ISE @ OSU Integrated LeanSigma Best in Class Certification Case Studies

Webinar Leaders

D. Scott Sink, ISE @ OSU
Katie Monaghan
Daniel Low Pitroff
Michael Beardsley

26 April 2017
Purpose, Objectives, Agenda

**Purpose:** Share best in class Integrated LeanSigma Certification Project Case Studies

**Objectives:**
- Overview the ILSS Capstone Cert Prog in ISE at OSU
- Share three neat case studies, all different
- Entertain Questions as go along if possible
- Share upcoming Webinar’s from IISE’s Chapter #1

**Key Points:**
- The ILSS Capstone Certification Program is celebrating it’s 10th year!
- Case Study 1—There is a science to reducing turnover, causing improved ideal behaviors from employees
- Case Study 2—Getting the Data Model right is required to achieve Level 5 Process Maturity
- Case Study 3—Tapping in to our Suppliers full capabilities often improves the effectiveness and efficiency of our own organizations.
Each year, in April, the Eastern Ohio Chapter of IIESE brings you a Webinar that shares best in class Case Studies of LeanSigma Certification Projects in the Central Ohio area.

1– **Katie Monaghan** completed an **Employee Turnover Reduction Project** for Interim Healthcare. She employed the Employee Value Exchange Optimization Model/Method and created a ‘points program’ that is now being tested and will be deployed across the organization. The CEO of Interim says’, “Katie, where have you been, we’ve need this for so long.” $7M in uncaptured revenue is the size of the prize.

2– **Daniel Low-Pitroff** completed a **Yield Loss Reduction Project** for Kroger Bakery. He has created a data model that utilizes VBA to link/integrate data capture to data organization to Minitab Analytics and will create the ability for Kroger to move to Level 5 Process Maturity on this ‘band/line’. The real benefit is that this models how Kroger can become more effective with Operational Analytics.

3—**Michael Beardsley** completed a **Strategic Outsourcing Project** for Peerless Saw. He developed a Make/Buy Model for outsourcing the ‘circles’ to their steel supplier. The President/Owner of Peerless says, **“this is a game breaker for us”**. Benefits are COGS reduction, ESOP improvements, and employee pain point reduction.
ILSS Certification Program Overview

- Three Semester Sequence of BB Foundation Course (ground school) and then a two semester Certification Project
- **Blended Training/Development Model** (Moresteam, Case Studies, Labs…)
- External Review Board of Deployment Leaders, MBB’s, program graduates
- **“Dark” Green Belt** Certification on top of **Black Belt** Foundation Certificate.
- Excellent Track Record of Success for Sponsors and for Candidates
Program Outcomes: Sponsor Impact

- 10 years of successes
- 25% of the ISE students at OSU take this ‘option’
- 90% certificate rate (440 BB Certificates)
- 70% Certification Rate (200 completed projects, 21 in flight)
- ~$10 M in audited direct and indirect benefits
- 100% of candidates get their desired jobs before graduation—super high demand for these candidates
Blended Training Model in many respects

Blended and balanced hard/soft skills
Program and Project Management Focus (Bias for Results)

Personal and Professional Mastery:
Team work and leadership
Habits of Highly Effective People
Learning how to learn better
Change Leadership and Management
Full Potential Performance

Systems and Statistical Thinking:
Operational Excellence
End2End Value Stream Mapping and Analysis
Improve your skills with Statistical Process Control
Exploratory and Confirmatory Data Analytics
How many of your core ISE courses come together to improve systems and

Pragmatic Modeling of Problems and Projects
Integrated Program Management
Modeling and Execution Approaches
Extensive Case Examples from a wide variety of organizations

Opportunity to add an Integrated LeanSigma Certification and a best in class Internship to your BSISE
Green Belt Certification on top of your Black Belt Foundation Course Certificate (5810)
Greatness is a lot about disciplined people (thought, word, deed)—Jim Collins

Disciplined about what?—Peter Senge

- Systems & Statistical Thinking
- Personal Mastery
- Mental Models
- Building Shared Visions
- Team Learning

If an egg is broken by an outside force, life ends.

If an egg is broken by an inside force, then life begins.

Great things happen from the inside.
Operational Analytics—another major focus in the training

- In the current state process, we split data and analytics
- Data are stored in a common place, and are trusted and available

Foundational data role
- Select and gather data from many sources, preferably through automated extract, transfer, & load (ET&L) process
- Assure data are cleaned & ready for analysts to use – data quality monitors
- Assure data are integrated & can be joined with other data – think LEGO's
- Assure data storage is high reliability & user-friendly – SSAS cubes, databases

“Above the line” analyst role
- Extract features from data through statistical analyses
- Apply business acumen to data & analyses – create new knowledge
- Apply data visualization techniques to aid in telling the right story – as in life, so in business: the best story wins ...

