

November 5, 2004

The Informance Manufacturing Performance Webinar Series

The Urban Legends of OEE Nov. 4th, 2004

Please take a moment to answer the questions to the right. The poll will close when the presentation begins. The responses will be displayed during the Q&A session.

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ATKEARNEY

 **informance** INTERNATIONAL
Driving Manufacturing Performance

Agenda

- Introductions
- An OEE Primer
- Five Urban Legends of OEE
- A.T. Kearney Benchmarks
- Q&A
- Extended Product Demonstration

Introductions

- Introductions and background

- Sean Monahan, Vice President, A. T. Kearney
- John Oskin, CEO, Informance

Informance Overview

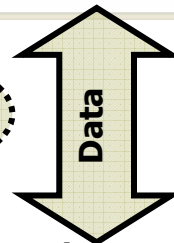
Informance provides World-Class Manufacturers pursuing Continuous Improvement low risk, rapid-delivery solutions to help them drive Improved Manufacturing Performance.

Top Management
Visibility of Key
Manufacturing
KPI's

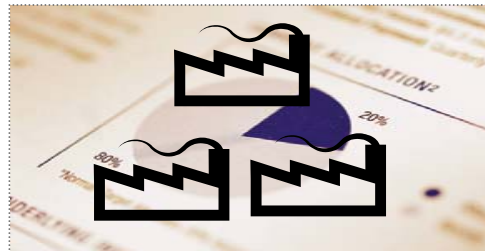
Enterprise Visibility



Provide Key Data to
ERP/SCM



Plant Network



Plant Management
Productivity
Analytics for
Lean/TPM

Solution Drives Improved:

- Labor Efficiency
- Capital Asset Utilization
- Inventory
- Quality

A. T. Kearney Overview

- ❑ A.T. Kearney is a leading high-value added general management consulting firm helping clients achieve meaningful and measurable results
- ❑ A.T. Kearney's Operations practice capabilities span:
 - innovation
 - supplier relationship management
 - manufacturing & supply chain
 - customer relations
- ❑ Operations-related work accounts for over 50% of A.T. Kearney's nearly \$1 billion in revenues
- ❑ With over 50 offices, A.T. Kearney can support clients on a global basis
- ❑ Our experience encompasses every major industry including both discrete and process manufacturers

The Opportunity

- ❑ “OEE is a useful, but underused metric that addresses overall asset/equipment effectiveness..”
ARC Advisory group

- ❑ Improving OEE is the fastest payback, highest value opportunity in your plant today!
 - Measuring it correctly can lead to huge gains
 - Measuring it incorrectly can lead to frustrations, lost momentum and inaccurate conclusions

OEE Primer

Components of Operating Equipment Effectiveness (General Definition)

$$\begin{aligned} \text{OEE} &= \text{Availability} \quad \times \quad \text{Performance} \quad \times \quad \text{Quality} \\ &= \frac{\text{Actual Hours Run}}{\text{Total Hours in Period}} \quad \times \quad \frac{\text{Production Rate}}{\text{Max Sustainable Production Rate}} \quad \times \quad \frac{\text{Net Volume Fit for Use}}{\text{Total Volume Produced}} \\ &= \frac{\text{Actual Fit for Use Production}}{\text{Maximum Fit for Use Production}} = \text{Productivity of the Fixed Asset Base} \end{aligned}$$

OEE shows the balance between increasing production hours, faster production, and product acceptance

Five Urban Legends of OEE

1. There is one correct way to calculate OEE
2. Most manufacturers baseline OEE accurately
3. Using OEE improvements to impact the business is difficult
4. The financial benefits are not well defined to drive a business ROI around OEE
5. Manual data collection is sufficient for OEE baseline and improvement

Legend 1: There is one correct way to calculate OEE

Components of Operating Equipment Effectiveness (General Definition)

$$\begin{aligned}
 \text{OEE} &= \text{Availability} \times \text{Performance} \times \text{Quality} \\
 &= \frac{\text{Actual Hours Run}}{\text{Total Hours in Period}} \times \frac{\text{Production Rate}}{\text{Max Sustainable Production Rate}} \times \frac{\text{Net Volume Fit for Use}}{\text{Total Volume Produced}}
 \end{aligned}$$

*24 x 365
vs.
Scheduled*

*Demonstrated
vs.
Design*

*100%
vs.
Planned Yield*

Key is not to lose visibility of "Sources of Loss" and measure key business indicators

