

Furniture Finishing into the Future



Mark Thomson

2011 Higher Education and Skills Group Overseas Fellowship

Fellowship funded by Higher Education and Skills Group (formerly Skills Victoria)



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i. Executive Summary

The Fellowship “Furniture Finishing into the Future” explored water-based furniture finishing applications and alternatives products to achieve a more sustainable and effective result.

The purpose of the Fellowship was to investigate:

- Water-based finishing applications for the Australian furnishing industry
- The viability for an alternative paint product for the Australian market
- Innovative approaches that would benefit the furnishing industry
- How furniture finishing was delivered elsewhere in the world
- State-of-the-art processes in water-based paint applications.
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The Fellow’s research included guided tours of paint companies in Europe and meetings with training providers and University staff in the UK. His findings were unforeseen in that he discovered that the technology surrounding water-based paint has progressed and improved dramatically over recent years.

The following specific recommendations are made by the Fellow based on the findings of his research in order to meet the identified skills deficiencies:

- Conversion to Water UV paint products and adopt a painting line system similar to Cefla Paint Finishes.
- Conversion to Waterbourne paint products used in conjunction with a heated spray booth.
- Controlling emissions with either absorption of solvent vapour by sand or the recovery of the solvent by adsorption techniques.

Peak industry bodies and furniture associations need to consider the promotion of safe and environmental friendly paint products in order for industry to take this on board.

This research derived from this Fellowship is a stepping stone to implementing greener, sustainable practices for the furniture finishing industry.

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ii. Abbreviations/Acronyms

FdA	Foundation Degree
TAFE	Technical and Further Education
UK	United Kingdom
USA	United States of America
UV	Ultra-Violet
VOC	Volatile organic compound

iii. Definitions

Adsorption

The adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface[1]. This process creates a film of the adsorbate on the surface of the adsorbent. This process differs from absorption, in which a fluid (the absorbate) permeates or is dissolved by a liquid or solid (the absorbent).

Cacogenic

Pertaining to or causing degeneration in the offspring produced.

Coagulation

To change from a fluid into a thickened mass; to curdle; to congeal.

Polymer

A compound of high molecular weight derived either by the addition of many smaller molecules, as polyethylene, or by the condensation of many smaller molecules with the elimination of water, alcohol, or as nylon.

1. Acknowledgements

Mark Thomson would like to thank the following individuals and organisations who gave generously of their time and their expertise to assist, advise and guide him throughout the Fellowship program.

Awarding Body – International Specialised Skills Institute (ISS Institute)

The International Specialised Skills Institute Inc is an independent, national organisation that for over two decades has worked with Australian governments, industry and education institutions to enable individuals to gain enhanced skills and experience in traditional trades, professions and leading-edge technologies.

At the heart of the ISS Institute are our Fellows. Under the **Overseas Applied Research Fellowship Program** the Fellows travel overseas. Upon their return, they are required to pass on what they have learnt by:

1. Preparing a detailed report for distribution to government departments, industry and educational institutions.
2. Recommending improvements to accredited educational courses.
3. Delivering training activities including workshops, conferences and forums.

Over 200 Australians have received Fellowships, across many industry sectors. In addition, recognised experts from overseas conduct training activities and events. To date, 22 leaders in their field have shared their expertise in Australia.

According to Skills Australia's 'Australian Workforce Futures: A National Workforce Development Strategy 2010':

Australia requires a highly skilled population to maintain and improve our economic position in the face of increasing global competition, and to have the skills to adapt to the introduction of new technology and rapid change.

International and Australian research indicates we need a deeper level of skills than currently exists in the Australian labour market to lift productivity. We need a workforce in which more people have skills, but also multiple and higher level skills and qualifications. Deepening skills across all occupations is crucial to achieving long-term productivity growth. It also reflects the recent trend for jobs to become more complex and the consequent increased demand for higher level skills. This trend is projected to continue regardless of whether we experience strong or weak economic growth in the future. Future environmental challenges will also create demand for more sustainability related skills across a range of industries and occupations.

In this context, the ISS Institute works with Fellows, industry and government to identify specific skills in Australia that require enhancing, where accredited courses are not available through Australian higher education institutions or other Registered Training Organisations. The Fellows' overseas experience sees them broadening and deepening their own professional practice, which they then share with their peers, industry and government upon their return. This is the focus of the ISS Institute's work.

For further information on our Fellows and our work see <http://www.issinstitute.org.au>.

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1. Acknowledgements

Fellowship Sponsor

The Victorian Government, Higher Education and Skills Group (HESG) formerly Skills Victoria, is responsible for the administration and the coordination of programs for the provision of training and further education, adult community education and employment services in Victoria, and is a valued sponsor of the ISS Institute. The Fellow would like to thank them for providing funding support for this Fellowship..

