

Case-study of Competitive Manufacturing

*New Zealand Marine Industry
December 2010*



Case Study Summary

The Competitive Manufacturing Qualifications were chosen by the New Zealand Marine Industry Training Organisation as an improvement and staff development methodology.

Why: The world economic downturn of 2008-2009 presented all companies profiled in this case study with an opportunity to focus on building more robust systems to manage, reduce cost and wastes, and significantly up-skill staff to cope with the changing economy.

Who: The companies profiled belong to the New Zealand marine and composites industries. All of their staff were involved with the Competitive Manufacturing (CM) journey, but not all had CM training agreements. QCDSystems were contracted as CM coach for the first 24 months.

What: To respond to the challenge posed by the economic downturn nationally recognised CM certificates were chosen to develop and engage staff while improving business activities. The companies involved were looking for a simple and affordable system to ultimately make them more competitive in the domestic and international market place.

Where: All training and CM activities took place on-site and staggered training sessions ensured production was not delayed during these events.

When: The companies started their journey in May 2008 and it continues every day.

How: The CM coach typically spent half a day a month on site.

How much: While not all companies were prepared to share the financial outcomes of the project a RoI of 10:1 was reported by one company over the first 24 months.

Training engaged 58 staff members across all four businesses, with an expected 58 National certificates at level 2 and 580 unit standards achieved. The completion rate by March 2011 is expected to be 97%.

The time commitment required from staff was the largest investment by a company, however it was paid back through improved business measures and staff development. The total investment of 23,286 hours by all four companies (average of 5.3 hours per week per person) included training, coaching, assessment of unit standards and actively working on improvements.

Sustaining CM: All companies accepted CM is a journey and practising this philosophy and keeping the systems going will be essential to building upon the improvements made to date. Further knowledge must be acquired and applied for further improvements and to become a true world-class competitor.

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Introduction and cross reference

This Case study consists of a summary of the thinking behind the NZ MARINE ITO model, and four individual company summaries that demonstrate the success of this model in the Marine industry.

A full length case study has been produced on each of the four companies. These are available on the CMI website at www.cmi.org.nz.

7-1 Case study of Competitive Manufacturing for the Marine Industry

7-2 Jucy by Design

7-3 Formula Cruisers

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Background

In 2010 the New Zealand Marine Industry (NZMI) was the country's largest non-primary manufacturing based industry employing over 10,000 people in approximately 1,000 companies. Worldwide New Zealand was highly recognised as a nation of builders of high quality boats including sailing and motor super yachts, launches, and trailer boats as well as a supplier of marine related products and services.

The annual turnover of the NZMI was in excess of \$2.4 billion. Approximately \$800 million of the boats and products manufactured were exported. In addition, highly talented Kiwi sailors have made the America's Cup and Round-the-World racing yachts household names. The New Zealand public was a great supporter of the NZMI and every year purchased around 4,500 boats.

At time of writing the NZMI was a growth industry with the New Zealand Marine Association predicting growth to double by 2020. The growth had been linked to increased development of infrastructure at key geographic locations including Tauranga, Whangarei, and Auckland.

To support this growth the NZMI would require the ongoing supply of skilled, qualified and talented people in a wide variety of specialized trades and professions, including: naval architects, designers, boat builders, systems engineers, electrical, electronic installers, electricians and technicians, substrate sillers, fairers, exterior painters, cabinetmakers and interior painters, riggers, spar-makers, sales, services, retail, distribution and marina operators.

Every year between 600 and 700 apprentices and trainees were undergoing training spread across all sectors of the marine and composites industry. Their training was managed by the NZ Marine Industry Training Organisation (NZ MARINE ITO)¹.

Situation

The NZ MARINE ITO took a holistic view of the shape and condition of the marine and composites industries in New Zealand. They observed companies had difficulty achieving a fair profit margin from their businesses and many suffered because of the economic downturn. Some saw reduced staffing levels as the only means of controlling their margins.

