RELIABILITY-BASED DESIGN (RBD) OF FOUNDATIONS

-

THE GOOD, THE BAD, THE UGLY

FRED H. KULHAWY

PROFESSOR EMERITUS, CORNELL UNIVERSITY

&

CONSULTING GEOTECHNICAL ENGINEER

FHK1@CORNELL.EDU

RBD for Foundations - The Good, The Bad, and The Ugly

Fred H. Kulhawy, PE, GE, Dist. M.ASCE

Professor Emeritus, School of Civil & Environmental Engineering
Cornell University, Ithaca, NY

ABSTRACT:

The writer has been involved with the development of reliability-based design (RBD) for foundations since the early 1980s. From this perspective, some basic concepts in the transition from allowable stress design (ASD) to RBD are reviewed. Critical issues related to RBD are noted, including their fundamental strengths and weaknesses - or more specifically "The Good, The Bad, and The Ugly". It is stressed that current simplified RBD methods used in foundation design for all structure types need to be improved and expanded. The structural-based approaches that employ "nearly-unique" resistance factors need to be replaced by geotechnical-based methodologies that address ground engineering evaluations in a direct manner so that resistance factors are related to the "quality" of the geotechnical data. Observations are made for improving factor calibrations, addressing serviceability and economic limit states, and optimizing the foundation design process - linking all to what might be viewed as good, bad, or ugly. Good points include, for example, our intentions and goals, while ugly points include, for example, some of our implementations.

A very useful and relevant reference on geotechnical RBD is given below:
Kulhawy, F.H., Phoon, K.K. & Wang, Y., "Reliability-Based Design of Foundations - A Modern View", *Geotechnical Engineering State of the Art & Practice (GSP 226)*, Ed. K. Rollins & D. Zekkos, ASCE, Reston (VA), Mar 2012, 102-121.

_____

Prepared for First Conference of ASCE Geo-Institute (Virginia Chapter) on *"Lessons Learned in Geotechnical Engineering"*, Williamsburg, VA, 1-2 May 2012