Lean Effects on Aerospace Programs
Boeing 737 Fuselage
Comments and Insights
March 27, 2002

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Research Sponsored By the Lean Aerospace Initiative
Awareness, Understanding, Knowledge, Capability, Ability, Adaptability, Agility

‘Process Kaizen’ where opportunities for Quality, Safety, and Cost are obvious and urgent.

More focused and targeted improvements based on ‘System Kaizen’…Target the process improvements based on what the ‘System’ tells us it needs.

Boeing - Wichita Division
Our Lean Enterprise Journey

- Leadership Culture
- Process Management
- Value Chain Management
- System Kaizen
- Lean Production System Academies
- Supply Chain Partnerships
- Continuous Quality Improvement as the Management System
- Boeing Production System
- JIT/Lean Manufacturing
- Process Kaizen
- Accelerated Improvement Workshops
- System Kaizen
- Lean Maturity Assessments

- Total Quality Control
- Leadership
- Structure
- Reliability Methods & Processes
- Cost of Quality
- World Class Competitiveness
- New Boeing Production System
- Work Management
- Determinant Assembly
- Hardware Variability Control
- Quality Vision
- Quality Circles
- Deming

Date: 1/05/01

To: 737 Structures & Support Team Members

As you all know BPS implementation into 737 Structures Production Line will be in full swing beginning January 2001. One very important aspect of the implementation is the adoption of a “Standard Problem Resolution Process”.

Our future success for QCDSM is tied directly to the success of BPS. Your involvement and commitment is the essential ingredients to making this happen. I realize that change is very difficult, but I also realize that change is very necessary.

Together, with your excellent teaming ability, we can succeed in this endeavor.

I fully support and endorse the Boeing Production System implementation as described in this booklet and I request your full support.

Thanks,

Original signed by Forrest Urban

Forrest E. Urban, Senior Manufacturing Manager
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LEAN STRATEGY

- Utilize both ‘System Kaizen’ and ‘Process Kaizen’ to achieve 737 Structures 2001 Lean objectives

- Assignment of a full time Lean Improvement Specialist to 737 Structures Lean team as of November 2000.

- Prioritize improvement events that:
  - Remove barriers to making 28 per month airplane deliveries.
  - Stabilizes Production Health
  - Lean opportunities and Operation Strategic Visions

- Schedule events aggressively through March 2001, relax events during 737 rate change (May through July) and accelerate events August 2001 through December 2001.
Communication Plan
What must be communicated, understood, and agreed to.

737 - Wichita - Nine Tactics++

Current Condition

Transition

Target Condition

Improvements & Countermeasures

Foundation & Support Systems
- Education
- Immediate Response
- Problem Solving
- Information Flow
- People Involvement
- Rules-In-Use

Implementation Progress & Performance
What must be tracked, measured, reported

BCAG Lean Nine Tactics
- Value Stream Mapping & Analysis
- Balance the Line
- Standardize Work
- Put visuals in Place
- Point of Use Staging
- Establish Feeder/Supply Chain Lines
- Breakthrough Process Redesign Along Main Line
- Convert to Pulse Line
- Convert to Moving Line

Renton Approach
- Andon
- Balanced Work
- Standardize Work Instructions
- POU Staging
- Kanban Card
- Pacemaker
- Feeder Line

RR=Rapid Response WPO=Work Place Organization SPI=Strategically Placed Inventory RIU=Rules In Use SW=Standard Work POU=Point Of Use TPM=Total Productive Maintenance RI=Rapid Improvement PS=Problem Solving
System Kaizen and Process Kaizen
Parallel Tactics

‘System’
- Discover the system together
- Create the target flow path(s)
- Define the countermeasures
- Put the countermeasures and improvements in place
- Measure the progression toward the target flow path(s)

‘Process’
- Understand and produce to takt time
- Create uninterrupted flow of information and resources
- Define and establish Standard Work
- Balance and level based on Takt and Standard Work

Measuring Progress

- Step One
  - Assess current condition and current Level of Excellence

- Step Two
  - Establish target condition and target Level of Excellence (Goals)

- Step Three
  - Status weekly the percentage of completion toward the target. When target is 100% go back to step one.
Visual representations of the future state value stream (or target condition) for each end item.

Progress measured on a maturity scale.

Targets established not on obtaining the highest score but on what is necessary.

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Target Condition for 737NG 11/44 Section

1/17/02

- Downstages (Withdrawal & Replenishment) (Cycle vs Takt)
- ACC 480 Standard Work and Flow
- Hothouse Seal Flow (Critical process, Cycle vs Takt)
- Eliminate chronic 1448111 part shortages through the Value Chain.
- Upper and Lower Panel Value Chain Blitz
- Establish pull system with outside vendor
- Kit the BIG stuff on Front and Rear Spar
- Kit the BIG stuff on 727 Bulkhead
- Establish milk run on certified tools
- Set up Pilot Project

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GOAL BY YEAR END

* Std. Work Level 4, Balance Level 2, and POU Level 3 work in conjunction.
Weekly BPS Review Format

• Senior Leadership Review Strategy, Goals & Objectives

• Section Review Deliverables:
  • Updated A-3 target condition including LOE review
  • Activities / Plan associated with solving starburst
  • Review most recent lean improvements or activities
  • Milestone charts depicting Starburst work sequence
  • Review by Team Leader of all AIW projects with 3 weeks using 3 week checklist

• Review Friday AIW report out agenda

Note:
1. VC teams encouraged to participate with sectional teams.
2. Shop Mechanics are encouraged to attend and participate.
**Definition of Value Stream/Chain**

- The entire set of activities running from raw material to finished product for a specific product or product family seeking to optimize the whole from the standpoint of the final customer.

**BPS One Plan**

- Expand the “One plan” to include the entire 737 value stream starting with raw material and finishing with shipment to our Customer in Renton.