Supporters

Individuals and organisations involved in the development of the overseas program and in the Fellowship submission were as follows:

- Bill Emerson, Former Education Manager, Victoria University
- C.G. Watt, Assistant Chief Fire Officer, Metropolitan Fire & Emergency Services Board
- Kath Curry, Dean, Trades College, Victoria University
- Ron Redman, Business Development Manager, Blum Australia Pty Ltd
- Rohan Wright, Former General Manager, FIAA

Employer Support

Mark Thomson acknowledges the support, encouragement and time his colleagues at Victoria University have given over the past 12 months while undertaking this Fellowship, particularly Bill Emerson, Coralie Morrissey, Wendy Sutton and Kath Curry.

Organisations Impacted by the Fellowship

Government

- Department of Education, Employment and Workplace Relations
- Higher Education and Skills Group (formerly Skills Victoria)

Industry

The Fellow will liaise with the following businesses associated with the cabinet-making and furniture industry. Research from the Fellowship will help support the development of using water-based paints in furniture finishing:

- Cabinet-making and Furniture Making Industry
- Allitt Joinery, Moolap
- AB Cabinets, Grovedale
- Geelong and Kitchen Coatings
- Des Coltish Panels
- 2 Pak Kitchens
- A & A Quality Furniture Sprayers
- Claytons Kitchens.

1. Acknowledgements

Professional Associations

- Furniture Industry Association of Australia (FIAA)
- Furnishing Teachers Advisory Group (FURNTAG)

Education and Training

The Fellow will liaise with relevant TAFE Institutes associated with the furniture industry:

- Victoria University, Australia
- Holmesglen TAFE
- Kangan Institute TAFE
- Bendigo TAFE
- Wodonga TAFE
- The Gordon, Geelong

Community

The Fellow will liaise with the following community services:

- Metropolitan Fire and Emergency Services Board, Richmond, Victoria
- Trade Park Drive
- Men's Shed.

2. About the Fellow

Name: Mark Ashley Thomson

Employment: Furniture Studies Teacher

Victoria University Sunshine Campus, Victoria

Qualifications:

- Certificate II Carpentry, Gordon Institute of TAFE, 1997
- Completed Cabinet-Making Apprenticeship, Allitt Joinery, 2001
- Certificate IV Assessment & Workplace Training, Victoria University, 2005
- Diploma of Vocational Education and Training Practice, Victoria University, 2009
- Certificate III Furniture Finishing, Victoria University, 2009

Memberships:

- Australian Education Union

After completing Year 11 at Belmont High School in Geelong, the Fellow completed a cabinet-making apprenticeship with Allitt Joinery, Moolap, Geelong. He worked full-time as a tradesperson then as the factory foreman managing six tradespeople. The Fellow began working at Victoria University, Newport Campus, on a sessional basis in 2007, and then was employed full-time on an ongoing basis as a Furniture Studies Teacher in 2009.

A highlight of Thomson's career was being commissioned by the Western Bulldogs Football Club in 2010 to build their boardroom table for the newly built clubrooms and being commissioned by the Vice Chancellor of Victoria University in 2011 to build a dining room table for his own home. This involved the Fellow working closely with several apprentices to design, construct and spray the tables and attend the respective opening ceremony to finally unveil them.

3. Aims of the Fellowship Program

The purpose of the Fellowship program was to investigate:

- Water-based finishing applications for the Australian furnishing industry
- The viability for an alternative paint product for the Australian market
- Innovative approaches that would benefit the furnishing industry
- How furniture finishing was delivered elsewhere in the world
- State-of-the-art processes in water-based paint applications.

The Fellowship will assist in filling the identified skills deficiencies in Australia by:

- Enabling the development of new units for the Furnishing training package around water-based finishing
- Providing an insight into which methods of delivery best suit the Furniture Finishing Training Package
- Establishing links with international training organisations for future teacher professional development/teacher swap.

4. The Australian Context

The Australian Furnishing Industry Association of Australia (FIAA) represents:

- bedding and mattress makers
- built-in and wardrobes businesses
- commercial furniture makers and joiners
- flooring and floor covering specialists
- French polishers
- furniture finishers
- hardware suppliers
- importers
- kitchen manufacturers
- other furnishing businesses
- picture framers
- residential furniture suppliers
- retailers
- suppliers to the furnishing industry
- timber furniture manufacturers
- upholsterers
- window furnishings specialists

The need for investigating water-based finishing applications has become evident through several furniture factory fires caused by a build-up of chemicals, particularly nitrocellulose lacquers and thinner-based products, used to spray the furniture. There is a skills deficiency, particularly a lack of understanding and knowledge of alternative paint products in the furniture industry, as well as alternative painting methods within Australian higher education institutions. It is important to introduce water-based paints into the Australian furniture industry to provide significant benefits for the environment, manufacturers and individuals working in the trade.

