

## EMPTY - LOAD BOX

It is a simple mechanical device, which enables to provide two different leverage ratios to the brake rigging of the wagon for the empty and the loaded conditions.

The braking force required to stop a train depends on the load and the speed of the train, to stop within the permissible stopping distance.

As the speed & the load increases more brake power is required, and as the speed & the load decreases less brake power is required to stop the train.

or

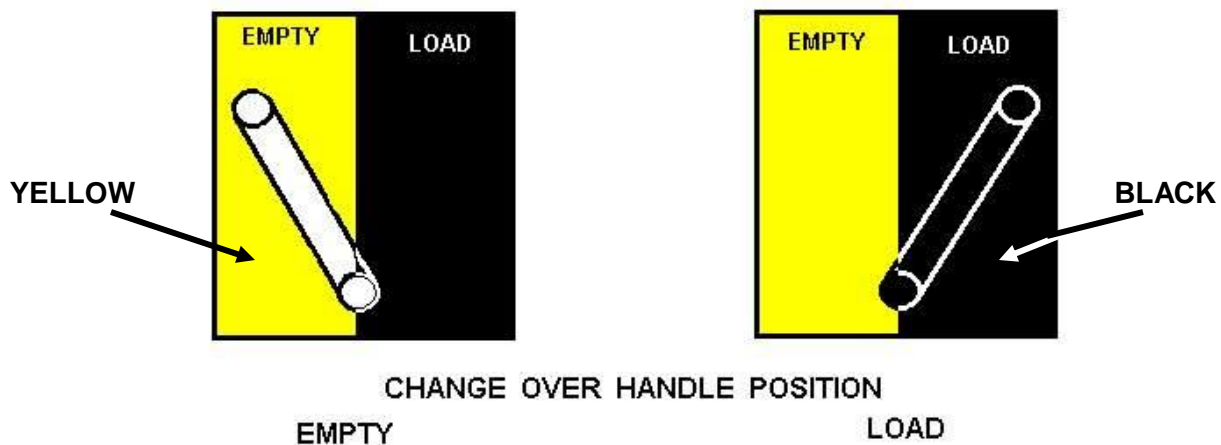
In loaded condition more brake power is required and in empty condition only less brake power is required to stop the train.

Hence the brake power can be changed whenever required by changing the brake leverage ratio. To enable this changeover, the '**EMPTY - LOAD BOX**' device is provided on wagons, in between the brake cylinder and the brake blocks in the brake rigging.

The position of the change over lever of the **EL Box** is to be set to ensure correct brake power according to the gross weight, as given below,

**less than 42.5 tonnes** - in empty position

**42.5 tonnes & above** - in load position



## **Brake Rigging :-**

It consists of two horizontal levers known as Horizontal Live Lever and Horizontal Dead Lever. One end of Horizontal Live Lever is connected to short pull rod in vacuum brake system or piston rod in air brake system, while the other to adjuster ear of slack adjuster. One end of Horizontal Dead Lever is connected to a point fixed on underframe while the other to control rod of slack adjuster as well as main pull rod of another trolley. In the middle both of the levers are having two individual pinholes connected by two individual rods called Empty Tie Rod and Loaded Tie Rod. Empty Tie Rod is in two parts and connected together by a sleeve nut.

The correct effective length of Empty Tie Rod can be adjusted by rotating Sleeve Nut. The Lock Nuts and Lock Washers are there to lock the adjusted length. The Empty Tie Rod is secured with Horizontal Live Lever and Horizontal Dead Lever by means of pins. The Loaded Tie Rod has a pinhole connected to Horizontal Dead Lever while on other hand a slotted pinhole connected to Horizontal Live Lever.

