

**From the Business Improvement  
Navigators at**



# **Why the Operations Capability Average for Australian Industry over the past 8 years has Flat Lined at less than 50%**

**Based on a 8 year Study of the Operations  
Capability of Australasian Industry (2002 – 2009)**

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**A Special Report for Corporate  
Executives and Senior Managers**

## Executive Summary

Competitive Advantage can come from a number of sources; 3 key sources are:

- Unique Product / Service Features;
- Unique Distribution / Delivery Capability; and
- Superior Operations Capability.

Toyota Motor Company is currently demonstrating to the world that Superior Operations Capability can be the hardest to rapidly replicate by a competitor, as shown for example by the loss of market share that GM, Ford and Chrysler are currently going through. Yet, achieving Superior Operations Capability is often the competitive advantage area that Senior Management pays least attention to.

Operations Capability can be evaluated through 3 key areas:

- Quality Performance;
- Response Performance; and
- Employee Engagement Performance.

This was the focus of our study which involved surveying over 1000 delegates to our public workshops from over 300 companies over a period of 8 years averaging 127 delegates from 39 leading Australian companies each year. The results highlight that in 2002 the average score for Australia compared to world's best was only 50%. More concerning is that over the 8 years since formally commencing the study the average Australian Industry score has made no improvement as in 2009 the average score was down to 45%.

***Disturbingly we have found Australian Industry's operations capability has Flat Lined at just under 50% over the past 8 years.***

***There is an urgent need to improve Operations Capability within Australian Industry and many companies are trying, however from the results of the survey it appears we are not doing a very good job at it.***

Operations Capability can be improved through 3 key focuses:

- Improved Technology & Automation;
- Project Focused Improvement; and
- Improved Practices & Behaviours

We have found improved Practices & Behaviours is critical to ensure the maximum benefit is achieved from the first 2 however we have also found during our research that improving Practices & Behaviours of the workforce is often given the least attention over Technology & Automation and Project Focused Improvements.

A process to improve Practices & Behaviours is outlined in this report along with 3 companies that have gone against this trend by focusing on improving Practices & Behaviours of their entire workforce through a formal operational improvement journey and achieved both an increase in their Operations Capability rating and significant bottom line benefits.

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## The Importance of Operations Capability

Excluding external sources such as cheap finance, raw materials, infrastructure, etc, Competitive Advantage tends to come from three sources:

- Unique Product and / or Service Features;
- Unique Distribution and / or Delivery Capability;
- Superior Operations Capability.

In our rapidly changing world we should always be striving for unique and innovative Product and / or Service options along with unique and innovative Distribution and / or Delivery options however once such a competitive advantage is recognised in the market place, in this day and age it can often be rapidly copied by competitors.

As demonstrated by Toyota over recent years, Superior Operations Capability can be the hardest to rapidly replicate by a competitor. This offers great opportunity for Australian Industry to improve and lock in their competitive position in both the domestic and international market place. It is also one of the areas of business opportunity that is often only given cursory senior management attention.

## What drives Operational Competitive Advantage?

Over the years we have seen different operational focuses as companies strive to achieve competitive advantage in the market place. Leading up to the mid 1970's the goal was to be the lowest cost producer. This is still important today however it alone no longer ensures competitive advantage. In the mid 1970's the Quality movement commenced and competitive advantage was about having a quality product to an approved standard that was the lowest cost. In the mid 1980's we saw Just-in-Time 'Response' become the new way to achieve competitive advantage when customers wanted to reduce their holding stocks and have high quality, lowest cost products delivered in the shortest time possible. In the mid 1990's Innovation became the new edge for companies. Having the product packaged differently or presented differently or with that special option was the way to increased competitive advantage. Now we are seeing a new competitive advantage emerging called the Learning Organisation where improvements are rapidly translated through the organisation with everyone contributing to making the company more efficient, more quality conscious at the source, more responsive, more able to take on innovation, and more able to rapidly take on new technology.

We have found organisations that engage all their employees to contribute and develop through regular formal continuous improvement activities are the ones that can best embrace Innovation and Learning.

In the early days of CTPM we developed through international benchmarking studies a simple but effective Operations Capability Rating Survey tool covering the specific areas of Quality Performance, Response Performance and Employee Engagement Performance to assist delegates at our workshops to evaluate how they perceived their site or region's operational performance.

During the first session of each two-day workshop we ask all the delegates to complete our Operations Capability Rating Survey and for the past 8 years we have been collecting the results.

## Operations Capability Rating Survey used during the 8 Year Study

### Operations Capability Survey

For each of the 3 categories, please score your site out of 10 using the words in each block as a guide to giving a rating. If the words in the first block described your site you would rate your site somewhere between 0 and 3 depending on how close the words described your perception of the site. If the words in the second block better described your perception of your site then you would rate your site some where between 3 and 7 etc.

0	1	2	3	4	5	6	7	8	9	10
<b>Quality Performance</b>										
Machines and processes unable to hold desired tolerances, high rate of 'off-spec'.			Good machine and process capability supported with Statistical Process Control monitoring and quality improvement tools training but with limited application.				Excellent machines and processes capability continuously monitored using Statistical Process Controls supported by the application of quality improvement tools with low process variability.			
Large and powerful inspection departments, 'off-spec' discovered by inspection and customers.			Strong quality assurance department with analytical capability and charged with primary quality responsibility.				Very low 'off spec' rate measured in parts per million.			
Low Skills training.			Good skills training.				Highly trained and versatile work force responsible for quality inspection and corrective action.			
Large discrepancy between documents and the actual practices, frequent non-conformances.			Few non-conformances.				High application of mistake - proof devices to ensure no non-conformances to specification.			
Large number of customers' complaints.			Low number of customer complaints, however problems do remain and are handled by QA department.				Virtually no problems with complaints and customer inputs solicited for continuous improvement.			

0	1	2	3	4	5	6	7	8	9	10
<b>Response Performance</b>										
Frequent replanning / rescheduling of production.			Relatively stable production schedule with limited expediting.				Production schedule directly coupled with market demand.			
'Fix it when it breaks' maintenance.			Established preventive maintenance, infrequent breakdowns.				TPM as the key equipment management strategy.			
Low process flexibility, lengthy changeovers, set-ups, or transitions.			Faster changeovers, set-ups or transitions, however frequent bottlenecks.				Quick changeovers, set-ups or transitions (measured in minutes) and virtually no bottlenecks.			
Inventory levels between equipment or process high.			Inventory levels under control.				Inventory levels stable and low.			
Long Lead Times.			Relatively shorter Lead Times for selected products / outputs.				All Lead Times less than one-day			

0	1	2	3	4	5	6	7	8	9	10
<b>Employee Engagement Performance (supporting Innovation &amp; Learning)</b>										
Adversarial labour management relations.			Stable labour management relations.				Labour management relations based on trust and continuous two-way communication.			
Little employee involvement (especially all operators) in formal improvements			Some formal employee involvement in formal improvement activities with main focus on Cross-functional teams.				All employees involved in formal improvement activities through both Cross-functional and Area Based Teams ensuring a high rate of implemented improvements.			
Leadership based on seniority rather than skills with many job classifications.			Structure is based on cascading team environment where each organisation layer is seen as a team of people.				Cascading team organisation structure is 'purpose' aligned and is capable of supporting continuous learning by all employees through well-led synergistic Area Based Teams along with dedicated support.			
High employee turnover or high use of casuals.			Stable work force with good employee morale.				High focus on learning by employees with low turnover and high morale.			
Highly demarcated work force resulting in high inefficiencies.			Skills training well developed to achieve both flexibility and expertise in well-defined areas.				Continuous training to achieve skill versatility and team problem solving skills.			

The three scores out of 10 are added to give a total score out of 30.

The results are captured during each workshop and displayed on the screen to allow the delegates to compare their rating to everyone else and the group average.

## Who participated in the Surveys?

The respondents came from a wide spread of Australian companies. On average there were some 3-4 delegates from each site. The delegates ranged from Manufacturing Directors, General Managers, Site Managers, Manufacturing Managers, Production Managers, Maintenance Managers, Training Managers, Improvement Co-ordinators, Project Engineers, Supervisors, Tradespeople and Operators.

The majority of people attending the workshops either requested to attend because they were interested in learning how to improve the performance of their company, or were sent because they would play an important role in improving their company and hence demonstrated a reasonable feel for the current performance at their site.