The companies in focus were mostly small to medium sized businesses (SME's) employing between 5 – 50 employees, so the business model needed to be able to deliver a quality product and service within a fair price.

Lean Marine Thinking (LMT) was developed so it could be applied through a cross section of industries; productivity was different for every business. The LMT journey would enable these companies to bring significant new skills to employees to be far more competitive in all aspects of their business. Here was something that was simple for craftsmen and craftswomen of the marine and composites industry to use in their workplace every day.

The NZ Marine and Composites Industries were well known for their innovative approach in development of the products they manufacture. This needed to be extended to include the whole workforce so everyone had an opportunity of contributing towards the business

¹ Until September 2010 the NZ MARINE ITO was known as the Boating Industry Training Organisation.

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success rather than just working **in** the business. LMT provided them with the expertise to learn the skills to work **on** their businesses.

In order to achieve these results for each business, the NZ MARINE ITO only chose to work with those companies prepared to fully engage with the training and that have shown total management commitment to the programme. The companies that have demonstrated this succeeded and made huge strides in growing their business. They were fully equipped with the tools they needed to sustain their operation beyond the support provided by the NZ MARINE ITO.

Developing a NZ MARINE ITO strategy for ‘Lean Marine Thinking’

“The NZ MARINE ITO got involved in promoting Lean Thinking because of the benefits it brings to all levels of the marine industry.

As NZ MARINE ITO works closely with marine industry companies, helping them guide their apprentices through our world-renowned training system, it became apparent that many of these companies and their staff would derive huge benefits from employing a Lean Thinking approach in their businesses. The true value proposition of this is that while the industry requires trades/craftsman that work in the business, competitive manufacturing trains you how to work on the business, this is a paradigm shift for most.

NZ MARINE ITO management then investigated a number of possible providers for the programme before choosing the highly-acclaimed QCD System Inc.

“We chose QCD Systems because it was a comprehensive, on-going system not a short term one. It also offers a ‘whole of company’ approach; one which is driven both from the top down and from the bottom up.”

Lean Marine Thinking is also easy to understand and run and is accessible to all of the Marine Industry Association’s member companies.

Most of those working in the marine industry, including those who own and manage the businesses, are highly skilled trade’s people, not university graduates. What we like about Lean Thinking is that it is a practical rather than an intellectual system. Because it is delivered through the use of the competitive manufacturing qualifications, it engages everyone in the fundamentals this unifies the company into a change management environment. This new environment sustains their journey through learning the lean tools such as 5S. It is easy for everyone in the company to buy into it.

Lean Marine Thinking is also an affordable system that is employed in the workplace using coaching and mentoring provided by QCD Systems and supported by NZ MARINE ITO.

It is another way that we can help the industry become more efficient and therefore more profitable.

Although we have only been running the Lean Marine Thinking programme for a relatively short time, we are already seeing the benefits, both in manufacturing efficiencies, but also in our NZ MARINE ITO training.”

