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Wysowl Pty Ltd
Newsletter Number 7
March 2002
(Original paper written in 1995)

METAMORPHOSIS AT SOLA OPTICAL AUSTRALIA

by
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Sola Optical Australia was transformed from a troubled operation to one that had become the benchmark in only two to three years. It clearly demonstrates that rapid improvement is possible, if we know how.

WHO IS SOLA OPTICAL AUSTRALIA?

Today, Sola Optical is the world's largest producer of plastic optical lenses. Every week customers in 50 countries purchase 1,500,000 lenses from a range of 15,000 lens types. These lenses are dispatched from 35 distribution centres located in 16 countries after being produced in 14 manufacturing plants dispersed across 12 nations. To maintain its position as market leader, the company maintains major research and development centres in Australia and the USA. It has come a long way since the time in the late fifties when it was little more than an idea taking form in a backyard business in suburban Adelaide.

Sola began when a director of an Adelaide optometric business came across a material called CR39, a plastic developed during WW2. Up until that time, its principal use was as a lining for aircraft fuel tanks - a self-sealer for bullet holes. CR39 had two other important characteristics: excellent optical qualities and high resistance to abrasion. Scientific Optical Laboratories of Australia (Sola) was formed in 1960, with a staff of nine. In 1967 it won its first export award, the first of seven, making it the record holder.

In 1968 Sola went into space when Captain Walter Shirra, commander of Apollo 7, chose Sola lenses for his 11 day flight. The American astronauts who landed on the moon in 1969 also

used Sola lenses. In 1979 Sola was sold to a U.K. based building and glass company, Pilkington Group. Because a larger part of the business had developed in North America, in 1988 the corporate head office was moved to California. In 1993, the business was sold to AEA Investors who in turn floated the company on the NYSE in February 1995. This article is a case study on the metamorphosis of Sola Optical Australia, which is located near Adelaide in South Australia.

DISCOVERING QUALITY

Like many other companies, Sola Optical Australia became aware of the "quality movement" in the mid eighties. We decided to join the throng, impressed by the achievements of some companies that had embraced a quality improvement approach. We hired a consulting firm, conducted some initial training, selected facilitators, and went through the "train the trainers" phase. I went on a study tour of Japan. Large numbers of people were then trained in quality improvement. A heavy emphasis was placed on training in statistical methods. Quality circles were formed; goals were set and...not much of any worth happened.

In retrospect, it is easy to see that we were doomed to fail from the outset. We had acquired some statistical tools and techniques, but many of them were the wrong tools. Also, we had not appreciated the impact that a profound

understanding of variation, empowerment and systems thinking should have on management philosophy. Our quality improvement initiative, like the fabled old soldier, faded away.

DISCOVERING DEMING

Not a lot changed by mid 1992. The manufacturing leg of Sola Optical Australia had costs that were too high and a product quality that simply wasn't good enough. We were always under pressure from sister companies who could make similar products much more cheaply. During the mid 1980s we had begun a major program to focus the entire company on customer service. We saw this as a major competitive advantage. The program was very successful and we changed the culture to one of "excellence in service", at all costs. It was this culture of customer service that allowed us to continue to compete. Even though our manufactured cost was higher, our service was second to none.

Throughout the latter part of 1992 we were looking for something different, but we were not sure what that "thing" was. If we continued to manufacture the way we were, sooner or later the product we were making would probably have been sent off shore to a cheaper site. The responsibility to over 400 people who worked for me in the factory was a major spur to action. They would have found themselves out of work if another Australian factory were tossed onto the scrap heap. I realised if we kept doing the same thing tomorrow as we were doing today **and** expected the results to be different, we were in fact being quite foolish. We had to change something. What that something was, I was yet to understand.

