# Increasing Efficiency of the Refrigerator Assembly Area

Matsushita Refrigerator Company
Kusatsu City, Japan
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Panasonic
ideas for life

SIEMENS

- Founded in 1939 as Nakagawa Machines, Co. Ltd.

- Became Matsushita Refrigeration Company in 1972, which is a Division of Matsushita Home Appliance Company a subsidiary of Matsushita Electric Industrial Co. Ltd.

- Branded as Panasonic

- Products manufactured include Refrigerators and Freezers

- Headquarters is located in Kusatsu City, Japan

- Employees: 2,170 (2007)

Siemens PLM Software
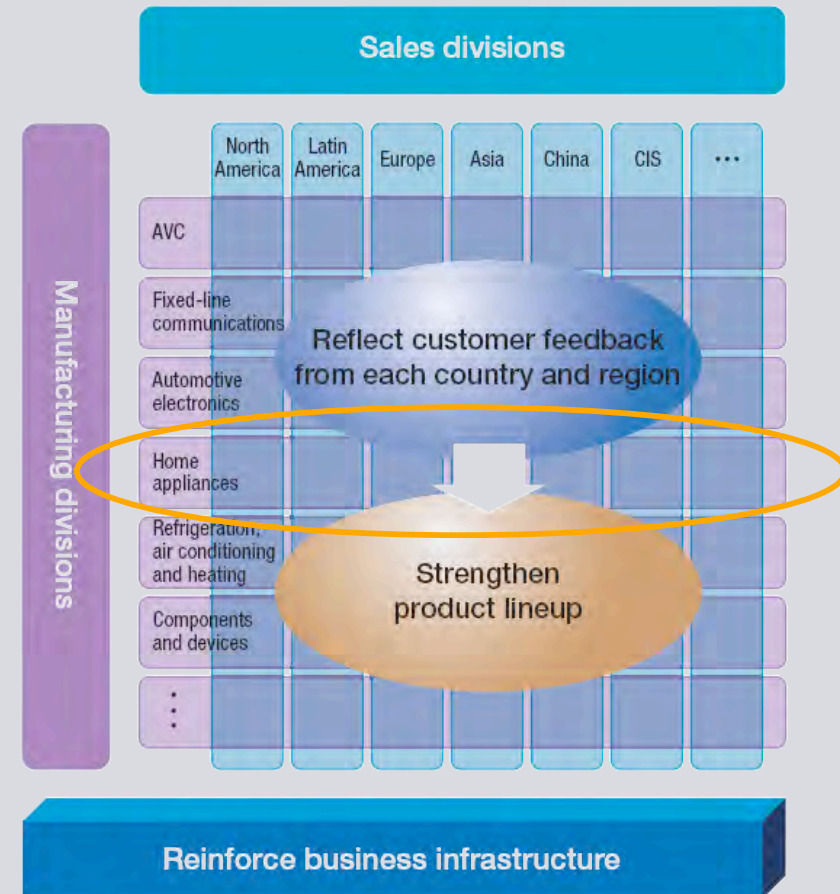
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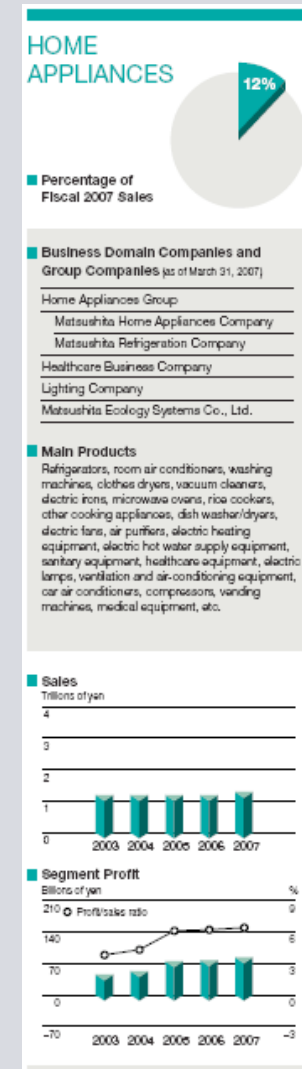
Products Assembled