SWOT Analysis

Strengths

- Water-based paint products are user-friendly and environmentally safe
- Water-based paints are brush-able and do not yellow over time
- No odour is exhibited by water-based paints (unlike the odour that is associated with solvents)
- A reduction in hazardous material use
- Health benefits for workers from reduced usage of carcinogenic products
- Ability to tailor furniture finishing courses to better suit industry requirements in Australia.

4. The Australian Context

Weaknesses

- Slow drying times
- Possible reduction in productivity
- High costs
- A finish that can be described as dull, or without full body.

Opportunities

- To introduce a safe product at a foundation level of training that will have a flow-on effect to the industry in the future
- Boom in construction sector, especially design for international styles of living.

Threats

- Difficulty introducing a new product into an old market
- Backlash due to high price of product
- An inferior finish.

5. Identifying the Skills Deficiencies

Specific skill deficiencies to be addressed through the Fellowship Program are:

1. Current alternative painting methods and applications

- » Identify a water-based product that is able to be a direct replacement for nitrocellulose and all thinner-based paint products in the furnishing industry, including clear coatings, stains and colour finishes.

Action: Analysing the current alternative painting methods and applications, in order to provide advice to the industry on these particular methods and increase the use of cutting-edge technology in this area in Australia.

2. Improved Environmental impact from introducing water-based paint into the furnishing industry

- » Expose the major benefits of water-based paints systems to the environment
- » Benefits of water-based paints in storage.

Action: Investigate the benefit to the environment from introducing water-based paint exhibited in the countries visited with the view to consulting with industry representatives on the benefits of implementation in to the Australian furniture industry.

3. Obtaining new techniques for the application of water-based paints

- » Determine the spray systems currently being used to get the best results from water-based paint.

Action: Discover new methods of paint application in order to train and up-skill students with new products.

4. Establishing a suitable drying method

- » Currently, nitrocellulose and thinner-based products dry extremely quickly, so it is important to identify different drying methods and new products with a drying time similar to the nitrocellulose and thinner-based products already in use by the industry.

Action: Investigate a way to keep manufacturing times up to speed in order to encourage industry to use water-based products.

5. Managing maintenance aspects of water-based paints

- » Spray booth cleaning and spray gun maintenance with water-based paints.
- » Disposing of waste
- » Recycling of waste.

Action: Research how best to maintain painting equipment in order to train students to become efficient with cleaning and to minimise the environmental impact.

6. Training of furniture finishing students

- » Investigate how other training organisations deliver furniture finishing courses
- » Determine what success has been gained from these alternative methods of delivery
- » Determine whether these methods of delivery are suitable for implementation in Australia.

Action: Determine the suitable application of these methods in Australia.

6. The International Experience

The purpose of the overseas experience in the UK, Italy, Greece and Austria was to identify and explore the skill deficiencies identified by the Fellow.

The information obtained will enable the Fellow to provide advice on:

- Water-based furniture finishing applications
- Viability of alternative products
- Elimination of toxic chemicals
- Alternative training techniques relevant to the Australian industry.

The Fellowship research included meetings with training providers and University staff in the UK as well as guided tours of paint companies in Europe.

Visit One

Destination - Creative Woodwork, Chiswick, West London, United Kingdom

- Creative Woodwork is one of West London's top custom-design and hand-made bespoke furniture manufacturers. Founded in June 2005, it is located in an industrial estate in the London Borough of Ealing. Creative Woodwork employs five tradesman and labourers.
- The factory contains a computer numerical control (CNC) router in a state-of-the-art machinery set-up.

Contact

The following staff member provided invaluable information to the Fellow during his tour of the workplace:

- Marc Hickey, Owner and Manager.

Objectives

- To interview a business operator based in London and to get his opinion on the direction of water-based paint, its necessity and his experience with its use.



Outcomes

- Mark Hickey had trialled water-based paint within his business. The main reason he has experimented with the product was to combat the issue of fumes. His most popular product is built-in wardrobes. These robes are mainly painted finishes on the interior and clients were complaining about the initial amount of fumes when the doors are opened.
- There were two main reasons why he chose not to continue using water-based paint:
 - » Inconsistency of colour. Hickey found pigmented colours settle very quickly in the paint tin and if it is not stirred regularly, the colour changes quite dramatically.

6. The International Experience

- » Drying time, especially in winter. Water-based paints require a well heated application and drying area. In an ideal heated atmosphere the drying time is at least twice as long as a solvent based product. Hickey didn't have this much time or space to pursue and continue with this method.

