

STABILIZATION OF TRACK ON POOR SOIL

Sometimes it becomes unavoidable to lay tracks on a very poor (or undesirable) soil. In such cases it becomes necessary to improve and strengthen the nature of soil by some suitable methods. Under such circumstances, the following methods are used.

1. Layer of Moorum
2. Cement Grouting
3. Sand Piles
4. Use of Chemicals
5. Laying of geo textiles

Layer of moorum:

This method is widely used and is adopted if a poor-quality soil comes across a track such as black cotton soil which is a fine black loamy soil. This soil has the tendency of expanding (or swelling) when moist and of caking and cracking heavily when dry. Tracks laid on formation of maintain. In rainy season, the soil fills up ballast interest less, the track in the worst places gets sodden and spongy track is reduced. In hot weather, the cracks are formed and the ballast is lost in filling up these cracks.

Thus, the alignment as well as level is disturbed and with mud filling the interstices, the track loses. Its resiliency, therefore, for these very reasons, a layer of moorum varying in thickness from 300mm to 600mm is laid under the ballast. This layer distributes the pressure of the load and prevents the ballast from being lost in the cracks of the soil. Instead of moorum, other materials such as ashes, concrete, slabs, rubber, unserviceable sleepers etc are also used and are found quite satisfactorily

Cement Grouting

In this method, steel tubes of 30mm in diameter and 1.5m long are driven into the formation at every alternate sleeper and near their ends as shown in figure. The tubes are driven into the foundation at an angle such that the end of tube is nearly under the rail. The cement grout is forced under a pressure of 0,7 N/mm² through these tubes. The proportion of cement grout depends on the type and condition of formation. The concert grout spreads through the poor soil and consolidates it. The steel tubes are then gradually taken out. Sand piles This method of strengthening the track laid on poor is most widely used in development countries like America.

In this method, a vertical bore about 300mm diameter is made in the ground by driving a wooden pile. The wooden pile is then withdrawn and the space is filled with sand and is well rammed. The sand piles are driven in the pattern as shown. It is also arranged that cross sectional area of the sand piles is about 20% of the formation area.

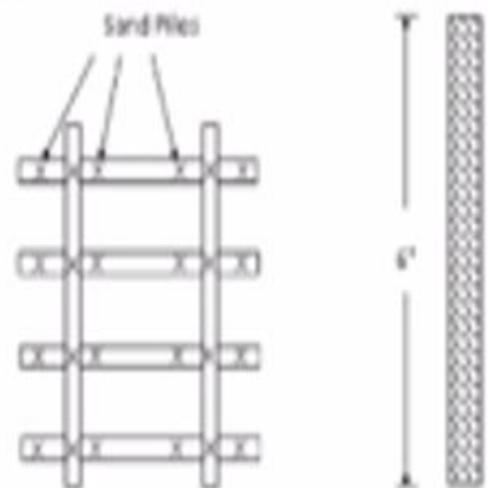
Thus, the top section of the formation is covered with sand which makes the track stable on poor soil. Use of chemicals In this method, chemicals are used in place of cement grout to consolidate the soil. For example, silicate of soda followed by calcium chloride is effective for sandy soil.

Sand Piles

- ✓ In this method, a vertical bore of about 300 mm diameter is made in the ground by driving wooden pile;
- ✓ The wooden pile is then withdrawn and the space is filled with sand and is well-rammed;

The functions performed by the sand piles are as follows:

- a. They can function as timber piles.
- b. They provide an arrangement of vertical drainage.
- a. They provide good mechanical support.



USE OF CHEMICALS

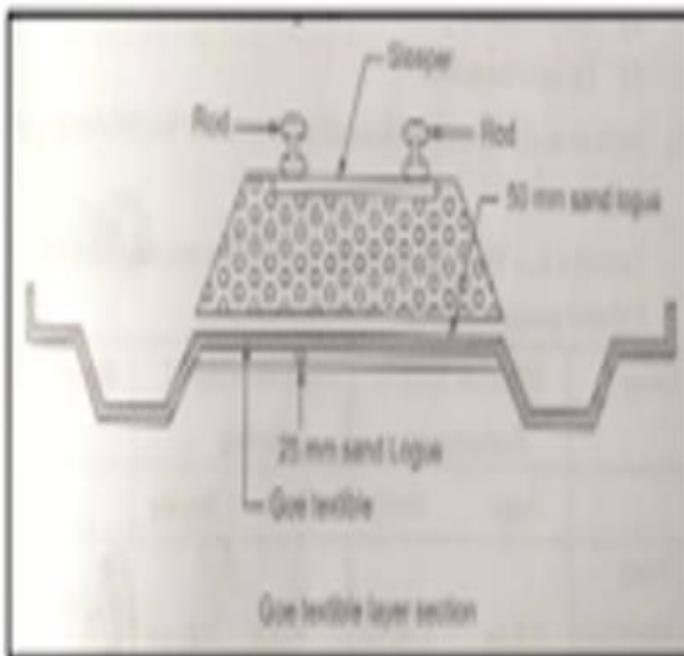
- ✓ In this method, the chemicals are used in place of cement grout to consolidate the soil;
- ✓ The silicate of soda followed by calcium chloride is effective for sandy soils containing less than 25% clay and silt.

Lime stabilization

- ✓ Lime stabilization is done by adding lime to soil. It is useful for the stabilization of clayey soil.
- ✓ When lime reacts with soil there is exchange of cations in the absorbed water layer and a decrease in the plasticity of the soil occurs.
- ✓ The resulting material is more friable than the original clay, and is, therefore more suitable as sub-grade.

LAYING OF GEO TEXTILES

- ✓ Made out of polymers
- ✓ Combined property to allow water to pass through but not the soil fines



Polypropylene Or Polyester Geo-textile For Railway Stabilisation, 1-5 mm