Evolution of Operational Data to Support Excellence in Paper Manufacturing

Presented by **Laurent Watremetz, QC Manager & Data System**

Quality in Paper Manufacturing

Main Characteristics

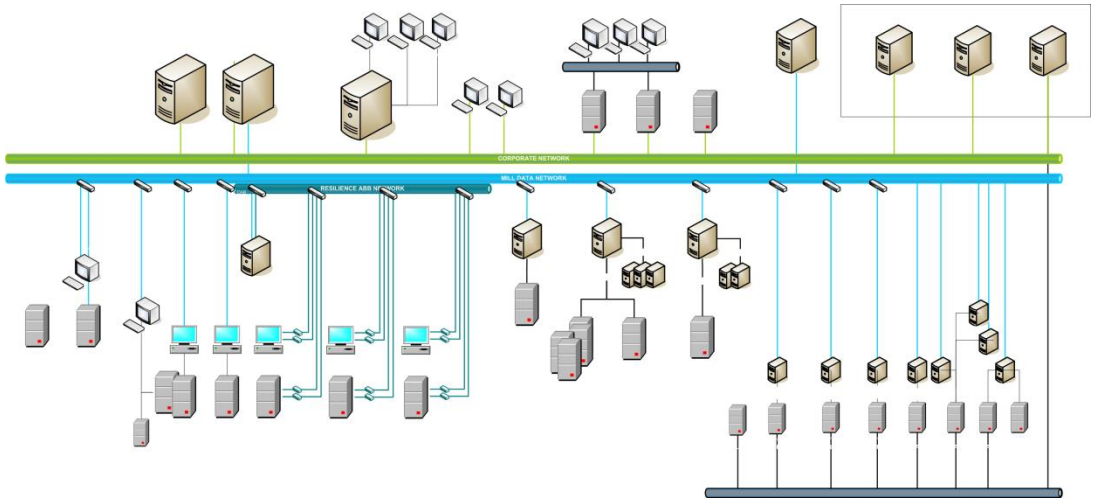
- Long-established manufacturer of security paper
- Specific products, with complex design
- Challenging quality requirements
- Low volume production orders

High volume of spoil from Machine Start Up and Out-of-Control processes

Data Systems Expansion

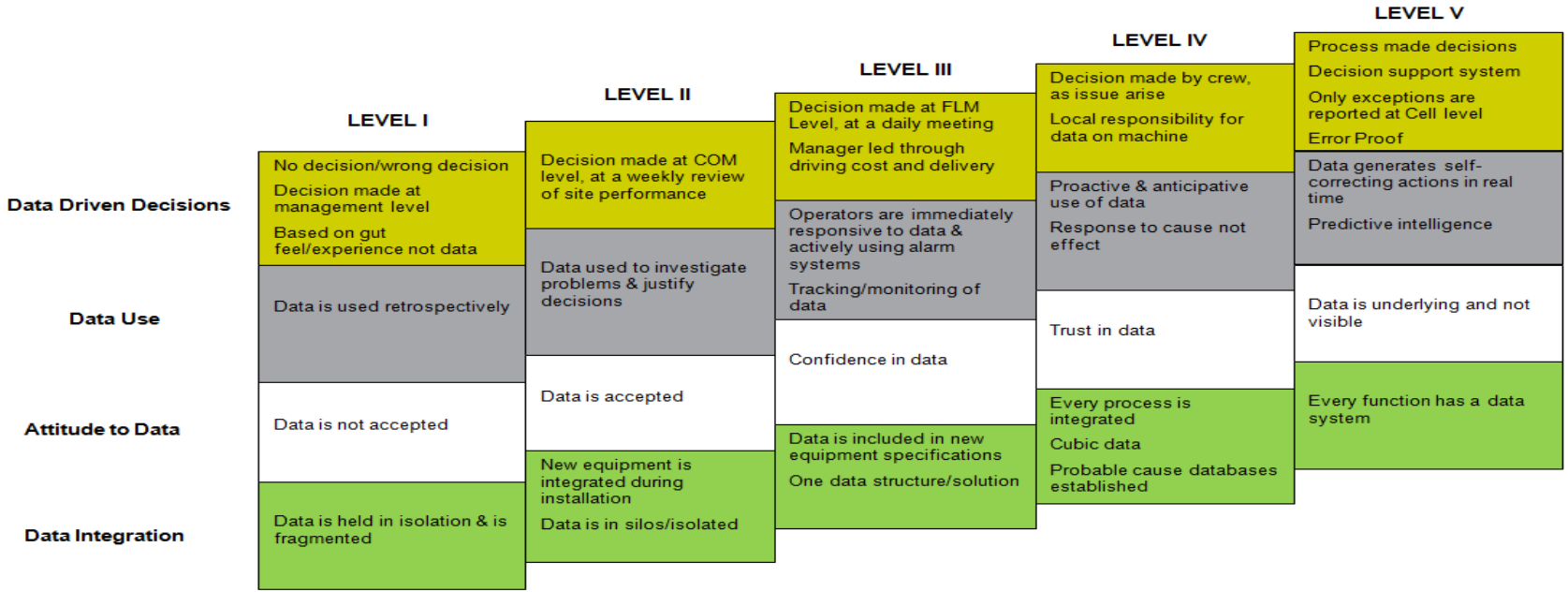
The PI System has been deployed throughout the mill, not only collecting process data but also online and offline product inspection information.

