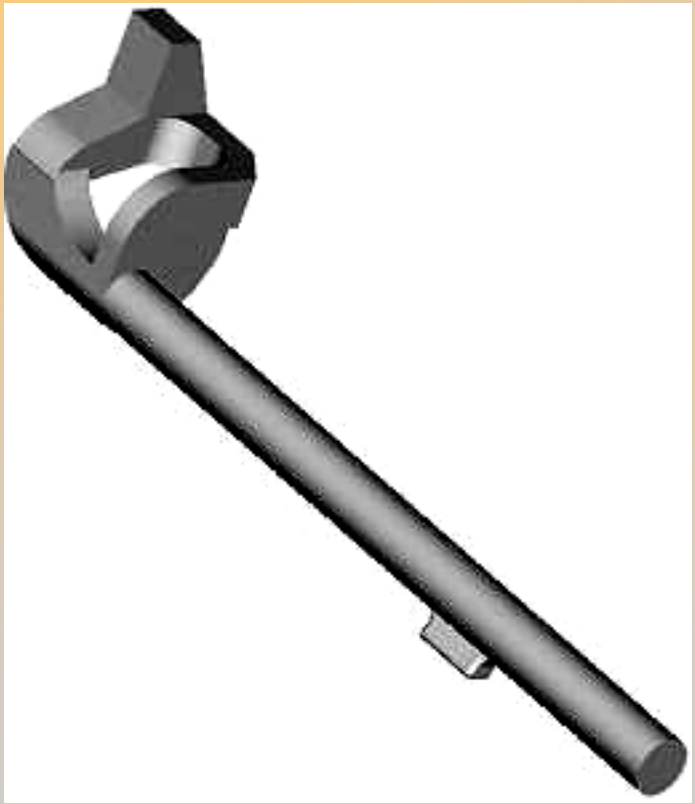
Knuckle Thrower



Tell tale

Rotor

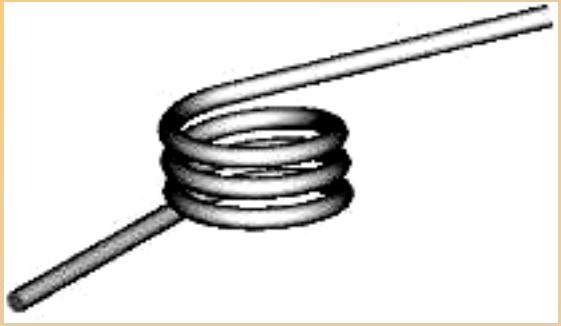
CBC-HEAD COMPONENTS



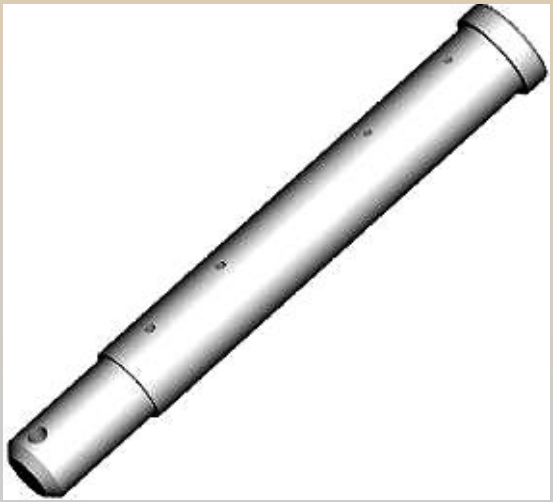
Rotor

Locklift
Lever

CBC-HEAD COMPONENTS

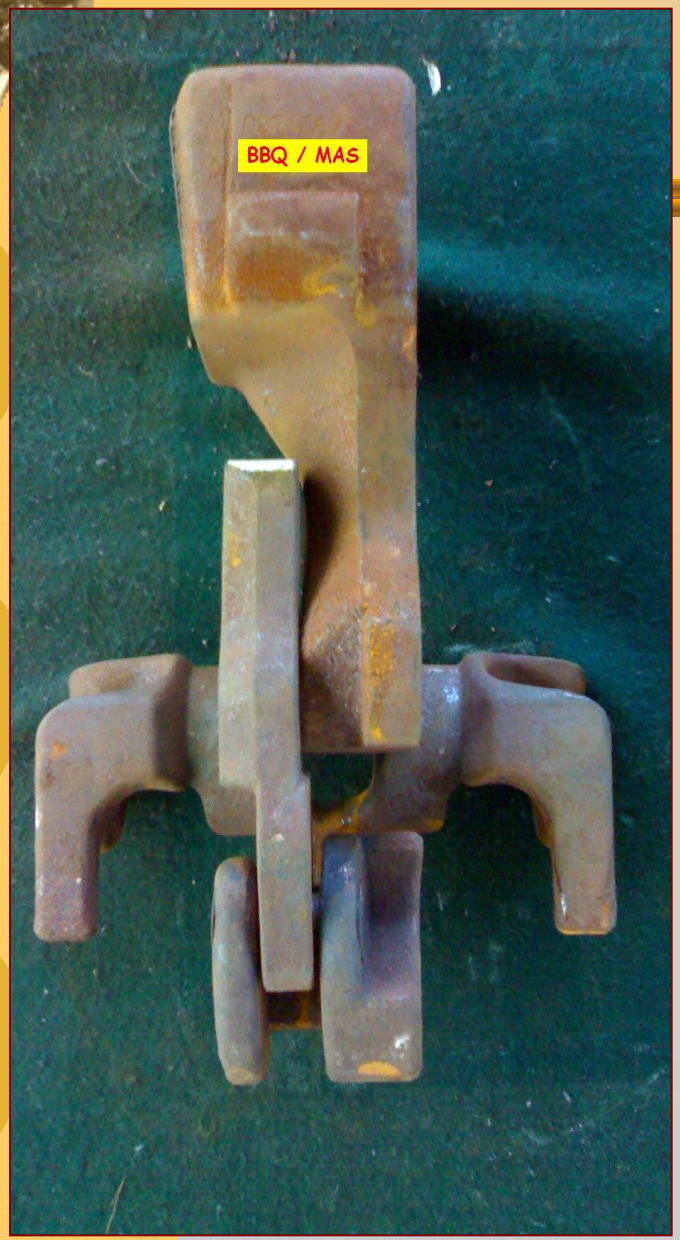


Knuckle Spring



Knuckle Pivot Pin

Lock with lock lift assembly



TOP VIEW OF COACH CBC'S IN COUPLED CONDITION

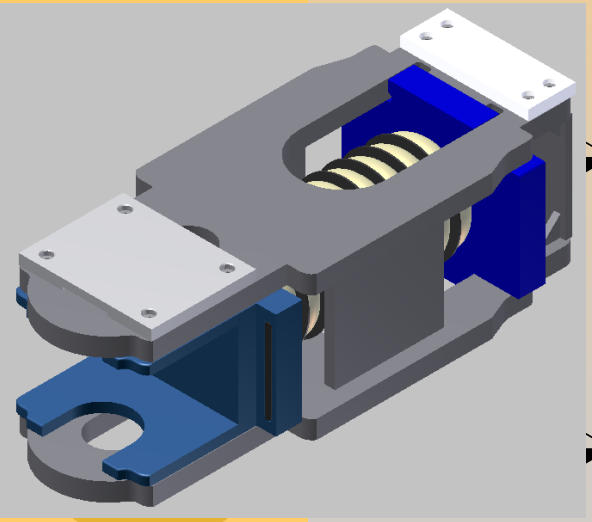
KNUCKLE PINS ARE INSERTED FROM BOTTOM

CBC SHANK

Draft Gear

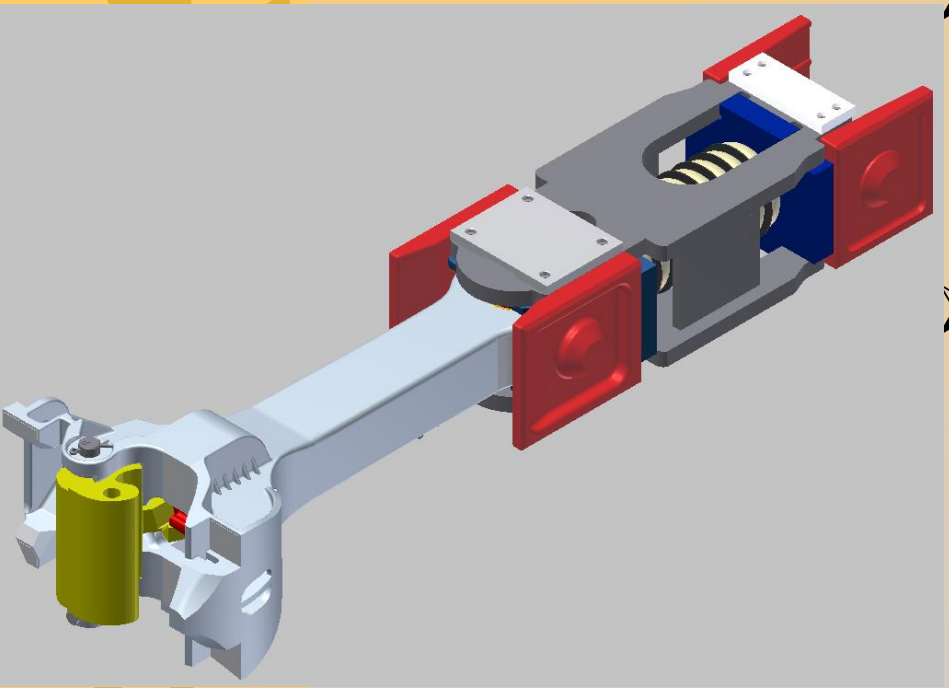
- The draft gear is a double acting device. This device absorbs energy during coupling & during service. This device is fitted in to the pocket of the coach where it absorbs the dynamic energy in both draw & buff modes.
