

## THE PERFORMANCE EVALUATION OF SCOUR PROTECTION AROUND BRIDGE PIER USING NATURAL GEOCELL AND GEOTEXTILE

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### *Abstract*

The bridge is the structure that builds for crossing the physical obstacle. There are many designs to support the purpose of use. In civil engineering, the important substructure of the bridge that affects the stability of the bridge is the bridge pier. The bridge piers have problems with the foundation surrounding the pier from the erosion by the streamflow that called scour. This study aims to determine the efficiency of geocell and geotextile to protect the riverbed around the bridge pier from the scour. Since the geocell and geotextile are made from plastic, as time passed, the plastic was decomposed to be microplastic which is the major cause of the environmental problems. Nowadays, Water hyacinth has become a major pest in waterways around the world, so the products that make from water hyacinth are helpful for water hyacinth management. Accordingly, the water hyacinth was made to be the geocell and geotextile to compare the efficiency with the plastic material in this study. The experiments were carried out in the large open channel flume at KMUTT. The scour mechanism, and the effect of scouring on the riverbed was studied. Geocell and geotextile were installed in 4 different cases in order to find the most effective protection and reduction from the scour. Maximum depth and cylindrical coordinate points around the pier were measured and collected. The experimental results show the maximum scouring depth is increasing in the function of Froude Number. The bridge pier without geocell and geotextile was conducted to be the reference. The cases of geocell and geotextile that produce by plastic and water hyacinth for protection were carried out to compare and analyze the protection efficiency. For the results, the case of installing geocell with geotextile in both plastic and water hyacinth materials on the riverbed give the most protection efficiency.

**Keywords:** *Geocell, Geotextile, Water hyacinth, Bridge Pier, Scour*