



Wyatt Koerner, Crystal Springs, MS, USA, September 24, 2014

InnovateMEP Success Story

Coil Winding Cycle Time Improvements, Small Power Transformers

- ABB (www.abb.com) is a leader in power and automation technologies. The ABB Group of companies operates in around 100 countries and employs about 145,000 people.

Crystal Springs, MS Operations

Power Transformers

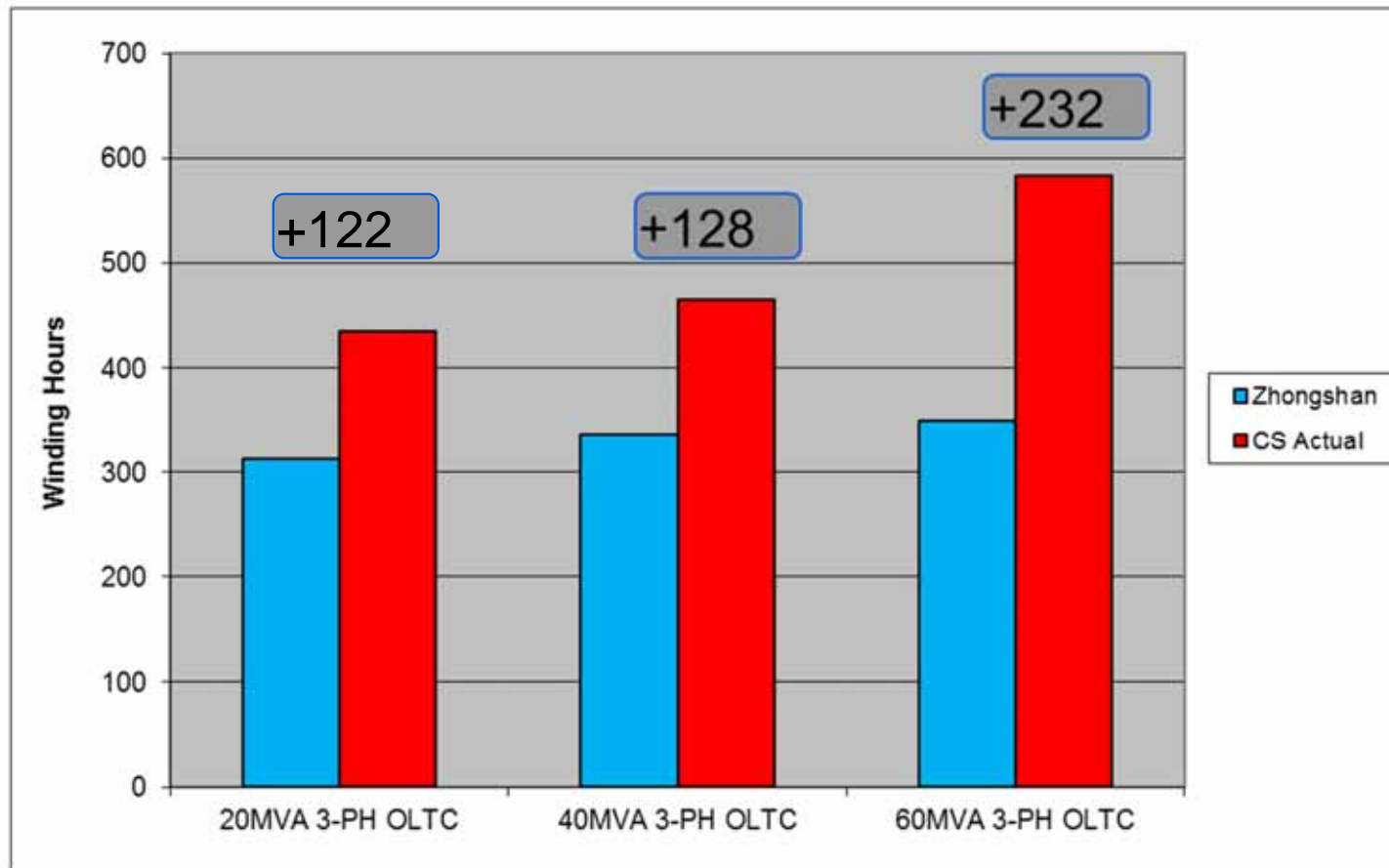


Instrument Transformers



Current Situation (January 2012)

