

# Introduction to Infrastructural Engineering

## Introduction to Railway Engineering1

by

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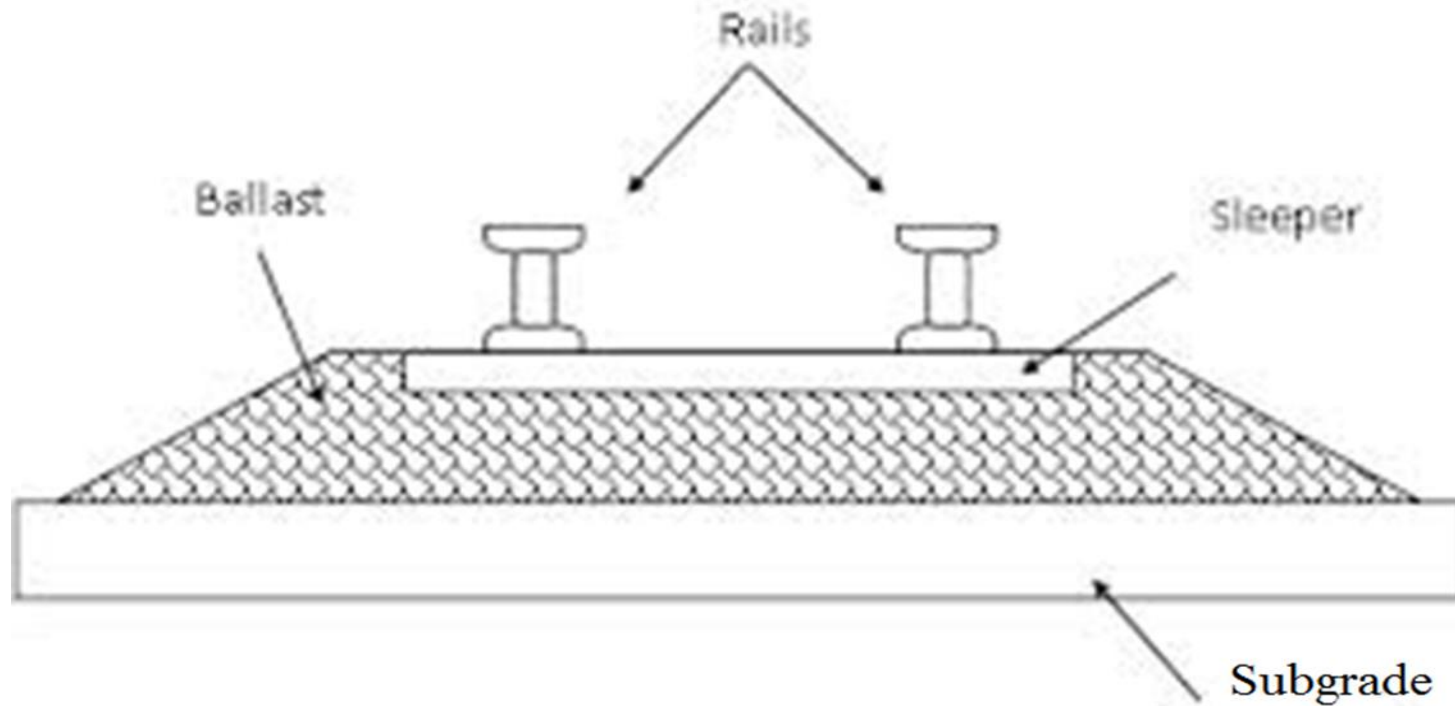
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# RAILWAY TRACK

- COMPONENT PARTS OF A RAILWAY TRACK



# RAILS



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# RAILS

- Can be considered as steel girders for the purpose of carrying loads
- Made up of high carbon steel to withstand wear and tear
- Flat footed rails are mostly used in railway track



