

ICSEng08

MAE-P³ – A system to gain transparency of production structure as a basis for production relocation planning

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Outline

- Initial Situation
 - Internationalization of the production
 - Problem and Aim
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- The method MAE-P³
(**M**achines and **E**quipement, **P**rocesses, **P**roducts, **P**lanning)
 - The system MAE-P³
 - Production structure optimization based on MAE-P³
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- Conclusion & Discussion

Initial Situation

Environ- ment

- Large automotive electronic suppliers,
- With global production networks
- Similar products

Initial Situation

The conditions on the international market are changing:

- Reduction of production lifecycle times,
- Increasing globalization,
- Raising competition

Many companies pursue an internationalization of their production based on two motives:

1. Motive:

Opening of new markets



2. Motive:

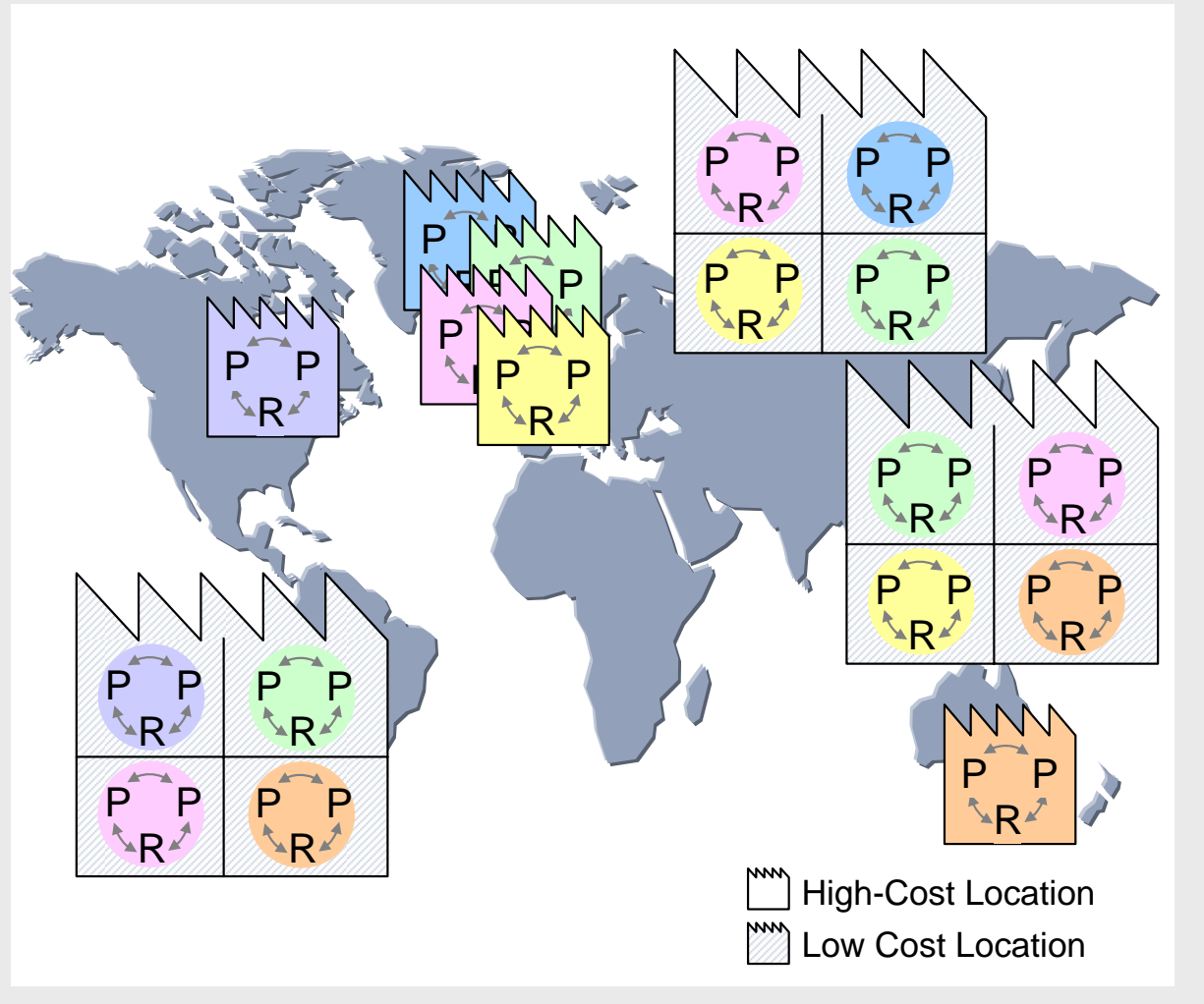
Reduction of production costs by relocating production from high-cost- to low-cost-locations

