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## Interaction Properties of Geosynthetic with Different Backfill Soils

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### ABSTRACT

Characterization of a geosynthetic is necessary for its effective use in various field application of reinforced soil structure. In this paper, a new type of geosynthetic has been evaluated for its interaction properties for different backfill soils using direct shear device. The test results are compared based on the type of soils, inclusions, and interface mechanical properties. Three backfills soils (sandy, clayey, and pure sand) in combination with four different geosynthetics (one geotextile and three geogrids) were tested at various loading conditions in direct shear. Test results reveal that the stress-deformation behaviour of the geotextile and geogrid interfaces with sandy and clayey backfills can be defined as hyperbolic. For the pure sand-geogrid interfaces, the relationship is followed by displacement hardening and softening behaviour. The dilatancy behaviour of a particular soil-geosynthetic interface is found similar at all normal stresses. Both contractive and dilative nature is observed for the interfaces with pure sand. On the contrary, only negative dilatancy or contractive behaviour is observed for sandy and clayey backfills with the same geosynthetics. The test results reveal that the relationship of the interface shear strength with the normal stress is not linear in most cases. Based on the test results, a simplified nonlinear equation is proposed for the soil-geosynthetic interface shear strength envelopes which was in good agreement with the experimental data.

### KEYWORDS

Geosynthetic; Toyoura Sand; Direct Shear Test; Interface Shear Strength; Dilatancy Behaviour

### Cite this paper

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