Having seen process engineers resolving issues through data exploration and analysis, operations managers and operators are now demanding data-driven solutions.



Data & Operational Excellence

- The Business is deploying Operational Excellence, focussing on Built-in Quality:
  - Defects are no longer created rather than detected
  - Decisions are taken within the manufacturing cells rather than by managers
  - Processes are planned to achieved Quality rather than reactive
- The Data Systems team developed a vision to support this journey



Project Overview

A joint project with Global IT and OSIsoft to communicate vision to the Site and Company Leadership Teams, to prove benefit realisation and to justify an Enterprise Agreement

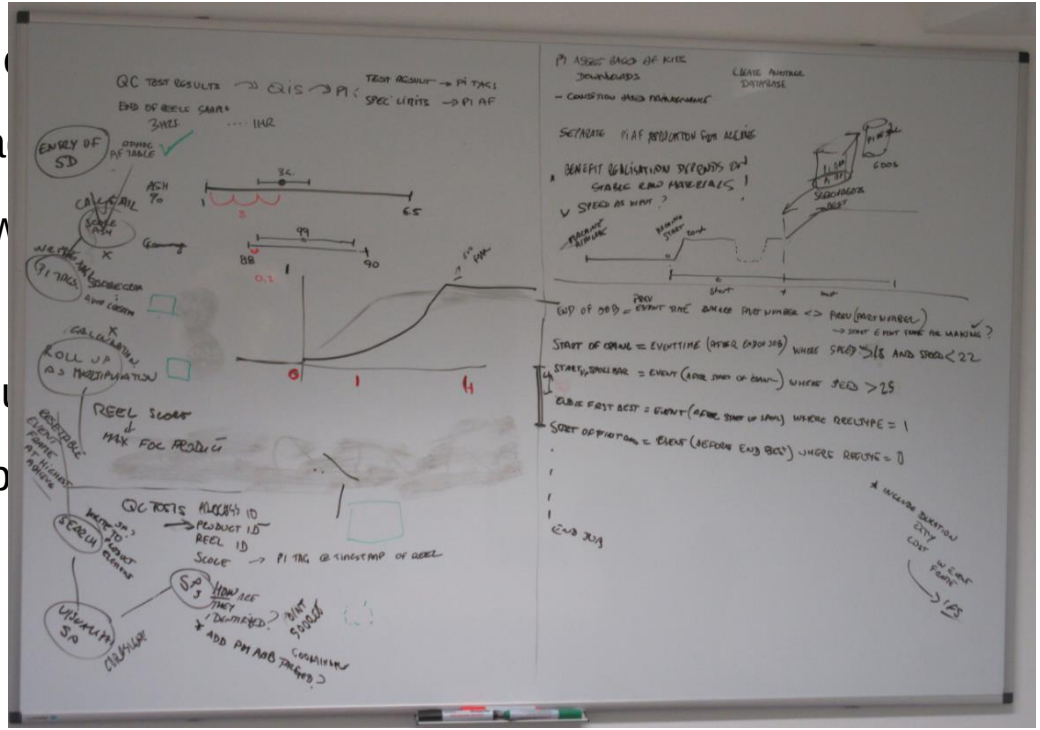
- **Opportunity**
  - Spoil is the most significant cost to the business, with two-digit spoil level not usual