S. Cunningham; Intel Corporation; 2013
Great Sponsors in the Greater Columbus Area

Very balanced portfolio of industries, problems, solution approaches that benefits the group of candidates

Life Sciences, Health Care & Social Services

Retail & Food Processing Services

Financial & Other Transactional and Shared Services

Production, Manufacturing, & Process Industries
The Program Launched in 2007 with the goal of doing a better job of Readying our Students to Contribute in the Real World

Soph/Jr. (‘composite’ Profile)

PERSONAL MASTERY
• don’t listen well
• Action junkies
• don’t stay focused, can’t juggle multiple balls well
• don’t communicate well
• victim behavior
• judgment mode common
• Parent-child lingering, still, with Teacher-Student, which will carry over to boss to subordinate if not corrected

PROFESSIONAL MASTERY
• do not exhibit ideal learning behaviors
• do not understand what it takes to succeed in the ‘real world’
• struggle mightily to ‘reduce to practice’, sloppy, undisciplined practice
• can’t manage projects successfully
• do not manage relationships proactively
• cannot produce results, lose sight of the end-game
• have heard the talk on ‘ethics’ and values

2 Semester, Real World Capstone

Black Belt Foundation Course (all five Disciplines)

ILSS CERTIFICATION PROGRAM

Senior (‘composite’)

PERSONAL MASTERY
• can deep listen, can active listen, seek to understand
• Plan before acting, Context, Possibilities, Action
• practiced focus and persistence with something difficult for 6+ months
• communication skills (written, oral, body language) enhanced for success
• spend less time in judgment more time in evaluation and difference, consciousness about tendencies
• made the switch of making the switch to Adult to Adult

PROFESSIONAL MASTERY
• improved consciousness and practice with ‘ideal learning behaviors’
• clear understanding of ‘flat world’, competitive World requirements for success, more real world savvy
• lot’s of opportunities for perfect practice
• demonstrated program and project management skill to gain certification
• relationship management skill development initialized, understand importance
• Capable of producing results in timely fashion and understand them in context of the system or higher good
• have had to walk the talk on ethics and values

Solid ISE Core Curriculum:
OR, HFE, MSE, M/PSE

The Program Launched in 2007 with the goal of doing a better job of Readying our Students to Contribute in the Real World
Candidates Defending and Sponsors

THE OHIO STATE UNIVERSITY
Candidates and Sponsors for 2017-18
Agenda Highlights

- ILSS Certification Program Overview
- Case Study Presentations

- Katie Monaghan—Designing, Developing, Testing an Employee Value Exchange Optimization Program in order to reduce turnover and capture in excess of $6M in lost revenue each year.

- Daniel Low Pitroff—

- Michael Beardsley
Turnover Reduction Project

Salo Solutions
Interim Healthcare

Presented 4/26/2017

Project Leader: Katie Monaghan
Mentor: Laura Czuba
Coach: Dr. Scott Sink
Who’s Katie Monaghan?

- Cincinnati Native
- Industrial Systems Engineering (SP17)
- Organizational Communications Minor
- 6 independent internships
- Accepted full-time position at General Motors
- Activities:
  - Women in Engineering
    - Professional Development Lead
  - High School Outreach
    - Event Coordinator
Webinar

Meeting Purpose
- Summarize my design for lean sigma project regarding turnover in the healthcare industry

Objectives
Gain an understanding of how design for lean sigma can be applicable in human resources and the healthcare industry

Agenda
Intro to candidate
Intro my company
What’s at stake?
- Business case
Main problem
- Why is it this way?
- How can we fix it?
- Design of Solution
- Does it work?
- Long Term
- Operational Definitions
Immediate next steps
Wrap up
Interim is the Midwest leader for at-home HealthCare services

Salo Solutions
Industry leader for at home healthcare services: Home Health Aides (HHA), Nurses (RN) etc.

5000+ employees across Ohio, Pennsylvania, West Virginia, Kentucky and Indiana—most in Ohio

64 Midwest Branches under Salo Solutions
Each branch is independently operated
Turnover is high, average 56% every year causing 6.9M lost revenue due to understaffing.

Interim HealthCare experiences a high turnover rate of field staff employees. 

**Goal is to decrease turnover.**

<table>
<thead>
<tr>
<th>Branch</th>
<th>Turnover Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Columbus</td>
<td>65.22%</td>
</tr>
<tr>
<td>Lancaster</td>
<td>79.17%</td>
</tr>
<tr>
<td>Newark</td>
<td>81.68%</td>
</tr>
</tbody>
</table>

**Current State**

% Turnover (by month annualized)

**Scope**

Expand programs that reduce turnover

**Why? (Business Case)**

There is high variability across the system/branches in terms of how they attempt to manage retention—a ‘root cause’
Variability is due to the independently created retention programs being used.

Each branch is independently operated = Retention practices differ by branch Best practices aren’t shared

Variation between branches
Each branch creates and implements their own retention programs

Variation within a branch
Branches change up quarterly incentives but these interventions are not tracked systematically

We researched the practices across and within branches.
Points programs are top category in long term retention

The largest contributing factors by lifecycle are:

**Lifecycle of an Employee**
- Decide to work for Home Health Care
- Pick Interim
- Onboarding
- Adjustment Period (1yr)

**Activities #1-3**
- Gas Reimbursement
- Sign on bonus
- Free CPR Training
- Cell phone Peer mentor
- Welcome kit for new hires
- Shadow another employee

**Data for Future Projects**
- Attracting New Employees
- Ease New Hires into the Company and the Position

**Scope of my Project**
- Points Programs
- Anniversary Birthday Cards/Gifts
- Free CPR training

For each activity, participants were given a set of factors that contribute to each of these figures and asked to rank them on impact.
Most impactful programs: Points Program, No Call Off, Longevity Bonus, Birthday & Gatherings

These 5 Programs…

1. Have the most impact in turnover, if the program exists, less turnover, if not, higher turnover.
2. And we have enough data to make us 80% confident in that impact.
Implementation of variations of these 5 programs are shown to decrease turnover

How can we extract value from this information?

