

A Summary of Load and Resistance Factor Design in Geotechnical Engineering based upon the AASHTO Code

1. Introduction

In its LRFD Bridge Design Specifications (2007), the American Association of State Highway and Transportation Officials (AASHTO) requires that bridge projects be designed using load and resistance factor design beginning October 1, 2007. This includes geotechnical components such as foundations, embankments, and retaining walls. Previously, geotechnical components could be designed using allowable stress design (ASD), which is also known as working stress design.

The primary purpose of this report is to help geotechnical engineers learn about load and resistance factor design (LRFD). The report includes short sections on the following topics: comparison of ASD and LRFD, history of LRFD, load factors, resistance factors, and the design process in LRFD. These sections are followed by retaining wall examples that permit direct comparison of LRFD and ASD designs. The wall types are a reinforced concrete retaining wall, a tied-back soldier pile wall, and a mechanically stabilized earth (MSE) wall. The design criteria for these walls include foundation support, so the examples incorporate comparison of LRFD and ASD for shallow and deep foundations as well as earth retention. The examples are described in the main text, and the detailed calculations are provided in appendices. The examples are followed by conclusions, references, and a bibliography.

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