

Leaning on Suppliers

The Value of Lean Management Practices to Strategic Supply Chain Management

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Lean Agent, Global Recycling, Exide Technologies

Presentation Agenda

- The need for lean supply chain management
- Extending the lean enterprise: people, process and technology
- Case examples: Exide and beyond
- Lessons from the trenches

Imperative For Lean Thinking

The Impact on Supplier Relationships

Our Strategy

- Implement the EXCELL lean initiative rapidly, simultaneously and worldwide
 - Revenue remains healthy
 - Cost reductions from lean will improve profitability without hurting revenue
- Improvements to the supply chain promise the best near-term cost reduction
 - Significant inventory reduction
 - Strategic sourcing

Why a Lean Strategy?

1. Lean eliminates waste.

Reduces work that doesn't add value to the customer, and refocuses energy toward activities that do

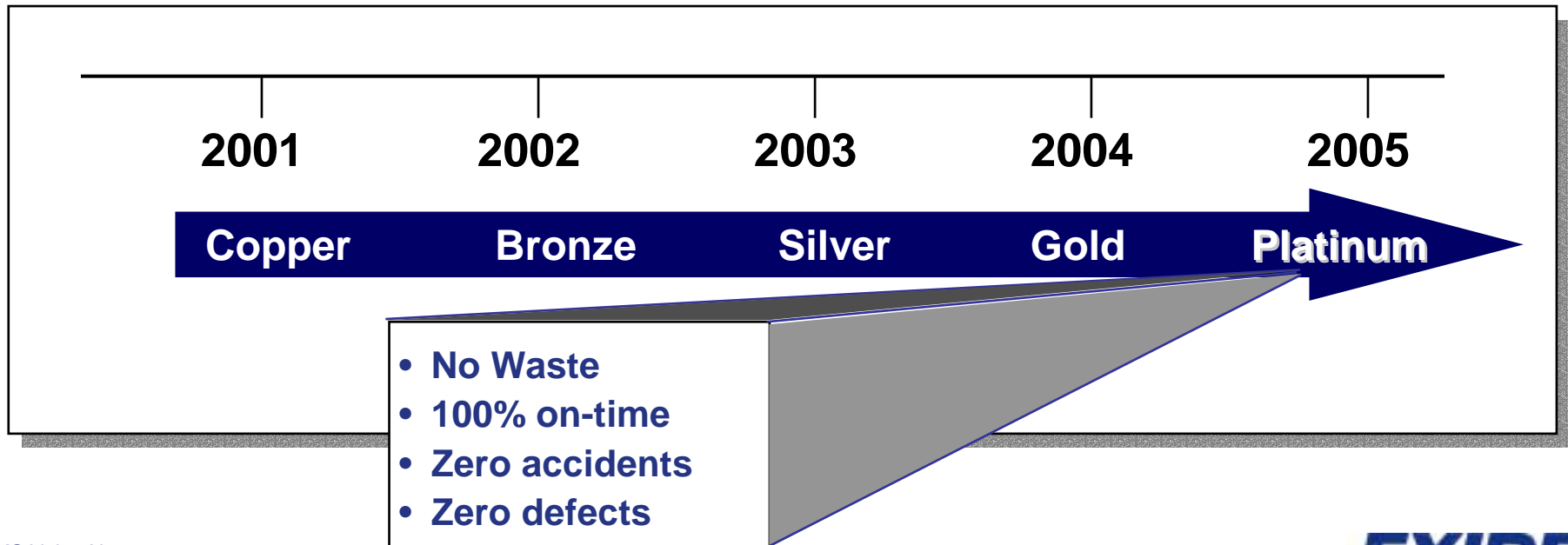
2. Lean companies drive the marketplace.

Toyota, Southwest Airlines and Dell Computer

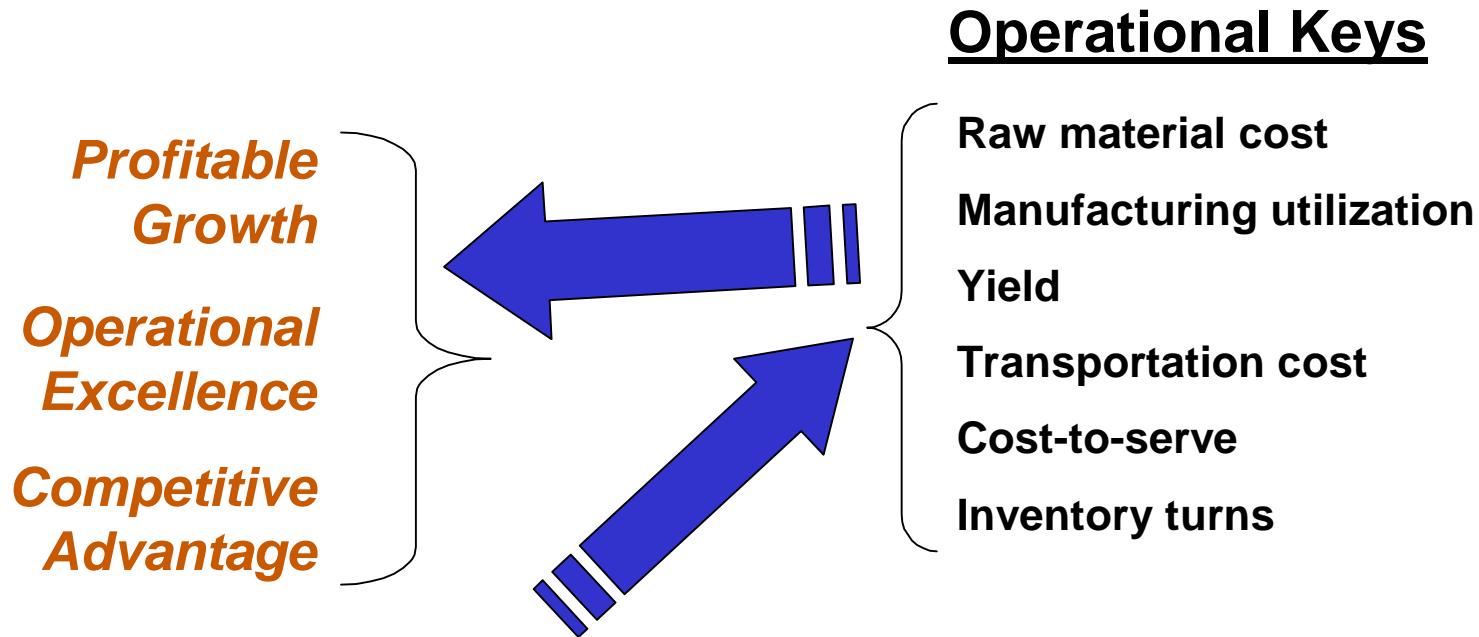
3. Lean is the only known methodology that simultaneously improves cost, quality, and dock-to-dock times.

