

MARGINAL ANALYSIS FOR GROUP TOPSIS WITH ANAPPLICATION TO FACILITIES LAYOUT DESIGN SELECTION

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ABSTRACT

There is a requirement of very high capital outlay but moderate risk in setting up a Flexible Manufacturing System (FMS). The same is true while organizing production using CNC, DNC and CIM. In today's manufacturing world of JIT, economic justification techniques are insufficient by themselves since they cannot cope with the benefits such as flexibility, improved quality, reliability and maintaining delivery schedules. Hence, a robust decision making procedure for evaluating Facilities Layout (FL) alternatives requires the consideration of both economic and strategic issues. An extension of TOPSIS (Technique for Order Performance by Similarity to Ideal Solution), a Multi-Attribute Decision Making (MADM) technique, to a group decision environment is investigated here in this article. TOPSIS in conjunction with marginal analysis is a practical and useful technique for ranking and selection of a number of externally determined alternatives through distance measures. To get a broad view of the techniques used, we provide a few options for the operations, such as normalization, distance measures and mean operators, at each of the corresponding steps of TOPSIS.

The proposed model is indeed a unified process and it will be readily applicable to many real-world decision making situations without increasing the computational burden. The results have demonstrated the model to be both robust and efficient.

KEYWORDS: *Facilities Layout Selection, TOPSIS, Multi-Attribute Decision Making, Group Decision, Distance Measure, Normalization*