

Manufacturing Culture Required to Sustain Reliability

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The Business Benefits of Reliability Are Well Understood

- Improved equipment performance
- Lower overall fixed costs
- Lower overall variable costs
- Improved quality (reduced variation)
- Improved product delivery
- Increased Sales
- Improved safety performance
- Improved environmental performance
- Improved plant morale
- Accelerated improvement on business improvements (less time on breakdowns)

“Reliability impacts safety, environmental, quality, service, cost, and CTO”

The Components of A Great Reliability Program Are Also Very Well Known !!

- Work identification process
 - Planning and scheduling of work
 - Preventive maintenance
 - Predictive maintenance
 - Precision maintenance
 - Operator basic care (TPM)
 - Root cause failure analysis
 - CMMS
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THE RELIABILITY PARADOX!

- ❑ There is a high degree of confidence in the business advantage gained through superior reliability results.
 - ❑ **AND** – we generally know **WHAT** to do **TECHNICALLY** to achieve superior reliability practices.
 - ❑ **BUT** - Sound reliability practices and superior reliability results are very rare?
 - ❑ **WHY?**
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Five Basic Leadership Steps

To Alter Our Manufacturing Culture And Solve
the Reliability Paradox

Five Basic Leadership Steps to Alter Our Manufacturing Culture and Solve The Reliability Paradox

STEP #1

Be Humble – Learn

– Accept Reality

“It is impossible for anyone to begin to learn that which he thinks he already knows ”

Step #1 - Be HUMBLE and LEARN - The experience of one NA Metals Producer – beginning in the 1980's

- ❑ **Inflation raised costs while market prices dropped**
 - ❑ **Globalization**
 - ✓ High quality Asian imports available at low price
 - ✓ Buyer's market
 - ❑ **Profit formula changed:**
 - ✓ **From:** $\text{Price} = \text{Cost} + \text{Profit Margin}$
 - ✓ **To:** $\text{Price} - \text{Cost} = \text{Profit Margin}$
 - ❑ **Shareholder value substantially eroded**
 - ❑ **Created an urgent need to improve results**
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Step #1 - Be HUMBLE and LEARN - The experience of one NA Metals Producer – beginning in the 1980's

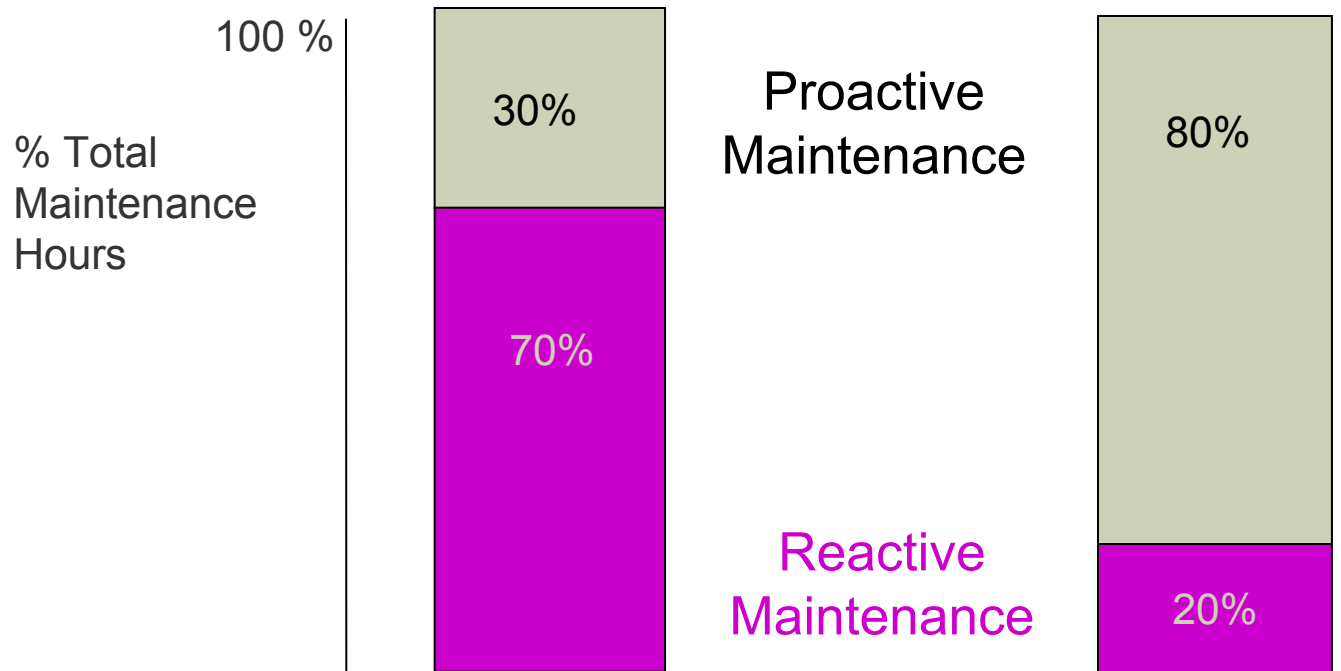
Their Response to the Threat to Their Business – Learn !!

