

同濟大學

TONGJI UNIVERSITY

COLLEGE OF ELECTRONICS AND INFORMATION ENGINEERING

Design and Optimization of a semiautomated Assembly Line for Axial Flux Drives



Candidate:
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Supervisor:
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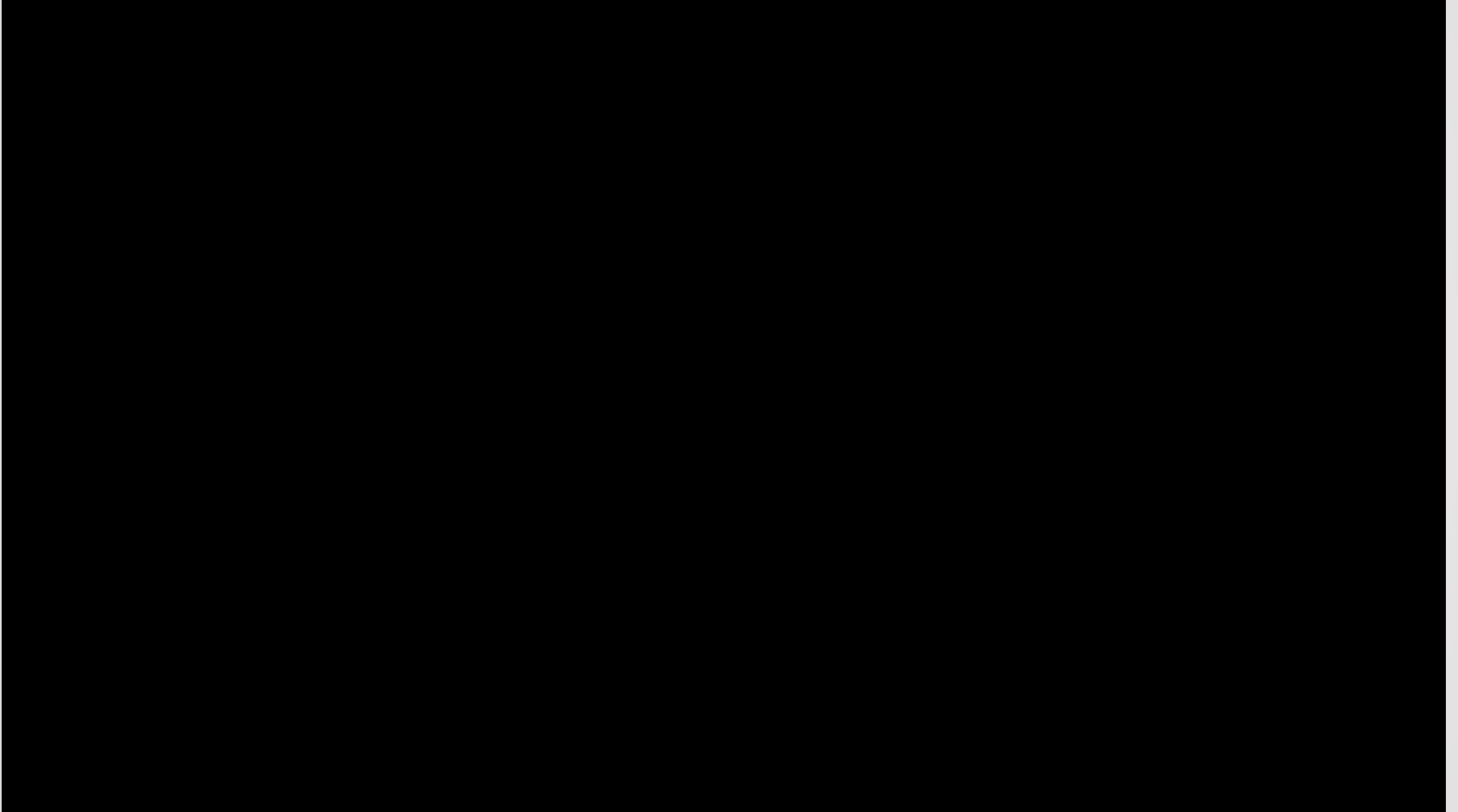
Industrial Tutor:
GM Nerio Rossi