Visit Two

Destination - Peter Sefton Furniture School, Upton Upon Severn, England

- The Peter Sefton Furniture School is located on a three acre farmstead in a 17th Century oak framed Threshing Barn, only two kilometers from the historic riverside town of Upton upon Severn, Worcestershire, England. It is 70 km south of Birmingham or 180 km North-west of London.
- The Peter Sefton Furniture School is the only private purpose-built furniture school in the United Kingdom dedicated solely to teaching woodworking and furniture making. It consists of three main rooms, including a theory room, a static machine room and a practical workshop with numerous workbenches. The machinery was well laid out in an extremely clean working environment, perfectly suited to high-end furniture making.

Contact

The following staff member provided invaluable information to the Fellow during his tour of the workplace:

- Peter Sefton, School Principal and owner.

Objectives

To investigate innovative approaches in water-based paint usage that would benefit the furnishing industry and how furniture finishing training was delivered elsewhere in the world.

Outcomes

- Sefton had an extensive range of water-based paint that he used for hand application on furniture. Spray guns were not used at all.
- The Fellow gained a greater understanding of the UK water-based product range.
- Modern hand furniture finishing techniques with water-based paints only required brushes and rags to complete the finished look.
- The school delivers several specialised short courses throughout the year, focussing on:
 - » Veneering and laminating
 - » Chair-making
 - » Wood machining
 - » French polishing
 - » Modern wood finishing
 - » Wood turning.

These are between two and five-day courses that accommodate a maximum of ten students per class, ranging from £190 to £495 (approximately \$A300 to \$A795) per person.

6. The International Experience

- The school also delivers three long courses throughout the year, focussing on:
 - » Designing and constructing hand-crafted pieces of furniture
 - » Knowledge and use of tools and machinery
 - » Veneering
 - » Marquetry/parquetry
 - » Polishing and finishing techniques.

These are three, six, or nine month courses that accommodate a maximum of seven students per class and range in price from £5,950 to £13,950 (\$A9,550 to \$A22,400) per person.

- Furniture Finishing was not a major focus in the courses delivered. Hand finishing was briefly taught and spray painting was not used at all.
- Sefton expressed a strong interest in the findings of this Fellowship and was very keen to experiment with water-based paint finishes. The attraction for small business/training providers is the safe properties of water-based paint. Extraction setups do not need to be as complex and a basic breathing apparatus is all that is required. Due to his small volume, the longer drying time would not be an issue for him.



6. The International Experience

Visit Three

Destination - Jonathon Markovitz Furniture, Letcombe Bassett, England

- Jonathan Markovitz is a private training provider. The furniture-making workshop is located in the quaint village of Letcombe Bassett, in the Downs of south-west Oxfordshire, England. It is close to the market towns of Wantage in Oxfordshire and only 90 minutes or 125 km west of London.
- The workshop was originally built in the 19th Century for the village carpenter and wheelwright. Markovitz has added a design studio and upgraded and extended the workshop with a large open-plan workbench/assembly area. It contains a machine room fully equipped with modern three-phase industrial machinery meeting all safety regulations. The bench room accommodates up to four adult trainee furniture-makers at any one time to allow for invaluable one-to-one tuition throughout the furniture and cabinet-making courses.

Contact

The following staff member provided invaluable information to the Fellow during his tour of the workplace:

- Jonathan Markovitz, Owner and Manager.

Objective

To investigate innovative approaches in water-based paint usage that would benefit the furnishing industry and how furniture finishing was delivered elsewhere in the world.

Outcomes

- Markovitz runs short courses, between one and 13 weeks, throughout the year. These range in price from £750 to £5,200 (\$1150 to \$8,000 AUD approximately) per person. This generally covers the cost of materials and the use of tools.
- Markovitz also conducts longer fulltime 40 week courses throughout the year, costing £15,000 (\$23,500 AUD approximately) per person, with a maximum of four adults. This covers all tuition, bench space and the use of workshop equipment.
- Markovitz does some Furniture Finishing but it was very limited. It mainly consisted of hand finishing products.
- As Markovitz is a small business, he was interested in my findings and was very keen to experiment with water-based paint finishes.



6. The International Experience

Visit Four

Destination - ICA Group, Civitanova Marche, Italy

- ICA Group is based in the central Italian city of Civitanova Marche, in the province of Macerata. Civitanova Marche, Italy is located 40 km south-east of Ancona and 260 km north-east of Rome.
- ICA Group has a 383-strong workforce and over 8,000 clients around the world. The ICA Group Civitanova Marche is one of the leaders in industrial production for special paints for wood. It was founded in 1971 and continues to remain a family-owned business. In 2011, ICA Group's consolidated turnover was €106.6 million. ICA Group won the 'Life' award in 1995 for the advancement in water-based paint products.
- Alongside ICA, the Group also includes Salchi Wood Coatings, which was founded in 2004 following the takeover of an existing business.