Conducted global benchmarking research on:

- ✓ Industry maintenance and reliability practices
 - ✓ Predictive maintenance technologies
 - ✓ Information systems
 - ✓ Reliability methodologies
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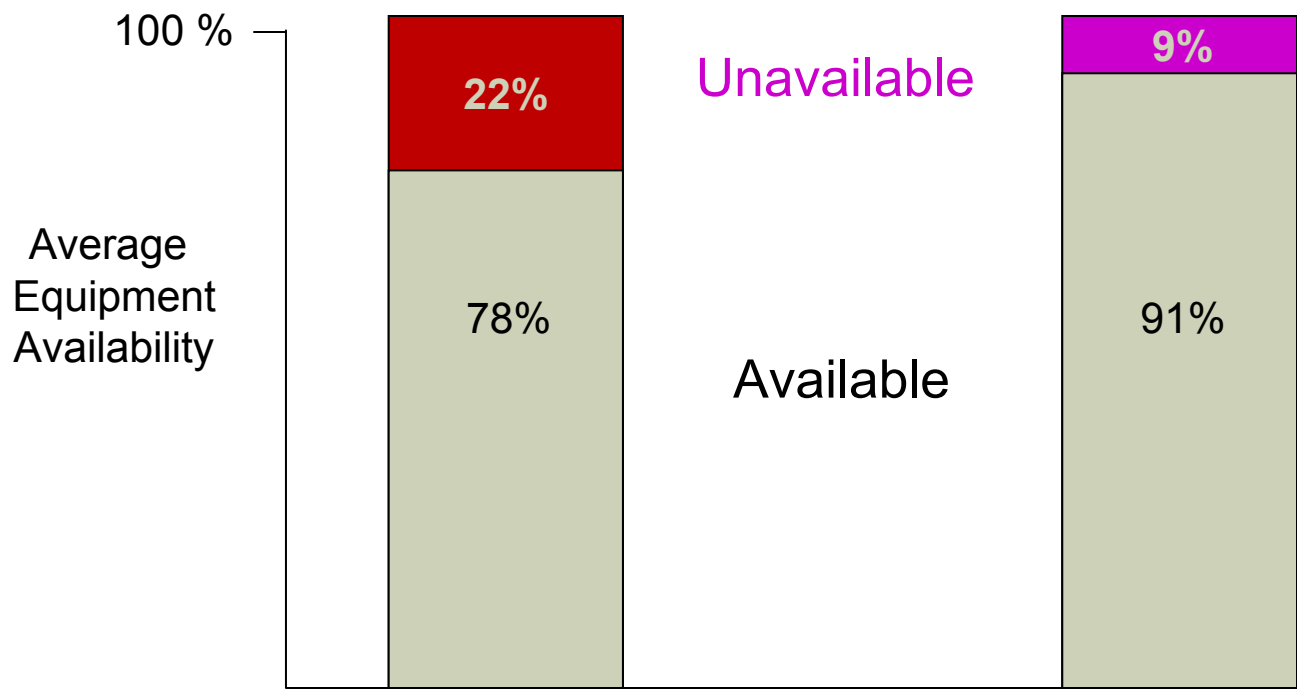
Step #1 - Be HUMBLE and LEARN - The experience of one NA Metals Producer – beginning in the 1980's