Chris van der Hor
General Manger NZ MARINE ITO

The Partnership Model

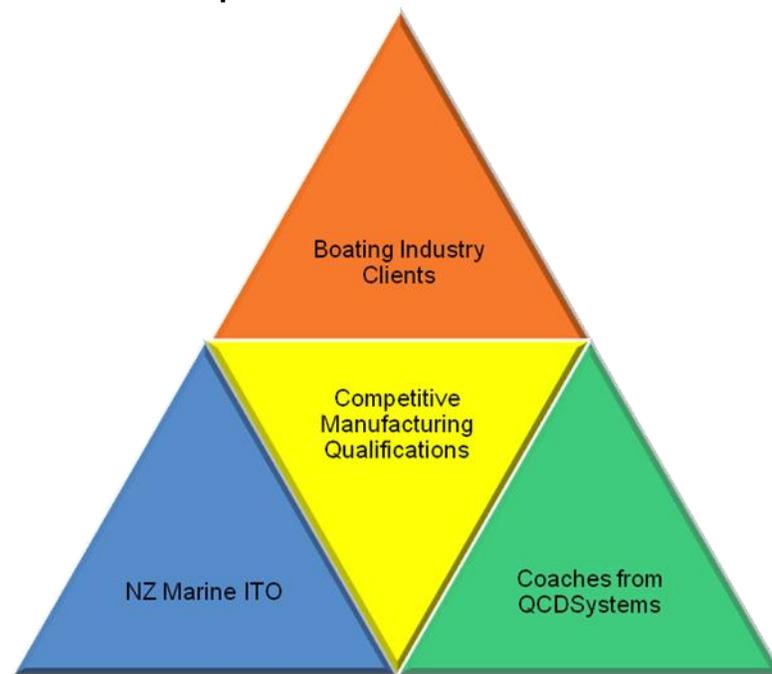


Figure 1: the partnership model facilitated by the NZ MARINE ITO

The above model (Figure 1) is based on a partnership between the three stakeholders; NZ MARINE ITO, QCDSystems (CM coach), and each respective client business. Each stakeholder both delivered and received mutual benefit from the partnership. The model exists around the centre triangle, the CM qualifications:

- NZ MARINE ITO delivered support funding while receiving completed CM training agreements.
- QCDSystems delivered knowledge and completed assessments of staff whilst receiving financial compensation for their work.
- The client companies invested heavily in time commitment from all of the staff, leadership commitment to supply resources for continuous improvement and tenacity to stay with the journey to complete the qualifications, while receiving benefits in improving quality, reducing cost and waste, decreasing delivery times, improving safety and engaging staff with higher levels of morale.

Beginning with TRY-Z, and continuous coaching

The *Try-Z* Seminar was used to introduce a company and its staff to the process of implementing Lean Manufacturing, management principles and practices into their organisation. The seminar derived its name from a process known as 'Trial Zero' in the automotive industry that was used to introduce model changes or new models onto a production line. The purpose of the Trial Zero was to demonstrate, test and finally confirm that the new models/changes can be produced with defined efficiency and productivity parameters.

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This process was translated into a 3 day seminar during which the participants were charged with using Lean tools such as procedures, measurements, ideas and suggestions, tolerances, jigs and tools, housekeeping, line balance to be given a hands-on experience of how it worked. The participants used these tools to produce 15 model cars made up of 68 different parts each to defined standards, through experiential learning.

Participants were given the opportunity of running three production runs of 15 units. Production units were completed at six stations, using different operators each run. The change of operators was another example of the transfer of knowledge and expertise that demonstrated how Lean principles enable people to control their processes and therefore their outputs.

After each 'run', many aspects of the produced model were discussed as a group. These discussions encompassed items such as defined dimensions, customer quality appearance standards together with unit times, elapsed time, bottle-necks, and station issues.

The solutions arrived at were based on their new Lean knowledge and the application of the Lean tools. It was not uncommon to obtain a success rate of between 89-100% Quality improvements at the same time obtaining 20-33% productivity improvements with a 3-5 point performance standard met.

The outcome of the seminar was the understanding by each participant that when Lean principles are applied correctly they would help the staff to improve their work environment irrespective of what tasks they perform. The learning was not restricted to manufacturing in any way. Once they had learnt the process and how to apply it, it could be applied to any situation. Many of the administrative staff in manufacturing businesses also used these principles to improve the complete value stream.

After the seminar the participants returned to their various departments and implemented the process known as QCDSM, utilising the learning they had experienced in the forum known as the Green Room meeting as the core of continuous improvement.



Figure 2: The TRY-Z experiential learning seminar



Figure 3: The experiential learning model car

Implementation

The following pages summarise the experience of four companies that engaged with “Lean Marine Thinking”.

Jucy by Design



Dan Alpe, Chief Executive

“The implantation of the QCDSM system has seen Jucy By Design transform its business. We have seen a marked increase in productivity and decrease in defects which has ultimately resulted in a better product for a cheaper price. The buy in from our staff has been key and the daily Green Room meetings have given them the opportunity to make suggestions and also deal with any issues there and then rather than days or weeks down the track. The transformation has been great to see.”