‘Smart’ Investments in the development of consistent programs in these five areas have shown to positively impact retention.
Points program is the best route to move forward

Why?

1. **Already has a positive impact** on the branches
2. We can **incorporate other programs** known to decrease turnover
3. **Customizable** by branch

*How do we create a points program?*
How do we design a Points Program?

- Input directly from Field Staff (from value survey)
- Encourage Ideal Employee Behavior
- Costs of Program
- Utilize Best Practices

Employees were asked to rank which actions they thought should be worth the most points.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Points</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10+ Hours</td>
<td>100</td>
<td>$0.10</td>
</tr>
<tr>
<td>20+ Hours</td>
<td>500</td>
<td>$0.50</td>
</tr>
<tr>
<td>30+ Hours</td>
<td>750</td>
<td>$0.75</td>
</tr>
<tr>
<td>40+ Hours</td>
<td>1000</td>
<td>$1.00</td>
</tr>
<tr>
<td>Saturday and/or Sunday</td>
<td>200</td>
<td>$0.20</td>
</tr>
<tr>
<td>A Holiday*</td>
<td>5,000</td>
<td>$5.00</td>
</tr>
<tr>
<td>Birthday</td>
<td>5,000</td>
<td>$5.00</td>
</tr>
<tr>
<td>Anniversary</td>
<td>20,000</td>
<td>$20.00</td>
</tr>
</tbody>
</table>

Additionally, call offs will cut your total points for the week in half.

Simple & Easy to Understand

11 Unique Activities to 4 plus Tiered Hours

1000 points = $1
Mount Vernon Test for Rural Area

Hamilton Test for Urban Area

Similar statistics for testable metrics

AVA Rewards could make you an extra $300 or more a year!

<table>
<thead>
<tr>
<th>Activities to Earn Points</th>
<th>Points Earned Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working</td>
<td>No Call Offs</td>
</tr>
<tr>
<td>a Holiday</td>
<td>5,000</td>
</tr>
<tr>
<td>a Weekend</td>
<td>200</td>
</tr>
<tr>
<td>10+ Hrs/Week</td>
<td>100</td>
</tr>
<tr>
<td>20+ Hrs/Week</td>
<td>500</td>
</tr>
<tr>
<td>30+ Hrs/Week</td>
<td>750</td>
</tr>
<tr>
<td>40+ Hrs/Week</td>
<td>1,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events That Earn Points</th>
<th>Points Earned Per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anniversary</td>
<td>20,000</td>
</tr>
<tr>
<td>Birthday</td>
<td>5,000</td>
</tr>
</tbody>
</table>

Gift Card Amounts

<table>
<thead>
<tr>
<th>Gift Card Amounts</th>
<th>Points Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25 eGift Card</td>
<td>25,000</td>
</tr>
<tr>
<td>$50 eGift Card</td>
<td>49,000</td>
</tr>
<tr>
<td>$75 eGift Card</td>
<td>73,000</td>
</tr>
<tr>
<td>$100 eGift Card</td>
<td>96,000</td>
</tr>
<tr>
<td>$150 eGift Card</td>
<td>143,000</td>
</tr>
<tr>
<td>$200 eGift Card</td>
<td>190,000</td>
</tr>
</tbody>
</table>

You’ll be enrolled and earn points automatically

Ava will do the math!

You’ll now have a total of 2,200 Appreciation Points!

Save up 25,000 points to spend!

Personalized weekly emails sent out using MailChimp

Hello, I’m Ava!

Redeem points for Amazon eCards!
Timeline: Trial implemented and gathering data

**First Hours turned in**

13, 14, 15

**Communications to Employees**

April

First Weekly Email Sent

**Onsite Feedback Event 4/4 and 4/6**

**Feedback Phone calls to interested employees 14-18**

AVA is LIVE!
# Metrics: Canceled visits, participation, and long time returning employees

## 3 Key Metrics

<table>
<thead>
<tr>
<th>Canceled Visits</th>
<th>Participation</th>
<th>No Paycheck Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canceled visits due to “no staff available”</td>
<td>Goal 50% participation</td>
<td>Do we see a surge of employees that have not picked up a shift in awhile choosing to return to Interim</td>
</tr>
<tr>
<td>We have historical data of trends</td>
<td>Onsite event Bonus Points via email response</td>
<td></td>
</tr>
</tbody>
</table>

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**Interim**

**Ohio State University**

**Salo Solutions**
Across all segmentations, participation in program is extremely higher than expected.

Of those opening emails, 60% of them have opened 3 or more!

Goal was 30-50%
New Hire participation is high, which is key to reducing turnover.

"Research shows that worldwide, just 13% of employees are engaged in their jobs."
- Gallup

"An engaged employee is less likely to leave."
- Customer Service Group

"Higher Participation, More Impact."
- Quality Incentive Company

40% of new employees have read at least 3 of our emails!

Termination data + opening rate new hires = sticky relationship with new hires who are at most risk for leaving.

