C-130 Production at Warner Robins ALC: Lean Change at a Crossroads

Presented By
John Dickmann
LAI
24 Mar 2004
Outline

• What is a C-130?

• Lean timeline in C-130 PDM

• Lean results in C-130

• Successes and Challenges
What is a C-130?
What is a C-130?

- First flight: 1954
- Entered service: 1955
- 11 models in service, most recent: C-130J, 1999
  - Up to 450 different configurations
  - 2,156 A/C of all models built since 1954
  - 800+ A/C in USAF, 600+ Foreign Govt
- Used by all Services, Forest Service, USCG, many foreign governments
- Missions: Cargo, Tanker, Electronic Warfare, Gunship
- PDM cycle determined by many factors, boiled down to # months
We Provide Combat Capabilities for DoD Warfighters and Our Allies Through Superior Sustainment and Deployment of Combat-Ready Forces...Now and in the Future!

Effects-Based Capabilities for the Warfighter
C-130 Timeline

• July 01: Lean Change Agent designated

• 9-11: “Walking the Value Stream” for the first Lean Event

• Oct-Nov 01: Initial Cell Flow established
  • “Low-hanging fruit”, simple value stream efforts
C-130 Timeline

• Feb 02: Lean Symposium in Atlanta
  • “The light went on”
  • “Make the General happy” to “Full bore Lean”
• Feb-Apr 02: Crash course in Lean
“Crash Course”

• Cellular flow on the Production Line
  • Organized/Reorganized 15K - 20K tasks and operations*
  • 10-12 people in 8 weeks

• Scope
  • 11 maintenance skills
  • 450 possible A/C configurations

*8,900 to 40,000 work hours for a PDM aircraft
C-130 Cells

Cell 1: Incoming fuel pit
- ALL MDS
- 2 day

Cell 2: Strip for De-paint
- 3 days Slick
- 5 days MCE, MCH, ACH
- 10 days ACU

Cell 3: Strip for De-paint
- 2 days Wash
- 5 days De-paint
- All MDS

Cell 4: Inspect
- 15 days All MDS

Cell 5: Mod Dock RPR
- Rig Ops Flt Cont
- 40 Days
- 50 Days

Cell 7: Fuel Pit
- 2 days All MDS

Cell 8: OPS
- 5 days Slick
- 10 days MCE, MCH, ACH, ACU

Cell 9: Functional Test
- 10 days Slick
- 20 days MCE, MCH, ACH, ACU

Cell 6: Paint
- 6 days ALL MDS

Cell 10: Delivery
- 2 days ALL MDS

Cell 11: MABBC MABBA/B MABBP Sections
C-130 Lean Events

Events held in C-130’s

(1) VSA C-130 PRODUCTION
(4) VSA C-130 PRODUCTION
(8) Fit Line VSA
(12) VSA C-130 Production

PRE-DOCK
(2) 6S BLDG 50
(3) Bldg 50 Fit Cont
(19) C-2 SW
(22) C-2 6S

MOD-DOCKS
(5) 6S BLDG 91
(11) Phase 4 SW
(12) Phase 4 6S
(16) C-4 6S
(17) C-4 PCB
(18) C-4 SW
(19) C-5 SW
(20) C-5 T-2
(27) A/C W B
(28) C-5 T-3
(29) C-5 T-4
(30) C-5 T-6
(31) C-5 T-7
(32) C-5 T-8

POST-DOCK
(13) SW FT
(10) 6S BLDG 89
(15) 89 F/U

SUPPORT
(23) SW FOM
(11) SW 103/107
(14) SW REWORK
(4) SW TOW/CRANE
(6) MIC Storage
(9) PMEL
(10) Kitting
(24) MRT
(25) VSA Supply Support
(26) FOM Transition Plan
(33) POU HAZ MAT
Sequence of Effort

- Established Cells and Flow: VSA/VSM
- 6S
- Standard Work
- Visual Management

Main emphasis now
Sequence of Effort

Aug 2001-Sep 2002
- Value Stream Analysis
- Bldg 50 and 89 Events (Depaint/Paint)
- Functional Test
- Mod-Dock

Sep 2002-Present
- 3P (People, Property, Process)
- Cell 4 6S and Production Control Boards
- Standard Work – Cells 2, 4 and 5
- Cell 5 6S – T2, T3, T4 and T5
- FOM Event

Future
- Continue Cell 5 6S
- Workbook Standardization
- Transition to Bldgs 47, 48, 49
- Development of Sheet metal/Engine shops
- Develop parts disposition cell
Lean Effort and Results

• Personnel:
  • July 2001: 1
  • Today: 10
• 47 Events
• 122 Projects
• 175 Do-its

• De-paint
  • 7 to 5 days…28% Reduction

• Functional Test
  • 15 to 13 days…14% Reduction

• Flight Controls
  • Savings: Over $5K per A/C
  • Est. annual savings: $288K (50 A/C)

• Paint Shop
  • Cut costs: $347,000 per year
  • Reduced flow time 50%
C-130 Results

• Point of Use for Tools, Consumables, Hazardous Materials:
  • Cut mechanic travel time by 50 hours/day
• Increased Aircraft Production
  • FY01: 32 PDM
  • FY03: 46 PDM...44% increase
Current Big Issue

• Internal vs. External rates of change
  • FY04 TAKT time goal: 52 PDM* (+13%)
  • Customer demands 64 for FY04 (40% increase)
• External demand surge highlights gaps in Lean implementation
• Short term vs. long term focus re: Lean

*52 A/C was the goal from the start of Lean effort: based on historical customer requirements

Working on Lean under war time demands
Keys to Success* in C-130 PDM

• Implementation Plan/Strategy
• Worker concerns
• Human Resources issues
• Organization and process mismatches

*Often doubling as challenges

These initial insights warrant detailed research
Tough Challenges

- Rapid process change on Production Line leaves support processes challenged
  - Enterprise organization vs. Production process
  - Programming and Budgeting vs. Process/Work packages
- Metrics: Incentives vs. Expected behaviors
  - Budget performance metrics vs. ‘ground truth' activities
  - Manpower transfer between organizations
  - Personnel/HR System vs. Production/Lean duties

*Early interview data supports these points*
Initial Take-aways

• There are no surprises here
  • Change is hard
  • Persistence pays off

• Think through implementation plan

• Scale of an ALC
  • Attention to seams and interfaces critical
  • Enterprise - Institutional metrics key challenge