Improving In-Line Quality by Leveraging Real Time Data

Presented by **Brent Lindsey**

Evergreen Packaging

- Fiber Based Food & Beverage Packagin
- 2 Mills
- 13 Converting Facilities
- 2 Filling Machine Manufacturing Plants

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Evergreen – Mill Value Chain

Image courtesy of nuttakit at FreeDigitalPhotos.net

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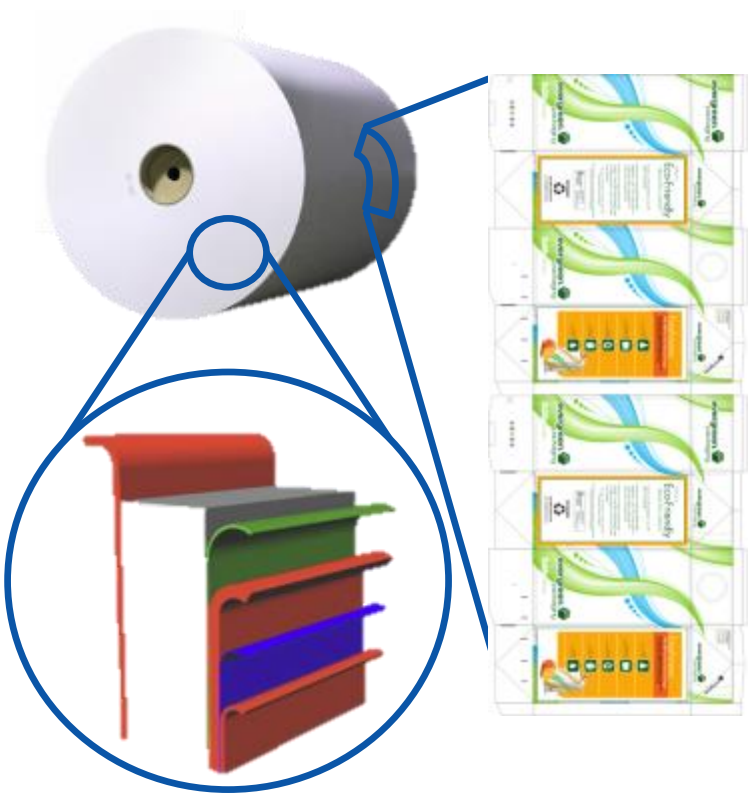
Evergreen – Converting / Equipment Value Chain



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Enterprise Agreement 2014 – Limitless Technology

Unlimited Tags

Updated Versions

- PI Server
- PI Interfaces
- PI DataLink
- PI ProcessBook

New Technologies

- PI Asset Framework
  - Notifications
  - Event Frames
- PI Coresight
- PI Manual Logger

Enterprise Agreement Resources

- Online Training
- Conferences and Seminars
- Asset Based PI Example Kits
- Training Credits
  - AF Workshop Evergreen Specific
- Field Services
- Managed PI
- Enterprise Agreement Team