- The stroke in tensile (draw) direction is limited to 58 mm while that in the compressive (buff) direction is 80 mm (max).

Conventional Draft Gear



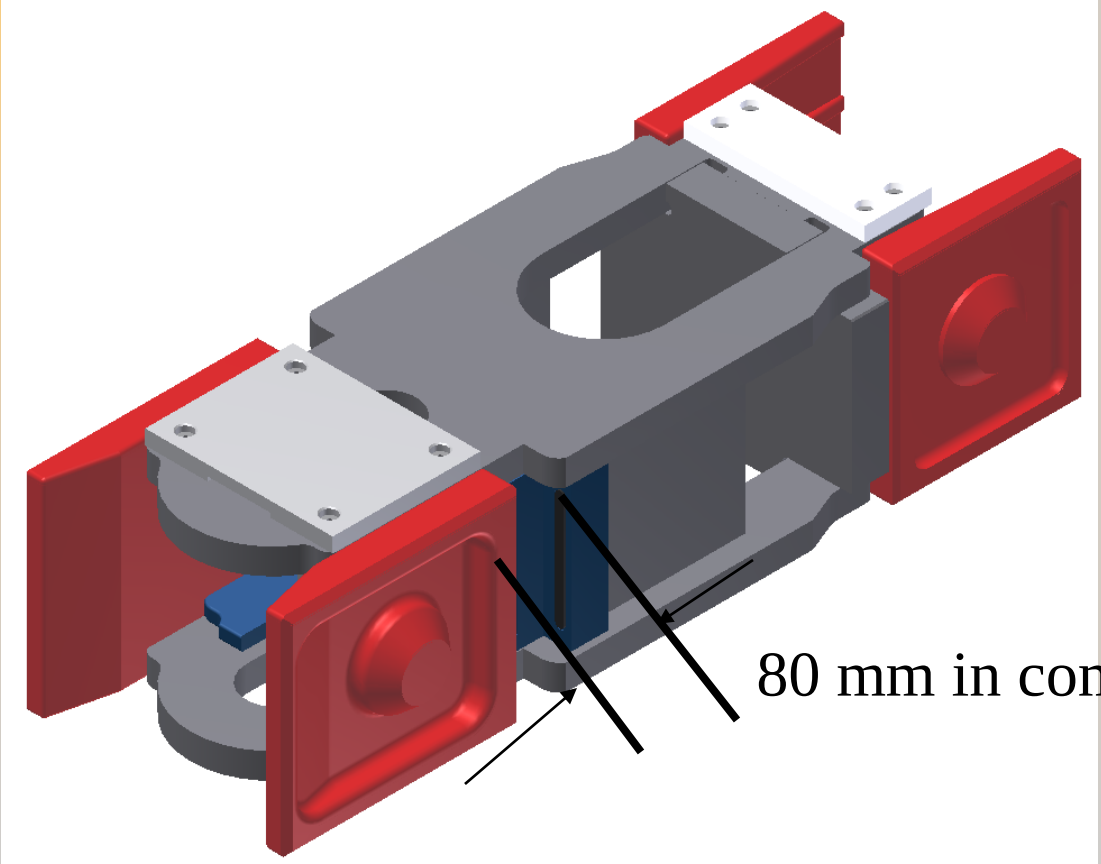
- **Standard Draft Gear consists of a single pack of 10 nos. Elastomeric pads which work in compression as well as in tensile loading.**
- **On the other hand BDG consists of separate packs for compression (4 pads) and for tension (3 pads).**
- **Elastomeric pads used for compression in BDG (pack of 4 pads) have equal energy absorbing capacity as compared to 10 pad pack used in conventional draft gear.**

