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Status Pengusul : ~~Penulis pertama/ Penulis ke-3/ Penulis Korespondensi~~ \*\*

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**LEMBAR**  
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# ENABLING INTERSTELLAR TRAVEL: THE NEED FOR A DIVERSE MIX OF ADVANCED ENERGY CONCEPTS: SAFE TRACKING LASER POWER TRANSMISSION, HARVESTING PROBES & FUTURE PROPULSION SYSTEMS

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# Reinforcement of Pavement Subgrade using Granular Fill and a Geosynthetic Layer

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**Abstract** — Engineers are often faced with construction of pavement structures over soft and highly compressible subgrade. Such conditions render the structures unable to withstand the required design loads and susceptible to high settlements with associated excessive distress, leading to pavement damage. Because using imported quality fill to improve the load-bearing capacity of the subgrade has limited benefits, an alternative construction approach is needed to ensure the required strength of the soil structure is reached. The use of geosynthetics in soil to improve bearing capacity and stability offers a better alternative to imported fill. This research was conducted to determine the degree of improvement of the load-bearing capacity and reduction in settlement as a result of the geosynthetic reinforcement of soft clay overlain by granular material. Compression tests on the unreinforced clay subgrade and geosynthetic-reinforced two-layered soil composite were conducted at bench-scale using a Universal Compression Machine at the University of Cape Town Geotechnical Engineering Laboratory. The geosynthetic products used to reinforce the soil structure in this study included geogrids and geotextiles. The reinforcement layer was placed alternatively within the layer of granular material and at the interface of the soil and a range of fill thicknesses and depths of placement were tested to determine their influence on mobilized strength. The use of these composites could potentially lead to reduced construction costs as a result of less aggregate material used, an extension in the design life of the pavement structure and, consequently, a reduced necessity for maintenance work.

**Keywords**— Geosynthetics, Reinforcement, Subgrade, Pavement, Bearing Capacity

## I. INTRODUCTION

The construction of pavement structures often occurs over soft and compressible subgrades that have low load-bearing capacities and are susceptible to large settlements. This results in damage to the structures erected on them [42].