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Driving Six Sigma Improvement with PI

Russ Gregg

Process Eng. & Controls Functional Leader

AET

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Applied Extrusion Technologies

- Largest Supplier of OPP in North America
- Sales in excess of $275 Million
- Over 500 customers
- Over 80 different product groups

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Business Challenges

- Improve Profitability
  - Over capacity in the market place
  - Falling Prices
  - Rising energy cost
  - Record high raw material costs
  - Work force reductions
  - Increased customer performance demands

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Improvement Strategy

- Use Sigma principles to improve quality and reduce cost within manufacturing.
- **DMAIC**
  - **Define**
  - **Measure**
  - **Analyze**
  - **Improve**
  - **Control**

Identify Financial Opportunities

- Pareto analysis identified film profile to be the largest improvement opportunity.
  - #1 Customer Complaint Category
  - #1 Internal Quality Reject Issue
  - #1 Yield Loss
  - Significant FFU requirement

Measurement Barriers

- Multiple thickness control platforms.
- No standard specification for fitness-for-use at the customer.
- No long term history of high granularity thickness profile data and key process variables.
- Multiple process interactions
- Downstream process effects.

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Key to Success

- Successfully create a reliable customer fitness-for-use measurement.
- Prove concepts on a small scale with limited capital.
- Make lasting improvements that generate quick returns.
- Gain plant acceptance of the tools and methods.
- Solution must be transferable and scalable.

Data System Requirements

- Reliable connections to various control systems.
  - Foxboro IA, Intellution,Measurex,Eurotherm,PLC's
- Open Connectivity
  - ODBC, OLEDB, OPC, SDK
- Easy to use client tools
- Batch tracking
- High speed data collection and retrieval
- Provide high data granularity
- Fully scaleable

Solution: OSIsoft's PI System

- Rich suite of native interfaces ensured future connectivity needs could be met.
- Exceeded data storage and access requirements.
  - Very Open System
- Rich Suite of Client Tools
  - ProcessBook, DataLink, PI Profile, Batch
- Very fast storage and retrieval rates.
- Easy to scale up over time.
- 24 hour product support.

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Pilot System 2002

2000 pt PI Server to support one production line.

- 5 ProPacks
  - DataLink
  - ProcessBook
  - PI Profile
- 2 Interfaces
  - Foxboro IA/Pi
  - Gensym G2/Pi

Analysis Applications

- Real Time Profile Quality Report (RTPQR)
  - Real time feedback to operator.
  - Trigger corrective action.
- Enterprise Profile Quality Report (EPQR)
  - Summarized by mill roll lot.
  - Customer Fitness-For-Use.
  - Slitter operator decision support
- ProcessBook Displays
  - Process monitoring.
- PI Profile
  - Detailed scan by scan analysis

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EPQR Report

- Enterprise Profile Quality Report
  - Built with Microsoft.Net
  - Summarized statistical data from PI
    - PI Batch
    - PI SDK
    - Microsoft SQL Server