Conventional Draft Gear

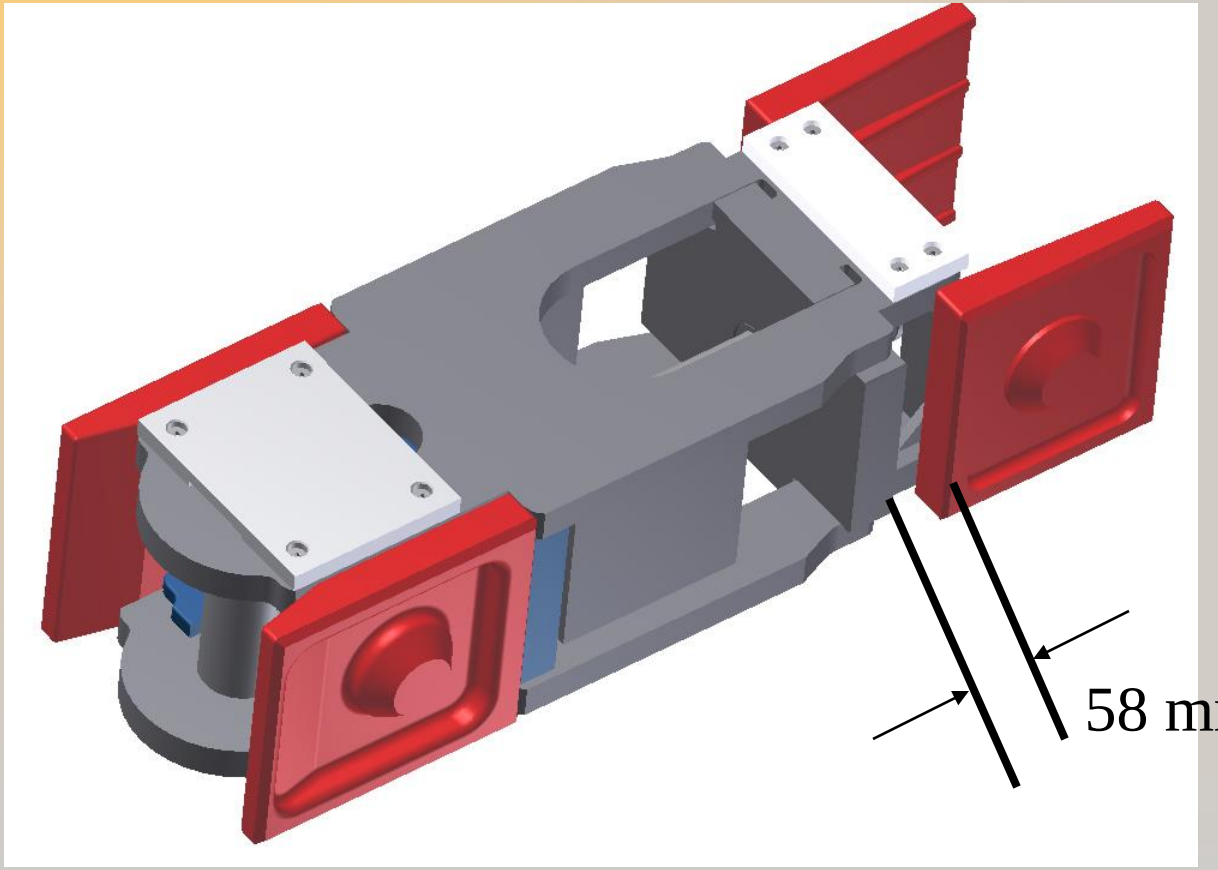


- Standard Draft Gear has Front Fork plate and Rear Stopper plate (in blue color).
- These two plates hit the coach under frame Stoppers (in Red color) during force reversal after buffing (compression) and in tension mode respectively in deceleration and acceleration.