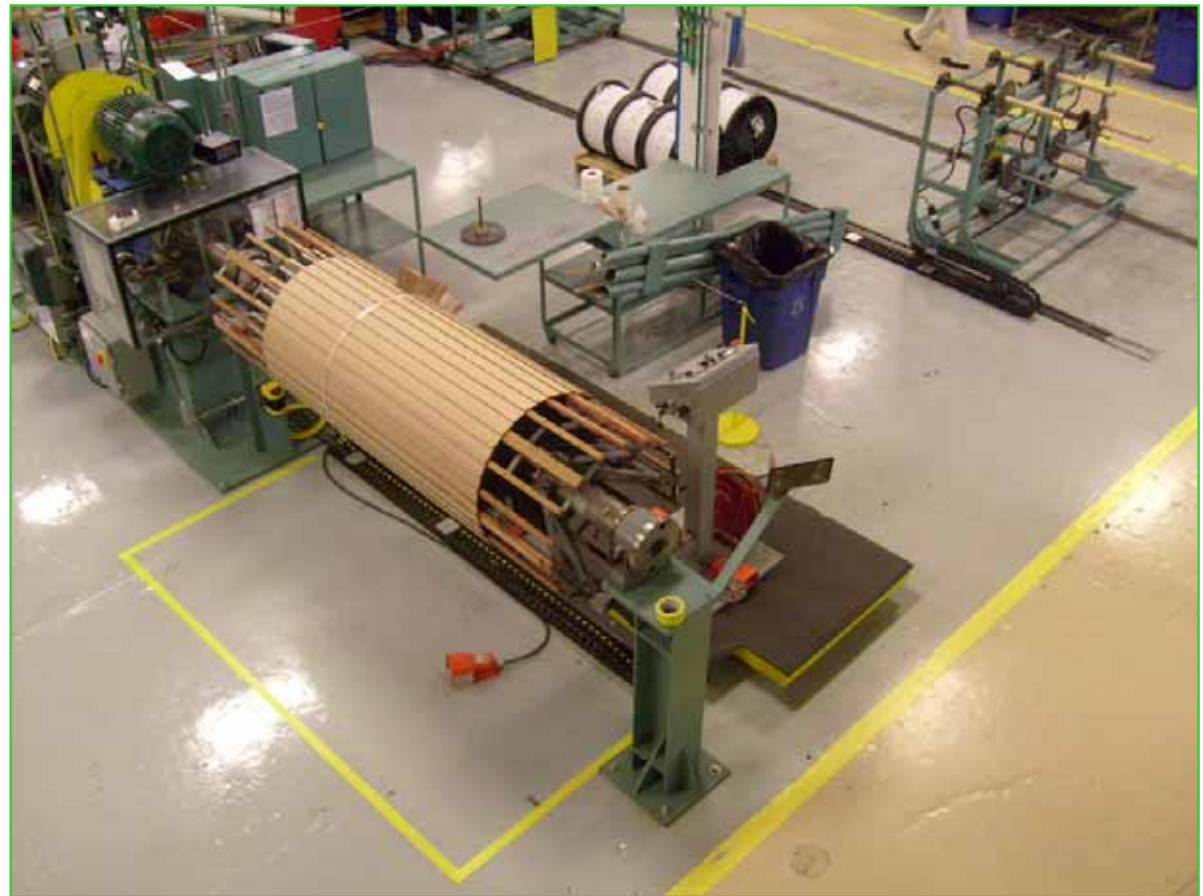
- ABB benchmarked Crystal Springs against four other Power Transformer factories (Italy, India, Colombia, China)
- Crystal Springs significantly exceeded coil winding hours target
- ABB experts recommended coils could be wound in benchmark countries and shipped to Crystal Springs



Current Situation (January 2012)

- CS-SPT uses 22 horizontal winding machines to produce 25 units per month
 - Benchmark plants have up to 12 winding machines to meet equal volume**
- CS-SPT has winding operators perform non-value added work such as:

