INVESTIGATION OF LOAD TRANSFER MODELS FOR RECYCLED PLASTIC REINFORCEMENT FOR SLOPE STABILIZATION

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ABSTRACT

Slope failures are not only hazardous to the public, but they are also costly to maintain and repair. A field testing program involving five test sites has been executed in an effort to develop better design practices for slopes reinforced with slender reinforcement. This thesis is directed at three of these sites, including a slope located along Interstate 70 near Emma, MO, a slope located along US 36 near Stewartsville, MO, and a slope located along Interstate 435 (at Wornall Road) in Kansas City, MO.

This thesis describes analyses performed to evaluate current analysis models and to develop recommendations for future design of slopes stabilized with slender reinforcement. The analysis models were evaluated by comparing measured bending moments from the field test sites with predicted bending moments calculated using conventional soil-structure interaction models implemented in the commercial software, LPile, Version 5.0®. The models and input parameters for the soil-structure interaction analysis were varied to produce matches between the measured and predicted response of the reinforcement. The models that produced the best results for each site were then collectively assessed to develop recommendations for use in slope designs with slender reinforcement.

Results of the analyses described suggest that the "API Sand (O'Neill)" model should be used when modeling reinforcement for long-term, drained loading conditions, regardless of the type of soil present. This model should be used with a p-multiplier selected based on the relative pile batter angle. The soil movement profile should be input as anticipated soil movements down to the sliding depth, and then zero below the sliding depth.