Standard Draft Gear in Compression mode



Standard Draft Gear in Tensile mode



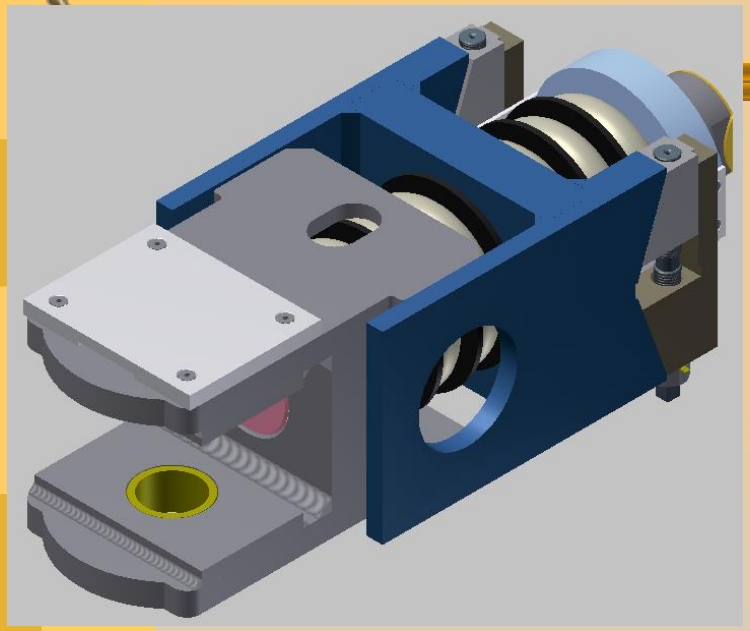
Balance Draft Gear

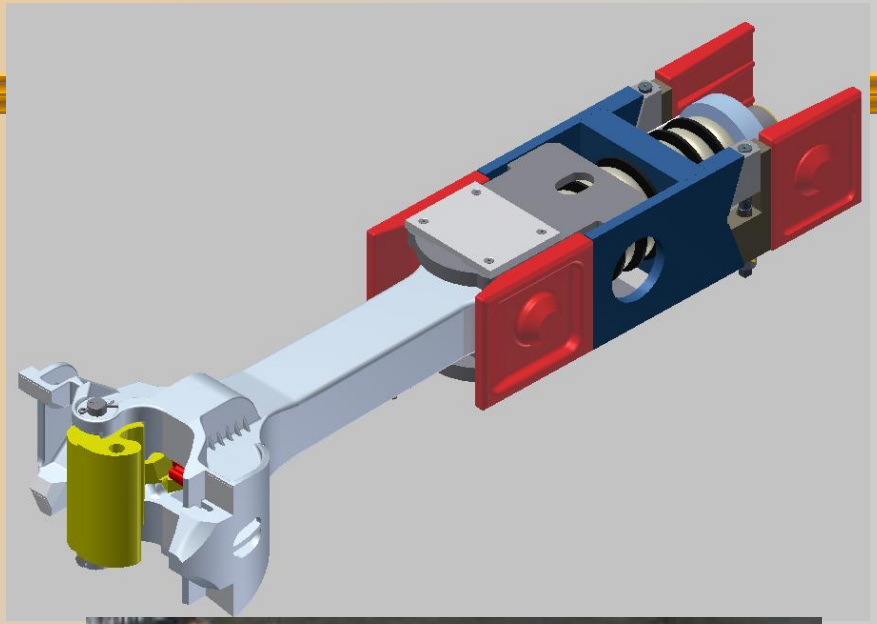
- Recently balanced draft gear are being introduced, which had a single stopper plate at the middle and pads are provided on either side. The spindle is inserted through the pads and the plate and secured at the other end. Hence during buffing the front pads are compressed and the rear pads compensate by expanding and vice versa for draft action, due to which during both the buffing and draft action there is no gap generated leading to almost nil jerks during train operation.

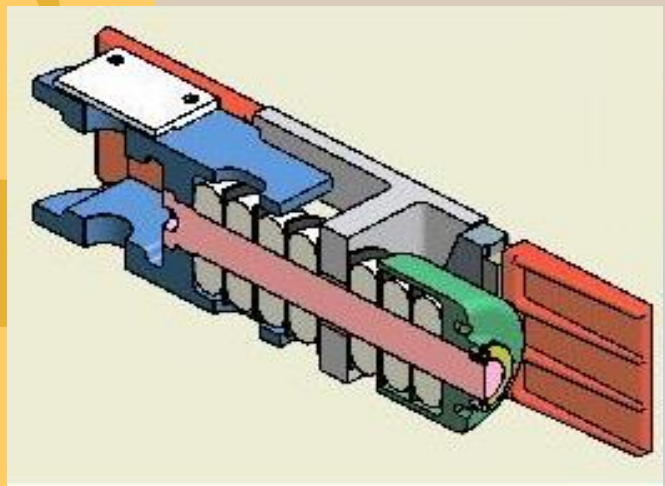
BDG Major Components

- **Stack of Heavy Duty Elastomeric Pads (Imported) - 04 in compression & 03 in tensile mode.**
- **PA-6 bushes for smooth sliding of intermediate plates & pads over Main bolt.**
- **Fabricated Front Fork & H - Housing.**
- **Main bolt - High toughness, forged.**
- **Adjustable wedges to tighten the BDG assembly with coach under frame.**
- **The fixed plate, a part of H Housing (Blue color,) which is tight fitted with coach under frame (Red color) between front & rear stoppers with the help of special design wedge key.**

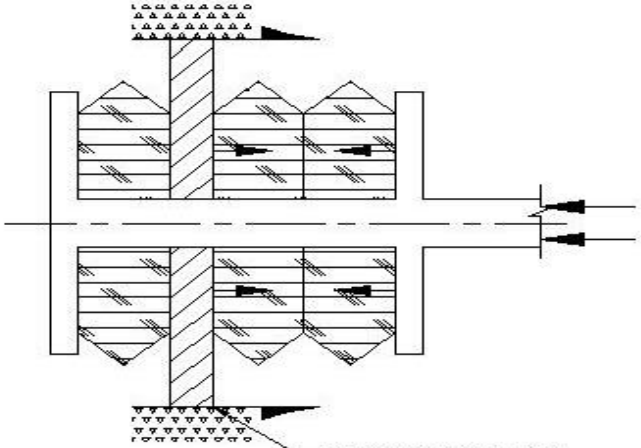
Balanced Draft Gear AAR H coupler with BDG



