State of the Art – Norway

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When the Directorate of Cultural Heritage in Norway, asked me to join this Ariadene Workshop concerning Historic Structures, they knew that my skills were not in the field of structural engineering. I am educated as an architect, but I have been working in the field of protection of cultural heritage most of my 30 years as professional architect, and I have a good knowledge of the situation of cultural heritage in Norway.

At the moment I am director of Stiftelsen Bryggen, The Bryggen Foundation, which is both owner of more than 50% of the World heritage monument Bryggen, but also has a building-team of 8 carpenters, architectural office and act as the vital organisation with responsibility for this monument. This also means that we act in near co-operation with different research institutes, and has also taken responsibility as project leader in an international project called “Safeguarding Waterfront sites”, the case of Bryggen in Bergen. This project is a part of the EU program called “Culture 2000”.

Before this workshop I have been in contact with the different institutions and organisations that have special knowledge and skilled people connected to them, and I will here give a brief overview of the situation in Norway.

1. NTNU – Norwegian University of science and Technology

NTNU – Norwegian University of science and Technology is situated in Trondheim. There is no special teaching in the field of structures connected to cultural heritage. The former professor Petter Aune of the Department of wood structures – now retired (but still going strong) has a long reputation with consultancy regarding old wooden constructions. The cultural heritage of Norway consists mainly of wooden buildings, and therefore our effort and main specialities are connected to the use and preservation of wood.

The successor of professor Aune is the newly elected professor Kjell Arne Malo. He is the head of “Department of Structure and Science”. He has intentions of following in professor Petter Aune's interest and skills in old wooden structures. Professor Malo`s background is in structural engineering, but he has mostly worked with metal.

(Adresses in Anneks):

The NTNU in Trondheim is also the base of “Institut for arkitekturhistorie”. “ Department of history of architecture”. Professor Knut Einar Larsen has a large reputation in wood structures in connection to traditionally Norwegian building, but also regarded internationally for his work in the field of wood. His department has always been strongly engaged in the work of the ICOMOS Wood Committee where he for many years was president.

The department give special courses in the field of architecture and cultural management. That is: “Documentation and analyses”. Course no. SAA 3560 and the course “Architecture –safeguarding architecture”. Course no. SAA 3565. These courses are also open to people that are not students at the university.

2. SINTEF- .The Foundation Scientific and Industrial research at the Norwegian Institute for Technology"

SINTEF - The Foundation Scientific and Industrial research at the Norwegian Institute for Technology" has its main research staff in Trondheim, but has also offices in Oslo.

In the field of heritage management and research they have only done small projects. But the spring 2002 a rather large research program has started in the field of wood. The program will engage 8 graduates for dr.ing studies, and the program is briefly described here:

1. Field: "*Wood and milieu.*"

   Studies of life lasting conditions for buildings of wood.

   The leader of this field will be professor Per Jostein Hovde. (Address in Appendix).

2. Field: "*Use of wooden buildings in urban areas.*"

   The leader of this field is professor II, Finn Hakonsen (address in Appendix)

3. Field: "*Design with natural resistance (against rot and fungus) in wood.*"

   The leader of this field will be prof. Knut Einar Larsen. (Address in Appendix).

4. Field: "*Identity of wood and aesthetics.*"

   Connected to "Department of product design" – The leader will be professor II Johannes Sigurdjorson.

5. Field: "*Modelling and design of joints in constructions of wood*".

   Connected to "Department building and construction science". The leader will be professor Kjell Arne Malo. (Address in Appendix)

6. Field: "*Lasting conditions for means for protection of wood.*"

   Connected to "Department building and construction science". The leader will be professor Kjell Arne Malo. (Address in Appendix).