Internationalization of the production

Former Strategy

- Plants at different High Cost Locations
- Own **P**roduct-Specters
- Preferred **P**rocesses
- Preferred Suppliers and **R**esources

International production



Problem

- Now Products are build in different High- and Low-Cost-Locations
 - Different Products from different plants come together at Low Cost Locations
 - Consequence is an inhomogeneous production structure in Low Cost locations
- Transparency of the production structure is missing

Aim

- Visualize the production structure of producing companies within a worldwide production network
- Compare the production structure
- Compare product-flows and production lines for relocation planning

The method MAE-P³

The method MAE-P³ enables to compare lines and product flows visually with a matrix:

- **MAE** – **M**achines **A**nd **E**quipment
- **P** – **P**rocesses
- **P** – **P**roduct flows
- **P** – **P**lanning

		Manufacturing Processes					
		Process 1	Process 2	Process 3	Process 4	Process 5	Process ...
Line-View	Line A	1	2		4		
	Line B		2	3	4		
	Line C					5	6
Product flow-View	Product X	1	2		4	5	6
	Product Y	1	2				
	Product Z		2	3	4		6

The system MAE-P³

The system MAE-P³ is a database:

- The data of production lines and product flows are stored in lists
- The Needleman-Wunsch algorithm - of the discipline of bioinformatics - was developed to find similarities in the amino sequences of two proteins.
- The algorithm to compare protein chains is here used to compare process chains