- 1 Door Refrigerator: 50L, 150L, 160L

- 2 Door Refrigerator: 180L, 200L

- Freezer: 140L, 160L

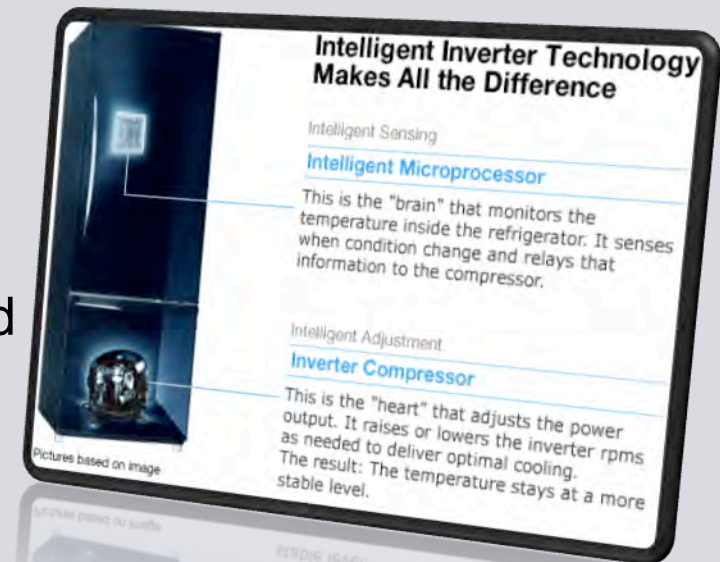Siemens PLM Software

Simulation of Assembly Area Goals

- Reduce Production Cost

- Reduce Production Planning Time

- Increase Planning Safety

Manufacturing That Draws on Customer Feedback

Simulation Project Details

- Model Small and Medium sized Refrigerator Assembly Lines

- Manual Worker and Shift Models are taken into Account

- Number of Workers are Flexible and Varied

- Workers and Workloads can be varied within different Assembly Areas

- Integrate Complex Algorithms – for Smooth Line Balancing – with existing Know-How and Project Experience

Intelligent Inverter Technology Makes All the Difference

Intelligent Sensing

Intelligent Microprocessor

This is the "brain" that monitors the temperature inside the refrigerator. It senses when condition change and relays that information to the compressor.

Intelligent Adjustment

Inverter Compressor

This is the "heart" that adjusts the power output. It raises or lowers the inverter rpms as needed to deliver optimal cooling. The result: The temperature stays at a more stable level.

Pictures based on image

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Assembly Area Challenges

- 8 Product Types, Hundreds of Variants

- 200 Assembly Processes Per-Unit

- Product Mixed across several Assembly Lines

- Single Unit Production with no Lot Sizing

- Belt Conveyor System

- 75 Workers on average are working in the Assembly Area

- Complex constraint based Line Balancing

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Simulation Model Process

- Create Production Sequences

- Simulate Production Sequence

- Simulation detects Bottlenecks and Balances the Utilization of each Assembly Area by adjusting Workloads

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Simulation Results

- Planning Time was Reduced from 40 hours to 4 hours

- Average Number of Daily Workers was Reduced from 75 to 71 (more than 5%)

- Better Line Utilization and Balancing

- Same Output with Less Resources

Line Utilization

Planning time

before simulation

after simulation

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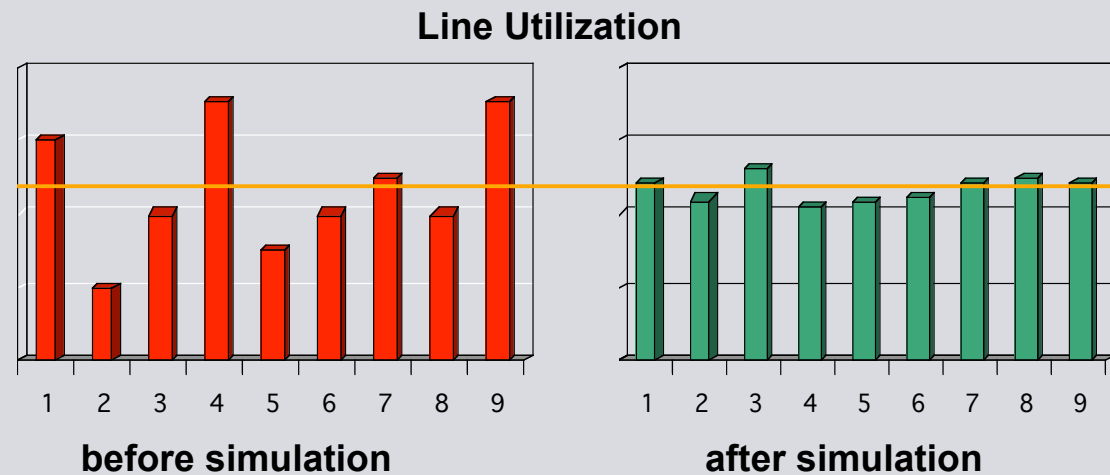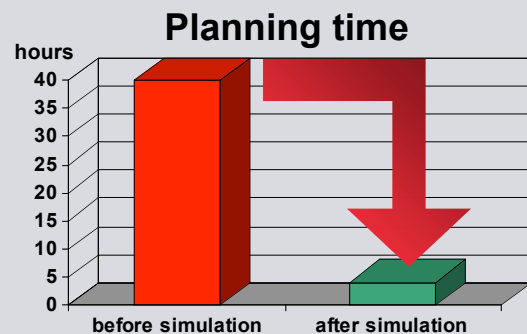
"Plant Simulation helps us to make better decisions in a shorter time. The weekly production program simulation helps us to decrease our planning time by a factor of 10, while utilizing the assembly lines more efficiently." – Leader of Simulation Group

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