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Metaheuristics-based Pre-Design Guide for Cantilever Retaining Walls

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ABSTRACT

A pre-design guide for cantilever retaining walls and a detail parametric study of such walls is presented here. Mathematical models based on statistical methods were improved for calculating safety factors of sliding, overturning, and slope stability of those walls. The harmony search algorithm (HSA)-a metaheuristic method-was employed to realize reasonable results of the pre-design guide from all distinct cases. Through the design algorithm, the optimal design was determined for varied soil types differently from suggestions of design codes. Thus, an optimal pre-design guide for safe and economic wall design was realized in a shorter time compared to the conventional method.

Keywords: Cantilever retaining wall, mathematical model, pre-design guide, external stability of the wall.

1. INTRODUCTION

In geotechnical engineering, the stability of two different soil levels is achieved by using retaining walls. In the absence of sufficient excavation areas at construction sites or docks, retaining walls act as a vertical connector, thus providing resistance to lateral soil forces.

Retaining wall design must satisfy external stability conditions and be economical. In traditional retaining wall design, wall dimensions to ensure stability are determined by a trial

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