EXPERT COMPETENCE FOR SUSTAINABLE TIMBER BUILDING – A MASTER PROGRAM IN CLOSE COOPERATION BETWEEN INDUSTRY AND ACADEMIA

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ABSTRACT: From a legislative point of view it has been possible to build timber buildings with arbitrary number of storeys in Sweden during almost two decades. Several buildings up to eight storeys have been completed during that time, but the competence for planning and building such structures are limited to a handful of actors. This fact has been recognized by funders of research/educational and an educational program for spreading the knowledge within the industry led by Linnaeus University is financed since about one year. Particularly interesting in the programme is that the courses are developed in cooperation between the industry and the academia. The courses are to fulfill needs with respect to knowledge, but also with respect to format so that the main target group, skilled engineers within the industry, can find the motivation to follow a course or larger parts of the program.

KEYWORDS: Education, timber building, courses, interaction

1 INTRODUCTION

From a legislative point of view it has been possible to build timber buildings with arbitrary number of storeys in Sweden during almost two decades as long as the builder can show that specified criteria regulated in the building code are met. During these two decades numerous timber buildings taller than two storeys and several as tall as eight storeys has been completed on a national level. Looking back at those years one may easily find out that the market segment is dominated by 6-8 companies. Much of the detailed knowledge about the planning, the building process and the management of more advanced timber buildings on a national market are found within these companies.

In order to spread this knowledge and deepen the understanding of the timber material in a wider range of builders, consultants, management employees and others three initial courses on multi-storey timber buildings were offered by Linnaeus University from September 2013. The courses will be the basis for a two-year long master program (120 ECTS) on timber buildings to be offered by Linnaeus University.

The educational program is made possible by the funding of a six year long project funded by The Knowledge Foundation and by contribution in the form of time and engagement of about 20 different companies, trade organizations and research institutes with interest in the wood and timber industry.

The aim with the current work is to discuss the structure of the initiated program, the development of the initial courses and the courses to be developed in the next stage and draw some conclusions about how the three initial courses are received by the students, i.e. practising people employed at various companies.

2 INITIALLY GIVEN COURSES

During 2012 researcher at Linnaeus university conducted interviews with representatives for more than 20 companies in the forestry, wood working and building industry in Sweden to map their preferences for content and format for education that would suit their employees.
With this as background structure of the programme was formed. The general idea was to start with three courses covering some of the key topics related to building with timber, e.g.

- Structural engineering according to Eurocode 5,
- Topics related to the wooden material and the resistance for degradation and
- Topics related to climate and energy in the context of timber structure.

Each of the three courses covers 7.5 ECTS (about five weeks’ full time studies) and they were subdivided into three modules respectively, where the focus was different in each of the modules. The intensity in which each course was given corresponded to 25 % of full time and the courses were on-going during September to December 2013.

Many of the students were practicing engineers with a broad range of knowledge which was utilized in the courses. One important pedagogical aspect of the courses was that issues/problems related to students’ workplace experience was used as cases in the courses. These cases were discussed among students as well as in small groups with the student and university supervisors. Bringing real cases into the course will make the course to a learning experience for both the students and the university teachers. In the following a brief review of the content in each of the initial courses will be given.

2.1 LOAD BEARING TIMBER STRUCTURES

Many of the consultants in the field of structural engineering have considerable experience using structural materials such as concrete and steel, but feel less confident with the timber material. In particular knowledge and experience are lacking in the field of designing tall residential timber buildings. In this course design procedures using Eurocode 5 are covered by means of lectures (physical as well as web based), exercises, project works and experimental tests.

2.2 WOOD MATERIAL AND SURFACE TREATMENT

Degradation in the timber material is one critical issue that may cause decision makers to choose other surface materials than timber based ones. In this course detailed knowledge about the material is covered as well as principles for various surface treatments. More traditional lectures are complemented by several case studies where people with different experience write reports in common.

2.3 CLIMATE AND ENERGY EFFICIENT CONSTRUCTION

The building sector is one of the most energy consuming sectors with about 40 % of the total energy consumption on a national basis. To reduce this consumption the energy consumed in the whole life cycle of a building should be put in focus rather than only the energy consumed in the operating phase of the building. In this course the life cycle energy and climate implications of using various frame materials including the uncertainties is studied. In similarity with the previous courses lectures are complemented with project works in small groups of students.

3 PLAN FOR EXTENSION OF THE PROGRAMME

During the autumn of 2014 three more courses are planned. Below is a short description of these courses.

Heat and moisture in timber buildings (7.5 ECTS)

Fire safety in timber buildings (5 ECTS)

Industrialised building (7.5 ECTS)

For each of these courses five different companies have been involved in the process of adapting the courses so that they suit skilled employees with respect to content as well as formalities such as number of physical meetings and the intensity of the course.

The aim is to successively forge closer ties with various companies in the industry by showing the possibilities of influencing the content in the courses and also by showing the benefits gained by the students that have passed previously given courses.

4 CONCLUSIONS

In October 2012 Linnaeus University initiated a project in which a two year master program is to be developed in close cooperation with the industry. The first three courses in the program were run during the autumn of 2013. This way of further education, in close cooperation between academia and industry, is still uncommon in the building sector in Sweden. In total more than 70 students applied for the three courses, not all had enough experience to be admitted to the courses. After the courses about 70% of the students staring the courses had also finished them. The evaluation of the courses showed that the students were satisfied both with the course content and format. Some of the students have applied also for the courses to be run during the autumn of 2014.

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