7. Field: "*Products in thermo plastics / wood composites; design, market and production.*"

   Connected to "Department for technique and design of machinery." The leader will be professor Kristiina Oksman. (Address in Appendix)

8. Field: "*Composites of natural fibre*"

   Connected to "Department for technique and design of machinery." The leader will be professor Kristiina Oksman. (Address in Appendix)

Although most of this new research program not has aims towards the management of cultural monuments, I meant it was right to include the information in this small presentation. The topics of field 1 and 3 must surely bring information concerning old wooden buildings into its research program. The work in this field will start as soon as people are connected to the program. In these days people apply for the different positions in the program.

I believe this is the most important program that goes on at the moment in Norway.

3. Other research institutions connected to wood structures in Norway.

There are other groups that work with wood, and the condition of wood structures in Norway. For common information they are about to start an Internet site common for many of the institutions that work towards wood industry and the building industry.

Information about this you will find at: www.trelast.no

Here are lists of important research groups that work in the field of wood in Norway:

Trelastindustriens landsforening , Oslo - contact person Knut E Fjulsruds tel ++47 23087500

Norsk treteknisk institutt, Oslo - firmapost@treteknisk,no

Norsk byggskole, Lillestrøm - post@byggskolen.no

Norges Byggforskningsinstitutt , Oslo www.byggforsk.no

Also around The University of Agriculture, which also educate in forestry there is strong research groups, here are:

Norges Landbrukshøgskole , Ås ,(Norwegian university of agriculture)

Dept. of forestry – Prof. Olav Høibø - olav.hoibo@isf.nlh.no

Norsk institutt for skogforskning (The Norwegian Forest Research Institute)

Leader: Per Otto Flæte

Internet site: www.skogforsk.no

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4. Governmental protection of Cultural heritage.

The institutions connected to the Act of protection of cultural heritage, in Norway:

The Directorate for cultural heritage, Riksantikvaren, Oslo, is connected to the Department for environmental protection, Miljøverndepartementet. Internet site: www.riksantikvaren.no

Riksantikvaren is responsible for the listed buildings and for archaeological deposits. Riksantikvaren do not have a research team connected to its staff. Research on the cultural heritage is spread on many institutions, but much research work is carried out by:

NINA/NIKU (NIKU – Norwegian research institute for cultural heritage.) The institute have offices in Oslo, Bergen and Trondheim.

As far as my information goes there are at the moment no special program or research in Norway were the problems of historic structures are in focus.

5. Organisations connected to important monuments.

Related problems and interest in the field are therefore connected to offices that work with practical issues connected to cultural heritage monuments. There are offices connected to structural problems at least on 3 places in Norway.

The most important office in that field is “ Domkirkens restaureringsatelier” in Trondheim. Due to more than 100 years of restoration of the cathedral in Trondheim , Nidarosdomen, which is Norway’s most important church, they have established a large team of craftsmen and planners to carry out the work at the cathedral. This includes very complicated structures

carried out in stone. The team around the Nidarosdomen have taken part in different research programs, also with international participation.

The director of the office is Øyvind Lunde.

5.1 The World heritage site of Røros.

Røros is one of Norway's 4 world heritage sites. It is a town build around the copper mine that was in use from beginning of 17th century and worked until around 1960. The town, built in wood, is situated in the highland of inner Norway, and the town is well preserved, both due to good climate for preservation of wood, but also active maintaining by the local authorities. Since the town was listed among the world heritage sites, a skilled group of craftsmen, architects and local authorities has developed. The group form a professional team that do the planning and practical work on these listed buildings.

More information: Cultural department, Røros kommune (municipality) , Røros –Norway.

5.2 Stiftelsen Bryggen (Bryggen Foundation).

On the world heritage site at Bryggen in Bergen, there has been continuous restoration work since 1962. The Bryggen Foundation has architects, 8 carpenters and a small administration in addition. During these 40 years of work at Bryggen there are developed certain skills and knowledge on the task of restoring these special wooden buildings.

