Bosch Rexroth - The Drive & Control Company

Case study worldwide production strategy Overview

- Industrial hydraulics of Bosch Rexroth
- Case study:
  - Product
  - Techniques of production
  - Production location
  - Task
  - Key data
  - General conditions

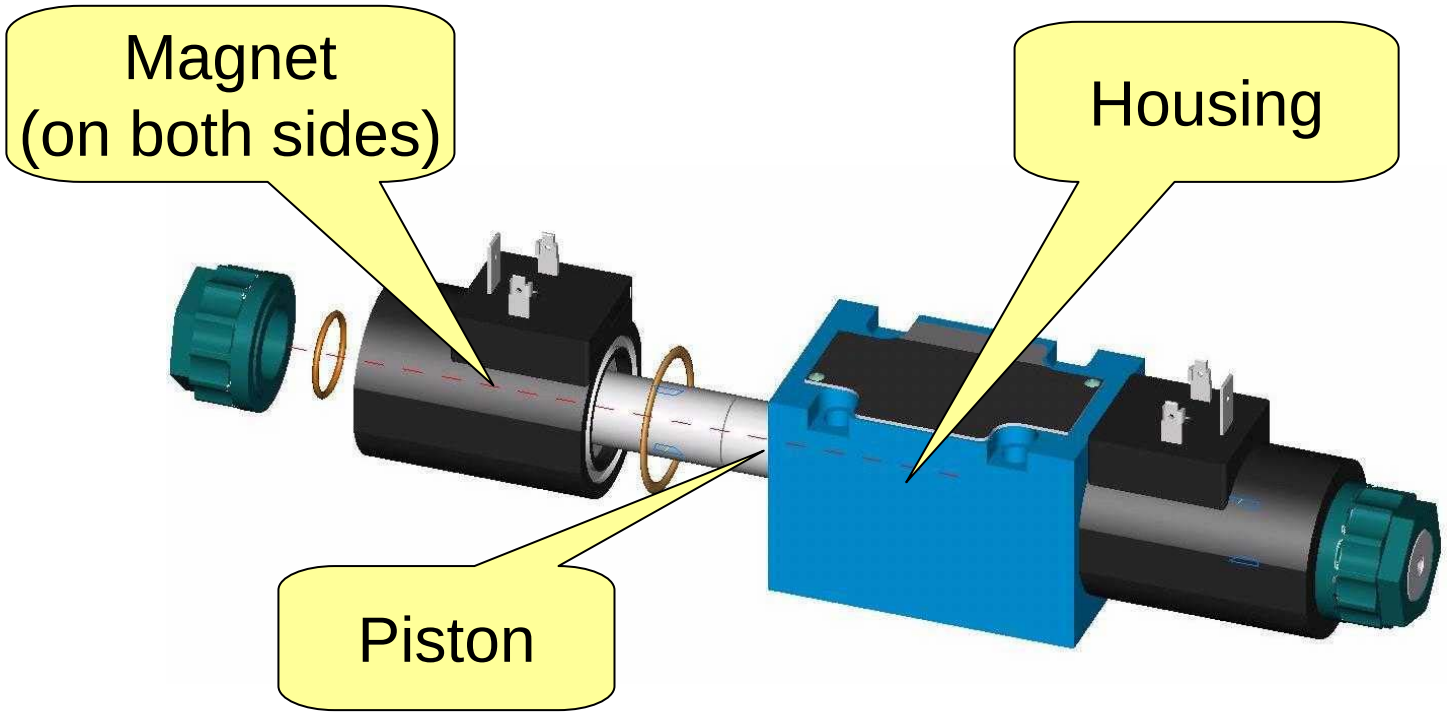
Objects of analyzation
Manufacturing strategy of valve housings

- Bosch Rexroth sells hydraulic valves worldwide
- The Asian market is becoming increasingly important to Bosch Rexroth
- A production plant has to be built up in China to supply the Asian market regionally
- In the beginning components are delivered from Europe. The final assembly is made in China. This will happen until the end of 2005.
- Please analyze the economic efficiency of a potential production of valve components in China and define a worldwide production strategy.

Product
Procurement strategy of valve components

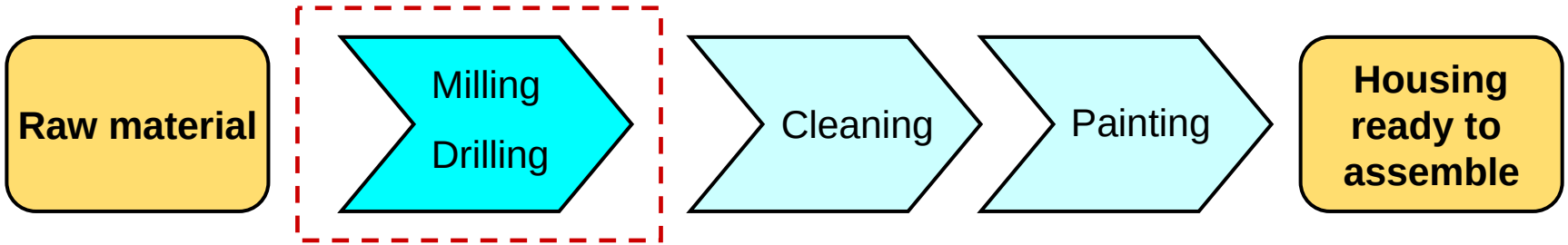
- The hydraulic valve consits of the following components:
  - Housing
  - Piston
  - Magnet
- Magnets are purchased from specialised suppliers
- The housing contibutes a considerably high part of the total costs of the valve. Therefore this case study focuses on the costs of the housing.
- The Pistons are supplied from Europe and are not relevant for this case study