Where Jucy by Design started from

The company had been in the composites manufacturing business before becoming Jucy by Design, the manufacturing division of Jucy Group Ltd.

Prior to embarking on the Lean Marine Thinking journey less than ten staff were employed at the Helensville site which was responsible for the design, manufacture and complete interior vehicle fit out of Jucy rental vehicles. The company also stripped, painted, panel beat and performed full mechanical overhauls within their factory.

As a result of the expansion of the business during the year 2010 and with an emphasis on social responsibility, staff have almost exclusively been hired from within the local community.

What Jucy by Design have achieved

Embarking on the journey with only a handful of staff in April, the company faced the ambitious task of completing 250 campervans by the end of 2010. Starting with a blank sheet and by utilising the QCD Systems methodology and coaching, the small team set out to develop their manufacturing systems and also the associated quality and documentation systems.

Recording standards for work processes by the employees themselves has significantly improved the DIFOTIS² results of the company. It brought about trust in the quality and consistency of the product and captured the knowledge of experienced employees helping with the up-skilling of new workers to keep up with a rapidly growing team. The recording of standard processes and quality criteria also had an additional ‘intellectual property’ asset value.

² Delivery in Full on Time in Spec

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The application of Competitive Manufacturing knowledge enabled the company to effectively gauge how best to meet their orders. The investment in matching QCDSystems with their flexible application of methodologies into a diverse set of processes within Jucy by Design has been the underpinning factor of the first year's success.

After 8 months and investing 2,610 hours in CM training (at an average of 3.7 hours per employee per week), coaching and improvement activities *Jucy by Design* were on target to meet the delivery of all 250 camper vans by December 24, 2010.

Other significant benefits have been:

- over 30 people from the Helensville community were employed locally
- All staff have been up-skilled to perform tasks according to a Detailed Process Sheet (DPS)
- All staff were engaged, knew how to implement their ideas, and were passionate about a future with Jucy by Design.

A Personal Journey of Learning

Tony Clayton

"The biggest change that has assisted me since the implementation of TRY-Z is the ability and ease of tracking the parts produced and the quality. As this is done on a daily basis I am able to pin-point any problem areas or issues and deal with them immediately. The communication between me and our staff in the Green Room meetings is highly beneficial."

Roimata Ruhe-Hodge

"One of the most important steps to maintaining the culture of 'Continuous Improvement' in the company is to ensure all new employees are inducted appropriately. Special emphasis is placed on not only how we do things but also the benefits to both employer and employee of following these processes"

Matt Webber

"It was a nightmare just to keep the staff informed of where their orders were. Some of the ideas from QCD have definitely made my work day easier and more organised."

Anita Ruhe-Hodge

"I have found the QCDSM system and templates valuable instruments in recording, evaluating and enhancing the efficiency of the processes that we have in place. Processes are only as good as the people driving them. Daily monitoring and following up on issues and ideas promptly encourages everyone to buy-in to the ideology of continuous improvement. This culture is fundamental in the success of any company"

Formula Cruisers



Grant Senior, GM Formula Cruisers

“The training was embraced company-wide, by everyone, from me to the youngest apprentice, and the benefits have been widespread. Not only has it helped us weather the current financial crisis and improve our gross profit, it has also brought our staff closer together, enhanced teamwork and helped us improve all of our internal processes.

When we decided to adopt Lean Marine Thinking, we quickly realised that we needed a ‘whole of company’ approach and that this would have to be led from the top. Unlike before implementing Lean Marine Thinking, now I usually have a very good idea on production progress and cost on any given day.”

Where Formula Cruisers started from

In 2007 the business plan was revised to actively target offshore markets in order to grow sales and increase the number of build projects completed per year. In order to do this Formula Cruisers have identified the need to implement a controlled production system to enable the monitoring of exactly what was being achieved. The mantra of “you cannot manage what you don’t measure” was obvious and seen as an essential for any improvements to be sustainable.

