



## Car Maker Achieves Remarkable Performance Gains

**Context:** Going up against Detroit and Tokyo, the survival of smaller automobile manufacturers depends on their ability to achieve world-class production/operations performance. One such Asian manufacturer had been producing cars since 1968. The Functional Specs<sup>TM</sup> process helped this auto maker achieve remarkable improvements in its manufacturing operations as part of the firm's overall implementation of Lean Manufacturing.

**Problem:** The car maker had been producing an auto body part since 1993. However, when the manufacturer benchmarked its production process numbers to industry standards, significant deficiencies were found in its body production center in the following areas:

- High work-in-progress
- Inefficient material flow
- Low productivity levels

**Solution:** The Functional Specs<sup>TM</sup> process analysis showed engineers how first to attack the deficiencies through decomposition of the problems. In accord with Lean principles, they recognized that any kind of process that did not add value to the product should be considered waste or a non-value-added activity. The functional decomposition map revealed several sources of non-value adding or waste activities. Using axiomatic design functional decomposition, the engineers decomposed all these elements and discovered that the most significant areas centered on the door production. The production-line floor cells were completely redesigned minimizing coupling and removing non-value added functions. Furthermore, the function map design matrix pinpointed the need for improved interaction with other non-production line groups. The flexibility of the new overall design will allow the firm to add future value-adding enhancements to its manufacturing process.

The methods provided both a blueprint for implementing Lean Manufacturing principles and a tool for analyzing and designing the door and floor cells in the production line.

The resulting improvements were impressive:

- 50% work-in-process reduction
- 20% cycle time reduction
- Reduced floor space
- 50% reduction in volume of transport
- Reduced traffic

### Functional Specs<sup>TM</sup> Process

- Improves the quality of designs
- Facilitates the creative process
- Requirements driven
- Captures design intent and traceability
- Decouples solution for optimal functional architecture
- Provides early phase risk assessment
- Gives objective metrics for design evaluation
- Reduces Design-Build-Test-Design Cycles
- Scalable from small projects to very large
- Fully compatible with:
  - Six Sigma
  - QFD
  - Lean Process