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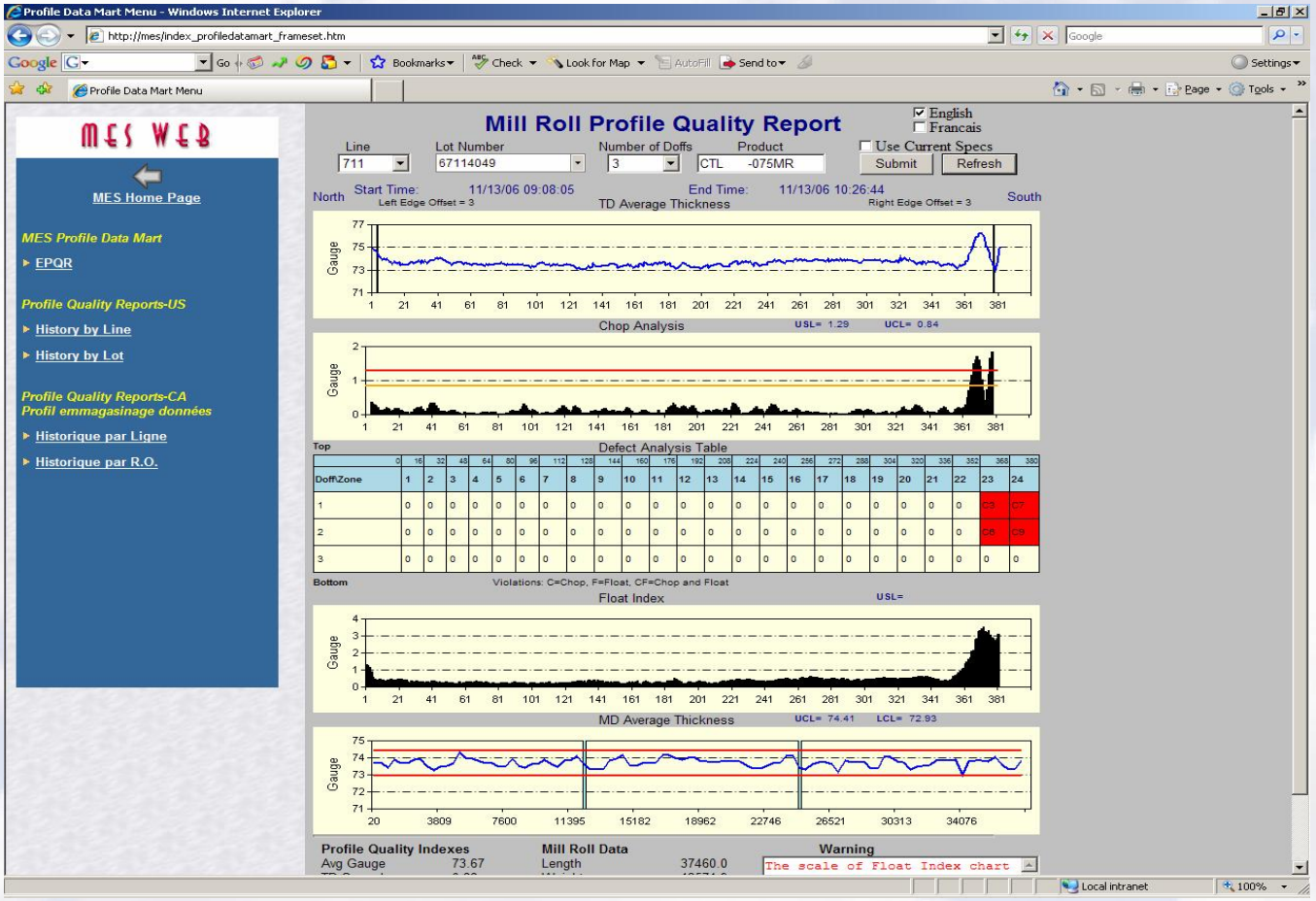
EPQR Web Application



