INNOVATION BY CARRIAGE WORKS/PER, SOUTHERN RAILWAY

Dynamic Test Rig for Wheel Slide Protection (WSP) Device of LHB coaches

Description :

LHB Coaches are provided with wheel slide protection device (WSP). WSP control unit is a combination of various electronic cards. This unit is housed in electrical control panel. During the course of brake application, there are possibilities of skidding / sliding / locking of individual axle. The WSP provided in the system avoids wheel sliding, also cuts the maintenance cost. Speed sensors, the part of the system detect the speed of the wheel and sends signal to the processor unit.

The processor unit evaluates the received signal from speed sensor of the vehicle and generates signals enabling the dump valve / antiskid valves to control the brake cylinder pressure in case of any locking / skidding.

In order to test the device in dynamic condition an Electronic gadget has been developed in Mechatronics Lab. This gadget consists of :-

a) Four nos. of Variable Voltage Variable Frequency (VVVF) drives
b) Four nos. of AC motors
c) Four nos. of Speed Sensors
d) Four nos. of Potentiometers
e) WSP System
f) Four nos. of Phonic wheels
g) Indicators to simulate the Dynamic condition of the coach.

In this gadget, phonic wheels are attached to AC motor, this AC motor is made to rotate at different speeds using the VVVF drive (speed of the motors corresponds to the speed of the wheels). Initially all the four motors are made to run at an equal speed and when the speed of any one motor is reduced below specified limit, the number of pulses transmitted by the speed sensor reduces, this is sensed by the WSP and WSP energizes the respective dump valve to act accordingly. In other words, the dynamic condition during running of coach is simulated in order to ascertain the effectiveness of the functioning of the WSP.

WSP test gadget

WSP

VVVF drive & motor

During testing, if there is an error in the PCB Card, the same can be rectified and reused after checking. This avoids necessity of replacement of PCB Card in case of failure.

This test is repeated for various speeds and for all the four motors to check the working of the other dump valves.

With this setup, the working of WSP can be understood and the working of the WSP in the Dynamic condition can be tested.

Advantages

1. Working of WSP can be understood and studied further.
2. Complete WSP including all of its components are dynamically tested and any defects in any components can be identified and attended.
3. With this innovation, Carriage Works, Perambur is able to detect the defective PCB Cards of WSP apart from other components and rectify them.
4. Dependence on OEM is avoided.