Components of the valve NG6



Initial situation - method of production

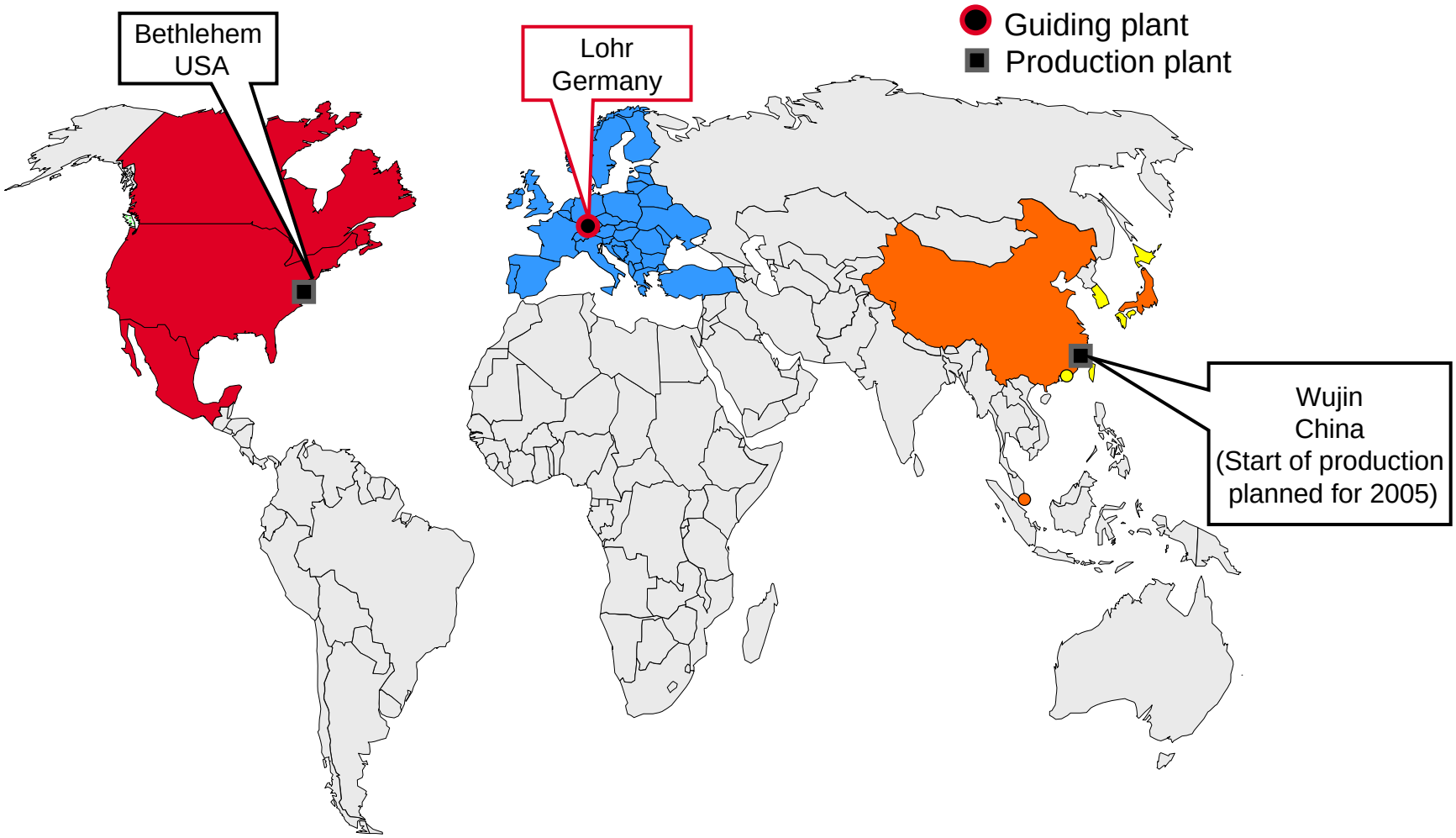
- The process of housing production:



- To fullfill quality standards in all production plants the housing must be produced worldwide standardized
- For milling and drilling the housings you can use either
  - a Flexible Manufacturing Cell (FMC)
  - or a Machining Centre (MC) (single machine)