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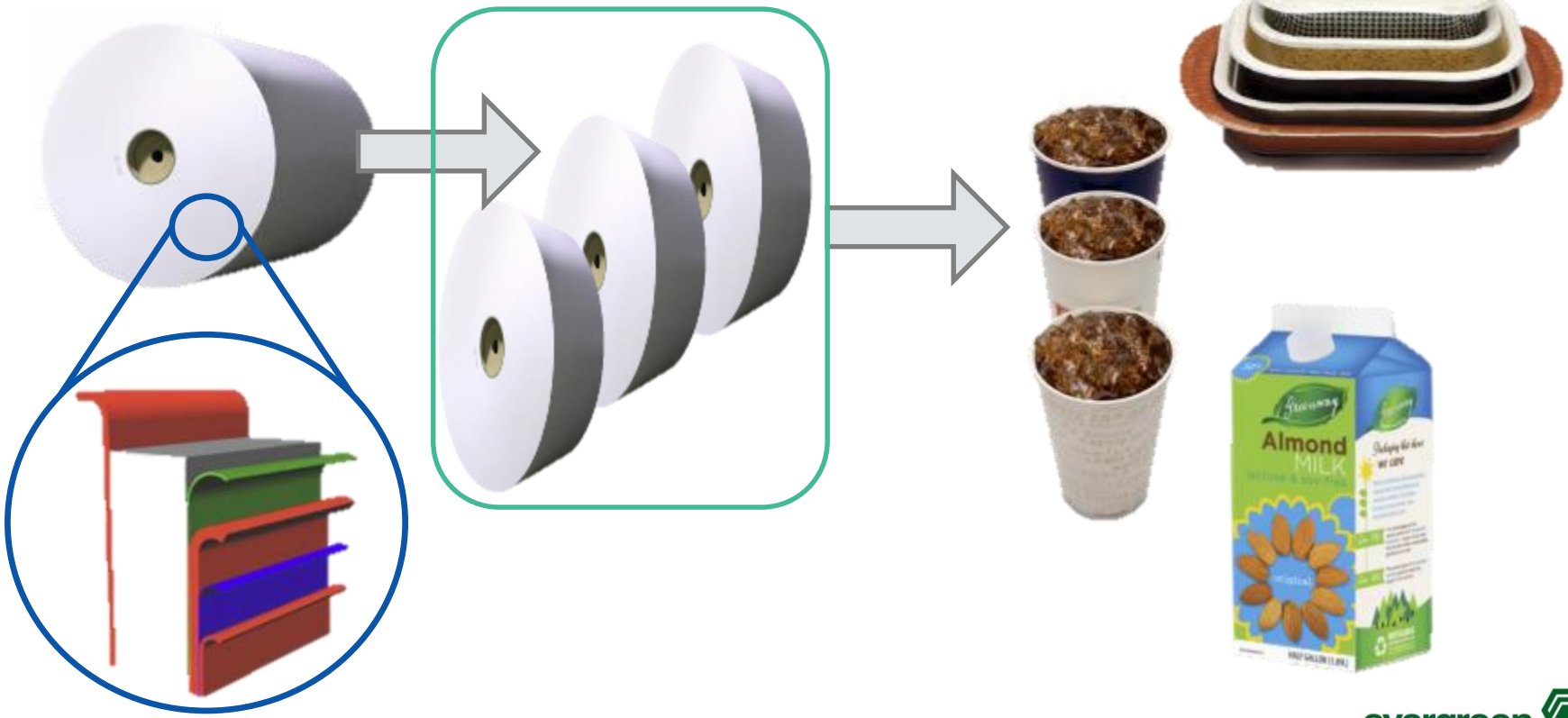
Business Challenge – In Line Quality



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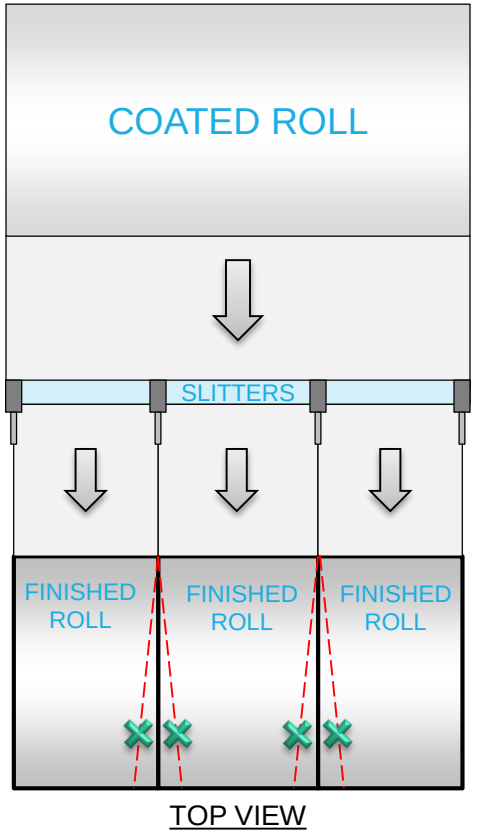
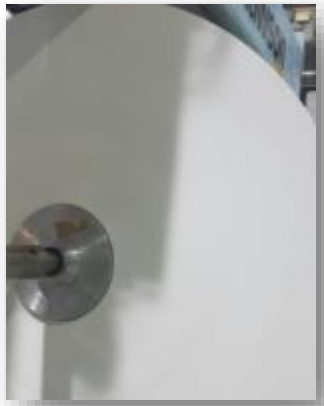
Business Challenge – In Line Quality

- Finished rolls become lapped or “stuck” at the slitting and winding process
- Rolls are scrapped at a significant cost
- 3 winders (24/7)



