Summary

Concepts for automated integrated manufacturing (AIM) are discussed by the contributors to this ASTM Special Technical Publication (STP). Many organizations in this country and in foreign countries have developed standards useful to AIM, but the use of these standards has been uncoordinated. The innovative implementations used by the authors to spread automation throughout the factory have been presented in this STP.

The papers in this volume have been divided into two groups. The following sections summarize some of the papers.

Standardization Applications and Requirements

Schilling describes the efforts of ASTM Committee E-31 on Computerized Systems to lead the standardization of the phased development of computerized systems. He points out, however, that there is a long way to go before a purchaser can order "one each AIM per ASTM Specification XXX." *Bacheler* notes that there are many standards available for use with NC and DNC equipment, but that the integration of such equipment into FMS and such systems into AIM generates the requirement for new standards. As *Grierson* has said, "Defining the roll of standards in the factory is the most important issue." The success of factory automation depends upon fostering integration by standardization. *Bloom and McLean* describe experiences with a testbed system for investigating the decomposition of structure for the automated factory. *Berkley* has challenged ASTM to develop a matrix for identifying and tracking development of automation standards.

Tools for Computer-Controlled Manufacturing

Holland describes the present state of technological development and remarks that the environment to develop standards must change before large-scale automation is reached. A modular system for automation and process control is described by *Bruno et al. Walter* continues in the same vein by describing the design of controllers. *Mackulak* approached this task by using the techniques of $IDEF_0$ developed by integrated computer-aided manufacturing. Examples of controllers for management information were used as illustrations.

The paper by *Hopp and Lau* develops control system architecture for decision hierarchy and parallel task decomposition. An unusual application of computer-controlled manufacturing is presented by *Nilsson* in his description of a fully automated clothing factory. *Schilling et al* bridge the gap between management information systems and process control using ingot tracing in a rolling mill as an example. The approaches used by post-secondary education to teach computer-controlled manufacturing and standardization are discussed by *Merkel*.

Final Remarks

ASTM Committee E-31 and its Subcommittee E31.08 on Computerized Manufacturing Processes have assumed a leadership role in the development of standards for materials comprising an automated factory and for the testing of these materials. Results of their efforts include the ASTM Guide for Procurement of Computerized Manufacturing Systems (now in final review), the present symposium, and the development of a model of an integrated system of standards for factory automation (see Appendix). All interested individuals are welcome to participate in the development of this model and in other Committee E-31 activities.

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