Reliability Results



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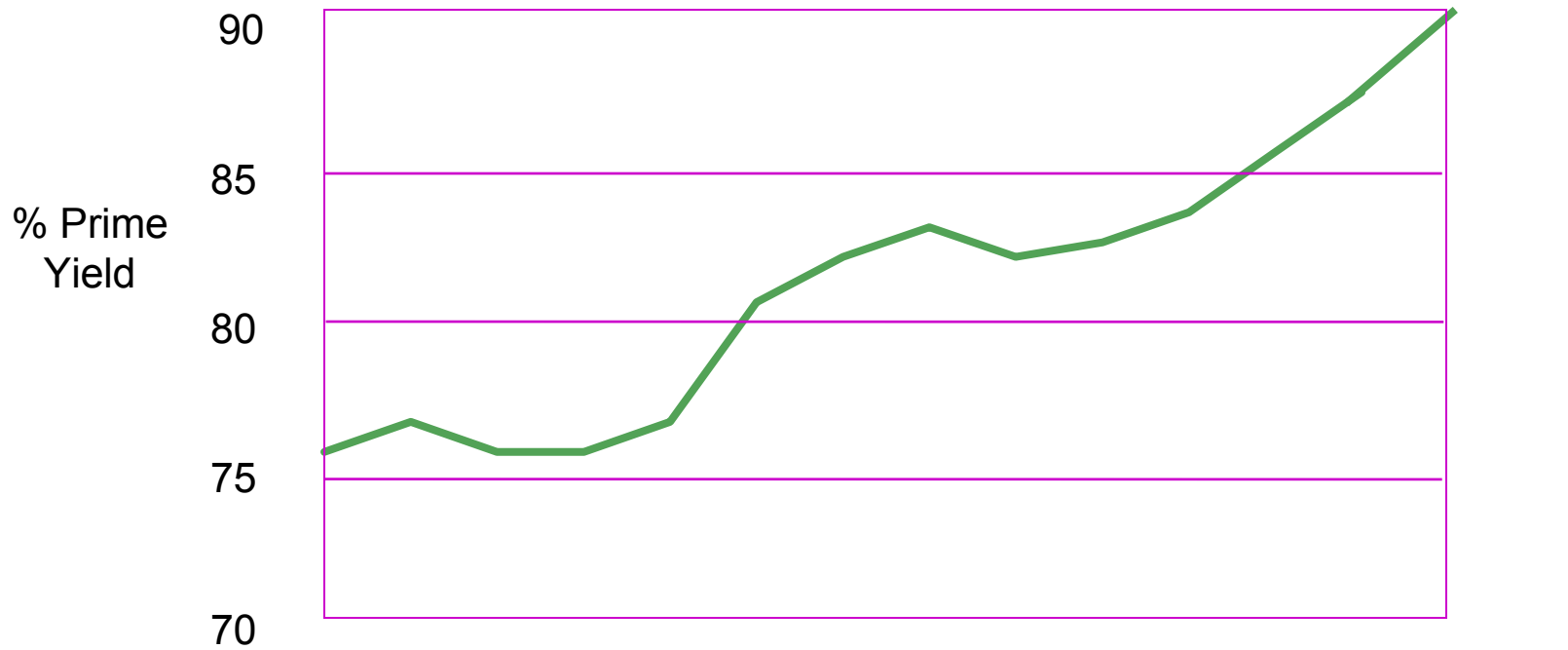
Reliability Results



Step #1 - Be HUMBLE and LEARN - The experience of one NA Metals Producer – beginning in the 1980's