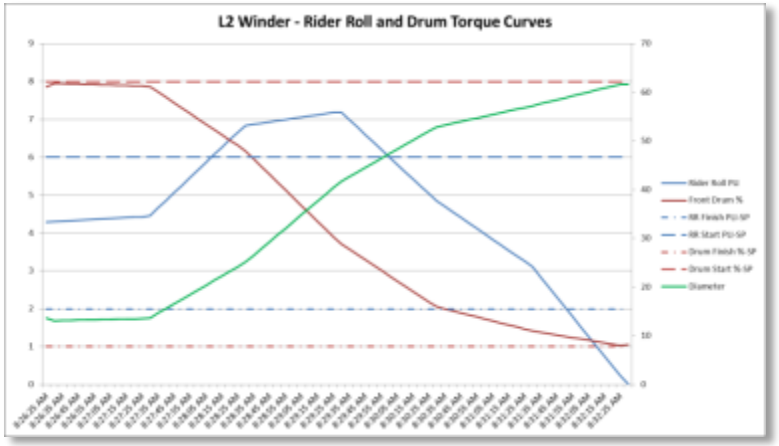


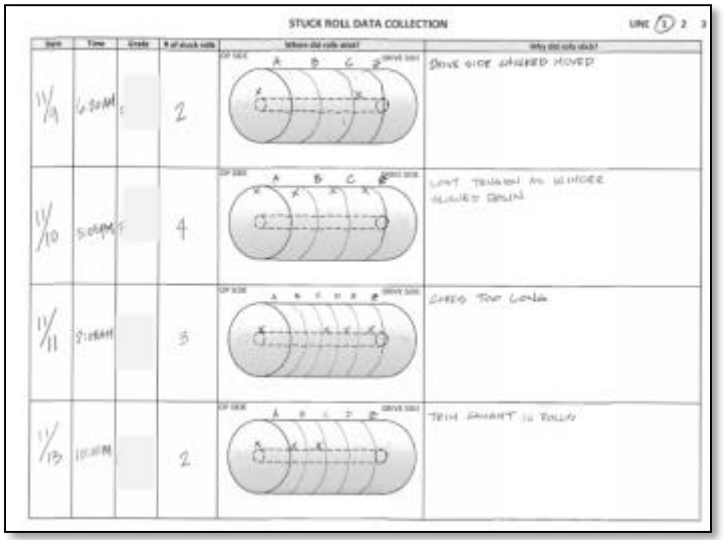
Business Challenge – In Line Quality

- One particular piece of equipment consistently produced “stuck” rolls
  - Produced on all types of product grades and widths
  - Significantly higher amounts produced on drive side of equipment

Leveraging Applications – Data Analysis to Drive Solution

- Collected Data
  - PI ProcessBook
  - PI DataLink
  - Descriptive “Stuck Roll” Form