Legend 2: Most manufacturers baseline OEE accurately

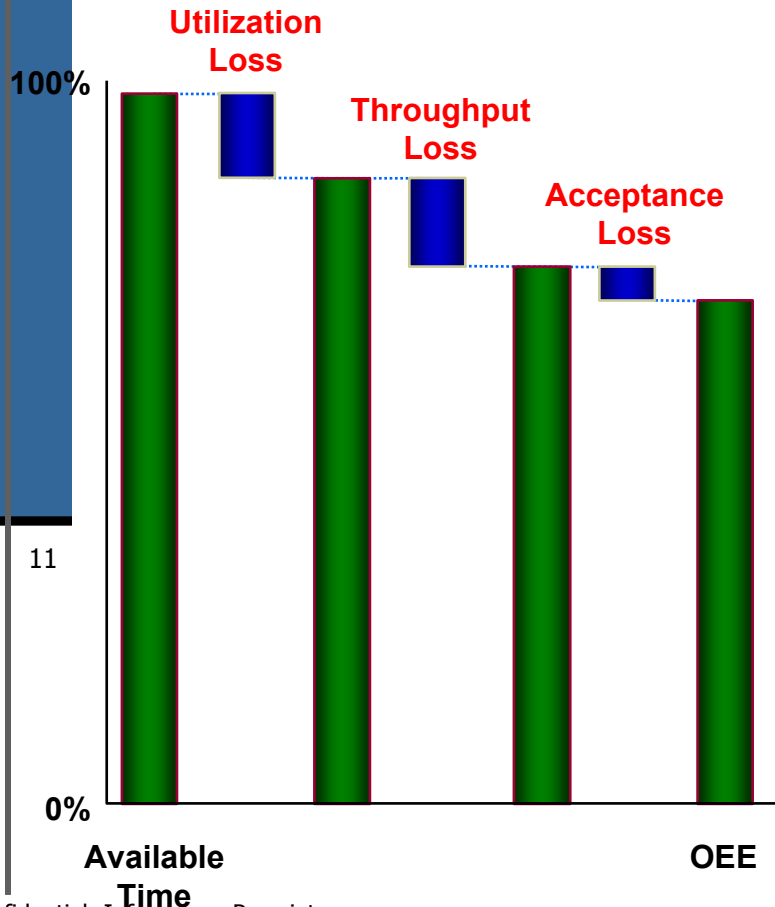
- ❑ There are several common mistakes in OEE baseline and improvement:
 - Manual data collection
 - Time period too short (minimum 4 weeks)
 - No definition of planned downtime is established
 - OEE is calculated as a simple average instead of a weighted average by product/sku

 - Quality is not accurately captured
 - Poor operator involvement/buy-in
 - No consistency in measurement across organization
 - Lack of training on OEE/lean principles

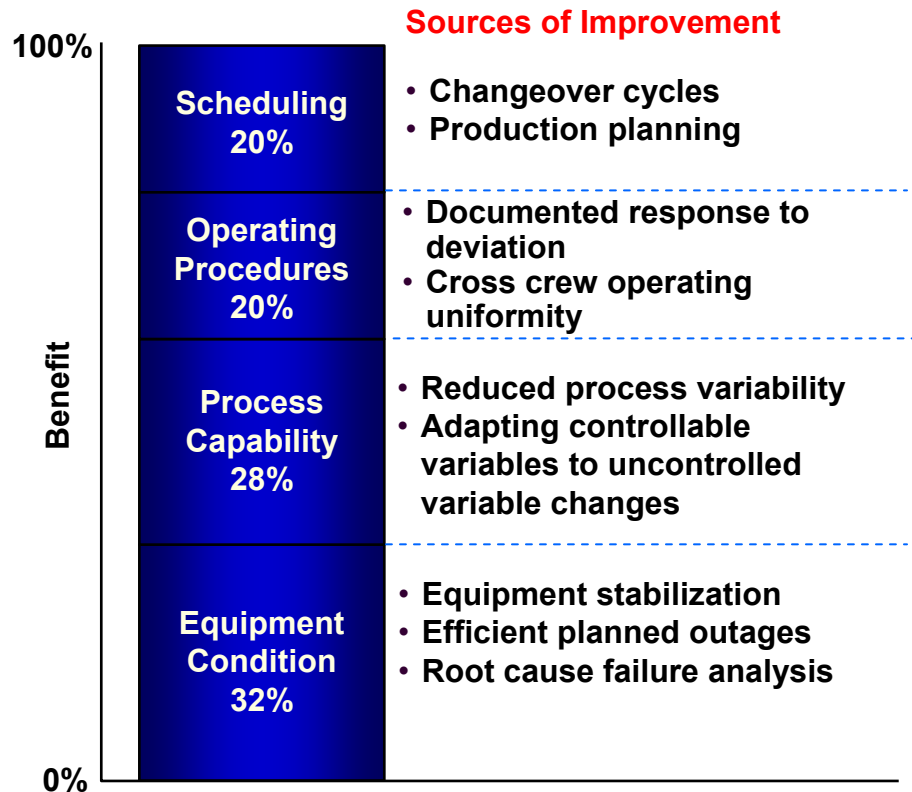
Legend 3: Using OEE improvements to impact the business is difficult