We classified respondents into 5 types:

- Senior Management eg Site Manager, General Manager, Director etc
- Management eg Production Manager, Quality Manager, Maintenance Manager etc
- Support Staff eg Improvement Co-ordinator, Planner, Technician etc
- Supervision eg Superintendent, Supervisor, Team Leader etc
- Shopfloor eg Operator, Fitter, Electrician etc

We classified their companies into 5 Industry Groups:

- Manufacturing – Discrete
- Manufacturing – Food & Pharmaceutical
- Manufacturing – Process
- Mining & Resources
- Utilities & Service

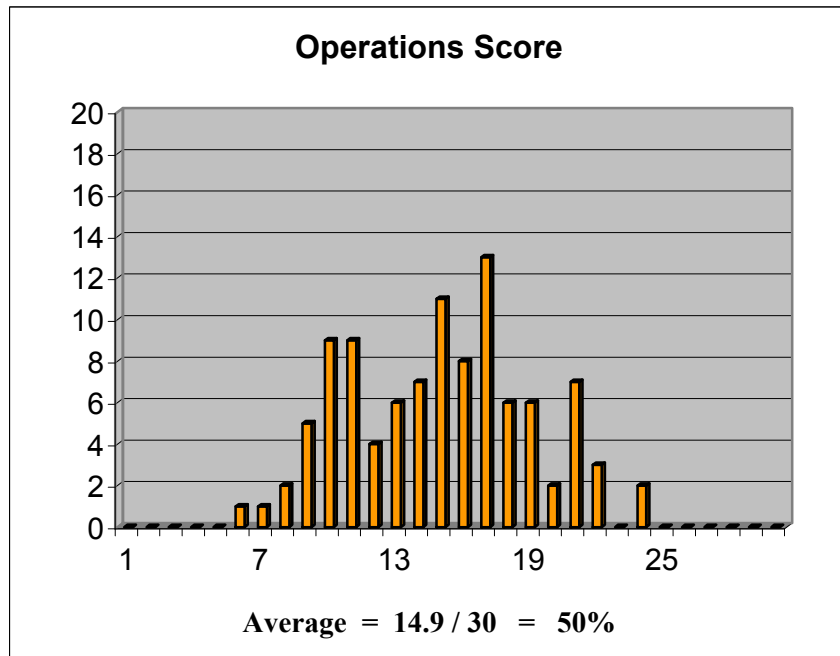
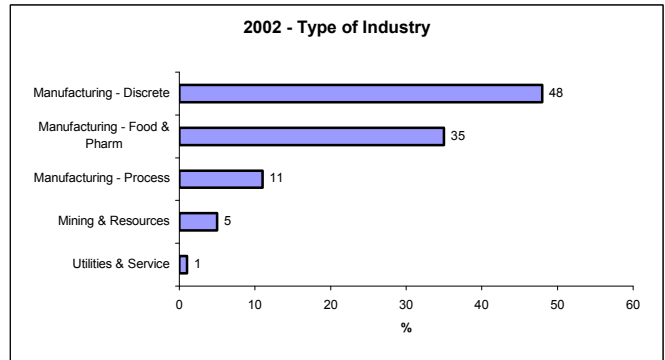
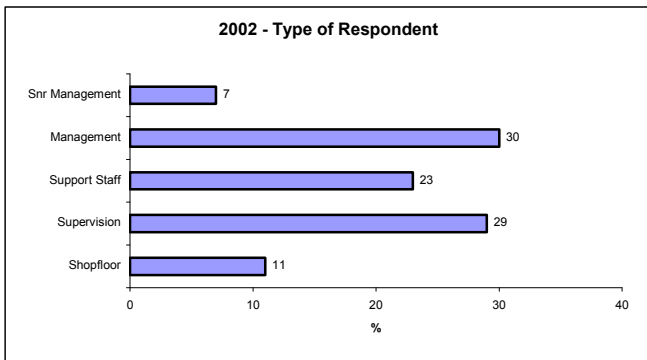
We provided the following summary to explain what the scores mean:

00-06 / 30	or	00% – 20%	In need of urgent attention
07-12 / 30	or	21% – 40%	Great opportunity for improvement
13-18 / 30	or	41% – 60%	On the right path but ways to go yet
19-24 / 30	or	61% – 80%	Well managed with further improvement potential
25-30 / 30	or	81% - 100%	World Class Performance

## 2002 Survey Results

**Location of Workshops:** Adelaide, Brisbane, Melbourne, Sydney and Edinburgh Park – SA  
**Respondents to Survey:** 102 from 39 Companies covering 45 Sites

- |                             |                             |                                     |
|-----------------------------|-----------------------------|-------------------------------------|
| ACI Closures Division       | Coopers Brewery             | Penrice Soda Products               |
| ACI Plastics Packaging      | Cooper Standard Automotive  | River Sands                         |
| Adelaide Brighton Cement    | CSL Bioplasma               | Sola Optical                        |
| ADI Mulwala                 | Detmold Packaging           | Speedibake                          |
| Agnew Gold Mine             | Hills Industries            | Telstra Regional Service Operations |
| AI Automotive               | Holden                      | TI Automotive Systems               |
| Air International           | Ingal Civil Products        | Tomago Aluminium                    |
| Alphapharm                  | Kennon & Melded Fabrics     | Transitions Optical                 |
| Blue Circle Southern Cement | Kolotex Aust                | Trend Laboratories                  |
| Boart Longyear              | Kraft Foods                 | Tridon Australia                    |
| Bonlac Foods                | Merisant Manufacturing Aust | Varian Australia                    |
| Boral Metro Quarries        | Mitsubishi Motors           | Vinidex                             |
| Boral Hancock Plywood       | Pandrol                     | WMC – Olympic Dam Corporation       |



## 2003 Survey Results

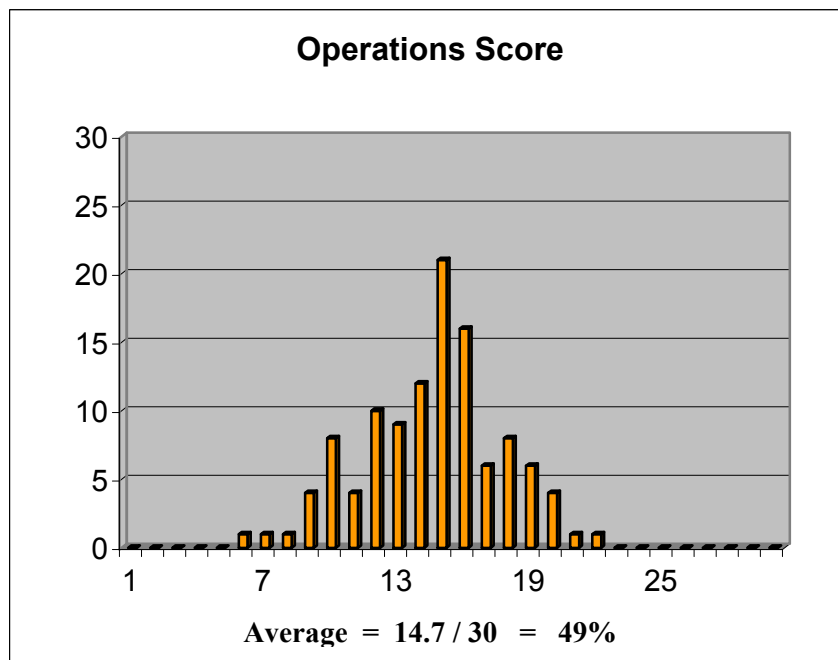
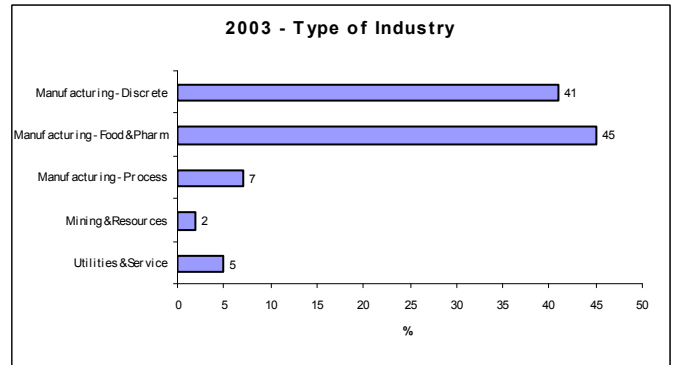
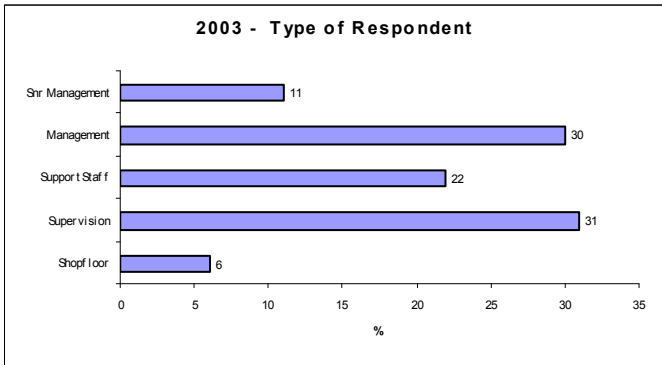
**Location of Workshops:** Adelaide, Brisbane, Melbourne, Sydney  
 Albury, Bathurst, Devonport, Broadmeadows – VIC, Clayton – VIC

**Respondents to Survey:** 162 from 41 Companies covering 49 Sites

ACI Plastics Packaging  
 Alphapharm  
 Australia Post  
 Australian Country Spinners  
 Blue Circle Southern Cement  
 Bridgestone TG  
 Calsonic Australia  
 Caroma Industries  
 Carter Holt Harvey Radius  
 Cobar Mining  
 Coca – Cola Amatil  
 Coopers Brewery  
 Cooper Standard Automotive  
 CSL Bioplasma

Exide Technologies  
 Gerard Industries  
 Hardy Wine Company  
 Hills Industries  
 Holden  
 Holden Engine Operations  
 Hydro Aluminium  
 Integral Energy  
 ION Automotive Systems  
 Johnson Controls  
 Kayser Hosiery  
 Kraft Foods  
 Mitsubishi Engine Plant  
 National Starch & Chemical