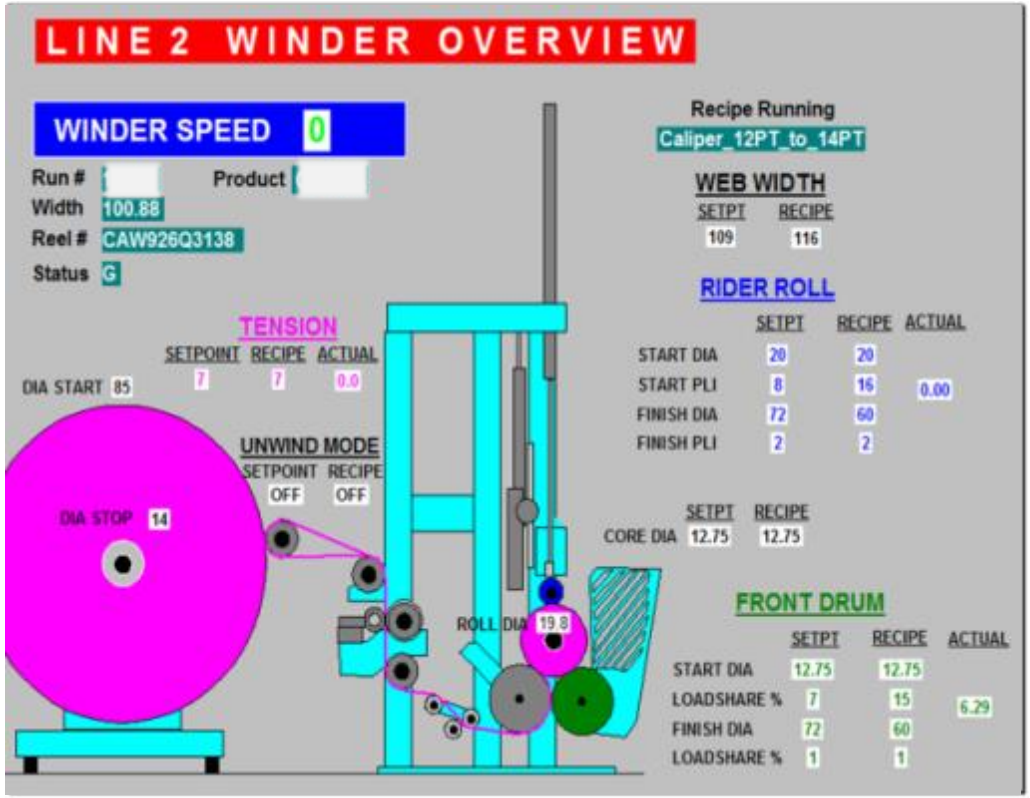


Implementation Details

- Collected real time data when both off quality and good quality products were produced.
- Six Sigma data analysis and defined problem solving techniques determined:
  - Process variation between recipe set points and process running set points were common issue when off quality product was produced.
  - Operator knowledge of set point variation was minimal

How Individual Product Capabilities Solved Your Business Challenge

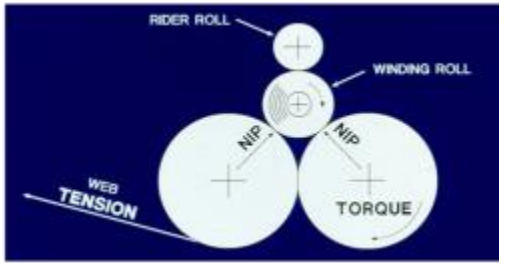
- Established process set points
  - Three basic groups (recipes) of products
- Created PI ProcessBook screen to monitor recipe set points vs running parameters



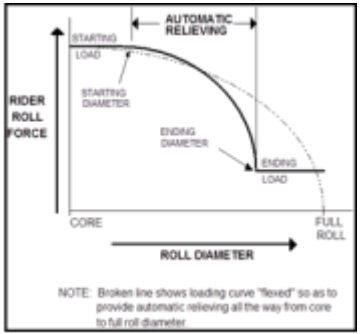
Basic Training

- Operators trained on basics of “TNT” for winding
  - **T**ension
  - **N**ip
  - **T**orque
- Trained on recipes
  - How to recall
  - How to check recipes vs running parameters

PAPERBOARD[1]	TENSION LEVEL	RIDER ROLL START DIA PLI (NIP LOADING)
8 Point	4 PLI	8-12 PLI
12 Point	6 PLI	12-18 PLI
15 Point	7.5 PLI	15-23 PLI
20 Point	10 PLI	20-30 PLI
25 Point	12.5 PLI	25-38 PLI
30 Point	15 PLI	30-45 PLI



Recipe Set points



PI DataLink

- Historical Data analyzed for set points vs running parameters
- Charts/Data reviewed with operators and engineering to determine optimal settings

