

## TEXTILE & DESIGN LABORATORY CASE STUDY 05/2010

**PROJECT TITLE:** BUILDING CAPABILITY IN THE NEW ZEALAND APPAREL AND TEXTILE SECTORS  
**T+DL PARTNERS:** NZ KNITWEAR MANUFACTURERS  
**PROJECT PERIOD:** NOV 2006 – JUNE 2010

### BACKGROUND

The AUT University was awarded a significant Government Innovation Pilot Initiative (GIPI) grant in 2006 to establish a cutting edge R&D centre at its Auckland City campus. The Textile and Design Lab (T+DL), as it was to be named, invested part of this grant in Shima Seiki digital textile/garment printing and Whole Garment (WG) seamless knitting design and programming systems, and machinery. One of the key aims of the T+DL was to build capability and create value in the NZ apparel and textile sectors by encouraging industry partners to engage with it and access its technologies and staff expertise for the purposes of research and development, design innovation, product development, sampling and small scale production.



*The Textile and Design Lab's Whole Garment knitting and digital textile printing technology*

### DEVELOPING AWARENESS

Creating an awareness of the university's new T+DL resource was initiated through a high profile launch in November 2006 to which media, industry bodies, industry partners and suppliers of the AUT Fashion School, educational organizations and AUT staff were invited. Thereafter, a database of prospective interested parties was created, links with additional media and industry organizations were established, open days were held for industry and other educational institutions and a monthly T+DL newsletter was introduced. Initial interest in the lab's facilities for development work, sampling and small scale production was very high, particularly in the digital print area which offered easily adaptable, scalable, 'on demand' textile printing with significant advantages for experimental print development.

### STAFF TRAINING AND EXPERTISE

With the benefit of hindsight, more time should have been allocated for our staff to learn about the digital printing system, which was not as simple as was first envisaged, however the milestones and delivery dates contracted with the TEC prescribed project roll out timeframes. As a result, some of the earlier industry work

that was undertaken in the print area was 'below par' as we struggled to overcome a range of technical issues and some modest claims resulted, which could have been avoided had there been a longer learning and trialling period. Conversely, interest from industry around our new Whole Garment (WG) knitting technology was minimal. While the knit area was staffed in a part time capacity by academic staff who were knit design specialists, there was some reluctance on the part of the T+DL manager to further promote the lab's knitting capabilities until a permanent technician was appointed. A full time knitting technician with many years Shima Seiki experience joined the T+DL in April 2007. However, his experience, like most NZ based technicians, did not include WG knitting, a matter that was addressed with the support of the local Shima Seiki agent's technician followed by a two week visit to Shima's technical training centre in Japan in early in 2008.

### **DEVELOPMENT PROCESS**

Around the time of our technician's appointment, we were approached by Company A, a South Island based knitwear manufacturer that houses 3 prominent knitwear labels, to help them develop two WG merino/possum/silk cardigans, one of which was to be printed using the lab's digital system. Although aware of the new technology, Company A had no experience in WG knitting but was prepared to be led by ourselves in finding the best ways of developing their designs. The company's Operations Manager and Designer visited the lab in order to gain some basic knowledge of the technology prior to committing to the development process.



*The garment as it leaves the knitting machine complete with draw thread*



*The draw thread is removed in preparation for wet finishing*

To begin with, sketches of the 2 styles were sent to the T+DL with specifications and artwork for the printed style. This was the first significant WG project that the lab had undertaken. Whilst programmes for both styles were being developed according to the specifications, it soon became apparent that the knitted rib structure required for the placket (front opening) and welt area could not be knitted in a WG style. We were also faced with an abnormal 'kink' in the neckline and a method of knitting pockets on one of the styles also had to be developed.

Whilst the benefits of producing an item of knitwear in one piece using the Whole Garment method are numerous, there are often compromises that must be accepted. One such compromise was the need to consider alternative structures for the placket and welt areas of these 2 styles. A number of options were put forward and a purl/plain 'mock rib' was finally agreed upon. The 'kink' in the neckline was also resolved by knitting a looser stitch in the offending area. The pocket issue was

addressed by knitting a pocket flap to give the illusion that a pocket was present. Once agreed upon, an order for the first size set was placed for the unprinted style. So far as the printed version was concerned, numerous sample submissions were made with variations on the placement, scale and angles of the prints. This style was finally approved and a size set and sales samples were subsequently produced.

It was agreed with the client at the outset that the number of styles and colour options should be kept to a minimum to enable both parties to gain experience and confidence in WG knitting without adding unnecessary pressures. As a result, just 2 colour options of the printed version were offered to their clientele, and 3 options of the plain style. Orders for production quantities that ensued were 'daunting', bearing in mind our limited experience. However, confidence grew rapidly and delivery dates were met with zero returns for issues associated with product quality. Both these styles resulted in repeat orders for the T+DL and further products have been jointly developed, including accessories and additional plain and printed styles.