It was about this time that one of my colleagues, Gerry Loots, was struggling with the problem of how to get a meaningful measure on a number of operators doing the same job but delivering significantly different results. Gerry was struggling with the question of, "how do I measure the difference and know it means something?" Incidentally, we were using the traditional measures of deviation from average. If you were in the top half, you were OK, if you were in the bottom half you were doing "bad work". We had yet to understand the meaning of variation.

Previously, Gerry had been working on another assignment with the statistical department at the CSIRO, so he asked them if they could help. Posed with this problem they couldn't offer too

much advice other than, "Have a read of this book". The book was *Safer Than A Known Way*.

Giving it to me the next day he said: "You have to read this, the answer's in the Red Beads experiment!" Subsequently, a number of the executive team read the book. The penny dropped with the chapter on the Red Beads. We thought we were onto something. We invited the author, John McConnell, to come and talk with a few senior executives. The rest, as they say, is history. We ran a two-day briefing for the senior managers. We got the message and we got mobile.

The executive briefing was a watershed for me. It changed the way I thought about both manufacturing and management. Following these realisations, and some more training, I sat down with my three senior production managers. We set about working out what was next. We knew we were on to something, but needed a practical methodology.

INVENTING THE "HOW TO"

The approach we chose was to re-invent our business around a single aim, to reduce variation, with four limiting conditions. These conditions were: a process based, customer focused approach; the teams were to be multi-disciplinary; our people and their ideas would be valued, and the American axiom, "In God we trust - all others must have data". All this is easy to say, but a lot tougher to make happen on a daily basis.

It was now we developed the idea of the process linked work groups concept, and a process based common objective. In effect, we largely replaced the traditional hierarchy with process leaders who manage the entire process, regardless of the functional groupings. Nowadays people in the factory find it difficult to imagine doing business any other way, but it certainly was cutting edge stuff at the time.

For example, lens casting and coating were once managed within separate departments. Now, the process managers own and manage both these elements, and others, that once were grouped functionally.

The process leaders and their teams are pretty much free to do what they think is right, providing they meet the aim and the limiting conditions. Like other companies, we knew that empowerment of our people was likely a good thing, but until we arrived at a structure that made it happen, empowerment was little more than a nice word. Well over half of our considerable improvements can be traced to ideas from, and

work done by, our front line employees and their supervisors. However, little would have changed without the initial management re-design of the business.

Also, we found that there were a lot of “knowns” in the business that, when tested in data, turned out to be little more than voodoo and black magic. Remember, we are not talking about a backyard business here. Sola Optical Australia is the record holder for export awards, and was profitable even before the changes. All businesses contain what they believe to be fundamental truths, but many of these do not stand up to close, data based scrutiny. Sometimes, these “truths” are a significant roadblock in the path of progress.

Whenever I talk to managers from other businesses about our success at Sola, I emphasise the 85/15 Juran rule. Generally, they nod in agreement, but usually I am left wondering if they really appreciate that their problems are seldom in the work force. This quality stuff is tough for managers, because it places the responsibility for improvement squarely on our shoulders.

NEW STRUCTURES

When you decide to manage your business differently, you find there are a bunch of structures that were built around the old way that just don't fit any more. One example is measuring variance from budget and explaining these variances. Looking for the cause of a variance in a stable system seems absurd now, but even when we figured out how silly this practice is, it was the system we had in place at the time.

You, like us, will discover that replacing these old structures with those that are in line with the new philosophy is an early priority. Also, we were organised as little companies within a company. Departments and sections had their own agendas: to meet budget. The “Damn you Jack, I'm all right” mentality towards sharing resources was rampant. This too, had to be changed.

We had pay and skill levels that depended on operators achieving X yield or Y volume in a process we now saw they had little control over. We are intelligent managers and at the time these measures actually made sense. In the new paradigm, with new knowledge about systems and variation, they're just plain dumb and need changing.

We set about restructuring. We set up process linked work groups with cross-functional resources. We defined the objective: reduce cost of goods, by reducing variation. In retrospect it is

clear that a significant part of our success was due to everyone in the process having the same aim.