Time	Rider Roll	Front Drum	Speed	RR Finish PLI-SP	RR Start PLI-SP	Drum Finish %-SP	Drum Start %-SP	
16-Dec-15 08:11:35	0.017133476	5.966382027	0.234755009	2	6	1	8	26.48
16-Dec-15 08:11:40	0.0410964	5.966382027	0.563083947	2	6	1	8	26.48
16-Dec-15 08:11:45	0.065059327	5.966382027	0.891412914	2	6	1	8	26.48
16-Dec-15 08:11:50	0.089022249	5.966382027	1.21974194	2	6	1	8	26.48
16-Dec-15 08:11:55	0.112985171	5.966382027	1.548070788	2	6	1	8	26.48
16-Dec-15 08:12:00	0.136948094	5.966382027	1.876399755	2	6	1	8	26.48
16-Dec-15 08:12:05	0.160911024	5.966382027	2.204728842	2	6	1	8	26.48
16-Dec-15 08:12:10	0.184873939	5.966382027	2.53305769	2	6	1	8	26.48
16-Dec-15 08:12:15	0.208836868	5.966382027	2.861386776	2	6	1	8	26.48
16-Dec-15 08:12:20	0.232799783	5.966382027	3.189715624	2	6	1	8	26.48
16-Dec-15 08:12:25	0.256762713	5.966382027	3.51804471	2	6	1	8	26.48
16-Dec-15 08:12:30	0.280725628	5.966382027	3.846373558	2	6	1	8	26.48
16-Dec-15 08:12:35	0.304688573	5.966382027	4.174702644	2	6	1	8	26.48
16-Dec-15 08:12:40	0.328651488	5.966382027	4.503031254	2	6	1	8	26.48
16-Dec-15 08:12:45	0.352614403	5.966382027	4.83136034	2	6	1	8	26.48
16-Dec-15 08:12:50	0.376577318	5.966382027	5.159689426	2	6	1	8	26.48
16-Dec-15 08:12:55	0.400540262	5.966382027	5.488018513	2	6	1	8	26.48
16-Dec-15 08:13:00	0.424503177	5.966382027	5.816347122	2	6	1	8	26.48
16-Dec-15 08:13:05	0.448466092	5.966382027	6.144676208	2	6	1	8	26.48
16-Dec-15 08:13:10	0.472429037	5.966382027	6.473005295	2	6	1	8	26.48
16-Dec-15 08:13:15	0.496391952	5.966382027	6.801334381	2	6	1	8	26.48
16-Dec-15 08:13:20	0.520354867	5.966382027	7.129662991	2	6	1	8	26.48
16-Dec-15 08:13:25	0.544317782	5.966382027	7.457992077	2	6	1	8	26.48
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16-Dec-15 08:13:50	0.664132416	5.966382027	9.099637032	2	6	1	8	26.48
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16-Dec-15 08:14:20	0.807909966	5.966382027	11.0696106	2	6	1	8	26.48
16-Dec-15 08:14:25	0.83187288	5.966382027	11.39793968	2	6	1	8	26.48
16-Dec-15 08:14:30	0.855835795	5.966382027	11.72626877	2	6	1	8	26.48
16-Dec-15 08:14:35	0.87979871	5.966382027	12.05459785	2	6	1	8	26.48
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16-Dec-15 08:14:50	0.951687515	5.966382027	13.03958416	2	6	1	8	26.48
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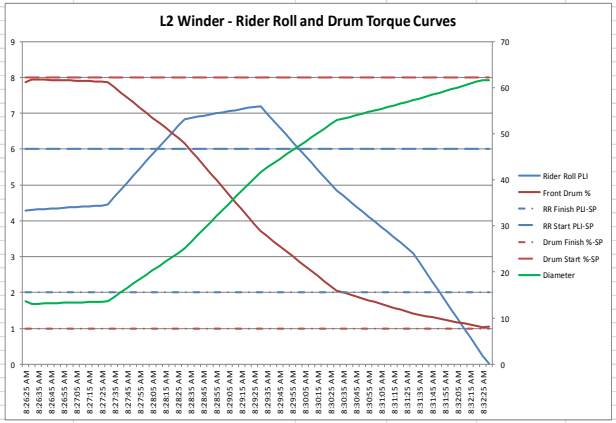
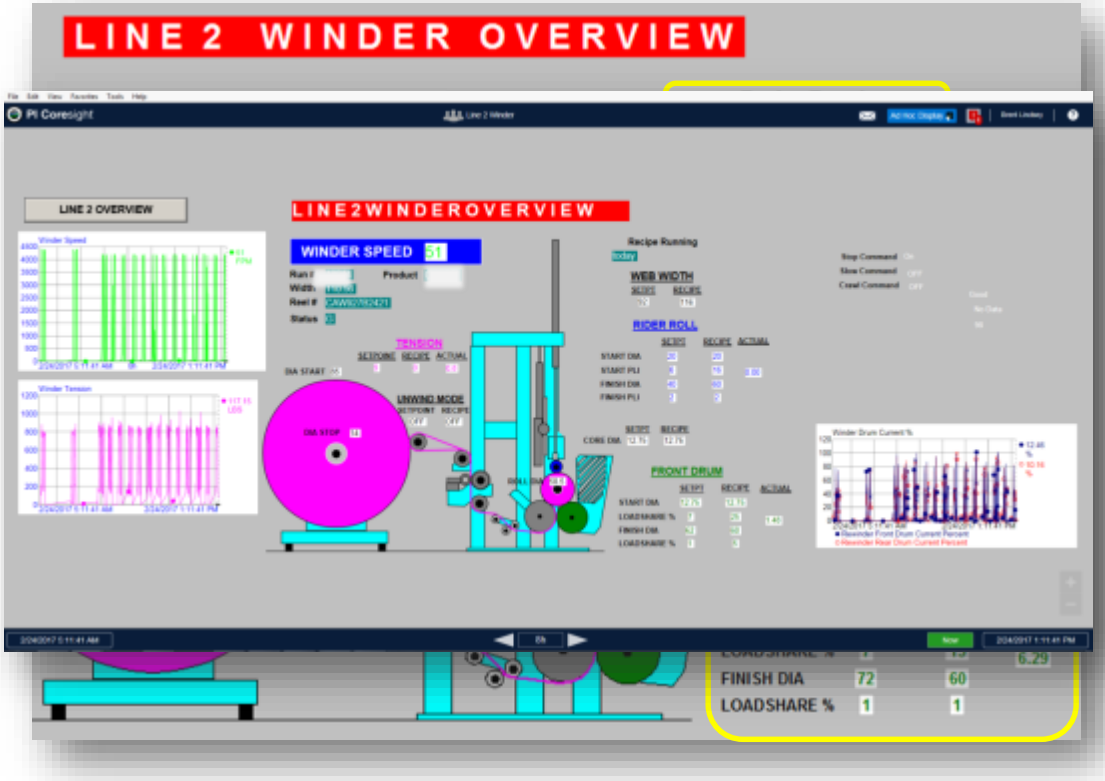
16-Dec-15 08:15:00	0.999613345	5.966382027	13.69624233	2	6	1	8	26.48
16-Dec-15 08:15:05	1.02357626	5.966382027	14.02457142	2	6	1	8	26.48
16-Dec-15 08:15:10	1.047539234	5.966382027	14.35290051	2	6	1	8	26.48
16-Dec-15 08:15:15	1.07150209	5.966382027	14.68122959	2	6	1	8	26.48
16-Dec-15 08:15:20	1.095465064	5.966382027	15.00955772	2	6	1	8	26.48
16-Dec-15 08:15:25	1.119427919	5.966382027	15.33788681	2	6	1	8	26.48
16-Dec-15 08:15:30	1.143390894	5.966382027	15.6662159	2	6	1	8	26.48
16-Dec-15 08:15:35	1.167353868	5.966382027	15.99454498	2	6	1	8	26.48
16-Dec-15 08:15:40	1.191316724	5.966382027	16.32287407	2	6	1	8	26.48
16-Dec-15 08:15:45	1.215279698	5.966382027	16.65120316	2	6	1	8	26.48



