Utilizing KolibriMFG Software System to Schedule and Control Shop Floor

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Abstract: Manufacturing software modules are essential part of any large ERP IT product. However, in most practical cases, the detailed process planning for shop floor control to assembly component parts to manufacture finished goods needs further software extension to improve manufacturing execution. Additional difficulties that large ERP systems are frequently comprise shop floor control solutions with too much data entry exercise in their daily operation.

Recognizing this situation KolibriMFG system has been developed to implement an easily maintainable planning and control software to increase manufacturing process efficiency. KolibriMFG is a stand alone collection of program modules but it is designed and can be used in integration to extend capabilities of other ERP systems that provide the KolibriMFG product with the master production plan. After the master plan is available KolibriMFG determines all the information needs to issue work orders and plan and manage the flow of assemblies at the particular work centers. This function of the system is based a novel pull manufacturing approach. The KolibriMFG suite uses its own database and advanced in-one scheduling method to implement an efficient way to perform the complex tasks of management to execute manufacturing. The system also involves a very effective approach to manage and control all the main manufacturing data for planning such as part master data, BOMs and routings.

From technical point of view the KolibriMFG system can collaborate with all known and popular database servers and runs under Microsoft Windows 2000 professional or later Microsoft operating systems. It can work in LAN, WAN or VPN.

In this paper we present details on generic KolibriMFG implementation issues, show how the main database should be built up and highlights features of system’s usage. An explanation how the system can make the MRP for manufacturing planning, the work order scheduling and kitting together with the assembly control more simple and effective will be also presented in the paper.

Keywords: manufacturing, ERP, MFG, shop floor control, IT, information technology, programming, computer code, MPS, MRP, assembly, planning, work centre, mfg process scheduling, pull manufacturing
1 Introduction

Modern manufacturing can hardly be imaginable without the significant utilization of large ERP systems, such as SAP, Baan, PeopleSoft, Oracle, or ASV, for instance. ERP systems obviously comprise MRP, MPS and shop floor control modules to do demand driven manufacturing planning and issue work orders as required. Shop floor control modules usually offer well established material and operation tracking to aid manufacturing execution effectively. However, detailed work order tracking requires as many data entries that override economic administration capacity. In order to resolve this problem companies do not increase administration cost instead they try simplify their shop floor control processes working with non-detailed material tracking or implement new information technology subsystem designed to aid manufacturing execution exclusively.

Considering the situation outlined above KolibriMFG system has been developed to implement an easily maintainable planning and control software to increase manufacturing efficiency. KolibriMFG is a collection of program modules and designed to be used in integration with other ERP systems that provide the master production plan for the KolibriMFG software. After the master plan is available KolibriMFG determines all the information needs to issue work orders and plan and manage the workflow via the particular work centers. This function of the system is based a novel pull manufacturing approach. The KolibriMFG suite uses its own database and advanced in-one scheduling method to implement an efficient way to perform the complex tasks of management to execute manufacturing. The system also involves a very effective approach to manage and control all the main manufacturing data such as part master data, BOMs and routings.

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2 The KolibriMFG System

KolibriMFG system [1] runs under Microsoft Windows 2000 professional or later operating system. The software deployment is straightforward. The user should run the 'setup.exe' program from the installation CD and follow the instructions appear in the installation wizard dialogs. After a successful installation the system can be accessed via two modules: the ‘Kolibri Manager’ and the ‘Kolibri Base
Data Management’ modules. These modules provide the user interface to start the particular system components as listed:

- Materials management
- BOM management
- Work center management
- Configuration class management
- Material report writer
- Main planner interface
- Sub planner module
- Work flow scheduler
- Technical report writer

2.1 Materials Management

The Materials management module provides the necessary dialog pages within the materials’ property sheet to enter main part data into the system database. The system works together with several database servers, such as MS SQL Server, Oracle, or MySQL Server. The main part data can also be changed or deleted with using another page of the material’s property sheet. The material property sheet also provides the dialog page to enter, change, or delete the appropriate routing information for all items existing in the database. With this novel approach the system integrates process engineering with materials management.

2.2 BOM Management

BOM management is highly automated. The BOM property sheet makes it possible to select or search the assembly parts from the database and the possible component items will be listed out by the system. If a component is selected it can be add to the BOM by one mouse click. Another page of the BOM sheet makes the user possible to view the intended BOM structure and copy it as needed.

2.3 Work Center Management

Work center management sheet provides the following pages:

- Plant data handling
- Shop floor data handling
• Production line data handling
• Work center data management
• WIP inventory management

The listed varieties of manufacturing units offer different controls at the different levels of management. The work center management property page handles entries such as main process time. The same page makes the user possible to gain report of the work center’s main data.

2.4 Configuration Class Management

Configuration classes are required to define configurable items and implement an advanced product configuration function within the KolibriMFG system. Classes can be added in a very simple way provided by the Configuration class management dialog.

2.5 Material Report Writer

Material report writer is to provide information on all of the fundamental data being entered the system database. The report writer is a generic configurable solution to edit report templates due to the required information. All particular reports can be exported into MS Excel pages.

2.6 Main Planner Interface

The main planner interface an advanced dialog to let the user enter the main production plan into the system database. The main production plan can be deduced from the customer orders and customer forecasts and it is used for finished goods regularly. The main production plan can also be received from a large ERP system’s MRP or MPS function.

2.7 Sub Planner Module

The sub planner module operates as follows:

1. Reads the main production plan from the database.
2. Looks for the component items that need to be assembled and determine the routing for them.
3. Schedule all the manufacturing activities for every routed part at all work centers involved in the manufacturing process.
2.8 Work Flow Scheduler

This module schedule and report the manufacturing tasks at particular work centers for the actual date. This report will serve as daily production orders at the work centers.

2.9 Technical Report Writer

This module is used by the shop floor manufacturing planners and foremen to verify the detailed plan and work orders reported by the system.

3 Application of the KolibriMFG System

KolibriMFG system is designed to aid manufacturing management and shop floor control. The system runs on Microsoft Windows 2000 or later operating system. It can work together with several different SQL servers, such as MS SQL Server, or MySQL, for instance. The use of MS SQL Server is recommended and it is in case of the default deployment of the KolibriMFG system. The software has its own database and the database should exist before any transaction may happen with any KolibriMFG components. It is very important to fill in the database with accurate fundamental data, such as part information, BOMs, routing data and work center information. After the static information is in the database the user can enter main production plans and start to use the system to aid daily manufacturing planning and control. The system makes a pull manufacturing model possible and organizes the work center activities particularly. The main production plan can be obtained from a large ERP system and entered manually by using the main planning module in the KolibriMFG program. After that the sub planner is used to calculate all the manufacturing activities to meet the target of the main production plans. The work flow scheduler is used to provide the work centers with daily work orders and activity due dates. The work centers act independently following the work flow scheduler reports. With this approach the daily administration can be reduced and the target reached due to the pull notes. Software presentation is available on request.

Conclusions

Instead of a step by step material tracking data entry the KolibriMFG system utilizes its pull method and built in valid simulation to organize manufacturing more accurate than it would happen with a detailed tracking approach.

References