Our Goals

- Double the output per individual and per square foot
- Reduce cost of quality by one-half
- Instill teamwork
- Bring all of Exide up to:



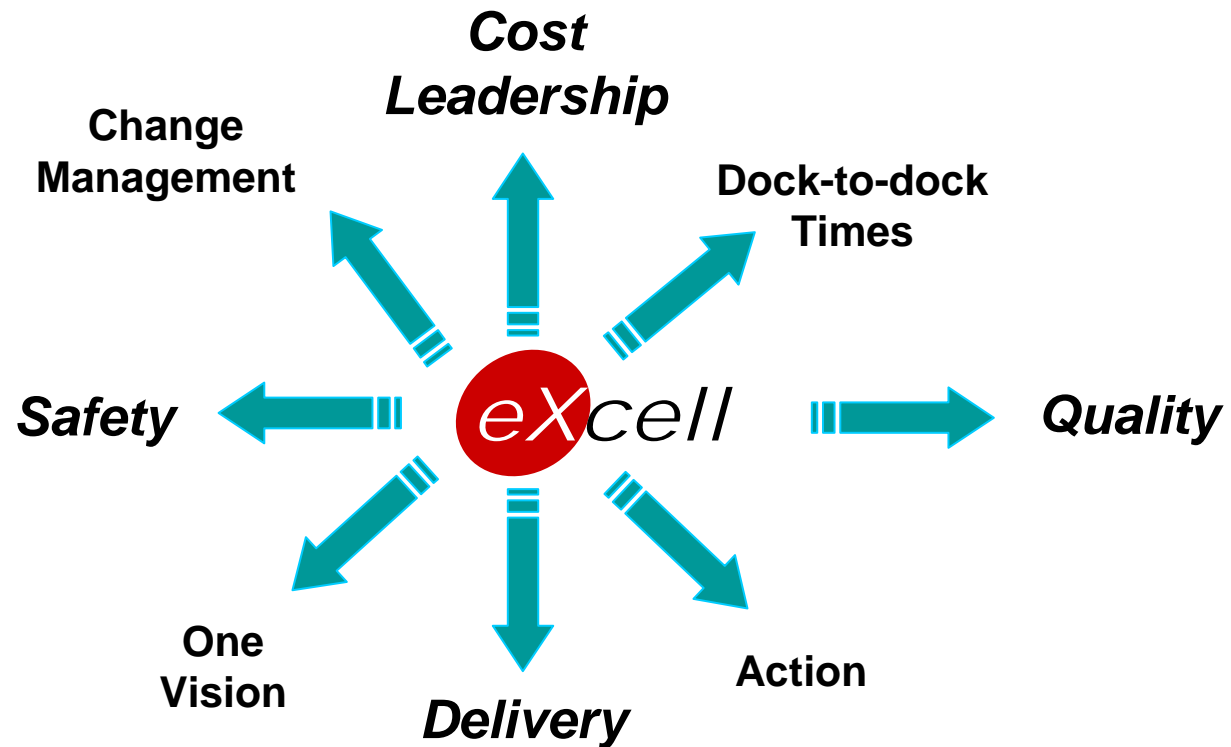
Lean Drivers



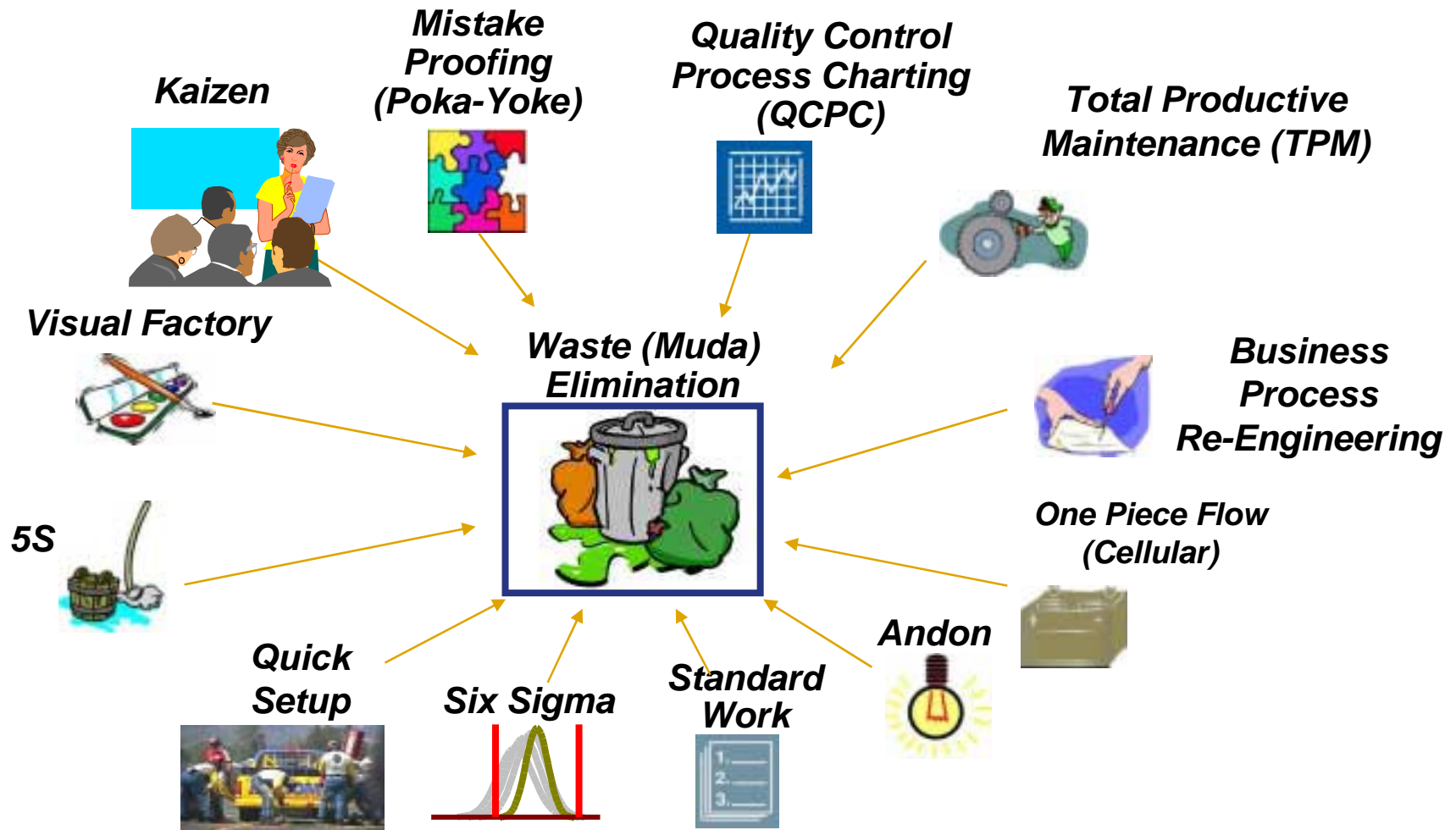
Lean management drives improvements that directly affect product quality, service value, channel relationships and shareholder value.

EXCELL: Cornerstone for Turnaround

EXide's **C**ustomer-focused **E**xcellence **L**ean
Leadership system



EXCELL: Continuously Attacking Waste



Hurdles

Introducing new and different methods exposes natural resistance to change.