Contacts

The following staff members provided invaluable information to the Fellow during his tour of the workplace:

- Andrea Paniccia, Chief Executive Officer
- Vito Sergi, Safety Quality Environment Officer
- Claudio Grandoni, Laboratory Technician
- Frediano Fuscá, Laboratory Technician
- Alessandra Mincio, Laboratory Technician.

Objective

To investigate water-based finishing applications for the Australian furnishing industry and the viability for an alternative paint product for the Australian market.

Outcomes

- ICA Group has a close relationship with the local fire brigade to ensure safety standards are adhered to. This relationship was built after a devastating fire destroyed one of their production facilities.
- The laboratory technicians provided valuable insight into the structure of paint and polymers (small particles of paint) and how they need to coagulate after the application process:
 - » The polymers require a material around them to create viscosity and to enable the painting process.
 - » This material may be thinners or water and this material needs to evaporate to promote this coagulation process.
 - » As thinners evaporate, it causes the polymers to bind together and harden. Using just water does not cause the polymers to bind together so another process is needed to be added.
 - » This is where the UV system is required.
 - » Instead of the thinners evaporating and causing this binding process, the water evaporates and the UV light enables the binding process to occur.
- Waterborne paint is a mixture of the two processes. It is a mainly water-based product but it contains approximately six to eight per cent thinners to enable the coagulation process. Waterborne paint can air dry and does not require a UV light.

6. The International Experience

- The Fellow gained a very clear insight into what waterbourne paint and water-UV paint was and how they are applied and cured. Water-UV and the associated UV machines enabled extremely fast coating and re-coating.
- The Fellow also gained an insight into European dangerous chemical emissions by being provided with a copy of the: Directive 2004/42/CE of The European Parliament and of the Council of 21 April 2004. “On the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products and amending Directive 1999/13/EC.” An important piece of information out of the directive for the Fellow was:
 - » The VOC content of certain paints and varnishes and vehicle refinishing products should therefore be reduced as much as is technically and economically feasible taking into account climatic conditions.



6. The International Experience



6. The International Experience

Visit Five

Destination - EuroCucina Furniture Fair, Milan, Italy

- Milan is the second largest city in Italy and is its main industrial, commercial and financial centre. It is located in the northern part of Italy, 600 km approximately North-west of Rome.
- EuroCucina, established in 1974, is the International Kitchen Furniture Exhibition. It runs concurrently with the International Bathroom Exhibition at the Milan Fairgrounds in Rho, Milan. These fairs are a place for the top Italian and foreign manufacturers to showcase their latest designs and products.
- EuroCucina houses 160 exhibitors, occupying over 26,000 square metres. It is Europe's only major trade show for furniture, kitchens and bathrooms. More than 292,000 professional visitors attend, of which more than 60 per cent are from foreign nations.

Contacts

The following contact was made during the EuroCucina Furniture Fair Exhibition:

- Brett Pekin, Territory Manager, Cabinet Hardware, Lincoln Group, Geelong.

Objective

- To gather contacts in the paint manufacturing sector with the prospect of visiting relevant companies whilst in Europe.

Outcomes

- EuroCucina was mainly about the final products and companies trying to sell their kitchens or furniture. Salesmen either did not know about the finer details of the displays, like the paint products used, or did not want to reveal the information as they were there to sell the whole product.
- Highlights of the EuroCucina exhibition was that:
 - » The Fellow was able to see current trends in kitchen/bathroom, interior spaces and furniture
 - » Paint was emerging as the most popular finish for kitchen doors and timber finishes
 - » The lack of handles on kitchen doors and drawers at EuroCucina was incredible. The Fellow saw many examples of moulded edge handles. This type of door with the handle, integrated into the door by a moulding, requires painting to finish.
 - » The Fellow can foresee an increase into the demand of painted finishes in kitchens/bathrooms, interior spaces and furniture based on the displays at this fair.



6. The International Experience



6. The International Experience

Visit Six

Destination – Technodomus: International Expo of Wood Technology, Rimini, Italy

- The Fellow was recommended to attend the Technodomus Expo by a technician from ICA Group, which proved to provide some positive, unexpected findings.
- Rimini is on the western coastline of Italy, with a population of 142,000. It has become one of the most important sites for trade fairs and conferences in Italy.
- The third edition of the biennial Technodomus Expo for the Furnishing and Construction Industries was organised by Rimini Fiera and exhibited at the Rimini Expo Centre over five days. More than 33,000 visitors attended, 37 per cent of whom were foreign.
- Technodomus covered 45,000 m², and 300 companies represented the most important players of the woodworking, window frame and door manufacturing world. Other companies and key players committed to research, innovation, technical progress, energy efficiency and environmental sustainability, were also present.
- Cefla was created in 1932 in Italy. The Cefla Finishing Group consists of leading companies and brands:–

Cefla Finishing, specialist for raised panels.

