P·O·W·E·R
Pushing Offshore Wind Energy Regions

Workshop:
Harmonisation of Training for the Offshore Windenergy Industry

Executive Summary

Windzentrum
Bremen

26.th. April 2007

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Executive Summary

Welcome

Counsellor of State Dr. Birgit Weihrauch

Dr. Wolfgang Müller (Bremerhavener Arbeit GmbH) welcomes the participants of the workshop, which is a transnational project of the five countries facing the North Sea: Great Britain, The Netherlands, Belgium, Denmark and Germany. Sadly a person from Belgium could not come. He also welcomes counsellor of state Dr. Birgit Weihrauch from the Senate of Bremen and Michael Schmidt (Gewerbliche Lehranstalten Bremerhaven) who will act as a presenter.

Counsellor of state Dr. Birgit Weihrauch welcomes everybody to Bremen and the interesting environment of Speicher XI on behalf of the Senate. Bremen has a long-standing tradition of harnessing and promoting Wind Energy and especially Bremerhaven is very involved in this field. Also the government in Berlin supports wind energy projects. 'Windenergy is the answer to the challenge of the global climate change' says Sigmar Gabriel, the Minister for the environment. So far Wind Energy supplies 5.7% of the total electricity in Germany and well qualified people are needed in this area. Bremen has already around 500 employees who will be trained until the end of 2007. Also Bremen welcomes high ranking companies from other countries. The education and certificates in this area need to be compatible in the EU which means employers and employees will benefit from a 'harmonized' training and qualification. She hopes this workshop will push this agenda further ahead.

Mr Michael Schmidt welcomes the participants from abroad and near and reminds everybody of the 21. anniversary of the accident in Chernobyl which generated at least 4000 cases of cancer, needed 600 000 people to clean up the site and caused 200 000 to be evacuated – a true warning. The fossil fuels will last another 30 – 50 years, so it is extremely urgent to work for renewable energy. Especially young people need to be involved. Offshore wind energy generation seems to be the best bet and the training for these occupations need to be 'harmonized' within Europe. He then introduces the programme of the day and the first speaker.

Speakers

Executive Summary

Prof. Felix Rauner

Institute Technology and Education
University Bremen
Germany

Ian Fisher

Northumberland College
United Kingdom

Dr. Sören Peters

Westacademy, Esbjerg
Denmark

Prof. Gerard van Bussel

University Delft
The Netherlands

Prof. Henry Seifert

Hochschule Bremerhaven
Germany

Thomas Reincke

GAUSS, Bremen:
Environmental Protection and Safety
in Shipping (Gesellschaft für angewandten
Umweltschutz und Sicherheit im Seeverkehr)
Germany

Towards a European VET Architecture

Dual Study Programmes for Technicians

Prof. Dr. Felix Rauner

Employees in Europe have the right to be qualified as European skilled workers. The academic communities have long been internationally organized whereas the vocational occupations are still nationally organized. This hampers the development of a European labour market. And sadly the European VET policy does not supply the legal and political framework.

Firstly the qualifications of employees within the European labour market need to be defined. Secondly occupations and professions need to be understood the same way within Europe. Thirdly organisations need to restructure towards being managed by participation rather than by control. This would enhance productive work and competitiveness. It would further the commitment, responsibility, and quality consciousness of the European workforce.

When business sectors embark voluntarily on preparing their employees for the European market the outcome is positive, e.g. the automotive sector integrated 13 different occupations within Europe and was supported in this by the vocational education and training research as well as their own training institutions. There are around 200 occupations which need to be identified and become European – thus the vocational training for these occupations needs to be European since these are the corner stones of the European labour market.

Currently there are too many qualification levels. 3 – 4 levels are sufficient in nearly all sectors of employment. Research suggests four levels:

- unskilled and semi-skilled workers
- intermediate level 1
- intermediate level 2
- highly qualified employees

The labour market share of unskilled and semi-skilled workers is under 10% at present and will decrease further. The share of the highly qualified employees will increase further from the present 17-20%.

In this beginner expert model of learning to attain the levels of qualifications a beginner starts with work experience and the application of rules – thus becoming an advanced learner

who now acquires context-specific knowledge through work experience and observation at work. The competent learner acquires detailed and functional knowledge by solving complex problems and reflecting on them. The skilful learner will develop into an expert by experience-based in-depth knowledge through completing tasks that require a high level of experience at work and theoretical knowledge.

Vocational training is very different to school based training because it reflects the work experience while learning at and through work. The technician nowadays holds a position between the skilled worker and the engineer and has to take on more and more managerial tasks in his/her field of expertise. This needs to be reflected in a dual vocational training. So a two-year dual study programme at a technical college which follows the initial training should replace the current model and lead to the same qualification. As the student is employed at an enterprise while going through the initial training he/she will be able to finance the dual study programme at a technical college by working part time.

