The Impact of Synchronization of Material Flow in Manufacturing Systems on Scheduling and Control:

Abstract

The optimal synchronization of the material flow in a job shop appears to be a prerequisite to ensure the constant availability of resources at the manufacturing systems. Synchronization has been extensively studied in many disciplines (e.g., physics, biology, chemistry, medicine). In addition, it has also received certain attention in the logistics and supply chain management literature as a possible mitigation of the Bullwhip Effect in supply networks.

However, in manufacturing it is not yet possible to fully evaluate the effects of synchronization on performance figures, such as cycle time, due date reliability, or capacity utilization.

The goal of this research project is to 'enrich' classical scheduling and control methods with a synchronization of the manufacturing operations and investigate the impact of the increased level of synchronization on the performance of the manufacturing system.

Research Questions

How can a synchronized schedule for operations be integrated in existing scheduling and control approaches in manufacturing? Does this increased level of synchronization facilitate scheduling or increase the performance of the system?

Proposed Methodologies

- Scheduling in job shop manufacturing
- Dispatching and control rules in manufacturing
- Computer simulation of manufacturing systems with synchronized operations
- Statistical evaluation of the simulation results

Contact:

Production Systems and Logistic Systems
BIBA – Bremer Institut für Produktion und Logistik GmbH
Dr. Till Becker
tbe@biba.uni-bremen.de
www.psls.biba.uni-bremen.de

For further information on the application procedure please visit our website at http://www.logistics-gs.uni-bremen.de/

International Graduate School for Dynamics in Logistics (IGS)
Spokesman: Prof. Dr. rer. pol. Hans-Dietrich Haasis
Managing Director: Dr.-Ing. Ingrid Rügge
info@IGS.LogDynamics.de