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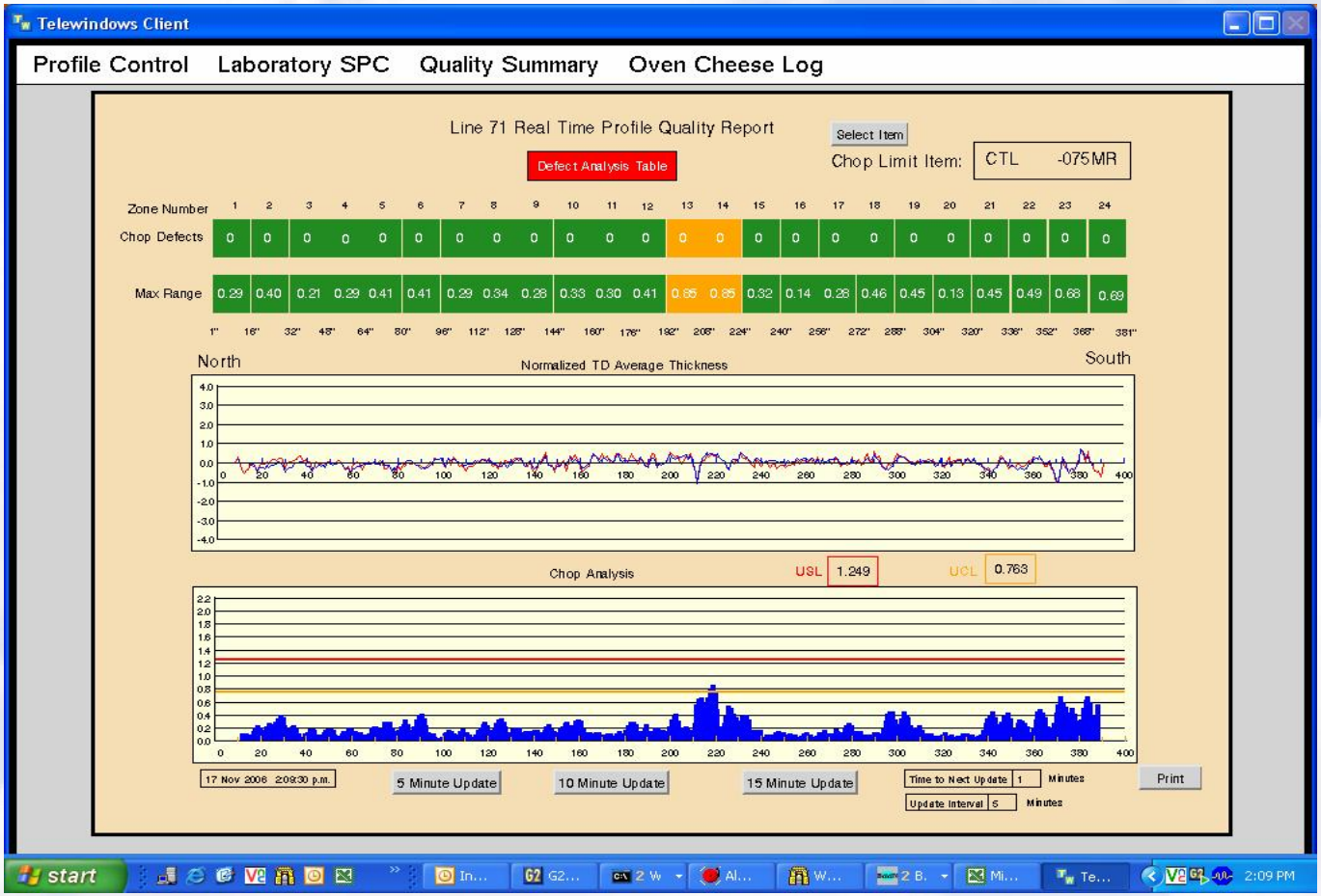
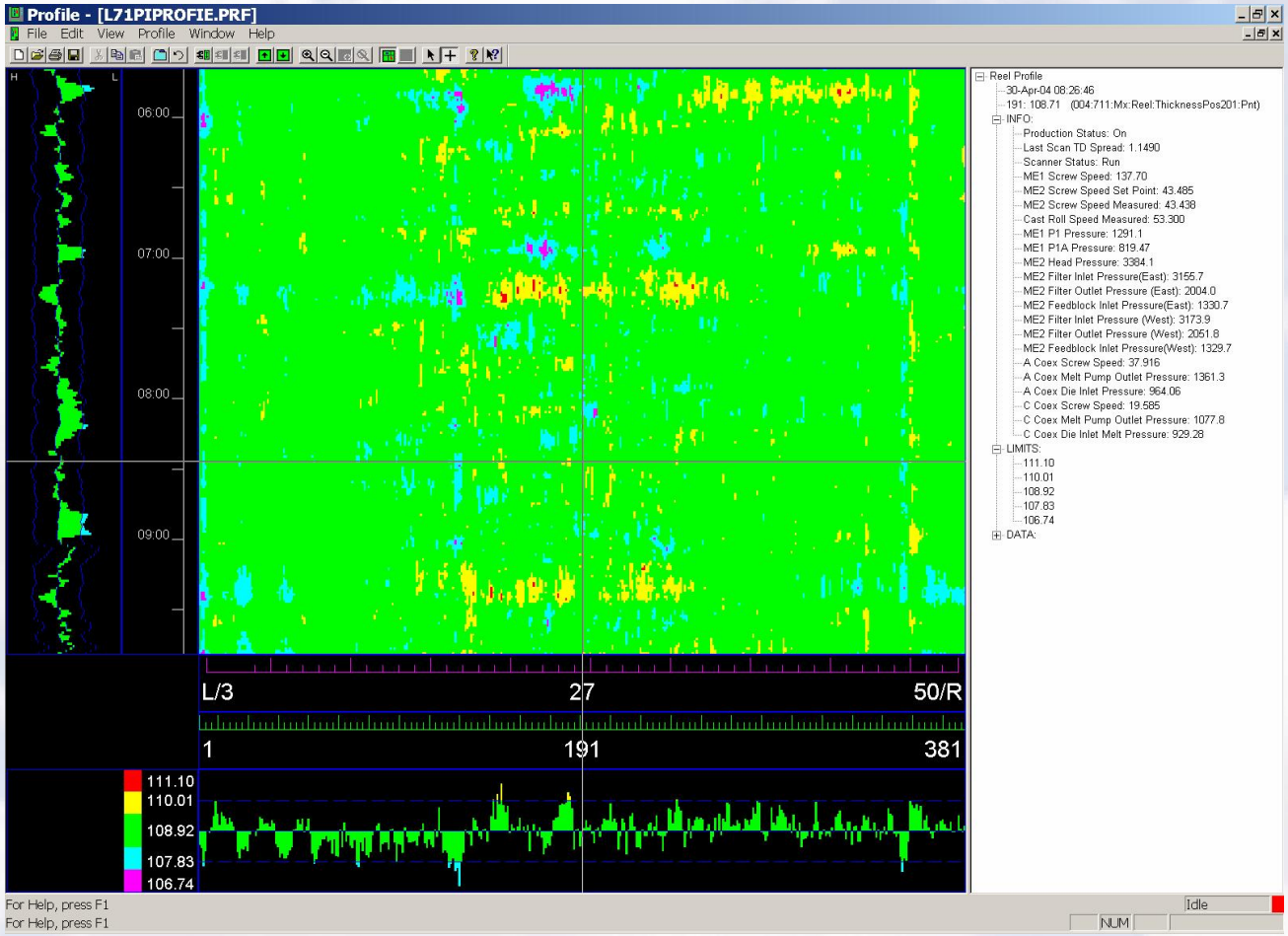
Real Time Report