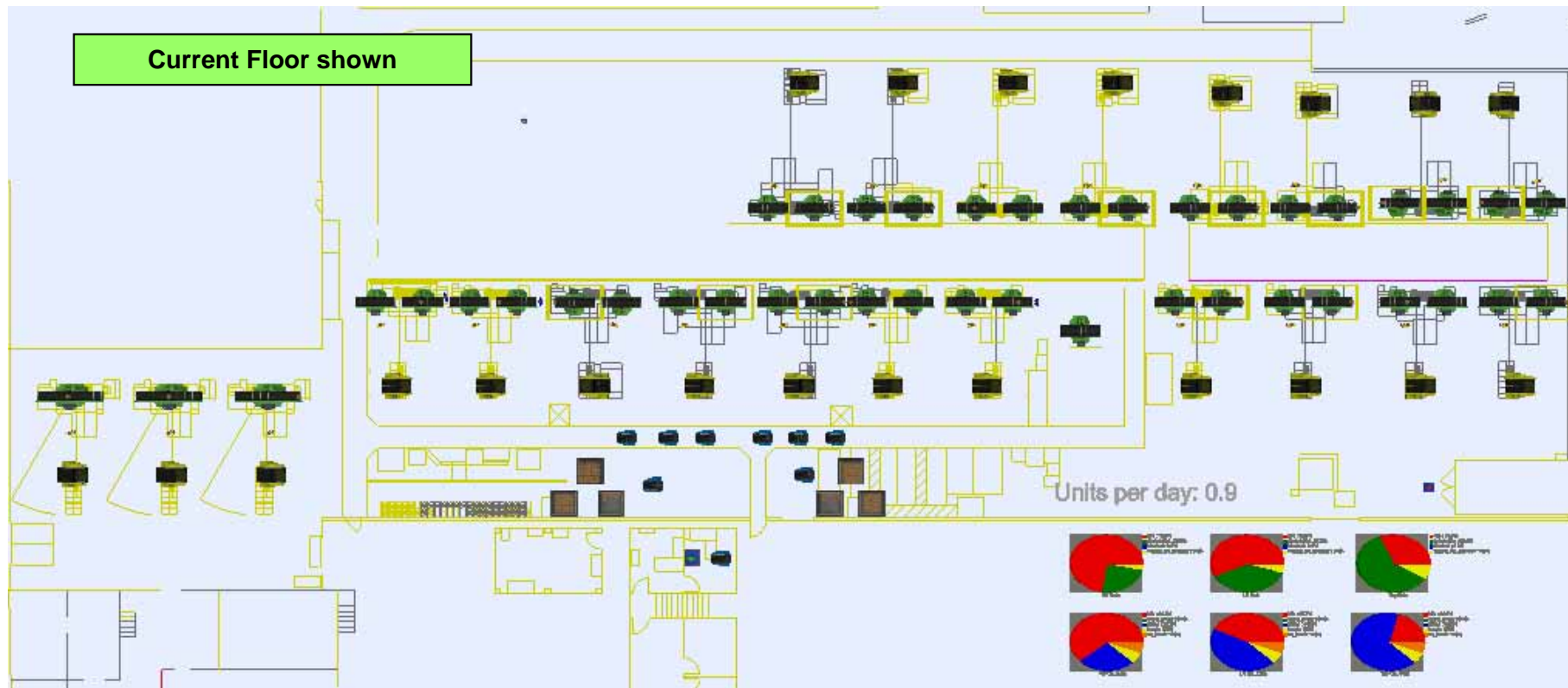
- Obtaining and loading conductor to dereelers**
- Obtaining and loading winding cylinder**
- Installing key spacers (1000s) to the winding cylinder**
- Hand-cutting small insulation kits**
- Waiting for assistance from shared back-turner**



