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SEINÄJOEN AMMATTIKORKEAKOULU
SEINÄJOKI UNIVERSITY OF APPLIED SCIENCES

Janne Jokelainen

LOG CONSTRUCTION TRAINING IN THE NORDIC AND THE BALTIC COUNTRIES

PROLOG Final Report

Seinäjoen ammattikorkeakoulun julkaisusarja
B. Raportteja ja selvityksiä 84

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Seinäjoki 2014

Seinäjoen ammattikorkeakoulun julkaisusarja
Publications of Seinäjoki University of Applied Sciences

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SeAMK julkaisujen myynti:

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ISBN 978-952-5863-71-0 (verkkojulkaisu)
ISSN 1797-5573 (verkkojulkaisu)

FOREWORD

The PROLOG Project was financed by the NordPlus Horizontal Programme and the following participating schools: Tartu University Viljandi Culture Academy, University of Gothenburg Department of Conservation, Ergli Vocational School, Oulu Vocational Collage, and Seinäjoki University of Applied Sciences.



ABSTRACT

Jokelainen Janne: Log construction training in the Nordic and the Baltic Countries - PROLOG Final Report. Publications of Seinäjoki University of Applied Sciences B84, 25 pages.

The aim of the PROLOG Project was to find out the status of log construction training in the Nordic and the Baltic Countries. The study resulted in the creation of a training network which will allow the development of log culture training in the future. PROLOG was implemented from 1 August 2012 to 1 August 2014.

Log construction was the prevailing mode of construction in the Northern coniferous forest belt for more than a thousand years. The predominance of log construction ended in all areas during the first half of the 20th century, and log construction was rare everywhere after the middle of the 20th century. Luckily, log construction was revived at the end of the 20th century. Today, log construction occupies a stable position in all the countries, although manufacturing volumes are low.

One of the objectives of Pro Log was to find new, well-functioning ways to provide training in log construction. During the project, two pilot courses were arranged, one of which exploited IC technology and the other teacher mobility. Both courses provided encouraging experiences, and both approaches were found to be efficient and pedagogically enriching, when implemented in the right way.

The status of log construction training is similar in the Nordic and the Baltic Countries. Training is available everywhere, and, basically, this supply is varied and of many levels. Also the problems are similar. The official position of log construction in the educational system is unspecified: courses are arranged in the context of different professional fields, nobody coordinates the course supply, and trainers cooperate very little. Almost all of the courses provided are basic courses. There is no supply of or study material for more advanced studies.

Keywords: log, log construction, log construction course, log construction training

TIIVISTELMÄ

Jokelainen Janne, Hirsirakentamisen koulutus Pohjoismaissa ja Baltiassa – PROLOG loppuraportti. Seinäjoen ammattikorkeakoulun julkaisusarja B84, 25s.

PROLOG projektin tavoitteena oli selvittää hirsirakentamisen koulutuksen tila Pohjoismaissa ja Baltiassa. Selvitystyön avulla saatiin aikaan koulutusverkosto, joka pystyy tulevaisuudessa kehittämään hirsialan koulutusta. PROLOG toimi 1.8.2012 – 1.8.2014.

Hirsirakentaminen oli pohjoisen havumetsäalueen vallitseva rakennustapa tuhanen vuoden ajan. Hirsirakentamisen valta-aseman päätyminen ajoittuu kaikkialla 1900-luvun ensimmäiselle puoliskolle ja hirsirakentaminen oli kaikkialla vähäistä 1900-luvun puolivälin jälkeen. Hirsirakentaminen saatiin onneksi elvytettyä 1900-luvun lopulla. Tänä päivänä käsinveistetyllä hirsirakentamisella on vakaa asema kaikissa maissa, vaikka sen tuotantomäärät ovat vähäisiä.

Eräs PROLOGin tavoite oli etsiä uusia, toimivia tapoja antaa hirsirakentamisen koulutusta. Projektin aikana järjestettiin kaksi pilot-kurssia, joissa toisessa hyödynnettiin IC-tekniikkaa ja toisessa opettajan liikkuvuutta. Kokemukset molemmilta kursseilta olivat rohkaisevia ja kumpikin opetustapa todettiin oikein toteutettuna olevan tehokas ja opetusta rikastuttava.