PI Profile View



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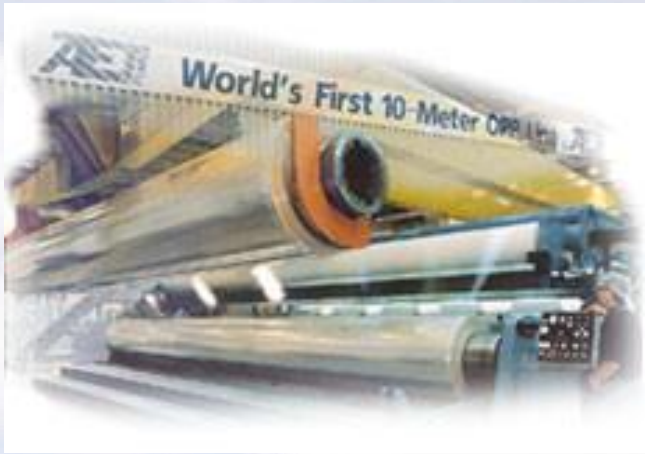
Improve

- Floating Profile on new 10-meter Line
  - Intermittent problem since start up.
  - Process Engineers unable to pinpoint cause.
  - No existing metric to quantify problem.
  - Major customer complaint elevated the urgency to resolve the issue.
  - High cost, High Growth, High Urgency=Management Support

