

USING CEMENT TREATED BASE AND SUB-BASE IN FLEXIBLE PAVEMENTS AT EXTREME HIGH ALTITUDE AREAS: A CASE STUDY

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ABSTRACT

This case study is based on the road construction activity, being undertaken by Border Road Organization in High Altitude Area in Eastern Ladakh in India. The road is being constructed along an altitude ranging from 12000 feet up to 18200 feet above Mean Sea Level (MSL), and the construction activity is restricted to only 4-5 months in a year, due to extreme winters during balance of the year. At higher reaches, lack of good quality aggregate material meant their haulage from long distances which was costly, time consuming and energy intensive. Considering the peculiarity of the terrain and challenges imposed by extreme weather and climatic conditions and in order to expedite the road construction to offset the limited working season in a year, few stretches on this road were identified for undertaking technological initiate. Thus, there was a need to adopt alternate road construction techniques which can improve the characteristics of available soilaggregates and provide an economical, strong and durable load bearing and distributing surface thereby improving pavement performance while reducing construction time. Therefore, in-situ soil stabilization was undertaken to construct cementitious sub-base (CTSB) and cementitious base (CTB) course layers while constructing flexible pavement.

The concept, mechanism and requirement of executing CTSB/CTB are studied and the construction methodology to execute the work has been discussed. The mechanical properties and characteristics of the materials are tested in laboratory and based on several iterations, most economical yet adequate job mix design for a particular thickness for both CTSB/CTB layers with specified quantity of admixture and cement at OMC and desired density during compaction offering desired E-values were derived. Post construction performance evaluation was done wherein cores were tested for strength and durability parameters. FWD testing was done to obtain critical stresses, strains and deflections using Elastic Analysis Module (EAM) and results were compared with the stresses, strains and deflections obtained for design parameters using IIT-PAVE. Back calculations were performed to ascertain the remaining pavement life based on the FWD tested and reported strains for the BC layer, the sub grade and stresses under CTB layer.

KEYWORDS: Admixture, Cement Treated Base (CTB), Cement Treated Sub-base (CTSB), Flexible Pavement, Performance Analysis

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