

Creating a Competitive Advantage for Australian Manufacturers (Part I)

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Australia's CAD and terms of trade are of great concern. Generally, our whole economy is based upon low value added products whilst world trade is predominantly about high value added products. Australia's high value added infrastructure is very poor. Intimately woven with this is our poor industrial R&D effort. This is due to the high preponderance of small businesses and their focus on the short term. This in turn is due to the low level of process control and innovation. It is not logical to push these firms into making new products, since their processes are very poor but they do need to innovate and renew their business and manufacturing processes. They urgently need process innovation.

The Manufacturing Society of Australia (ManSA, a technical society of Engineers Australia) and Blakemore Consulting International have been conducting a development program through the Federal Government's Innovation Access program called "The Creative Innovative Company Program". This will reach its conclusion in September 2005. It is already clear from the very positive results obtained so far that small manufacturers (less than \$50M turnover) need special help which is not covered by existing support programs. The last thing they need at this stage is a new product. In addition, it is now recognized that 70% of the nation's new investment comes from its existing industry base. Hence, this is a good reason to expand it.

Manufacturing generally is not well represented at the professional level and small manufacturers appear to have no group representing them at all. During a discussion with the National President of Engineers Australia last September I was told that "manufacturing is not really engineering". This is borne out by the fact that IEAust does not even have a college of manufacturing. General industrial engineering and operational process methods and knowledge are absent from almost all small manufacturers. Attempts to successfully use the continuous flow techniques (Toyota Production System), have most often failed because most companies, particularly SMEs, cannot adapt the Toyota assembly systems to Australia's multi-product short run environment. American advisers cannot see past low variety long run supply and hence the methods that will be successful in Australia are significantly different from their perceptions. Australian innovations have already been developed and applied successfully under the SIP program and need to be diffused to small SMEs.

Conventional manufacturing methods and planning systems in Australian SMEs are highly inefficient but this problem can be rectified if the connection between process innovation and product development is made focusing on the creative flow techniques pioneered by Japanese car manufacturers. Process innovation is a precursor to good product development. These techniques can be applied to SMEs. Current programs like "Commercial Ready" do not address this issue because in many cases new products are not what these organizations need. The Industry Coopera-

tive Innovation Program may address some of these issues but the results of this are unknown at the moment. The problem is not the immediate introduction of new products it is the creative innovation and development of the existing processes to manufacture all products. This includes the development process itself. At a recent forum in Sydney, Harvard Professors Sam Hayes and Warren McFarlan now recognize, belatedly, that the key to Japanese automotive success is process innovation and internal R&D and a strong link between process and product innovation, not acquisition, something not widely recognized.

One of the most significant development projects in Australian Industrial R&D was the development of Colorbond (Zincalume) by what is now Bluescope Steel. I was the Chief R&D Development Scientist leading much of this project. This achievement was a result of process innovation.

The secrets of the future development of manufacturing depend upon:

- Increasing competition and exposure to the international market (This is being addressed with existing Federal Government Policy)
- Removing restrictions to industrial productivity improvement by improving Industrial Relations (This is probably going to occur).
- Focusing on and utilizing industries (source and downstream) where we have a natural competitive advantage (energy, bauxite, iron ore, power, nuclear, agriculture etc)
- Completing the supply chain so that we add as much value to the raw materials as possible (consistent with demand and isolation)
- Concentrating on export.
- Continuous innovation of processes linked to products innovation.
- Utilization of patent know-how. (Colorbond).
- Process innovation by isolating the constraint and improving productivity and utilizing the appropriate technology.
- Introducing continuous flow techniques for all products.
- Rapid product and process development (R&D).
- Replacing Labour with capital.
- Concentrating on the Premium end of the market.

** Part II of Dr. Blakemore's paper will appear in the next issue with a paper entitled "Broadening the Application of Kanban & JIT Techniques to improve MRP, Customer Service and reduce working capital"*

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SOME EXAMPLES OF PROCESS INNOVATION ACHIEVEMENTS.

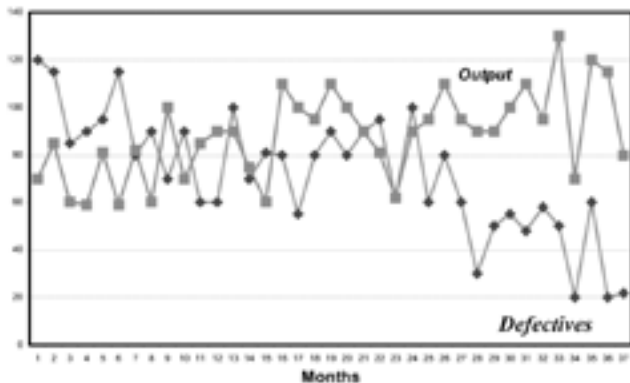
1. Feltex Australasia

Process innovations at Feltex under the Strategic Investment Program (SIP), led to an improvement in profitability from a loss situation to a profit after a 3 year program. This improvement occurred at the same time as on time deliveries increased by 20% and working capital was significantly reduced. Feltex floated in May 2004 on the back of these improvements.