- **Obstacles**
  - The product quality is determined by laboratory testing, sometimes hours behind manufacturing
  - Two systems are being used, the PI System and the Quality Database
  - Operators are not trained in trend review and data analysis
  - Approximately 200 process inputs, and 20 quality parameters would need to be monitored
  - The impact of process inputs on quality parameters is not fully understood
  - Numerous different products are being made, with varying specifications
  - Operators are proud of their “art” and can feel threatened by automation

Solution Design

Contracting Data into simple and actionable messages for machine crews

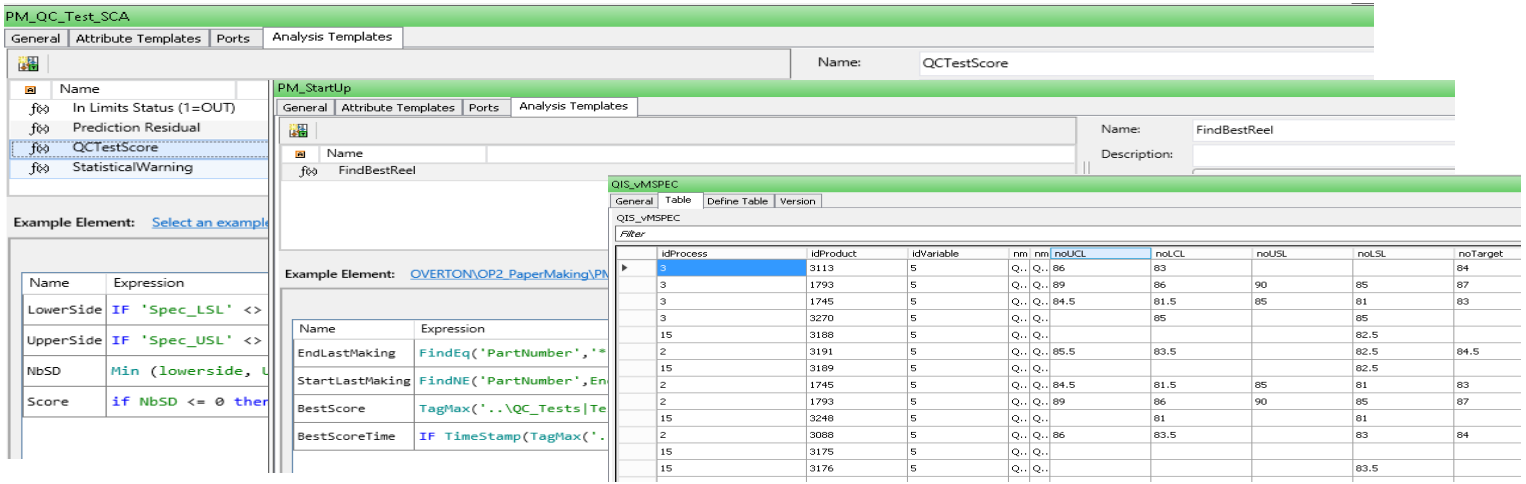
- A single point
- A clear messa
- Investigation w
- Crews should
- The product qu
- Trends and ab