Accademic Year 2018/2019

Magelec Propulsion LTD



AF PM Manufacturing



Requirements

Production Rate

<classified>

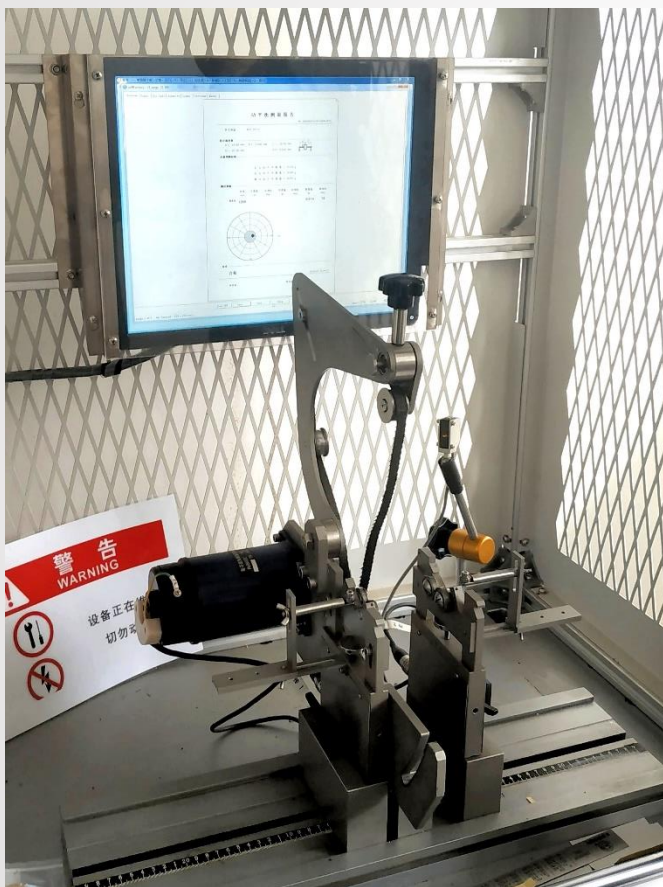
Assembly Process

Process Flowchart

<classified>

M-OP000 Rotor Assembly

Process Steps



