

From Physical Measurements to Design Codes for MSE Walls

Dr. Richard J. Bathurst

Royal Military College of Canada
13 General Crerar Crescent, Kingston, ON, Canada

Abstract

Mechanically stabilized earth (MSE) walls constructed with steel and geosynthetic reinforcing elements are now well-established technologies. The lecture gives a very brief historical overview and then a review of current approaches to the design of these systems including strength-based limit equilibrium methods and reinforcement stiffness-based methods. The use of measured reinforcement loads from instrumented full-scale laboratory and field structures to quantify the accuracy of current design methods to calculate reinforcement loads under operational conditions is demonstrated. The lecture explains how these measured data have been used to develop simple load models that are more accurate and result in rational load and resistance factors for load and resistance factor design (LRFD). The results of this research have led to the adoption of the Stiffness Method as the recommended design method for internal stability design of geosynthetic MSE walls in the 2020 edition of the AASHTO LRFD Bridge Design Specifications in the USA. Finally, the movement towards reliability-based internal stability analysis and design of MSE walls, and the link to LRFD calibration is explained.