Abstract

In order to pursue smaller turn-around time and increase the response speed to customer’s needs, there is high demand on machine tool manufacturing planning, which serves as the bridge between product design and manufacturing, to use a systematic approach to integrated design of products and their related processes. Traditionally, different people carry out different steps such as part design, process planning, and manufacturing resources identification sequentially. Collaboration between these people is usually minimal. Because of this, many revisions have to be made, numerous iterations are needed and a long time passes until a satisfactory part design is produced.

The objective of the research was to develop an Integrated Product and Process Planning Information System (IPPPIS) for a machine tool manufacturing firm. After analysing the fundamental elements necessary for modeling manufacturing and process planning framework used in machine tool manufacturing, a model for collaborative design has been developed. The main components of this model are - process planning model (PPM), manufacturing activity model (MAM), manufacturing resource model (MRM), manufacturing cost and a manufacturing time model. The reuse of planning methodologies and variety of best of practices (BOP) are used to increase the design/planning efficiency and reduce the cost and time. The workability of this approach has been tested using a prototype of the system developed in a machine tool manufacturing firm. Case study is presented to demonstrate the feasibility of such an approach and brings out the benefits to be had from its implementation.

Keywords: Concurrent Engineering, Manufacturing, Integrated Product and Process Planning Information System