Improvements in OEE are achieved by targeting sources of loss with appropriate improvement tools

OEE Elements



Opportunities for Improving Asset Effectiveness



Sources of Improvement

- Changeover cycles
- Production planning
- Documented response to deviation
- Cross crew operating uniformity
- Reduced process variability
- Adapting controllable variables to uncontrolled variable changes
- Equipment stabilization
- Efficient planned outages
- Root cause failure analysis

Illustrative Example

Legend 3: Using OEE improvements to impact the business is difficult

Small changes can yield big improvements as seen in this recent example of client with a filling line problem

Baseline Data

<input type="checkbox"/> Availability	78.1%
<input type="checkbox"/> Performance	82.0%
<input type="checkbox"/> Quality	99.0%

One Month After Data Collection

<input type="checkbox"/> Availability	82.5%
<input type="checkbox"/> Performance	85.5%
<input type="checkbox"/> Quality	99.5%

OEE
63.4%



OEE
70.2%

- Simple improvement actions drove early success...
 - Availability: Reducing setup times by defining best practices and training
 - Performance: Correcting 3 most common occurrences of minor stops
 - Quality: Identifying and eliminating main cause of rejects
- And the process is only gaining momentum

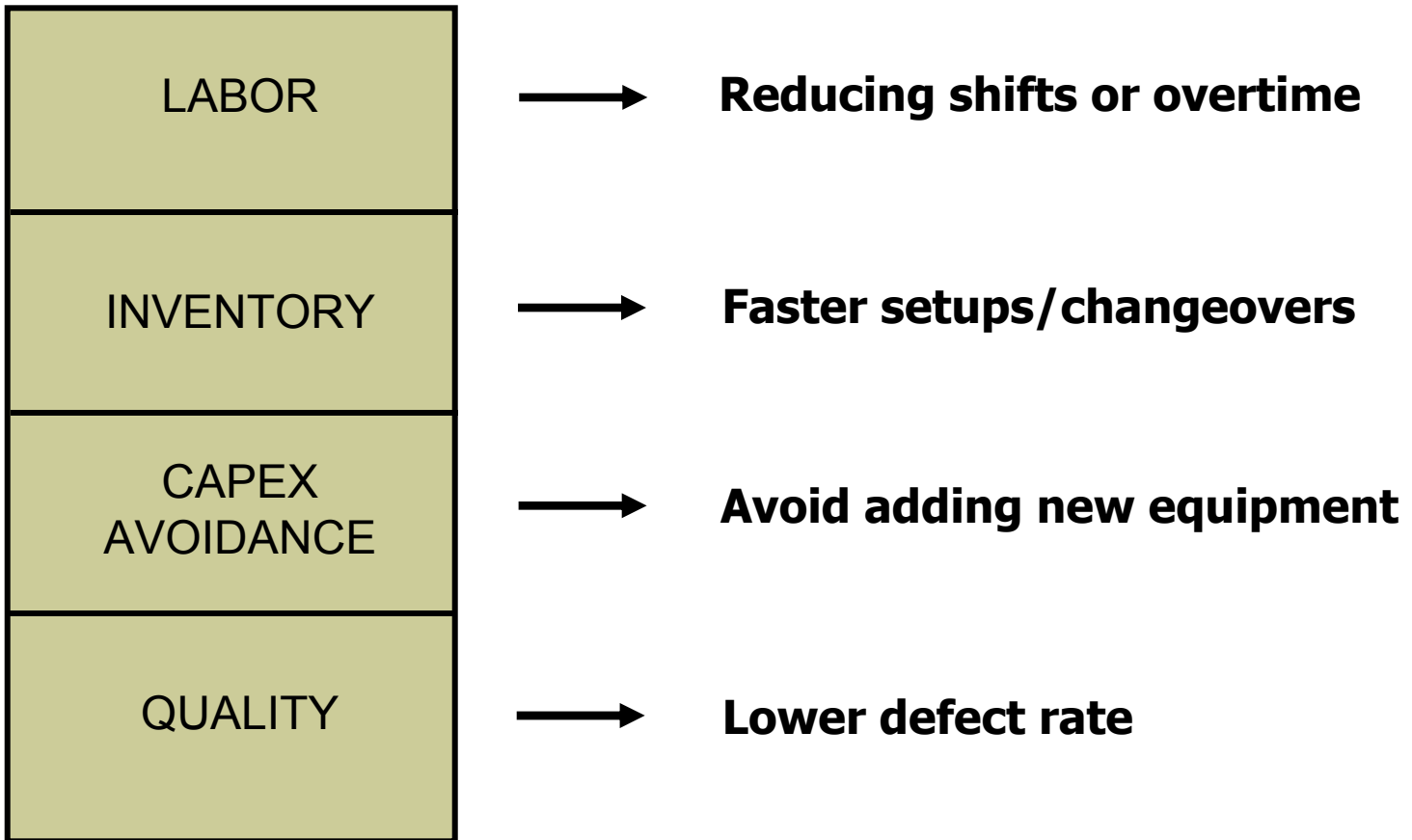
Legend 4: The financial benefits are not well defined to drive a business ROI around OEE

