(vi) To provide stability to the permanent way on the whole.

Requirements of Good Sleepers

The following are the requirements of good sleepers:

(i) The sleepers should be sufficiently strong to act as a beam under loads.

(ii) The sleepers should be economical.

(iii) They should maintain correct gauge.

(iv) They should provide sufficient bearing area for the rail.

(v) The sleepers should have sufficient weight for stability.

(vi) Sleepers should facilitate easy fixing and taking out of rails without disturbing them.

(vii) They should facilitate easy removal and replacement of ballast.

(viii) They should not be pushed out easily of their position in any direction under maximum forces of the moving trains.

(ix) They should be able to resist impact and vibrations of moving trains.

(x) They should be suitable to each type of ballast.

(xi) If track-circuiting is done, it should be possible to insulate them from the rails.

Types of Sleepers

Sleepers are of the following types:

1. Wooden sleepers.

2. Steel sleepers.

3. Cast iron sleepers.

4. R.C.C. sleepers.

5. Priestesses concrete sleepers.

1. Wooden Sleepers: These sleepers are regarded to be the best as they satisfy all the requirements of good sleepers and are the only sleeper suitable for track circuiting. The life of wooden sleepers depends upon their ability to resist wear, attack by white ants and quality of timber used. Timbers commonly used in India for sleepers are sal, Teak, Deodar and chair wood.

The standard sizes of wooden sleepers for different gauges are as follows:

For B.G. – 2740 mm X 250 mm X 130 mm

For M; .G. – 1830 mm X 203 mm X 114 mm

For N.G. – 1520 mm X 150 mm X 100 mm

Round spikes are used for fixing chairs of B.H. rails to wooden sleepers and also for fixing slide chairs of points and crossings. These have either cylindrical or hemispherical head and blunt end.

Screw spikes are tapered screws with V-threads. Their head is circular with a square projection and are used to fasten rails with wooden sleepers. The holding power of these spikes is more than double to that of dog spikes and can resist the lateral thrust better than the dog spikes.

Elastic spikes are used for fixing F.F. rails to wooden sleepers. These give better grip and result in reduction of wear and tear of rail. The advantage of this type of spike is that it is not pulled up by the wave action of the moving train.

REQUIREMENTS OS A GOOD SPIKE

(i) It should be easy in fixing or removing from the sleepers.
(ii) It should hold the rails and bearing plates in proper position.
(iii) It should be cheap.

(iv) It should require minimum maintenance.

(v) It should not come out of the sleepers under vibrations.

BOLTS

Different types of bolts used in Indian Railway are described below.

FISH BOLTS

Fish bolts are used for connecting fish plates with the rails. Four bolts are required for each pair of fish plates. These bolts are inserted from outside the track and bolted on the inside of the track.

Fish bolts have to withstand shear due to heavy transverse stresses, hence they are manufactured of medium or high carbon steel. The length of fish bolt depends on the type of fish plate used. For 44.7 kg rail, the fish bolts of 25 mm dia and 127.6 mm length are used. These bolts get loosened due to vibration of moving train and hence these are to be tightened time of time. Too much tightening of bolts is prohibited as it prevents free expansion or contraction of rails due to temperature vibrations.

HOOK BOLTS

Hook bolts are also known as dog bolts due to the shape of their heads. These bolts are used to fix sleepers which rest directly on a girder. Two bolts per sleeper are used. Dog bolts are of two types.

(i) Sloping lips- for fixing sleepers to plate girder spans.
(ii) Straight lips- for fixing sleepers to joist spans.