科技資料

COMPUTER APPLICATIONS IN PRODUCTION AND ENGINEERING

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Proceedings of the Fourth International IFIP TC5 Conference on
Computer Applications in Production and Engineering: Integration Aspects
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Edited by

GUY DOUMEINGTS
Laboratoire GRAI
University of Bordeaux
Talence, France

JIM BROWNE
CIM Research Unit
University College
Galway, Ireland

MARCO TOMLJANOVICH
ITALCAD S.p.A.
Rome, Italy

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FOREWORD

This book consists of all the papers that have been selected for the CAPE (Computer Applications in Production and Engineering) Conference organized by IFIP (International Federation for Information Processing) and the GRAI Laboratory of Bordeaux 1 University .

CAPE'91 is the fourth CAPE conference. Created in 1983 in Amsterdam by IFIP's Technical Committee number 5, this International Conference has travelled from Copenhagen (1986) to Tokyo (1989) and has landed in Bordeaux for its 1991 edition.

The objective of CAPE is to present the latest results of applied research and the most advanced applications in the fields of engineering and manufacturing, in the broad sense of these words that is to say from product design to product delivery, regardless of the industrial domain involved.

You will find in this volume :
- A panorama of the main international research programmes in the field of CIM in Japan, in the States, and in Europe (ESPRIT, EUREKA)
- A number of presentations on CIM applications, among the most advanced in the world
- The State of the Art in the field of research results concerning such topical subjects as Feature-Based Reasoning in Engineering, CAD modelling techniques, concurrent engineering, modelling techniques for manufacturing systems, the various aspects of integration in CIM between the manufacturing functions (Robotics, flexible manufacturing system, quality control ...), expert systems in maintenance, methodological approaches to design and implement CIM systems, human and economic aspects, planning and scheduling as tools for integration, and finally the design of information systems in CIM (structures, object-oriented approach ...)

At a time when the development of CIM techniques raises more and more questions for production-managers, not only from an economic and human point of view, but also from the point of view of technological evolution, all these papers provide a number of answers that will contribute to enlighten the future.

Through this book, IFIP TC5 carries on its mission, which is to bridge the gap between research and implementation.

Guy DOUMEINGTS
Professor at Bordeaux 1 University
Chairman of the GRAI Laboratory

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CIM Research Unit, University College Galway, Galway, Ireland.

1 Introduction

For years now we have been reading about the many different production management approaches that are used in manufacturing systems. The advantages and disadvantages of each approach are outlined and discussed in numerous technical papers. This paper argues that there is a need for an alternative production management approach and a move away from traditional thinking in the area of Material Requirements Planning (MRP) and Manufacturing Resource Planning (MRP II). There is a need to review the underlying approaches of MRP and MRP II and to develop an alternative production management architecture. This architecture revisits MRP II and MRP and includes some of the concepts learned from other production management approaches such as Just In Time (JIT) and Optimised Production Technology (OPT)[1]. The main themes of this paper are *firstly* the positioning and use of core existing MRP techniques within a revised hierarchy and *secondly* the incorporation of new functionality at the Master Scheduling, Factory Co-ordination and Production Activity Control levels. These functions will be presented in the context of an overall production management system architecture. This smaller role for these core MRP type systems, referred to in this paper as Requirements Planning is denoted as *mrp*.

In effect this paper argues that the MRP II approach is mistaken in that it tries to apply similar techniques at all levels in the production management hierarchy. Requirements Planning (denoted mrp here) is useful in the tactical phase through the use of bill of material processing and average lead times, but the approach is not appropriate at the higher and lower levels where aggregation and detailing are respectively necessary. Further, insufficient effort in terms of industrial and research energy, has been expended on developing solutions at the master scheduling level and indeed the shop floor control level. The structure of the paper is as follows. Firstly we argue that MRP II is mistaken in its attempt to integrate functions at the strategic, tactical and operational levels which require different approaches to address them adequately. Then in section 3 following we present a simple functional architecture for production management systems and argue that the functionality at each hierarchical level should be considered in the context of the various types of

[1]OPT is the registered trademark of the Scheduling Technology Group Ltd., The Hounslow Centre, Lampton Road, Middlesex TW3 1JB, UK.