Lean Aircraft Initiative
Plenary Workshop

Factory Operations Focus Team

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Outline

- Phase I research
- Phase II research direction
- Research activities
- Next steps
Phase I Research Report

- Inventory survey and case studies
  - Baseline for the industry
  - Front end loading of inventory
  - Two recommendations for improvement
- Benchmarking nonsponsor companies
- Comparative case studies
  - Flow optimization
  - Variability reduction
- Focused case studies
- Lean implementation considerations
- Member flow benchmarking
Phase II Research Considerations

- Identifiable and practical deliverables
- Meaningful to senior management
- LEM used as a guide for research
- Extendible to the enterprise level
- Balanced breadth and depth of research
- Linked to Implementation IPT
Strategic Approach

- Build on the LEM
- Conduct on-site field research
- Drill down to prioritized metrics/enabling practices (using “Order to point of use delivery cycle time” as initial metric)
- Use appropriate models to analyze interactions of key factors
- Use models as decision tools
Example Deliverables

- Production system benchmarking
- Models for analysis and decision
Phase II Factory Operations
Research

- Better understanding of assembly stage
- Identification of appropriate metrics
- Identification of causes for deviation in assembly cycle time
- Recommendations for leaner systems
Research Activities Starting September 1996

- Visits to member assembly facility
  - Weekly visits (234 person hrs)
  - 2 week stay in January (28 person days)
- Development of process maps
- Detailed tracking of specific serial numbers for product types during build
- Analysis of archival data of recent builds
On-site Visits

- Collection of module build status documentation at assembly areas
- Identification of delay causes, if any, with Cell Leaders, Lead Persons, Operators, Schedulers, etc.
- Identification of waste
Subassembly Process Maps

LEAN AIRCRAFT INITIATIVE

operation 1
operation 2
operation 3
operation 4
operation 5
operation 6

Flow

operation 9
operation 10
operation 11
operation 12
operation 13
operation 14
operation 15

Flow

operation 16
operation 18
operation 20

Legend:
- Storage
- Transportation
- Value-Adding Operation
- Inspection
- Non-Value-Adding Operation

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Reasons for Increment in Cycle Time

- Part shortages (outside source)
- Part not found but ‘available’
- People not available
- Built awaiting inspection
- Quality problem
  - part quality
  - work quality
- Tooling availability
- Station availability
Several lean changes are readily understood, but barriers exist ...

**External Conditions**
- Contract conditions
  - with customer
  - with supplier
- Suppliers are limited
  - business reasons
  - there aren’t that many
  - capacity

**Internal Conditions**
- Performance measurement system
- Need to work with upper management to meet requirements for lean transition
- Workforce issues
  - much overtime
  - flexibility
Next Steps

● Continue research at field sites
  – Multiple sites in same sector
  – Multiple sectors
    – Engine sector in 1997
    – Airframe and Electronic sector in 1998
● Propose experiments and monitor results
● Develop models or decision tools
● Product transition to production study starting in 1998