

WORLD PLUMBING COUNCIL SCHOLARSHIP 2006



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1. SCHOLARSHIP OBJECTIVE

In my 2006 Scholarship submission I outlined the following objective:

“I would appreciate visiting this Scandinavian country as it would broaden my personal and professional development and provide me with the opportunity to meet a variety of people and gain an insight into their culture, vocational training methods and working environment.”

2. INTRODUCTION

It is my belief as a Senior Head Teacher of Plumbing that in order to improve international plumbing standards “plumbing training and methodologies” must be exchanged worldwide.

I believe that I was able to achieve my scholarship goals by:

- Visiting and working with staff and students from Technical Education Copenhagen
- Attending meetings with TEKNIQ – Danish Mechanical & Electrical Contractors Association
- Meeting staff from the Danish Plumbing Training Board
- Discussions with Plumbing Trade Union representatives
- Visiting plumbing contractors and plumbing manufacturers
- Viewing various types of building sites including heritage roofwork and “green” environmental projects.

3. STUDY VISIT BACKGROUND

Denmark is a modern welfare state with approximately 5.4 million people who have access to social welfare financed through taxes, free public services and high living standards.

The Danish labour market model is based on the “flexicurity model” which incorporates tripartite co-operation, high employment and is gender balanced.

Vocational Education and Training (VET) makes up some 40% of the educational composition of the labour force.

The government’s objectives for the future are as follows:

- At least 85% should complete a youth education in 2010 and 95% in 2015
- At least 45% should complete a higher education program in 2010 and 50% in 2015.

The key principles of the Danish Education System are as follows:

- Education for all
- Flexible pathways
- Lifelong learning
- High-quality education
- International outlook
- Guidance
- Active participation
- Partnerships

4. DANISH MAINSTREAM EDUCATION (Reference 1)

The Danish education system is comprised of three main parts. They are as follows:

- Compulsory education
- Youth education
- Higher education

Financing of education in Denmark is by way of the “taximeter system” i.e. annual government grants. They are as follows:

- basic grant
- teaching grant
- administration grant
- building grant

The teaching, administration and building grants are calculated on the number of students enrolled at the school/college etc. Additional grants may also be obtained where students complete their programs or obtain an apprenticeship.

Quality assurance and innovation are controlled by:

- common national guidelines
- testing and examination
- ministerial approval, monitoring and inspection
- involvement of stakeholders

There is also a large emphasis on “guidance” in relation to completion across all areas of education.

5. VOCATIONAL EDUCATION AND TRAINING IN DENMARK (Reference 2)

The Danish Parliament passed the Vocational Education Training Act (No.234) and it became fully operational on 1 January 2001. This act is an instrument for achieving innovation and aims to enhance the quality of vocational education, cultivate talent and encourage companies and colleges to organize interactive learning activities.

Danish VET is centralized. The Minister of Education in the form of a trade regulation issues the training standards for the trade. Trade regulations are prepared by the social partners and then approved by the Minister of Education.

VET 2000 is a broad youth educational program. The VET 2000 has a broadbased curriculum not restricted to vocational skills and knowledge but also designed to offer opportunities for the personal development of the students. The four main objectives of the VET Act are:

- To motivate young people to learn.
- To provide young people with training opportunities which will form the basis for their future career.
- To satisfy the needs of the labour market for vocational and general skills.
- To give young people seeking further and higher education a learning platform for this later goal.

Access to VET courses is open to all young people and adults who have completed compulsory education.

Plumbing Based Vocational Education Programs (Reference 3)

1. Initial Vocational Education and Training (IVET) Foundation Course (Foundation Program)

Access to plumbing courses is via the Building and Construction foundation course. Foundation courses are typically 20 week duration and can be either a college or company pathway. The students will be issued a certificate stating the subjects and levels which they have achieved.



2. Main Courses (Main Program) Certificate

- Plumber (energy systems specialist)
- Plumber (ventilation systems specialist)
- Plumber (roof and façade specialist)
- Plumber (rust-proof industrial systems specialist)

The vocational training for plumbing/roofing/HVAC yearly intake is between 600-700 plumbing apprentices. Fifteen colleges offer the plumbing programs. The main program is always contract based and alternates between education and training in VET colleges and in-company training.

A four year contract contains 60 weeks at college i.e. Basic Course 20 week block and Main Program of 4 courses of 10 week blocks.

Wages paid by the company during attendance at the college are reimbursed from the employers Reimbursement fund (AER) for apprentice wages. All Danish employers pay a training levy whether or not they draw upon the AER fund. Most students (70%) start their education in-college before signing a training contract.