Hirsirakentamisen koulutuksen tila on samankaltainen Pohjoismaissa ja Baltiassa. Koulutusta on kaikkialla tarjolla ja tarjonta on periaatteessa monipuolista ja monen tasoista. Myös ongelmat ovat samanlaisia. Hirsikoulutusten virallinen asema koulutusjärjestelmässä on epämääräinen, kursseja annetaan erilaisten ammattialojen yhteydessä, kukaan ei koordinoi kurssitarjontaa ja kouluttajat tekevät hyvin vähän yhteistyötä keskenään. Lähes kaikki tarjottavat kurssit ovat peruskursseja. Edistyneempiin jatko-opintoihin ei ole tarjontaa eikä oppimateriaalia.

Avainsanat: Hirsi, hirsirakentaminen, hirsikurssi, hirsikoulutus

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1 PRESENTATION OF THE PROLOG PROJECT

The aim of the PROLOG Project was to find out the status of log construction training in the Nordic and the Baltic Countries. The study resulted in the creation of a training network which will allow the development of log culture training in the future. During the project, the applicability of new learning methods to log construction training was tested during two short courses.



Figure 1. PROLOG Final seminar in Estonian Open Air Museum, Tallinn (Inguna Spaile)

The implementation period of PROLOG was from 1 August 2012 to 1 August 2014. The project was coordinated by Seinäjoki University of Applied Sciences (Finland). The project partners were the University of Tartu (Estonia), the University of Gothenburg (Sweden), Ergli Vocational Secondary School (Latvia) and Oulu Vocational College (Finland). Partners were also searched in Lithuania and Norway. In Lithuania, there was no school providing training in log construction. In Norway, this training is provided by associations and companies, and they had no interest in a project also demanding some self-financing. However, during the project, an effort was made to find out the status of log construction and of related training both in Lithuania and in Norway. For this, a visit was made to Norway.

The activities of PROLOG consisted of making national evaluations of the status and level of log construction training in each country, arranging two pilot courses testing

the applicability of new learning methods to log construction training, and field work aimed at establishing the need for log construction training, opportunities for development in the field, and possible interest groups. The present Final Report was written based on these actions and the experiences gained from them.

2 LOG CONSTRUCTION IN THE NORDIC AND THE BALTIC COUNTRIES

Log construction was the prevailing mode of construction in the Northern coniferous forest belt for more than a thousand years. It is obvious that the early stages of log constructions were very similar in the Nordic and Baltic Countries and that log construction in its present form established its position as the principal frame structure in the late first millennium AD. Also the predominance of log construction ended in all areas during the first half of the 20th century.

After the middle of the 20th century, log construction lost its importance in the Nordic and Baltic Countries. Log construction-related know-how was at risk of vanishing. Luckily, this problem was paid attention to everywhere in early 90's, and the revival of traditional log construction know-how was begun. Today, manually carved log construction has a steady position in all the countries, although manufacturing volumes are low. This is because of the great volume of industrial log construction, which is significant especially in Finland.

2.1 Finland

Log construction is expected to have arrived in Finland from the east in the 9th century. The oldest existing log buildings are wood churches from the early 17th century. Log construction techniques developed in the course of centuries and were influenced by western wood construction techniques. However, the basics of these techniques, cribs and long grooves have remained similar up to the present time. (Jokelainen, 2005, 20–22)

In Finland, log production is mainly industrial. The first pre-industrial log production companies were established in the 1950's. In the 1960's, both log profiles and cribs took their present forms and all the stages were mechanized. (Saarelainen, 1993, 44–45, 48) In the 1980's, development also focused on the technical properties of products, because they did not meet all the criteria of the building regulations. Nowadays, industrial log products are dimensionally accurate, the form of logs is exactly geometric, and logs are of uniform quality and crack-free. (Heikkilä, 2002, 17)

Finland is the world leader in the manufacture of industrial log buildings. The biggest companies and productions plants of the log construction sector are in Finland. The turnover of industrial log is about 300 million euros, and 7 000 log frames are

manufactured annually. Half of the production is exported. (<http://www.puuinfo.fi/jankohtaista/viennin-veto-piristaa-hirsitaloteollisuutta>, Ref. 14 Jan 2014)

In 2013, the number of companies constructing log buildings as handwork was 250, with a turnover of some 60 million euros. The companies are small, of one to two employees. There is some training in manual carving, but the volume of research and development is low. Manual carving is chiefly done using a chainsaw, and the joining methods used are simple and unsophisticated.

