

# The Flexibility of Manufacturing Systems versus Optimality

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**Abstract**— On the shop floor, the facility designer sometimes faces some constraints that force him to find alternative optimal or adequate solutions. Optimal solution is defined as a manufacturing system that contains minimum sum of voids and exceptions in the solved matrix. In many cases, the manufacturing systems may have more than one optimal solution. In this paper the effect of alternative optimal solutions on flexibility will be studied and analyzed. The case where alternative optimal solutions are not exist, most adequate solution should be used. It is found that alternative optimal solutions will give the designer the flexibility to choose between these solutions. Moreover, flexibility will give the designer the ability to control the cell size and to avoid some constraints.

**Keywords**— Cell Formation, Optimal Solution, Alternative Optimal Solution, Flexibility