Students over 18 obtain grants through the State Education Grant Scheme during the foundation program.

The main program consists of:

- common core subjects (math, science, IT etc)
- broad industry subjects (OH&S, building site management)
- industry subjects (general plumbing, general roofing)
- specialist subjects (mechanical services, roofing)
- elective subjects (heritage plumbing, renewable energy systems)

The main program has a duration of no more than 3½ years. The program starts with a practical training period in a company followed by periods at college and in the company.

The main program is completed by a “journeyman’s test” which tests the vocational knowledge, skills and attitudes. This test is monitored and assessed by the social partners.

The qualifications obtained from vocational education and training is recognized nationally and at EU level. They are recognized by enterprises and employers alike as their organizations (social partners) have participated in the design and implementation of the curriculum and in monitoring the examinations.



6. CURRICULUM DEVELOPMENT

The outstanding features of the Danish VET includes the State's control function, the co-operation between employers and employees and the wide autonomy of the individual colleges with regard to syllabus and budget administration.

The Danish Ministry of Education maintains control by means of "objectives and frames" governance. Known as the "black box" governance, the ministry decides what goes in the box and the social partners monitor what comes out of the box. The college is the "black box".

Trade committees where parties are equally represented decide on vocational training qualifications and stipulate the training conditions. For the plumbing industry, the Danish Plumbing Training Board performs this task.

The Danish Plumbing Training Board is also responsible for;

- curriculum development
- course books, CD-roms and software for education
- CPD for college teachers
- information, PR, research and development projects
- testing, assessments and awarding certificates/licenses
- approval of plumbing companies for taking apprentices

Plumbing Technician/Licensed Contractor (Sanitation, Gas and HVAC Diploma)

This is a full-time 2 year course. It is comprised of common core and specific diploma core subjects.

The objectives of this course are to provide the students with the skills and knowledge to:

- Design, contract and supervise HVAC systems
- Integrate knowledge on technical, organizational, economical, environmental and legal matters in relation to design, dimensioning, installation and running of systems within sanitation, gas and HVAC.
- Apply relevant technologies and methods in this work and
- Enter into management teams and sectors with other professionals having diverse educational, cultural and linguistic background.

Successful completion of this course allows the student to become a Licensed Contractor.

7. TECHNICAL EDUCATION COPENHAGEN – MEETINGS WITH STUDENTS AND STAFF

On arrival at the college I was introduced to staff members and soon realised that colleges are the same worldwide. Very busy places with many things happening.

I was then introduced to a Stage 1 class from the Plumbing Technicians Course who were very interested to learn about life in Australia. We discussed the TAFENSW Plumbing VET system and the possibilities of Danish trained plumbers working in Australia.

I found the Plumbing Technicians Course to be quite substantial and I was interested to learn that it was for two years full time.

The next day I visited a “foundation program plumbing group” and discussed similar issues to the previous day. It was interesting to note that there were several adult students in this group who were looking for a career change by completing a plumbing course.



8. INDUSTRY GROUP MEETINGS

TEKNIQ (Reference 4)

During my scholarship visit it was my pleasure to visit TEKNIQ and meet with Flemming Preisler and Jens Høffner who explained to me TEKNIQ's involvement with the plumbing industry and vocational education.

Some important facts are as follows:

- TEKNIQ is the Danish Mechanical & Electrical Contractors Association.
- They are the 5th largest trade/employers organization in Denmark
- Second largest in the construction industry
- Represent more than 3000 contractors
- Member contractors cover a wide field of areas in the business
- Members range from small single proprietorship to large mechanical and electrical contractors with more than 2000 employees
- Total turnover amounts to more than DKK 30 billion a year
- Employ around 40000 people
- More than 95% of the employees are skilled



CIRIUS – Danmark

I was invited to another meeting at TEKNIQ where I was introduced to Dorthe Skovrød Christensen who is responsible for arranging the funding for a proposed trip by Danish Plumbing students to travel to Australia during 2008.

Dorthe was interested in making contact with a TAFENSW Institute in order to investigate the possibility of Danish Plumbing students studying and working in Australia.

The Danish Government is very supportive to offer opportunities for personal development to their plumbing students. There was also discussion suggesting that there may also be an opportunity for Australian students to travel to Denmark in the future with a similar outcome.



GEBERIT

While in Denmark I attended a training workshop at Lystrup conducted by Erling Johansen who is the Technical Consultant for Geberit. I was shown many new products and their application for use in heating water and rainwater systems.