Delle Vedove, specialist in profile sanding, coating and finishing.

Düspohl, specialist in wrapping.

Falcioni, specialist in window sanding, coating and finishing and in manual painting. Sorbini, specialist in flat panel, parquet coating and edge finishing.

- Cefla Finishing LAB in Imola, is the most advanced research centre in the world in the sector of wood finishing. It consists of more than 100 machines in which customers and coating producers can carry out tests on new products and experiment new technologies for the future development of new machines. Cefla Finishing Group excel when it comes to the productivity, high quality, efficiency and the environmental impact of finishings.
- The Cefla Finishing Group, based in Imola, Italy, design and manufacture tailored finishing machines and lines for the wood industry, as well as its derivatives; glass, plastic, metal, aluminium and composite materials. Cefla Finishing was the first company to introduce the UV technology in Italy, both in high and low power. Cefla Finishing Group exhibited the latest, specialised electrical technologies at Technodomus Expo.

Contact

- Cristian Giovannini, Business Manager, Cefla Finishing Group.

Objective

- To gain insight into new paint finishing technologies available overseas.

Outcomes

- Christian Giovannini was the business manager from the Cefla finishing group. They had a major display at the Technodomus Expo.
- Giovannini was able to give the Fellow an informative insight to the latest technologies in automated painting machines, UV curing production lines and edge preparation machines. The Fellow was

6. The International Experience

thoroughly impressed with the display of high quality machinery, particularly the UV Curing and Edge Coating machines.

- The Drying Systems exhibited at Technodomus consisted of an oven with an air chamber followed by an area with infrared lamps which is suitable to dry solvent based coatings. The result is maximum colour uniformity and surface opacity. There is progressive control of UV rays for perfect gelification of specific UV coatings.
- The Edge Coating machines are based on a roller technology. The automatic machine works on solid wooden, veneered and MDF straight and shaped panel edges with UV acrylic coatings. With these state-of-the-art technologies, Cefla are worldwide leaders in the finishing of wooden, plastic and non-ferrous material products.
- Giovannini demonstrated how a robotic automatic spraying system works. The iGiotto machine sprayed the water-based finishing application over the product, ran it through a UV curing process and then stacked it ready for shipping all in under approximately 10 minutes. The finished products are stacked one on top of the other after the process is completed and are then immediately ready for packaging and shipping.



6. The International Experience

Visit Seven

Destination - Blum, Vorarlberg, Austria

- Julius Blum founded the Blum company in Vorarlberg, Austria, in March 1952. It was a production workshop manufacturing horseshoe studs; today it is still a family-owned international company with more than 5,300 employees worldwide. They are a leading manufacturer of functional hardware for kitchens.
- Vorarlberg is the western-most state in Austria. There are seven Blum plants in Vorarlberg and three additional production plants in the USA, Brazil and Poland.
- Three plants were visited in Vorarlberg:
 - » Plant 3 in Höchst is the technical centre where product ideas are developed all the way through the start of production and the Construction and Specialised Mechanical Engineering departments along with the apprenticeship centre are also located here
 - » Plant 4 in Bregenz manufactures drawer and pull-out systems
 - » Plant 5 in Fußach manufactures various stamped and plastic components as well as the zinc die-casting facility.

Contact

The following staff members provided invaluable information to the Fellow during his tour of the workplace:

- Ron Redman, Business Development Manager, Blum Australia
- David Noakes, Sales and Marketing Director, Blum Australia
- Daniel Schützelhofer, Apprenticeship Training Coordinator, Blum, Austria.

Objective

- The main objective of the visit to Blum was to observe the training techniques used in a large company.

Outcomes

- Blum's 'Apprentice Training Program' was tightly bound with the growth and development of the company. Whilst the company itself was founded in 1952, it was in 1970 that Blum's 'Training Program' came to be an integral part of the corporate strategy.



The Fellow, Mark Thomson with Ron Redman, Business Development Manager, Blum Australia and Christian Schwerzler, Sales Manager, Blum Australia

6. The International Experience

- » Intense cooperation with the vocational schools in Vorarlberg has resulted in new ideas and possibilities. Several specific features of Blum's 'Training Philosophy' are oriented around, and based upon basic human morals and values. They also characterise the Blum 'corporate culture'. All training components or job requirements of Blum's 'Apprentice Training System' lie within the framework of the syllabus defined by the relevant decree of the Federal Ministry of Economic Affairs of Austria.
- Blum has a strong commitment to training young people and the statistics speak for themselves:
 - » 45 to 50 new apprentices annually
 - » Approximately 200 apprentices in training at any given time (including the USA)
 - » Seven career tracks are offered, most being a three and a half to four year
 - » apprenticeship in:
 - Machine Mechanic, Tool & Die Mechanic, Systems Electrician, Technical
 - Draughtsperson, Plastics Processor, Machinist, IT-Technician
 - » 36 fulltime and 40 part time trainers are responsible for teaching
 - » Training costs €18,100 per apprentice annually or €72,600 for the entire Apprenticeship.

