Lean Aircraft Initiative
Plenary Workshop
Factory Operations
Ford Electronics Benchmark

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Presented by:
Jim Everett
TRW
Ford Electronics
North Penn Facility
Surveyed May 17, 1996

The team —
- George Alexander, Lockheed Martin
- Fred Bolling, University of Michigan-D
- Mike Chapman, Boeing
- Gene Danser, Texas Instruments
- Jim Everett, TRW
- Joe Hill, Hughes
Ford Electronics Facility Background

- Part of Automotive Components Group
  - North Penn facility, formerly Philco (1961)
  - New 705 k sq. ft. plant opened 1990

- Employees
  - 2500 (390 Salaried, 400 Skilled Trade)
  - Union Shop (UAW)

- Products
  - 10 product lines
  - 100,000 units shipped per day
  - 9,000,000 components consumed per day
NPEF Products

- **SMT Assemblies**
  - Engine Controllers
    - 4 Million/year
  - Antilock Brakes
    - 2.5 Million/year

- **Hybrid Assemblies**
  - Speed Control Amps
    - 4 Million/year
  - Mass Air Flow
    - 4 Million/year
Products cont’d

- **Sensors**
  - Air Charge Temp
    - 8.5 Million/year
  - Engine Coolant Temp
    - 8.5 Million/year
Facility Achievements

- **Internal Awards**
  - Q1; TQE; Customer Driven Quality
  - World Wide Quality Achievement

- **External Awards**
  - Industry Week 10 Best Plants in America ‘93
  - Auto Alliance Quality 1993 & 1994
  - Shingo Prize for Excellence in Manufacturing

- **ISO9001 Certification**
Some Metrics . . .

- **Baseline 1991**
  - Cycle time — down from 7.8 to 1.7 days
  - WIP turn — 148 times/year
  - 1st pass yield — 92.8%
  - Lead time, order to ship —
    - SMT 2 days, Hybrid 4 days
  - Customer reject rate — 121ppm
  - Cost reduction — 38%
Lean The Ford Way

- Drive to stay alive
- Paying attention to the people
- Thoroughly understand processes
- Well planned new part introduction
- Stable products
- Continuous Process Improvement
- Rigorous self-assessment
- Everyone focused on common objective
Everyone has an “at risk” mentality

“Agile” is the watchword

Each customer has a single POC

Code Blue production response
  – 20 minutes to call for help
  – 60 minutes to call plant manager

RAPID
  – Structured, focused, facilitated, problem solving method

A sense of urgency
100 self-directed work teams

Training Management System (TMS)
  – Training automatically scheduled

Comprehensive training program
  – Basic skills; all employees as required
  – Occupational training
    • 539 modules developed

Regular peer group meetings

Formal team recognition program
  – Non financial
Understanding Processes

- All processes are documented
  - On-line with flow-chart and procedures
  - Measured with SPC or other metric

- Understanding of maintenance issues
  - as primary importance — uptime & quality
  - as impediment to process
  - Total Preventative Maintenance Program
Planned New Part Introduction

- Rigorous transition to production rules
  - Manufacturing involved in design
  - Onsite rapid prototype proveout
  - Design engineering representative on site
  - Must run in paperless factory

- Suppliers are part of introduction team
  - Aided by supplier management teams
Stable Products

- 3 1/2 year life
- Product quality is a “given”
- Minimal engineering changes
- Minimal production engineering
Continuous Process Improvement

- Continuous Improvement Recognition System — CIRS

- Financial and non-financial metrics
  - All facets of business driven by metrics
    - Teams, products, objectives, equipment, etc.

- All teams required to have CPI projects
Self Assessment

- **Self assessment is continuous**
  - Rigorous process
  - Expected of all work teams

- **Repeated evaluation by outside parties**
  - Internal assessment by Ford entities
  - Independent auditors & consultants
  - Ongoing application for industry awards
Focus on Common Objective

Customer Delight

Rule #1
“If we don’t take care of the customer, someone else will.”
Lean at Ford: Key Facilitators

- Integrated Database
  - Financial
  - Personnel/Training
  - Production/Assembly/Test
  - Engineering

- Constant-assessment
  - Aggressive pursuit of opportunities
    - Internal and external

Total Quality and Productivity
Management Culture and Infrastructure