2.2 Estonia

In Estonia, some people think log construction was known there as early as early as BC. The actual heyday of log construction in Estonia was at the end of the 19th century and at the beginning of the 20th century. At that period, several books related to log construction were published (Klein, 1930; Bölau, 1938). A few log construction books (Veski, Aarman, Niine, 1959; Veski, 1969) were also published during the Soviet occupation period (1939–1991).

In 2006, there were about 150 log construction companies in Estonia, with a turnover of some 120 million Euros (Markson, 2008, 6). Of the log production, 66 percent was exported. The Estonian log construction sector employs approximately 2 500 people.

In Estonia, the production volumes of industrial log and manual carving are about the same order. No statistics have been compiled about the number of companies doing manual carving, but based on the production output the number of these companies can be estimated to be about 50. The majority of the companies are small, but in the country there are some manual carving companies employing more than 10 people. In Estonia, the log construction sector is represented by the Estonian Woodhouse Association. It has the right to define the professional levels and qualifications.

The bulk of the manual production in Estonia is exported. Overall, these products are of high quality, with diversified log construction techniques. The production aimed at the domestic market is manufactured mainly using a chainsaw, and the joining methods used are simple and unsophisticated.

2.3 Sweden

The oldest log buildings in Sweden date back to the 13th century. There is no commonly accepted view on how log construction arrived or developed in Sweden (Sjömar, 1988, 8). Log construction was the most common wood construction technique until the beginning of the 20th century, when it was replaced by vertical frame structures. During the second half of the 20th century, the log construction technique was only used in repairs of buildings and in small holiday cottages.

Nowadays, about 500 log buildings are annually produced in Sweden. The companies have mainly one or two employees, although there are also a few companies employing 10 to 15 people. The technique used in their production is traditional, and, in addition to a chainsaw, many builders also use an axe. The problems with the production are the lack of professional workforce and the ageing of the employees, as well as the tightening building regulations.

2.4 Latvia

The oldest existing log buildings in Latvia are from the 16th century and are located at the in Latvian Ethnographic Open Air Museum. At the beginning of the 20th century, there were 25,000 farms in Latvia, with an average of three log buildings. Most of these 75,000 log building were destroyed in war and during the Soviet Period.

During the last 15 years, there has been an increasing interest in log construction (Bauere, 2006). In Latvia, there are nowadays approximately 70 companies engaged in log construction, with 3 to 25 staff (Bekeris, 2010). Of their production, about 70 percent is exported. The interest group for log construction companies in Latvia is the Latvian Wood Construction Cluster.

3 LOG CONSTRUCTION TRAINING IN THE NORDIC AND THE BALTIC COUNTRIES

The educational systems in Finland, Estonia and Latvia are similar. They distinguish clearly between professional schools and institutes of higher education, and the schools are publicly financed. The Swedish educational system is somewhat different. There, professional education is provided at many different levels and at very different schools. Also privately financed schools are common. In spite of this, the educational levels of all the Nordic and Baltic Countries are mutually comparable, and they allow mutual transfers of professional studies (ECVET) and studies of higher education (ECTS).

The log construction courses provided in the Nordic and Baltic Countries can be divided into five groups:

1. Short courses provided by institutes of higher education (5 to 10 ECTS), which are part of some larger degree programme in construction engineering.
2. Log courses provided by professional schools, the duration of which is normally one to two years (30 to 120 ECVET).
3. Short courses provided by professional schools (5 to 10 ECVT), which are part of some larger training programme in construction engineering.
4. Short courses provided by professional schools (2 to 3 weeks) not included in any training programme.
5. Short courses provided by private companies and organizations (1 week).

3.1 Finland

Up to the 20th century, the carpenter's trade was mainly self-taught or passed on in families. The largest towns had carpenters' trade guilds, in which learning took place through the apprentice-journeyman-master system. These trade guilds were abolished in the 1870's. Professional education developed from the 1910's, but its volume and importance did not increase until the 1950's. However, the teaching of log construction never had an important position in the Finnish educational system.

