B. The Components of CIM

The CIM components represented in the Y-diagram of Fig. A-1 are:
- Production Planning and Control,
- Computer Aided Design,
- Computer Aided Planning,
- Computer Aided Manufacturing,
- Computer Aided Quality Control,
- Maintenance.

A brief description of these components will follow, in which the content of the individual functions will be critically assessed as a basis for the subsequent integration discussion.

I. Stage of Development of CIM Components

a. Production Planning and Control (PPC)

Production Planning and Control (PPC) is a classic field of application for electronic data processing. Although, over the past 20 years, many industrial enterprises have dedicated considerable resources to its introduction, the current level of application is not entirely satisfactory. One cause of this is that many enterprises have been overstretched by the introduction of such a complex system, and hence have got "stuck" half way. The complexity arises from the fact that production planning and control accompanies the entire productive process (see the functions represented in the left fork of the Y in Fig. A-1).

At the same time rapid hardware and software developments have caused an equally rapid aging of these expensively implemented developments, as regards their functionality and user-friendliness, leading to high reorganization and software maintenance costs.

Suppliers of PPC systems as well as advanced in-house developments of large industrial concerns have established a far-reaching planning concept which builds on the idea of successive planning. Here individual planning levels, built on each other, are carried out in logical and chronological order. These planning levels are accompanied by a unified primary data management system.
1. Primary Data Management

Primary data management within a computerized production planning and control system makes available the source data necessary for the planning of materials and capacity management. At the same time it yields the data needed for the production plan for a specific production order, which is the basis of production control. The production plan contains the essential information needed for production (see Fig. B.I-1).

![Production plan](image)

Fig. B.I-1: Content of a production plan

Given the large volume of data, particular organizational forms have been established which minimize redundant data storage. This may apply to the construction of a part from its components (bill of materials), production instructions (work schedule and work processes), the equipment to be employed (equipment groups), the tools required and the relations between them. Fig. B.I-1 shows this informational decomposition of the production plan.

The construction of parts from their components can be represented diagramatically by means of a gozintograph (see Fig. B.I-2). The gozintograph shows which lower level parts are used in what quantities to construct a given higher level part.