

Research Proposal

Stabilization of Subgrade with Waste Plastic or Bio-Enzyme in Flexible Pavements

I am applying to the Indian Institute of Technology, KGP, India for admission to the Joint Doctoral program. My goal is to pursue a career in research, either in industry or in academia. Ten years from now, I envisage myself for a full fledged research professional in an organization or a faculty member at one of the leading universities. A Doctoral degree is an important step in achieving this objective. This will also give me opportunities to fulfil my dream in field of research.

My master's thesis topic is "Analysis of Twin Tunnels". It is experimental and software analysis based project. Analysis is performed on a lab model and results are compared with GEO5 software results. This project gave me better understanding of Tunnelling. I have completed my bachelor's degree in Civil Engineering with **8.8/10** grade and masters in Geotechnical Engineering with **CGPA 9.5/10** up to 3rd semester. I am presented two research paper named **"Response of Twin Transportation Tunnel in Earthquake Loading: A Review"** in an International, CBRICE2021 conducted by Manipal University, Jaipur, India 18-19 March 2021. I am presented a research paper as a co-author **"Numerical Modelling for Stabilization of Slopes Using Soil Nails"** In International Conference, RACESD2021 at NIT, Bhopal India 16- 18 Feb 2021.

The growth of the population has created a need for better and economical vehicular operation which requires good highway having proper design, pavement condition and maintenance. The highways have to be maintained so that comfort, convenience and safety are provided to the travelling public. Transportation roads expends with high rate and designer are sometimes restrict to construct on undesirable site like black cotton soil. Therefore subgrade stabilization is necessary when required quality of subgrade not found then use various method of subgrade stabilization.

Poor subgrade leads to failure of pavement. Stabilized Soil reduces pavement thickness, reduce swelling characteristics and improved bearing capacity of soil. Bio-Enzyme is a natural, non-toxic, non-flammable, non-corrosive liquid enzyme formulation fermented from vegetable extracts that improves the engineering properties of soil, facilitates higher soil compaction and increases strength. Plastic Bottle Strips can be used to increase the CBR value of soil used in pavement. Subgrade should be stabilized to improve the performance of such pavements in long run and to minimize the maintenance. Our aim is to develop economical and sustainable solution for subgrade stabilization.

Experimental lab test and field observation can be performed. Use plastic waste in different proportion with soil. Various properties determined like CBR Value, Liquid Limit, Plastic Limit, Plasticity Index, Maximum dry density, Optimum moisture content, Shear strength parameter etc. Results from these test analysed and develop economical solution.

Our aim is to develop economical and sustainable solution for subgrade stabilization. Develop such a solution which can be effective for all type of condition and find new sustainable materials and method for subgrade stabilization which reduced environmental pollution.