Operations: “We’ve *always* done it this way” and the “not invented here” syndrome

Purchasing: The “price isn’t everything, it’s the *only* thing” problem

Sales: “Don’t mess with *my* customers” and the “I don’t have time for *this*” defense

Key Success Factors

1. Place customer demand at the center of all efforts
2. Understand lean principles and educate key players in its fundamentals and benefits
3. Use teams to assess work flow in accordance with lean principles
4. Rearrange operation to establish flow, pull, and visual control
5. Rewicker culture to train, implement and refine continuously
6. Support with technology to solve specific problems

Extending the Lean Enterprise

Developing new value from supplier and customer relationships

Reality

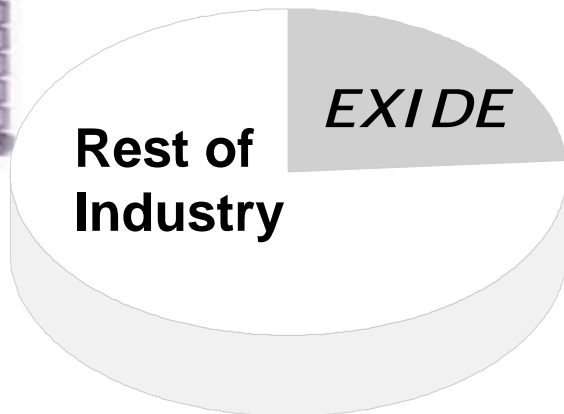
“I think anybody who doesn’t believe that lean is the solution will eventually put themselves out of business.”

Bob Weiner, Exide’s SVP Product Delivery
Manufacturing News, May 16, 2002

Global Leader In Stored Electrical-energy Solutions

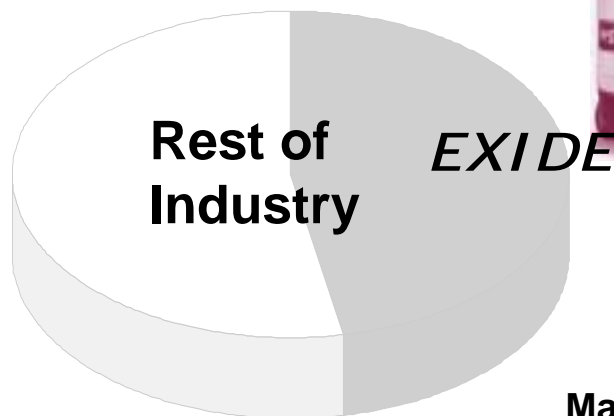


Network Power



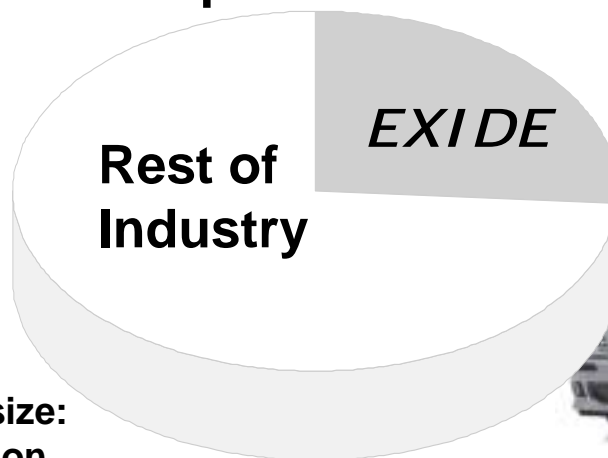
Market size: \$2 billion

Motive Power



Market size:
\$1.2 billion

Transportation Power



Market size:
\$6.2 billion

*EXIDE FY 2002
revenue:
\$2.4 billion*

Where We Were in May 2001

- Batch manufacturing
- **Massive amounts of inventory**
- Minimal total productive maintenance (TPM)
- Few visuals
- Lack of standardization between facilities
- Lack of good financial data (i.e. product cost)
- Weak consistency of shop data tracking
- Excessive setup time
- **Carrying excessive suppliers' inventory**

- Plants didn't feel in control of their destiny – “corporate”
- Ergonomic nightmare
- 5Ss were, in general, poor
- Facility and product rationalization needed
- Inter-company transfers
- **Push vs. pull system**
- Schedule constantly changing
- Mistake proofing was weak
- **Material handling was excessive**

Exide's Position Today

Managing through tough times

- Filed for Chapter 11 Bankruptcy protection April 2002 to restructure balance sheet
- Immediately secured \$427.5 million new financing to continue operations
- Consolidated net sales in 1Q (April – June 2002) were \$555 million, ahead of plan and forecast

Leading to new opportunities

- 92 percent of plants actively getting lean
- Improved product quality at reduced cost
- High order fill rates, rising customer satisfaction
- New products and new contracts – supplying industry, government and retail customers

Lean Production Impact in the First Year

May 2001

Batch manufacturing

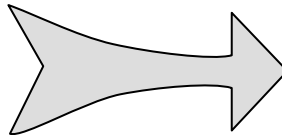
Massive amounts of inventory

Minimal total productive maintenance (TPM)