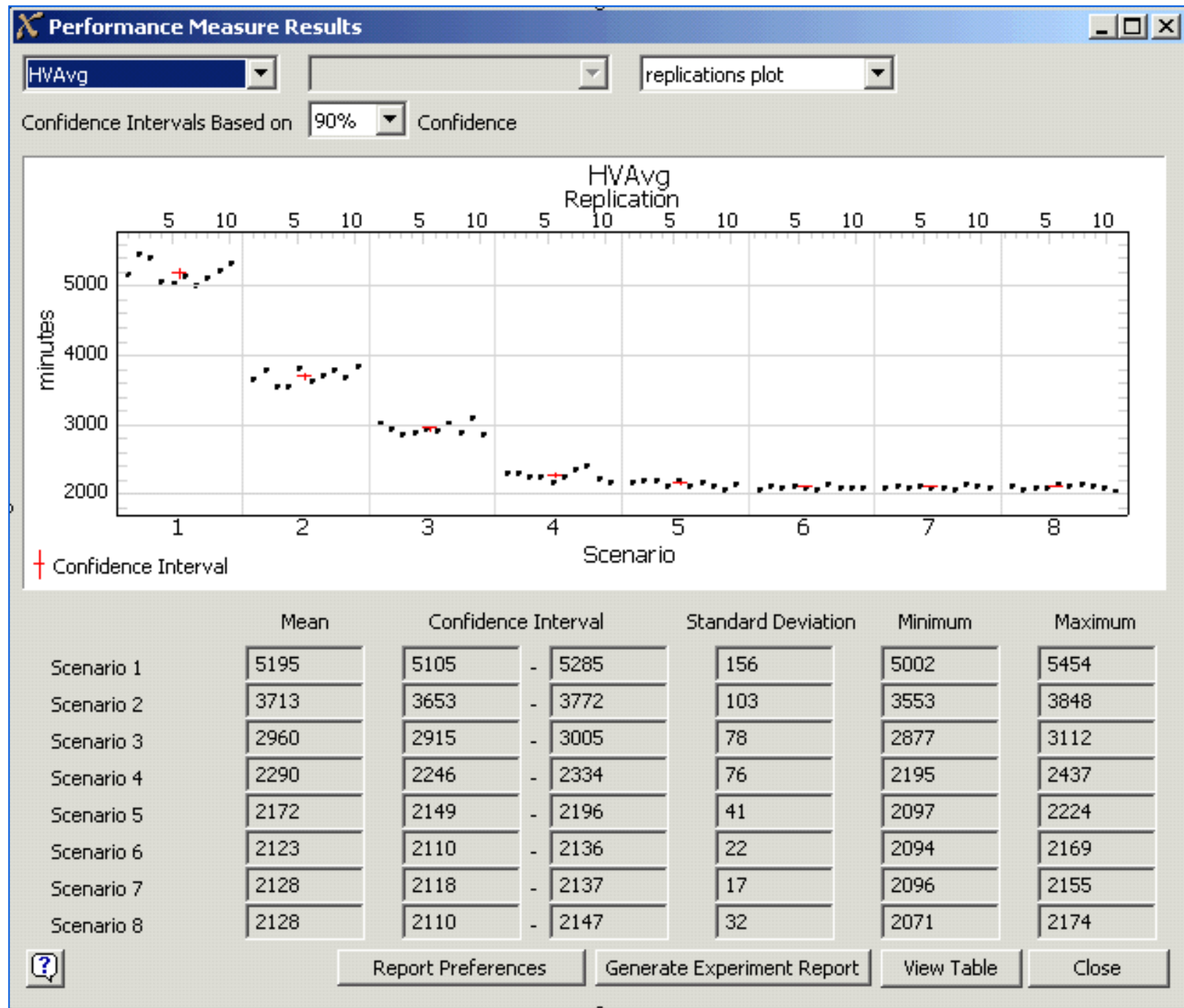
Simulation Modeling and Analysis

Flexsim Plan

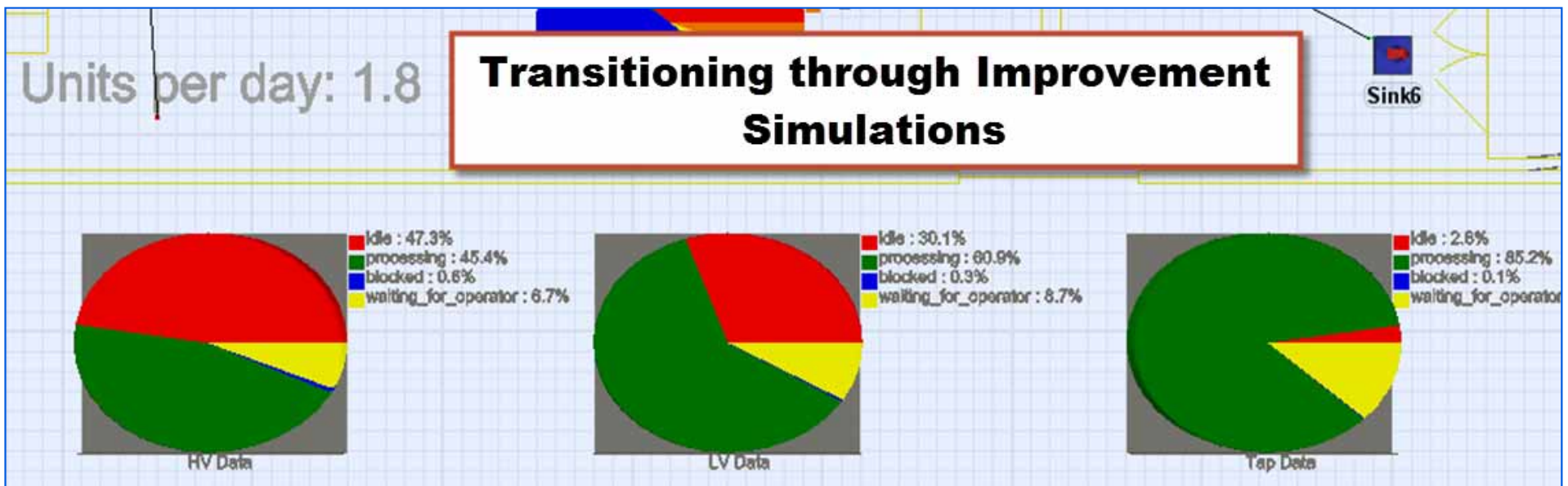
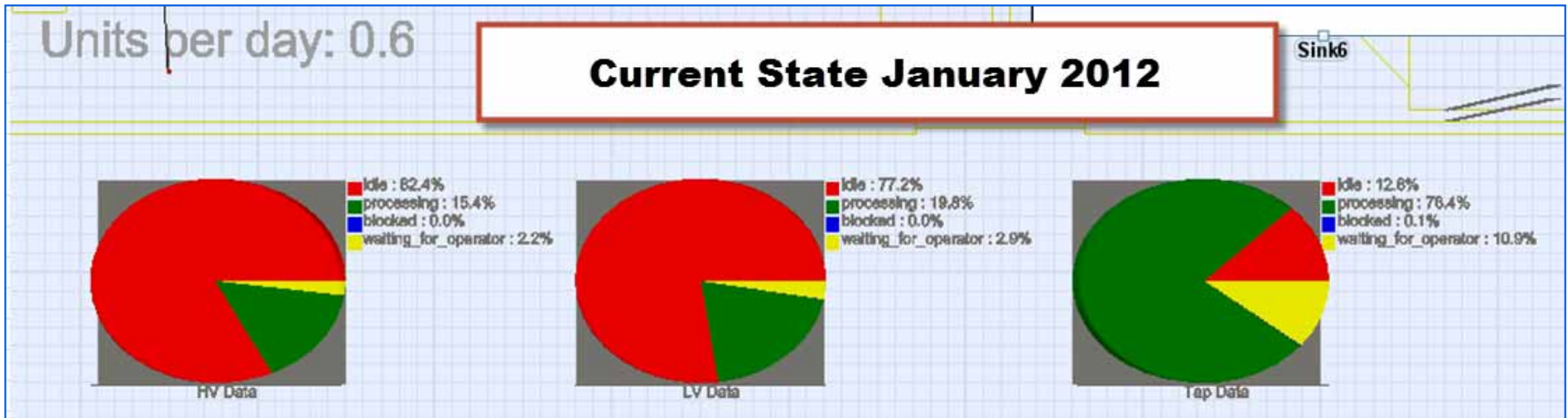
1. Develop base model of single machine
2. Expand model to simulate production floor
3. Identify cycle reduction from 3-shift to 2-shift production
4. Identify cycle reduction through implementation of winding standards
5. Identify cycle reduction through optimization of back turner
6. Identify cycle reduction through SMED setup
7. Optimize number of winding machines to meet sustained volume target
8. Demonstrate potential of new technologies (CTC conductor, vertical machines, etc)