## **OUTCOMES**

As a result of the collaboration between the T+DL and Company A, their directors took the decision in late 2008 to purchase their first WG machine. At the time of writing, Company A have 3 WG machines and have recently commissioned a WG accessory machine. The decision to co-develop new products using the lab's WG technology and expertise has proved to be a successful means of entering the WG knitting market for this company. Of all the commercial projects that were undertaken by the T+DL in its first year, this has been among the most beneficial and rewarding to all those involved. Whilst the relationship with Company A has generated valuable revenue both for the company and for the T+DL, it has perhaps more importantly, helped us gain confidence in our ability as a developer of new products and to overcome design issues by seeking out alternative methods. It has provided an exemplar of a successful commercial application using both WG and digital print technologies. Above all, it resulted in the lab meeting one of its key objectives of building capability and value within the NZ apparel and textile sectors, evident in the ongoing commercial manufacture of this garment range and the company's investment in WG machines.

Subsequently, the lab has been involved with another five NZ knitwear companies, all of which have or intend making the transition to Shima Seiki WG knitting. Company B, also based in the South Island, approached the lab in early 2010 to ask if their technician could spend some time working at the T+DL to gain some hands-on experience of our accessory machine prior to taking delivery of their own unit.

During the last 3 years, the lab has also been working with Auckland knitter, Company C, co-developing and producing a range of 100% merino wool accessories including gloves, beanies and ties. The company's designer, a graduate of AUT's Fashion School, worked with the lab's technician through the development process for each style to create the various products, many of which included a number of sophisticated knit structures. The lab then commissioned knitting their bulk orders,

which were often in excess of a hundred units. As a result of the collaboration with the T+DL, the company is currently negotiating the purchase of their own accessory machine.



*Examples of Whole Garment styles developed at the Textile and Design Lab that have inspired NZ knitters to invest in this technology*

Whilst the lab is not privy to the actual value of each of the capital purchases already made and being negotiated by its partner companies, a conservative estimate would be in the order of NZ\$ 1.5 million.

The lab's technical expertise has also benefited Company D, a knitwear business based in the Thames area. This company invested in their first WG knitting machine in early 2010. The company's Director and Technician visited the T+DL earlier this year to request some technical assistance with the development of some new WG styles, which we did during their visit. Further assistance was requested when the company's technician was in Japan receiving training in May of this year. As a result, a 3 day consultancy visit was arranged during which the T+DL technician spent time at the company's premises to help them develop several WG styles using the same Shima SDS One programming system as our own. Further consultancy and technical training for this company is envisaged in the near future.

## **CONCLUSION**

### *Value to the NZ industry*

New Zealand businesses have a reputation for adopting new technologies and the uptake of Shima Seiki's Whole Garment knitting systems, aided by the T+DL, is a good example of this tendency. Whilst there are several benefits associated with WG knitting, perhaps one of the most important to the NZ industry is the ability for knitters to remain competitive in the price driven apparel and fashion markets.

### *Comments from Shima Seiki's NZ agent*

"Shima Seiki and their NZ agents, Ramsay McDonald, have seen a dramatic increase in Whole Garment knitting over the past 5 years. When a flat-bed knitting company moves into Whole Garment there are some major changes to the production process required. Firstly we must produce samples for the customers, going through the whole production process from initial garment design, sample knitting, finishing to evaluating and testing the end product. This process can take a number of weeks involving materials, processes and finished product moving back and forth between the Whole Garment machine, designer, programmer, manufacturer and

retailer/buyer. Previously Ramsay McDonald would use the machinery available at Shima Seiki in Japan for customer sampling. Logistically though, this has been a very expensive and time consuming process for all involved.

Ramsay McDonald has direct access to the Whole Garment machine, Whole Garment accessory machine and 4 SDS One Shima Seiki design systems at the T+DL to sample for our NZ based customers. This has allowed us to not only dramatically increase Whole Garment production in New Zealand but become the leading country with Whole Garment machinery per head of population. Along with other developments such as successfully digitally printing on merino/possum garments with reactive dyes, Shima Seiki has a great respect and admiration for the T+DL and New Zealand knitwear market. These thoughts have been expressed by Dr Shima, President of Shima Seiki, earlier this year”.

#### *The next steps*

It is intended that the T+DL will further develop its profile as a cutting edge R&D centre and continue to be of significant value to the NZ apparel and textile industry. In order to do so, it will need to invest in additional CAD systems and capital equipment to keep abreast of new technologies as they are introduced to the market. At the time of writing, the T+DL has recently submitted a proposal to the University for a new Shima intarsia knitting machine that will provide a range of new options that will be hugely beneficial in the development of smart materials and products, as well as increasing the design capabilities for our students and design partners.