2. Pirelli Cables

Pirelli doubled output and reduced waste by 90% over three years and changed a loss making enterprise to the second most profitable Pirelli Cable manufacturer in the world (second to the main plant in Milan) in three years. All this was achieved without introducing new products. The company then floated and bought its main opposition, Metal Manufactures.

PIRELLI... OUTPUT AND DEFECTIVES



3. John Lysaght(Aust) now Bluescope Steel

John Lysaght (Aust) first licensed the Galvalume process from Bethlehem in the USA. The product was renamed Zinalume. Numerous patent investigations and plant trials established that the stripping process was the major constraint. JL(A) developed a new stripping process and eventually increased productivity by up to 50% and became the dominant supplier worldwide...a result of process innovation.

4. Innovation Access Program Tasmania 7 Companies. (All less than \$50M turnover)

All the participants have common problems. They are under-capitalized, have difficulty raising money, and have a small market share, and very poor processes and higher than desirable manual handling and manufacturing costs.

In all cases the productivity gains so far achieved under this program are already significant but these gains are small compared with the potential improvements that can be made. In one case our aim is to develop a process where clearly one person will be able to do the work of several.

5. Relationship Between Process Innovation and Product Development

New products must be developed more quickly but it is not sufficient to just develop a new product. The method of development and the processes used to manufacture them must be innovative as well. This is not currently recognized and as a result programs are supported by the R&D Board when they should not be participating by limited or less process orientated R&D.

GENERAL

Many of the principles are well established in manufacturing plants in a wide range of industries, particularly in Japan for automotive manufacturers, and electronic manufacturers. These principles can be introduced successfully into any manufacturing plant in Australia but unlike the USA environment, we need to modify the methodology to suit the fact that Australian plants most often must make a very large variety of products. This means that the production runs are often short and there is a lot of pressure put on the manufacturer to maintain high levels of finished goods inventory. In the USA often plants can be dedicated to low variety of products on very long production runs.

Good business practice aims for continuous and never-ending innovation and improvement. This means a continuous emphasis on new ideas in all parts of the business both in product and process but process innovation does not come naturally to all.

The methodology advocated has already been tried in a complex multi-product environment which is far more complicated (5500 products, 7 plants, 16 machine types, 20 different processes) than most plants.

CONCEPT

The concept is to:

- Create continuous flow and so increase value added time %.
- Link process and product development
- Transfer the measurements to the Profit and Loss account and the Balance Sheet.
- Take the resultant working capital released and re-inject it into technology and new innovations to increase productivity and reduce labour.
- Continue the process by further increasing the value added time %.

Starting with the key principles of creative flow of products and services, as well as operations research, the 14 Toyota Management Principles, the 14 Rules of Dr Deming and the key links between process and product innovation, a series of concepts have been developed and successfully applied. These need to be understood by all manufacturers, specifically those below \$100M turnover. The concept introduced at Feltex with some of the principles applied at Pirelli and following the methods used on the Colorbond project, needs to be diffused quickly through Engineering schools at all levels. There has to be a continuous understanding that the value added percentage in all manufacturers must continuously increase.

The concept is to take these ideas and apply them through demonstration projects supported by Universities and TAFE following the basic scientific method, and transfer these measurements to all functions of the company, and measure them through the P&L and balance sheet.

The innovation Access program in place in Tasmania can be used as a showpiece. This includes the following companies who are all showing significant benefits. These benefits are most noticeable in those with turnovers greater than \$5M. In all cases the lack of internal resources, particularly where the company has a turnover less than \$5M per year, has hampered development. However the following have made significant development in a relatively short time. In the case of Muir Engineering, this program has significantly helped the company win the Austrade Export award for a company under \$20M turnover.

- Muir Engineering Pty Limited
- Hazard Pty Limited
- Tasmanian Timber Engineering Pty Limited
- Novaris Pty Limited

CONCLUSION

SMEs need help. Generally, the smaller the company, the greater the variety of products and the shorter the manufacturing run length. Simply thinking that the Toyota production System will work in the Australian manufactur-

ing environment without significant innovations will lead to failure. However these problems have been solved. The current "Commercial Ready" program encourages these companies to develop new products but what is needed are new innovative processes. The guidelines for "Commercial Ready" need to be broadened so that maximum benefits can be obtained from the allocated funds or alternatively funds should be diverted from this program so that the maximum national benefit is obtained.

CONFERENCES, COURSES

EuroMaintenance and 3rd World Congress on Maintenance

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Congress Centre, Basel, Switzerland

The Maintenance and Facility Management Society of Switzerland, MFS, together with the German Maintenance Society, GFIN, and the European Federation of National Maintenance Societies vzw, EFNMS, will organize the 18th European Maintenance Congress – EuroMaintenance 2006 and the 3rd World Congress on Maintenance in Basel, Switzerland, on 20th to 22nd June 2006.