Nestle  
 Orica – Chemnet (ex Incitec)  
 Pacmetal Services  
 Park-Tec Engineering  
 Pioneer Building Products  
 QNI  
 Rheem Australia  
 Robert Bosch  
 Simplot Australia  
 Southcorp Wines  
 Tip Top Bakeries  
 Vinindex  
 Walker Australia

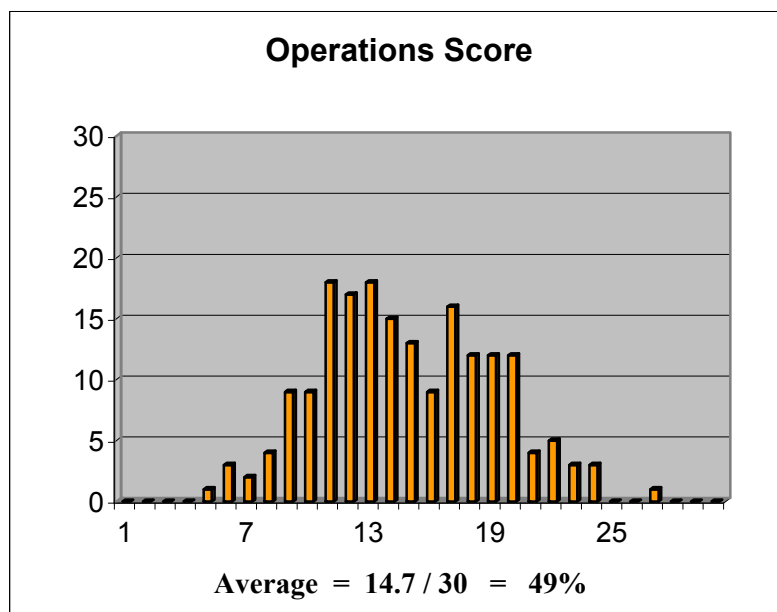
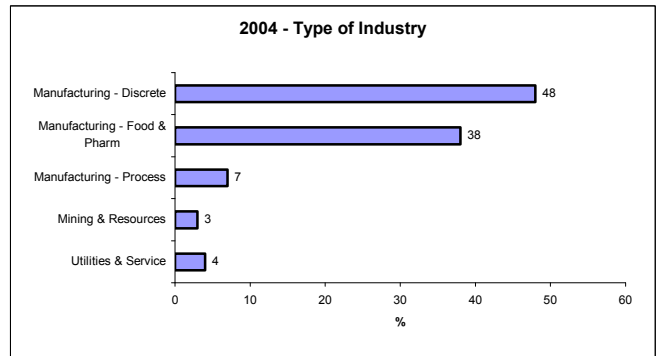
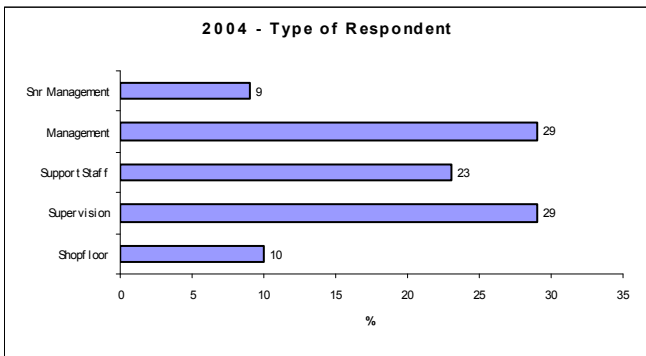


## 2004 Survey Results

**Location of Workshops:** Adelaide, Brisbane, Melbourne, Sydney, Devonport - TAS, Ulverstone - TAS, Berkeley Vale – NSW, Ingleburn – NSW, Woodville - SA

**Respondents to Survey:** 186 from 49 Companies covering 65 Sites

- |                                |                            |                                       |
|--------------------------------|----------------------------|---------------------------------------|
| ACI Plastics Packaging         | Bulla Dairy Foods          | Monroe Springs                        |
| Adelaide Brighton Cement       | Caroma Industries          | Pacmetal Services                     |
| Advance Metal Products         | Coca Cola Amatil           | Pax Australia                         |
| aiAutomotive                   | Coopers Brewery            | Performance Plus Australia            |
| Air International              | CSL Bioplasma              | Pioneer Building Products             |
| Alcan                          | CSR – Sugar Mills          | Rayonier – NZ                         |
| Alpine MDF Industries          | EGR                        | Rheem Australia                       |
| APC Global                     | Energy Resources Australia | Sanitarium Health Food Company        |
| Australia Post                 | Fort Dodge                 | SCA Hygiene Australasia               |
| BMA Blackwater Mine            | Holden                     | Schefenacker Vision Systems Australia |
| Boart Longyear Asia Pacific    | Holden Engine Operations   | Simplot Australia                     |
| Bonlac Foods                   | ION Automotive             | Southcorp Wines                       |
| Boral Bricks                   | JCV Tooling                | Sunmetals Corporation                 |
| Boral Metro Quarries           | Kraft Foods                | Tomago Aluminium Company              |
| Botainical Resources Australia | Marsden & McGain           | Zinifex Century Limited               |
| Boyne Smelters                 | Mitsubishi Motors          | Zinifex Hobart Smelter                |

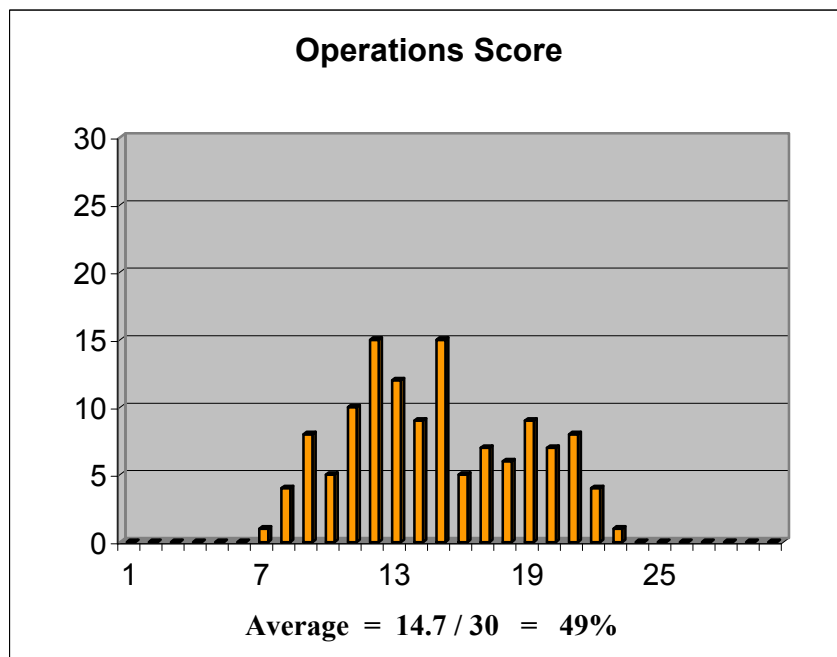
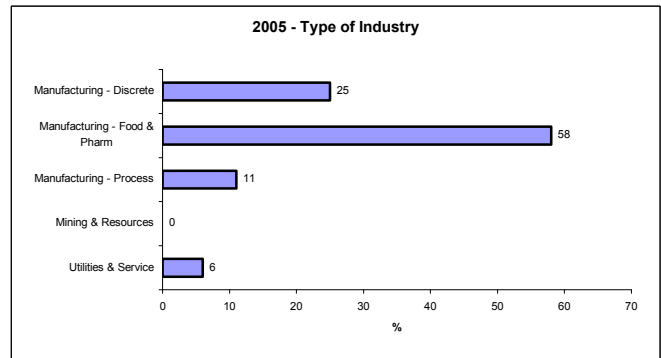
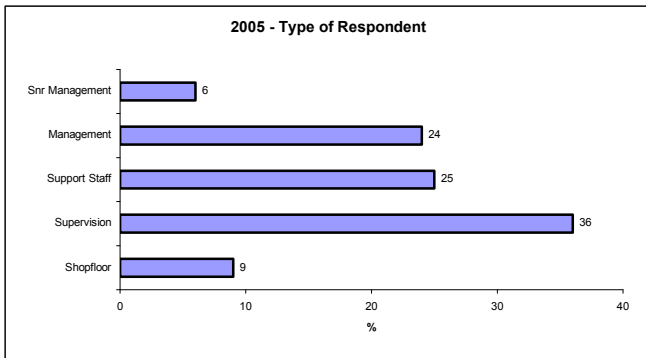


## 2005 Survey Results

**Location of Workshops:** Adelaide, Brisbane, Melbourne, Sydney, Launceston, Boyer - TAS, Colac - VIC, Cooranbong - NSW, Ulverstone - TAS