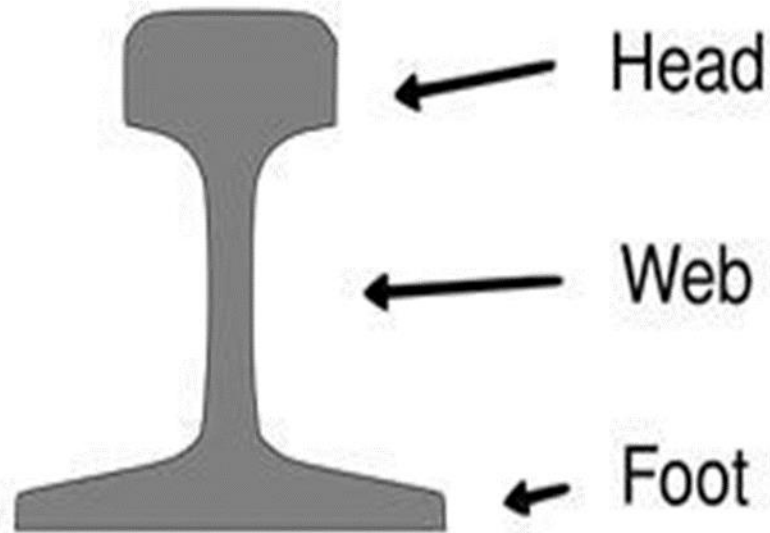


# FUNCTIONS OF RAILS

- Rails provide hard, smooth and unchanging surface for passage of heavy moving loads with minimum friction between steel rail and steel wheel
- Rails bear the stresses developed due to heavy vertical loads, lateral and braking forces and thermal stresses
- The rail material used is such that it gives minimum wear to avoid replacement charges and failure due to wear
- Rails transmit the loads to sleepers and consequently reduce pressure on ballast and formation below



# REQUIREMENTS OF RAILS



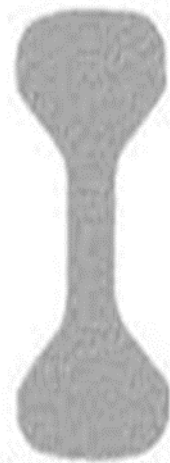
- Rails should be designed for optimum nominal weight to provide for the most efficient distribution of metal in its various components

# REQUIREMENTS (cntd..)

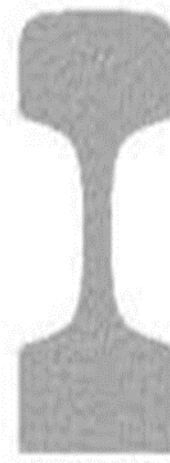
- The vertical stiffness should be high enough to transmit load to sleepers. The height of the rail should be adequate
- Rails should be capable of withstanding lateral forces. Large width of head and foot provides the rail with high lateral stiffness
- The depth of head of rail should be sufficient to allow for adequate margin of vertical wear. The wearing surface should be hard
- The web of rails should be sufficiently thick to bear the load coming to it and should provide adequate flexural rigidity in horizontal plane

# TYPES OF RAIL SECTIONS

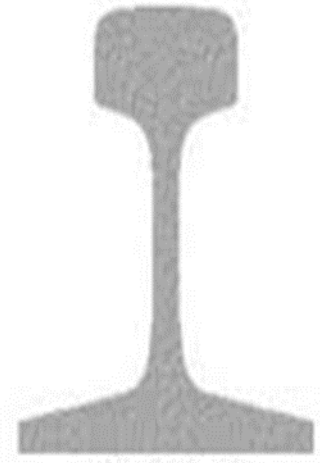
- **Double headed rails**
- **Bull headed rails**
- **Flat footed rails**