Solution Development-*Guiding to optimal Quality*

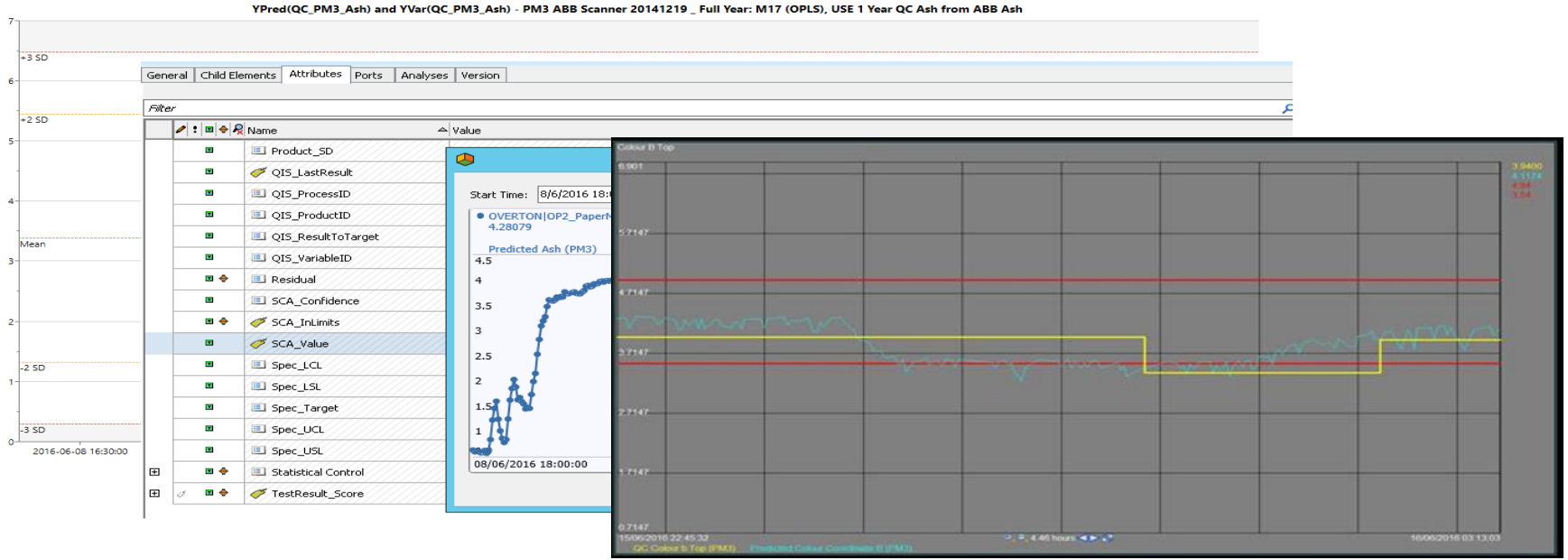
- PI Asset Analytics scores each reel for its quality, retrieves the point in time when the best product was manufactured and the machine set points

- PI AF enables more complex analytics than Performance Equations, quick replication across elements, and easy backfill



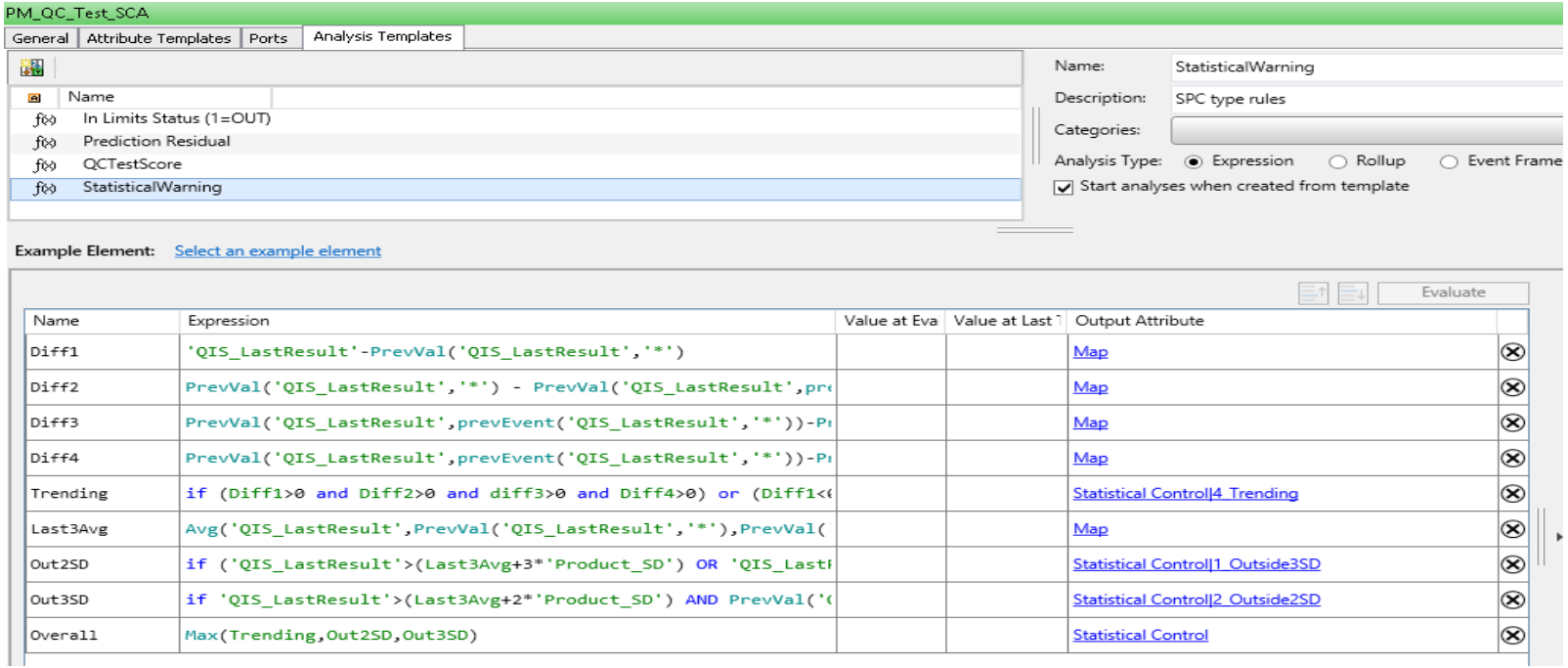
Solution Development - *Predicting Quality*