**Respondents to Survey:** 126 from 35 Companies covering 44 Sites

- |                             |                                 |                                |
|-----------------------------|---------------------------------|--------------------------------|
| aiAutomotive                | Coopers Brewery                 | Neumann Steel                  |
| Air International           | Hawker de Havilland             | Norske Skog                    |
| APC Global                  | Holden Engine Operations        | Oberthur Gaming Technologies   |
| Bega Cheese                 | Huhtamaki Australia             | Quality Plastics               |
| Boart Longyear              | J Boag & Son Brewing            | Sanitarium Health Food Company |
| Bonlac Foods                | ION Automotive                  | Simplot Austrlia               |
| Boral Bricks                | Kraft Foods                     | Sugar Australia                |
| Bradman's Windows and Doors | Machinery Automation & Robotics | Sunmetals Corporation          |
| Carter Holt Harvey – Radius | McCormick Foods                 | Tasmanian Alkaloids            |
| Clipsal                     | MM Kembla                       | Tomago Aluminium Company       |
| Coca Cola Amatil            | Multinail Australia             | Transitions Optical            |
| Cochlear                    | NCI Packaging                   |                                |

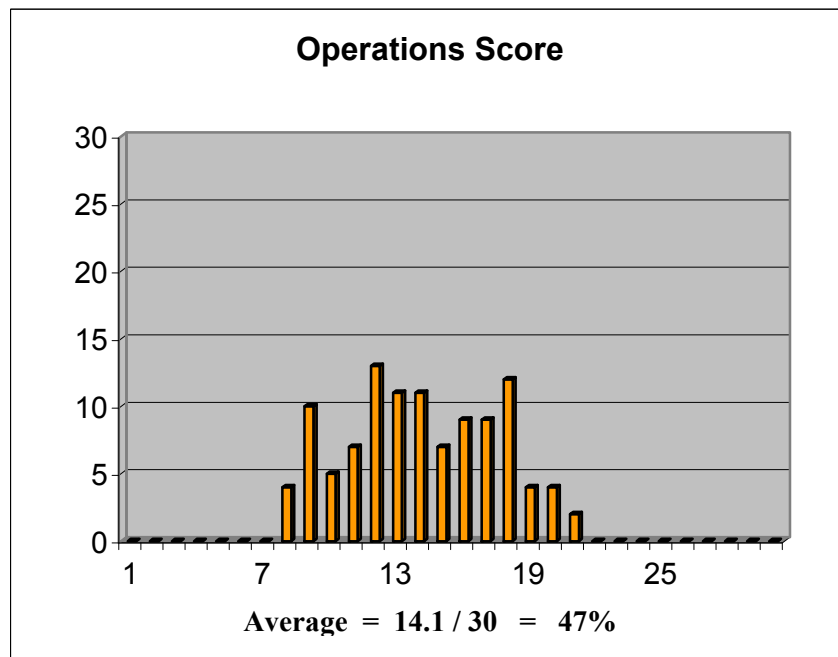
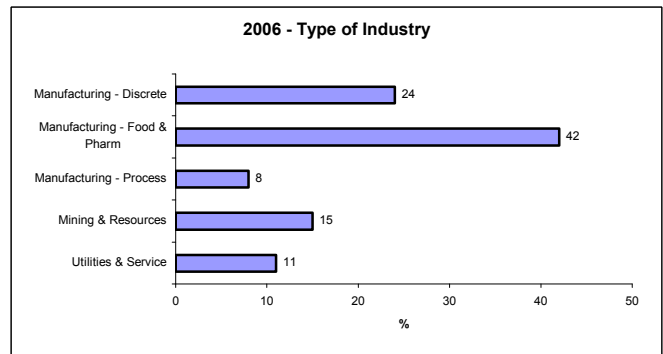
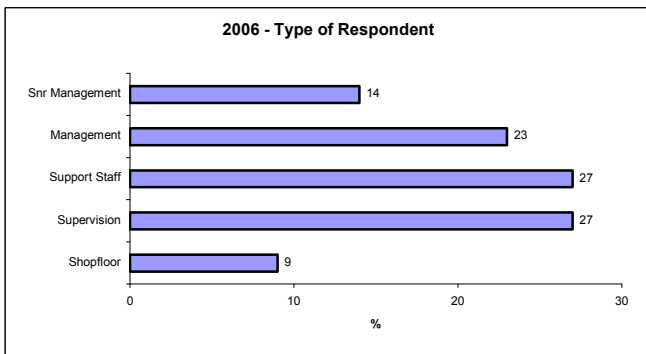


## 2006 Survey Results

**Location of Workshops:** Adelaide, Melbourne, Sydney, Albury – NSW, Bega - NSW, Burnie – TAS, Mt Isa - QLD, Newcastle – NSW, Whyalla - SA

**Respondents to Survey:** 108 from 33 Companies covering 42 Sites

ADI	Coopers Brewery	NCI Packaging
BAE Systems	Drivetrain Systems International	Newcrest Mining
Bega Cheese	Fonterra Australia	Onesteel
Boart Longyear	Fort Dodge	Rio Tinto Coal
Boeing Australia	Foster’s Australia	Roche Mining
Bonlac Foods	Kooka Brotha’s	SA Brewing Company
Boral Metro Quarries	Macquarie Textiles	Simplot Australia
Bradken	Merck Sharp & Dohme	Sugar Australia
Bush’s Pet Foods	Milspec Manufacturing	Willow Ware
Cochlear	Monroe Springs	Wilson Transformer Company
Comalco	Moore Business Systems	Xstrata Copper – Mt Isa Mine



## 2007 Survey Results

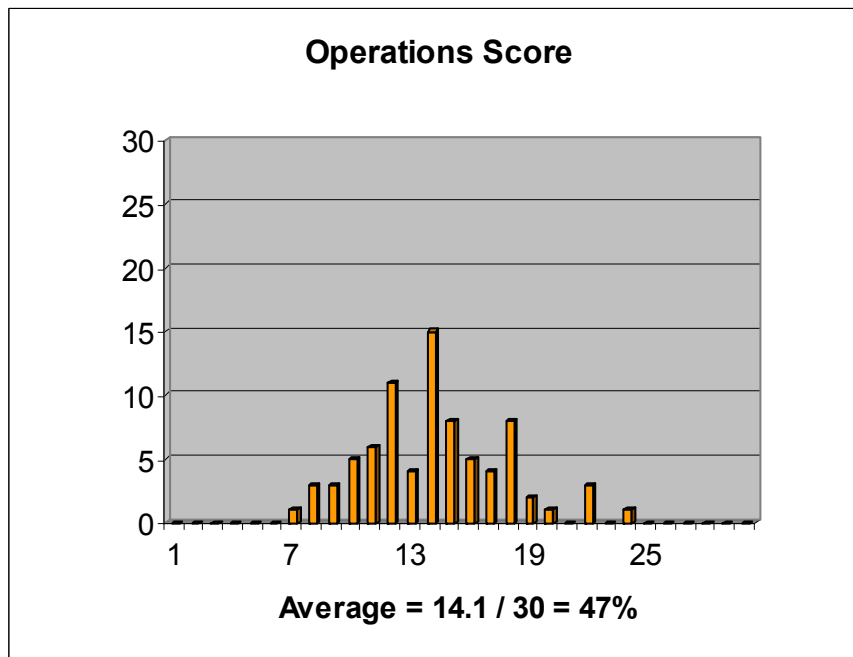
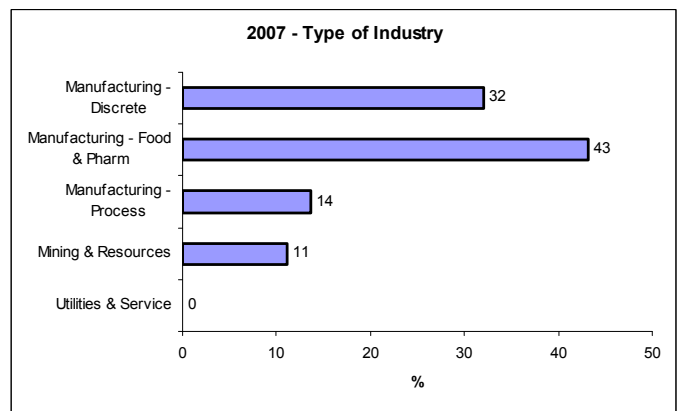
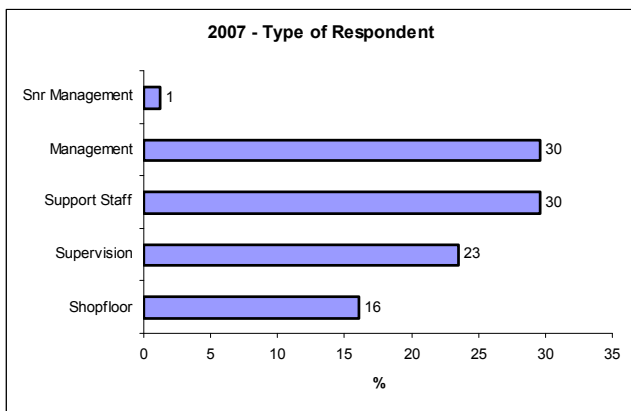
**Location of Workshops:** Adelaide, Melbourne, Sydney, Wollongong, Mt Isa - QLD, Woodville – SA

**Respondents to Survey:** 81 from 27 Companies covering 33 Sites

Boral Bricks  
 Boral Resources  
 Bristol – Myers Squid  
 Cooper Standard Automotive  
 Coopers Brewery  
 Crane Copper Tube  
 Halley & Mellowes  
 Holden Engine Operations  
 J. Boag & Son