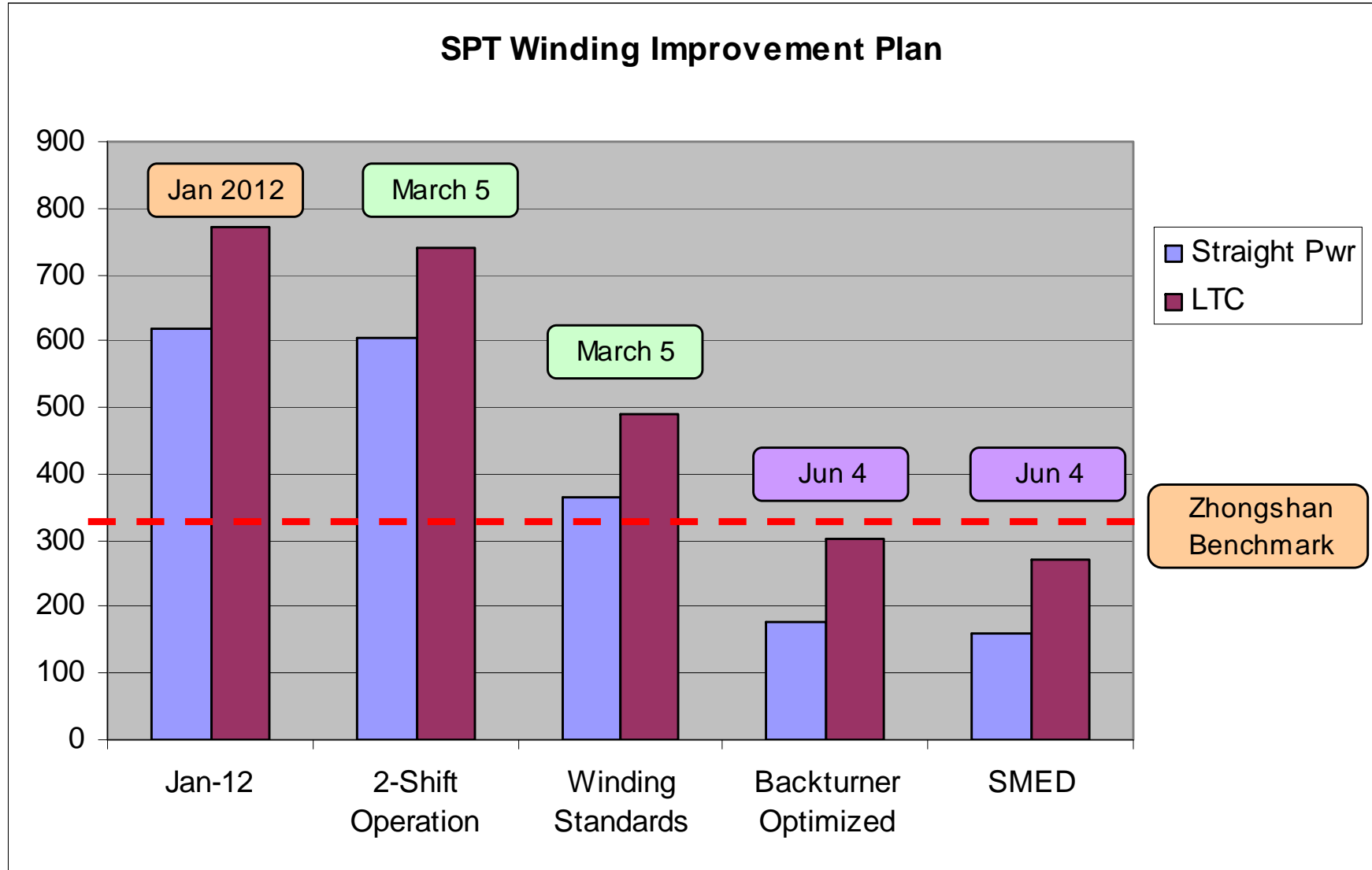
Flexsim Data Example



Flexsim Data Example

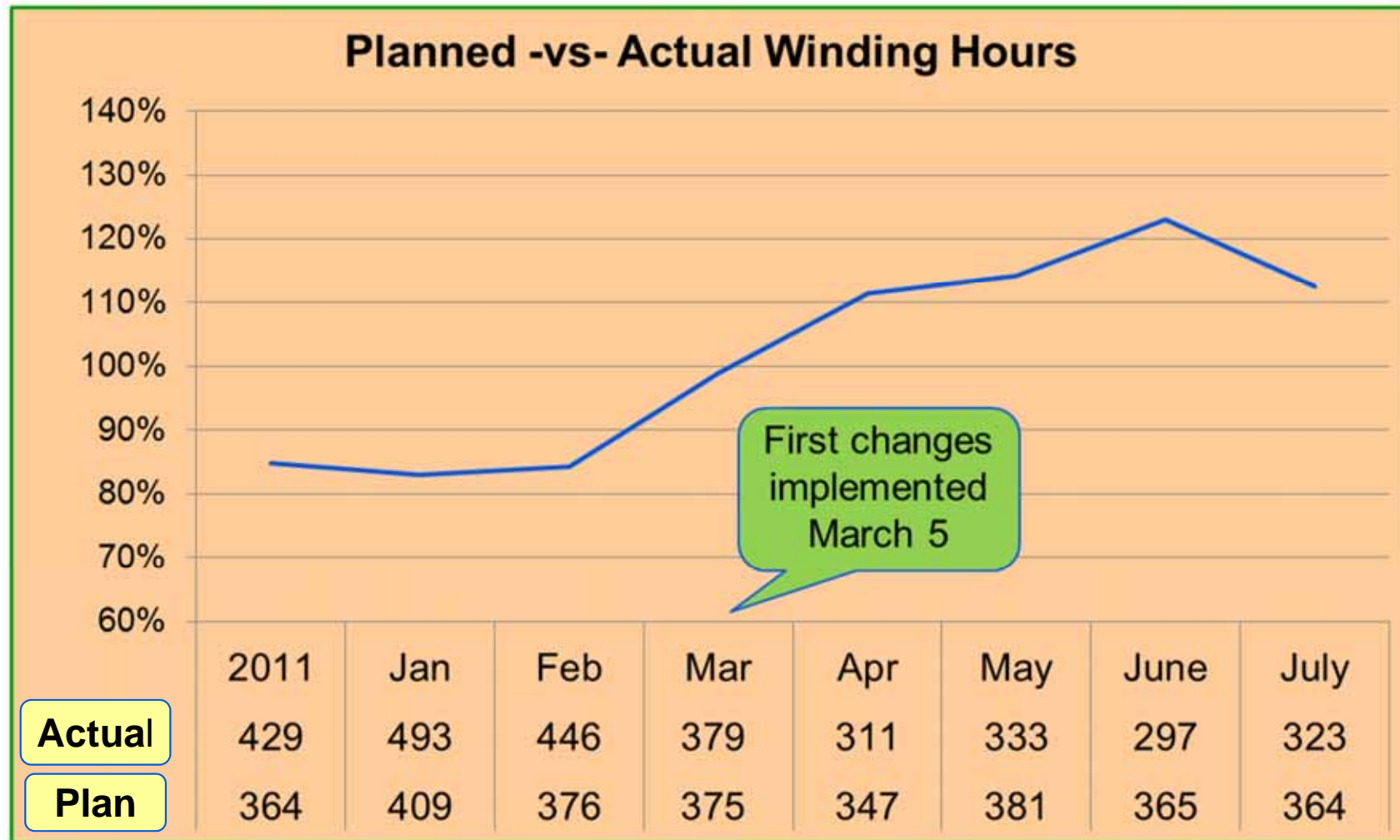


Flexsim Results



Results – SAP Labor Confirmation

- 113 hour/unit improvement versus 2011
- Winding Dept improved margin in by \$9600/unit!
- Additional capacity and flexibility