Visit Eight

Destination - ER-LAC, Polyhendri-Attikis, Greece

- ER-LAC is located 40 km north of Athens. For over 35 years, the ER-LAC company has grown and expanded towards planning, developing and researching paints, varnishes and synthetic resins for the Greek and foreign markets.
- ER-LAC designs, manufactures and distributes numerous paint products, that are friendly to the user and the environment, particularly for construction, furniture, car-refinishing and industrial.

Contact

- Athanasios D. Kaforos, Technical Manager

Objective

To investigate water-based finishing applications for the Australian furnishing industry and the viability for an alternative paint product for the Australian market.

Outcomes

- The Fellow was taken on a tour of the facility including the laboratory, the warehousing despatch area and the production area. The chemist at ER-LAC demonstrated many interesting developments in water-based paint products. The laboratory chemist showed the Fellow examples of numerous products he and others had developed over the years:
 - » How gloss levels are measured on a scale from 0 to 100 Gloss, where 100 meant a fully polished surface and 0 meant a mat finish with an instrument called a gloss meter.
 - » The transparency of paint was measured by applying a large drop of paint on a piece of glass and smearing it evenly with a tool to compare its transparency with other products. A downfall for water-based paint is its transparency (or lack thereof), as it can be quite milky.

6. The International Experience



6. The International Experience



6. The International Experience

Visit Nine

Destination - Sylac, InofitaViotias, Greece

- The Fellow met the Sylac contacts at the Technodomus Expo and was subsequently invited to visit their production facility.
- Sylac is located in an Industrial Estate approximately 60 km north-east of Athens. The large factory housed state-of-the-art drying and curing machines, several technical laboratories and comprehensive paint production lines.
- The company was founded in 1985 by Dr K. Symeonides for the development and production of varnish for wooden surfaces. Since then it has focused its production on professional furniture varnish used in furniture manufacture finishing units.

Contacts

- Michael Symeonides, Research & Development Manager
- Kyriakos Symeonides, Managing Director

Objective

To investigate water-based finishing applications for the Australian furnishing industry and the viability for an alternative paint product for the Australian market.

Outcomes

- Sylac had developed a very specific range of water-borne paints. The range includes: UV Polyurethane, UV Acrylic, Polyurethane 1K & 2K and Acrylic 1K & 2K. The Fellow was able to test spray and use each of these products, which was such a highlight of this visit.
- Sylac had a state-of-the-art UV drying and curing machine specifically designed for them by Cefla Finishing group. Michael Symeonides from Sylac facilitated an unexpected, eye-opening experience for the Fellow. Symeonides began with explaining formulas and how he designed his paint products in the laboratory. A tour was then conducted of the production facility, where the paint is developed, packaged and despatched.
- Symeonides produced samples of each of his water-based products and allowed the Fellow to test spray and sand each of the products. Full access to his drying and UV curing machine was permitted. The Fellow was able to paint his products, put them through an approximately eight minute drying process, re-sand them and recoat. This experience for the Fellow was outstanding. It gave the Fellow a very clear idea as to what is possible and what machinery is required to successfully use water-based products.

6. The International Experience

Visit Ten

Destination - London Metropolitan University, East London, United Kingdom

- The Commercial Road City Campus of the London University was built for the Norwich Union Insurance Company in the late 1960s, and was adapted for the London College of Furniture in 1970, later becoming the University in 1990.
- Furniture Studies is offered as undergraduate and postgraduate courses, both part time and fulltime. Making and Finishing Furniture is offered as a short course through the Sir John Cass Department of Art, Media and Design for students wishing to broaden their understanding of using woodworking tools and selecting and using finishing materials for specific purposes. Students benefit from the University's Furniture Works, a furniture manufacturing and business resource centre set up to support furniture designer-makers, which holds an acclaimed annual show.

Contacts

- Cathy Stack, Senior Lecturer, Course Leader FdA Furniture Making and FdA Furniture Design
- Andy Hills, Finishing Department Manager

Objective

- To investigate innovative approaches that would benefit the furnishing industry and how furniture finishing training was delivered elsewhere in the world.
- To observe Furniture Finishing delivery methods and to learn about what paint products are being used by this University.