After the 1950's, 7 guides to log construction have been published in Finnish (Roininen, 1957, Håkansson, 1974, Hakalin, 1984, Nikula, 1986, Heikkilä, 1987, Vuolle-Apiala, 1999, Jansson, 2011), which are basically aimed at do-it-yourself people, but also used as textbooks.

The development of the current training courses in log construction started at the beginning of the 1980's. First, this training was implemented as evening classes at adult education centres and became part of the course supply of forestry institutes at the end of the 1980's. The educational supply reached its high in the mid-1990's, and several of the training courses started at that time are still in operation. At present, log construction courses are provided on a regular basis at about ten schools.

All the schools providing log construction courses are vocational colleges. At Seinäjoki University of Applied Sciences, they teach traditional log construction techniques, but practical work is casual. Regarding universities, Tampere University of Technology has studies the properties of industrial log, and the University of Oulu has specialized in the architecture of industrial log buildings.

Longer training courses in log construction are provided by Savo Vocational College, Siilinjärvi (30 ECVT) and Hyria Education, Riihimäki (42 ECVT). These are aimed at adult learners and focus on present-day chain saw techniques.



Figure 2. Working field of the Hyria education, Riihimäki, Finland

Oulu Vocational College, Oulu, provides courses based on traditional techniques (4 ECVT) as part of professional qualifications in restoration (120 ECVT), and Kainuu Vocational College, Kajaani, provides a log construction course (20 ECVT) as part of professional qualifications in housebuilding (120 ECVT).

Log courses not related to official qualifications or studies are annually provided by Jedu education, Haapavesi (3 weeks), Tampere Vocational College, Kuru (2 weeks) and WinNova Education, Kullaa (2 weeks). Alppisalvos is a company manufacturing woodwork joints at Hyrynsalmi, which provides more advanced, handwork-oriented log construction training with changing topics. The languages of teaching are Finnish, English and German.

In Finland, the supply of training in log construction has always been low and dispersed. The problems with the current training courses are operating in different sectors, quality variation, and the lack of common goals and quality requirements. With its present structure, the training in log construction cannot be developed, which results in a stagnation in know-how and development in the entire field.

The status of the log construction sector could be improved significantly by introducing a specific professional qualification. Through this, the level of know-how could be established and training courses could focus on achieving this particular know-how. A specific professional qualification would also allow a more demanding further training programme, which would be related to a specialist vocational qualification. Trainers in the field of log construction should gather the common goals and strive to improve the position of log construction in the official educational system.

3.2 Estonia

Before the Estonian independence (1991), log construction training was scarce or non-existent. The national romantic period caused by the independence yielded several log construction courses but they were sporadic, transient and poorly documented. During the last 20 years, there have been several short courses in log construction, provided by various actors. Most of these courses have been ended, and many of them have clearly been hobby-oriented.

In 2013, there were six organizations in Estonia providing log construction courses regularly or with some regularity. These organizations are Viljandi United Vocational School, Valga County Vocational Training Centre, Vocational Centre of Pärnu County, University of Tartu Viljandi Culture Academy, NGO Society of Estonian Native Construction, and NGO Vanaajamaja.

Of these organizations, Tartu Viljandi Culture Academy is a institute of higher education, and log construction courses are part of the four-year Degree Programme of Estonian Native Construction (240 ECTS). The aim of the programme is to prepare foremen and experts with a special knowledge of Estonian popular architecture and the local nature and cultural environment.

Viljandi United Vocational School, Valga County Vocational Training Centre and Vocational Centre of Pärnu County are vocational colleges with one-year training programmes for log construction builders (60 ECVET). These training courses have been implemented only for 2 to 3 years. In Viljandissa and Pärnu, they study the basics of chainsaw techniques, and in Valga only industrial log construction.

NGO Society of Estonian Native Construction and NGO Vanaajamaja are associations providing more advanced short courses with some regularity. Both are connected with Viljandi Culture Academy.

In Estonia, the flagship of log construction training is Viljandi Culture Academy. Among the vocational colleges, Pärnu is the one providing serious teaching in manual carpentry, even though the level of student work is not higher than fair.