Under our old structures, department and section heads were all in pursuit of their own objectives. We didn't realise it at the time, but this turned out to be a great way to hamstring systems thinking and a process approach.

Moreover, we didn't try to define the actual problems to be solved in manufacturing. That was a job for the work groups. The old targets and goals were replaced with the uniform aim. That's not to say that we no longer cared about yield, mould damage, work-in-progress/inventory or labour productivity. We did, but we were banking on the fact that reducing variation would solve, or help to solve, the problems we were having with those characteristics. Thankfully, it did.

We now had a simple objective everyone could understand and we set about training and team building like never before. At the time of writing well over three hundred of our people have been through a three day introductory course that is focused on our aim and limiting conditions.

The process linked work group concept we developed is relatively easy to comprehend, it's much more difficult to get. We went through several iterations of different work groups. Some were successful early, some struggled for many months, but we always had the same objective and essentially the same structure.

GETTING STARTED

Actually starting was simultaneously the hardest and easiest of things to do. Articulating the concepts and objectives was easy. Then came the tough part. I drew an imaginary line in the sand and said: “What was, is now in the past. Today is the start of a new way of doing things. The way I used to manage this factory cannot fit with my new beliefs. We will change”. This was not easy.

I found this needed an enormous leap of faith. I didn't use those words then; I think I just knew it was right. I believed in the plan we had developed. I couldn't know for sure whether it was going to work, and there wasn't anybody to talk to about “it”. Even after many successful months, having work groups in all the major areas returning outstanding results, I still had many sleepless nights.

Along the way we have had a number of casualties. After explaining the concepts, the new rules if you like, I said to my management group: “We are all in the same boat, if it goes down we

all have a problem. So, if it springs a leak, fix the leak, if you haven't got a paddle, pick one up and start paddling!" At this stage I didn't much care which way they paddled, so long as they did.

Over the past three years, the face of management within the factory has changed. A few managers and supervisors who either couldn't or wouldn't pick up a paddle or make the necessary changes have gone. You can't move to the new paradigm and keep a foot in the old one. It's all or nothing because in many respects the old and new paradigms are mutually exclusive.

DOES IT MAKE A QUID?

The ultimate test of any approach to management is in the financial results; does it make a quid? Our results are a testament to the fact that this paradigm does work. They're not fuzzy. They're very clear; stuff you can measure. Things like: yield increases of 10% to 15%; mould loss halved or better; improved labour productivity; reduced inventory and work-in-progress, and better quality. All these are hard measures and they have moved in the right direction to the tune of millions of dollars. In many characteristics, we have become the benchmark.

Other things are more difficult to measure, like morale and pride in work. Even though we don't try to put hard measures on these aspects, we know they are greatly improved. Sola Optical Australia provides plenty of hard work and challenges, but empowering our work force has paid off in human as well as financial terms.

Most of our processes are in control. When they do go off the rails, and that still happens occasionally, we are able to fix them much more quickly. We have a number of processes "by the throat". In those, nothing much happens unless we want it to. *We control the work. It doesn't control us.*

Where to next? More of the same; continue to work on the process; work to understand even more about it and spread these concepts even further throughout the organisation; promote innovation. Deming was correct. The process of improvement and innovation never ceases. We are in the P.D.S.A. Cycle, and plan to stay there.

Geoff Ward
September, 1995

Geoff Ward commenced his career as an apprentice Optical Technician in Sola Optical Australia. He advanced through the business to become the Manufacturing Manager. His implementation of a quality based approach to management and manufacturing revolutionised the performance of the business to the point where is best demonstrated practice in many respects.

The original version of this paper was presented at a seminar series in the USA late in 1995. Geoff is a talented speaker who captured the imagination of his audiences with his powerful message and his ability to speak to the subject on a very personal level.

Geoff Ward is currently employed by Adelaide Brighton Cement Limited, where he continues to employ quality principles to good effect. In his first year with this business, production lifted by 20%.