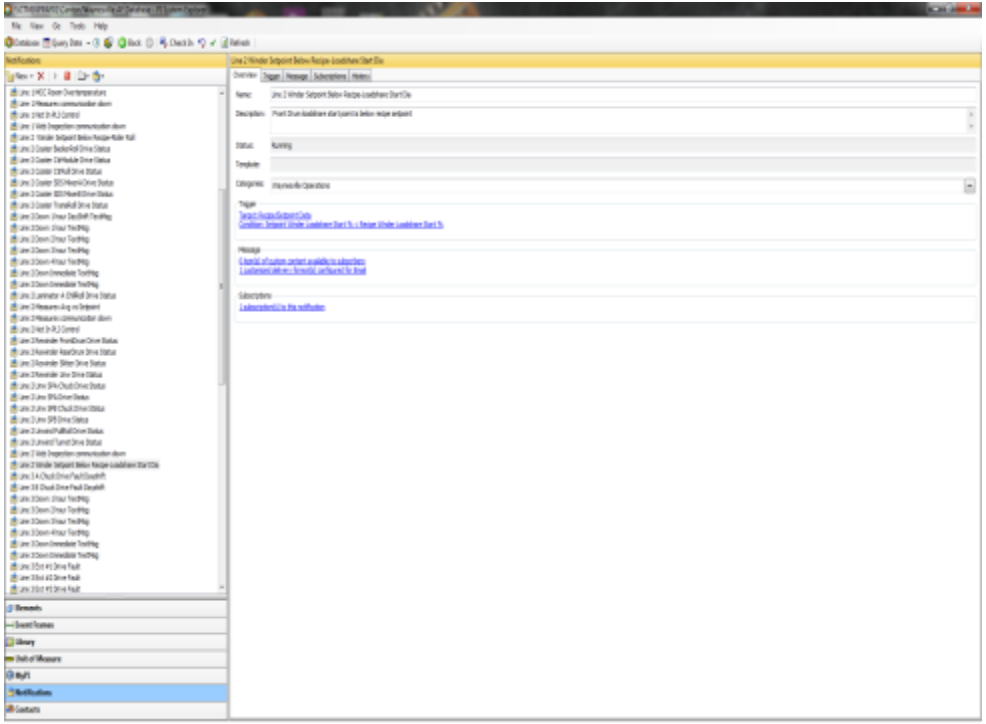
PI ProcessBook – Monitoring Real Time

- PI ProcessBook screen created to monitor recipe points vs running parameters.
- Screen made available to operators, supervisors, and managers on local intranet
- Duplicate PICoresight screen available via remote login