Kellogg's  
 Kimberly-Clark Australia  
 McWilliams Wines  
 Memcor Australia  
 Merck Sharpe and Dohme  
 Mitsubishi Motors Australia  
 Mt Isa Mines  
 National Adhesives  
 Queensland Energy Resources

Road Management Solutions  
 Sanitarium Health Food Company  
 Santos Ltd  
 Simplot Australia  
 Smorgon Steel Reinforcing  
 Sugar Australia  
 Sun Rice  
 Unilever Australasia  
 Zinifex Rosebery



## 2008 Survey Results

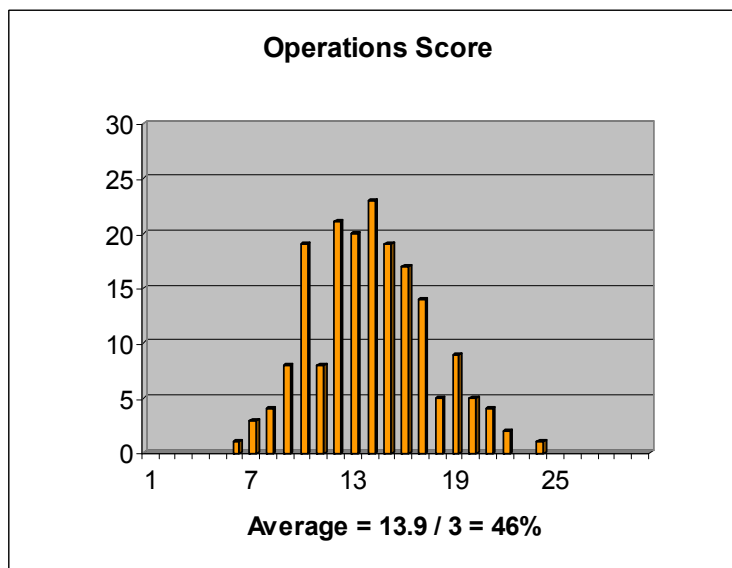
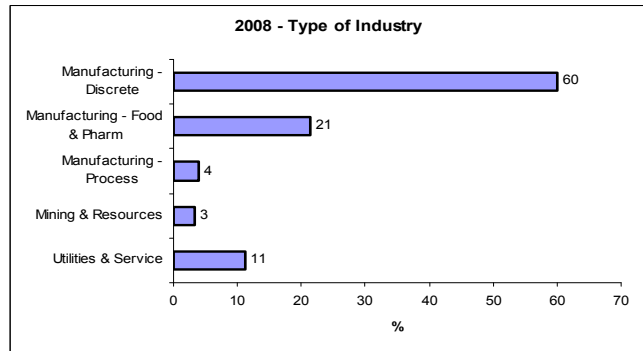
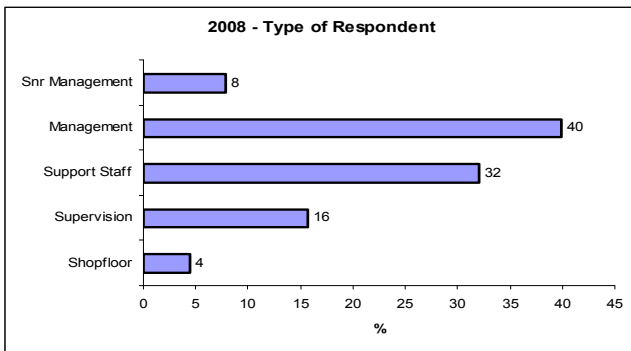
**Location of Workshop:** Perth, Brisbane, Adelaide, Sydney, Melbourne, Smithfield – NSW, Bomaderry – NSW, Launceston – TAS, Edinburgh – SA, Hobart – TAS, Sarina – QLD, Middle Swan – WA, and Asquith – NSW

**Respondents to Survey:** 178 from 63 Companies covering 73 Sites

ACL Bearing Company  
 AGL Power Station  
 Amcor Fibre Packaging  
 Amcor Glass  
 Australian Bakels  
 Australian Paper – Shoalhaven Mill  
 BHP Billiton – Olympic Dam  
 BIS Limited  
 B&D Doors & Openers  
 Boart Longyear – Asia Pacific  
 Bolwell Corporation  
 Boral Bricks  
 Boral Quarries  
 Botanical Resources Australia  
 Bradken Resources  
 Carter Holt Harvey – Cartons  
 Cochlear  
 Confoil Containers  
 Coogee Chemicals  
 Crane Copper Tube  
 CS Energy

CSR Ethanol  
 CSR Sugar  
 Devon Industries  
 Doral Fused Materials  
 Fielders Steel Roofing  
 Houston’s Farm  
 Incat  
 James Hardie Building Products  
 Law Castings  
 Lion Nathan – Castlemaine Perkins  
 Mader International  
 Machinery Automation and Robotics  
 McCain Foods  
 Memcor Australia  
 Midland Brick Company  
 National Foods  
 Noble Metal Processing Australia  
 Norske Skog  
 Nylex Automotive  
 Olex Cables  
 Phosphate Resources

Rio Tinto  
 Rondo Building Services  
 Saizeriya Australia  
 Sanitarium  
 SC Johnson & Sons  
 Simplot Australia  
 Smorgon Steel Reinforcing  
 SPC Ardmona  
 Speedibake  
 Sugar Australia  
 Swift Australia  
 Tasmania Timber Engineering  
 Tasmanian Alkaloids  
 Tassal Operations  
 Temco  
 Tenneco  
 Theiss QNP  
 The Wrigley Company  
 Tooheys Brewery  
 Willow Ware Australia  
 Wilson Transformer Co.



## 2009 Survey Results

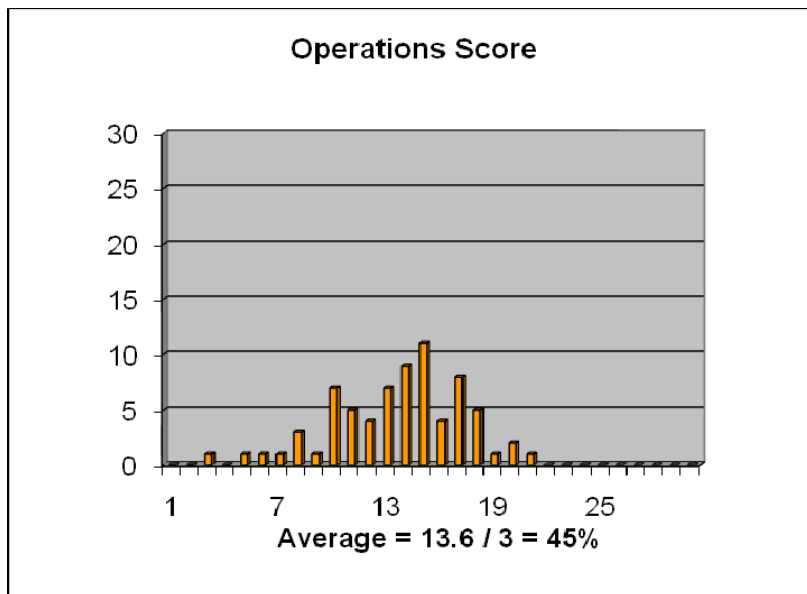
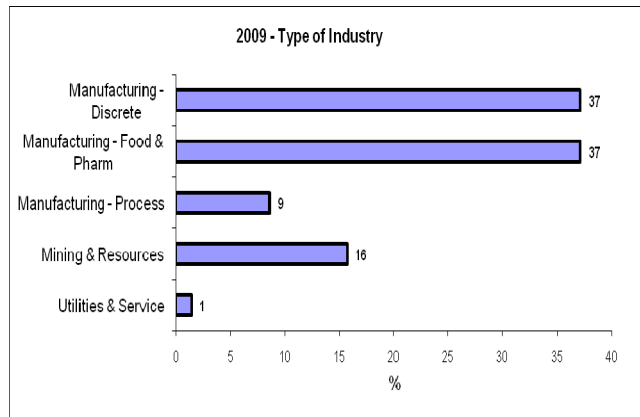
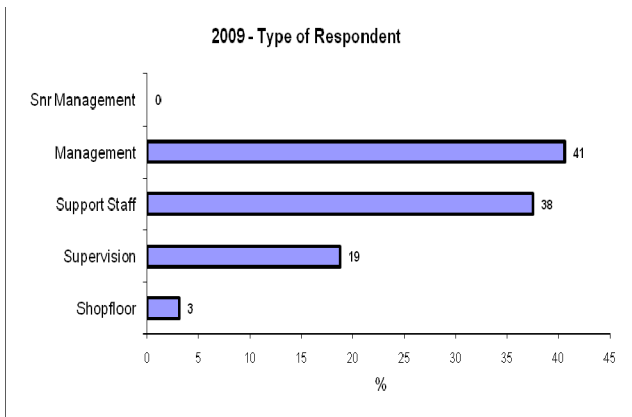
**Location of Workshop:** Perth, Sydney, Yarraville – VIC, Echuca – VIC, Ulverstone – TAS, Gladstone – QLD, Kogarah – NSW, Melbourne, Revesby – NSW, Moss Vale – NSW

**Respondents to Survey:** 72 from 21 Companies covering 31 Sites

Australian Paper  
 Baxter Health Care  
 Bega Cheese  
 BHP Billiton Iron Ore  
 B&D Doors & Openers  
 Boral Asphalt  
 Boral Quarries