Interim loses 57% of new hire employees within their first year.

2016 Terminated Employees
No Paycheck Employees- no observable trend, but they are reading our emails

59% of Paycheck employees are reading our emails

Hard to say definitively but there is a possibility that program is aiding paycheck employees
Canceled Visits: Change More Drastic in Larger Branches

So far we have 764 less canceled visits than last year, 78% from Hamilton, over $60K!

2017 has less canceled visits than 2016

Hamilton significantly more “not canceled” visits

2016/17 Trendline

Less Canceled Visits 2016 - 2017

Hamilton finally has lower canceled visits than Akron, first time in over a year!
Scheduler feedback - easier to get people to pick up shifts

“Scheduling is A LOT easier, people seem eager to pick up more hours especially since we posted up the hours on the wall. Competition increased and people are trying to beat their friends” - Mandy HHA Scheduler Mt. Vernon

More hours trending upward starting the 4th!
Employee feedback—overwhelmingly positive!

“Awesome idea because everybody wants to be appreciated and in this industry we don’t get that much pay or benefits compared to other places”

“Excited about it! It’s a really good way incentive. Its really positive watching my points go up!”

Motivational  Incentive  Appreciative

“ Inspiring—excellent motivation. Any incentive makes our jobs more enjoyable.”

“It makes a person think “wow they really care about me” ”

“I was talking to another employee and telling them they have to hop on the portal I and check it out! I love that I can get amazon gift cards”

“I love how simple it is to understand”
Trial achieved our two main objectives

Is it achieving our goals as an appreciation program for our employees?
Employees extremely receptive which is key for long term retention benefits.

Short term metrics support long term retention?
Participation extremely promising across all engaged employees stick with their company
Quick Recap

Points Program

Ideal Employee Traits

Employees were asked to rank which prizes they perceived as more valuable.

Trial in Progress

AVI Rewards could make you an extra $300 or more a year!

Gift Card Amounts

Points Required

$25 eGift Card: 25,000
$50 eGift Card: 49,000
$75 eGift Card: 73,000
$100 eGift Card: 96,000
$150 eGift Card: 143,000
$200 eGift Card: 190,000

Employee DATA

- Decide to continue working for interim
- Points Program
- Anniversary Birthday
- Get Free Gift
- Long Term Retention
- Longevity
-时段和活动
- Points Program
- No Call Off
- ROI
- VALUE EXCHANGE
- Investments ($)
- Returns ($)

Long term sustainability
Logical Next Steps

Step One:  Do we want to continue to expand AVA Rewards to all offices?

Step Two:  What are we changing about the program?  
Make changes/transition to AVA Rewards version 2

Step Three:  Rewards Fulfillment options

Step Four:  Implementation Planning:  Who, What, When?  
Implement in all offices

Step Five:  Analyze Responses (Plan→ Do→ Check→Act cycle)
Completed:
- By analyzing the data, it was determined that a **points program would yield the greatest cost/benefit**
- Data collected from **employee input** and **ideal employee behavior** along with cost was used to **create program with high perceived value**
- A trial is currently in progress at Mt. Vernon and Hamilton offices
- **Data supports short term metrics that program will encourage long term turnover reduction.**

Do you have any questions?

Special thanks to Salo Solutions and Dr. Sink for the opportunity to work on this project!
Agenda Highlights

- ILSS Certification Program Overview
- Case Study Presentations

  - Katie Monaghan: *Interim Healthcare Revenue Assurance via Turnover Reduction.*
  
  - Daniel Low Pitroff—Developing a more robust data model in order to enable Optimizing process capability to minimize Yield Loss in a Bakery

  - Michael Beardsley: Peerless Saw, Developing a Make-Buy Model to support improved utilization of Supplier Capability
Engineering Process Maturity Level Five Using Macros in Excel and Minitab
Hello!

I am Daniel Low-Pitroff
I am here to talk about how I used macros in Excel and Minitab to reduce cookie over-pack at the Columbus Bakery
Objective: Review what has been accomplished throughout the course of this project.

- Executive Summary
- Current State Process
- Conducting the DoE
- Setbacks and the Pivot
- Concurrent Methodologies
  - Process Re-Engineering
  - Data Collection and Optimization
- Final Results

Appendix
Using both the DMAIC and DCDOV methodologies, I was able to reduce cookie package weights

**WHAT**
- Short-term reduction of cookie package weights (mean) by 13 grams (about 2 cookies)
- Long-term plan to optimize cookie weights and reduce variation

**WHY**
- Resulting in savings of $34,500 in the amount of dollars lost due to over-pack
- And, demonstrate capability to do this and then expand to other lines

**HOW**
- Short-term: Process re-engineering to improve detection of high cookie weights upstream
- Long-term: Data collection and analysis tool allowing for optimization of cookie weights once data has been collected
Current State
Process

How the process works and performs
I was tasked to reduce variation, shift the mean left and have no pack weights below the Lower Bound (the government requirement).

**Current Stats**
- **Overfill Rate:** 95%
- **Underfill Rate:** 0.2%
- **Mean:** 390 grams
- **St. Dev.:** 12.5 grams

**Targeted Stats**
- **Overfill Rate:** 74.4%
- **Underfill Rate:** 0.2%
- **Mean:** Shifted over 15 grams
- **St. Dev.:** Approximately 5.5 gram reduction (44%)
I chose to focus on the wire cutting process step due to it having the best opportunity for optimization.
Capability analysis on dough weights found that 78% of weights are out of spec—only two control points in the process.
Performing the DoE

Factor screening and DoE results
SMEs were leveraged to understand what factors might be contributing the most to variability in dough weights.

