

## Optimum design of welded structures

Károly Jármai

**Summary.** This article presents the cost calculation system developed by us to determine the cost of a welded structure. In the paper the design, fabrication and economy are linked together in the optimization system. Two tubular truss applications show, that the reduction of cost can be significant.

**Key words:** welded structures, optimization, mathematical methods

*Received 4 July 2017. Accepted 17 August 2017. Published online 21 August 2017.*

### Introduction

The main requirements of modern welded metal structures are load-carrying capacity (safety), fitness for production, and economy. Safety and fitness for production are guaranteed by fulfilling the design and fabrication constraints. The economy is achieved by minimizing the cost function.

These cost calculations are founded on material costs and those fabrication costs, which have a direct effect on the sizes, dimensions or shape of the structure. The cost function includes the cost of material, assembly, welding as well as surface preparation, painting and cutting, edge grinding, forming the shell and is formulated according to the fabrication sequence. Other costs, like amortization, investment, transportation, maintenance are not considered here. Cost and production time data come from different companies from all over the world. When we compare the same design at different countries, we should consider the differences between labour costs. It has the most impact on the structure, if the technology is the same. This Chapter describes the cost calculations of the different technologies. These costs are the objective functions in structural optimization.

# Optimum Design Of Structures

**Yijin Wang**



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