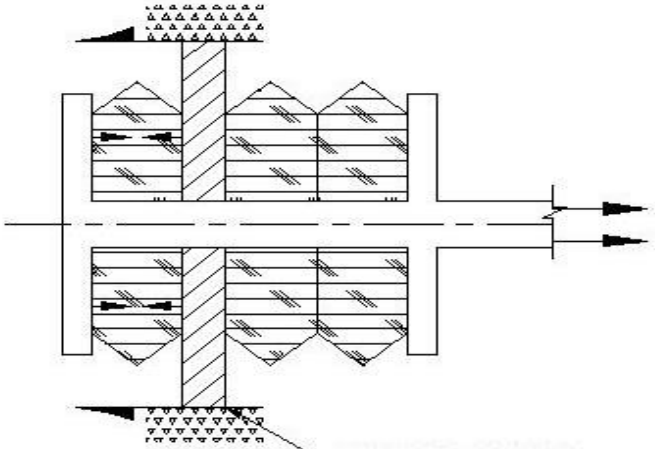




FORCE FLOW DIAGRAM OF DOUBLE ACTING BALANCED DRAFT GEAR



BUFF MODE



DRAFT MODE

	SUPERSEDED BY			
	SUPERSEDES			
REFERENCE:—	SCALE	P		FORCE FLOW DIAGRAM OF DOUBLE ACTING BALANCED DRAFT GEAR
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FILE No.:— DRAW	BG	RDSO (CARRIAGE)		CG- K8207

Comparison:

CONVENTIONAL DRAFT GEAR	BALANCED DRAFT GEAR
➢Energy absorption 45 KJ in dynamic testing .	➢Energy absorption 45 KJ in dynamic testing .
➢Single pack of 10 Nos. Elastomaric pads used in buff & tensile loading.	➢Two separate packs of Elastomaric pads (4 pads in Buff & 3 pads in tension) have been used.
➢Life is average due to single pack takes load in both buff & tensile mode.	➢Enhanced fatigue life due to separate packs used for buff & tensile loading.
➢Jerks experienced in longitudinal train dynamics.	➢Jerks totally eliminated in longitudinal train dynamics by enhancing design.
➢Draft Gear size (length 510+0/-5 * width 345 * height 275 mm) is suitable to fit in coach under frame pocket	➢Draft Gear size (length 510+0/-5 * width 345 * height 275 mm) is suitable to fit in coach under frame pocket

Benefits of Balance Draft Gear

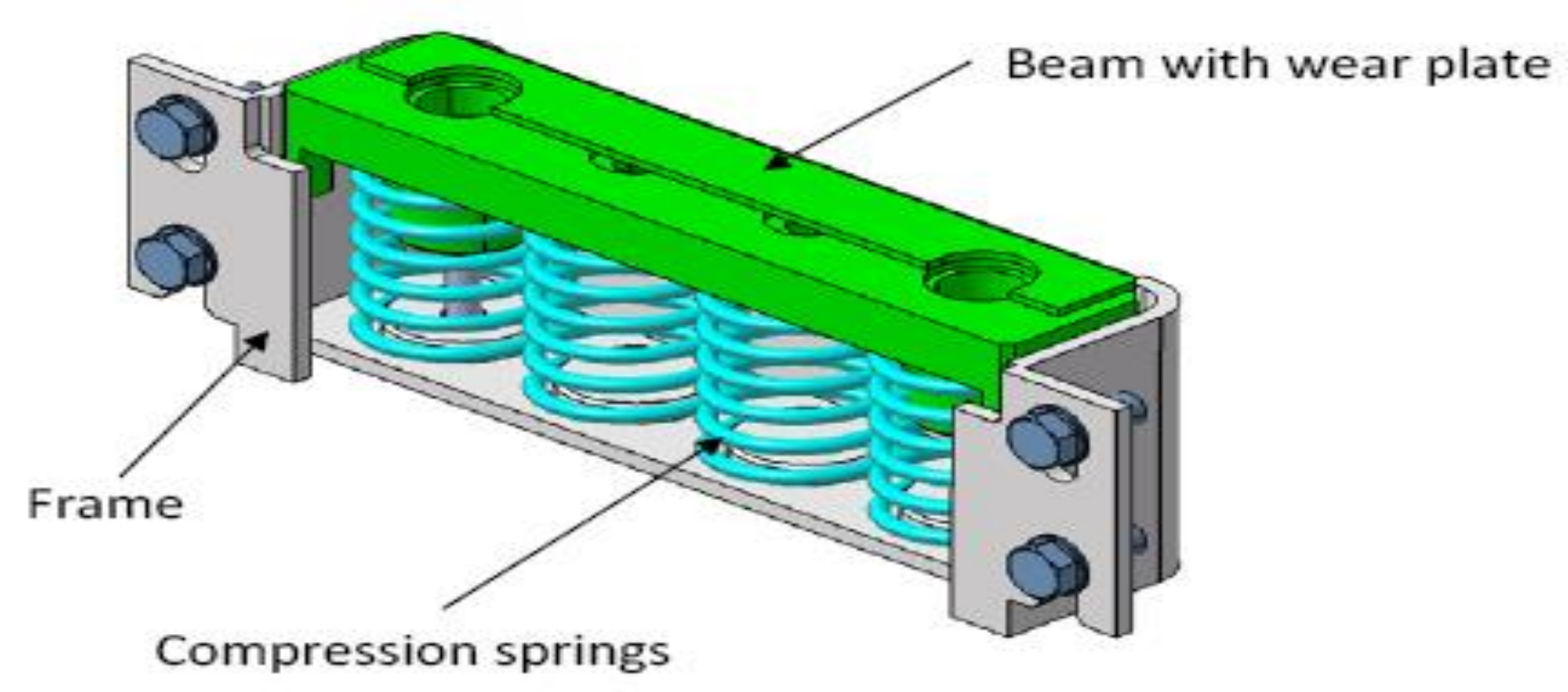
- **Design aims at eliminating Jerk.**
- **In new design Draft Gear (BDG), Jerk & hammer noise problem has been eliminated completely by modifying the design.**
- **On the other hand End force has been balanced in tensile as well as in compressive mode.**
- **Enhanced life of equipment by using Durel GmbH heavy duty Elastomaric pads.**
- **Balanced Draft Gear flexible connection with coupler shank is a proven one and eases the horizontal & vertical movement of coupler head.**
- **Poly Acetel bushes used to avoid wear of Main bolt from metallic separator plates.**
- **In BDG separate packs of heavy duty Elastomaric pads have been used for tension and compression which will enhance the life of equipment up to double of conventional Draft Gear.**

  BDG 04 pads stack is equal to 10 pads stack of conventional Draft Gear in Energy absorption and damping. BDG have bigger size imported (Durel Germany) pads than conventional Draft Gear pads.