CSR Ethanol  
 Darrell Lea  
 Dux Manufacturing  
 ICD Asia Pacific  
 Midland Brick Company  
 Norske Skog  
 Queensland Energy Resources

Saizeriya Australia  
 Schweppes Australia  
 Simplot Australia  
 Sugar Australia  
 Sunrice  
 Thales Australia  
 Weir Minerals Australia



## Summary of the Survey Results

### The Respondents

Year	2002	2003	2004	2005	2006	2007	2008	2009	Total	Avg	Range
<b>Number of Respondents</b>	102	162	186	126	108	81	178	72	<b>1015</b>	<b>127</b>	<b>72-186</b>
Senior Management	7%	11%	9%	6%	14%	1%	8%	0%	80	<b>8%</b>	0-14%
Management	30%	30%	29%	24%	23%	30%	40%	41%	313	<b>31%</b>	23-41%
Support Staff	23%	22%	23%	25%	27%	30%	32%	38%	270	<b>27%</b>	22-38%
Supervision	29%	31%	29%	36%	27%	23%	16%	19%	269	<b>26%</b>	16-36%
Shopfloor	11%	6%	10%	9%	9%	16%	4%	3%	83	<b>8%</b>	3-16%

There does not appear to be any significant change in the type of respondent over the 8 years

### The Companies

Year	2002	2003	2004	2005	2006	2007	2008	2009	Total	Avg	Range
<b>Number of Companies</b>	39	41	49	35	33	27	63	21	<b>308</b>	<b>39</b>	<b>21-63</b>
<b>Number of Sites</b>	45	41	65	44	42	33	63	31	<b>364</b>	<b>46</b>	<b>31-65</b>
Manufacturing – Discrete	48%	41%	48%	25%	24%	32%	60%	37%	150	<b>41%</b>	24-60%
Manufacturing – Food & Pharmaceutical	35%	45%	38%	58%	42%	43%	21%	37%	141	<b>39%</b>	21-58%
Manufacturing – Process	11%	7%	7%	11%	8%	14%	4%	9%	31	<b>9%</b>	4-14%
Mining & Resources	5%	2%	3%	0%	15%	11%	3%	16%	22	<b>6%</b>	0-16%
Utilities & Service	1%	5%	4%	6%	11%	0%	11%	1%	20	<b>5%</b>	0-11%

In 2006 we saw Total Manufacturing involvement in the study drop from the previous 4 year high levels of 94%, 93%, 93%, 94% to 74% due to a significant increase in Mining and to a smaller extent Utilities & Service. This could have contributed to the small drop in the average score in 2006.

From 2007 to 2009 we saw Total Manufacturing involvement in the study increase back to between 89% and 83% respectively, however the average score dropped from 47% in 2007 to a low of 45% in 2009.

**The Grouping of the Scores**

Score / 30	Description	% Score	2002	2003	2004	2005	2006	2007	2008	2009	Total	Avg
			50%	49%	49%	49%	47%	47%	46%	45%		
0 – 6	In need of urgent attention	0–20	1	2	4	0	0	0	1	3	11	1%
7 – 12	Great opportunity for improvement	21–40	30	39	59	43	39	30	61	21	322	32%
13 – 18	On the right path but ways to go yet	41–60	51	98	83	54	59	44	95	44	528	52%
19 – 24	Well managed with further improvement potential	61–80	20	23	39	29	10	7	21	4	153	15%
25 – 30	World Class Performance	81–100	0	0	1	0	0	0	0	0	1	0%
<b>Totals Respondents:</b>			<b>102</b>	<b>162</b>	<b>186</b>	<b>126</b>	<b>108</b>	<b>81</b>	<b>178</b>	<b>72</b>	<b>1015</b>	

There has been little change over the past 8 years.

**The Variation in the Scores**

Score / 30	Description	% Score	2002	2003	2004	2005	2006	2007	2008	2009	Range	Avg
			50%	49%	49%	49%	47%	47%	46%	45%		
0 – 6	In need of urgent attention	0–20	1%	1%	2%	0%	0%	0%	1%	4%	0-4%	1%
7 – 12	Great opportunity for improvement	21–40	29%	24%	32%	34%	36%	37%	34%	29%	24-39%	32%
13 – 18	On the right path but ways to go yet	41–60	50%	61%	45%	43%	55%	54%	53%	61%	43-61%	52%
19 – 24	Well managed with further improvement potential	61–80	20%	14%	21%	23%	9%	9%	12%	6%	6-23%	15%
25 – 30	World Class Performance	81–100	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Totals Respondents:</b>			<b>102</b>	<b>162</b>	<b>186</b>	<b>126</b>	<b>108</b>	<b>81</b>	<b>178</b>	<b>72</b>	<b>72-186</b>	

From 2006 to 2009 we see a significant 50+% drop compared to the average in the number of respondents putting their sites in the 61-80% classification of ‘well managed with further improvement potential’ score.

## What does this mean for Australian Industry?

*A decrease is becoming more noticeable over the past 8 years, which means we have a challenge ahead of us.*

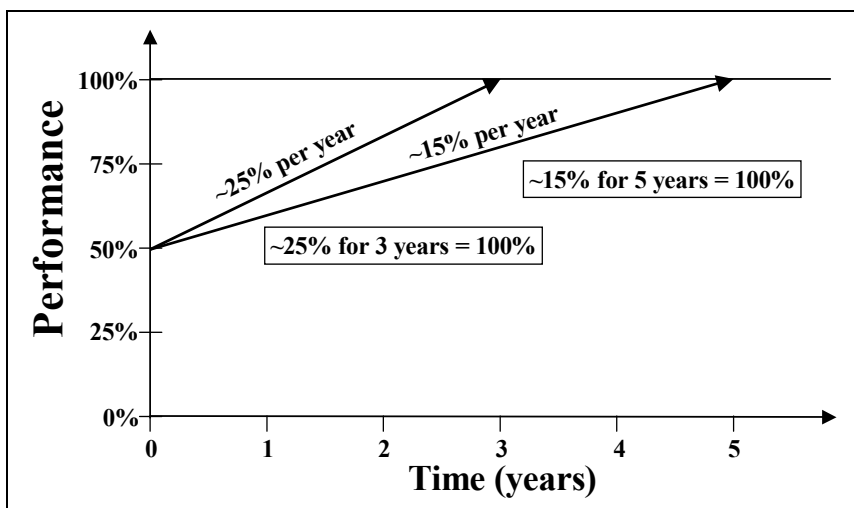
From the distribution of scores we can see that only 15% of the delegates rated their site above 60% with only 1 out of 1015 respondents rating their site above 80%.

At the other end of the scale 33% (1% + 32%) of the respondents rated their site below 40%.

If we keep the analysis simple and assume:

- what is described as 100% today will still be 100% in the future; and
- the required rate of improvement will be linear, then

the average rating will need to improve by at least 25% per year for the next 3 years or 15% per year for the next 5 years to reach a score of 100%.



However, from both our research and experience we have found that the improvement line is more of an exponential curve requiring greater input as we get closer to the top. In fact we have found when you first start the formal improvement journey the site on average may only be spending about 1% of the total work hours available on formal improvement activities. By the time you are striving for the last 20% of the 100%, this ratio will more than likely be closer to 10% of the total work hours available.

Our research and experience also highlights that there are three broad approaches to operations improvement:

1. Improve Technology & Automation  
*eg replace old equipment with enhanced technology*
2. Project Focused Improvement  
*eg address specific losses or wastes using improvement exports (black belts) or Improvement Teams*
3. Improve Practices & Behaviours  
*eg engage all employees through formal continuous improvement*

We have often found that the Technology & Automation and Project Focused Improvement approaches are the most common approaches taken by companies. These are very important, however we have found **it is the people engagement that distinguishes the average performer from the best.**

In the book, *The Toyota Way: 14 Management Principles of the World's Greatest Manufacturer* by Jeffrey K Liker, principle 10 states: 'Develop exceptional people and teams who follow your company's philosophy', however as outlined below, all the principles create an environment that promotes people engagement.

### **The 14 Management Principles, which create the 'Toyota Way':**

#### **Long Term Philosophy**

1. Base your management decisions on a long-term philosophy, even at the expense of short-term financial goals

#### **The Right Process will Produce the Right Results**

2. Create continuous process flow to bring problems to the surface
3. Use 'pull' systems to avoid over production
4. Level out the workload (*Heijunka*)
5. Build a culture of stopping to fix the problems, to get quality right the first time
6. Standardised tasks are the foundation for continuous improvement and employee empowerment
7. Use visual controls so no problems are hidden
8. Use only reliable, thoroughly tested technology that serves your people and processes

#### **Add Value to the Organisation by Developing your People and Partners**

9. Grow leaders who thoroughly understand the work, live the philosophy, and teach it to others
10. Develop exceptional people and teams who follow your company's philosophy
11. Respect your extended network of partners and suppliers by challenging them and helping them improve

#### **Continuously Solving Root Problems Drives Organisational Learning**

12. Go and see for yourself to thoroughly understand the situation (*Genchi Genbutsu*)
13. Make decisions slowly by consensus, thoroughly considering all options; implement decisions rapidly (*Nemawashi*)
14. Become a learning organisation through relentless reflection (*Hansei*) and continuous improvement (*Kaizen*)

## Key Learnings

**Option 1** (Improve Technology & Automation), provided we have the capital to spend and the technology is proven, is an important path to take, however our research highlights that this path alone will only get you about half way along your journey to Operations Excellence.

