

## AIR SUSPENSION FOR MAINLINE COACHES

### INTRODUCTION

Air suspension, also called pneumatic suspension, uses the properties of air for the cushioning effect (springiness). It is a proven technology on Indian Railways and is being used on EMUs for last many years. Now these have been introduced in mainline coaches with ICF bogies because it is technically superior in many ways;

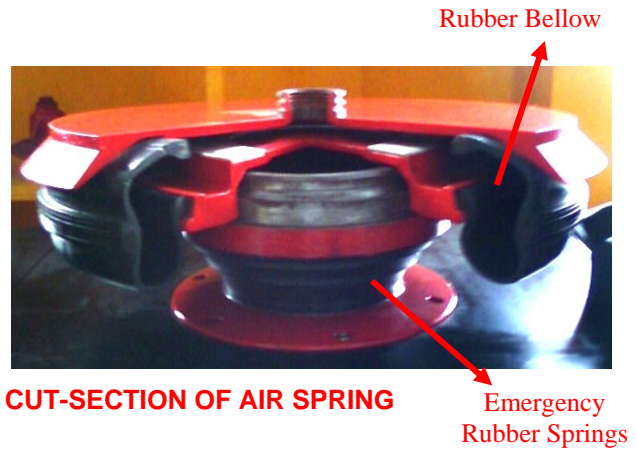
- Provide better ride quality for passengers  
Ride index with air springs is 2.72 against 3.37 in steel coil springs (*lower the ride index better the ride quality*)
- Maintain constant buffer height even with dense crush load on the coaches
- Improved reliability and less maintenance
- Isolation of structure borne noises
- Maintain one natural frequency at all speeds which reduces vibrations and in turn reduces passenger fatigue

To start with, these springs are being provided on hybrid coaches of Duronto rakes which have stainless steel body and conventional ICF bogies. Trials of air springs on high speed FIAT bogies of stainless steel coaches have also been completed with satisfactory results and in due course, all coaches will be provided with air springs.

### WORKING PRINCIPLE OF AIR SPRINGS

Air springs are basically pressurized air chambers made up of rubber bellows which maintain constant height under varying loads. The height of the air springs is controlled continuously by adjusting the air pressure in the bellows with the help of a load leveling device connected between the bogie frame and the base plate of air springs. The air springs replace only the secondary suspension, whereas primary suspension continues to use steel coil springs.

An auxiliary air reservoir of 150 litre capacity is provided below each coach which is fed



**CUT-SECTION OF AIR SPRING**

from feed pipe through a non-return valve. Driver maintains 7 bar pressure in loco compressor and air springs operate at a limiting pressure of 6 kg/cm<sup>2</sup>.

### SAFETY OF OPERATIONS

The C&W staff at nominated points and other train passing staff should vigilantly see that all the bellows are in inflated condition. This can also be checked by seeing that the leveling valve lever is in horizontal position.



**Leveling Valve Lever**

In case of heavy leakage or deflated air spring, the defective bogie is to be isolated with the help of isolation valves and driver should observe a speed restriction of 60 Kmph upto terminal point for maintenance. The air springs have inbuilt emergency rubber springs for safety with which train can work at a maximum speed of 60 Kmph up to a distance of 1000 kms.

For further details on air springs and down loading RDSO maintenance manual, visit "Technical Information" page on RCF website [www.rcf.indianrailways.gov.in](http://www.rcf.indianrailways.gov.in) click here for RDSO manual

[http://www.rcf.indianrailways.gov.in/works/images/rcf\\_docs/RDSO-2009-CG-CMI-01.pdf](http://www.rcf.indianrailways.gov.in/works/images/rcf_docs/RDSO-2009-CG-CMI-01.pdf)