PI to the Rescue

- Transferred pilot technology
  - PI Profile
  - EPQR
  - RTPQD
  - Added 2000 tags
    - Temps, Flows, Pressures, Current, Speeds
  - Creation of new float metric



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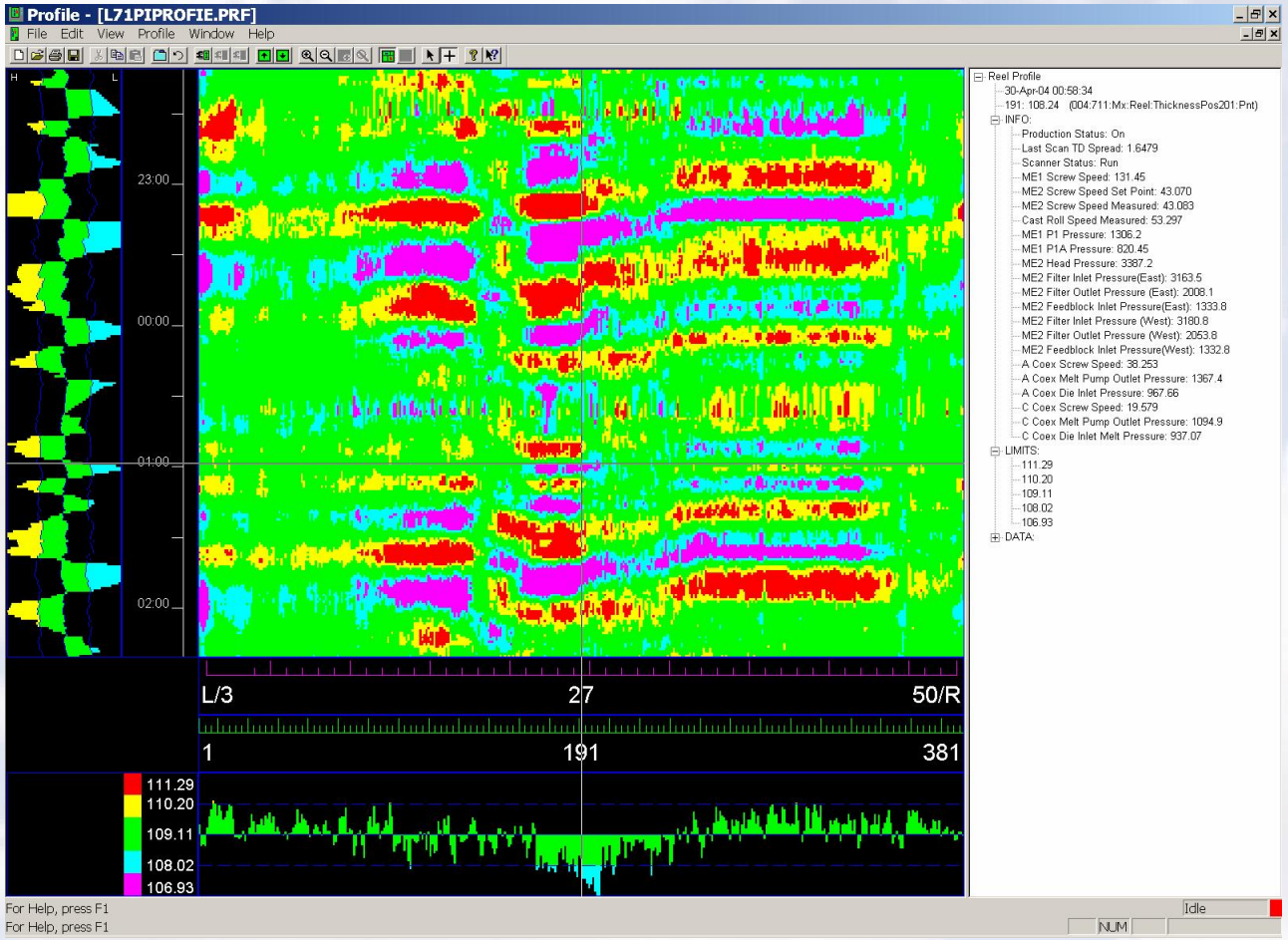
Measure Floating Profile



