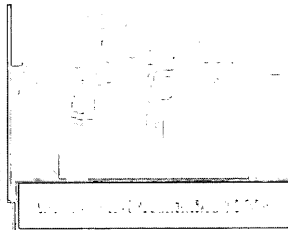


Session: MP2-D
Advanced Manufacturing**Realization of Autonomous Decentralized FMS
by Two Kinds of Hypothetical Reasoning**

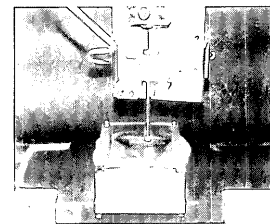
Hidehiko Yamamoto and Etsuo Marui

This paper discusses the basic research necessary for realizing an autonomous decentralized Flexible Manufacturing System (AD-FMS) with Automatic Guided Vehicles (AGVs) and Machining Centers. As the AGV actions' decision, the idea for a real-time decision method for AGV actions based on the predictions that foresee not only current production situations but also anticipate future ones is introduced. Also, the developed decision method is applied to an AD-FMS. Because of the results, it can be seen that multi-production is possible even though neither AGV actions' plans nor parts input schedules are given beforehand.

**Development of a Forging Type Rapid Prototyping System
(Automation of a Free Forging and Metal Hammering)**

Hidetake TANAKA, Naoki ASAKAWA and Masatoshi HIRAO

This paper proposes a development of the forging type rapid prototyping system on the basis of CAD data. In the free forging and plastic working field, there is few method to automate the process. In order to automate those working, the numerical controlled free forging and the metal hammering working system are developed in the study to be adopt as a new modeling method of the rapid prototyping. From the experimental result, the system is found to have a possibility to be a new method of three-dimensional modeling as the rapid prototyping.

**Time Shifting Bottlenecks in Manufacturing**

Christoph Roser, Masaru Nakano, Minoru Tanaka

We recently developed a novel method to find the bottlenecks in a manufacturing system and to return a quantitative measure of the bottleneck constraint. This shifting bottleneck detection method has now been expanded to monitor the bottlenecks for non-steady state and highly variable discrete event systems, allowing the user to monitor these running bottlenecks over time as the underlying system changes. This paper presents the method for monitoring these shifting bottlenecks over time. This method uses a holistic approach to the analysis of discrete event system, analyzing not only the entities by itself but also the interactions between the entities.

