ASCE Manuals and Reports on Engineering Practice No. 90

Guide to Structural Optimization

ASCE

AMERICAN SOCIETY OF CIVIL ENGINEERS

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Guide to Structural Optimization

By the Technical Committee on
Optimal Structural Design of the
Technical Administrative Committee
on Analysis and Computation of the
Technical Activities Division of
The Structural Engineering Institute of the
American Society of Civil Engineers

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Abstract:

Recent advances in computer methods for analysis and design have been of substantial aid to the designer in the creative process of designing the best (optimum) system. Optimization methods are seen to be at the heart of computer methods for designing engineering systems. With these methods, the designer can evaluate more alternatives, thus resulting in a better and more cost-effective design. The main purpose of this *Guide* is to describe the use of modern optimization methods with simple yet meaningful structural design samples. It emphasizes the formulation of design problems as optimization problems and includes discussion of the features and pitfalls of the statements of these problems. Optimum solutions are obtained and, where possible, compared with solutions obtained using traditional design procedures. Sample applications demonstrate and clarify the basic concepts and serve to show how and what can be achieved by optimum design methods.

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