Harmonisation of Training for the Offshore Wind Energy Industry in UK

Ian Fisher

The aim of the Northumberland Renewable Energy Group (NREG) is to promote and support the development, production, installation, and usage of renewable energy in the region via several specific projects thus building a sustainable market and creating employment opportunities. Our college plays an important role within this group and takes part in the research, development and application of renewable energy. The college will also provide vocational training courses for the installation, service and maintenance of renewable energy technology (biomass and wind).

The college piloted a programme with four modules:

- Erection Techniques
- Electrical Connections
- Maintenance
- Health & Safety

After a thorough feedback from candidates and developers the programme was improved and validated to allow students after completion to embark on a career in renewable energies. It is monitored and updated annually and now has 6 modules (level 2). 3 mandatory modules are:

- Safe Working Practices in the Renewables Industry (30g/h)
- Sustainability and the Renewables Industry (30g/h)
- Contribute to Positive Working Relationship in the Renewables Industry (30g/h)

Option Wind Power:

- Fuel Supply Technology – Wind Fuel (30g/h)
- Converting Wind to Energy and Power (60g/h)
- Maintenance of Wind Fuel Systems (30g/h)

The level 3 programme whilst awaiting validation will possibly start in November this year. It will provide 3 qualifications: Certificate (min. 2modules), Awards (min. 8 modules) and Diplomas (more than 8 modules). It allows for total flexibility for teachers and students alike in its 4 different modes of delivery. The content is as follows:

- Passport to Safety
- Health and Safety (Turbine Specific)
- Sea Survival
- Working at Height
- First Aid at Work
- Team building
- Environmental Awareness
- Mechanical Engineering 1
- Mechanical Engineering 2
- Electrical Engineering
- Blade Technology
- Lifting, Hooking and Strapping Techniques
- Supply Chain Management (level 3-4)
- Data Transfer and Control Techniques (level 3-4).

These training programmes are tied in with requirements and guide lines produced by government bodies.

The college is also working on a Foundation Degree which should allow students to enter one of the college's partner universities at level 5/6. It comprises: Project Management, Risk Assessment, Procurement, Planning Control, Environmental Analysis, Material Testing, Teambuilding, Contract Law, Health & Safety and Production Control.

NREG and the Northumberland College are very much interested in working together and developing training programmes on a European level.

Harmonisation of Training for the Offshore Wind Energy Industry in Denmark

Dr. Sören Peters

The Business Academy West develops Talent by Training Technicians

The academy offers ten 2-year programmes and one 3-year programme. The AP degree programmes (diploma programmes) combine theory and practical knowledge because they are designed in collaboration with businesses and industry. They lead to a qualification for further education in Denmark or abroad and allow students a close contact to the companies in the region of Esbjerg. It is predicted that the energy needed in 2020 will be around 2000 MW so there will also be a lot of jobs for trained and skilled technicians. The academy is looking for a wide range of students.

The academy offers a degree in Technical Manager Offshore – a 3-year course taught only in Danish. It qualifies the student to safety manage, operate, maintain, and partly design technical plants and installations within the field of offshore industry nationally and internationally at management level.

The degree in Technical Offshore Operation – a 2-year course also taught in Danish only qualifies students to manage, plan and implement tasks at major technical plants in all types of companies within the offshore industry nationally and internationally. Entry requirements for the first term are as follows:

- vocational training and education as a smith, mechanic, engine fitter, welder or shipbuilder
- other relevant vocational training with mathematics level C and English level C
- upper secondary education with mathematics level C and English level C
- entrance examination for schools of engineering

The mandatory subjects (term 1-3) are as follows:

- General (25 ECTS)
- The Company 1 (11ECTS)
- Automation and Process Analysis (8 ECTS)
- Electrical Technology 1 (18 ECTS)
- Machine Technology 1 (28 ECTS)

These are the basic subjects. Then the student moves on to either a technical manager or a technical operator. The mandatory subject areas (term 4-5) are as follows:

- Electrical Technology 2 (12 ECTS)
- Machine Technology 2 (22 ECTS)
- The Company 2 (9 ECTS)
- Energy and Environment (12 ECTS)

During the 6th term students have to hand in 2 papers – one special project paper (15 ECTS) and one main project paper (20 ECTS).

The structure of the programme allows for flexibility of students and teachers alike. The local board of education meets twice per semester with the industry. Also other programmes to train as a technician in different fields are available like Laboratory Science, Production Technology, Construction and Architecture and Installations Technology. There are also commercial/business programmes in Administrative Management, Financial Management and Marketing Management. The IT programmes contain Multimedia Design & Communication and Computer Science. The academy is proud to present such a wide range of programmes since this also allows interdisciplinary work.

