

Recent Nordic experiences in multi-storey timber buildings

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Kodumaja

- name of trademark - 
- group of the companies who are acting under the trademark Kodumaja
- often used when talking about specific company in the group of Kodumaja companies

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Main field of activity

Design and construction of prefabricated wooden frame modular buildings

Kodumaja companies produces and builds mainly:

- **apartments in multi - storey block of flats**
- **apartments in small buildings**
(block of flats with 4 – 6 apartments, row houses, standard semi-detached houses and standard private dwellings designed usually in cooperation with the customer)
- **assisted living apartments for elderly people and people with disabilities**
- **other buildings for permanent use (student apartments, hotels, etc.)**

and if capacity is available then also

- *modules for camps and offices, nursery schools, schools, holiday homes etc.*

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We are building from prefabricated modular sections (MS)

MS is **spatial part** of a building where the floor, walls and ceiling of MS are assembled at the factory. One MS may include several rooms. Since MS is a „closed“ element, it is possible to complete following **at the factory**:

- **install doors and windows**
- **complete up to 95% of the interior finishing of the rooms**
(incl. installation of ceramic tiles, floor coverings, mouldings, etc)
- **build piping and cable systems within MS**
(incl. electricity, water, sewerage, heating, ventilation, security alarm system, TV, fire sprinkler system, etc)
- **install bathroom fixtures and fittings**
(incl. faucets, toilets, bathtubs, sinks, shower cabins, etc)
- **install kitchen and bathroom furniture and home appliances**
- **complete most of exterior finishing works**
(in case of "light" exterior finishing materials)

Kodumaja is able to produce MS, which transportation dimensions are within the following limits:
width - 5,3 m, length - 14,5 m and height - 4,5 m. The typical weight of one MS is: **8 – 16 tons.**

Time for mounting one MS on a completed foundation is: **20 – 60 minutes.** In case of multi-storey blocks of flats Kodumaja site team is able to mount: **15 – 30 MS a day.**

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History

Kodumaja history

- established - 19.05.1994
- first house mounted – 06.11.1995 (KM birthday)
- first export – 1996 (private dwellings to Germany, France)
- construction of block of flats and export to Norway started (Bodø) – November 1997

More detailed overview:

<http://www.kodumaja.ee/en/Introduction/History-of-Kodumaja>

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Norway	4 443
Denmark	361
Finland	116
Sweden	114
Estonia	244
Other countries	17
TOTAL:	5 295

Today's topics

- Regulations – construction is local business
- Developments on markets
- Challenge – complicated buildings
- Large multi-storey timber buildings

Regulations – construction is local business

Norway

- Decisive development during last decade
- Structural, logical
- Which TEK10?
- Verification of capability and skills to build multi-storey timber buildings (maximum 4-storey according to regulations)

Regulations – construction is local business

Denmark

- Not easy to understand and follow
- Strict restrictions for multi-storey timber buildings, no discussions
- Fire regulations from 1999

Regulations – construction is local business

Sweden

- No serious restrictions
- Already 1995 was built 5-storey wooden building

Regulations – construction is local business

Finland

- Remarkable change 06.04.2011

Developments on markets

General

C.F.Møller architects in „Dezeen“ magazine: „It is future housing that would be cheaper, easier and more sustainable than typical steel and concrete constructions. The main reason it hasn't been done before is that concrete and steel have a big part of the market. But now the building industry has started taking responsibility for the environment.“

Developments on markets

Norway

- Kodumaja built first 4-storey block of flats in Bodø, Norway in 1999
- Kodumaja built first 5-storey block of flats in Bodø, Norway in 2003
- VHT 14-storey block of flats in Bergen, Norway in 2014-2015
- During last 15 years - construction method, Kodumaja employs, is future for multi-storey timber constructions. Not only words, but real actions
- More players on a market, higher competition, better quality

Developments on markets

Denmark

- No way, we used to build in concrete, 2006
- Money talks – affordable housing in prefabricated wooden frame elements (quick and easy), 2007
- Kodumaja built first 4-storey block of flats in Copenhagen, Denmark in 2011

Developments on markets

Sweden

- Wälludden, first modern multi-storey building in Växjö, Sweden, in 1995
- Market share of multi-storey timber constructions in housing market, ca 1% in 2004
- Market share of multi-storey timber constructions in housing business, ca 15% in 2014
- „Everyone“ is talking about using prefabricated wooden frame modules in building of student apartments and nursing homes at least

Developments on markets

Finland

- We will of course build in wood, if we must
- Many-many years ago, one multi-storey block was built, disaster, they say
- Pressure by state and municipalities

Challenge – complicated buildings

Verdens høyeste trehus, Bergen, Norway

- 14-storey and 51 m high
- Passive house standard



Challenge – complicated buildings

Plejecenter, Copenhagen, Denmark

- Up-to-date technical solutions
- High demands
- Safety and comfortable maintenance
- Acoustic
- Energy consumption
- Fire safety



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Challenge – complicated buildings

Vårdhem, Norrtälje, Sweden

- Timber frame multi-storey block of flats for elderly people
- Miljöbyggnad Silver
 - Lower energy consumption than requested in BBR
 - Improved sound isolation, indoor climate, environmental friendly materials



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Large multi-storey timber buildings

Under construction

- Verdens høyeste trehus – world tallest timber building, Bergen, Norway
- Europe's largest wooden apartment block, Vantaa/Finland
- Finland's tallest wood-built apartment block, Jyväskylä

Ideas

- World tallest wooden skyscraper, 34-storey in Stockholm, Sweden (revealed proposal by C.F. Møller)

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Thank you!

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