Unbalance measurement

<classified>

Material removal

<classified>

M-OP010 Front Unit

Process Steps

<classified>

Bearing fixture

Thermal grease

M-OP020 Back Unit

Process Steps

<classified>

Heat shrink tube

Resolver mounting

<classified>

M-OP030 Leakage, Shimming, Magnetizing *Process Steps*



Leakage Test

<classified>

Magnetizing

<classified>

M-OP040 Final Assembly

Process Steps

<classified>

Rotor on Front Unit

Final Assembly Machine

<classified>

M-OP050 Connection Box Assembly

Process Steps



Connection Box

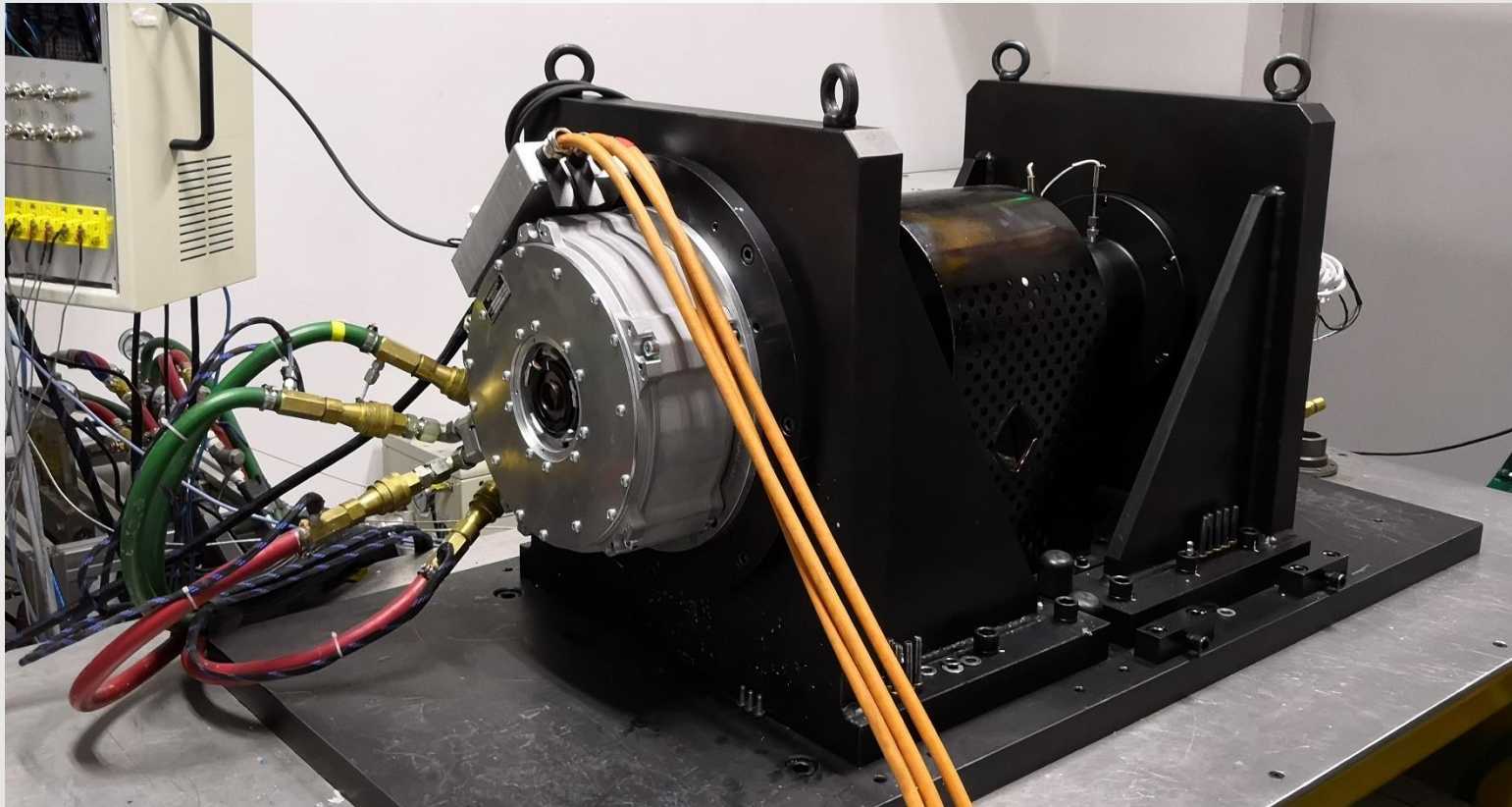


Insulation Test

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M-OP060 Functional EOL

Process Steps

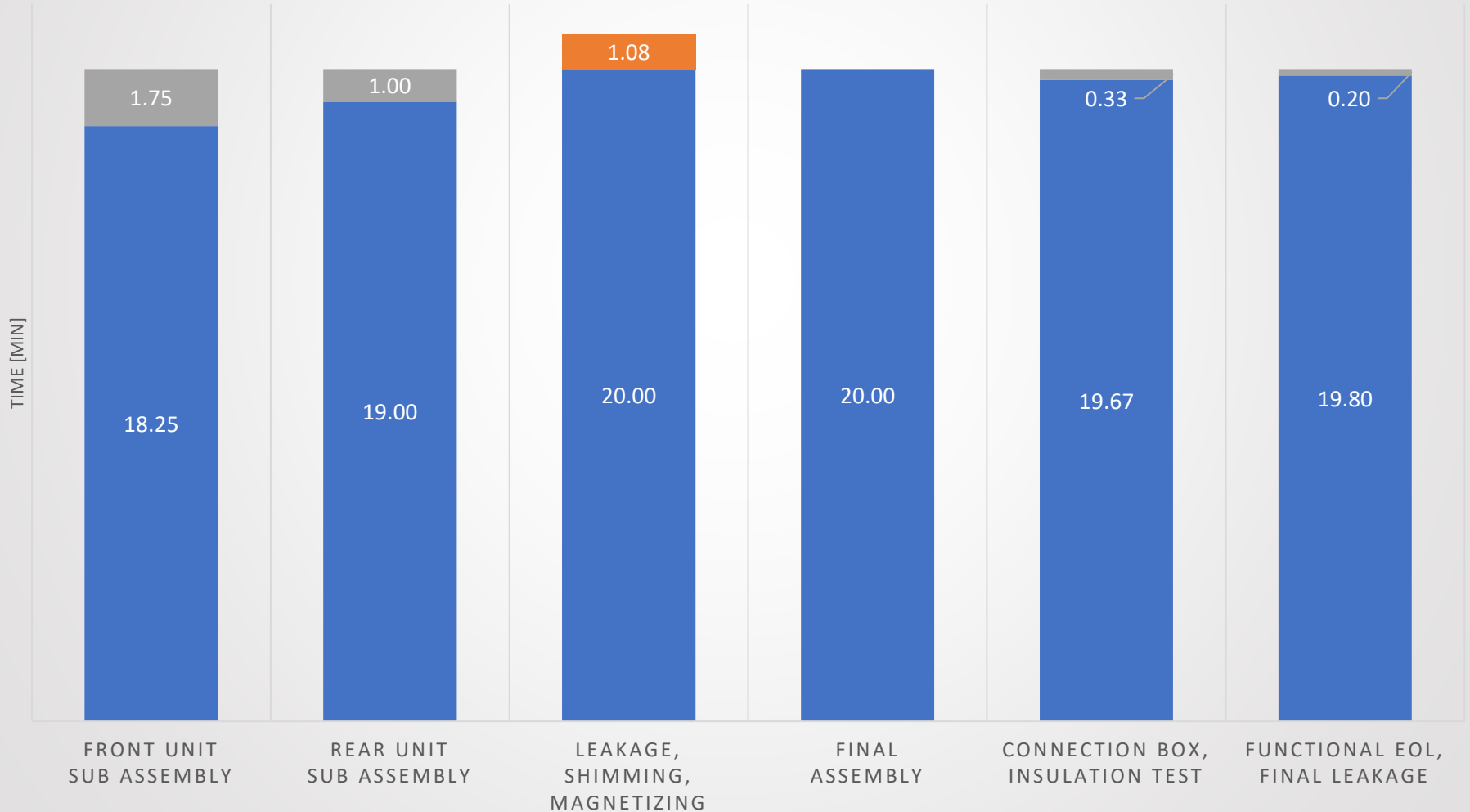


Functional Test Bench

