



# Project „Flexible Assembly Processes for the Car of the Third Millennium (MyCar)“

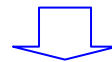
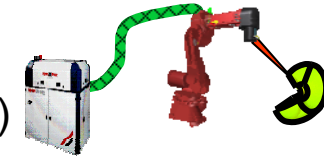
## Methodology Description

Highly reconfigurable assembly solution with permanent handling systems

## Methodology approach

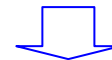
### *Basics for a Reconfigurable Process*

- Bodyshops consist of two types of tooling
  - Equipment that adds value, (welding and sealing robots etc..)
  - Non value added equipment (everything else)



The HRO Methodology approach

**Reduce non added value** operations  
to **increase added value** operation time



- Future Bodyshops Requirements:
  - Need to reduce complexity
  - Increase the available work time for value added equipment
  - Reduce the time it takes to do work (weld)
  - Reduce, Communize, Simplify, and Eliminate non value added equipment

## To Reduce non value added operation time we need

### *Guidelines to the reconfigurable Bodyshop development*

- Permanent robust standard mainlines capable of 4 models and 3 platforms **not model depending**
- **Permanent material handling** between mainlines
- Products **Bill of Production** (B.o.P.) designed to fit into **standard** mainlines
- Permanent parallel building block 3+1 **sub assemblies**, enabling **easy fast** product dependent component **changes** supporting block or batch build
- Reduce quantity of work stations by **equipment efficiency**
  - Faster Transfer
  - Faster Welding
  - Reduced time to locate and hold body
- Change from open loop to a **Common Closed loop positioning system** for transfers, tool trays, elevators, trommel, sub assembly slides, and turntables
  - That is a total of 4000 switches and related components that can be removed from an average bodyshop
  - When you remove switches you also remove the cords, j boxes, multi conductor cables, inputs, and diagnostics
  - This can add up to initial cost savings plus substantial savings in related downtime

## Future Bodyshops Concept



***"Product Driven"***

Bodyshops designed and configured for a specific known set of products



***"Process Driven"***

Develop Flexible Bodyshops configured for unknown generic products that maximize

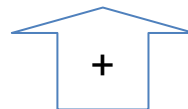


**TARGET: COMMUNALIZATION OF THE B.O.P.**

## Benefits of HRO Implementation

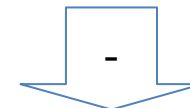
Model independent Bodyshop equipment

Increase



- Production flexibility, up to 5 models in the same body shop line
- Higher efficiency
- Full utilization of equipment
- Utilization at plant level by 10-15%
- Integration of non robotic reconfigurable equipment solutions

Reduce



- Running costs by 15%
- Energy consumption
- Maintenance requirements
- 20% Investment costs
- Time to market by 30%
- Undetected quality defects during assembly process
- Setup time for welding parameters