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

Methodology Description (High Level)

Dynamic Job Rotation Tool

LMS VOLVO CASP

Methodology Description (High Level)

Given the great number of different human operators and different tasks that need to be carried out ...

… How can we efficiently create operator schedules that smoothly distribute the physical and mental workload in an assembly line?

Problem Definition

▪Human Based Assembly Line Reconfiguration

Given the following data:

Product Specifications And Assembly Sequence	Required Assembly Process Specifications	Available Operators & Operator Characteristics	User defined performance indicators
		 Skills-Cost-Experience	•Workload Distribution •Repetitiveness of tasks •Accumulated Fatigue •Travelling Distance •Other user defined…

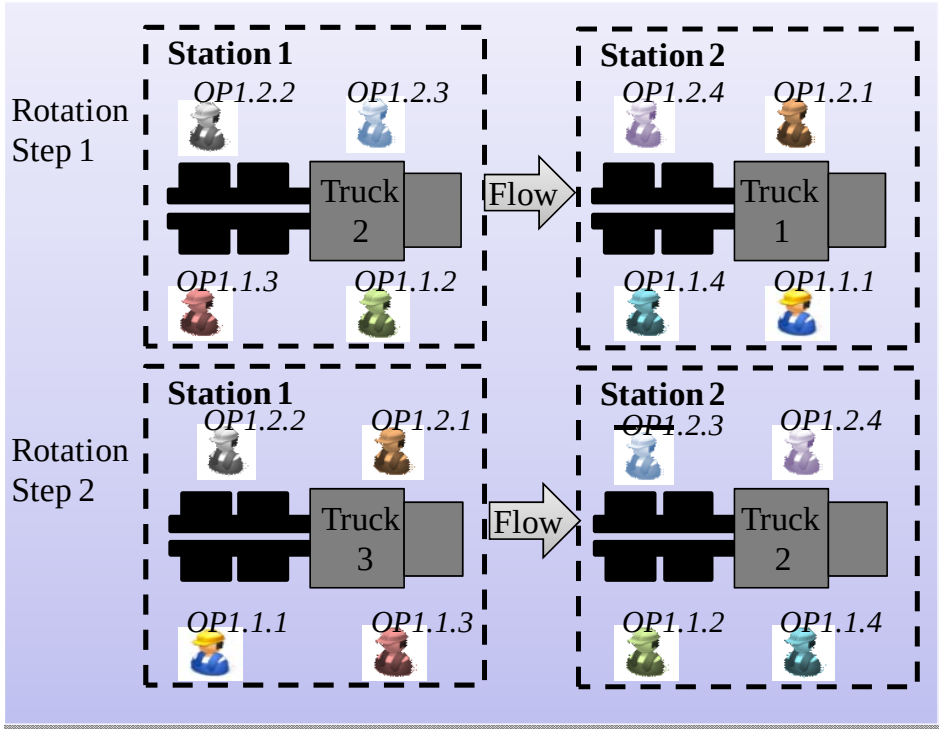
"Derive feasible sets of assignments between tasks and operators (alternative) to produce the vehicles and satisfy the performance criteria"

Problem Definition

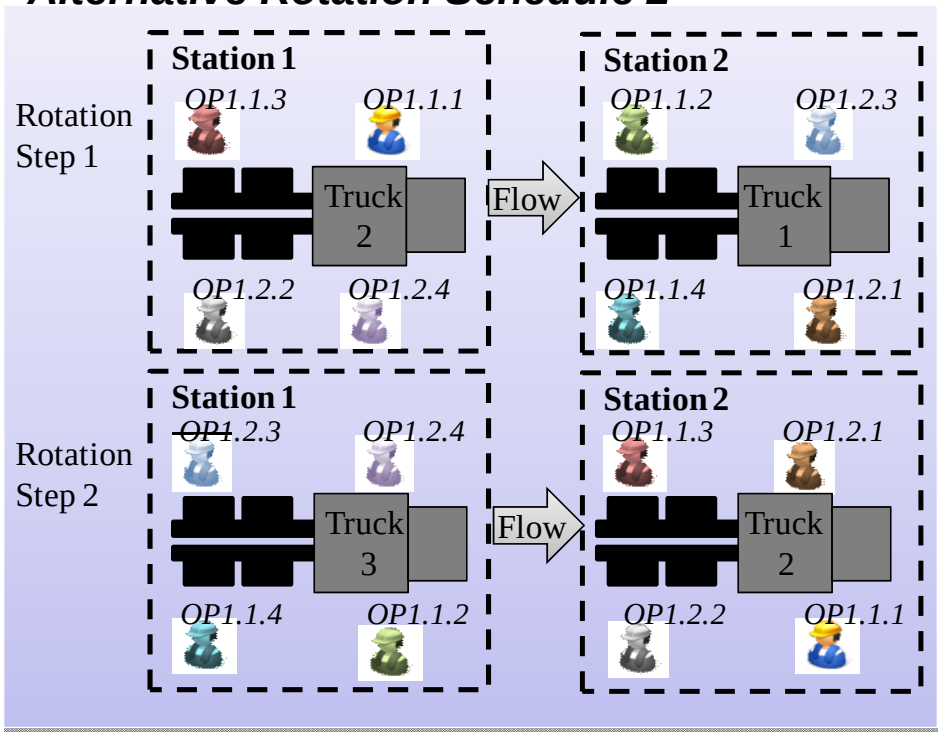
- Human Based Assembly Line Reconfiguration Alternatives