Continuing Improvement – Modern Expandable Winding Mandrels



- Built in Columbia, MS
- Saves up to 6 hours in set-up time
- Improves the quality of the winding
- Able to use thinner winding cylinders



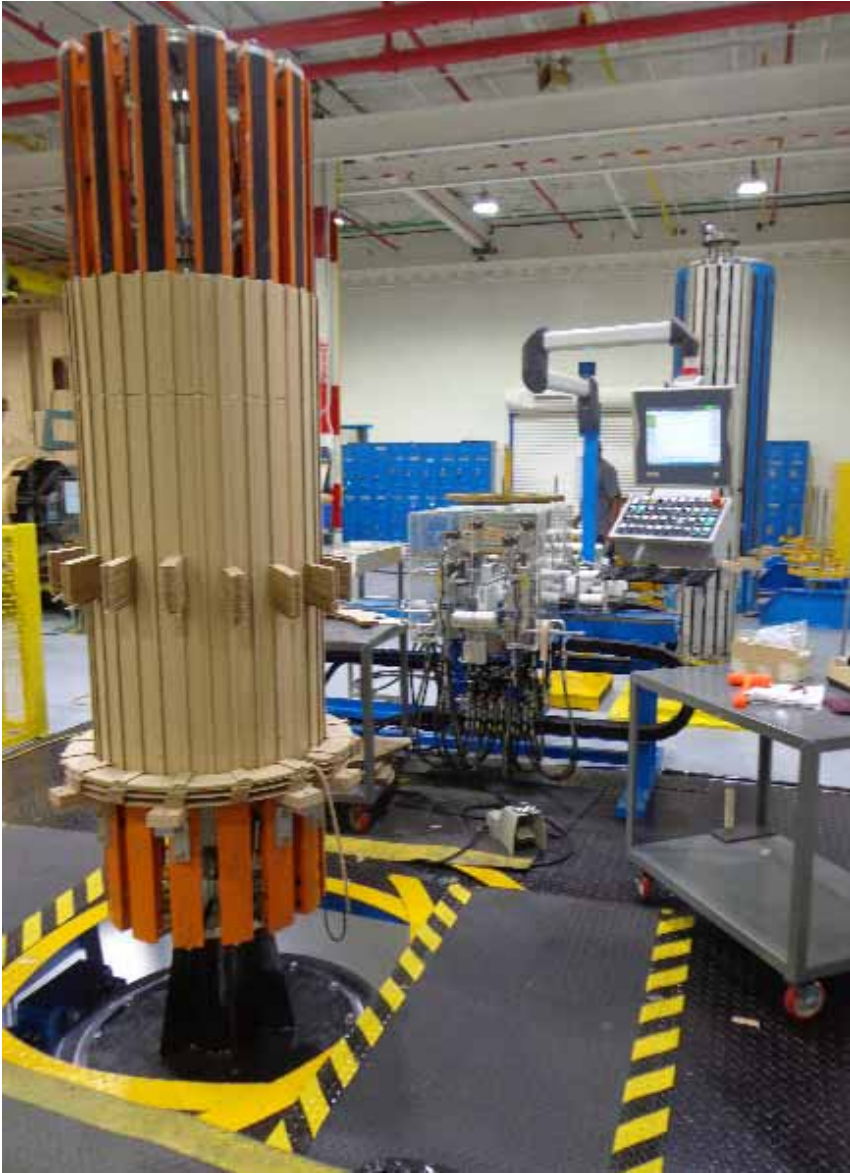
Continuing Improvement – Continuously Transposed Cable

- Significant reduction in winding hours
- Improved thermal and short circuit performance
- Outstanding opportunities for additional cost take-out



Continuing Improvement – Vertical Winding Machine

- 27% efficiency improvement over horizontal machines
- No back-turner required
- Automated wire bending, tensioning, and positioning
- 2nd machine to be installed by 10/15/14



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