

TITLE OF DIPLOMA THESIS

Metal constructions: Multicriteria analysis and probabilistic models are used for productivity estimation, risks identification and projects selection

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ABSTRACT

Metal constructions are the "constructions of the future". These have several advantages over others. But there is not the necessary knowledge about productivity, sustainability, and risks, especially in Greece. This study aims to help the reader understand all the stages involved in metal construction, what are the basic phases of the metal frame, but also what projects can occur with basic "component" the steel. The "rich" photographic material that accompanies the study is crucial in this understanding. In this work, photographic material has been extracted, as well as important data from a company that has been active in the field of metal structures for several decades. With the help of Microsoft excel this data is used and results are extracted for the basic work of the metal frame for productivity, which on average is at 378kg / hr per work phase, the unit cost, which on average for the general basic works of the metal frame is € 0.212 / kg. Also, for the metal works, as well as for the whole metal construction company, results related to sustainability are exported. Then there is a breakdown by type of project, and it seems that the most advantageous project options are airports and decorative railings. The Topsis multi-criteria analysis program is used for the prioritization of risks and the probabilistic program @Risk, for the analysis and categorization of risks. The analysis introduces 16 risks that have been selected after a discussion between the author and the owner of the company. It is concluded that a major risk is significant employee accidents. Based on the experience of the company owner and the author, the criteria for the selection of projects are defined, when it is not possible to undertake all the projects. The multi-criteria Transparent Choice program is also used to prioritize these selection criteria. Then the developed models are verified through a real project.

KEYWORDS

Steel Structures, Productivity, Sustainability, Risks, @Risk, Topsis Method, Analytical Hierarchy Process (AHP).