Formula Cruisers was the *first* marine company to start the journey of CM with the NZ MARINE ITO and QCDSystems in 2008.

What Formula Cruisers have achieved

The improvements across the board on individual projects have increased the company’s gross profit and are a major factor in how well the business weathered the financial crisis.

Formula Cruisers have quantified the Return on Investment (RoI) on Lean Marine Thinking to a ratio of 10:1. A reduction from 33,000 to 22,000 boat build hours was the most significant business improvement in Formula Cruiser history, ever.

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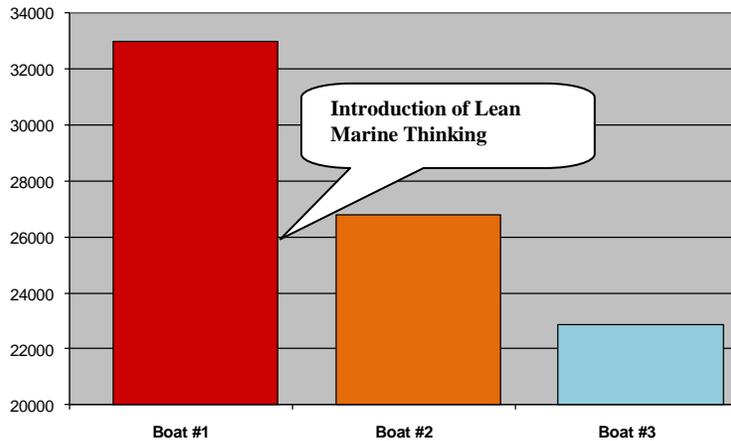


Figure 4: Build times per boat measured in hours

In 18 months and with investing 1536 hours in Competitive Manufacturing (CM) training, coaching and improvement activities, (at an average of 4.9 hours per employee per week), the outstanding benefits were mainly centred on cost reduction through reduction of waste.

Achievements in reduction of the seven forms of waste through CM:

- Defects: effective system of recording and remedy in place
- Overproduction: vast reduction of manager requests for information
- Inventory: reduction left-over materials of tens of thousands of dollars to less than a hundred
- Transport: courier fees reduced by 60% for transporting of materials
- Waiting: inter-process waiting reduced to synchronised flow to achieve one third reduction in total build man-hours and known for every sub-process
- Unnecessary processing
- Motion: two thirds reduction of man hours for certain processes by applying lean marine thinking to the workplace.

A Personal Journey of Learning

Troy Woods, Sales and Marketing Manager

“Somewhat surprisingly, but pleasing to us, is the uptake in the process by our staff on the floor. To have structured and monitored processes giving them clear targets, identifying internal defects and allowing them to be part of the improvement process has been welcomed and embraced by all. The Lean Marine Thinking has not only improved our bottom line per boat, it has brought our team together to further improve our processes and ‘own’ both our decisions and results.”

Leon Ford, Production Team Leader

“We now have apprentices who call me over to take photos of the quality of their work. To achieve that level of engagement is what you dream of. I have now a brilliant team and I have achieved my personal goals within a few years. The communication on the floor is so good that we solve most of the problems right here, quickly. All of this came together for me and the team when we experienced the TRY-Z workshop, as we could see where we could use this thinking in building our boats. We have used this knowledge to achieve the results the customers want and receive.”

Black Pearl Fibreglass and Work & Play Trailers



Robert McLean, Director and owner of Black Pearl Fibreglass and Work & Play Trailers

"Lean Marine Thinking came to us during the recession and it could not have come at a better time. My most profound realisation was that all the knowledge of a grand plan was only in my head. Now everyone knows what the plan is, and my life has become so much easier to manage the staff, resources and clients."

