

# A New Approach To Virtual Cell Formation

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## **Abstract**

In recent years there has been a tremendous growth in the number of cell formation methods. The surge of interest in the area has been fueled by the substantial industry interest in implementing cellular manufacturing (CM) system to reduce movement of jobs, set-up times and lead times. In this paper, a new approach for cell formation that integrates machine grouping and layout design, neglecting part-family formation has been presented. The procedure includes four phases. In Phase 1, primary cells are formed by dividing operations into three ranges (high, medium and low). The frequency of flow occurring between the operations has been taken as a measure for dividing flows into three ranges. Phase 2, involves redesigning of primary cells for minimization of the number of intercell travels and to address the machine duplication problem. Priority levels entered by the users solve the machine duplication problem. Phase 3, involves decomposition of individual primary cells into sub-cells. Sub-cells are formed by employing Phases 1 and 2 again on individual primary cells until further division into sub-cells becomes impossible. Phase 4, involves forced decomposition of sub-cells in order to obtain multiple cell designs. Multiple cell designs are based on criteria of maximum number of machines that can be accommodated in a cell. Multiple cell designs are formed by forcing excess operations to other cells based on the criteria of maximum number of operations that can be accommodated in a cell. The methodology is demonstrated using an illustrative example.

**Keywords:** Group technology, cellular manufacturing, hybrid layout, virtual cell formation, intracell flows, intercell flows.