Conferences Listed On-Line

Try the following sites:

IEAust

www.ieaust.org.au

Engineers Australia

www.engaust.com.au

Engineering Education

www.eeaust.com.au

Events Online

www.engaust.com.au/conferences/default.htm

Conference: Independent power sources: Batteries, UPS systems, standby generation. Perth, 22 June (3 days). *Inquiries: Janice Lake, Engineers Australia 08 9321 3340, email jlake@engineersaustralia.org.au* **Call for papers:** Abstracts due 28 Feb.

Conference: Bragg gratings, poling and photosensitivity/30th Australian conference on optical fibre technology 2005. Sydney, 4 July 2005 (6 Days). *Inquiries:* Website: www.bgppacoft2005.com

Conference: ICED 2005: 15th international conference on engineering design. Melbourne 15 August 2005 (4 Days). *Inquiries:* 03 9417 0888; Fax: 03 9417 0899 Email: iced05@meetingplanners.com.au Website: www.iced2005.com

Conference: Chemeca 2005: Smart solutions - doing more with less Brisbane, 25 Sept (4 Days). *Inquiries:* ICMS Pty Ltd 07 3844 1138, fax: 07 3844 0909, email: chemeca2005@icms.com.au. web: www.icms.com.au/chemeca2005 **Call for papers:** abstracts due 1 Feb

Conference: 4th ASEE international colloquium of engineering education. Sydney 26 September 2005, (5 Days). *Inquiries:* Email: d.radcliffe@uq.edu.au

Conference: 13th international heat transfer conference 2006. Sydney, 13 August 2006 (6 Days). *Inquiries:* Email: fdriver@tourhosts.com.au

Conference: Environmental Engineering Society 2005 conference. Sydney, 18 July 2005 (2 Days). *Inquiries:* Ice Australia. Email: ees@iceaustralia.com; Website: www.iceaustralia.com/ees2005

Shutdown management Sydney 5 May (2 days), Perth 11 May (2 days), Melbourne 18 May (2 days), Adelaide 1 June (2 days), Brisbane 8 June (2 days)

Preparing requirements specifications Sydney 29 June. Glenda Graham, Engineering Education Australia 03 9326 9777, fax: 03 9326 9888, email: glenda@eeaust.com.au Web www.eeaust.com.au

Conference: 2005 Safeguarding Australia conference: The 4th homeland security summit and exposition conference. Canberra, 12 July (3 Days). *Inquiries:* Safeguarding Australia Web: www.safeguardingaustraliaconference.org.au

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Conference: Australian construction industry conference (ACIC 2005). Sydney 18 July (4 days). *Inquiries:* Peter May. Email: pmay@engineersaustralia.org.au

Conference: Chemeca 2005: Smart solutions - doing more with less. Brisbane 25 Sept (4 days). *Inquiries:* ICMS Pty Ltd 07 38+4 1138, fax 07 3844 0909, email: chemeca2005@icms.com.au, web www.icms.com.au/chemeca2005

Conference: 4th ASEE International colloquium of engineering education. Sydney 26 Sept (4 days). *Inquiries:* Sally Brown email: sally.brown@uq.edu.au, web: www.gcee2005.com

Conference: Independent power sources: Batteries, UPS systems, standby generation. Perth 22 June (3 days). *Inquiries:* Janice Lake, Engineers Australia 08 9321 3340, email: jlake@engineersaustralia.org.au

Conference & Exhibition: The 8th International transmission and distribution conference and exhibition: Energy 21C - delivering energy in the 21st century. Brisbane 21 Aug (4 days). *Inquiries:* Waldron Smith Management email: info@wsm.com.au, web: www.e21c.com.au

Conference: ICED 2005: 15th international conference on engineering design. Melbourne 15 Aug (4 days). *Inquiries:* 03 9417 0888, fax 03 9417 0899, email: iced05@meetingplanners.com.au, web www.iced2005.com

Conference: 2nd International engineering heritage conference. Sydney 21 Sept (3 days). *Inquiries:* 02 9264 1677, fax 02 9264 1666, email: meetings@tmm.com.au, web: www.sydney.ieaust.org.au/heritage/heritage_Syd_Conf.htm

Courses: Business development Brisbane 2 June (2 days); *Systems engineering* Melbourne 27 June (2 days), Sydney 30 June (2 days)

Conference: Project management Australia conference (PMOz) Brisbane 30 Aug (3 days). *Inquiries:* web: www.pmoz.com.au

Conference: ASEC 2005: Australian structural engineering conference. Newcastle 11 Sept (4 days). *Inquiries:* email: asec2005@tourhosts.com.au, web www.asec2005.com

Conference: System engineering/ test and evaluation 2005: A decade of growth... and beyond. Brisbane 7 Nov (3 days). *Inquiries:* Systems Engineering Society of Australia. Web: www.sesa.org.au **Call for papers:** Abstracts due 15 June

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