Often people ask me what the return on investment was and how much we have saved. On the materials we have not made a big saving as we had always been quite accurate in our usage estimates. Sure we have taken a number of hours out of each build and that is significant. However the biggest return on the investment is the decrease in stress for me and the staff, in simple words 'A relaxed mindset'. It is a huge relief for all of us, to know we can do things with far more certainty now. But how do you put a price on less stress? Well, your lifestyle changes and there is no dollar figure on that quality. What we did create -which is totally new to the business- is a learning process."

Where Black Pearl Fibreglass started from

During 2008/2009 the market was dropping below Black Pearl fast and they knew that change was necessary to survive. The diversification into a new product of trailers gave birth to *Work & Play Trailers*. Through this move the Black Pearl company management has been able to focus on a different market segment, utilising their niche expertise as fibreglass fabricators. Black Pearl continued to build boats, however at a slower rate, but with much more impetus on working smarter and competing with their performance standards without ever compromising on quality.

The introduction of Lean Marine Thinking using the QCDSM system was brought to Black Pearl by the NZ MARINE ITO during 2009.

What Black Pearl Fibreglass have achieved

With the newly acquired Competitive Manufacturing (CM) knowledge they have meshed together a process that would work for a small diversified fibreglass fabricator. They made it simple for all employees to add their knowledge to what Black Pearl did.

After 18 months and investing 828 hours in CM training, coaching, and improvement activities, (at an average of 3.7 hours per person per week), the outstanding benefits were:

- Photographic documentation has become a major part of ensuring everyone can conform to quality requirements
- All staff have been up-skilled to perform tasks according to a Detailed Process Sheet (DPS) and these include many non-manufacturing processes.
- Process improvement of a magnitude of 30% for all high priority areas

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- Three staff members were fully qualified to lead CM.

A Personal Journey of Learning

Jock Smith, Workshop Supervisor

“The biggest positive outcome from the system is the huge lift in staff morale due to their buy-in as they found their input was welcome and valuable. As everyone’s confidence grew they shared more and became part of the planning process too. Every staff member attends the Green Room meeting and is actively involved in managing the production goals for the day and week. They are now both responsible and accountable for achieving their goals, and regularly do so. QCDSM makes managing easier!”

Shane Thurgood, product developer team member

“When we first started with the QCDSM system I had difficulty in trying to determine how much design work I would be completing on a daily or weekly basis. I did however record how long it took me to complete the design and prototype of the new models. With this information we had a good basis to know that as we began using all the specifications, drawings and photos I had taken, the time to complete fabrication would improve dramatically. This learning environment is great as I can pass on my experience of the prototype to the rest of the team so they can do a good job.”

Stabicraft Marine



Paul Adams, Business owner

“As a business Stabicraft Marine struggled to cope with phenomenal growth in the two years leading into the recession. We wanted to use the opportunity presented by a market slow-down to be poised to cope with not just what went on before, but what happens next. The recession has forced us to take stock about everything we do, and the way we do it. We were so busy filling orders in the boom years we weren’t taking the time to really think about what we were doing and whether there was a better way.”

Where Stabicraft started from

Stabicraft Marine pioneered positive buoyancy boats, turning out the first rigid hulled aluminum pontoon boat from a backstreet workshop in Invercargill, New Zealand, in 1987. In 2005 Stabicraft opened a new \$1.7 million factory employing 48 staff (2010).

The company slogan ‘Adventure with confidence’ - epitomised Stabicrafts’ belief in their products. In 2010 a new and fresh look at the slogan -looking inwards- had been taken through the introduction of Lean Marine Thinking to their business. Imagine how inspiring it would be to work with a company and think of everyday work as an ‘adventure with confidence’ enabled through the application of Competitive Manufacturing tools and methods.