The system MAE-P³

The system MAE-P³ is programmed with

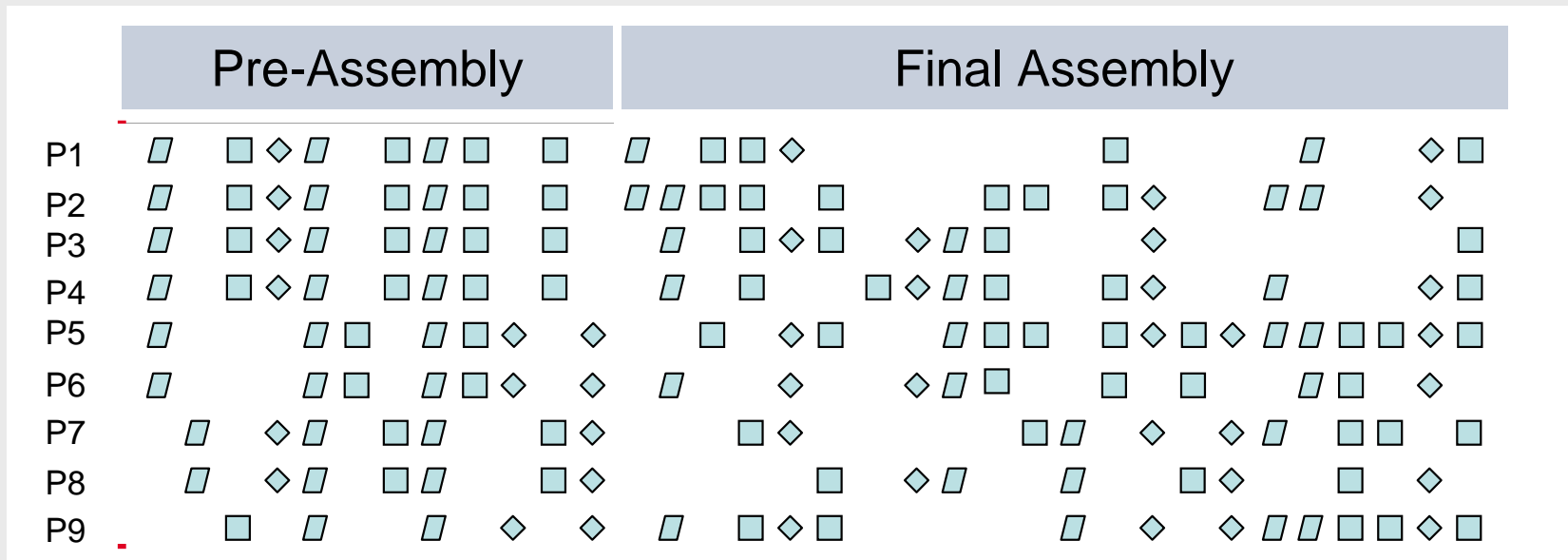
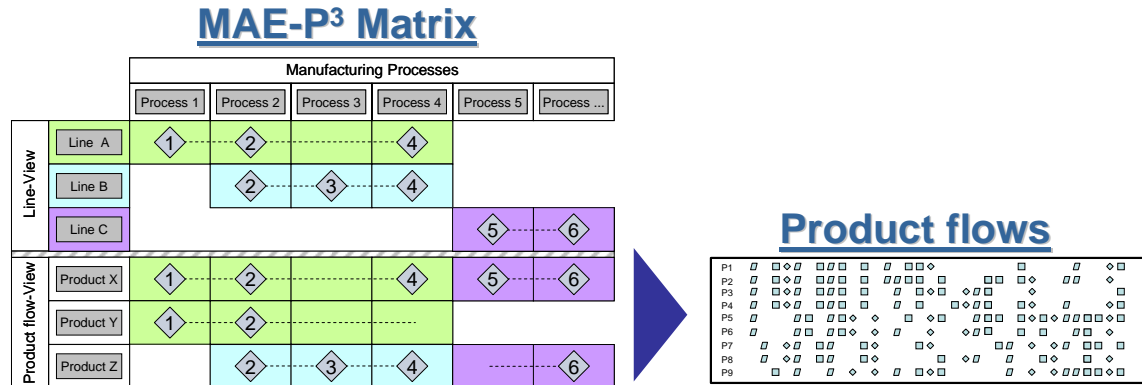
- A MySQL Database
- RubyOnRails
- Implemented in the intranet

The system MAE-P³ provides

- Search options for locations, departments, production lines, manufacturing processes and product flows
- Visualization of the production structure
- Visual comparison of production lines
- Visual comparison of production lines and product flows for relocation planning
- Visual comparison of product flows in order to optimize the production structure