Supporting Device

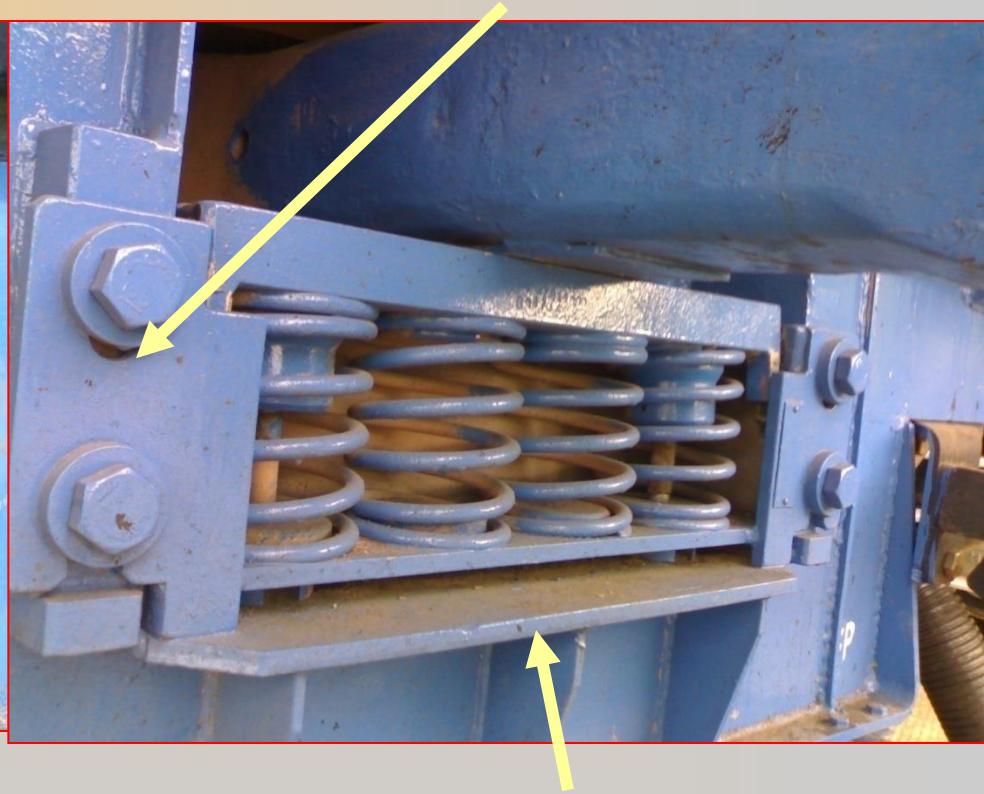
- **The supporting device comprises of 4 (four) preloaded springs.**
- **This device is fitted below the draw bar in the coach pocket & is bolted on to the body of the coach.**
- **The coupler head rests on the top wear plate of the supporting device. The complete weight of the coupler is taken by this supporting device.**
- **Height of Supporting Device including wear plate = 187.5 mm**