Double Headed  
Rail



Bull Headed  
Rail



Flat Footed  
Rail

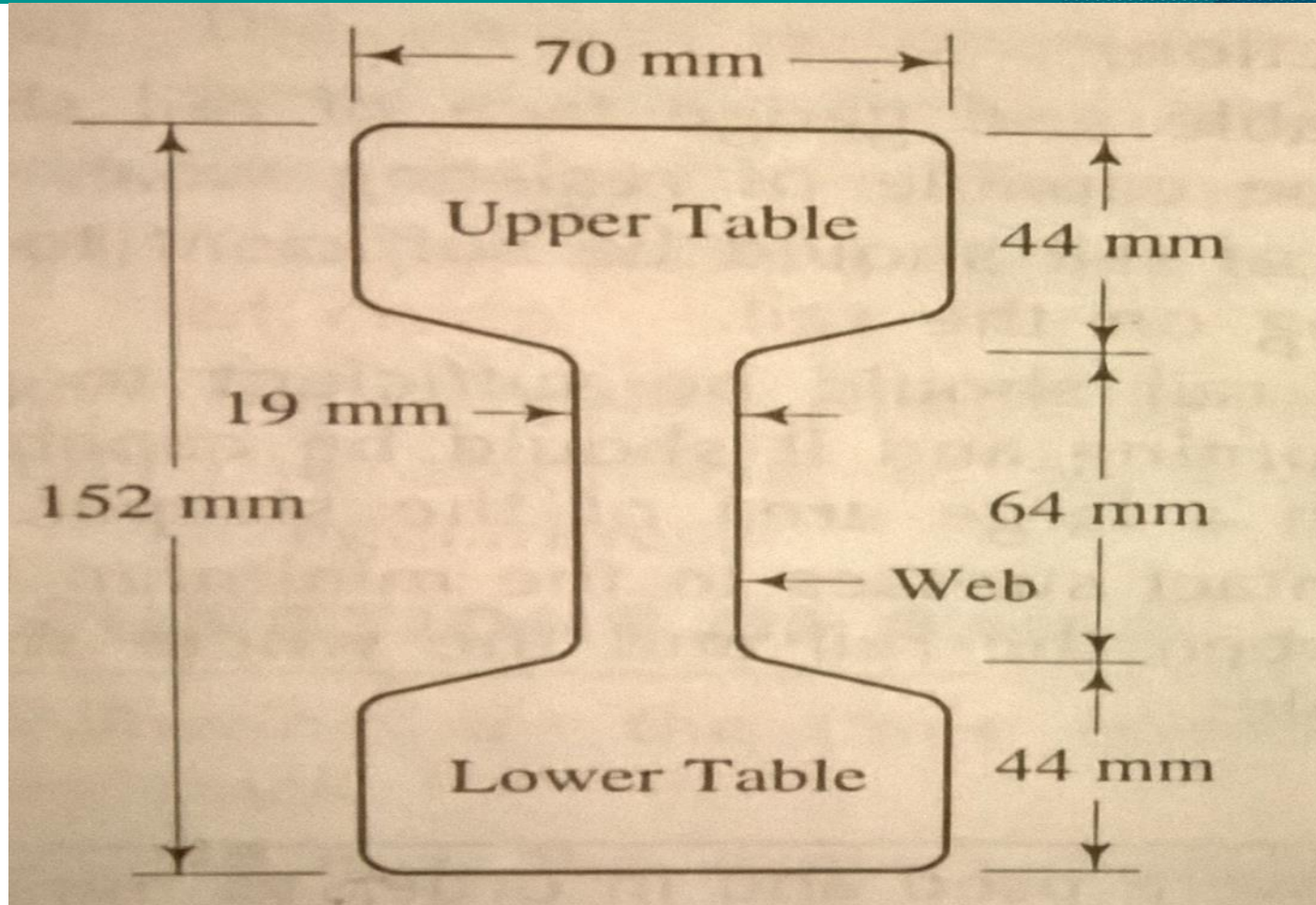


# DOUBLE HEADED RAILS

- First stage of development of rails
- 3 parts:
  - Upper table
  - Web
  - Lower table
- Similar to dumb bell section
- Both upper and lower tables are identical
- When upper table was worn out, the rail can be reversed thus lower table can be brought into use
- Practically out of use
- Made of wrought iron
- Length varying from 610 cm to 732 cm

