## Manufacturing Business Excellence

A Common Sense Approach

February 2006

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# I have good news!

Australian manufacturing practices are on par with US, Western Europe, and other modern economies!

# I have bad news!

Australian manufacturing practices are on par with US, Western Europe, and other modern economies!

This is simply not good enough. Australia also has:
 High labor costs

- High distribution costs distance from market
- Small domestic markets precluding some economies of scale (but that can be OK!)
- Australian manufacturers must be excellent in manufacturing to offset these disadvantages and compete globally

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# More good news!

As you know, in the resource sectors mining and agriculture, Australia often has structural advantages -Wealth of natural resources Good infrastructure for distribution Highly skilled workforce Highly productive employees Original wealth comes from mining, agriculture, and manufacturing

# Let's look at manufacturing

 Australia has distinct advantages in agriculture and mining
 Let's consider how we might enhance Australian manufacturers' competitive position



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# Your system is perfectly designed to give you the results that you get.

W. Edwards Deming

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# Capitalism is very "Darwinian"

- Globalization of capitalism and the ease of telecommunications is facilitating access to:
  - Technology
  - Methods
  - Markets
  - Capital
- "The world is awash in capital" much of it going to India and China - Intensifying competitive forces!
- Is your system designed to allow you to improve, compete, and prosper in this environment?
- Productivity, best practice and innovation are essential for survival, and prosperity

# Can Australian Manufacturers Compete?

**Consider the following Scenarios** 

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#### Scenario No. 1 – **Simplifying Assumptions** Asian Manufacturer vs. Western -Western labor costs are dramatically higher, i.e., 5x that of Asian manufacturers Marketing, R&D and G&A and taxes are significantly lower in Asia Asian shipping, duties, and the risk/cost of capital for products in transit are significantly higher Raw material, energy and depreciation costs are comparable; raw material is ~50% of total costs Both operate at 60% OEE and are sold out at current operational performance

# Scenario No. 1

	Western Co.	Asian Co.
Sales Volume	\$100	\$100
Cost of Goods Manufactured		
Raw Material	\$ 35	\$ 35
Energy and other variable costs	\$ 15	\$ 15
Labor	\$ 15	\$ 3
Depreciation and other costs	\$5	\$5
Other costs		
Packing and shipping	\$2	\$ 5
Cost of capital and risk, in transit	<b>\$</b> 1	\$ 2
Import duties	\$ 0	\$ 5
Other costs, e.g., order processing,		
inventory carrying, commissions,		
pre- & post-sales service	\$5	\$5
Gross Profit	\$ 22	\$ 25
Marketing and Sales	\$7	\$5
R & D	\$2	\$ 1
G&A, Interest and Taxes	\$ 7	\$5
Net Profit	\$ 6	\$ 14

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# Scenario No. 2 – Simplifying Assumptions

Asian Manufacturer vs. Western –

 Labor productivity of Western plant has improved by 20% - labor costs are now lower, i.e., 4x (vs. 5x) that of Asian; (and yields and energy costs have improved slightly)

- Both Western and Asian company have also increased OEE by 33% (and both are still sold out)
- Other costs respond as appropriate, e.g., raw material and energy grow in proportion to demand; or depreciation remains constant

# Scenario No. 2

Sales Volume\$133\$133Cost of Goods ManufacturedRaw Material\$45\$46.5Energy and other variable costs\$19\$20Labor\$12\$3Depreciation and other costs\$5\$5Other costs\$2.7\$6.6Cost of capital and risk, in transit\$1.3\$2.7Import duties\$0\$6.6Other costs, e.g., order processing, inventory carrying, commissions, pre- & post-sales service\$5.6\$5.6Gross Profit\$42.4\$37.0Marketing and Sales\$7\$5R & D\$2\$1G&A, Interest and Taxes\$7\$5		Western Co.	Asian Co.
Cost of Goods Manufactured Raw Material \$45 \$46.5 Energy and other variable costs \$19 \$20 Labor \$12 \$3 Depreciation and other costs \$5 \$5 Other costs Packing and shipping \$2.7 \$6.6 Cost of capital and risk, in transit \$1.3 \$2.7 Import duties \$0 \$6.6 Other costs, e.g., order processing, inventory carrying, commissions, pre- & post-sales service \$5.6 \$5.6 Gross Profit \$42.4 \$37.0 Marketing and Sales \$7 \$5 R & D \$2 \$1 G&A, Interest and Taxes \$7 \$5 Net Profit \$26.4 \$26.0	Sales Volume	\$133	\$133
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Marketing and Sales\$ 7\$ 5R & D\$ 2\$ 1G&A, Interest and Taxes\$ 7\$ 5Not Profit\$ 26 4\$ 26 0	Gross Profit	\$ 42.4	\$ 37.0
R & D\$ 2\$ 1G&A, Interest and Taxes\$ 7\$ 5Not Profit\$ 26.4\$ 26.0	Marketing and Sales	\$ 7	\$5
G&A, Interest and Taxes \$ 7 \$ 5	R&D	\$2	\$ 1
Not Profit ¢ 26.0	G&A, Interest and Taxes	\$ 7	\$ 5
$\phi = 20.4 \qquad \phi = 20.0 $	Net Profit	\$ 26.4	\$ 26.0