Reliability Results

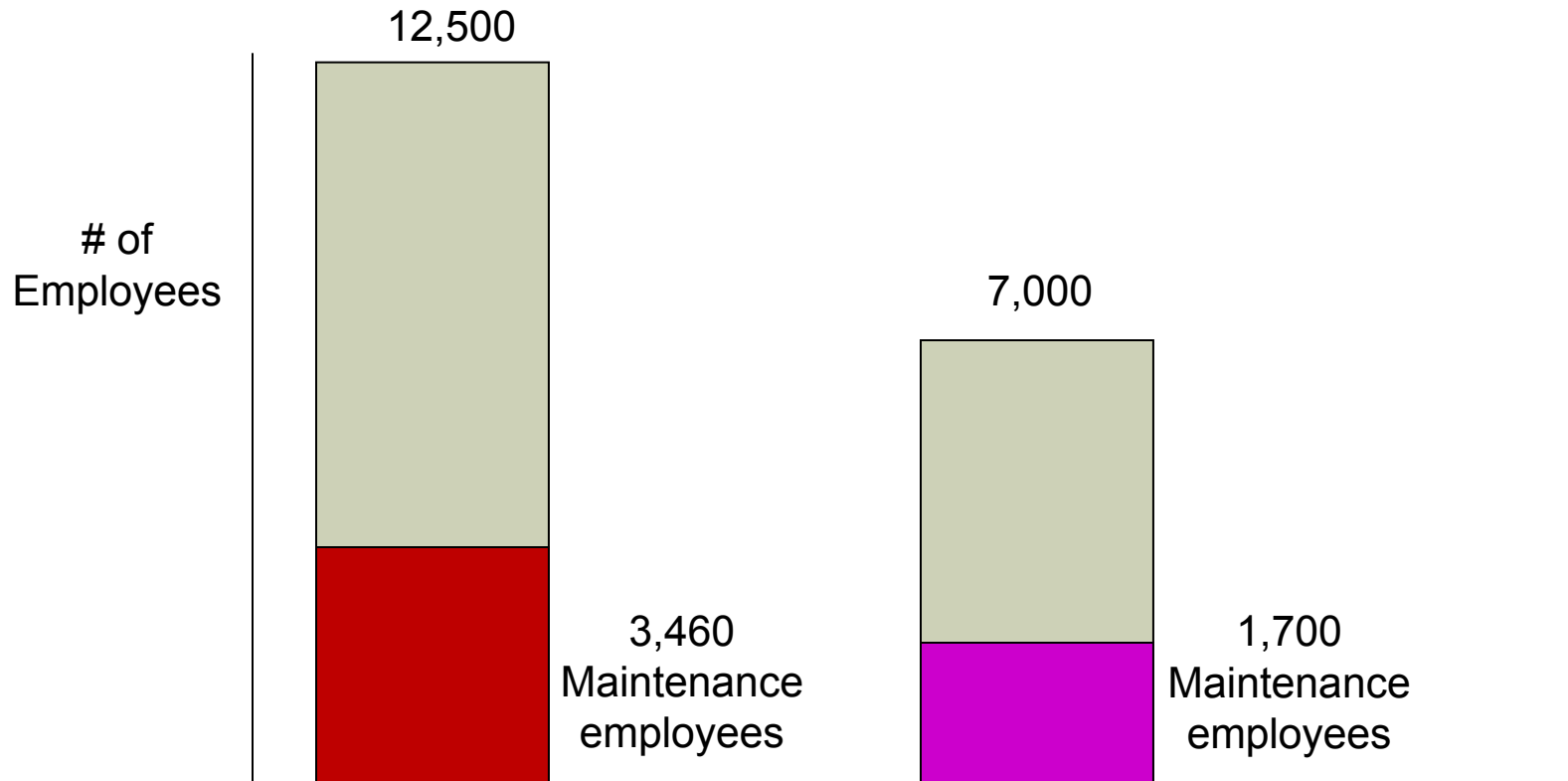
Quality increased from 76% yield to 91%



Step #1 - Be HUMBLE and LEARN - The experience of one NA Metals Producer – beginning in the 1980's

Reliability Results

Reductions achieved through voluntary attrition



Five Basic Leadership Steps to Alter Our Manufacturing Culture and Solve The Reliability Paradox

STEP #2

Know What Good Looks Like!

Results (Equipment and Business)

Practice

Process

Step #2 - Know What Good Looks Like – Equipment Results

	<u>World Class</u>	<u>Average</u>
✓ Average life of electric motors	> 15 yrs	< 10 yrs
✓ Mean time between repairs for pumps	> 6 yrs	< 3 yrs
✓ Average vibration levels	< 0.1 in/sec	> 0.3
✓ Overtime, percent of total hours worked	< 3 %	> 10 %
✓ Emergency work	< 5%	> 15 %
✓ Total maintenance cost as percent of RAV	< 2%	> 3%

Step #2 - Know What Good Looks Like – The PRACTICE – A More Difficult Proposition