SIMCA-online from MKS Data Analytics Solutions (OSIsoft business partner) is used to build PLS predictive models, providing real time estimations of QC test results against the specification



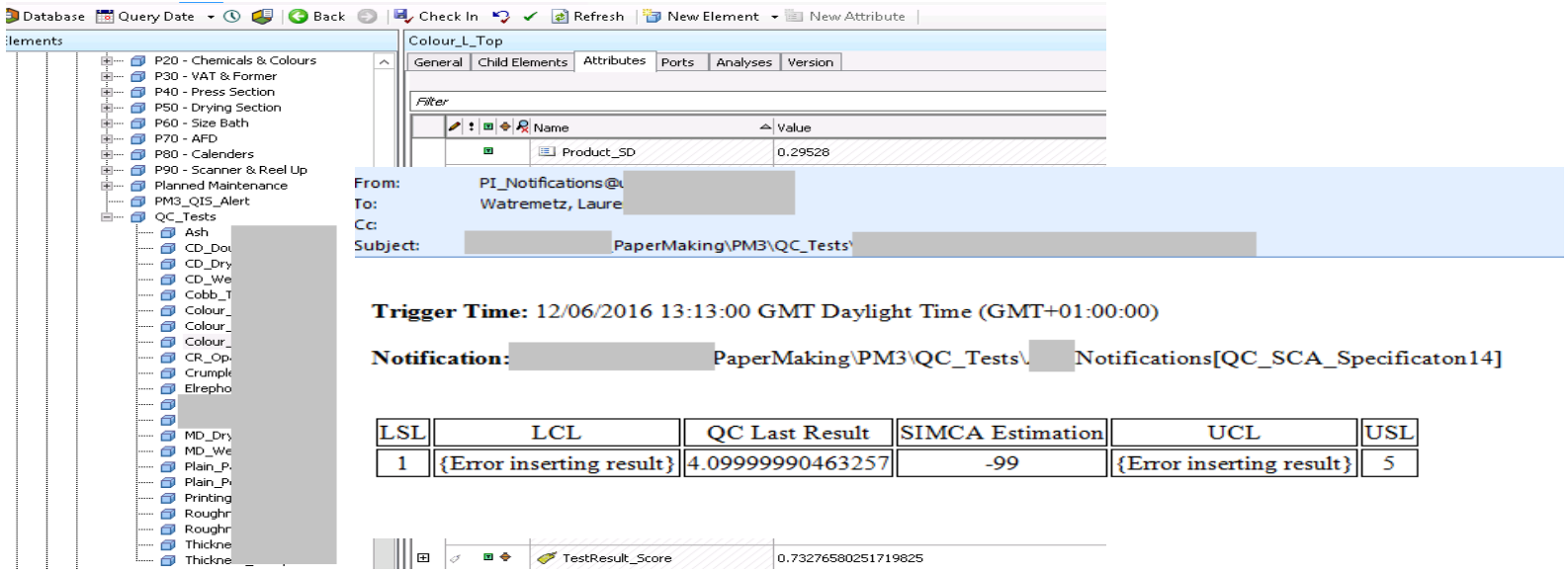
Solution Development - *Monitoring Quality*