**Option 2** (Project Focused Improvement) is very popular as it is the improvement path of least resistance, as you only have to engage a select, and often elitist, group within the company to get some improvement results. Provided a proven scientific approach is taken, this path will provide results however it often neglects to recognise the many people issues within our organisations and without the frontline support of all our people who do the work and add the value, many good project solutions fail to achieve their full potential or fail to sustain.

**Option 3** (Improve Practices & Behaviours) is about the systematic engagement of the entire workforce to help identify and solve problems at the source (frontline) and more importantly avoid problems. It is about the development of the right behaviours of all employees so there is a strong sense of desire to understand how to identify problems at the source and take the necessary care to avoid the problems occurring in the workplace. We have found that option 3 is critical to support the Technology & Automation, and Project Focused Improvement approaches, and to take you to Operations Excellence.

*To maximise the improvement journey, all 3 options need to be integrated to ensure each supports each other thus producing a synergistic outcome.*

## What differentiates companies that move ahead of the pack?

### 1. Good Measurement

A key measure used by many companies trying to drive their operations improvement activities is Overall Equipment Effectiveness (OEE). This measure is a combination of the 3 elements that are required for equipment and people to work effectively: Availability; Rate; and Quality. If your equipment is not available when required, running at the ideal speed without any minor stoppages or operator interventions, and producing first pass, within specification output, then the equipment is not effective.

A simple way of measuring Overall Equipment Effectiveness (OEE) is:

$$\text{OEE} = \frac{\text{Good Output Produced}}{\text{Required Production Time} \times \text{Ideal Speed}}$$

The Overall Equipment Effectiveness (OEE = A x R x Q) measure is a great tool for easily monitoring our ability to produce good output first time however it needs to be supported by a suite of Goal Aligned Performance Measures such as:

- Safety & Environment Performance (accidents and incidents);
- Asset Performance (equipment and inventories);
- Quality Performance (yield, scrap and rework);

- Customer Satisfaction Performance (delivery in full, on time and to spec);
- Supplier Performance (quality and delivery);
- Human Resources Performance (productivity and morale); which all lead to
- Financial Performance (costs)

to ensure improvements are taking your company in the correct direction.

When using the OEE measure to identify losses and potential improvement opportunities we find a very common pattern at most sites. Less than half the losses are caused by technical issues (eg the spring on the machine breaks due to being undersized for the job), whereas the people losses when identified as such (eg takes time to identify that the spring is broken), play a much greater part in the challenge facing most companies as they try to improve performance.

## 2. Engaged Workforce through a Commitment to Formal Continuous Improvement

During our workshops we discuss how well companies engage their workforce, and to highlight the issues, we look specifically at the roles of operators. Our learning is that operators should have 2 key roles: firstly to ‘Achieve the Production Plan’ in a safe, quality, cost effective and environmentally sound way (often described as the 4 functions of: Frontline Safety, Frontline Quality, Frontline Equipment Care, Achieve the Production Plan); and secondly to Formally Improve the way they do this.

Unfortunately as shown below the ‘Typical’ ratio tends to correlate to the performance of the plant:

Primary Roles of Operators	Typical Time	TPM <sup>3</sup>
1. Achieve the Production Plan (in a Safe, Quality, Cost effective and Environmentally sound way)	99%	90%
2. Formally Improve the way they achieve 1. above	1%	10%
<b>Plant Performance (OEE = A x R x Q)</b>	<b>Average</b>	<b>Best Practice</b>

If your site is typical, the challenge is to understand how we can achieve the 10% without impacting on the site’s ability to achieve the production plan. To address this we first need to understand what the 10% is made up of and the impact this has on the ability to Achieve the Production Plan:

### World Class Performance Model for Formal Continuous Improvement

Activity	Cross-functional Teams (Problem Solving)	Area Based Teams (Prevention at Source)	Discretionary Time (Cross-functional / Area Based)
Time per Week	<b>5%</b>	<b>5%</b>	<b>5%</b>
Impact on Plant	Machine or Plant runs while one Area Based Team member is away for say 1-2 hrs	Machine or Plant may need to be stopped while all team members are involved for say 15-30 minute meeting and 1-2 hrs improvement activity	Machine or Plant is running so well there is no need for operator intervention



## Identifying the Best Way Forward

Our research and experience has highlighted that there are a number of fundamentals that need to be in place:

- Clear purpose of what we are trying to achieve;
- Good scoreboards to feedback on our progress at all levels; and
- The correct relationships among all the players (workforce)

However, by themselves, these fundamentals will not get you there. We need to look further.

In an article in the Harvard Business Review in 1999, several authors reported on an extensive study into what really makes the Toyota Production System work. The results can be summarised into 4 key previously unwritten rules. These rules guide the design, operation, and improvement of every activity, connection and pathway for every product and service. The rules are as follows:

Rule 1:	All work shall be highly specified as to content, sequence, timing, and outcome
Rule 2:	Every customer-supplier connection must be direct, and there must be an unambiguous yes-or-no way to send requests and receive responses
Rule 3:	The pathway for every product and service must be simple and direct
<b>Rule 4:</b>	<b>Any improvement must be made in accordance with the scientific method, under the guidance of a teacher, at the lowest possible level in the organisation</b>
All the rules require that activities, connections, and flow paths have built-in checks, to signal problems automatically. It is the continual response to problems that makes this seemingly rigid system so flexible and adaptable to changing circumstances.	
<small>Source: Decoding the DNA of the Toyota Production System, HARVARD BUSINESS REVIEW Sep-Oct 99</small>	

Rule 4 is the key to sustainable improvement. Any improvement methodology needs to recognise the importance of Rule 4 and provide Team Member Manuals for both Cross-functional improvement teams and Area Based improvement teams to ensure a structured, step-by-step (scientific) method is followed that is flexible enough to suit all sites' unique characteristics.

One of our concerns is that many companies tend to focus on formal improvement through only Cross-functional Teams due to the ability to select the team members and as such minimise the impact to achieve the production plan. Unfortunately, this approach alone often results in Improvement Scenario 1 or 2 occurring as outlined previously.

The challenge is to recognise we all have 2 roles in our companies, not just the operators. Not only do we need to achieve the production (or service) plan obviously in a safe, quality – right first time, cost effective and environmentally sound way, but most importantly we all need to formally improve the way we achieve the production (or service) plan especially in light of the need to achieve prevention at source at the 'lowest possible level'.

## TPM, the DNA of the Toyota Production System

Since 1996 we have been gaining greater experience and learning from implementing business improvement based on the Toyota Production System / Toyota Way (Lean) focusing on people, equipment and processes (rather than just a TPM focus), however we are now finding TPM is taking a greater focus with many major companies who have been going down the Lean path for some time.

For example: at the Mainstream 2007 conference in Sydney over 300 delegates heard one of Alcoa's senior people from the USA (Hugh Blackwood) explain how TPM is now being recognised as the DNA of the Toyota Production System.

If we reflect back, Toyota developed TPM to address equipment problems (Defects) at the Source so as to increase reliability while reducing costs. We now know it was also used to develop their people so as to sustain their Toyota Production System.

When they first introduced TPM they realised they faced 3 challenges in implementing this concept: How do we:

- Train the operators to know what to look for regarding equipment defects;
- Change the equipment so it easy for operators to find the problems; and
- Create a maintenance support capability that can respond to small problems and issues identified by the operators

We have found these challenges are still with many companies today.

We have also found that an improvement methodology needs to address issues such as:

- Establishing Goal Aligned Performance Measures at all levels ie Site / Department / Area;
- Improving equipment performance (OEE) so as to reduce frustrations (the buy-in factor) and increase capacity to allow time for regular formal team based improvement activities (need to invest in our people for further improvement);
- Building relationships between production and maintenance so they work in harmony;
- Establishing Area Based Teams of 4-8 employees under the guidance of a working designated Team Leader to allow the rapid development of your employees;
- Improving communications and standards between shifts;
- Developing skills and abilities of operators to identify safety, quality and equipment problems at the source through at least weekly formal improvement activity; and
- Developing a maintenance capability that can respond to problems identified by operators so that the operators are motivated to continue to find more.

Our TPM & Lean (TPM<sup>3</sup>) methodology has been developed to address the above in a flexible way that allows each step to build a stronger foundation for the next step. This approach supports the ongoing development of employees so we develop and unleash their full potential.

We have found that to develop employees is like teaching a child to play a musical instrument (similar to new skills such as problem solving or finding equipment problems at the source). We can either provide the child with say a 2-5 day training course (Blitz) and then expect them to play the musical instrument competently or we can arrange a half-hour lesson every week for say 2-3 years and provide some time for practice and support this learning journey with a lot of encouragement. Experience tells us the latter is the approach that provides the sustained success.

There are times when urgent action is required, however if sustainability and ongoing improvement is required then the people who do the work need the skills. Short cuts rarely sustain.