We found:

- No correlation between humidity and dough weights
- Wire cut speed is not adjustable in the present system design

<table>
<thead>
<tr>
<th>Potential Factors for Screening DoE</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dough Rest Time</td>
<td>How long the dough has been resting</td>
</tr>
<tr>
<td>Dough Temperature</td>
<td>The temperature of the dough</td>
</tr>
<tr>
<td>Cylinder RPM Settings</td>
<td>The settings of the cut machine</td>
</tr>
<tr>
<td>Wire Cut Speed</td>
<td>The settings of the cut machine</td>
</tr>
<tr>
<td>Ambient Plant Temperature</td>
<td>The plant environment</td>
</tr>
<tr>
<td>Plant Humidity</td>
<td>The plant environment</td>
</tr>
</tbody>
</table>
Three factor levels were chosen on the day of the DoE because I did not have direct control over them.

<table>
<thead>
<tr>
<th>Metric</th>
<th>Lower Level</th>
<th>Upper Level</th>
<th>Units</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant Temp</td>
<td>75</td>
<td>77</td>
<td>Fahrenheit</td>
<td>Ambient temperature at wire cut machine using a calibrated thermometer, +/- 0.5 degrees</td>
</tr>
<tr>
<td>Dough Temp</td>
<td>72</td>
<td>74</td>
<td>Fahrenheit</td>
<td>Using a calibrated infrared thermometer, +/- 0.5 degrees</td>
</tr>
<tr>
<td>Dough Rest Time</td>
<td>30</td>
<td>70</td>
<td>Minutes</td>
<td>Timed from arrival of dough to “on deck” station to sample time (with 14 minutes assumed for dough to arrive once dumped)</td>
</tr>
<tr>
<td>Cylinder RPM</td>
<td>2.95</td>
<td>3.10</td>
<td>RPM</td>
<td>Ensure both sides of the feed roll is set to the proper setting</td>
</tr>
</tbody>
</table>
Research led me to believe that temperature was an important factor, but that was not found in the DoE. This was a major learning point for me in terms of data modeling and DOE Concept Design—I made a major logic error at this point.
Setbacks and the Pivot

*Transition into DCDOV*
After receiving coaching, I realized that plant temperature was incorrectly modeled in the DoE.

- The levels chosen for plant temperature represented a very small segment of possible temperatures as you can see below.
- As such, it was determined that a “historical DoE” or regression would need to be used to truly optimize dough weights.
- In essence, my focus shifted from doing a snapshot DOE to creating a data model that would support ongoing and dynamic analytics by getting more data and pairing it consistently.
I wanted to verify that plant temperature was creating variability in the process so I created the plot below.

Research and experience have shown that temperature and humidity are big factors in the baking process.
A t-test was conducted to verify the hypothesis that dough weights were less variable at lower temperatures.
In my MAi tollgate meeting, the question of the sufficiency of the Data Model and Data Base came up.

*Do you think that we can reduce variability with the data we currently have?*

The Process Engineers and Supervisors said they weren’t sure but believed that shifting directions to enhance the data model and set up how they would do the analytics made sense.
Concurrent Methodologies

*How we reduced cookie over-pack in the short and long-term*
After receiving more coaching from my coach, I decided to split the rest of my work into two concurrent tracks.

**CDOv:** Create sustainable long-term performance

**DMAi:** Improve performance in the short-term

- **We are here**
  - **Initial**
  - **Managed**
  - **Defined**
  - **Quantitatively Managed**
  - **Optimizing**

**Process Maturity Levels**

1. **Level 1:** Processes are unpredictable, poorly controlled, reactive.
2. **Level 2:** Processes are planned, documented, performed, monitored, and controlled at the project level. Often reactive.
3. **Level 3:** Processes are well characterized and understood. Processes, standards, procedures, tools, etc. are defined at the organizational (Organization X) level. Proactive.
4. **Level 4:** Processes are controlled using statistical and other quantitative techniques.
5. **Level 5:** Process performance continually improved through incremental and innovative technological improvements.

**Learning Path**: 1 to 2

- **Process Re-Engineering**
- **Excel and Minitab Macros**
Things we targeted to address short term process improvement

1. Band/Line Operator ‘tampering’. We ‘standardized’ settings on the equipment and trained/coached them to follow the protocol.

2. we create transparency for process performance and re-confirmed the target value. The culture had migrated to ‘overpack is better than underpack’ so just keep things heavy.

3. We created heightened awareness to the factors causing variation with the employees.

4. we increased/improved the Sampling Process.
This is what we have observed has happened to dough weights in the short-term and what we predict will happen in the long-term.

This is not conclusive, low power of sample.