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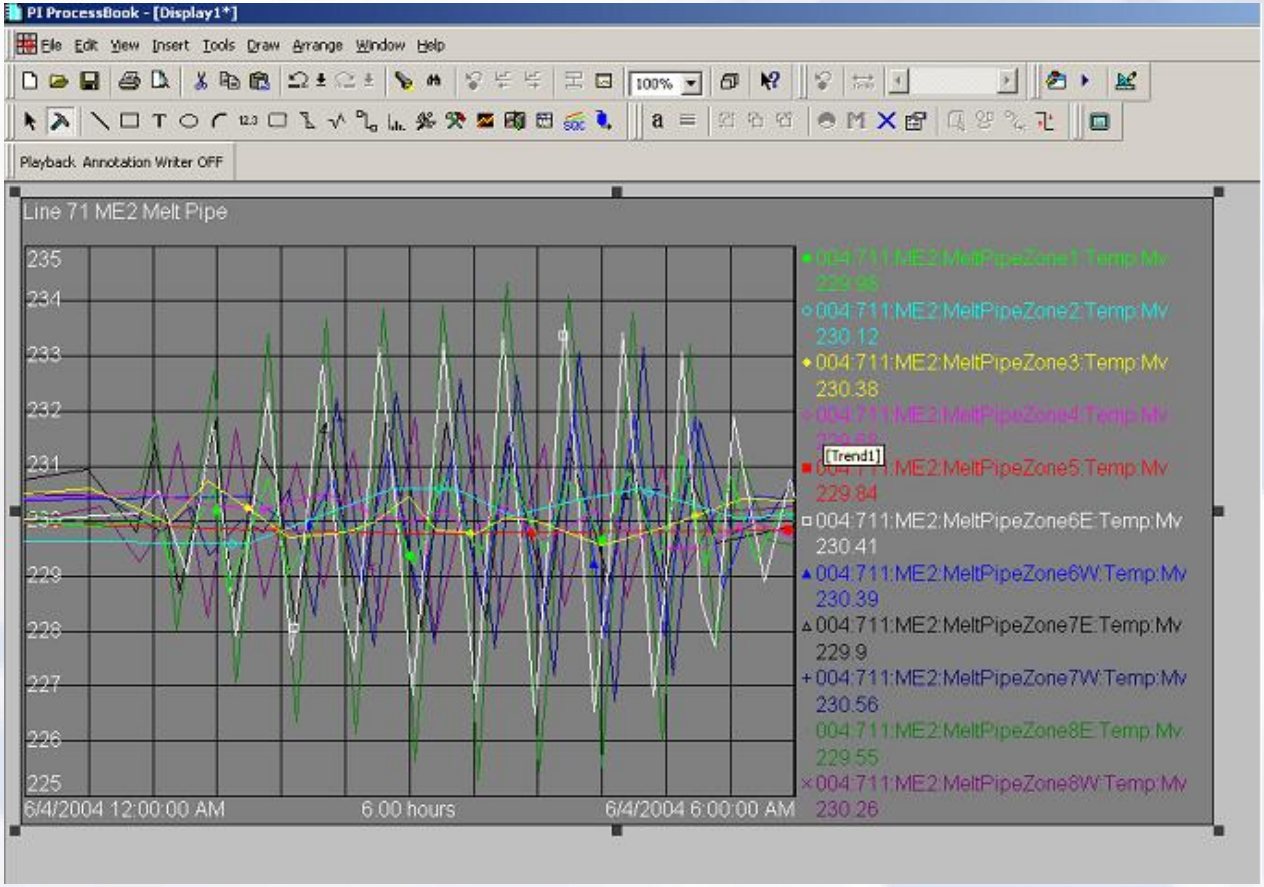
Identify Process Variability