In Estonia, they have a functioning model and system for log construction training. However, this model does not work in practice as desired. The training institutes do not have special tools of log construction at their disposal or a sufficient number of teachers and administration specialised in this field. The content and quality standards of the training courses are insufficient. Cooperation between the schools and working life does not work as desired.

3.3 Sweden

The first trade guild of log carpenters was established in Stockholm in 1454. In the trade guild system, learning took place through the apprentice-journeyman-master system. These trade guilds were abolished in the 1870's. Professional education started around the beginning of the 20th century as Sunday and evening classes, and the professional system of education in its current form was adopted in 1972. Yet, this professional education did not provide any separate training programme in log construction. Courses in log constructions were sporadically provided at forestry and agricultural schools, in regional and municipal adult training, and at Folk Academies.

At the turn of the 21st century, several training programmes focused on restoration of buildings and log constructions were started. Most of these programmes have been discontinued, but there are still four programmes operating, and three of them still provide log construction training.

Nowadays, the official Swedish educational system provides log construction training at five schools. They are the University of Gothenburg, Mid Sweden University, Folk

High School in Sjövik, Folk High School in Vindelen and Upper secondary school at Trägymsnasiet in Ljusdal. Self-financing short courses are provided by less than ten companies, the most important of which are Gränsfors Bruk and Logosol.



Figure 3. Working field of the GU Department of Conservation, Mariestad, Sweden

The University of Gothenburg, Department of Conservation, provided high-level log construction training in Mariestad. Log construction is part of the Building Crafts degree programme (120 or 180 ECTS), which includes two (7 week) log construction courses. The focus of the courses is on traditional log techniques and handwork skills.

The only training programme in Sweden focused exclusively on log construction is provided by Sjövik Folk High School. The level of the training corresponds to Higher vocational education (120 ECVET), and the duration of the programme is two years. The aim of the training is that the students master modern and traditional log techniques as well as the restoration methods of the log parts of old buildings.

Träakademi in Kramfors provides log construction training as part of the Furniture Making and Building Crafts training programme, which corresponds to Higher education (120 ECVET). During the first year, there is a course in the basics of log construction (3 ECVET), and during the second one, the students work with a small log building.

Folk High School in Vindel provides a short course (5 ECVET) as part of a one-year training programme in restoration (36 ECVET). The Wooden Gymnasium, "Trägymsasiet", is a private upper secondary school, at which there is a course in log (100 h) as part of the Building construction training programme.

Gränfors Bruk, famous for its axes, arranges two one-week-long log construction courses each summer. The course languages are Swedish and English, and the course fee is 1,000 euros. Logosol, a manufacturer of wood processing machinery, arranges annually several one-week-long log construction courses. The course fee is 700 euros. These self-financed courses are aimed at amateurs and beginners.

In Sweden, they have a wide array of log construction courses of different levels and durations. The problem is the short-term financing of the courses, and so the future of several courses is unsure. Another problem is that almost all courses are basic courses with a similar content, though provided at different educational levels. It is not possible to take more advanced or specialisation studies in log construction. Also the course literature is scarce, with only three books in use (Håkansson, 1976, Sjömar, 1988, Jansson, 2005). These are basic books, and there is no course literature on more sophisticated techniques. As a positive thing, one can mention log producers' support to the training, channelled mainly by the National Association for Log Timber Manufacturers.

3.4 Latvia

Traditionally, log construction know-how was passed from father to son. In recent years, this knowledge has been researched and exploited in restoration by the Latvian Ethnographic Open-Air Museum. In 1992, the staff of the museum established a company called SIA "Dziedrs", which is currently the leading expert in traditional log construction and restoration in Latvia.

Nowadays, there is training in log construction available at Ergli Vocational secondary school. Related theory courses are available at Riga Technical University. In Latvia, log construction is part of the professional qualifications of carpenters, and so it is taught in connection with these studies at Orge State Technical College, Training Center of Latgale, Riga Construction Secondary School, Riga Construction College and Ergli Vocational Secondary School.

There has been a study programme in log construction at Ergli Vocational Secondary School from 1997. At the moment, there are two log construction study programmes aimed at young people: the one-year-long, contact teaching-based Vocational

training program (60 ECVET) and the multiform learning-based Further educational program (24 ECVET). In addition, they arrange short courses in log construction at Ergli (40 h). Ergli has close cooperation with the interest groups, companies and other log construction actors in Latvia.