QC test results are archived in the PI System and PI Asset Analytics derives SPC-type alarms, tuned to the business specifics



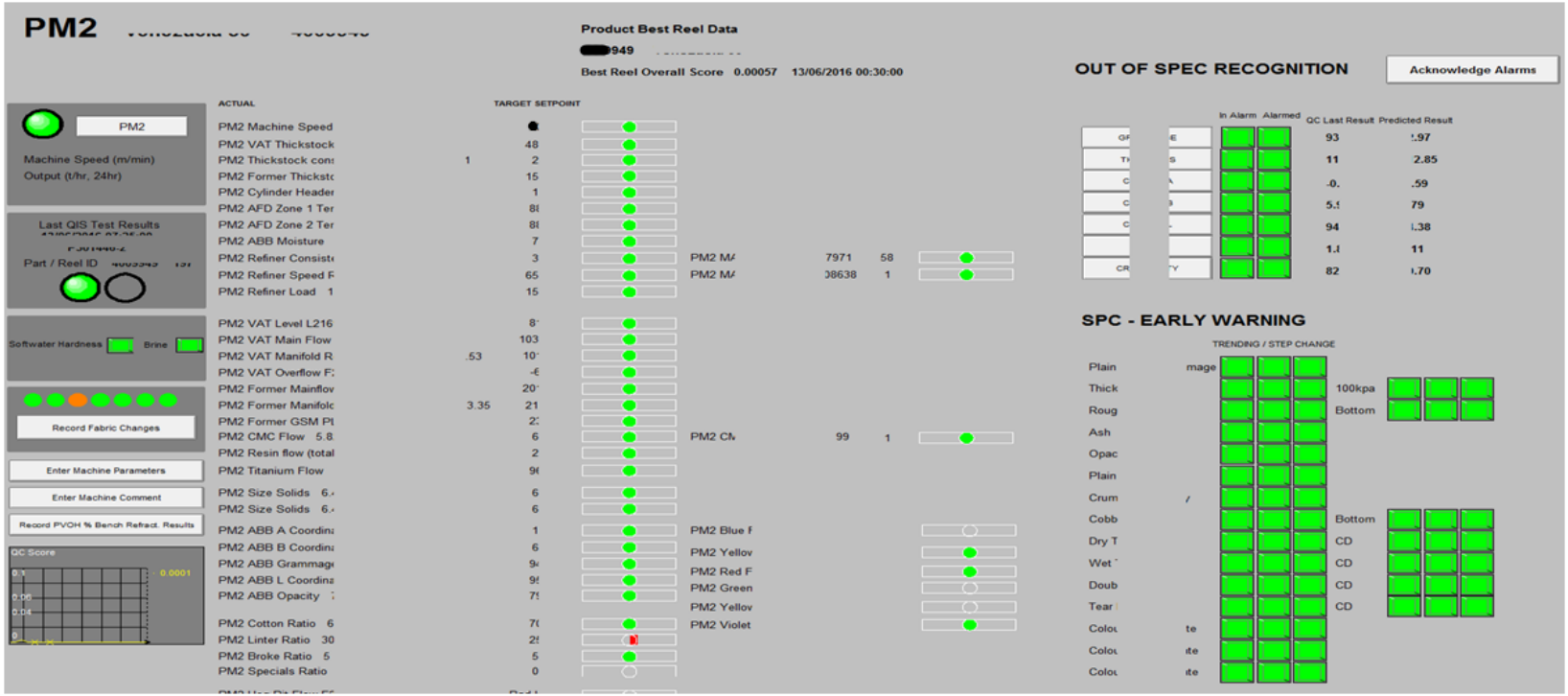
Solution Deployment - *Replication through PI AF*

- All analytics, retrieval of specification limits, archiving of predicted test result was made easy with PI AF templates.
- PI AF also enabled solution to escalation using PI Notifications