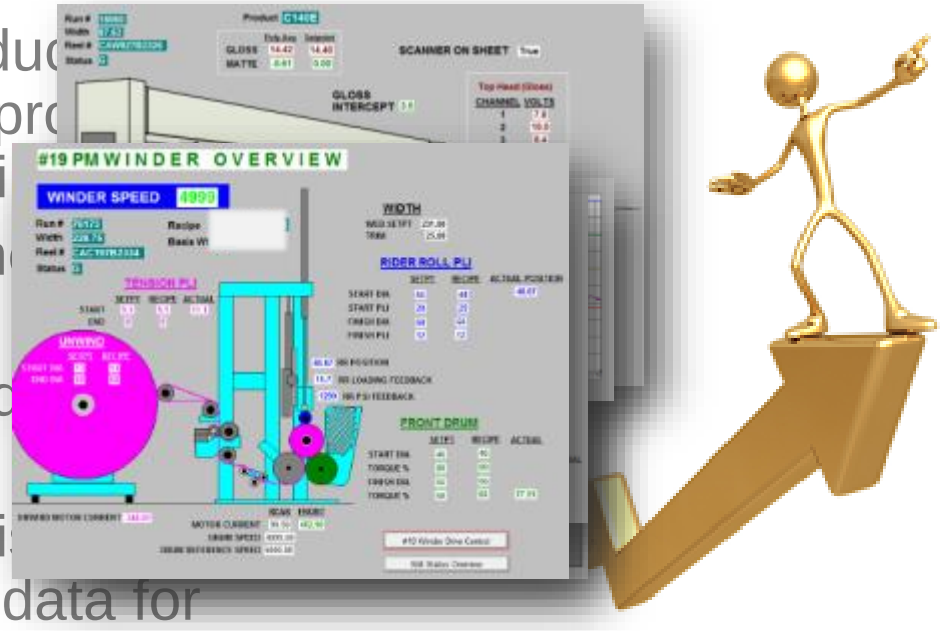
Notifications

- Notifications created to alert when winder is running above or below setpoint
- Different notifications for 3 main parameters “**TNT**”
  - **T**ension
  - **N**ip
  - **T**orque



Results Obtained and Business Impact

- Greater than 60% reduc
  amount of off quality pr
  produced on this equi
- Maintained improvem
  months
- Leveraged to other eq
  with similar results
- Operator and Supervi
  monitor process with data for
  immediate feedback to positively
  impact results



Leveraging PI Data for In-Line Quality Improvement

COMPANY and GOAL

Evergreen Packing produces fiber based packaging and needed to significantly reduce in-line quality issues at the final step in the extrusion coating process.

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CHALLENGE

Determining machine recipe settings vs running parameters when off quality products were produced.

- Data not often captured when off quality product produced
- Operators not fully trained to understand and interact with machine parameters.

SOLUTION

Real time data captured using PI ProcessBook and PI DataLink.

- PI ProcessBook screen setup to monitor recipe settings vs running parameters
- PI DataLink tables established to review good vs off quality parameters
- Notifications implemented to alert when recipe set points do not match running parameters.

RESULTS

Saved ~$180,000 in one year by reducing off quality product produced on target equipment by 60%

- Operators understand winder parameter settings better and training program updated
- Sustainable results with real time monitoring and notifications
- Leveraging lessons learned to other similar equipment

Conclusion

- Real Time and Historical Data is key to root cause analysis
- Operator Engagement with data will yield faster results
- Analysis has to be done on good production as well as off quality production.
- Immediate feedback with PI Notifications will result in increased in-line quality.

Contact Information

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Manufacturing Excellence Engineer

Questions

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State your **name & company**

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감사합니다

谢谢

Danke

Gracias

Merci

Thank You

ありがとう

Спасибо

Obrigado