Line Balancing

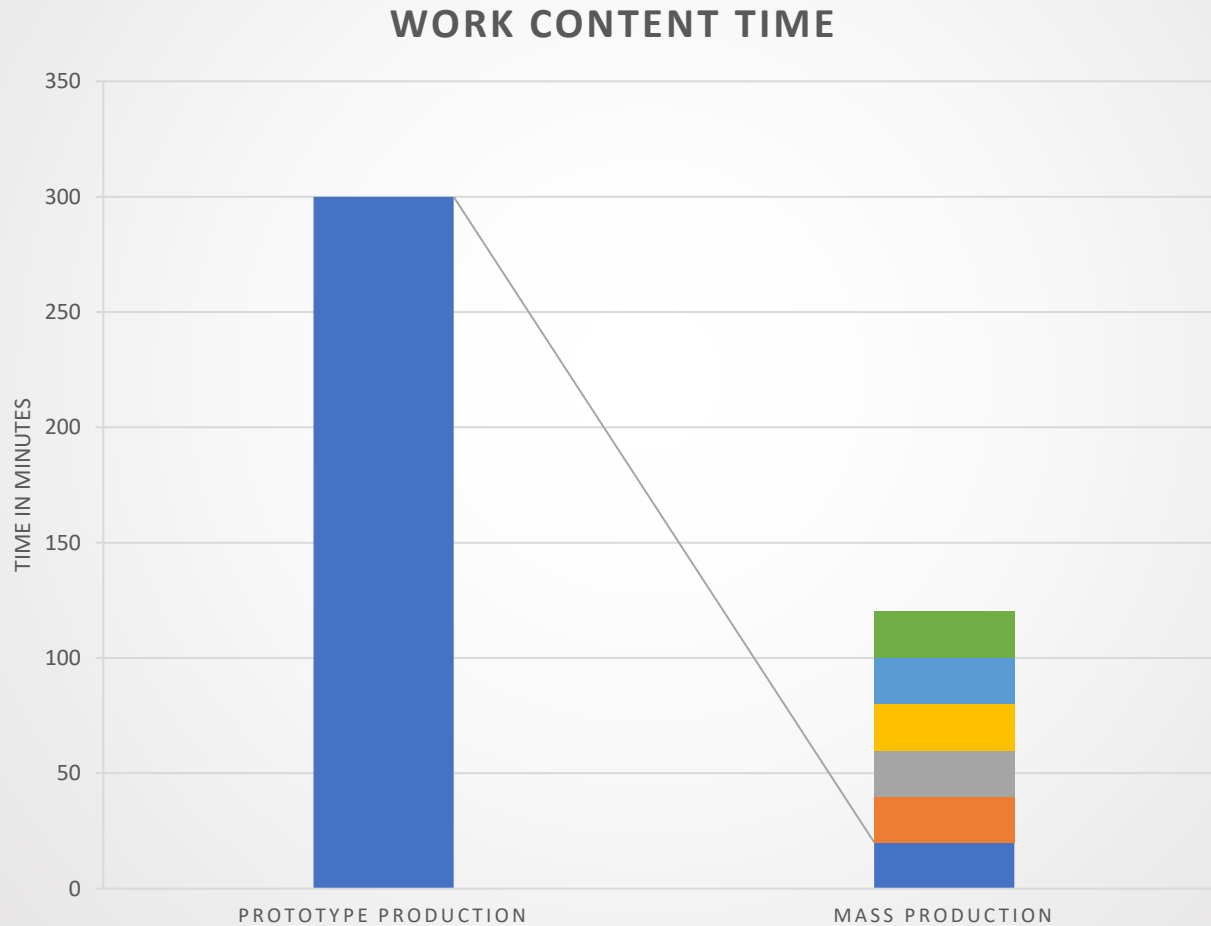
Workstation Timing

■ Cycle Time ■ Overdue ■ Idle Time



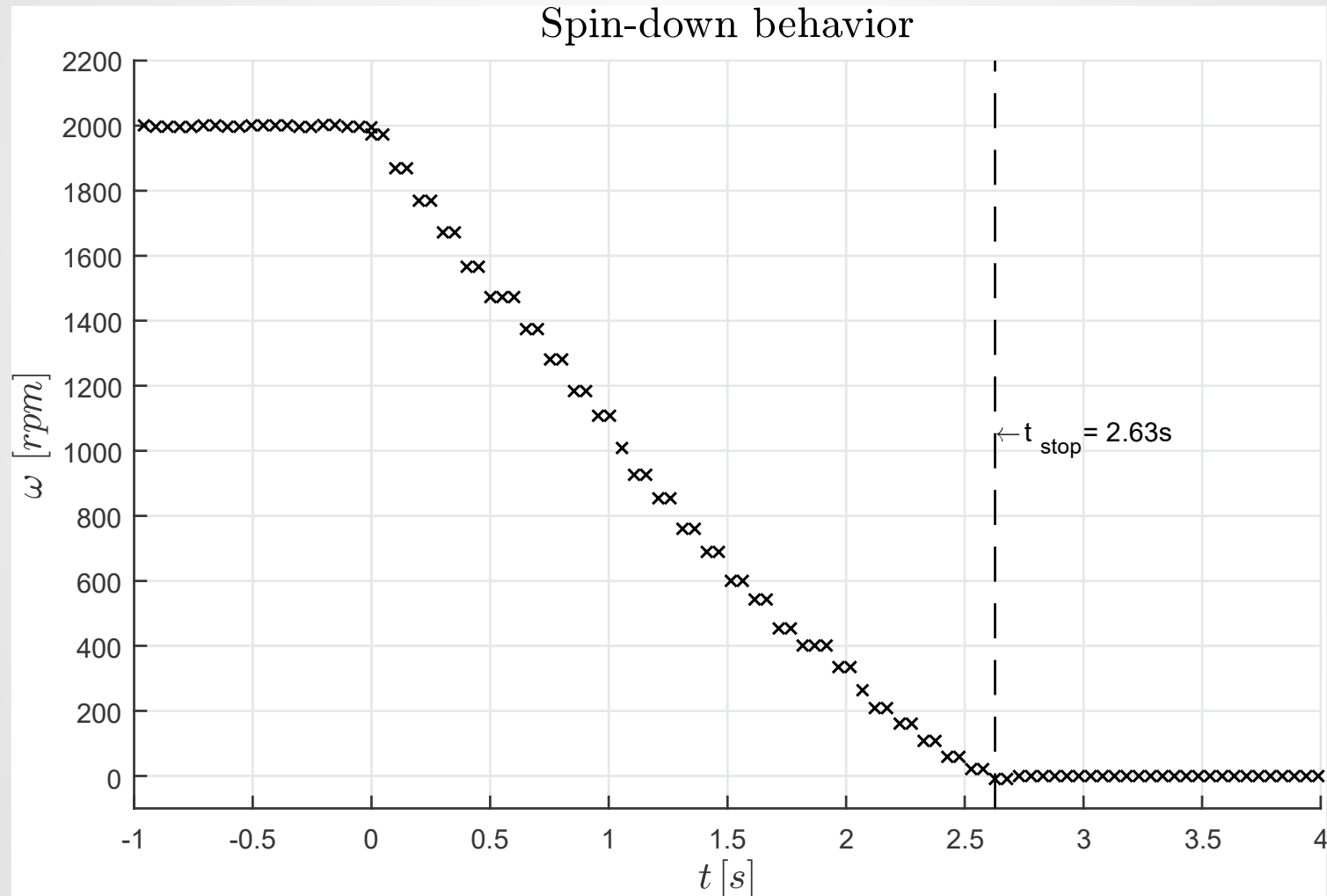
Work Content Time Reduction

Total time of all work elements



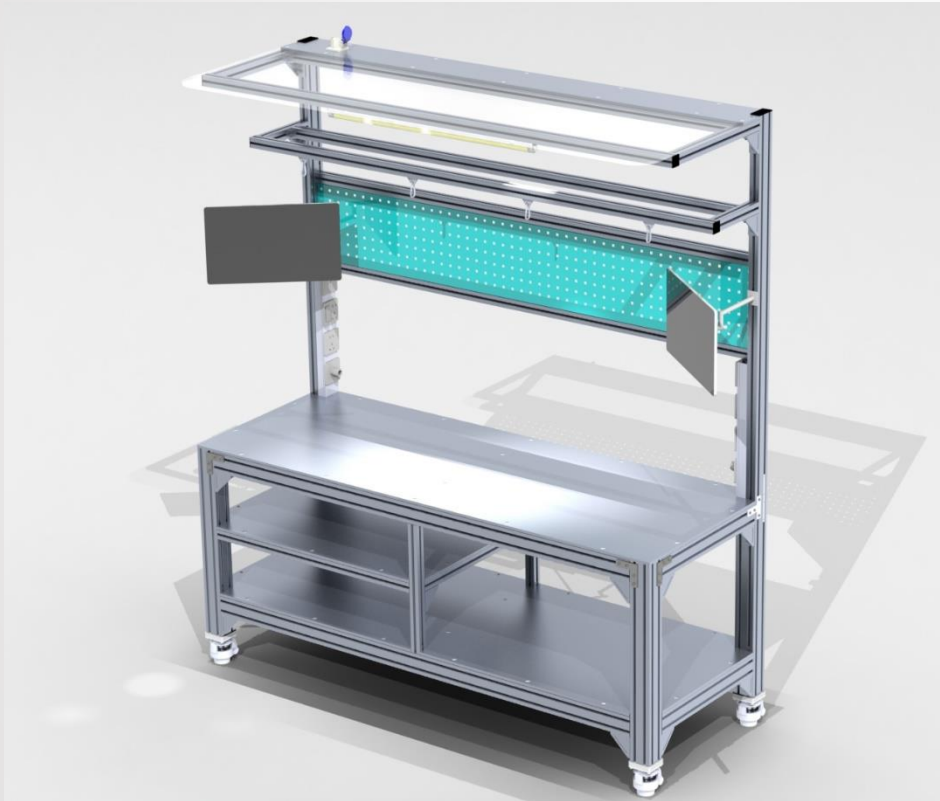