- ✓ Obvious deterioration in pump bases
 - ✓ Excessively leaking seals
 - ✓ Covers missing on lube containers
 - ✓ Craftspersons queuing up at a stores counter
 - ✓ Bearings running hot from poor alignment/balancing/lubrication
 - ✓ Operations where emergency work is the norm
 - ✓ Engineering design requiring a ‘blue-tip wrench’ for repairs
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Step #2 - Know What Good Looks Like – The PRACTICE – A More Difficult Proposition

- ✓ Sight glasses on oil sumps that are not visible
 - ✓ Belts obviously worn from slipping
 - ✓ Conveyor table rolls that do not turn
 - ✓ Excessive packing leaks at pumps and agitators
 - ✓ Clearly inadequate oil levels
 - ✓ Motor ventilation covered with process debris
 - ✓ Excessive cycling of electric motors by operators
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Step #2 - Know What Good Looks Like – The PRACTICE



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Step #2 - Know What Good Looks Like – The PRACTICE



Gas turbines stored outdoors in plastic bags and covered with a tarp. Storage area is in the Power Plant, which is an area of heavy environmental dust accumulation due to coal and ash handling operations. Equipment of this value and type should be stored in a controlled environment

Step #2 - Know What Good Looks Like – The PROCESS – A Much More Difficult Proposition

- ✓ Reliability ownership that extends past the maintenance organization
 - ✓ Reliability as a collaborative effort between engineering, purchasing, production, and maintenance (and HR and Finance and IT)
 - ✓ Reliability metrics and systems widely understood by leadership
 - ✓ Reliability efforts justified in business terms
 - ✓ Reliability efforts that take full advantage of HPWS practices.
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STEP # 3

Maintain High Expectations !

While recognizing the difference between 'what good looks like' and the 'current reality' !

Step #3 - Maintain High Expectations

- ✓ Maintain a low tolerance for poor results, poor practices, and poor performers.
 - ✓ Be a boss when the role fits
 - ✓ Never ignore a poor reliability practice as it will immediately lower the standard.
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Step #3 - Maintain High Expectations

- ✓ Be passionate about reliability results,
✓ practices and processes
 - ✓ Crank it up - Normal won't get it!
 - ✓ Leadership must be felt!
 - ✓ What gets **talked about** – what gets **measured**
– what gets **recognized and rewarded** – what
gets **personally demonstrated** – IS what gets
done!
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STEP # 4

Develop an Improvement Plan !

Work on the critical few vs. the urgent many

Step #4 – Develop An Improvement Plan

Systems driven approach ?

OR

Problem centered approach ?

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STEP #5

***Be Courageous – For The Obstacles
Will Be Many!***

Step #5 – Be Courageous

Opposition and Obstacles Will Come From Everywhere

- ✓ The 'Not Invented Here' Group
 - ✓ The 'We've Done It Before' Group
 - ✓ Reluctant Union Leaders
 - ✓ Cautious Employees
 - ✓ Apprehensive Supervisors
 - ✓ Impatient Executives
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Five Basic Leadership Steps to Alter Our Manufacturing Culture and Solve The Reliability Paradox

Summary Of The Five Steps

1. Be Humble - Learn – Accept Reality
 2. Know What Good Looks Like
 3. Maintain High Expectations
 4. Develop a plan around the critical few vs. the urgent many
 5. Be Courageous
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TOP TEN REASONS WHY WE HAVE A RELIABILITY PARADOX

10. 'Sins of the past' take time to correct.
9. Reliability is not practiced as an integrated discipline.
8. Reliability is not equipped with a few simple metrics.
7. Reliability terminology is not standard – and is tough to follow.
6. Supervisors can't recognize good/bad practices.

Five Steps

1. Be Humble - Learn – Accept Reality
 2. Know What Good Looks Like
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 4. Develop a plan around the critical few vs. the urgent many
 5. Be Courageous
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Top Ten Reasons Why We Have A Reliability Paradox (Continued)

5. Too high a tolerance for poor performers and poor practices.
4. Difficulty in accepting reality.
3. Failure to identify impact in business terms.
2. Often have the wrong focus.
1. Lack of understanding of organizational dynamics – the ‘soft side’.

Five Steps

1. Be Humble - Learn – Accept Reality
 2. Know What Good Looks Like
 3. Maintain High Expectations
 4. Develop a plan around the critical few vs. the urgent many
 5. Be Courageous
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Q&A

Thank You