What Stabicraft have achieved

After 16 months and investing 18,312 hours in CM training (at an average of 5.5 hours per person per week) some of the emerging benefits and results were:

- An updated organisation management system of three tiers guided the company at an operational level. => Flow of better and more focused business information.
- A reduction of 29% of internal defects in manufacturing (see Figure 5 below).
- A significant number of changes relating to standard procedures have been recorded and are now being used for production and training.
- Improvement ideas have been implemented at a rate of just less than one idea per person per month. => Teams have focused on their contribution along the value stream.
- ROI of Lean Marine Thinking of 4:1 for the first year

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- Everyone realises ‘Lean Marine Thinking’ is a journey and they are at the beginning, but daily improvement occurs that makes Stabicraft a leading boat builder.

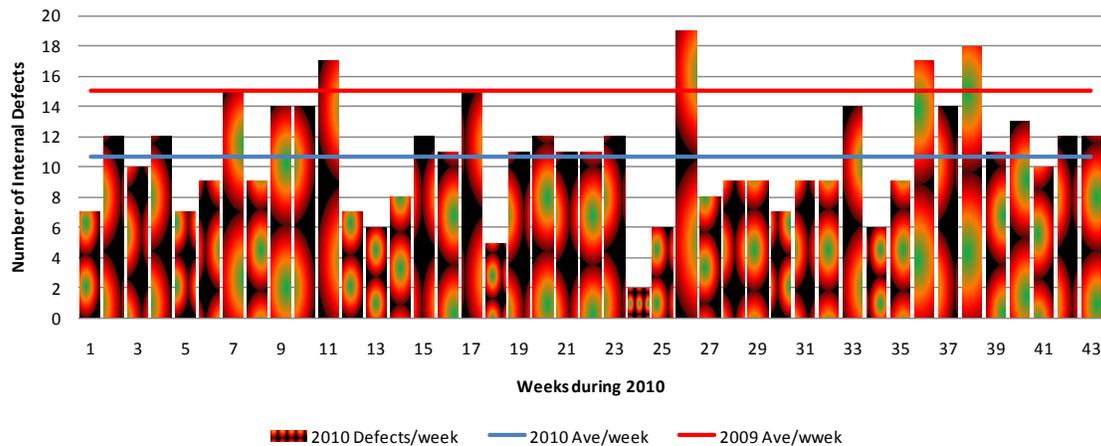


Figure 5: Internal defects in manufacturing, 2009 vs. 2010

A Personal Journey of Learning

Owen Millar, Team leader Work centre 2

“The QCDSystem has given me the opportunity to have meaningful discussions in the team format in a highly structured way. The discussion happens every day in the Green Room meeting and we find great value in this 10 minute discussion. The visual board we use is a great way to see what and when boats flow through our work centre. We have collected a lot of data over the past year and have found it useful but still have to analyse the trends and opportunities.”

Steven Gilbert, Team leader Work-centre 1

“I had been practicing the lean thinking long before we started this journey in Stabicraft. What is great about the journey now is that everyone has a common understanding through the TRY-Z, Green Room and all the other tools and methods we use.

To understand flow we have to understand all of the manufacturing processes, buffers, constraints and productivity levels. Our role is to piece together all the bits of information and synchronise these so smooth flow occurs. To prove how effective this has become through all staff understanding ‘flow’, we have effectively reduced our inventory of pulled parts from work centre 1 by 50%.”

Clinton Aitken, Production Manager

“I have been with the business since March. Most importantly about the QCDSystem are the hundreds of ideas everyone now contributes to solve the problems we have. This means the whole production team is solving problems and not only the team leaders. All of this work combined improves flow of work and ultimately cash-flow to the business.”

Damian McNaught, team leader work centre 6

“We are the last Stabicraft people to work on and inspect the boat before the customer receives it. What the QCDSystem has given us is the measuring system so we can set priority focus areas of what we should pay more attention to. Previously it was dependant on the problem that ‘shouted loudest’, while now we can base our focus priority on data.”

Productivity improvement through structured training

Over the two-year period up to the end of November 2010, a total of 23,286 hours for the four companies as stated here were dedicated to CM and improvement activities. This indicates on average 5.3 hours per week per employee were used to holistically improve the business and develop staff.