Work Content Time Reduction

Example: EOL

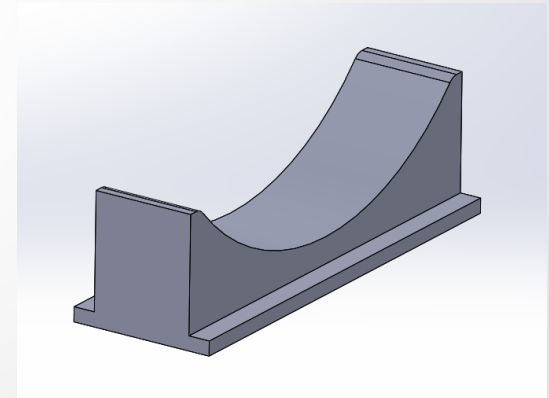


Standard Workbench

Workstation Design



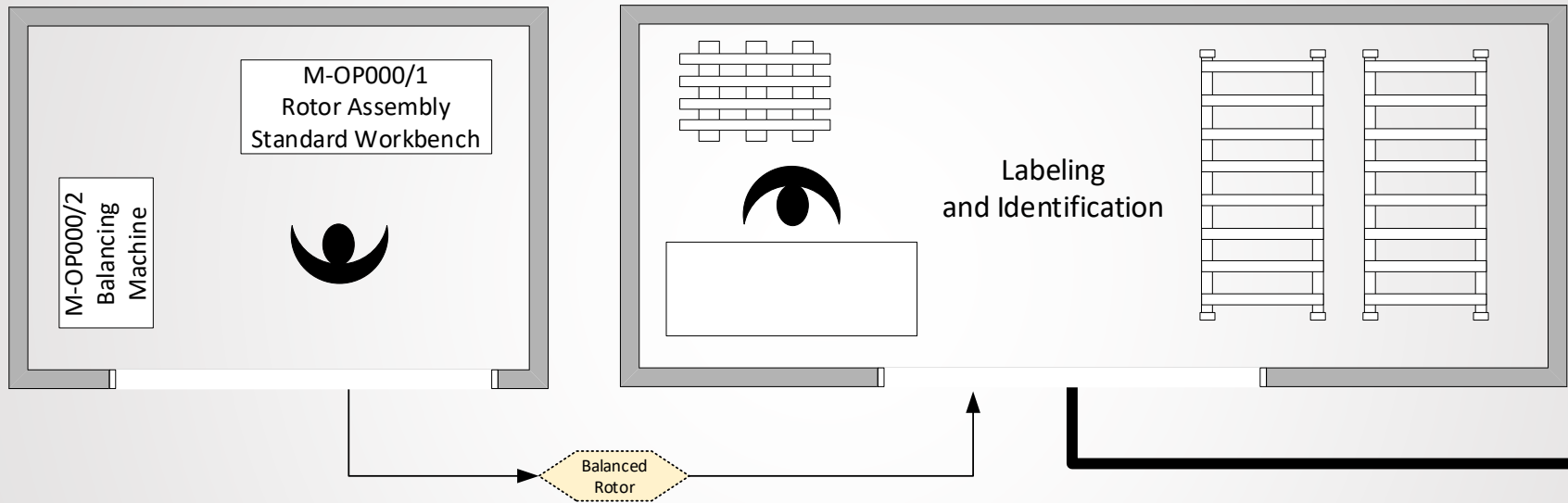
Standard Workbench



Connection Box Assembly Fixture