Erling provided me with technical information and resources that I will incorporate into my plumbing lessons when I return to Australia.



GRUNDFOS

I also attended a training seminar at the pump manufacture Grundfos. A very professional organization which has a long family history in the pump industry and has built its success on sound design and manufacturing principals with a strong customer focus.



9. DANISH ENVIRONMENTAL INNOVATIONS

Folehaven's Green Laundry (Reference 5)

A thorough renovation of Folehaven's laundry was carried out from 4 April to 5 August 2000. The renovated laundry has 24 washing machines, 1 spin dryer, 12 tumble dryers and 2 large rotary ironers.

As part of the renovation, a large biological treatment system and rainwater system were installed, meaning the waterworks is no longer used in the system. Previously 30 cubic metres of water were consumed each day in the laundry. The biological treatment system purifies the washing and rinse water to drinking water quality before the water is recycled. The renovation incorporated the following resource conservation features into the system:

- Heating the washing water in the return pipe by district heating
- Switching the energy supply for the tumble dryers and rotary ironers from electricity to gas
- Including heat recirculation and solar heating in the ventilation system
- Supplying electricity for the pumps, etc from a solar cell system.

Description of the biological treatment system.

- Step 1 The Water is piped into a septic tank. The biological treatment of the water starts with an anaerobic process. A circulation pumps sends the water from the septic tank to the first of eight treatment tanks.
- Step 2 The water flows through biological filters installed in these tanks and the filters are aerated 24 hours a day. There are micro-organisms, fish and pond snails in the last 7 containers and plants grow on the water surface of all the containers. The fish are used to eat the decomposition residue in the water entering from the septic tank.
- Step 3 The water is pumped from the last treatment tank into the large treatment aquarium in the laundry.
- Step 4 The water leaves the treatment aquarium as overflow and is piped under the floor before flowing into the large marsh section.
- Step 5 After leaving the marsh area, the water flows into the former swimming pool. The water is continually circulated from the swimming pool through a sand filter and a UV illumination system before returning to the collection tank. The water is purified to drinking water quality before it is recycled to the washing machines.



10. CULTURAL EXPERIENCE

Copenhagen (København) is Scandinavia's largest and liveliest city and is one of Europe's most sort-after destinations. It has the cultural and social attractions of a major European capital, yet it is compact in size.

It is a simple city to navigate by foot or by bike and it has a good transport system. Much of the central area is pedestrianised and the main roads have cycle lanes.

It could take weeks to explore all of Copenhagen's museums and attractions. They cover many special interests including Danish design, architecture, Jewish history, decorative art, working-class cultural history and Danish naval history.

Whilst in Copenhagen I also visited the "free town" of Christiania. Christiania is a self-declared "independent state" in the very heart of Denmark. It's a social experiment on the edge of Christianshavn. Christiania had violent beginnings in the early 1970's when hippies, artists and political activists broke into abandoned barracks and refused to leave. The government eventually agreed to let Christiania be as a "social experiment" and it has emerged as a 1000-strong alternative ghetto with its own commercial life, political structure, education system and social scene.



11. CONCLUSION

From the information contained in this report I am sure that the reader will agree that the Danish Plumbing Industry is served extremely well by an impressive Vocational Education Training System.

Students enrolled in the Plumbing courses experience a high degree of education combined with valuable guidance at all levels.

The Plumbing Technicians Course is second to none as it encourages both students learning and personal development.

I believe we have a lot to learn from our Danish colleagues and I hope that I was able to impart some knowledge to the Danish students while I was a guest in their country.

12. ACKNOWLEDGEMENTS

I would like to thank the Chairman and members of the Executive Board of the World Plumbing Council for awarding me the 2006 Scholarship. It definitely provided me with the opportunity to broaden my personal and professional development and gain insight into another culture and their vocational training system.

I would like to thank the following people whose support whilst overseas was appreciated:

Flemming Preisler - Director, TEKNIQ

Jens Høffner – Uddannelseschef, TEKNIQ

Dorthe Skovrød Christensen – International radgiver CIRIUS Danmark

Erling Johansen - Teknisk saigskonsulent GEBERIT

And finally I would like to thank Benny Wielandt, Student & Guidance Counsellor – Technical Education Copenhagen who from the outset made my scholarship in Denmark a truly memorable experience. Apart from many other things, Benny was responsible for arranging my scholarship program while I was based in Copenhagen.

Geoff Moore
25 October 2007

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