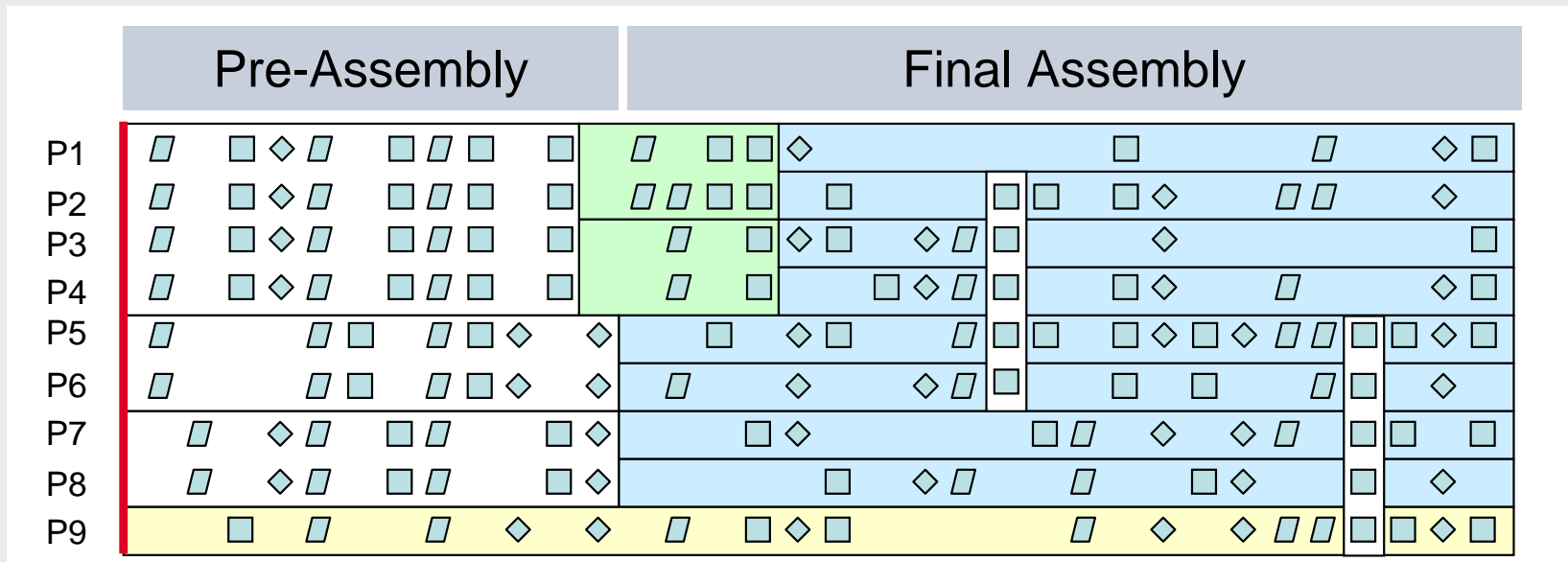
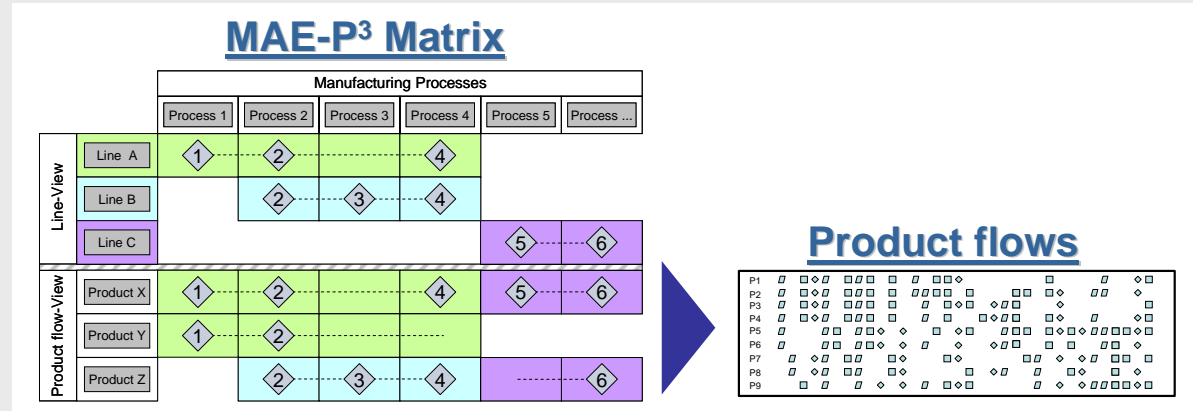
Production structure optimization based on MAE-P³

- To optimize the production structure, the product flow of every product will be compared



Production structure optimization based on MAE-P³

- To optimize the production structure, the product flow of every product will be compared



Conclusion

With the MAE-P³ system

- The production structure of a worldwide production network can be visualized
- By comparing product flows with possible production lines, location planning can be done
- By comparing the product flows of products in a
 - department,
 - plant or
 - whole production networkthe production structure can be optimized

Discussion

Thank you for your attention!