Solution Deployment - *Processbook Display*

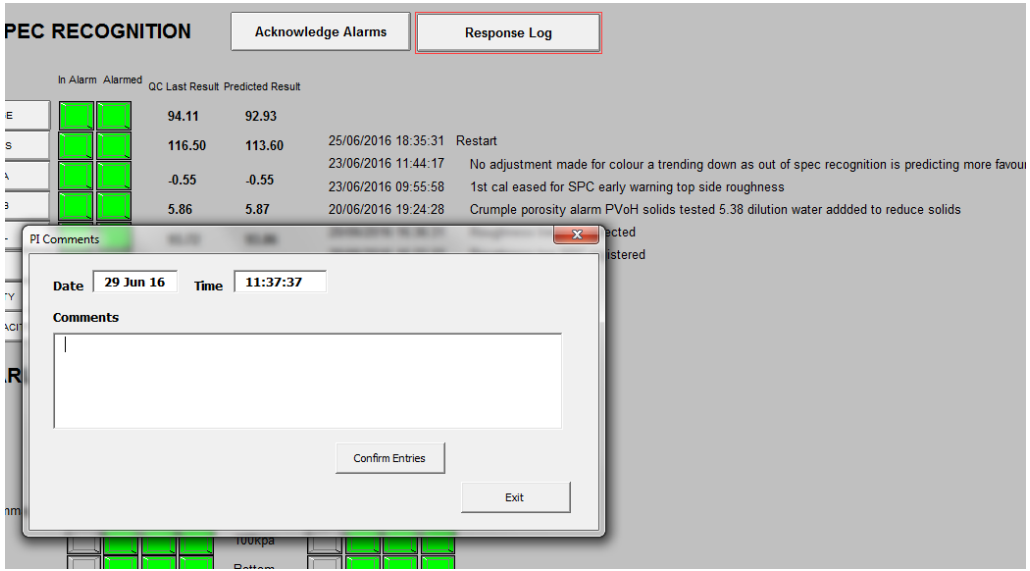
A unique PI ProcessBook display provides clear color coded indicators, and enables operators to “drill” into process parameters for further investigation



Solution Deployment - *Records*

Crew decisions are recorded within the PI System

- Decision made are communicated to next shift
- Effectiveness of system (alarms) can be reviewed and tuned



Solution Deployment - *Acceptance*

- Solutions are presented as ‘tools’ to the operators, improving on practices
- Operators are involved in projects from conception
- Alerts and data provided by the PI System are presented as indication
- Lower value PI System–enabled solutions are encouraged and delivered
- Solution can be aligned to existing processes from supporting functions
- Solution and concept are easily transferable

Results

Deployment was conducted following Agile principles, and a prototype released to Operations for a period of 8 weeks, during which benefits were monitored and significant improvements observed

Start Up	Baseline start-up time	Actual Time compared to baseline	Improvement
PIMP Product 1	100	60.81	39%
PIMP Product 2	100	33.78	66%
PIMP Product 3	100	90.09	10%
PIMP Product 4	100	33.78	66%
PIMP Product 5	100	31.53	68%
Overall			50%

Conclusions

Contracting Data into simple and actionable messages for machine crews

- **PI System:** alignment of data system development to corporate strategies
- **PI Asset Analytics:** complex calculations and logics to be built and standardised
- **PI Asset Framework:** convergence of multiple data sources and quick roll out of solutions
- **PI ProcessBook:** high level of customization to satisfy end-user requests and gain acceptance

Next steps

- Integration into existing systems of work
- Improvement of predictive models
- Deployment to other paper machines
- Development for other process areas of the mill, other sites of the business

Evolution of Operational Data to support Excellence

COMPANY and GOAL

The Business wanted to prove the PI System as an Enterprise solution for improvements and data-driven decisions and demonstrate financial benefits

CHALLENGE

The papermachine process is set by testing product during start up

- The crew adjust the machine during start up to reach good quality product
- Product is sent to the lab to provide feedback and further adjustments

SOLUTION

Product and process data are aligned and analyzed to provide the right information

- Complex calculations and logic are created in PI Asset Analytics and SIMCA
- Deployment is done using PI AF templates
- PI ProcessBook provides a single point of visualization

RESULTS

The time, and waste, required to start and set the machine up has been reduced by 50%

- Other benefits includes increased speed, increased availability, reduced testing requirements
- Solution is transferrable to other machines, and other processes

Contact Information

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Questions

Please wait for the **microphone** before asking your questions

State your **name & company**

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Complete the Online Survey for this session

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谢谢

Danke

Gracias

Merci

Thank You

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Спасибо

Obrigado