- ❑ Focus on reducing loss categories drives financial benefits
- ❑ The benefits often impact larger issues outside of manufacturing, such as supply chain, customer service, etc.
- ❑ The typical payback can be as short as 2-4 months

OEE Financial Impact

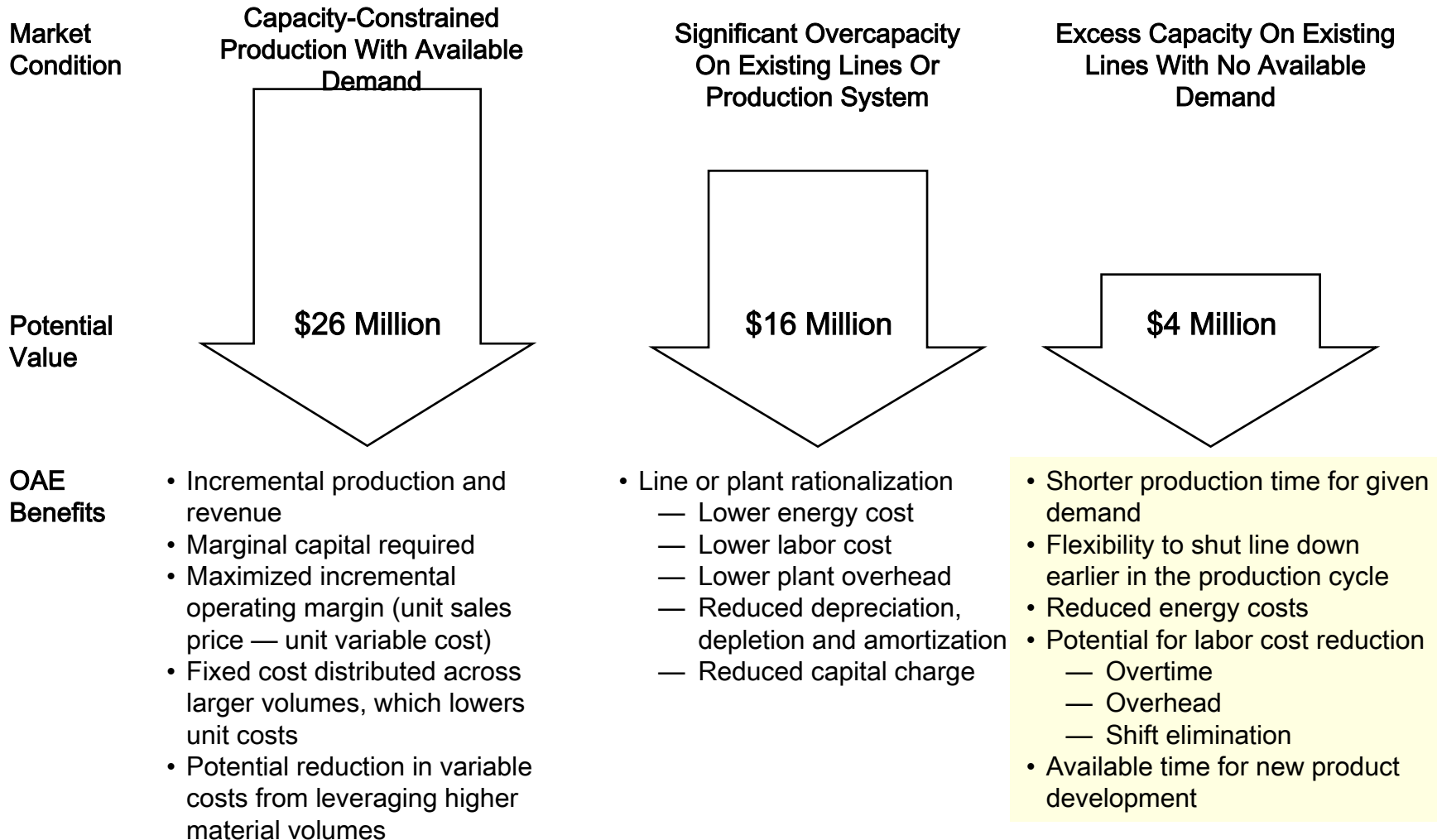
OEE solutions impact four economic areas in a typical manufacturing environment...