"An assignment of tasks to operators for producing a series of vehicles"

Alternative Rotation Schedule 1



Alternative Rotation Schedule 2



Approach

To formulate the problems as search problems that can be attacked more efficiently

Modeling of human decision making process

- Modeling of human based assembly line reconfiguration

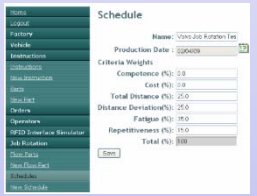
Automated generation of assembly line designs

- Model development for the systematic generation of operator schedules
- Development of search algorithm for the efficient exploration of the design solution space

Definition of criteria and evaluation of alternatives

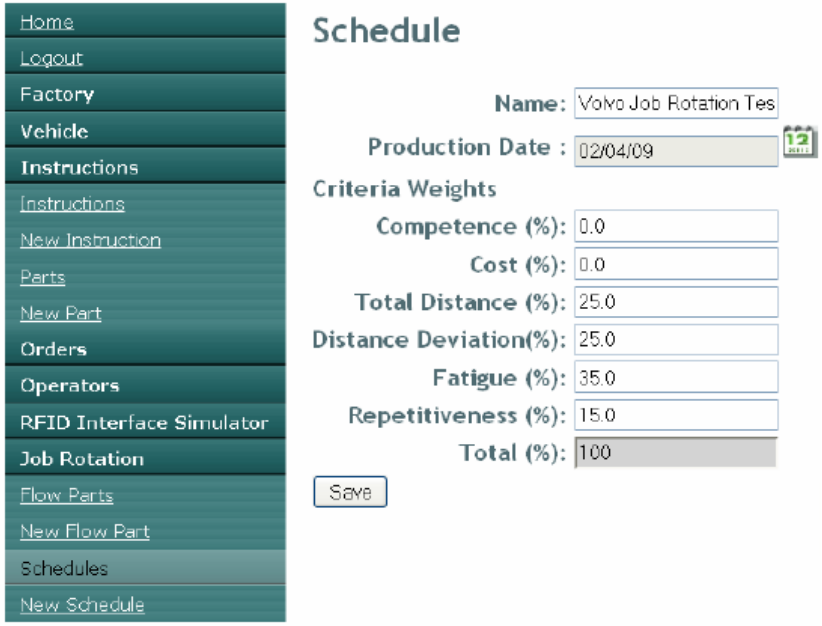
- KPI definition Human Based Assembly Lines
- Multiple criteria evaluation

Integration into decision making support software **tools**



LMS

Dynamic Job Rotation Tool

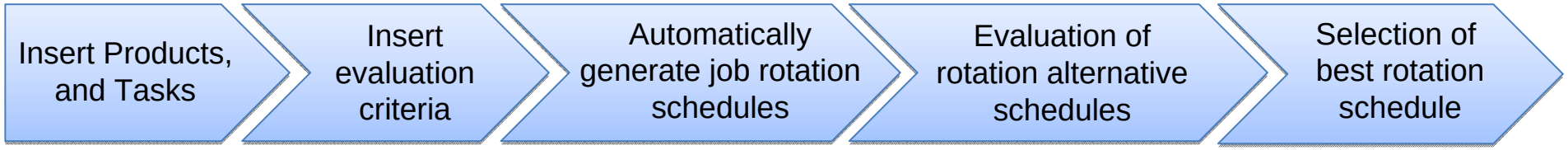


- Web based application

Designer may quickly:

- ✓ Insert product structure and task to be performed
- ✓ Insert the available operators and their characteristics
- ✓ Select the importance of performance criteria
- ✓ Obtain job rotation schedules of high quality

- The tool uses the following steps :



Benefits of the approach

- Multiple criteria approach accounting for both operator and task characteristics
- Adaptation to schedule disturbances by fast and efficient reallocation of operators
- Balanced workload distribution – Dynamic Line Balancing
- Benefits of conventional rotation techniques - Less monotonous, repetitive tasks and multi-skilled workforce