Table 1: Investment in training time

Level 2	Investment in hours per staff member					Total hours invested for each site
	Training	Follow-up	Internal Coaching	Projects	Total	
Jucy by Design	66	45	30	120	<u>261</u>	2,610
Formula Cruisers	66	20	30	400	<u>512</u>	1,536
Black Pearl	66	30	30	150	<u>276</u>	828
Stabicraft	66	80	40	250	<u>436</u>	18,312
Total	66	175	130	920	<u>1291</u>	
Average/site	66	44	32.5	230	<u>323</u>	

580 unit standards will be achieved by a total of 58 staff across four sites by the end of March 2011 at a completion rate of 97%.

Table 2: Unit standards completed by staff by March 2011, Level 2

Unit #	8087	21501	21502	21503	21504	21505	21507	21515	21332	21333
Leverage on	Quality	Morale	Delivery	Morale	Cost	Delivery	Cost	Cost	Morale	Delivery
Staff started Level 2 during 2009 - 2010	58	60	60	60	60	60	60	60	58	58
Total completions by Mar 2011	58	58	58	58	58	58	58	58	58	58

Table 1: Summary of unit standards

Level 2	Unit standards	Staff Started	Staff Completed	Credits
Jucy Rentals	100	10	10	420
Formula Cruisers	30	5	3	126
Black Pearl	30	3	3	126
Stabicraft	420	42	42	1,764
Total	580	60	58	2,436

Conclusions

The NZ MARINE ITO pilot project

The NZ MARINE ITO took a bold but realistic step to make CM available to a number of their industry clients. The marine industry was dominated by small to medium sized businesses that benefited from CM thinking but could very often not afford the initial cash injection to employ a CM coach.

By partnering and agreeing with QCDSystems to be the supplier of choice to the marine companies, and subsidising the initial pilot set of four companies, their Lean Marine Thinking journey was made possible. The four companies profiled in this case study have demonstrated a significant impact of CM to business results and staff development if the training and qualifications are made accessible at an affordable rate.

CM for small businesses

The project has proven even small companies with few employees can achieve significant changes in thinking and improvement in their processes to deliver quality products on time to the customer. The NZ MARINE ITO has therefore set up a successful model to introduce CM qualifications to small businesses across New Zealand.

Adopting the process of continuous improvement into a small company by means of CM qualifications has also demonstrated that it takes employees of a small company a significant amount of time to complete all unit standards, usually longer than in larger companies. Small companies with few employees find it more difficult to 'free-up' time for the completion of the qualifications without conflicting with product delivery deadlines.

CM outcomes

The initial improvements varied between companies depending on the focus of their improvement activities, yet all have achieved significant gains, especially in staff morale and engagement.

While not all companies were prepared to share financial outcomes of the project a RoI of 10:1 was reported by one company over the first 24 months.

Everyone involved accepted CM was a journey and the philosophy required continuous practise on the way to become a true world-class competitor, even if this meant being able to supply to New Zealand markets better, cheaper, and faster than any imports.

Appendix

The following table lists the full detail of the unit standards referred to in this case study. Further detail can be obtained from the NZQA website at www.nzqa.govt.nz.

NZQA ID	Title	Level	Credit
8087	Use core quality management tools	3	5
21501	Apply competitive manufacturing practices in a competitive manufacturing organisation	2	5
21502	Sustain process improvements in a competitive manufacturing organisation	3	3
21503	Manage the impact of change on own work in a competitive manufacturing organisation	3	3
21504	Apply quick changeover procedures in a competitive manufacturing organisation	2	5
21505	Apply Just in time procedures in a competitive manufacturing organisation	2	5
21507	Interpret product costs in a competitive manufacturing organisation	3	5
21515	Undertake root cause analysis in a competitive manufacturing organisation	3	5
21332	Demonstrate basic knowledge of establishing improvements in a manufacturing environment	3	2
21333	Demonstrate basic knowledge of workflow management in a manufacturing environment	3	4

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For more information, go to Competitive Manufacturing Initiative website at:

www.cmi.org.nz