We are here.
Process Re-Engineering

*Moving the needle in the short-term*
I used FMEA and observation of each operator to develop suggested improvements

1. Create data analysis tool (complete)
2. Train operators to try and hit specs rather than run heavy
3. Post charts on operator/shift performance
4. Recalculate new specs based on bake-off
5. Test different spec limits for each SKU
6. Purchase a freezer and freeze dough before dumps
7. Take dough weights more frequently (complete)
Data Collection and Optimization

*Using VBA to improve data collection and analysis to enable future optimization*
Based on the factors chosen for the DoE, I created a way to collect and aggregate that data using Excel and VBA.
The tool enables users to input, aggregate, and filter collected data then conduct automatic Minitab analysis that exports to a PowerPoint.

**Intended Benefits**
- Enables scaling of analysis across SKUs
- Collection of data into one location for optimization
- Save time on conducting analysis
Final Results

What are the short-term benefits
After implementation of more frequent weight sampling, FP weights can be seen to decrease significantly.
THANKS!

What questions do you have?
Agenda Highlights

- ILSS Certification Program Overview
- Case Study Presentations

  - Katie Monaghan: *Interim Healthcare Revenue Assurance via Turnover Reduction.*
  
  - Daniel Low Pitroff: *Kroger Bakery Yield Loss Reduction (minimize overpack) via Enhanced Data Model to drive process to Process Maturity Level 5*
  
  - Michael Beardsley—Designing and Developing a Model to support dynamic make/buy decisions and to tap into full capabilities of our key supplier. Peerless Saw
Peerless Saw Make/Buy Strategy Improvement

ILSS Green Belt Candidate – Michael Beardsley, OSU
Coach - Dr. Scott Sink, ILSS Program Director, OSU
Sponsor – Tim Gase, President, Peerless Saw

“This Project will be a ‘game breaker’ for us in the next couple of years.”
President, Peerless
• Purpose: To share a case study that demonstrates the application of ISE and ILSS Principles, Methods and Tools and that created significant value for our Sponsor.

• Agenda:
  – About Peerless Saw and the Value Stream being Improved
  – Future State Vision—What was possible?
  – Current State of the Value Stream and Opportunity
  – What was the performance gap and why did it exist?
  – The Solution—how we closed the gap, Pilot Results
  – Rollout and Full Potential Performance
Peerless is a Saw Bodies Manufacturer

- Established in 1931, it primarily made band saws for the auto industry. In 1981, the company implemented laser cutting technology to cut custom saw bodies.
- Value Proposition: High quality, made to order, saw bodies.
  - Laser technology gives us the flexibility and quality cuts to satisfy a diverse array of customer needs.
Peerless Saw has a Quality Culture

• Peerless believes that high quality comes from customer-focused service, happy employees, and a robust process.

• Recently, the company transitioned to being employee-owned. (ESOP)
  – All improvements directly benefit the employees through shareholder value

• From the President to the operators, the company is open to, and excited for, change.
Peerless has a vertically integrated Value Stream

Peerless keeps most of the value-add operations in-house

Steel Supplier

Supplier Sheet

Steel Process

Issues orders based on inventory level of stocked hard circles and customer orders

Production Supervisor

MRP

Customer

Work Orders

Laser Cut 1

Soft Circles

Deburring

Heat Treat

Tempuring

Laser Cut 2

Cut stock circles into saw bodies

Stock Circles

Salvage Circles

"soft" circle

"hard" circle

Supplier Sheet Steel Process

Weekly

Assorted Sheet Steel

Hot Rolled

Peerless Saw Company

Peerless keeps most of the value-add operations in-house

Peerless Saw Company

Production Supervisor

Issues orders based on inventory level of stocked hard circles and customer orders

Customer

Work Orders

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Cut stock circles into saw bodies

Stock Circles

Salvage Circles

"soft" circle

"hard" circle

Steel Supplier

Supplier Sheet

Steel Process
The Vision that Drove the Project

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Getting clear on DONE was a first step for me and the team.

**Pain Point:** We knew that COGS was too high, had been working to reduce it, internally, for a number of years.

We needed a ‘breakthrough’, outside the box approach.

We suspected our ‘steel supplier’ had capabilities we were not taking advantage of and could create a ‘Win-Win’ situation with them.

- **For Peerless, a Win – Win that drives down cost, improving Operating Margin which in turn improves Shareholder Value**

We envisioned a December 2017 DONE as seen on the right.

**Future State: December 2017**

- **Business:**
  - We have used the make/buy tool to expand to more sizes
  - Now outsourcing: 0.210, 0.230

- **Financial:**
  - Estimated Cost Save=$50,000 yearly

- **Process:**
  - 2 Product Families Outsourced
  - Labor and machine time freed up

- **People**
  - Heavy Lifts less Frequent
  - Less delays = less frustration

**END GAME:**

- Fully utilize our supplier capabilities
- With a dynamic make-buy ‘tool’ to continually reduce, minimize/optimize COGS
- and grow our Franchise value
My outside research told me that Improving Operating Margin is highly correlated with Franchise Value.

As you see, Apple’s profitability increase from roughly 5% to upwards of 20%, the stock price soars and keeps increasing.
In the ISE/ILSS training we learned to apply the Deloitte Enterprise Value Map.

I utilized a more detailed version of this EVM to work with the Owner and team to understand the full spectrum of things we wanted to get done on this project, but COGS above was our primary metric of interest.
The other early focus was on understanding the “current state”

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I used this chart to spark clarity and also ‘tension’ and motivation for the project.