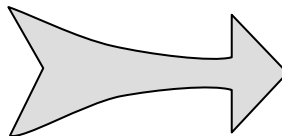
Few visuals

5Ss are, in general, poor

Mistake proofing is weak



Lean culture embraced



August 2002

Single piece flow, pull system started

Days of inventory reduced by 13%

TPM activities underway at all plants

Visual control begun at all facilities

5Ss highlighted and implementation started

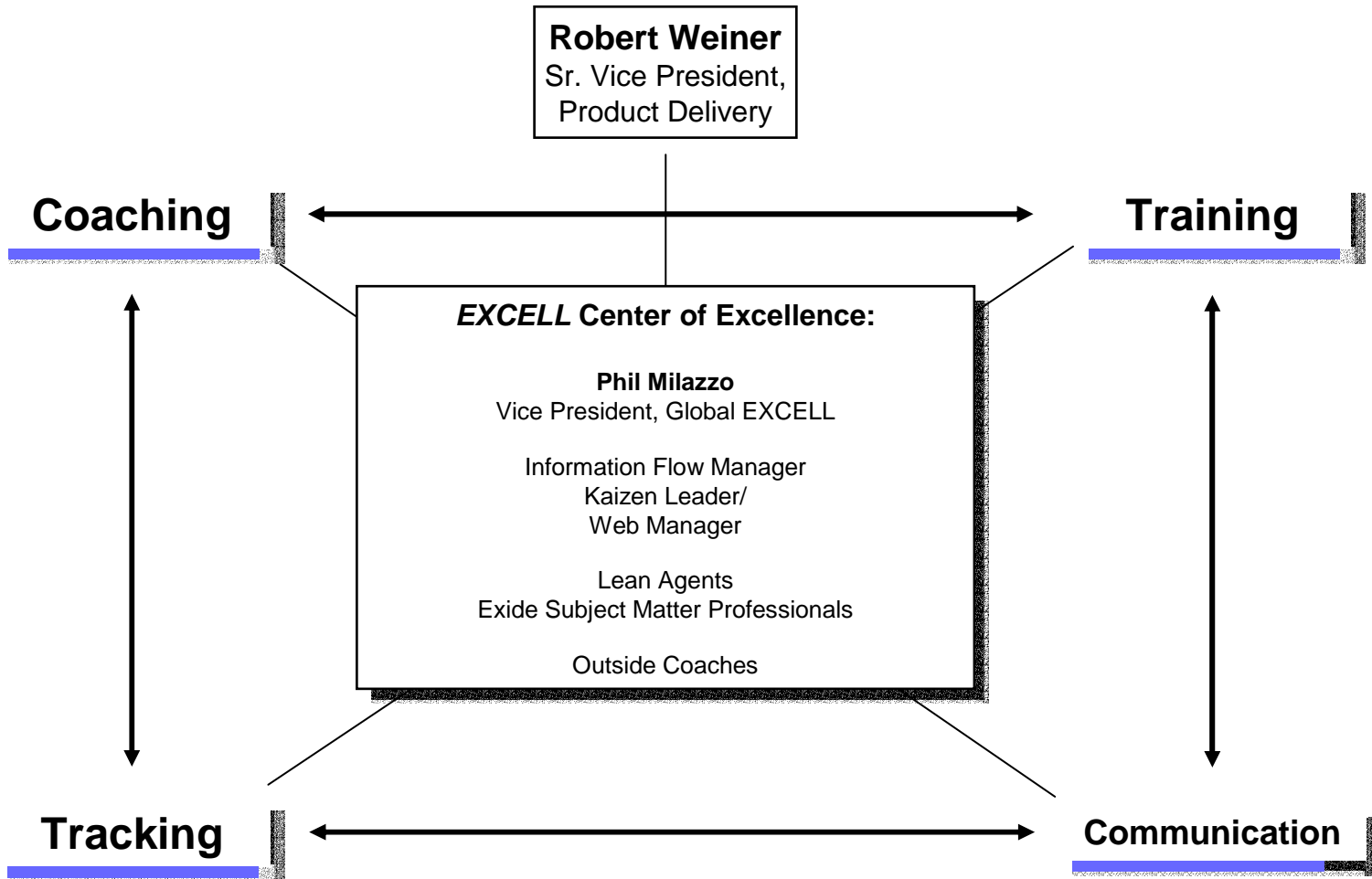
Mistake proofing introduced at all facilities

Case Examples

Exide's Leaner Supply Chain



EXCELL Organization



Sources of Inventory Improvements (I)

Raw material inventory: 15 days down to 2-3 days

- JIT delivery to point of use
- Recycling facilities converting to JIT, daily deliveries
- Other commodities following suit

Sources of Inventory Improvements (II)

Work in process inventory

- Raw & WIP down 35 percent in 6 months
- Result of classic lean techniques
 - ✓ Reduction in changeover times
 - ✓ Pull system
 - ✓ Total productive maintenance
 - ✓ QCPC (quality control process charting)
 - ✓ Standardized work
 - ✓ 5Ss – a place for everything and everything in its place

Inventory Tools That Facilities Can Implement Quickly



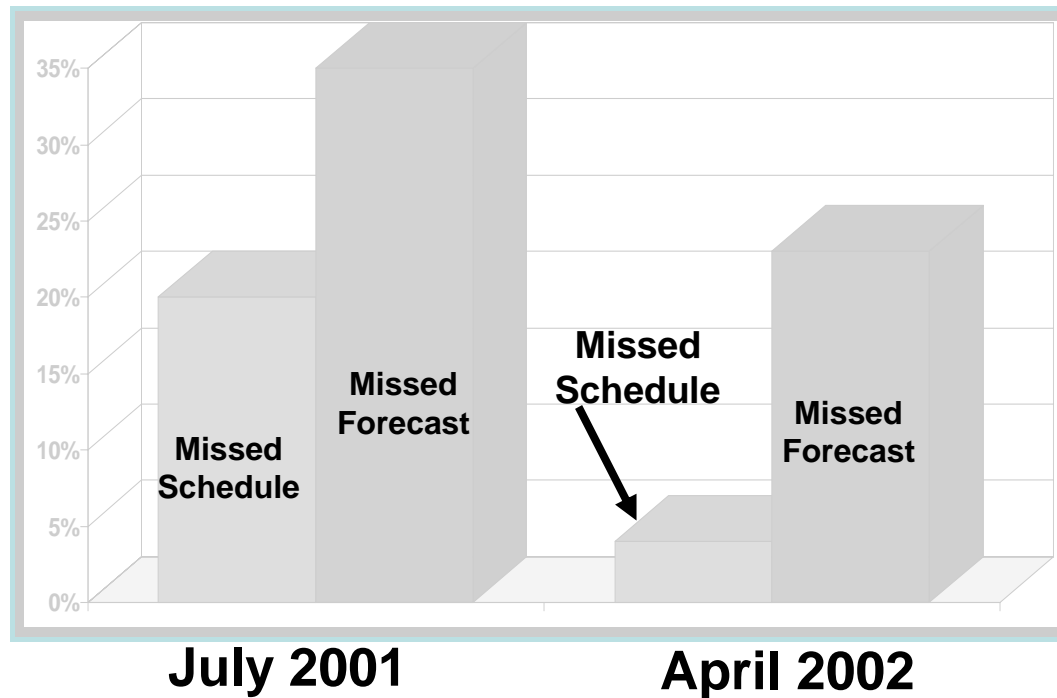
Raw materials area
Vernon, California,
Recycling Facility



Sources of Inventory Improvements (III)

Cost of finished goods inventory depends on

- **compliance to schedule** (improve via classic lean)
- **forecast accuracy** (customer relationships and level selling)



North American
Transportation

In July 2001:

- Approx. 50% of production was not what customers wanted*

By April 2002

- Less than 25% were the wrong product†

* $1 - (1 - .20)(1 - .35)$

† $1 - (1 - .04)(1 - .23)$

Integrating Strategic Sourcing

**Wave 1
October
2001**

**Prove the
opportunity**

- Design implementation plan and staff team to lock in Wave 1 savings



**\$50 million in
annual savings
(including
benefits)**

**Wave 2
October
2002**

5% year-over-year

- Secure significant savings on additional categories
- Design longer-term organization to deliver sustained competitive advantage



**\$40 million +
additional annual
savings**

Ongoing

**Continuous improvement &
build competencies**

- Assemble sourcing teams to address new areas of spend and revisit old ones
- Further integrate with other key business processes (e.g., product development, manufacturing)