Our flexible approach is based on understanding where a client is on their improvement journey and then working with them to develop a 2-3 year plan involving regular (weekly) activities during employees normal work times. The plan is formally reviewed each 3 months. This approach typically results in achieving quick gains such as 10%-20% lift in OEE within 3 months as well as putting in place the foundations to ensure the site develops the sustainability of improved business performance by focusing on finding problems at the source so as to significantly improve safety, quality and costs.

### Summary

We need to engage all employees to the challenge, as the article from Harvard Business Review said; we need to get Rule 4 in place.

**TPM<sup>3</sup>** has been specially developed for this purpose as it is an enhanced Australasian approach to applying the principles and practices of the Toyota Production System and Toyota Way (TPM & Lean).

Several of our clients now describe our methodology as a structured, yet flexible and practical, phased improvement *journey* to Operations Excellence to support Business Excellence. Others see it as a proven company wide improvement strategy that initially focuses on equipment and process performance with the flexibility and capability to allow management to expand the methodology throughout the supply chain, ultimately involving all employees, suppliers and customers.

With TPM<sup>3</sup>, the steps are not difficult with the pathway well defined. There is great flexibility to allow full control by your management team. Most importantly, it has been developed and refined to suit our unique Australian workplace culture.

### About CTPM

CTPM was created as The Centre for TPM (Australasia) as an outcome of the first conference dedicated to Total Productive Maintenance (TPM) in Australasia held in Sydney in 1995. During the conference, there was a call from the delegates to establish a much-needed Institute for TPM to support industry, academia and government similar to those already present in Japan, USA and Europe. Responding to this call the Centre was established as a membership-based organisation to promote networking and the sharing of learning in January 1996 with its head office located in Wollongong NSW (a major coastal city some 80 kilometres south of Sydney). Its charter was to develop, promote and advance the knowledge and practice of TPM in Australasia. In March 2007 we streamlined our business name to CTPM Australasia and expanded our charter to TPM & Lean.

Our TPM & Lean (TPM<sup>3</sup>) methodology has evolved into an enhanced Australasian approach to applying the principles and practices of the Toyota Production System and Toyota Way (Lean). It is based on 10 integrated improvement activities, which assist companies to develop and unleash the full potential of their People so as to maximise the performance of their Equipment and Processes as they strive to achieve Operations Excellence / World Class Performance.

CTPM and its membership continue to grow. There are now some 15 Industry Groups from Manufacturing, Mining, Processing, Utilities and Service companies that are currently progressing their TPM<sup>3</sup> / Operations Excellence journey. Over 20,000 member company employees are covered by CTPM membership.

In May 2007, CTPM gained official status as a Registered Training Organisation (RTO). As a result, our clients' employees can achieve a nationally accredited qualification in Competitive Manufacturing (Cert III & Cert IV) as they contribute to their site's strategically driven improvement journey using our TPM<sup>3</sup> methodology. In Australia and New Zealand, government funding of up to \$5,100 per eligible employee may be available to assist with this training.

CTPM is also very mindful of the need for companies to establish their own in-house capabilities to lead, manage and facilitate their TPM & Lean (TPM<sup>3</sup>) journey in order to achieved sustained success. However we also acknowledge that TPM & Lean has been developed based on over more than 30 years of practical experience and research, and as such, establishing or developing internal capabilities is not achieved just by attending one or two training courses. Proper training from a recognised authority is critical (such as the CTPM TPM<sup>3</sup> Leadership / Instructor's Program which was developed in November 1997 and to date, has over 300 graduates from more than 60 companies), however most of the learning comes from doing. There are very few short cuts to experience.

For this reason, CTPM has developed a proven flexible Australasian methodology covering a range of educational training courses, introduction and pre-cycle planning workshops, team kick-off workshops supported by comprehensive step-by-step Team Member Manuals, a site wide assessment & planning process, the 5 Level Milestone TPM<sup>3</sup> Excellence Award supported by our TPM<sup>3</sup> Milestone Assessment Process (MAP), and most importantly, a full-time team of experienced Navigators to provide on-site navigation, training and facilitation support who are located in Perth, Melbourne, Mackay, Wollongong and Sydney in Australia, Auckland in New Zealand, Jakarta in Indonesia and Bangkok in Thailand.

## About the Author

**Ross Kennedy B.Sc (Eng) Mech Eng, B.Comm (Mgmt), MAICD**

**President**

**CTPM** Australasia

A fitter and turner by trade, Ross has a Mechanical Engineering degree from the University of New South Wales and a Management degree from the University of Wollongong.

He has more than 20 years of hands-on manufacturing and operational experience covering maintenance, production, operations and executive roles. In 1985 Ross developed his passion for Lean Production following his involvement in the Value Added Management (JIT) initiative by the NSW Government. Ross quickly and effectively applied the new Lean principles and practices firstly at the CMA Foam Group Lullaby Bedding Factory while Factory Manager, then CMA's Cable Accessories Factory as Site Manager before moving to David Brown Gear Industries as Manufacturing Manager to oversee the relocation of the company from Sydney to Wollongong to a new facility set up on Lean principles and practices. In 1989 after the new facility was well established and recognised for its leading edge improvements based on Lean, Ross was invited to join the new JIT / Lean practice being established by the Manufacturing and Operations Group of Coopers & Lybrand's International Management Consulting Practice.

Over the next 5 years Ross had the opportunity to work on major assignments with some of the firm's leading Lean practitioners from USA, Canada and the UK. It was also during this time that he first came across TPM (a critical missing link in the Lean tool kit) in 1990 when he led one of the first implementations of TPM in Australasia with the assistance of John Campbell from Canada.

In August 1994 Ross established his own consulting practice specialising in TPM. He organised and chaired Australasia's first TPM conference in 1995 and, as at the request of the delegates at the conference, Ross with several colleagues founded The Centre for TPM (Australasia) or CTPM in January 1996 to provide a membership-based organisation to support Australasian industry and academia.

After extensive research including a trip to Paris in 1997 to attend Europe's first World-Class Manufacturing & JIPM-TPM Conference and associated workshops with leading TPM practitioners from throughout the world, CTPM launched its TPM<sup>3</sup> methodology in January 1998, which is an enhanced and expanded Australasian version of 3<sup>rd</sup> Generation TPM embracing the Toyota Production System and spanning the entire Supply Chain.

Since then CTPM has been involved with a wide range of leading manufacturing, mining, processing, utilities and service companies. For example from Sept 1998 to June 2003 CTPM assisted Telstra roll-out their TPM initiative to over 200 teams servicing their Copper Access Network in 16 Regions throughout Australia resulting in over \$110m in savings.

Ross has been actively involved with Lean since 1985, TPM since 1990 and TPM<sup>3</sup> since 1998 and has delivered publicly over 200 papers and workshops on the subjects both within Australia and overseas.

CTPM, under the direction of Ross with his team of experienced full-time CTPM Navigators, is presently assisting many sites spanning some 15 different industry groups located in Australia, New Zealand, Thailand and Indonesia on their TPM & Lean (TPM<sup>3</sup>) journeys to Operations Excellence and World Class Performance.

## A Brief Overview of our TPM & Lean Methodology we call TPM<sup>3</sup>

- An enhanced Australasian approach to applying the principles and practices of the Toyota Production System and the Toyota Way (Lean).
- An improvement strategy ultimately involving all employees, suppliers and customers.
- A flexible, structured and practical journey consisting of 10 integrated improvement activities, each with defined steps.

### Key features of TPM<sup>3</sup> include:

- Provides rapid returns on investment while laying the foundations for sustainability;
- Recognises that if your equipment and processes aren't working well, frustrations run high and attempts to introduce Lean thinking becomes unsustainable;
- Progressively engages all employees so they can achieve and have ownership to the improvements
- Provides a significant positive impact on safety and morale;
- Promotes a positive behaviour change of the whole workforce; and
- Takes the mystery out of integrating all the principles, tools, and concepts from traditional Lean.

### Key Objectives of TPM<sup>3</sup>

To significantly improve the Return on Investment (ROI) for the company through:

- **Maximising Productive Capacity and Customer Service** by cost effectively maximising overall workplace effectiveness through the identification and elimination or minimisation of all Losses and Wastes through 'Problem Solving'
- **Minimising Overall Costs** by creating a sense of "ownership" among all employees so they become committed to developing the understanding and capability to care for, and improve their workplace through 'Prevention at Source'
- **Improving Workplace Conditions and Culture** by ultimately establishing everyone's involvement in formal continuous improvement through Cross-functional Teams and Area Based Teams so as to develop and unleash the full potential of all employees and enhance their ability to take on innovation.

### Some of our CTPM Success Stories

*There are many success stories throughout Australia, New Zealand, Thailand and Indonesia covering Manufacturing, Mining, Process, Utilities and Service companies. Some of the gains achieved include:*

- A telecommunications company achieved savings of \$110m over a 4 year period
- A coal processing operation at an open cut coal mine reduced average maintenance costs across the plant by 50% over 4 years
- A timber processing plant reduced manufacturing costs by 50% along with an 88% reduction in Lost Time Injury Frequency Rate by 88% over 2 years
- A food processing plant closed the gap to Yield Excellence by 85% over 4 years
- A food processing plant closed the gap on OEE Excellence by 54% and the gap to Cost / Kg by 58% over 2 years saving over \$5m
- An ore processing plant at an underground metalliferous mine improved metal recovery by 3% over 1 year resulting in a \$1.6m saving