ENTERPRISE INFORMATION SYSTEMS

- ERP II
- MES – Manufacturing Execution System
- APS - Advanced Planning System
- MRP – Material Requirements Planning
- MRP II - Material Resource Planning

ERP – Enterprise Resource Planning

Literature:

- SODOMKA, Petr, Klčová, Hana. *Information systems in entrepreneurial practice*. 2nd edition (segments 42 and 43) 2. Brno: Computer Press, 2010. ISBN 978-80- 251-2878-7. Pages 249 - 286.

- GÁLA, Libor, Jan POUR and Zuzana ŠEDIVÁ. Business informatics. 2nd edition (segments 42 and 43) 2. Prague: Grada, 2009. ISBN 978-80-247-2615-1. Pages 172 - 173.

- BASL, Josef and Roman BLAŽÍČEK. Enterprise information systems: the enterprise in the information society. In *Management in the information society*. 2nd edition Prague: Grada, 2012. Management in the information society. ISBN ISBN 978-80-247-4307-3. Pages 80-83, 139-158.
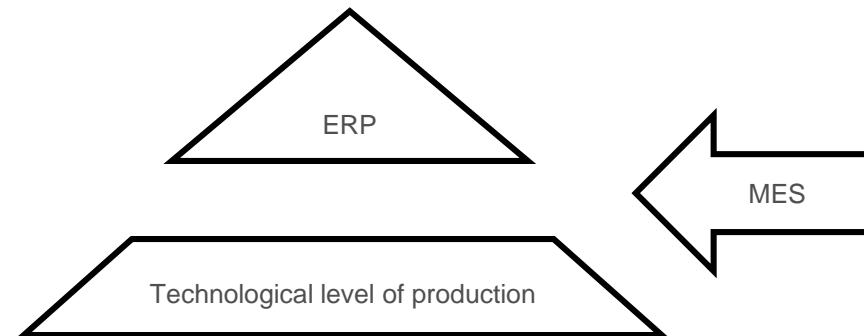
ERP – Enterprise Resource Planning

MES:

It provides information for optimisation of production activities starting with receipt of the order and ending with the final product.

It is particularly focused on the planning of production, respectively, production orders, monitoring of their fulfilment levels with regard to the deadlines, monitoring and evaluation of the warehouse stocks, production management at the operative and workshop management level. Gála 2009

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MES:

MES works at tactical to operative management level – primarily a production management system

Source: Sodomka p. 252

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MES - Overview of supported production management methods:

- Factory Manufacturing – management of discrete manufacturing processes – for instance, mechanical production

- Process Manufacturing – continuous manufacturing processes, for instance, chemicals

- Batch Manufacturing – batch product manufacturing – pharmaceuticals, foundries

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MES - Overview of supported production management methods:

- Management of manufacturing according to the minimum inventories – the minimum inventory stocks are defined and upon dropping below the set threshold, a replenishment proposal is generated.

- MRP – Material Requirements Planning – the material requirements are set using a bill of material, inventory stocks and the manufacturing schedule. It determines the proposals for purchase of material as well as manufacturing orders and parts

- MRP II - Material Resources Planning II – planning of material and capacity resources. It also contains the plan of sales, manufacturing and purchase. Simultaneously, it offers many financial previews of orders, manufacturing and material warehousing.

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MES - Overview of supported production management methods:

- JIT – Kanban – focuses on the management of the smoothness of the material flow. Product manufacturing is initiated by the customer, pull method. Kanban – cards.

- Kanban - Lean Production – recurrent manufacturing of the same or related components.

- TOC – Theory of Constraints. Focuses on the optimisation of constraints.

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MES functionalities:

- Resource management and allocation
- Operative planning and scheduling of production
- Dispatch production control
- Document management
- Data collection, compilation and archiving
- HR Management
- Quality control
- Process management
- Monitoring of manufacturing
- Performance evaluation analysis

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Resource allocation

- machinery

- tools

- personnel

- material

- miscellaneous equipment

- documentation

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Operational Planning

- Creation of short-term manufacturing schedules

- Usually based on planning in superstructure economic systems (ERP)

- The objective is to eliminate downtimes, incessant re-organisation, optimisation of transport operations, minimisation of energy consumption

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Dispatching Production Unit

Manufacturing flow control in the following forms:

- labour

- sequence

- batches

- quantity

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Document Management System:
- manufacturing standards, plans, recipes and results
- work instruction
- manuals
- project documentation
- standard operation procedure
- parts of the machine control software
- batch records
- change procedure records
- communication records

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Data Collection:

- acquisition of information from manufacturing
- parametric data from the manufacturing equipment
- from the manufacturing process
- provision of real-time evaluation of the states:
  - of the manufacturing equipment
  - manufacturing process
  - process history
  - history of parametric data

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Human Resources Management

- Information about the manufacturing personnel available at the given moment

- Employees' Qualification Records

- Optimal selection of workers for specific tasks

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Quality Management

- Acquisition of real-time measurement from manufacturing
- Analyses in the sense of proper product quality management
- Identification of problems that require attention
- Recommendation of actions for remedy of a problem
- Identification of undesirable manufacturing deviations

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Process Management

- Monitoring of manufacturing and automatic correction of manufacturing

- Support for the operator's decision-making on corrections

- Improvement of functions in the manufacturing process may also include the management of alarms

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Production Monitoring

- production planning and monitoring

- personnel assigned to given work

- material components used in manufacturing

- real manufacturing conditions

- alarms

- reworking and other exemptions related to the product

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Performance Analysis:

- immediate reporting of manufacturing results using the current information
- their comparison with the recent history and expectations
- Prediction of the economic output estimates
- The performance results include:
  - measurement
  - suitability of the resources
  - wear of the manufacturing units
  - compliance with the plan
  - comparison with the standards

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Specific MES functionalities:
- Bills of material
- Product configurator
- Management of production orders
- Production prognosis and planning
- Operational planning and management of production
- Management of manufacturing procedures
- Workshop production management
- Monitoring of the production status
- Monitoring of manufacturing tasks
- Monitoring of production costs

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Examples of specific MES functionalities:

- Creation of the production order
- Creation and editing of bills of material with items and individual characteristics - normal item, subcontract, derived production
- Breakdown of the bills of material at various levels
- Generation of manufacturing orders on the basis of an order proposal
- Browsing and editing of manufacturing orders according to various criteria
- Disposition lists on the screen
- Evaluation of the goods receiving in production

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Examples of specific MES functionalities:

- Creation of bills of material with manufacturing waybills
- Breakdown of production into various departments
- Generation of production orders from the order requisition
- Allocation of delivery deadlines for complete orders or individual order positions
- Editing of bills of material for production orders
- Visualisation of the necessary quantity of individual … for the total manufactured quantity of the finished product

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Specific MES functionalities:

- Printing of production orders through the form generator
- Merging of the production of individual articles and the delivery deadline showing the necessary individual parts for the given department
- Availability lists of individual parts
- Automatic receiving of finished products to the warehouse
- Calculation of the average price of each new product on the basis of the prices of the individual parts
- Automatic printing of delivery notes for production tied to the orders

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Specific MES functionalities:

- Definition of the workflow

- Overview of the production batch

- Capacity planning

- Multi-level quality inspection

- Integration of other ERP modules - evidence of performances, DMS, cost accounting - orders

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APS - Advanced Planning and Scheduling

A tool for advanced manufacturing planning at the level of one business subject while respecting all the constraints. The input conditions and parameters are defined in the system and the APS system has the task to identify an optimal solution variant. It is usually an integral part of the ERP or SCM solution.

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Significant MES products/producers:

Oracle Flow Manufacturing, SAP Business All-in-One, AROP, Microsoft Dynamics NAV, BMD, Exact, Altus Vario, K2

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Significant MES producers:

www.systemonline.c

Název produktu	Výrobce	Dodavatel
▲ ▼	▲ ▼	▲ ▼
abas ERP Production	ABAS AG	ABAS AG
ABRA G4, G3	ABRA Software a.s.	ABRA Software a.s.
AddOn Production	GT Systems 2, s.r.o.	GT Systems 2, s.r.o.
Ahmose	AHMOSE SOFTWARE s.r.o.	AHMOSE SOFTWARE s.r.o.
AHP Leitstand	factory solutions GmbH	factory solutions GmbH
ALTEC Aplikace	ALTEC a.s.	ALTEC a.s.
Altus Vario	Altus software s.r.o.	Altus software s.r.o.
AROP	ARSIQA system s.r.o.	ARSIQA system s.r.o.
Asprova	Asprova	Asprova
AZ.PRO	PROSPEKS-IT, a.s.	PROSPEKS-IT, a.s.
BarIS X	KASO TECHNOLOGIES, s.r.o.	KASO TECHNOLOGIES, s.r.o.
BYZNYS ERP	J.K.R.	J.K.R.
Comarch ERP Enterprise	Comarch AG	Comarch AG
▸ COMES	COMPAS automatizace spol. s r.o.	COMPAS automatizace spol. s r.o.
DIALOG 3000S	Control spol. s r.o.	Control spol. s r.o.