Over the last years the need for more knowledge has inspired research-program connected to the Bryggen site:

5.2.1 "Research on the contains of salt in timber at Bryggen":

In 2001 The Norwegian Forest Research Institute made a study of the timber in one of the buildings that were going to be restored in 2002. The reason for the study was that there has been found much salt in timber at various places in buildings at Bryggen, and there seems to be a conservational effect of this salt. Salt has the effect that it prevents attack of fungus. There is no traditional knowledge on how salt have been used, or if the salt just by "accident" or spill came into the timber.

So far the conclusion says that the salt is absorbed in the timber due to storing of salt or by spill from handling of salted fish, as Bryggen over centuries has been a centre for trading those goods. The question of salt in the construction is important in the connection to reconstruction of fundaments of wood. A new guideline for the restoration says that the fundaments of wood should be reconstructed in wood. The same techniques that were used when Bryggen was rebuilt after the city fire in 1702 should again be used when buildings are restored at Bryggen.

Therefore the question of the quality of the wood that shall be used in these constructions are very important, and if the salt was added before the timber came to Bryggen in 1702, we should have the timber handled the same way now.

There is more need for knowledge about the effect of the salt in the timber, and a new research program is set up in 2002.

5.2.2 "Attacks of fungus and rot on fundamentation"

The microclimate is essential for how long wood can last. Bergen has a very wet climate with high humidity. A wooden construction directly on the ground has not been restored at Bryggen before. In Norway too, there are not much experience either in this special field. The Bryggen Foundation has therefore started co-operation with specialist of fungus. The firm Mycoteam has done research of microclimate and conditions for fungus and rot in the ground-near constructions over the last 4 years. Mycoteam has now set up a new research program to follow the restoration of building 5E, which is the object for restoration in 2002 and onwards.

5.2.3 "Safeguarding waterfront sites"

During 2002 Bryggen Foundation is project leader of a project called "Safeguarding Waterfront sites – The case of Bryggen in Bergen". This is a project connected to the problems of protection of archaeological deposits in the waterfront areas and the problem of building on top of these deposited with wooden constructions. The problems at Bryggen are a good case for studying these problems. Most of the problems occur in the semi wet constructions of wood as rot or attack of fungus.

Partners in this project are The Archaeological Trust of York, England, The University of Delft in the Netherlands and The Technical University of Sczecin in Poland. In addition many of the Norwegian research institutions are attending the workshop that has been held by help of this project. This project goes by support of the European Union under the program "Culture 2000."

Two workshops have been held in this project so far. The first workshop was in Bergen, and started the project in January 2002. Then there has been held a workshop in York, in April. The next workshop will be in Poland in June.

In the same period building work is carried out in the "case-study" building 5E at Bryggen, followed by research of the wooden constructions that are being removed in the fundaments. This work is done by archaeological supervision and daily measurements and documentation is being held.

The project will make a report with both documentation of the accurate situation and work with the case-study building at Bryggen, and make recommendations for work on places with the same problems as one find at Bryggen.

5.3 Fortidsminneforeningen. Norwegian Society for preservation of monuments.

This is the oldest organisation for protection of cultural heritage in Norway, founded 1847. It is also owner of the world heritage monument Urnes stave church and owns 7 other of the Norwegian stave churches and other monuments of great cultural value.

The organisation has a great network of people with special interest in the cultural heritage management and plays an important role in the field of cultural heritage.

Fortidsminneforeningen has an Internet site: www.fortidsmineforeningen.no

6. Private consultants occupied with cultural heritage problems.

The consultancy in building engineering, Multiconsult, Oslo is one of the leading firms in work with building advice for old buildings in Norway. They have done several surveys of complicated damages on important buildings, and they are regarded as good handlers of problems were cultural heritage are of important value.

At the moment the managing of repairing the farmhouse at Bygdøy, owned by The King, is their actual task. This is a mixed construction of brick and wood and the damages are rather big, and at the same time the cultural value of the monument is very big.

Multiconsult has developed an excellent master plan for managing complicated problems with the mixture of building techniques/engineering opposite questions of protections of antiquarian values.

Appendix 1.

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