There are 50 teachers at the academy and 550 students – a great student/teacher ratio! As Esbjerg, situated on the westcoast of Denmark, is an international centre of offshore industry and businesses the Business Academy West is well located.

Harmonisation of Training for the Offshore Wind Energy Industry in the Netherlands

Prof. Gerard van Bussel

The Dutch forecast for the energy consumption in NW Europe in 2020 is 12.000 MW (at present 1000 MW). This translates into 7.800 new jobs for Dutch people. Most of the training will be needed in the higher education at polytechnical colleges (or: universities of applied sciences) at an intermediate level followed by vocational training. This training is needed in all sectors but mostly in Transport and Installation (emphasis on vocational training), Maintenance and Repair (emphasis on vocational training) and Production and Assembly (emphasis on vocational training). This is followed by a need for training in Monitoring and Operation (emphasis spread between vocational and higher education), Safety and Risk Analysis (higher education), Logistics (emphasis on higher education) and Site Development and Legislation (higher education). For Production and Sales and Financing and Insurance people need to be educated on a lower to high academic level. Important are skills in Project Management, International Law, Quality Assurance, Safety and Health Care, English and Offshore Training. These subjects could be incorporated into training and education at different levels. There are academic curricula, polytechnic curricula and curricula and courses for people in the jobs.

The academic education usually prescribes 3 years to complete a bachelor's degree and four to five years to complete a master's degree. Some European countries offer a master's degree (MSc) in Wind Energy Technology, others a master's degree (MEng) in Renewable Energy Technology with specialisation in wind energy. There are no academic curricula for offshore wind energy.

The universities of applied sciences usually offer a bachelor's degree (BSc, Beng, BA) after completion of a 4-year course. Some courses contain wind energy and renewable energy technology modules but no offshore wind energy technology.

Only very little exists in further education for professionals in the field of renewable energy technology and wind energy and management (typically a 1-year part time course). There is no accredited certificate.

Short courses of 1 – 5 days exist on academic and university of appl.sc. level, also at technical research institutes. Some contain offshore wind energy. The subjects in these seminars are Wind Turbine Techniques, General Wind Energy, Power Curves, Noise and Guarantees, Financial Risks, Grid Integration and Fatigue of Rotor Blades. The offshore wind energy seminars also teach Wind and Wave Forces, Environmental Impact, Power Production and Forecasting, Operation and

and Forecasting, Operation and Maintenance etc. There is no European structure in validation yet but there is the ECTS system, the UPWind FP 6 programme and the ReKnowNet to help harmonize different European education. But all the degrees and certificates still need to be harmonised as well as the curricula (with a local flavour).

The TU Delft organised a summer school for technicians, trainees, students of science and engineering and professionals from the wind industry to prepare technical personnel for offshore wind energy farms, to be able to work internationally and in interdisciplinary teams and know safety and rescue procedures. It showed that the knowledge of wind energy and the technical English is still insufficient.

Consistent European qualifications and training are needed. Certified and accredited vocational training providers should be selected across the region. The regional requirements should be specified. Training material should be developed and harmonized and training should be constantly evaluated and improved.

Improvement and Harmonisation of Education in the POWER Region

Prof. Henry Seifert

First a brief historical overview of the usage of wind energy was given. The wind turbine producing electricity is a rather young technology but has developed in leaps and bounds using different materials over the past 50 years. The first wind turbine used glass and polyester, later carbon and epoxy came into use. Now carbonreinforced polyesterfibre is the material used. The first wind turbine produced 7kW. With the increasing dimension of the rotor blades the power produced increases to about 5MW today. The forecast is that more offshore wind turbines with capacities up to 4.5 MW will be installed and less onshore ones. This development will reach a peak in 2020, then drop a little and reach another height in 2030.

The difficulties are the different languages, the different national standards and guidelines and the different education systems in Europe. Wind energy techniques need knowledge from many different fields like meteorolgy, aerospace-, electrical-, mechanical-, environmental-, civil-, and control engineering as well as economics, energy-, and measurement techniques. But above all public acceptance is important. Future staff has to be prepared for offshore work and where do we find them? They need to be experts in many fields and speak several languages. The Hochschule Bremerhaven contributes to the wind energy education by offering several off- and on-shore relevant courses like Maritime Technologies, Process Engineering and Energy Technology, Production Technology, Ship Engineering, and Logistics Engineering and Management. The courses can be completed within 3 years and students graduate with a bachelor's degree. Some other courses can be completed with a master's degree.

Basic Safety Training for Personnel in Offshore Windfarms

Thomas Reincke

GAUSS was founded in 1996 as a non-profit organisation for environmental protection and safety in shipping. It employs 10 people who work in R&D, training and qualification and consulting.