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# Results

The business is competitive with: A 20% reduction in labor costs, Combined with a 33% increase in output, Both are achievable with operational and business excellence Australian businesses would need a bit more productivity improvement to offset the higher distribution costs

#### **Market Survivor Profile**

(Prices trend down over time. We create a future by driving unit costs down, through continuous Improvement, or "little" innovation)



# **Does Cost Cutting Work?**

Hamel and many others report that cost cutting does *not* work well; Hamel refers to "Corporate Liposuction"- earnings growth is >5 times sales growth (thru cost-cutting or other constraints)

 In a review of 50 companies engaged in a cost cutting "strategy", 43 suffered a significant downturn in earnings after 3 years

Growing profits only through cost cutting is not sustainable, and must be balanced with sales growth through innovation, new product development, solid infrastructure, process improvement, etc.

# Cost Cutting (cont.)

From this and other data, cost cutting is a poor bet. When does it work? Perhaps: If you're a "C", and have no choice to survive If you're a bloated bureaucracy, and must If you're faced with reluctance in employees, unions, etc.; and/or need to get people's attention In specifically targeted situations- obvious waste In a major market shift, disruption, or downturn, e.g., 10-20% Much more likely to work when combined with restructuring of physical assets (Morris, et.al.)

# How do we know our capacity?

We measure all our losses from ideal production, i.e., Overall Equipment Effectiveness (OEE)

# 100% AU/OEE and Loss Accounting

Scheduled Downtime						
Unscheduled Downtime						
Process Rate Losses						
Quality Losses					uo	
<b>Changeover/Transition Losses</b>					izati	
No Demand/Market Losses			SS	ion	Util	lity
OEE is a measure of capital efficiency- Why spend more capital? Find your hidden plant! We must understand all losses from ideal and make business decisions to reduce them;	Asset Utilization	OEE/	Asset Effectivene	Quality Utilizati	Potential Rate	Actual Availabi

# Reliability (OEE) and Safety-Mutually Supportive



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#### Correlation of Corrective/Reactive Work Orders with Injury Rate – Plant No. 1



#### Correlation of PM/PdM Work Orders with Injury Rate – Plant No. 1



# Establish a *policy* linking Safety and Reliability

- If safe behavior is a requirement, then...
- Reliability, best practice, and manufacturing excellence is a requirement
- If you believe in Zero Incidents/Injuries, you must believe in Zero Failures/Downtime – Failures induce greater risk of injury
- Use the same drivers for your reliability improvement as you did for safety improvement
- Getting both requires: tenacious application of best practice

# Lean Manufacturing

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## Reliability & Stability are essential for Lean Manufacturing

(Poor stability and delays induces higher inventories and costs, and poor delivery)



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# The Toyota Way for Manufacturing Excellence (Lean Manufacturing)

Problem Solving

Continuous Improvement/Learning Problem Solving Tools, e.g., Kaizen, 5S, 5 Whys, Quick Changeover, TPM

Align, Respect, Challenge and Grow Employees & Suppliers

Source: The Toyota Way by Jeffrey Liker, McGraw Hill, New York, 2004

Understand Processes/Flow; Level workload; Use "Pull" systems; Standardize Work

Long Term Thinking (risking short term profits)

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# The Toyota Production System

High Quality, Low Cost, On Time Delivery
Excellence in Safety – High Morale

People and Teamwork

Just-in-Time

**Continuous Improvement** 

In-station quality

Waste Reduction

**Level Production Flow** 

Stable, Standardized Processes, including Equipment Reliability

The Toyota Way Philosophy

The RM Group, Inc. Knoxville, TN Source: The Toyota Way by Jeffrey Liker, McGraw-Hill, New York, NY, 2004.