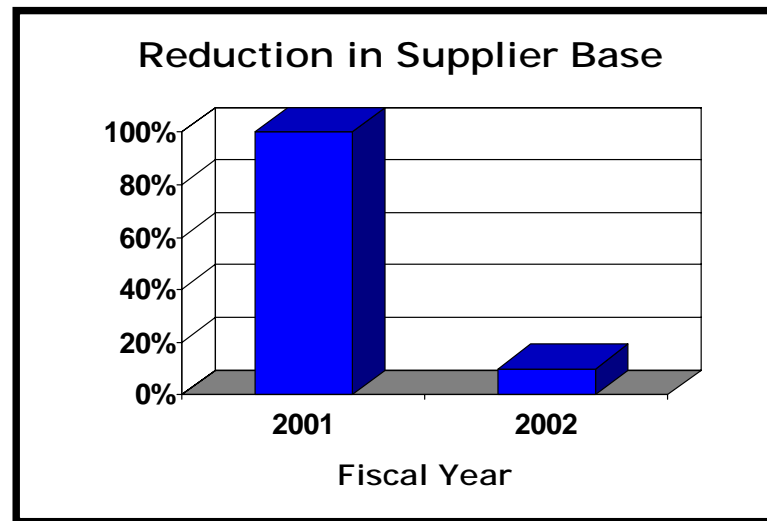


**3-5% ongoing
annual savings**

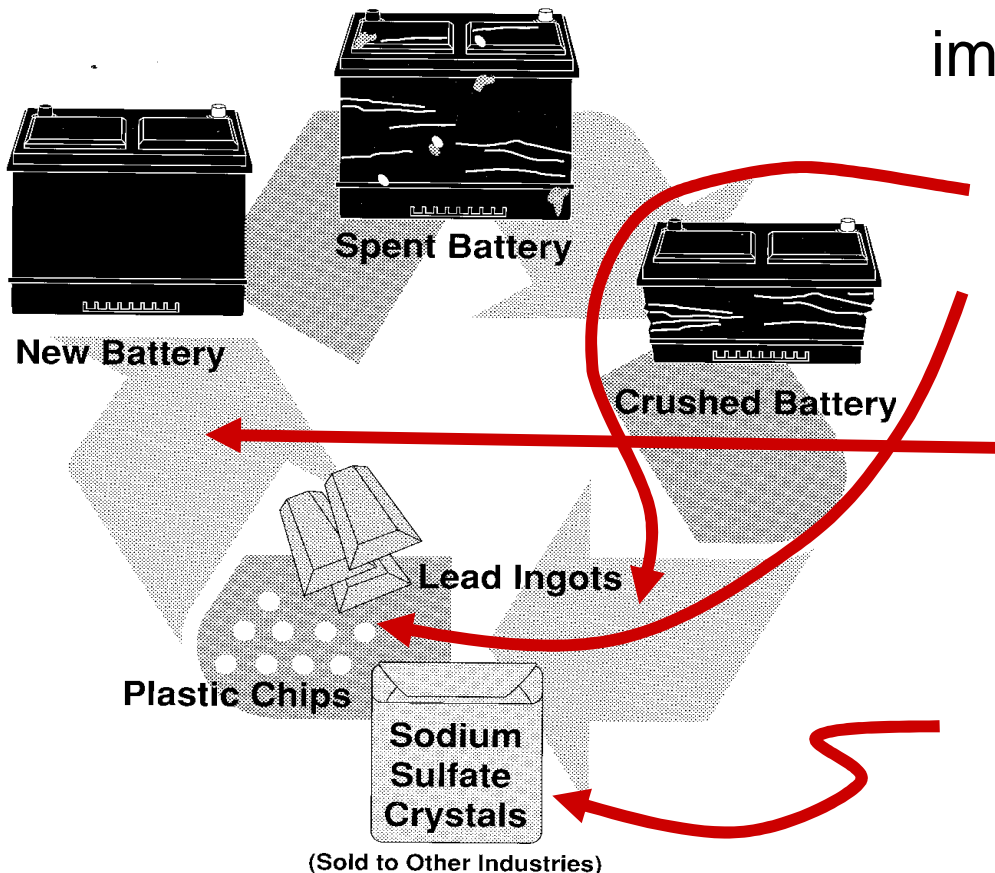
Selection Criteria: Follow the Lean Model

Supplier Base Consolidation Critical:

- Suppliers selected based on lean commitment
- Agree to 5 percent reduction (in real terms) per year
- Work with Exide to reduce total costs
- Reward: long-term partnership



A Triple Benefit From Lean



Exide benefits from lean improvements in three areas:

1. Recycles batteries
2. Produces its own raw materials
3. Designs and manufactures batteries

We also derive revenue from sales of sodium sulfate (from spent battery acid) to other industries

What Bronze Means

Improvement Beyond Copper

Copper

20% Improvement

- Achieving a 20% reduction in dock to dock time
- Achieving a 20% reduction in quality costs (i.e. scrap, rework, turnbacks)
- Implement 5S tools so that the total plant 5S score is at least a 2.0
- 100% of the critical equipment within the primary finished goods family (PFGF) is TPM certified
- 40 hours worth of operations equipment effectiveness (OEE) data on all critical equipment in the PFGF every six months
- 5 TPM events have been lead by the TPM Coordinator
- Set-up times for all machines within the PFGF have been reduced to below 40 minutes
- 100% of the processes in the PFGF have developed and implemented a data collection method
- Error proofing devices to prevent the top three warranty issues or customer concerns for the PFGF have been implemented
- A pull system has been implemented throughout one entire production line
- ... and more

Silver

Gold

Zero Waste

Platinum

(by 2005)

Every plant in the global Exide system is working on these same levels with the same goals for completion.

The Next Year of EXCELL

- Complete bronze certification at all facilities
- Push EXCELL into the supplier network

“At many companies, all the talk about supply chain management and lean inventories has been just that ...

A few firms, however, got supply chain religion early on and ... are now vastly more efficient than their competitors.”