In Latvia, it is possible to earn the journeyman's and the master's qualifications in log construction. The qualification tests are arranged by the Latvian Chamber of Crafts and they are aimed at staff of companies belonging to Chambers. In 2013, 9 log construction companies were members of the Chamber. The qualification of journeyman can be earned through individual studies and a competence demonstration. A journeyman can take the master's qualifications test after five years of work experience. Without the qualification of journeyman, you can take the master's qualifications test after eight years of work experience. Students who have graduated from the log construction study programme (Ergli) can take the master's qualifications test after one year's work experience.

4 NEW LEARNING METHODS IN LOG CONSTRUCTION

In the PROLOG project, new, functioning ways were searched for providing training in log construction. During the project, two pilot courses were arranged, one in Oulu, Finland, and the other in Ergli, Latvia. The course in Oulu exploited IC technology. For the course, a learning video was prepared, with a teacher showing the making of a traditional corner type. This video was uploaded to the Internet, which allowed the students to watch it through YouTube. There was no teacher on the course, but the students practiced the making of the corner type only with the help of the video.

The Ergli course exploited teacher mobility. The teacher of the course arranged in Latvia came from Finland and taught the making of the same Finnish corner type that was also made on the video course in Oulu. On the course, they assessed if it was possible to arrange the training in spite of language problems and organizational challenges and what learning outcomes were achieved on a course of this kind.

4.1 Video course

In Oulu, a video learning-based pilot course was arranged from 10 to 14 February 2014. The aim of the course was to test the functionality of digital learning material when studying log construction techniques. The course was implemented using learning videos uploaded to YouTube, showing the making of two corner types with traditional methods and tools. The students on the course had a basic know-how in log carpentry, but they had not implemented the corner joints showed on the video before. There was no teacher on the course.

At the beginning of the course, the students were shown the learning videos jointly. After this, they had an opportunity to watch the videos with a tablet computer. During the course, the students browsed the videos several times taking notes and repeating single phases of work.

Studying with the video presented some problems at the beginning of the work and when learning new things. At the beginning of the work, insecurity could be observed among the students, and working was very slow. The biggest problem was that the students did not notice the errors they made and the defective work phases in time, and they had to start certain work phases again. This caused obvious frustration. Also problem solving was difficult in situations in which no clear solution or instruction was provided on the video.

On the other hand, the challenges recognised in the learning process forced the learners to creative problem solving and the application of previous knowledge in a completely different way compared to traditional, teacher-oriented learning. Another advantage of learning with videos was seen in that the students could advance at their own pace and compare their own work to that showed on the video at any phase.

Based on the pilot course, it can be concluded that the use of video materials for studying log construction techniques is useful and also suit students for learning new things. However, the quality of the content videos is emphasized because the material must provide sufficient support in problem situations. Experienced carpenters are able to utilize videos on their own, but, for beginners, it is advisable to combine videos with classroom teaching.

4.2 Teacher mobility

A two-day pilot course was arranged in Ergli from 18 to 19 February 2014. On the first day, there was a seminar, and teacher mobility was tested at the workshop arranged on the second day. The workshop was attended by 18 students, who were workers of Latvian log construction companies as well as teachers and students of the institute in Ergli. The teacher was a Finnish architect, Janne Jokelainen, who taught the making of the traditional Finnish diamond notch with an axe during the day. All the students had experience in log construction but none of them had made a diamond notch before and they had little experience in the use of an axe. The language of instruction was English.

At the beginning of the course, the students were divided into four groups of 4 to 6. The teaching was done in such a way that the teacher made a demonstration of each work phase at his own working post, after which the work groups repeated the same procedure at their own work posts. When the work phase had been completed by all, the teacher demonstrated the following work phase. There were a total of eight work phases. This way, all the groups finished the notch in time.

One of the objectives of the pilot course was to find out the challenges caused by the lack of a common language. The command of English of the teacher of the course was only satisfactory, and many of the students did not know English at all. However, this lack of a common language caused surprisingly few problems during the course. When the method of learning was the making of a presentation before each work phase, the students learnt the work phase without oral communication. Based on this, it can be concluded that, with the help of adequate learning methods,

the lack of a common language is does not hinder providing high-quality teaching and teacher mobility.