Amongst other things people are trained in surviving in the water, e.g. after a helicopter crash. They are taught the basic knowledge of seamanship, handling small craft and rescuing persons from the water. The exercises are done in survival suits although it is questionable whether one can work in those on an offshore wind turbine which is also part of the training. Firefighting is practised although it was mentioned that when you cannot extinguish a fire within 2 minutes you should abandon the wind turbine. The training 's motto is: learning by doing. The training centres are at Nordholz and Wilhelmshaven and are both used during a 3-day course. It is officially approved by the employers' liability insurance association for fine mechanics and electrical technology. A few additional curricula are available like Maritime English and VHF communication (Short Range Certificate), Maritime Traffic Regulations asf.

This basic programme of 3 days would need to be reviewed and extended for the offshore wind energy industry and should consist of 3 levels:

- practical worker
- technician
- manager

Workshop and discussion

All participants



The participants of the workshop broke up into working in groups, the main groups headed under: academic, vocational and vocational safety training work group.

Thomas Reincke headed the group for basic safety training for vocationals, in this case safety training in offshore wind farms. Vocational colleges work together with GAUSS as part of their practical training. Mr Reincke explained what their training courses include:

- familiarity with the element water
- hypothermia
- distress signals and their safe handling
- theory and practice in helicopter transfer operations
- practice in helicopter emergency situations
- basic knowledge in seamanship
- safety in and handling of different types of rescue boats
- practice in and with survival suits
- coping with and behaviour in life rafts
- approaching, berthing and climbing a wind turbine
- practice in helicopter winding
- theory and practice in fire fighting
- breathing protection and how to escape from smoke filled area .

His answer as to how one is trained is: "learning by doing" as reality is the best teacher! The training course involves 10% teaching, 10% showing how what is done and 80% practice. The training bases are in Nordholz and Wilhelmshaven.

Additional modules include:

- basics in navigation, meteorology and tidal phenomena
- verbal communication for coastal waters
- maritime English, IMO standard vocabulary
- maritime traffic regulations
- MARPOL (marine pollution)! The Bible for Seafarers!

Scotland does not accept this training course as the participants do not take a final examination to prove their trained abilities. The duration of the training is 3 whole days, which does not include First Aid training.

The Danish partners give an assessment on their performance to the trainees. They too train by giving instructions. Mr Jeremy Sheppard of UK handed out a comparison of mutual recognition on Basic Safety & Emergency Preparedness training for Offshore Oil & Gas industries, accepted by Denmark, the Netherlands, Norway and UK. One solution to mutual acceptance & recognition of basic safety training courses could be is to be a member of the IASST (International Association for Safety Survival Training), a non-governmental, self-regulating body. Most institutions relating to Training on Safety and Survival meet once every 6 months. The suggestion came from Mr Sheppard, a member of IASST and Erik Jacobsen from Denmark, also a member, mentioned that the Association meet twice a year. The last meeting was in India last week and the next will be held in Cyprus in October this year.

At the conclusive discussion round, Thomas Reincke pointed out that course content and equipment used could not be discussed for lack of time.

The final round: Discussion & Questions

On the academic and vocational level in Wind Energy: Ian Fisher of Northumberland College:

- How to attract the younger generation to a new, exciting, cleaner, modern technology in comparison to gas and coal, which are not only messy, but with available resources dying out with time
- Challenge for school children to develop new games on play stations on renewable energy.
- Wind is free! This industry not only creates new jobs, a qualified technician/academic in Wind Energy has the possibility to widen his/her job perspective in other fields of employment.

Dr. Michael Schmidt is optimistic that an unemployed person can acquire a job soon after a 7 months further training course. Vocational training is a speedy path to higher education. On the academic educational level more challenges are required. The existing curricula in the technical college in Bremerhaven have 3 to 4 programmes, which a student has to fulfil, besides other personal requirements and the courses on specialised issues. The best area would be at a BA level. It was suggested a 30 credit overview course for Wind Energy Offshore, Technology & Management and the Applied Sciences are requirements on the academic level for mutual recognition and acceptance for the North-European countries.

Nils Olschner from Abeking & Rasmussen suggested an exchange of professors and teaching staff of professional institutes, offering the required studies and courses at different levels should be encouraged. Besides the dedication to the needs of the Offshore Wind Energy.

Presenter Dr. Michael Schmidt concluded the Workshop by welcoming the seed sown for harmonisation in various areas, thanked the participants for coming, assisting to exchange notes and hoped that they themselves could get a fair idea of the aims and work harder to achieve them, as well as mobilise contacts.

Organizing Institutions

Executive Summary

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