Miles Cook, head of Bain's
North American supply chain
practice

The Bottom Line Impact

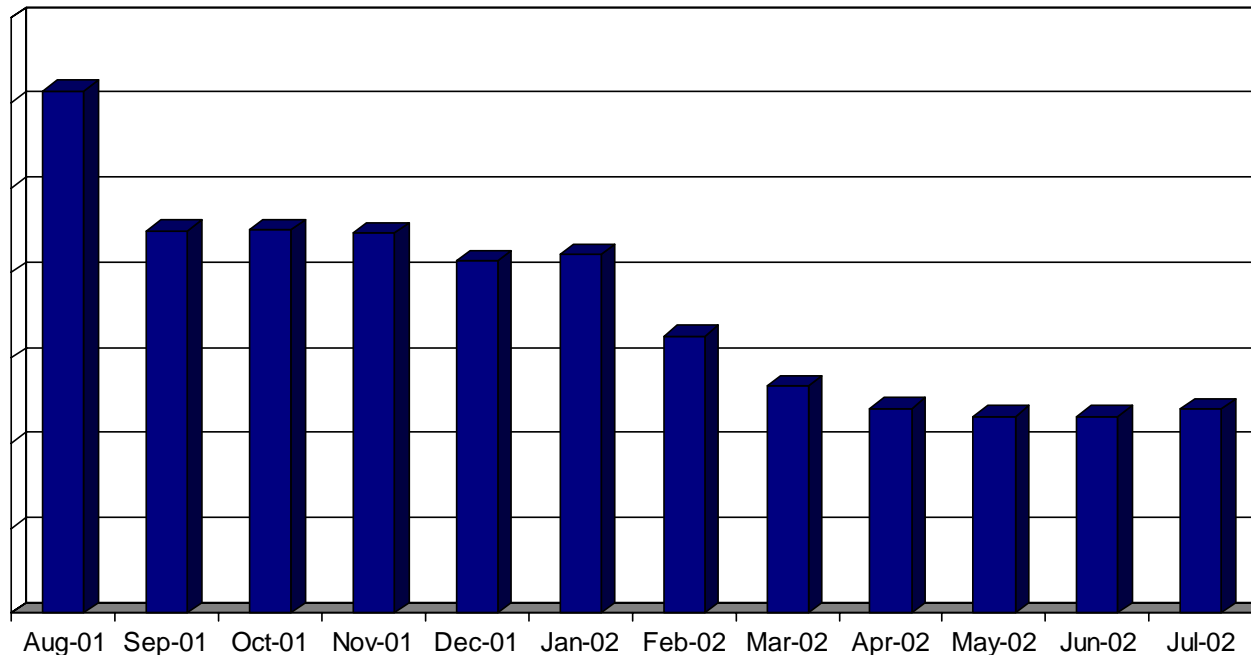
Metrics, Results & KPIs



Raw Material Inventory

61% Reduction from August '01 – August '02

North American Raw Material Inventory



**Procurement process focus on JIT delivery,
lead time reduction, consigned lane and
supplier visibility/collaboration**

Total Inventory

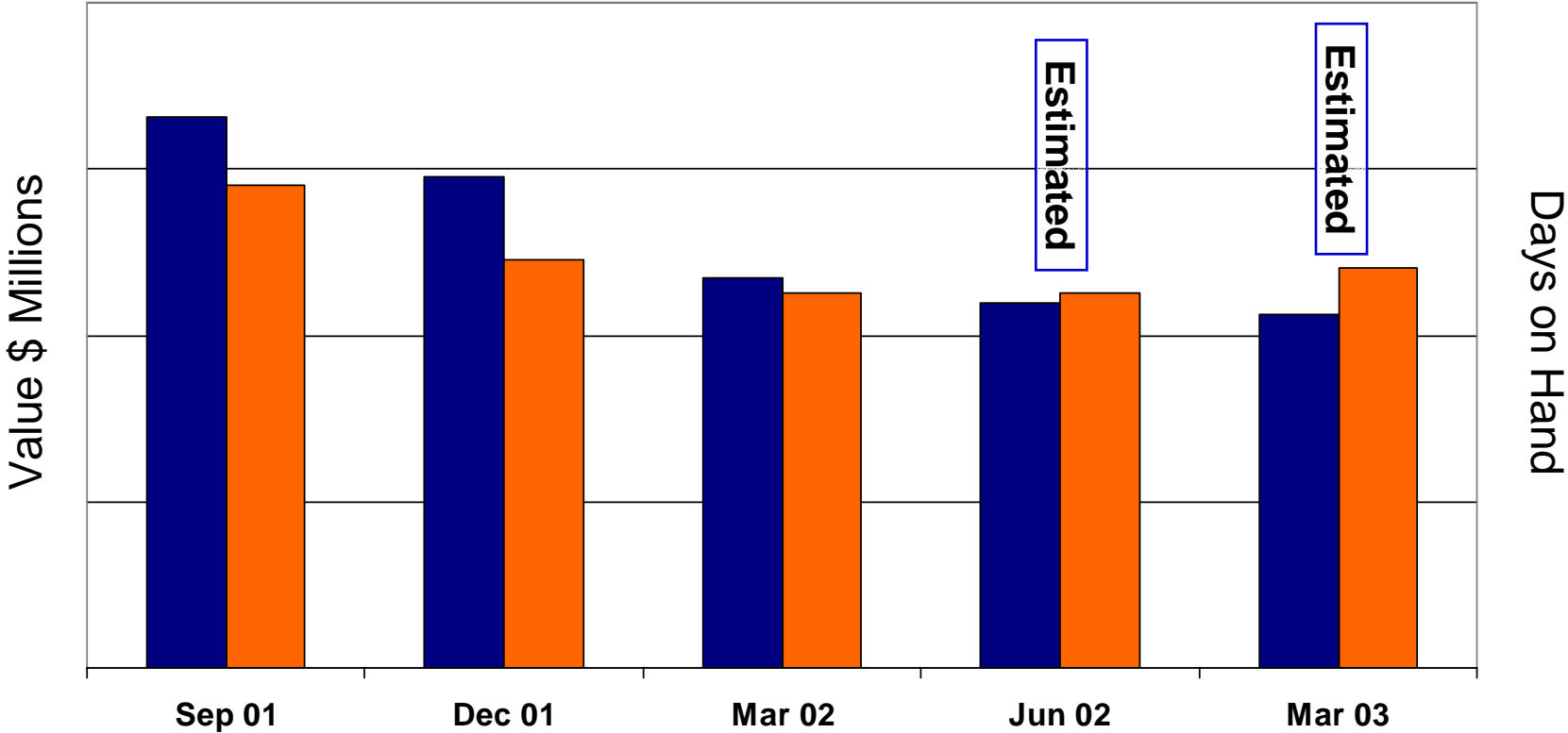
Inventory:



Value (\$)