Figure 4. Pilot course in Ergli, Latvia (Inguna Spaite)

The pilot course in Ergli was successful, and positive experiences were obtained of teacher mobility. The success of a teacher mobility-based course requires very careful preparation, in which it is advisable to use photos and drawings to complement oral communication, and the communication must be bidirectional. This assures that the right material and tools are available on the course and that the work posts are adequately prepared.

The students on a course based on teacher mobility must be highly motivated and they should have experience in log construction. It would also be good if the students' level of know-how were more or less similar. There must be one predefined language in use on the course, but it is not necessary for all the students to know this language. The learning methods used must be chosen in such a way that they allow for the compensation of language problems.

Based on the Ergli experiences, a course based on teacher mobility is an efficient and well-working way of distributing know-how in log construction. For teaching log construction, workshop teaching is the most viable option, with low requirements for a common language. Such a workshop allows the learning of new joining and working methods in a very short time. Courses based on teacher mobility can be applied in particular to more advanced teaching in log construction.

5 DEVELOPMENTAL PERSPECTIVES FOR LOG CONSTRUCTION TRAINING

The status of log construction training is similar in the Nordic and Baltic Countries. Training is available everywhere, and the supply is basically diversified and of different levels. The problems are similar, too. The official position of log construction training in the educational system is vague; courses are provided in connection with various professional fields, nobody coordinates the course supply, and trainers cooperate very little.

A significant problem in all the countries is the focus on basic courses. Almost without exception, the courses are basic courses, dealing year after year only with the basics of log construction and the simplest log construction techniques. More advanced studies in log construction are offered nowhere, and there is no study material available for them. Since more advanced courses are not available, the professional field cannot develop.

Nowadays, continuing from vocational education to higher education does not significantly contribute to the improvement of one's know-how in log construction. Even at institutes of higher education, courses always start from the same basics as at vocational colleges. For this, an educational path should be created for the log construction sector, based on a professional basic course of one or two years, which could be complemented with further studies of different contents with also an official position.

One problem occurring everywhere is the diversity of professional fields providing log construction courses. The courses may be connected to housebuilding, restoration, handicraft, folklore, or forestry. All of these fields have somewhat different approaches to log construction, which can be seen in the work techniques taught on the courses and the tools used. These are minor differences but still affect significantly the conceptualization of the content of the field and cooperation between the suppliers of training. When there is no clear support from the professional field behind these training courses, their future and financing is insecure.

Log construction training courses are old-fashioned everywhere. The learning methods used, learning materials, and learning goals are still the same as at the beginning of the 1990's. ICT is not utilised, and the connection with modern architecture or design is inexistent. Many of the training courses are also isolated, with inexistent contacts with other actors in the field. The majority of the teachers in the log construction sector are old.

In all the countries, they had observed that a close relationship between log construction training and log producers improves the quality of training. The needs of and support from working life help trainers direct the contents of courses towards the needs of working life. In future, these contacts with working life should be increased, and working life should be engaged in R & D related to the field. Furthermore, cooperation and visibility should be actively improved among other actors in the construction sector, such as developers, architects and construction engineers.

For the development of log construction training, it would be important that the position and content of the sector should be defined better. Under log construction, there is production based on historical skills, modernized traditional production, production based on chainsaw techniques, semi-industrial production, and fully industrial production. All of the above is log construction, but the differences are so big that the above areas should clearly be regrouped. This grouping would make it easier to conceptualize the field and profile the training courses clearly, and the orders of buildings would know the content of the product.

The definition of the different methods of production in log construction should be done internationally, in order that all cooperation would be facilitated when all are aware of what kinds of factors of production are involved. This grouping would allow cooperating both in training and in production in the entire area of the Nordic and Baltic Countries.

At the national level, more precise definitions of the log construction sector would facilitate the creation of national and international educational paths. The definitions would allow applying for a special position at the international level, such as UNESCO intangible world heritage, for log construction, which would give the sector appreciation and developmental perspectives of a completely new kind.

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ISBN 978-952-5863-71-0 (verkkojulkaisu)
ISSN 1797-5573 (verkkojulkaisu)