EXAMPLE:



A. T. Kearney Client Example

Client Example

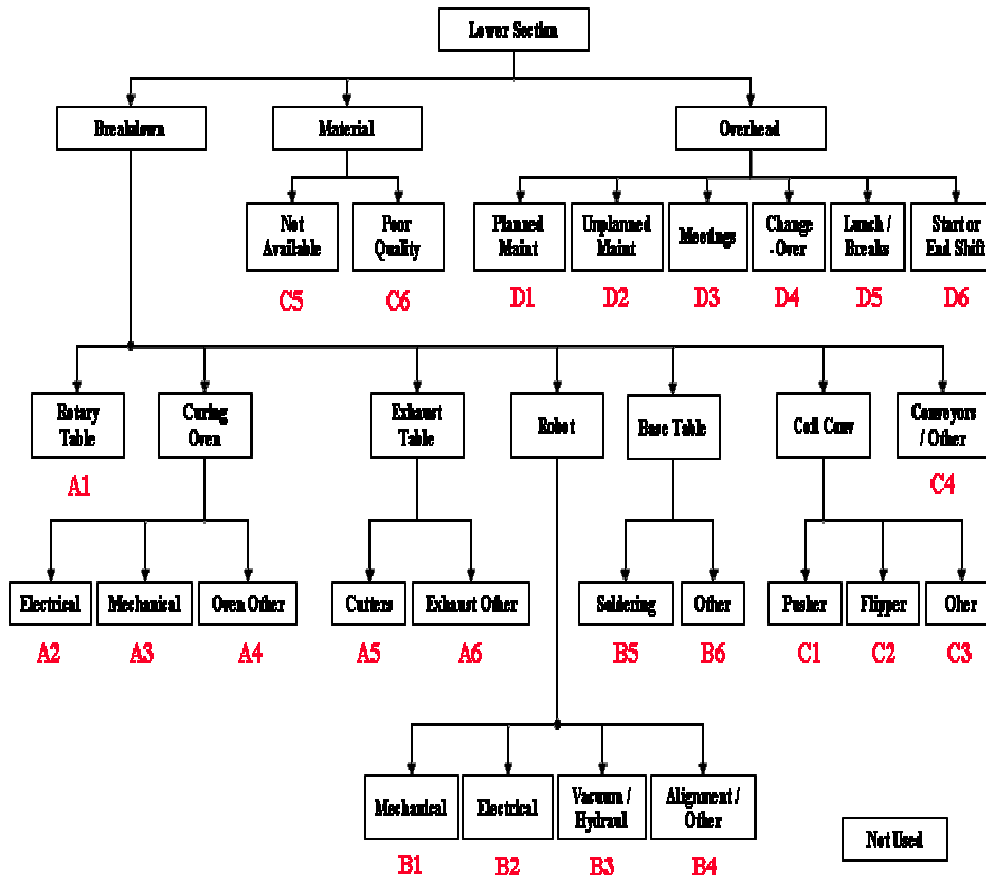


Legend 5: Manual data collection is sufficient for OEE baseline & improvement

- ❑ Manual systems focus on events greater than 10 minutes because of operator inability to capture minor stops
- ❑ Ironically, the overwhelming majority of stops are less than 10 minutes per incident
- ❑ Most importantly, the majority of time lost is due to minor stops
- ❑ Difficult to manipulate and capture actionable data using manual techniques (endless spreadsheets)

