Lean Aerospace Initiative
Plenary Workshop

Cycle Time Reduction through Integrated Supplier Networks: Overview and Introduction

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Research Sponsored By LAI
Focus

- Kick-off today’s theme: *Cycle time reduction through integrated supplier networks*
- Introduce today’s briefings
Cycle Time Key to Competitive Advantage

Focus on auto industry benchmarking results covering 1990s

MONTHS TO FIRST ENGINEERING PROTOTYPE, JAPAN vs US, 1990s

<table>
<thead>
<tr>
<th>Country</th>
<th>Drawing Release</th>
<th>Prototype Build</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAPAN</td>
<td>2.7</td>
<td>2.9</td>
<td>5.6</td>
</tr>
<tr>
<td>US</td>
<td>4.6</td>
<td>7.8</td>
<td>12.4</td>
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(Months before first prototype completion)

Japanese auto suppliers delegated greater design responsibility ("Black Box" components)

SUPPLIER ROLE, JAPAN vs US, 1990s

Major Lessons from Auto Industry

- Early supplier integration critical to sustained competitive advantage
  - Shorter cycle time
  - Faster introduction of new technology
  - Continuous improvement
  - More rapid market response

- Key success factors
  - Fewer first-tier suppliers
  - Strategic supplier partnerships
  - Major supplier role in design ("black-box" parts)
  - Up-front design/process integration
  - Close communications with suppliers
  - Target costing; supplier development
Major producer of complex airframe structures achieved significant performance improvements by using lean principles.

**REDUCED CYCLE TIME**
(Order-to-Shipment, months)

- 1989: 36 months
- 1997: 12 months

**IMPROVED SUPPLIER DELIVERY**
(Dock-to-Stock)

- 1989: 0%
- 1997: 75%

**REDUCED SUPPLIER DEFECTS**
(Rejections as % of all incoming supplier shipments)

- 1989: 7.10%
- 1997: 2.90%
Key Practices

Integrated supplier network linked to corporate strategic thrust

- Redefined business mix
  - Commercial sales as % of total sales: 48% (1989) to 92% (1997)

- Reduced supplier base
  - Number of direct production suppliers: 542 (1989) to 162 (1997)

- Improved procurement efficiency
  - Procurement personnel as % of total employment: 4.90% (1989) to 1.90% (1997)
  - Subcontracting cycle time (days): 13 (1989) to 7 (1997)

- Improved supplier quality and schedule
  - Procurement (dollars) from certified suppliers: 0% (1989) to 75% (1997)
  - Supplier on-time performance (% of all shipments): 76.4%* (1989) to 83.0% (1997)

- Established strategic supplier partnerships
  - Procurement (dollars) under long-term agreements: 0% (1989) to 95% (1997)

NOTE: *Refers to 1991
Early Supplier Integration: Results from Other Case Studies

“Old” Approach
- Rigid vertical FFF interfaces and control
- Arm’s length; interfaces totally defined and controlled

“Current” Lean
- Collaborative; but constrained by prior workshare arrangements

“Emerging” Lean
- Collaborative and seamlessly integrated, enabling architectural innovation
- Virtual Team w/o boundaries

Case studies demonstrate significant benefits: more than 30% cycle time reduction; 40%-60% cost reduction; significant quality improvements

Major benefits stem from architectural innovation in product development
Chrysler: Rethinking the Supply Chain
  – Prof. Jeff Dyer, Wharton School, U of Pennsylvania

Cycle Time Reduction with Part Synchronization
  – Tom Shields, LAI

Three Dimensional Concurrent Engineerings
  – Prof. Charlie Fine, LAI (Sloan School)

Key Characteristics Maturity Model
  – Basak Ertan, LAI

“Customer and Supplier Integration Across the Supply Chain”- Summary of Implementation IPT Workshop Results (February 12-13, 1998)
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