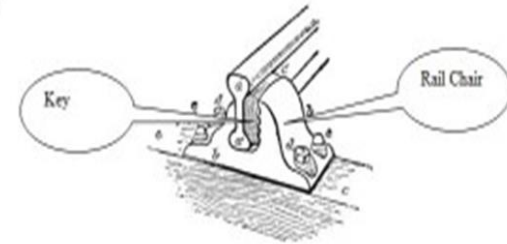


# DOUBLE HEADED RAIL

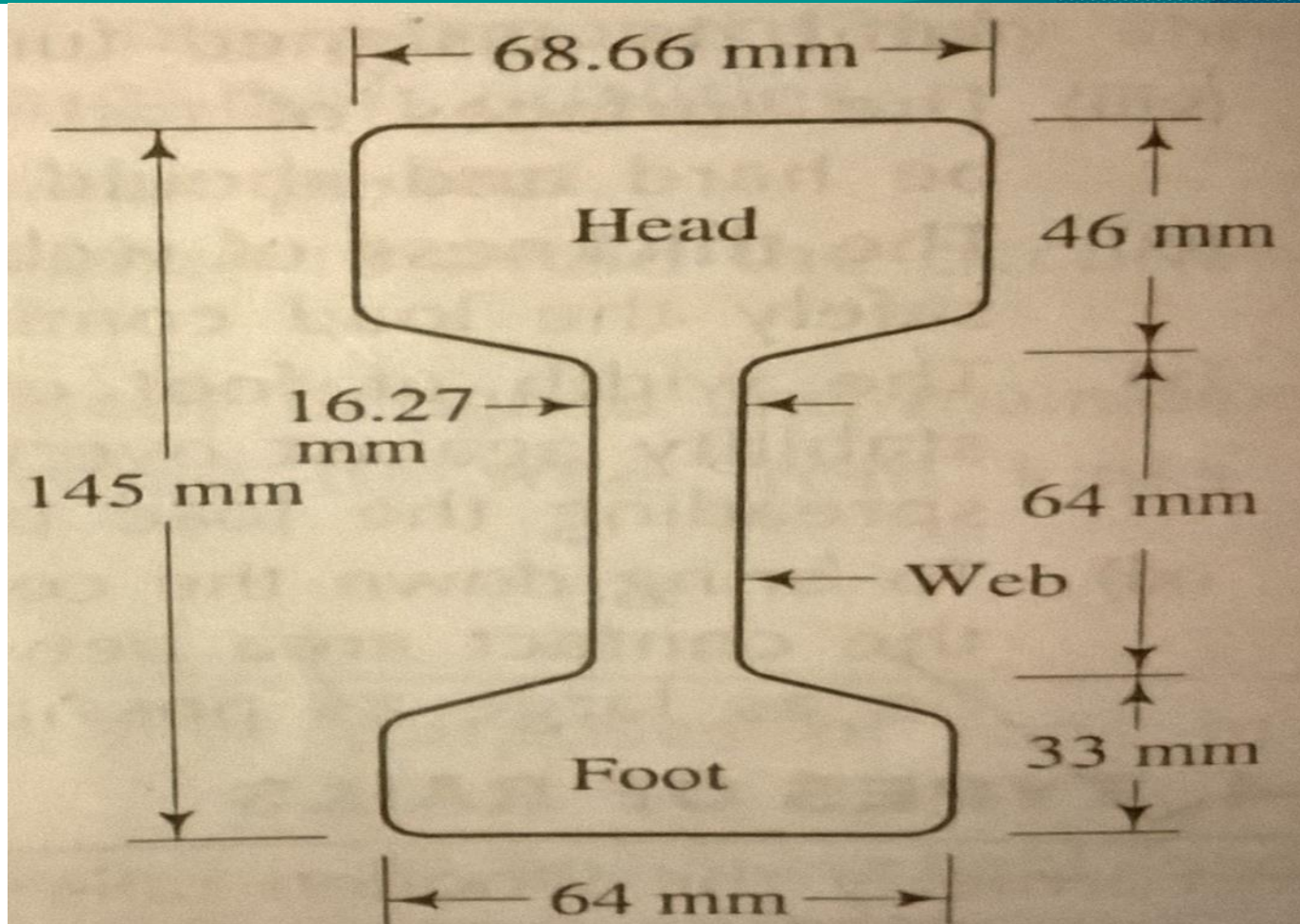


# BULL HEADED RAIL

- Made up of steel
- Head is larger than foot
- Foot is designed only to hold the wooden keys with which rails are secured to chairs
- Extensively used in England
- Weight of standard rail or British rail is 47 kg/m of length for main lines and 42 kg/m length on branch lines
- Length of rail usually 18.29 m



# BULL HEADED RAIL



# FLAT FOOTED RAIL

- Foot is spread out to form a base
- Invented by Charles Vignoles in 1836 and hence also known as “Vignoles Rails”
- 90 % of railway track is made up of flat footed rails





# FLAT FOOTED RAIL

