

## **RAIL TRACK ANALYSIS**

Railroad track serves to provide guidance for rail vehicles and to spread wheel loads so as to keep bearing pressure on the sub grade within acceptable limits. This latter function is similar to that of highway pavements, and the design of railroad tracks is similar in many ways to that of flexible highway pavements.

### **Track Structure**

Overall track structure typically consists of sub grade, ballast, ties, rails and rail fastenings. Railways must also include special provisions to handle intersecting, merging, and diverging track.

Structural design of track is primarily a matter of selecting the correct rail sections and tie spacing. Rail sections are designated by shape, with several standard shapes being available, and by weight, usually given in pounds per yard.

A variety of design procedures are used for track design, ranging from comparatively simple formula to highly sophisticated finite-element computer programs.

### **BALLAST**

Ballast has a number of functions, which include

- ü Distribute tie loads to the sub grade
- ü Anchoring track against lateral, vertical & longitudinal movement
- ü Providing for drainage of water away from rail & ties
- ü Facilitating maintenance, especially maintenance of track grade and replacement of ties
- ü Retarding growth of vegetation in the immediate vicinity of the track structure
- ü Providing some resilience to help absorb dynamic loads

- ⌚ **TIES** are used to maintain gauge and to transmit wheel loads from the rails to the ballast

In North America, wood ties are the most common variety, with some use of prestressed concrete ties. Elsewhere in the world, non-wood ties are fairly common. The action of ties under wheel loads is largely dependent on the type of support provided by the ballast.

- **RAILS-** support and provide guidance for the flanged wheels on rail vehicles and transmit wheel loads to the ties. Rails like ties rarely fail because of excessive bending stress, but they are subject to a variety of types of wear and to failures from metallurgical defects.

## WATERWAYS

- ⌚ Natural waterways sometimes serve as travel ways without any intervention but sometimes require extensive intervention.
- ⌚ **Dams & Locks-** when sufficient depth of flow is not otherwise available, storage reservoirs are used to provide artificial pools and slack water navigation. Thus, dams and locks are used to obtain navigable channels over water whose flow would not otherwise support navigation.
- ⌚ Requirement for lock & dam