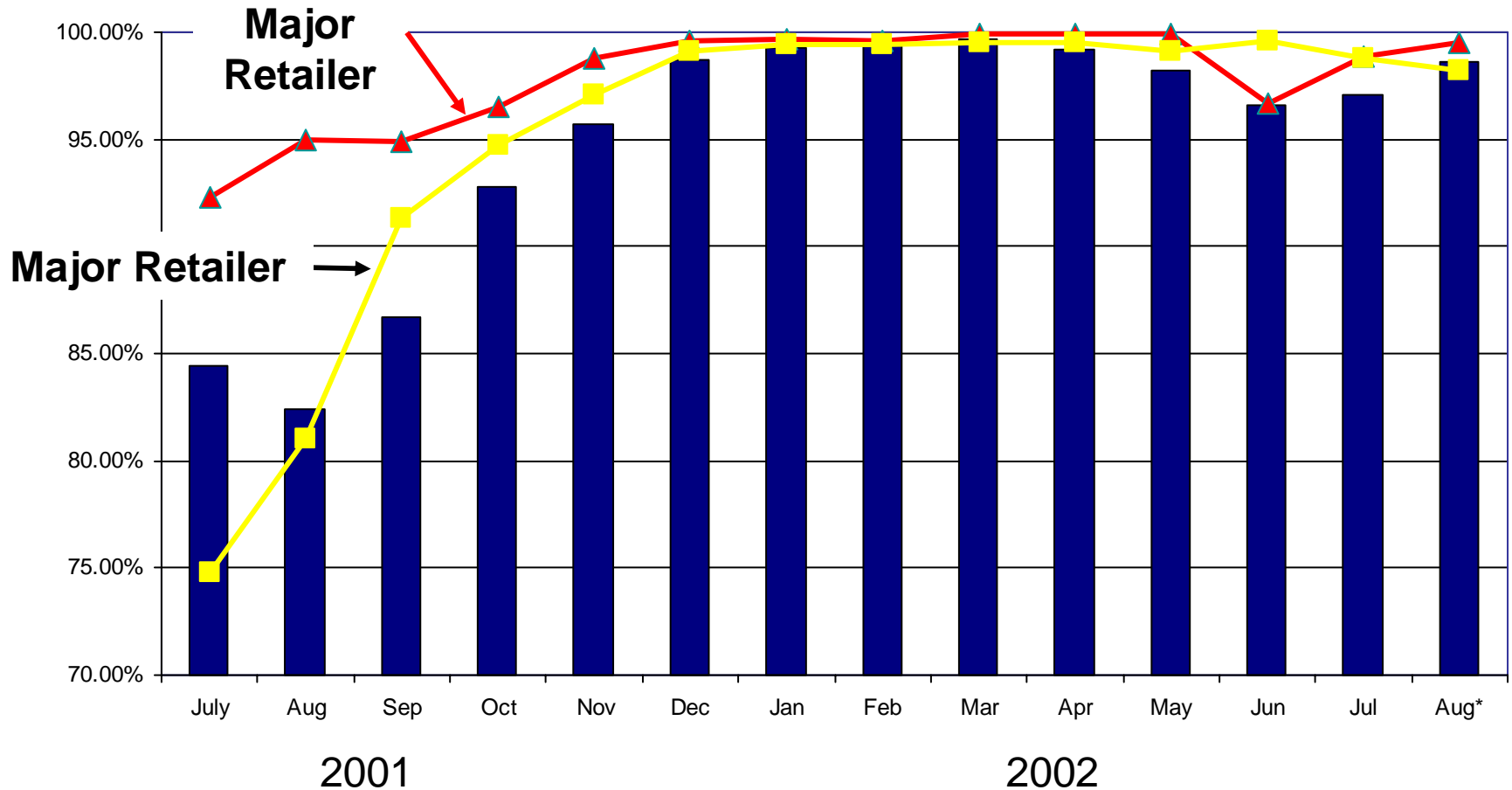


Days-on Hand



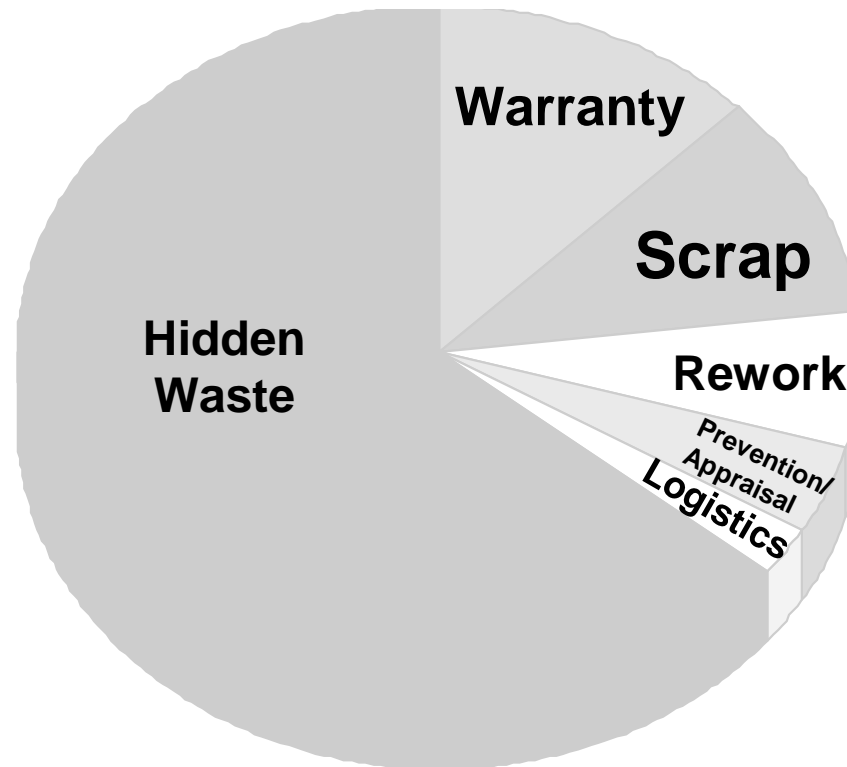
Improved Fill Rates

20 percentage point average increase



Total Cost of Quality

Relative contributions to total COQ



Hidden Waste



Lean Integration: Getting Buy-In

- Top Down ↓↑ Bottom Up
- Cascading Kaizen events
- Break down barriers to innovation

“I work on the floor and know floor life . . .

Seeing it first hand, the whole lean concept made sense to me. If I were running my own business, that’s how I would run it. I wanted to be a part of it.”

John Burch, age 28
hourly plant worker and EXCELL lean champion
Exide’s Kansas City, KS plant

Lean Integration: MRO / Sourcing

- Shared values and vision about lean
- Approach that simplifies replenishment and reduces total system cost
- Example: Bearing Distributors, Inc. created a service solution that integrated MRO supply with Exide's production schedules.

“As a result, [Exide has] realized our strengths and have been bringing more business to us. Our product width has grown. And they have asked us to increase our capabilities as they reduce their supplier base.”

Bill Holland
BDI branch manager,
Kansas City, KS

Turnaround in Action

Lean Transformation Momentum

The “5 Ss”

Fábrica de Manzanares, Spain

Improvement opportunities may be simple . . .

“Shadow boards....easy to find tools!!”

BEFORE



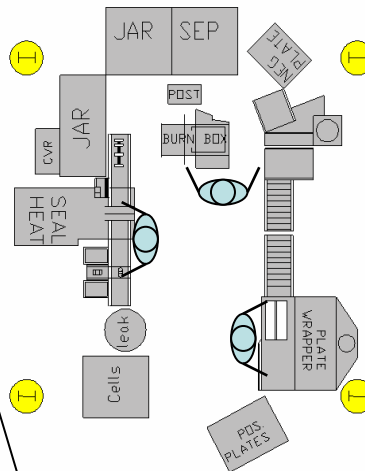
AFTER



Kansas City, Kansas

With standard work methodology, QCPC implementation, and reduced changeover times, it is possible to implement single piece flow on a U-shaped line.

New Line



- ✓ 3 people
- ✓ 7.1 cells/emp hr (65% improvement over the original line)
- ✓ \$3.40 dir labor/cell (39% reduction from original)
- ✓ Cycle time: 360 sec.

Mistake Proofing – Bristol TN Distribution Center



Bristol installed a camera on the OE line to inspect the battery for “green eyes.” This has enabled us to eliminate errors and mistake proof (*pokayoke*) the possibility of batteries leaving the line with a black, clear, or damaged eye.

Investing for the Future

Strategic capital equipment investment enhances productivity and streamlines operations...