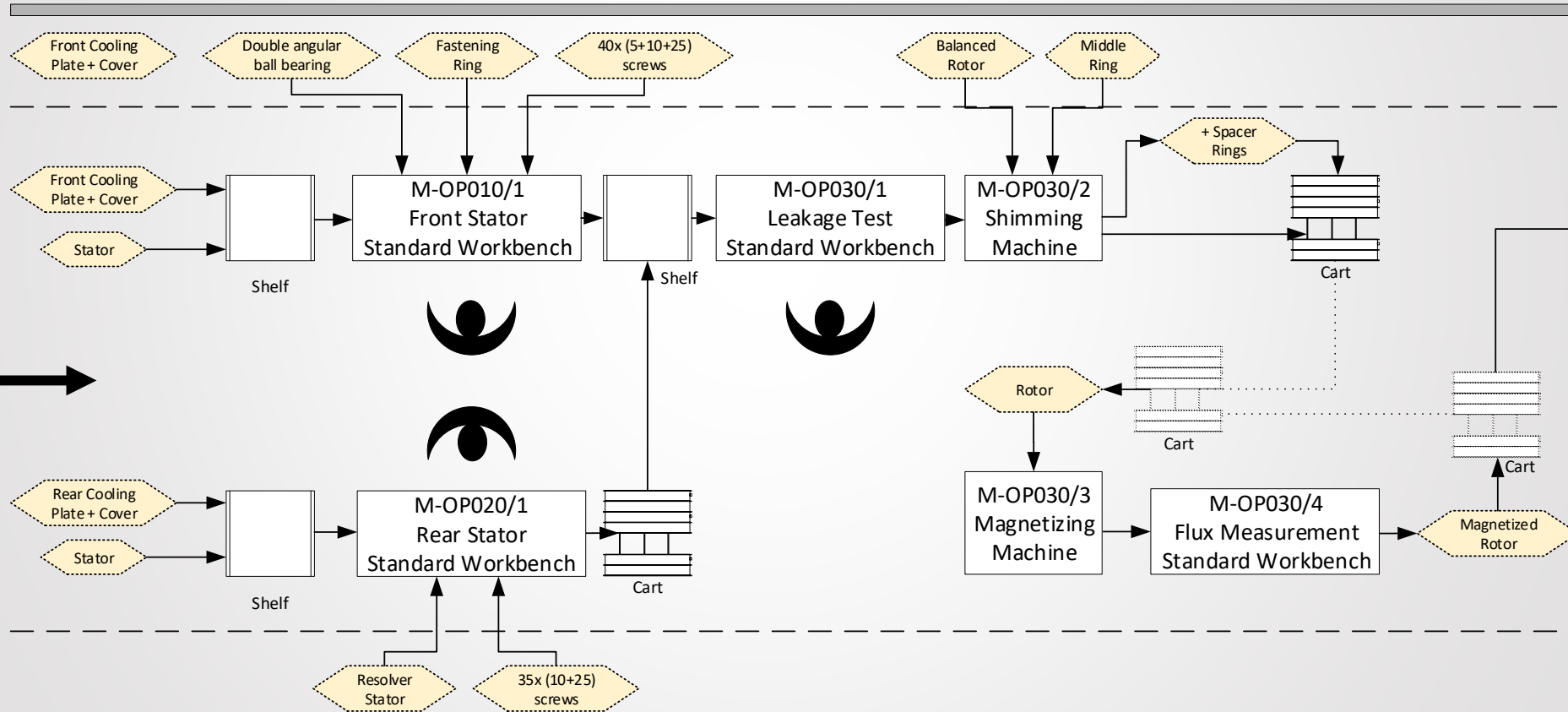
Line Layout

Logical Line Layout with Material Flow 1/3



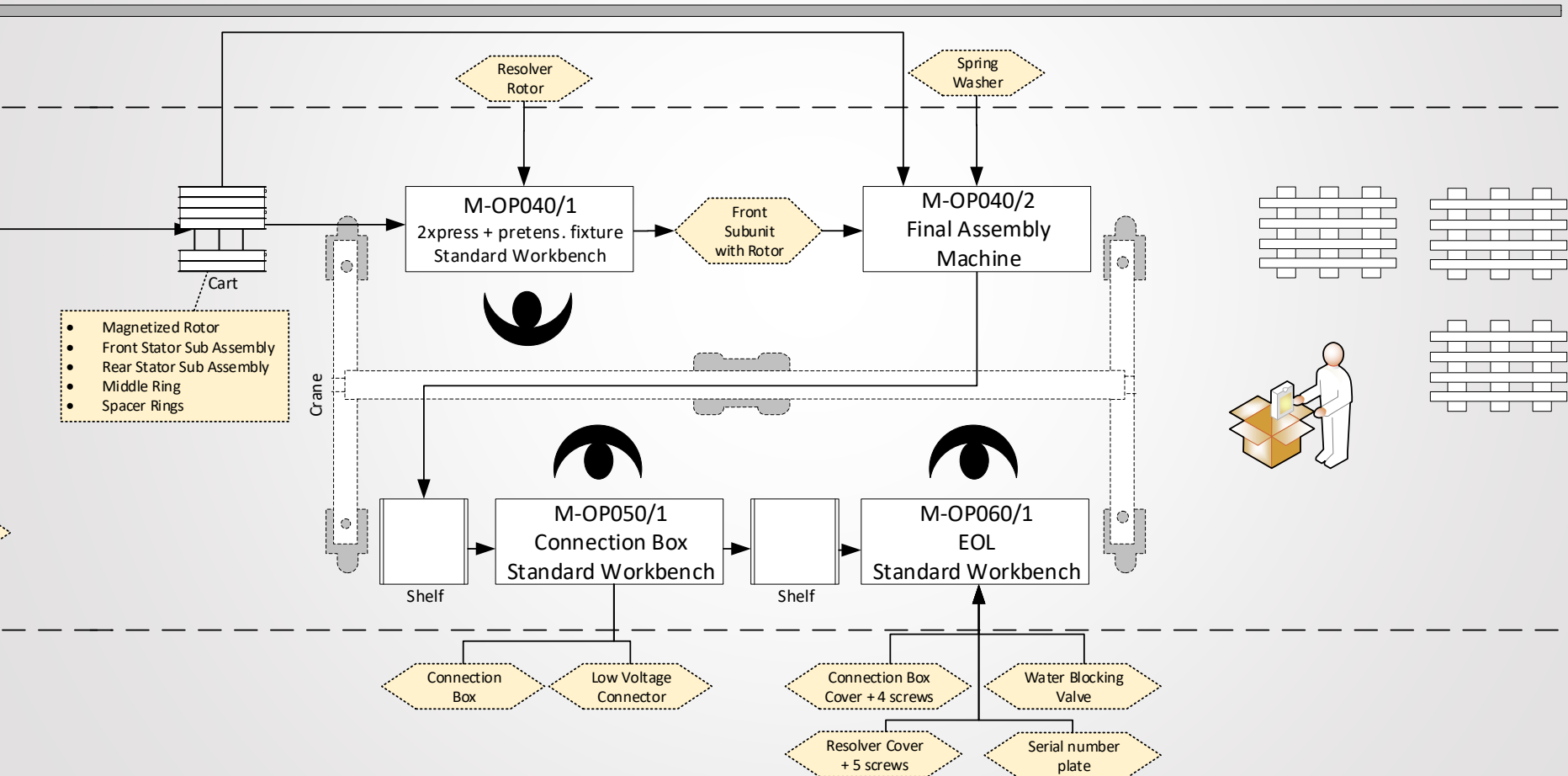
Line Layout

Logical Line Layout with Material Flow 2/3



Line Layout

Logical Line Layout with Material Flow 3/3





Q&A