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#### Stability Requires Process and Equipment Reliability-The Process



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#### Lots of Defects Induce Lots of Reactive Behavior, e.g.: Typical Maintenance Practices



Source: Author's surveys and The Reliability-based Maintenance Strategy: A Vision for Improving Industrial Productivity, R. Moore, F. Pardue, A. Pride, J. Wilson, September 1993, CSI Industry Report.

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#### Eliminating Defects Assures Stability, e.g.: Benchmark Maintenance Practices



Source: Author's surveys and The Reliability-based Maintenance Strategy: A Vision for Improving Industrial Productivity, R. Moore, F. Pardue, A. Pride, J. Wilson, September 1993, CSI Industry Report.

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# Managing Change – Things Get Worse Before Getting Better

# Effect on Costs (Only)



Source: *Taking the Forties Field to 2010*, R. L. Thompson, et al., BP Exploration, Presented at SPE international Offshore European Conference, Aberdeen Scotland, Sept. 1993

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#### Manage the Bow-wave using "Mini" Bow-waves: Small Improvement Teams



# Leadership – Key to Managing Change and Aligning the Organization

# Peter Wicken's Leadership Model



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#### Leadership Models – Common Characteristics

- Leadership requires vision, a greater sense of purpose, watching the horizon, while grounded in reality
  - Leaders put people first, treat them with trust, dignity, respect, and appreciation
- Leaders are trustworthy, true to their word & principles
- Leaders have a passion for excellence, set high work and ethical standards, and create a disciplined, caring, proud environment
- Leaders set the example, and have the courage to support their basic values and principles
- As Hugh Blackwood, Rear Admiral, US Navy said: Lead the people, manage the processes

# Leaders engage the entire workforce in improvement



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Leaders engage the entire workforce in improvement (cont.)

Nothing changes until the shop floor does things differently!

What can you do as a leader to A) create an environment where improvement is routine? B) to continuously remove the obstacles from your people's success?
What can you do to align the organization?

# Most Organizations are not Aligned

According to Harris Interactive Research (2006):

- Only 37% of employees had a clear understanding of what the organization was trying to achieve
- Only 20% were enthusiastic about organizational goals
- Only 20% saw a clear connection between their tasks and organizational goals
- Only15% felt the organization enabled them to achieve their goals
- Only 15% felt they were in a high trust environment
- Only 10% felt their organization held people accountable
- Only 13% felt there was a high-trust, highly cooperative working relationships with other groups or departments

 Consider the consequences of this if you were a coach and your team's athletes felt this way

# Leaders Align the Organization

 Communicate a common strategy with common "superordinate" goals, and respective roles

- View reliability, safety and manufacturing excellence as an integrated process
- Assure that operating units "own/lead" reliability; Maintenance supports reliability
- Foster a partnership for manufacturing excellence between production & maintenance; have a partnership agreement
- Establish common measures for production & maintenance, e.g., downtime, maintenance costs, PM Compliance, on-time delivery

# Leaders Align the Organization

Pause and reflect: Informally on a daily/weekly basis; And, have at least one "away day" for the management team per quarter – review strategy, progress, successes, failures, etc.

- Foster empowerment: Set up routine structured improvement time for cross-functional teams
- Make it easy to do the right thing, and hard to do the wrong thing; People will follow the path of least resistance – help them do that! (Winston Ledet)
- Set up measurement systems that expose your weaknesses- your improvement opportunities





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# Nominal Improvement Hierarchy

Long Term Thinking Process Mapping Employees Tools

The Toyota Way/Production System 1. Long Term Thinking 2. Process/Value Stream Mapping 3. Engaging Employees and Suppliers 4. Applying the Tools-Understand and Eliminate Waste Measure/Improve KPI's

Kaizen – 5S, Standard Work, "Go and See", 5 Whys, Quick Changeover, Kaizen "Events", Waste Elimination



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# Leadership - Essential for Manufacturing Excellence

Use these principles to create a common strategy with common superordinate goals for organizational alignment, so you can:

# Win in the Global Market!

# **Contact Details**

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Ron Moore is the author of *Making Common Sense Common Practice: Models for Manufacturing Excellence*, now in its 3<sup>rd</sup> edition, and of *Selecting the Right Manufacturing Improvement Tools - What Tool? When?*, both from Elsevier Books, Butterworth-Heinemann imprints. He is affiliated with SIRF Roundtables, Melbourne, Australia.