

SUBGRADE IMPROVEMENT OF PAVEMENT PORT BLAIR, ANDAMAN, INDIA

Sub-grade Improvement

Problem

NHIDCL has decided to take up the development of Two-laning with hard shoulder, Rehabilitation and up-gradation of various roads. The project corridor is a section of National Highway-223 (New NH-4) in Andaman. The road surface drainage of NH 223 was in poor condition and subgrade CBR in majority of the length of NH 223 was low, either less than 2% or ranging between 2-3%. The available soil is highly plastic in most of the reaches with PI up to 42%. Availability of quality aggregates for road works is limited to only a few areas of island. The poor quality of subgrade soil may lead to settlement forming progressive ruts and eventually failure of the pavement. The conventional solution of replacement top 0.5m subgrade was not be feasible due to the high cost and unavailability of the good quality soil nearby.

Solution

The solution involves, reinforcing the soft subgrade in order to improve the load bearing capacity and subgrade property in terms of CBR, by using biaxial extruded geogrid (MacGrid EG). It was proposed to excavate subgrade up to a depth of 0.5m and compact the same in two layers of 0.22m each to 95% of MDD. On the finished compacted soil layer, a non-woven geotextile (MacTex N) was laid for separation and filtration purpose. On top of the MacTex , MacGrid EG layer was installed. It was followed by filling of 60 mm of crushed aggregate (Minimum CBR 80) and compacting it to 95% of MDD.

MacTex N will prevent the intrusion of clayey soil into the crushed aggregate and MacTex along with MacGrid will reinforce/stabilize the soft subgrade. Besides above, it will enhance the overall internal drainage of the road pavement. The solution has helped to improve the CBR from 2% to 8%, Elastic Modulus of the Subgrade and improve the Load Bearing Capacity of the pavement by the following mechanism (a) lateral restraint, (b) improved bearing capacity (c) tension membrane effect.

Client: NHIDCL

Designer / Consultant: Eptisa Engineering services

Contractor: Vasishta Construction Pvt. Ltd.

Products used (Qty.)

- MacGrid EG	80,000 SQM
- MacTex N	80,000 SQM

Date of construction: 02/2019 - 11/2019



Photo 1: Condition of soil at site



Photo 2: Site preparation before construction



Photo 3: During construction - laying of MacTex



Photo 4: During construction - unrolling of MacGrid EG over MacTex



Photo 5: Layer of 60 mm, crushed aggregate over MacGrid

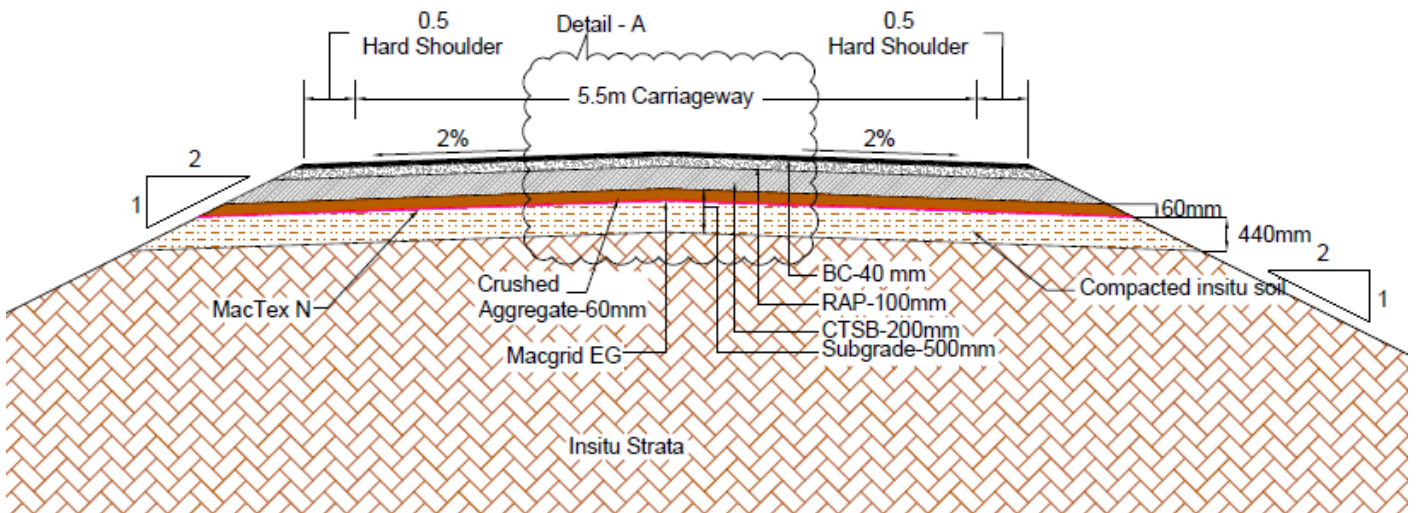


Diagram 1: Cross section details