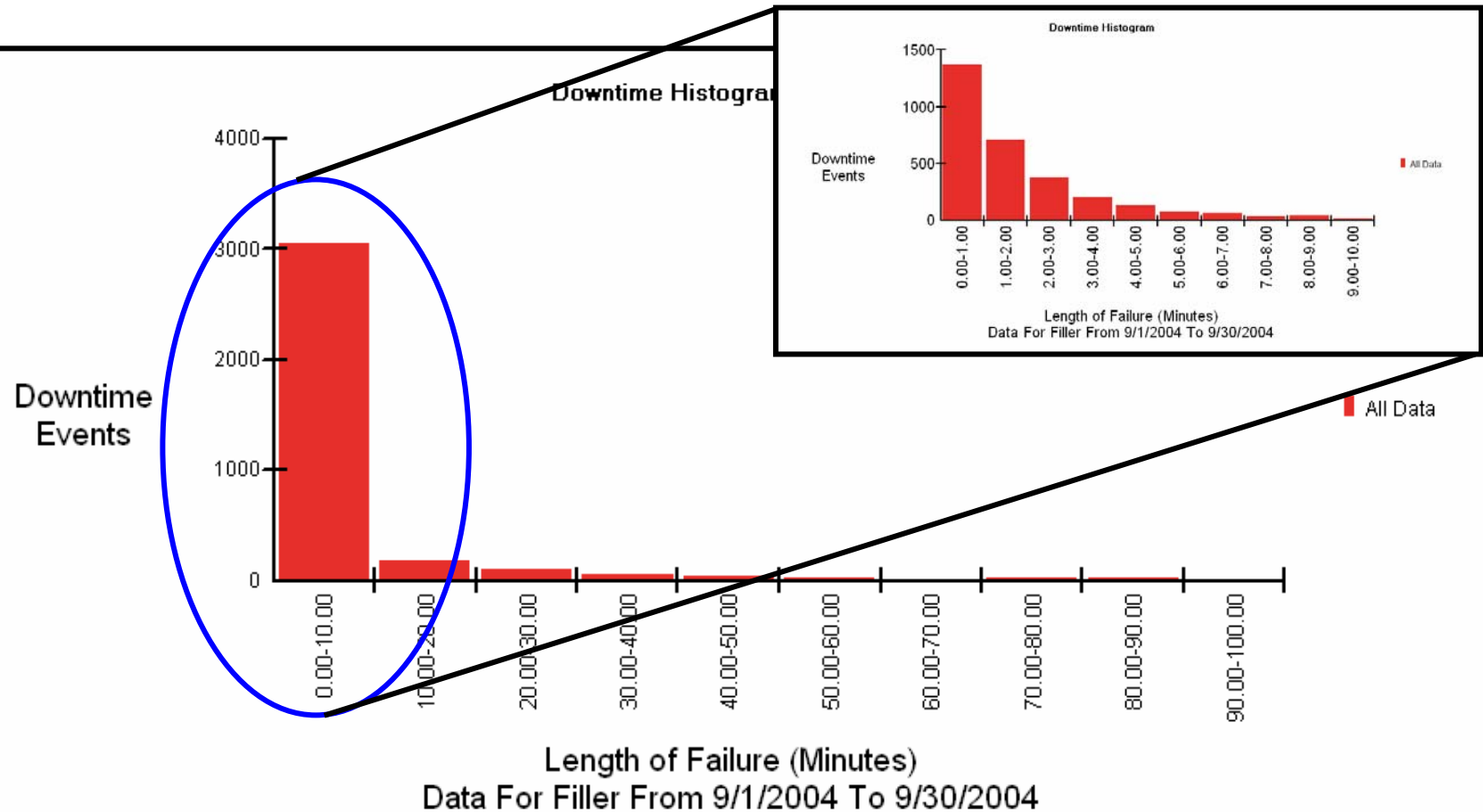
IMPACT: Manufacturers focusing on wrong issues!

Without a clear and consistent process for defining OEE losses and collecting data, many companies end up with data that is not actionable