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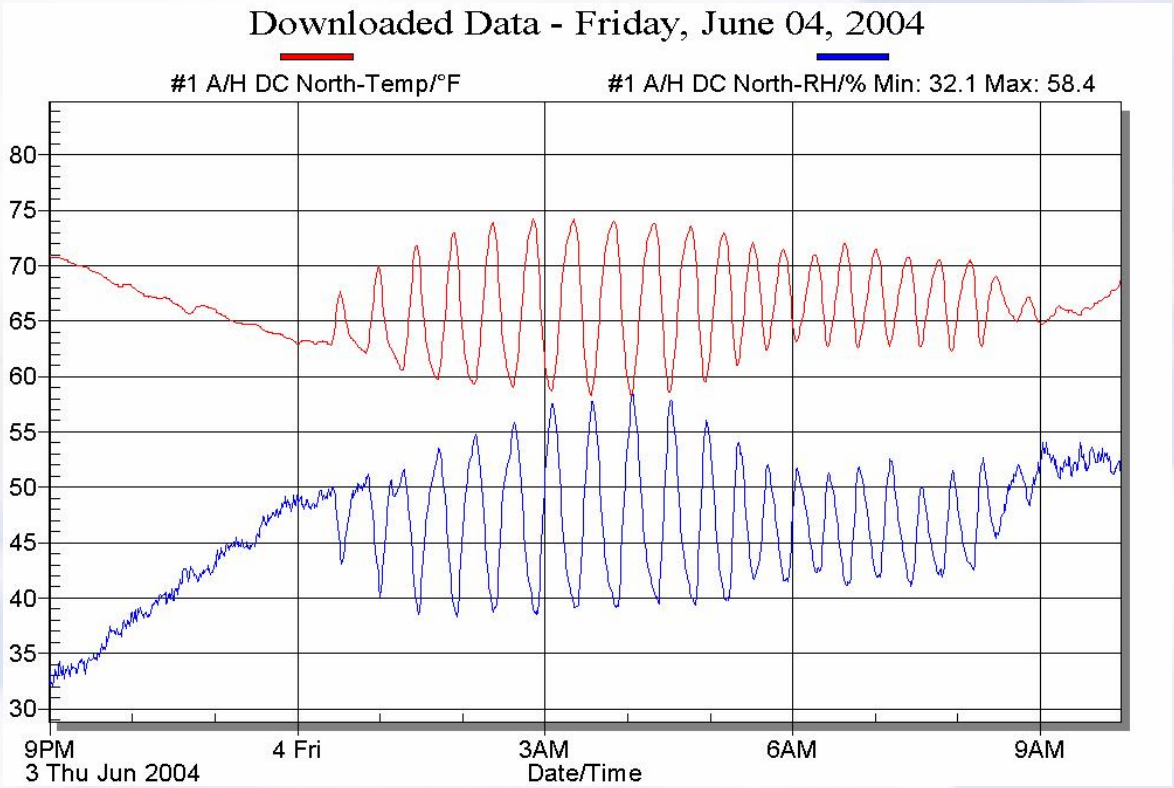
Improve Temperature Control

Retuned the HVAC and the extrusion temperature control loops.



Project Results

- Elimination of root causes for variation.
- New insights into interaction between HVAC control and process control.
- Losses for profile flatness were reduced by 70% with annual savings of over $300,000.
- Customer complaints isolated to small individual roll occurrences.
- Record Return Rate of .11%