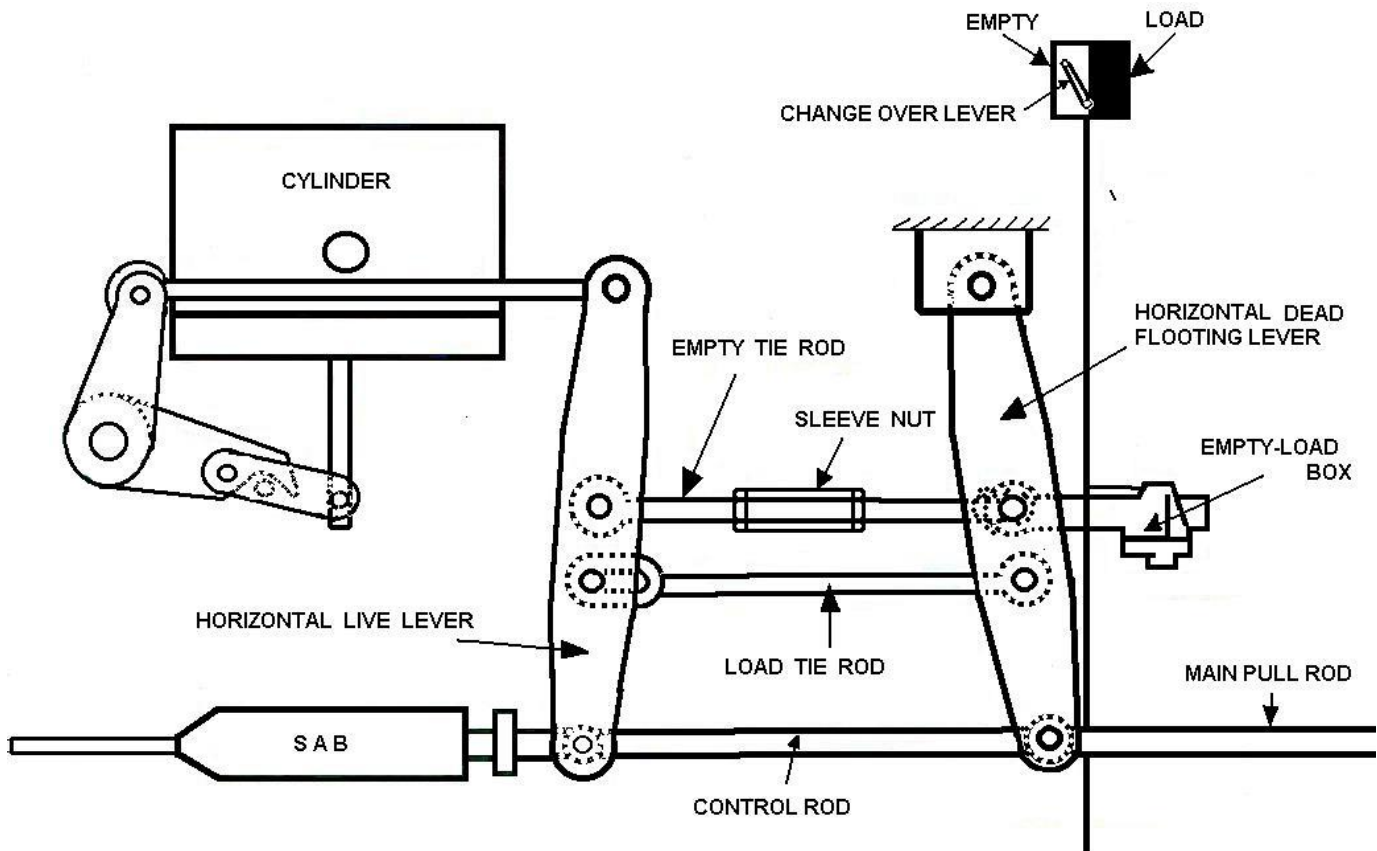
The Empty Load Box is fitted with Horizontal Dead Lever opposite to Empty Tie Rod pin by means of a slotted member. A handle is fitted on either side of wagon. It has two positions, Empty or Loaded.

When the handle is in Empty position the length of Empty Tie Rod is so adjusted with the help of Sleeve Nut that the extreme end of the slotted member of Empty Load Box is touching the pin connecting Empty Tie Rod and Horizontal Dead Lever at the same time the pin connecting Horizontal Live Lever and slotted pinhole of Loaded Tie Rod will be free to move in Loaded Tie Rod slotted pinhole. Empty position will show Empty Tie Rod tight and Loaded Tie Rod loose when brake is applied.

When the handle is moved on Loaded position the lever from slot of Empty Load Box is released with the help of bell crank lever, operating arm, connecting link and bell crank and gets to extreme position of Empty Tie Rod becomes free to take any position in the slot. Now pin connected to Empty Tie Rod and Horizontal Dead Lever is free to move, at the same time pin connected to Horizontal Live Lever and Loaded Tie Rod is touching the outermost position of slotted

pinhole of Loaded Tie Rod. As such the Loaded Tie Rod comes into operation.