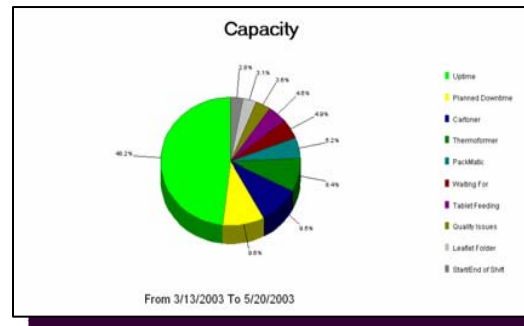
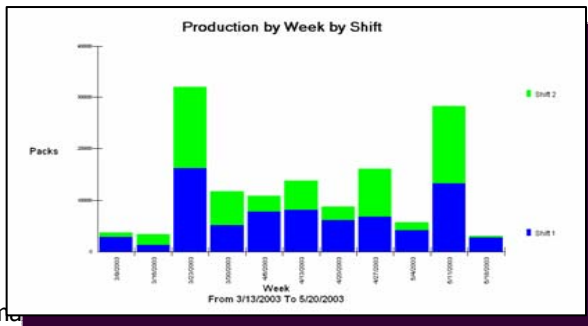
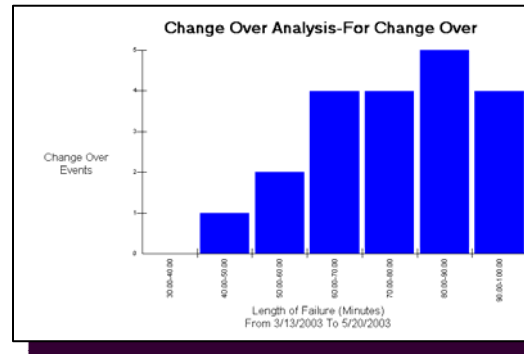
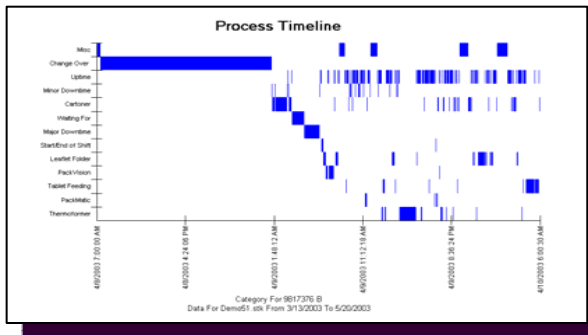
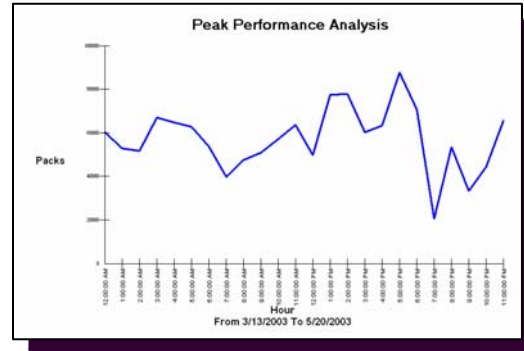
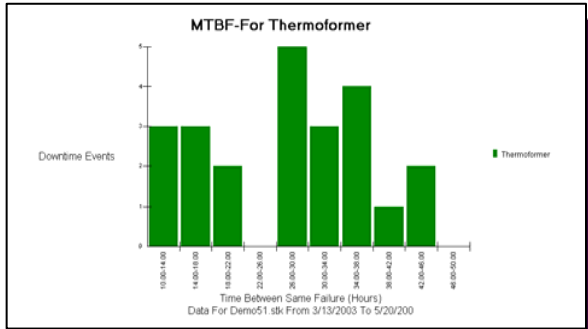
- ❑ Codes will depend on whether one or many assets are being tracked at the same location
- ❑ Think of downtimes as resulting from these groupings
 - Overhead activities
 - Material availability
 - Upstream or downstream starvation
 - Breakdowns
 - Mechanical
 - Electrical
 - Hydraulic
 - Other

Missing Minor Stops with Manual Data



87% of stops are less than 10 minutes per incident!
60-80% of time is also less than 10 minutes per incident!

Brief 5 Minute Demonstration of Concepts...



Informance Case Study

<u>Metrics</u>	<u>Beginning 4 Weeks</u>	<u>Ending 4 Weeks</u>	<u>Change</u>
OEE %	44.41%	77.08%	32.67%
Minor Stops Hours (< 10 min)	64.91	34.43	-30.48
Minor Stops Events (< 10 min)	3567	1948	-1619
<u>Top 3 Downtime (Hours)</u>			
Capper	40.26	5.61	-34.65
Casepacker	14.83	9.31	-5.52
Filler	8.59	5.92	-2.67