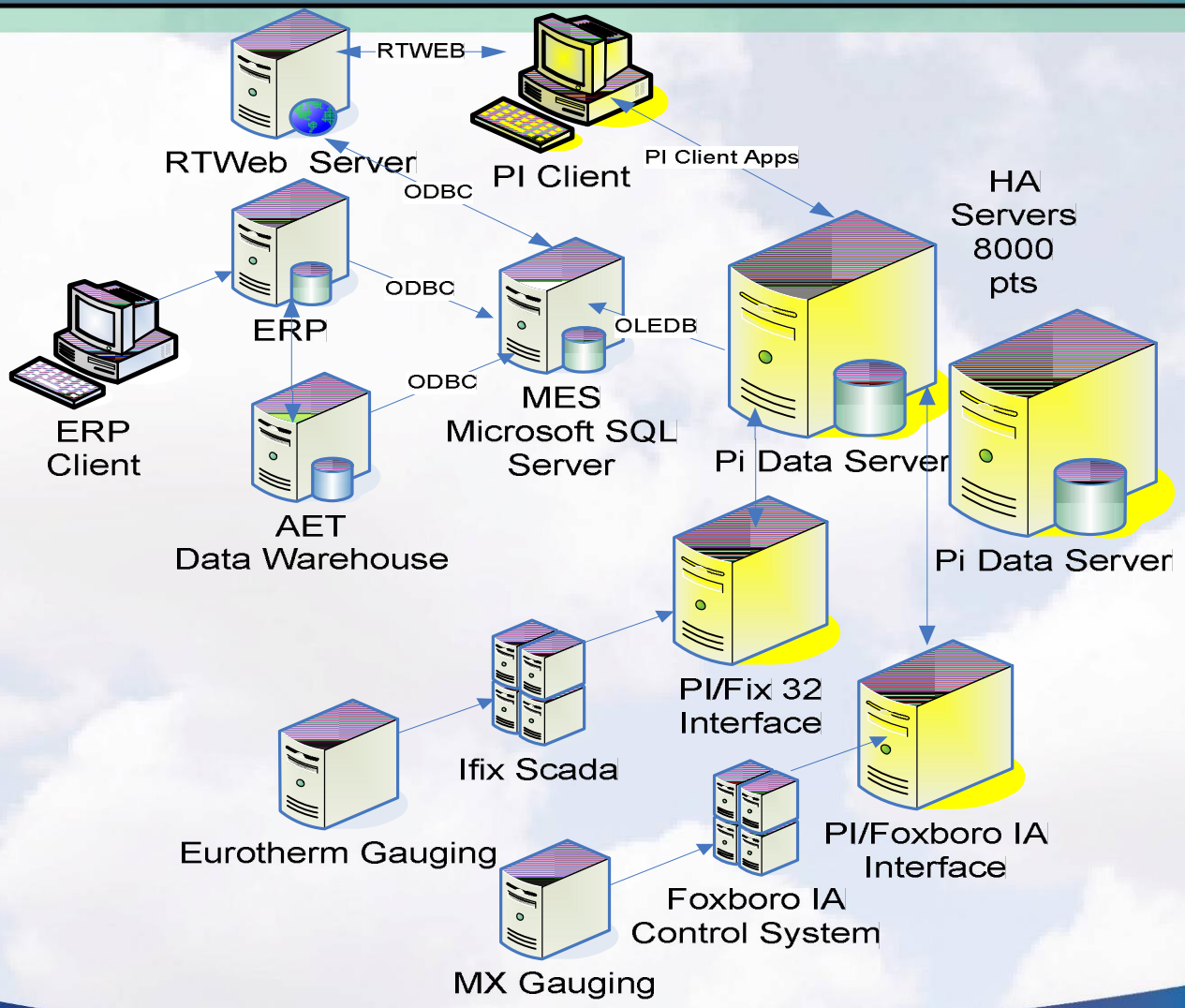
Overall Results

- PI and F.L.A.T system have now been installed on six lines accounting for over 75% of our production capacity.
- Through improvement projects we have driven down internal flatness losses by an average of 50%.
- Increased production rates due to the reduction in variability.
- Customer complaints and return rates at record lows.

Current System

- Supports 6 production lines in three different plants representing 80% of the companies capacity.
- PI Servers running on Windows Server 2003 in HA Configuration
  - 8,000 tags
  - 3 Foxboro IA/PI interfaces
  - 1 GE Ifix/PI interface
  - 3 Gensym G2/PI interfaces
  - 30 PI ProPacks
  - 5 User RtPortal

System Schematic



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Future Plans

- Continue expansion of PI to remaining assets.
- Upgrade to new platform release to take advantage of new notification and calculation capabilities.
- Integrate process plan limits and PI data for automatic process deviation alarming.
- Develop energy cost roll up by mill roll.
- Implement control performance analysis and monitoring using PI Data.

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Thank You

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