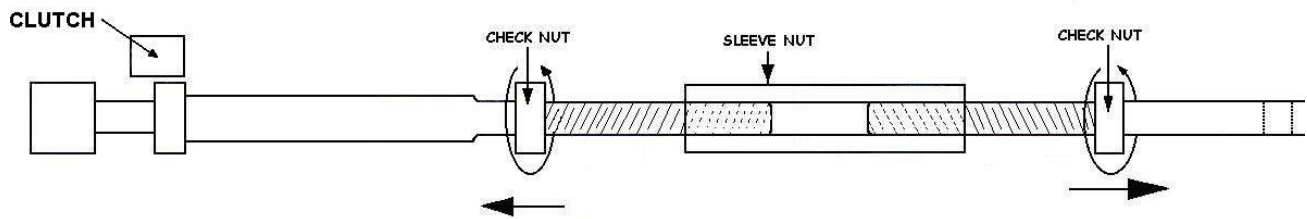
The two horizontal floating levers ( one live and the other dead ) are connected by means of two tie rods. The empty tie rod provides low leverage ratio, thereby gives low brake force and the load tie rod provides high leverage ratio, thereby gives high brake force as required.



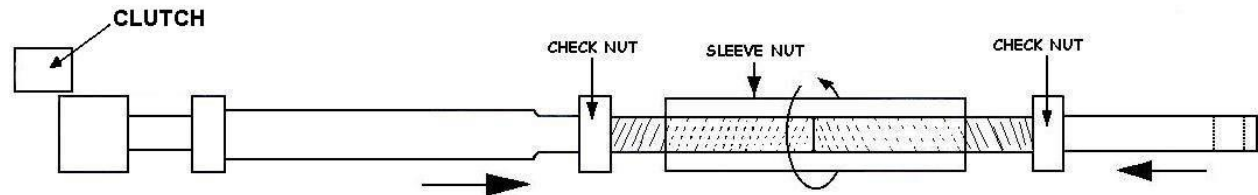
### Adjustment of E. L. Box (empty tie rod) :-

- Release brake rigging completely.
- Release hand brake fully.
- Ensure horizontal levers can move freely.
- Keep change over lever in 'load' position.

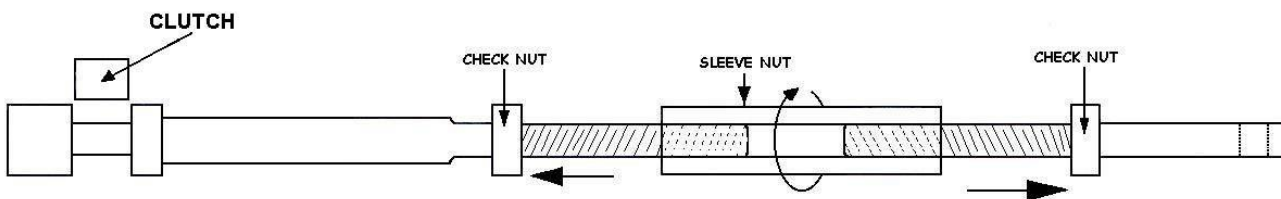
- Shift lock nuts and washers of sleeve nut as far away as possible.



- Rotate sleeve nut and tighten empty tie rod fully.



- Then rotate sleeve nut slowly in reverse direction to lengthen empty tie-rod.



- Stop rotating as soon as the end of the "live horizontal lever" starts moving.
- Carry out test.
- Tighten lock - nuts and bend lock washers.

### Testing for proper working :-

- Put change over lever in 'empty' position. Hear a clear click sound.
- Apply the brake (vacuum 50 cm).
- Tap the empty tie rod pins. They should be tight.
- Tap the load tie rod pins. They should be loose.
- If tight, the adjustment is wrong, indicates the sleeve nut might have been tampered with.
- Release brake.

- Put change over lever in load position and apply brake.
- Tap the load tie rod pins. They should be tight.
- Tap empty tie rod pins. They should be loose.
- If not, adjust the empty tie rod as given above.

In case the change over lever connections are missing, the position of the empty - load box lever will indicate the following,

<b>towards inside</b> of the wagon	-	<b>load</b> position
<b>towards outside</b> of the wagon	-	<b>empty</b> position

### **Causes of brake binding on empty wagon :-**

- ◆ Change over lever arm in load position.
- ◆ Lever operated, with partially jammed brake rigging due to jammed piston.
- ◆ Hand brake partially applied.
- ◆ 'A' dimension is less.
- ◆ Sleeve nut tampered.

### **How to attend or re - adjust :-**

- ✓ Apply and release brake few times fully with vacuum or with hand brake.
- ✓ Rotate S A B barrel manually to loosen the brake rigging.
- ✓ Apply brake keeping the change over lever in '**load**' position.
- ✓ Release the brake and knock out the most convenient pin (short pull rod pin). Correct the defect and put back the pin in position.

**Or**

- ✓ Loosen the check nuts and slacken the sleeve nut to release the binding and afterwards **reset** the empty tie rod correctly as mentioned earlier.