- Process time reduced by 56%
- Cure time reduced from 72 to 32 hours
- Productivity increased by 12%

Sovema Oven – Bristol TN

5S /Total Preventative & Predictive Maintenance (TPM)

Bad Lauterberg Oxide Work Center, Germany

This equipment is more than 10 years old, but appears brand new as a result of Exide's TPM program. Preventative and predictive maintenance ensures that the factory operates with a minimum of unscheduled downtime.



. . . while the new TPM practices reduce wear and tear, requiring new equipment replacement only when either technology has changed the process & final product or environmental compliance can no longer be met.

The 5 Ss – Above the Factory Floor

Manzanares, Spain

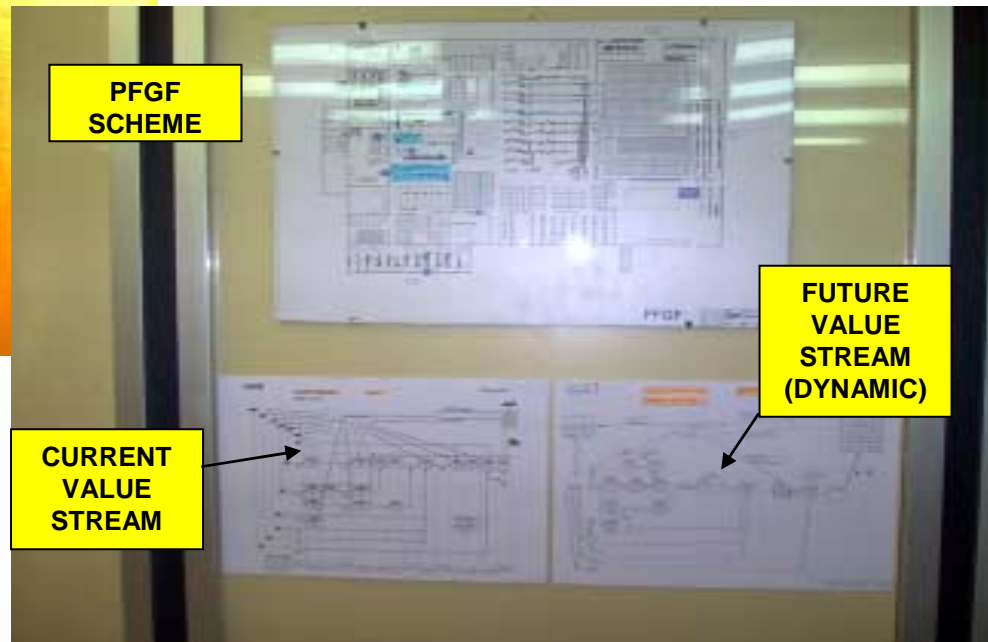


And EXCELL reaches beyond the plant floor...

Lean Above the Factory Floor

Manzanares, Spain

... to include all aspects of facility, production and administrative activities.



Lessons from The Trenches

Infusing Value in Supplier and
Customer Relationships

Looking Back: What We Learned

- Aggressive **global change** is possible – and critical in a turnaround situation.
- The power of **executive and board of directors' commitment** can not be underestimated.
- Cultural differences are best overcome if you **treat the company as a unified corporation**: Goals apply to everyone; execution details depend on the plant, country, etc.
- There are never enough **resources** available – but no company has *enough* resources. True lean eliminates waste and frees up resources.

Tips for Infusing Lean Thinking

1. Promote lean thinking (and those who do it.)
2. Nurture a new culture around lean.
3. Involve suppliers and customers (some of whom may be further along the lean path than you.)
4. Focus on appropriate metrics and goals (and decide what these are.)
5. Create visible infrastructure for ongoing improvement.
6. Set ambitious goals.

EXCELL in the News

MANUFACTURING NEWS

Thursday, May 16, 2002 Manufacturing News

www.ManufacturingNews.com

As Exide Pursues Lean, It Emerges From The 'Stone Ages' Of Manufacturing

Exide Technologies, the world's largest manufacturer of battery systems in the Americas and "500" company, is emerging from the "stone ages" of manufacturing. It is taking its manufacturing seriously and is now serious management staff, and is practicing that emphasis and deploying that emphasis.

The company is moving from a fragmented business, it was nearly bankrupt from the flow. It took a change and pushed quality to the forefront, something that is not only a business but a way of life.

To help explain it from its troubled and limited past, the company is moving to a new industrial space to build its brand. Robert Lutz, vice president of Chrysler Corp.

Lutz's vision is to make the 11.5-year-old Princeton, N.J., battery maker stand where it has been. Craig Mulholland, former president of Exide, is now CEO. Mulholland is now CEO. Mulholland is now CEO. Mulholland is now CEO.

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Question: Is the lean transformation just a marketing at Exide different from the lean transformation at Procter & Gamble?

Answer: When we started lean in 1994, that was about \$200 million a year. When I tell you that, that's a lot of money. Every year, you don't know what the lean system is going to do for you. It's not a magic trick. It's not a magic trick. It's not a magic trick.

We started the lean system with a lot of money. We started the lean system with a lot of money. We started the lean system with a lot of money. We started the lean system with a lot of money.

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Answering Corporate Executives, what was it all about. ACEL is now a lot of it. ACEL is now a lot of it. ACEL is now a lot of it.

Q: Is your EXCELL program the same as at Exide? The big difference between ACEL and EXCELL is that EXCELL is not a magic trick. It's not a magic trick. It's not a magic trick.

We started the lean system with a lot of money. We started the lean system with a lot of money. We started the lean system with a lot of money. We started the lean system with a lot of money.

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MANAGEMENT



Running LEAN STRONG

LEAN MANUFACTURING PROCESSES LEAD TO A STRONGER, MORE EFFICIENT BUSINESS

LEAN PRODUCTION is an important feature of modern manufacturing, but it can apply to any business process. Programs such as lean, kaizen and six sigma are frequently used in manufacturing, but what do they mean and how do they apply to distribution?

One of the biggest issues today for distributors is taking costs out of the supply chain. In the language of lean production, meaning waste, or waste and inefficiency from business processes is one of the best ways to do this.

Lean production is based on the Toyota Production System developed by Toyota executive Taiichi Ohno to address post-WWII production demands. Done properly, it can lead to improvements in efficiency, quality and customer service and drive down the costs of doing business.

Just-in-time philosophy is one of the developments of lean production. Lean focuses on the customer, involves collaboration and interpretation of data, creates

improved processes and helps to confirm improvement.

Kaizen translates from Japanese as continual improvement. It is a philosophy of continual, ordered and gradual improvement. It also concentrates on removing waste, providing customer service by involving everyone in the company.

Six sigma is a simple and sophisticated method for analyzing a complex cause-and-effect relationship as a way to discover improvements, eliminate waste, and improve customer value.

Originally developed by Motorola, Inc. and Allied Signal and adopted by General Electric Co. in 1995, thousands of firms now use six sigma methodologies. Six sigma is simply a data-driven approach for eliminating defects from any process. Sigma (Σ) is a Greek character that mathematicians use to represent deviation. In this case, a deviation is anything that is outside of customer specifications.

This analysis can be used to identify

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