**30% impact
with simple
modifications!**

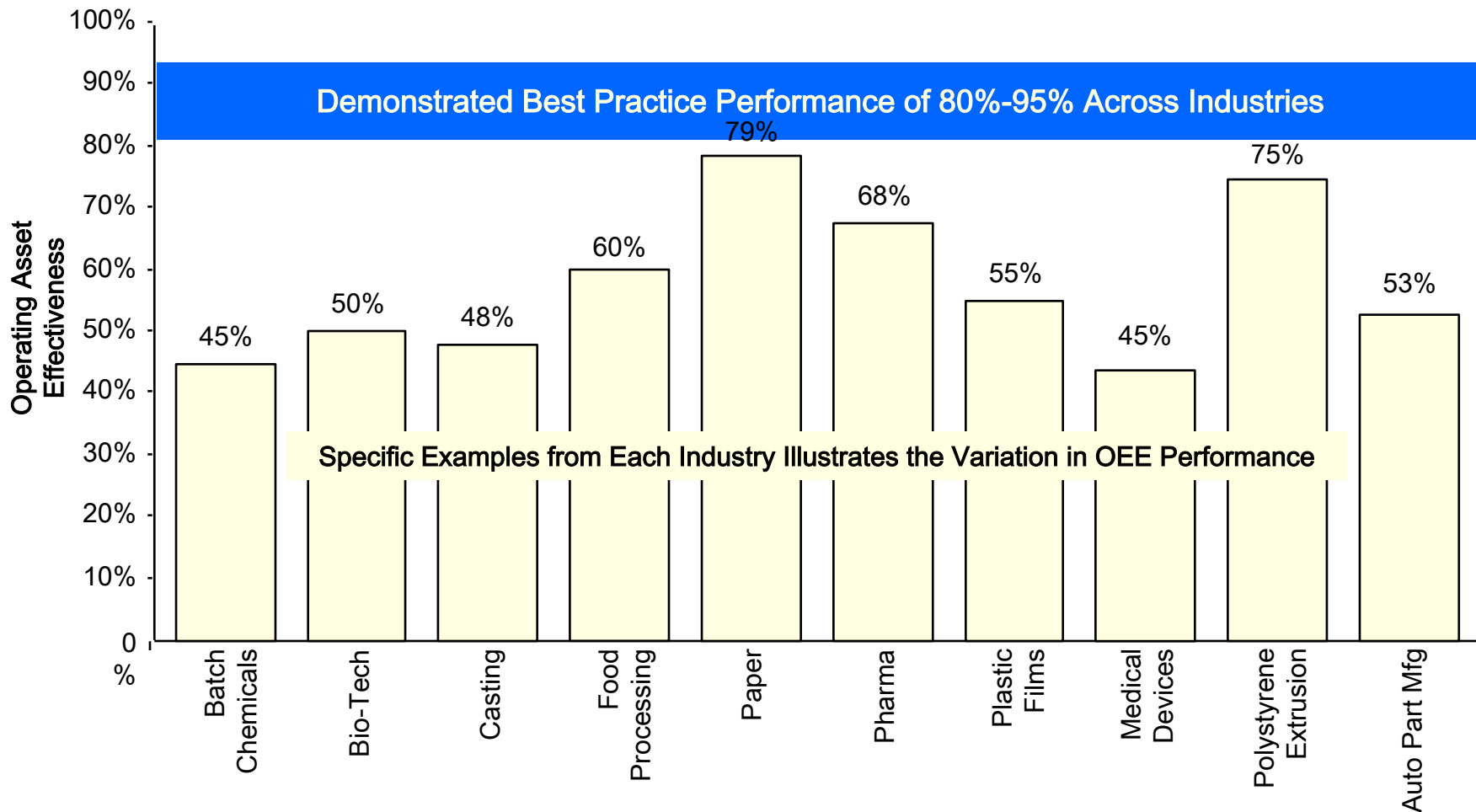
Payback: <1 month!
1 yr. ROI: 3500%

OEE performance varies widely across and within industries and clients. However, best practice performance above 80% is typically achievable

Client Examples



OEE (as scheduled) Levels – Starting points



Why Adopt OEE as a Performance Metric

- ❑ Disciplined Data Collection
 - Appropriate level of detail and actionable
 - Data collection automated where appropriate
- ❑ Trend Analysis versus Daily Analysis
 - Ability to prioritize and focus resources
- ❑ OEE Metric and on-going tracking mechanism
 - More complete indicator; includes many of the existing metrics
- ❑ Cross Functional approach to enhance existing team structure
- ❑ Vehicle for Change
 - Corporate Support and Resources
 - Communication and Best Practice Sharing
- ❑ Builds on existing programs

Why Adopt Informance as a Manufacturing Performance Solution

- ❑ Elimination of the controversies and deficiencies of manual data collection
- ❑ Accurately identifying OEE losses and “hidden” downtime
- ❑ Best practice analytics built on Lean principles
- ❑ A common measuring stick across the organization

Q&A

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Extended Product Demonstration