Supporting Device



CBC supporting device height adjustment

Elongated hole to accommodate supporting device height adjustment

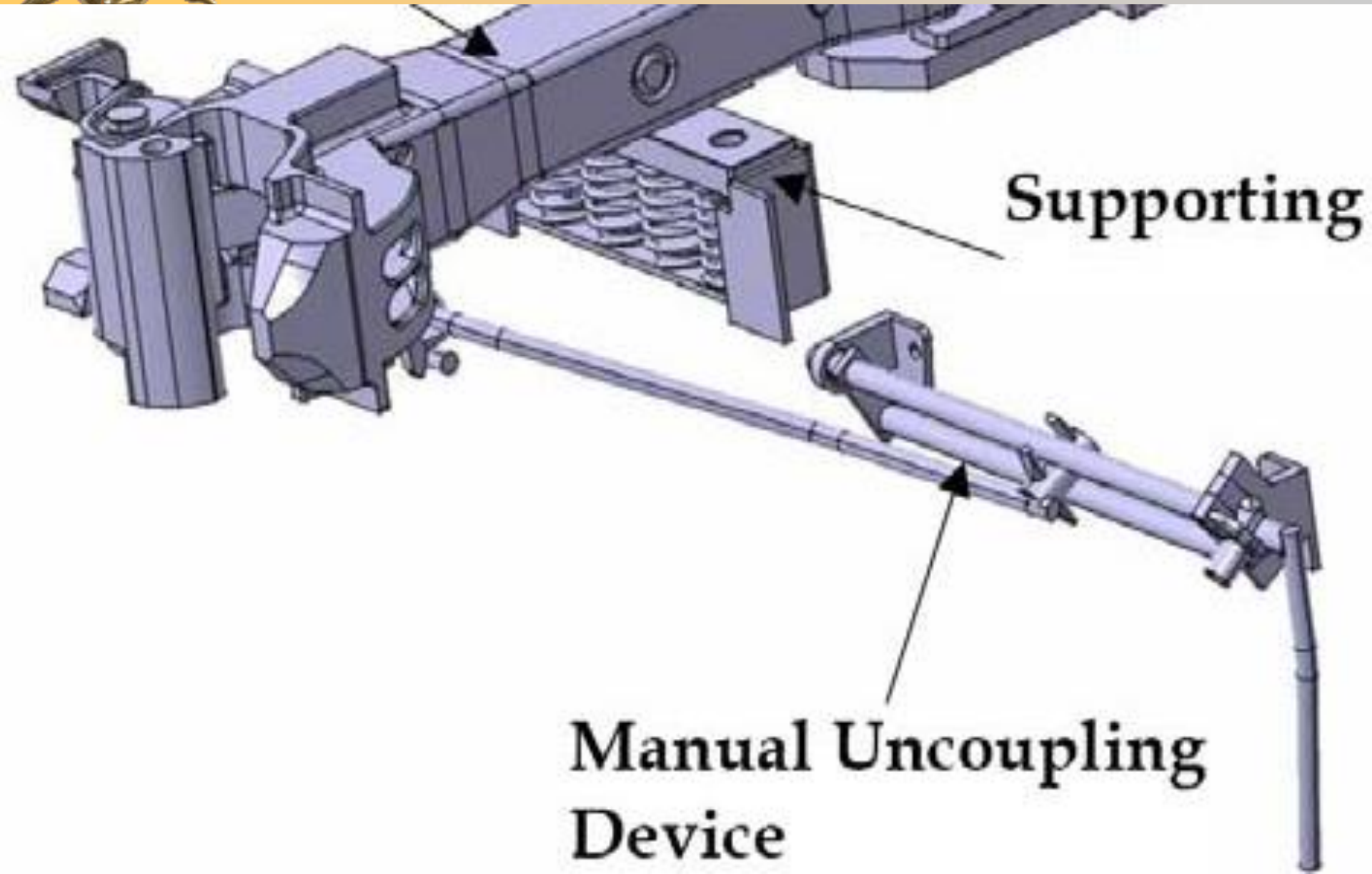


Striker support

Manual Uncoupling Device

- The manual uncoupling device is mounted on one side near end wall of coach. This device is connecting the uncoupling mechanism on coupler head through the sliding rod.
- For un-coupling the coupler, the handle of the coupler is unlocked, lifted and then rotated in clockwise direction.
- After coupling, locking of the handle has to be ensured to prevent unauthorized / Accidental uncoupling.

Manual Uncoupling Device



Coupling & Uncoupling procedure

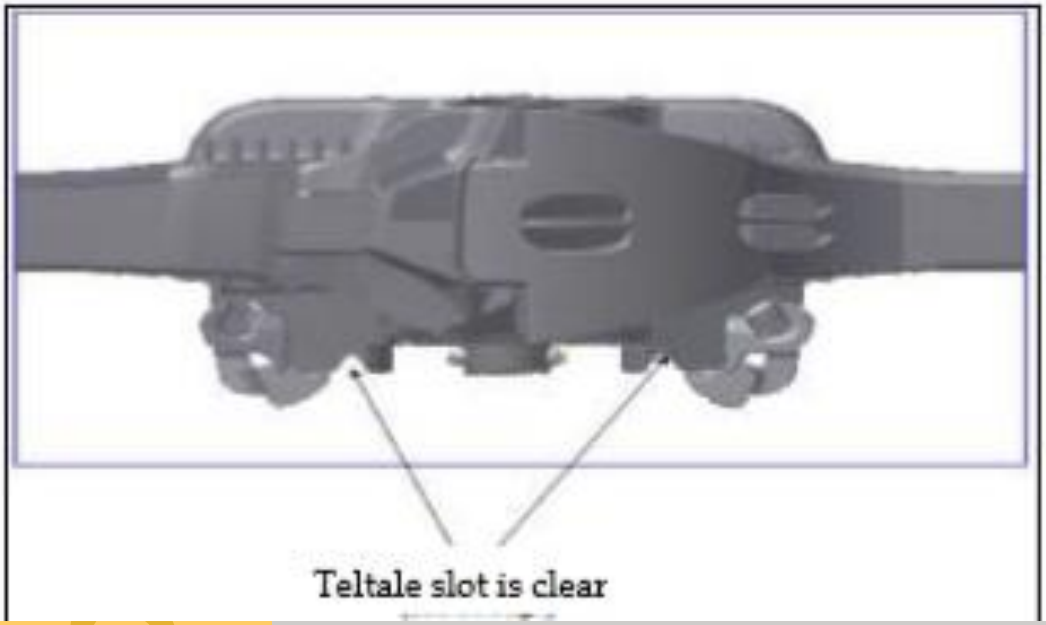
- **Coupling:**
  - Keep the knuckle of coupler of coach to be attached in closed position.
  - Bring the vehicle at a distance of one meter approximately.
  - The position of coupler centers of both the coaches to be coupled should be aligned.
  - If required pull the couplers manually towards each 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.

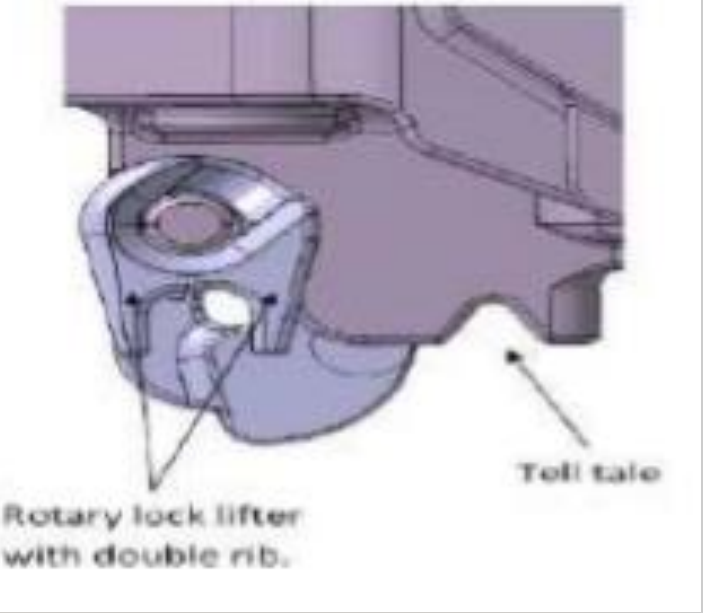
Un-Coupling:

- 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.