**Initial State: August 2016**

- **Business:**
  - No structured way to decide make/buy decisions.
- **Financial:**
  - COGS = 50% of Revenue
- **Process:**
  - 100% vertically integrated
  - Circle Stock Out Issues
  - Overtime needed to satisfy demand
- **People:**
  - Lifting heavy loads creates stress
  - Frustration when stock outs occur

**Future State: December 2017**

- **Business:**
  - We have used the make/buy tool to expand to more sizes
  - Now outsourcing: 0.210, 0.230, 0.250, and 0.275
- **Financial:**
  - Estimated Cost Save=$50,000 yearly
- **Process:**
  - 4 Product Families Outsourced
  - Labor and machine time freed up (300 hrs.)
- **People:**
  - Heavy Lifts less Frequent
  - Less delays = less frustration

When we compared the way we were in August 2016 to the way we wanted to be by the end of 2017, we got excited about the possibilities.

People could see the differences and started to get aligned to the ‘vision’ for the project.

Peerless engaged with the ILSS Program in ISE at OSU and we framed up the Project and launched it late Aug 2016.

Peerless has worked with ISE at OSU for the past three years.
And, as mentioned, COGS has been an issue and focus for the company for many years. COGS has been reducing the last few years. Peerless may have the opportunity to reduce it again through closer supplier engagement. 50% of Revenue is lost to Cost of Goods Sold.
Opportunity: The President had been thinking about utilizing their steel vendor more extensively in the process.

He conceptually had this thought through but didn’t exactly know how to operationalize it and ‘do the math’ on the business case but also build a model to support testing the concept and then ultimately supporting doing it on a larger scale.

That in essence was and is my project.
The ‘root cause’ of the opportunity gap is actually fairly simple to explain

- **Agenda:**
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A savings potential analysis showed that a performance gap exists.

Outsourcing the 0.230 product family yields a consistent $40,000 yearly cost save.

- **What is the source of this reduced cost opportunity?**
The supplier’s circle nest is more material efficient

Peerless Nesting

Supplier Nesting

They have bigger beds and better lasers, so they can use bigger sheets of steel and their nesting algorithms are better. This reduces waste because the supplier has:

- More space to play with to efficiently nest circles, and
- higher circle yield, less sheets needed to satisfy demand.

In our case we want more holes and less Swiss cheese.
Let’s now turn to the Solution I developed with the team and for the Company

**Agenda:**

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Where we started with our pilot with our Supplier

• We have 17 product families of circles, based on the different thicknesses of sheet steel needed to make the array of saws we sell, ranging from 0.045” to 0.375” sheet thickness.
  – The products within those families are the 24 different diameters of circles, from 10.5” to 41”.

• As mentioned in the savings potential analysis, outsourcing the 0.230 family nets a consistent cost save. For this reason, the team selected 0.230 for the pilot.
The team has determined that outsourcing the 0.230 product family, will net the company a **$16,000** cost save per order, equaling **$40,000** per year.
0.230 Pilot Results: Employee Satisfaction

• Employees have to lift sheet steel to put it on the laser.
• Ergonomically, this can be stressful on the employee’s back and shoulders.
• Employee satisfaction will increase by outsourcing a painful operation.

A 4’ x 8’ x 0.230” sheet of steel weighs approximately 300 pounds!

How was this done?
We created a model to compare Make/Buy Alternatives

It takes spreadsheets of measured data, and combines them into a single comparison spreadsheet.
Example: Make/Buy Comparison

- Per Circle costs are totaled by demand and annualized to achieve a yearly comparison.

This is the $16,000 cost save per order from the 0.230 pilot.
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From Previous State to Current State and Beyond

**Initial State: August 2016**

- **Business:**
  - No structured way to decide make/buy decisions.

- **Financial:**
  - COGS = $4,900,000

- **Process:**
  - 100% vertically integrated
  - Circle Stock Out Issues
  - Overtime needed to satisfy demand

- **People**
  - Lifting heavy loads creates stress
  - Frustration when stock outs occur

**Current State: April 2017**

- **Business:**
  - Has a make/buy decision tool
  - Capable of vetting more thicknesses

- **Financial:**
  - Cost Save=$40,000 yearly

- **Process:**
  - Outsourced one wasteful product family
  - Reorder system decreases chance of stock out
  - Labor and machine time freed up

- **People**
  - Heavy Lifts less frequent
  - Less delays = less frustration

**Future State: December 2017**

- **Business:**
  - We have used the make/buy tool to expand to more sizes
  - Now outsourcing: 0.210, 0.230

- **Financial:**
  - Estimated Cost Save=$50,000 yearly

- **Process:**
  - 2 Product Families Outsourced
  - Labor and machine time freed up

- **People**
  - Heavy Lifts less frequent
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How do we Sustain the Improvement?

• Make the Make / Buy Model Fast, Easy to Use, and Fit the Use Case
• Eternalize the New Processes with Standard Work
• Effectively Transition the Project: Control and Monitoring Plan
We automated the model using macros

- We wanted the analyst to be able to be the data they need at the click of a button.
  - The model pulls the raw data and converts it to a usable form so the analyst does not have to.
The Intel Data Triangle illustrates the process for getting from raw data capture to extracting knowledge and visualizing, by moving up the triangle.

Macros allowed us to eliminate the data cleaning work to enable fast analysis.