Outcomes

- Kathy Stack gave the Fellow an insight into the training system in the UK, particularly about the successful apprenticeship program. The Fellow went on to meet Andy Hills, the Finishing Department manager. Hills had a great knowledge of water-based paint and the Fellow was able to discuss the benefits and draw backs of water-based paint with him.
- A review of the Environmental Protection Act and its Implications, written by Hills, was given to the Fellow (refer to Attachment 2). This document looked into the Environmental Protection Act 1990. This is a British Act from legislation.gov.uk and it refers to the legislation to control the emissions of solvents in the air. This Act affects anyone who uses more than five tonnes of solvent per year.
- Hills came to the conclusion that:
 - » It is more viable to control your emissions with either absorption of the solvent vapour by sand or the recovery of the solvent by adsorption techniques
 - » The recovery of solvent could be a viable system for a number of reasons: recycling of solvent is environmentally friendly and cost effective (being cheaper than water-borne paint); and solvent recovery could offset the original purchase cost by being able to stay with current technology that we know well.

6. The International Experience

Concluding Remarks

The Fellow's findings indicate that:

- The Fellow's research has found that the technology surrounding water-based paint has progressed and improved dramatically.
- The direct replacement of waterbourne paint is a very real option for replacing current thinner based products and systems.
- The only real obstacle in setting a highly performing 100 per cent water-based UV system is cost. Set up costs would increase dramatically the further someone chooses to delve into the water-UV.
- The elimination of toxic chemicals being expelled into the atmosphere is a real option that could also be easily set-up to reduce the impact on the environment.
- The use of an automated painting system could open up a new form of training where students would need to learn how to operate machinery such as edge preparing machines, automated painting machines and UV curing machines.

7. Knowledge Transfer: Applying the Outcomes

The outcomes of this Fellowship include:

- Discovering the differences between waterbourne and water UV paint:
 - » Waterbourne – able to be air dried and contains up to eight per cent thinners
 - » Water UV – only dries/cures through heat and UV light methods
- Observing the latest in machinery technology to enable the new paint products to be applied.
- Toxic chemicals can be easily eliminated from being exhausted into the atmosphere with the installation of a system that would control emissions with either absorption of the solvent vapour by sand or the recovery of the solvent by adsorption techniques.

It would be the Fellow's recommendation to, as a minimum, look into the installation of a system that would control emissions with either absorption of the solvent vapour by sand or the recovery of the solvent by adsorption techniques.

The next option would be to swap immediately to a waterbourne product and ensure that the operator uses a heated spray booth with a heated drying room. The impact to production should be minimal if some thought is put into new painting habits.

The Fellow's key recommendation would be the installation of an edge preparing machine followed by and automated spray painting and UV curing machine all used in conjunction with a water-UV paint system. This of course would come at a great cost and the output levels of the workshop would need to be taken into consideration before installing such a system.

In order to convey the above recommendations, the Fellow will disseminate his research findings through presentations to a variety of stakeholders including government, industry associations, industry and education and training facilities.

8. Recommendations

The following specific recommendations are made by the Fellow based on the findings of his research in order to meet the identified skills deficiencies:

- Conversion to Water UV paint products and adopt a painting line system similar to Cefla Paint Finishes.
- Conversion to Waterborne paint products used in conjunction with a heated spray booth.
- Controlling emissions with either absorption of solvent vapour by sand or the recovery of the solvent by adsorption techniques.

The Fellow will disseminate the research findings through presentations and recommendations to:

Industry

Recommendation:

- Provide advice to industry groups of these new methods/processes and hopefully they will seek to find out more detailed information into converting to a water-based system.

Education and Training

Recommendations:

- The Fellow will look into the viability of introducing a unit of competency that looks at the use of water-based paint and the available technology in machinery.
- The Fellow is available to work with TAFE and other educational institutes to develop a strategy to convert to a water-based paint system.

Industry Associations

Recommendation:

- The Fellow will make presentations to:
 - » FURNITAG meeting (held every three months)
 - » The national Furniture conference (held once every two years)
 - » Victorian Furnishing Association meetings.

Government

Recommendations:

- The Fellow will make an initial request via the local Member of Parliament for a review of hazardous paint products in light of the recent fire at a Yarraville furniture manufacturing factory
- The Fellow will make a request via Manufacturing Skills Australia for an additional unit of study on water-based paint products to be included in the Certificate II and III courses within the LMF Training Package.

8. Recommendations

Dissemination sessions

Recommendation:

- The Fellow will provide information about the Fellowship at the following sessions:
 - » FURNTAG meeting (every three months)
 - » The national Furniture conference (held once every two years)
 - » Victorian Furnishing Association meeting.

The aim of these sessions would be to inform other Furniture Teachers of changes in the latest water-based paint technologies.

The target audience would be fellow Furniture teachers. The FURNTAG meetings are held approximately every three months. An appropriate time that suited the board would be arranged. The national Furniture conference is due to be held in September 2013.

ISS Institute

ISS Institute can provide contacts where needed to help the Fellow's findings reaching a greater audience than those mentioned.

9. References

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