Check points for Coupling:

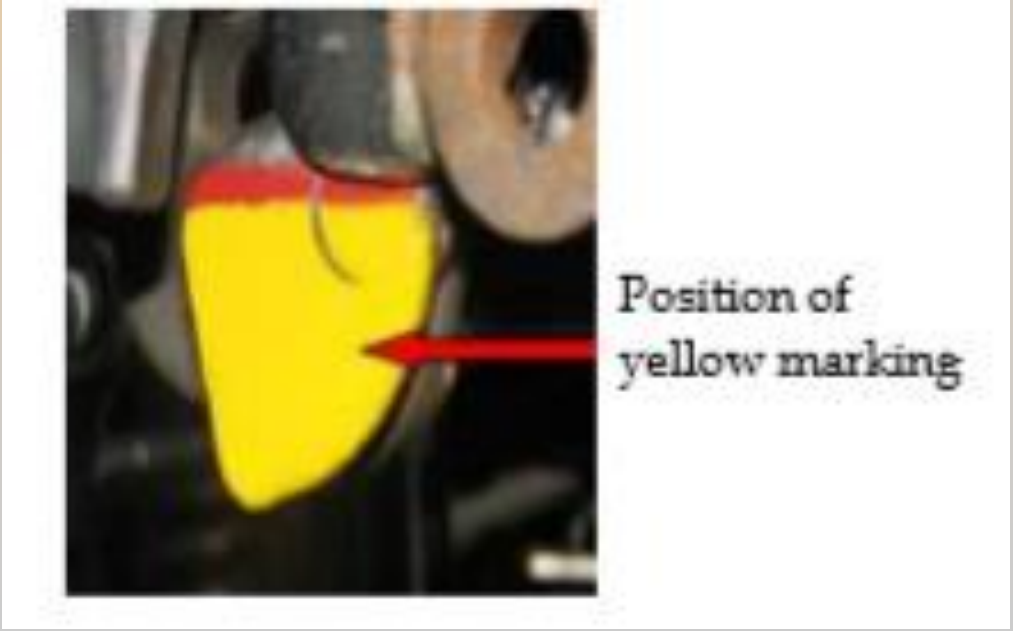
- Check point-1: Check position of tell tale device for proper coupling.





Check points for Coupling:

- Check point-2: Make sure that rotary lock rib is vertical. Loack lift lever are painted with yellow paint of approx. 2” dia. To improve visibility. Position of yellow marking should be such that it is just visible when lock lift lever is fully dropped

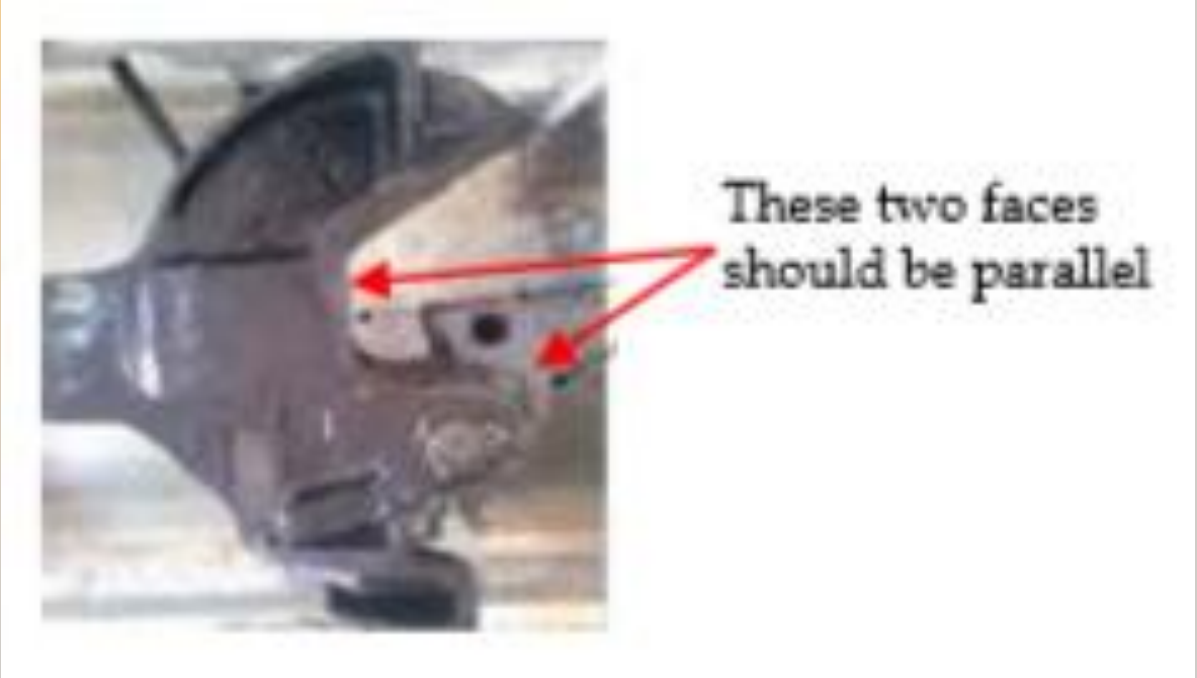


Check points for Coupling:

- Check point-3: Make sure that the handle of manual uncoupling device is locked after coupling.
- Uncoupling device operating handle can not be operated.

Check points for Coupling:

- Check point-4: The Knuckle and coupler head machined faces should be parallel.



Check points for Coupling:

- Check point-4: No oil or grease should be applied on the coupler internal parts such as Knuckle, Lock, Rotary Lock Lifter etc. oil and grease on the coupler internal parts can cause the Lock to slide and lead to uncoupling automatically.

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

Thank You !!