The automation allows the analyst to spend most of their time in Knowledge Extraction and Visualization visualizing, by moving up. This is where they want to be!
We created standard work to document process knowledge

• A documented process means people do not have to completely relearn the process when they have to reorder circles or conduct a study

Standard Operation Sheet

Department: Purchasing
Process: Circle Ordering
Revision Date: April 20, 2017
Revision #: 1.0

Summary: This document will explicitly direct the purchasing agent on how to navigate the soft circle ordering process. This process has three steps: check circle quantity, creating the circle PO, and sending the PO to the supplier, Steel Warehouse until otherwise stated. This document will cover each process in chronological order.

Checking Circle Quantity

1. You will begin from the main menu of Peerless computer system
2. To access the data sheet for inventory quantity, Enter PO TO RELEASE in the typing field
Adding a quality checkpoint at the Receiving-end of the value stream, ensures Peerless knows exactly what quality it is getting, how that quality changes over time, and gives critical information for a response.
Having a clear Control Plan is Critical to Sustained Success

We used a control plan to ensure that after project close-out, there are new process owners who manage the process

<table>
<thead>
<tr>
<th>Sustainability Measure</th>
<th>Description</th>
<th>Chart Type</th>
<th>Control Phase Owner(s)</th>
<th>Post-Handoff Owner(s)</th>
<th>Chart Location</th>
<th>Measurement Method</th>
<th>Reaction Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle Quality Check</td>
<td>Burr Size, Internal Diameter, Flatness</td>
<td>Time Series Plot of Defects</td>
<td>Michael Beardsley, Randy Russell</td>
<td>Randy Russell</td>
<td>Quality Dept.</td>
<td>Quality Check and Sampling Plan (see Excel doc)</td>
<td>Call meeting with Tim, determine if circles are usable at all, Contact SW</td>
</tr>
<tr>
<td>Update Service Level Agreement</td>
<td>We need to update our requirements for SW, to ensure we are receiving quality parts.</td>
<td>N/A</td>
<td>Michael Beardsley, Tim Gase, Randy Russell</td>
<td>Tim Gase, Randy Russell</td>
<td>N/A</td>
<td>Quality Check (see above)</td>
<td>Contact SW</td>
</tr>
<tr>
<td>Decision Tool Expansion</td>
<td>Expand model to vet more thicknesses</td>
<td>N/A</td>
<td>Michael Beardsley</td>
<td>Kelli DiMcNeal, Tim Gase</td>
<td>N/A</td>
<td>Make/Buy Model</td>
<td>Continuously update and apply to new sizes.</td>
</tr>
<tr>
<td>Standard Work Time Study</td>
<td>Document how to time study for M/B model update</td>
<td>N/A</td>
<td>Michael Beardsley, Ben Thomas</td>
<td>Ben Thomas</td>
<td>N/A</td>
<td>Time Study, Stop Watch</td>
<td>N/A</td>
</tr>
<tr>
<td>Monitor COGS monthly</td>
<td>Continue to observed COGS over time</td>
<td>Time Series Plot</td>
<td>Michael Beardsley</td>
<td>Kelli DiMcNeal</td>
<td>Finance</td>
<td>Income Statement</td>
<td>N/A</td>
</tr>
<tr>
<td>Update Purchasing Standard Work</td>
<td>If the purchasing process changes over time, the standard work must be updated</td>
<td>N/A</td>
<td>Michael Beardsley</td>
<td>Ron Norris</td>
<td>Purchasing</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
These process sustaining actions will help Peerless meet its vision.

**Current State: April 2017**
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The Future State

- By transitioning to the new process, cost is reduced, flow is improved due to less demand on the lasers, and employees are happier.
Eastern Ohio Mini Region: Columbus Chapter #1

Your Go To Virtual Chapter for ISE’s on the Go!!
The Second 7 Great Habits Successful Young Professionals Need to Develop. (and how IISE can help you acquire these faster)

PANEL MEMBERS

D. Scott Sink, Team Lead Columbus Mini-Region Chapter, and Director ILSS ISE @ OSU

Elizabeth Schweizer, Industry Advisory Board, IISE, and Engineering Services, Disney

Jared Dunlap, President IISE Young Professionals, and Management Consultant, Accenture

Jared Frederici, Young Professionals Segment Owner, Columbus Chapter, and Senior Consultant, The Poirier Group

June 14th Lunch and Learn

Developed and Offered through IISE by the Columbus Mini-Region of IISE
Making the Transition from Engineer to Leader and Manager

PANEL MEMBERS

D. Scott Sink, Team Lead Columbus Mini-Region Chapter, and Director ILSS ISE @ OSU

Joan Tafoya, Intel Corporation
Director / Senior Principal Engineer, Manufacturing and Operations

Steve Savoie, Senior Manager, Industrial Engineering, GM

Sept 12th 12-1 pm ET

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ISE Full Potential Contribution to Supply Chain Optimization (macro and micro views)

PANEL MEMBERS

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Jim Tompkins, President Tompkins and Associates (Macro, Global, System Views)

Rick Wilkinson, SVP Supply Chain, Dollar Tree (Micro, within the DC Views)

Nov 14th 12-1 pm ET

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Work on all continuing to Build you Believability Index by attending the IISE Conference in Pittsburgh!!

Save the date for IISE Annual 2017