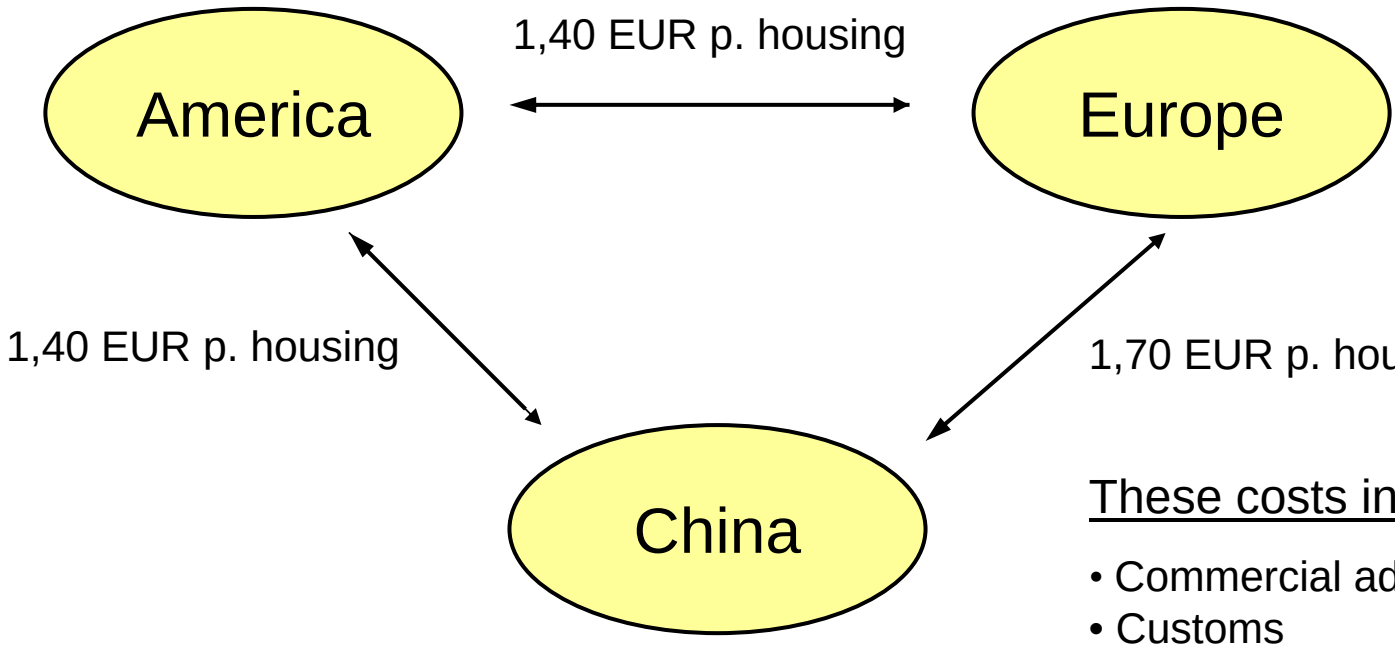
FMC to mill and drill valve housings

Production location



Logistic costs between regions

- The exchange of valve housings between the production locations costs as showen:



<u>These costs include:</u>

- Commercial administration
- Customs
- Freight

Task

- Please analyze in which way the production capacity should be expanded worldwide
- For 2006, 2008 and 2010 please define:
  - Necessary investment for each region
  - Production costs per valve housing for milling and drilling
  - Qalitative reasons for your investment decision
- Please use the given data regarding
  - Capacity and costs of the machines
  - Existing machines
  - Sales forcast
- Please take the following assumtions into account:

Capacity and costs of the machines

Feature	Unit	Europe		America		China	
Machine type		MC	FMC	MC	FMC	MC	FMC
Production hours per working day in a 3-shift-operation	in h	21	21	21	21	21	21
Production days per year 3-shift-operation	in days	240	240	240	240	240	240
Output per working day and machine	in pieces	260	620	260	620	260	620
Output per year and machine	in pieces	62.400	148.800	62.400	148.800	62.400	148.800
Fixed costs per machine	in EUR p.a.	280.000	600.000	280.000	600.000	280.000	600.000
variable production costs per machine	in EUR per h	65,00	139,29	58,89	108,63	45,56	97,62

MC: Manufacturing Centre
FMC: Flexible Manufacturing Cell

- For this case study all data remains constant

Existing machinary for milling and drilling

Machine type	Europe	America	China
MC	0	2	0
FMC	2	0	0

MC: Manufacturing Centre
FMC: Flexible Manufacturing Cell

- In 2005 all these machines are already used in series production
- These machines can not be removed to other locations
- Their technical life time exceeds not 2010

Sales forecast for valves

Prognosis	Unit	2006	2008	2010
Europe	pieces / year	332000	360000	390000
America	pieces / year	90000	93000	95000
China	pieces / year	53000	80000	104000
Total	pieces / year	475000	533000	589000

Assumptions

- All other production costs for cleaning and painting or raw materials are NOT taken into account
- Please take logistic costs into account in your investment desicion
- Currency unit is EUR
- The effects of currency flows are not taken into account
- There is enough space for the expansion of the production sites in all regions
- All housings must be used up for assembly in the same year as produced