ICON Project

Composite Frame
Sustainable construction of composite frame enabled by BIM

An efficient combination of steel and concrete is often the key to reach efficiency in the design and construction of high rise buildings. The latest example of an innovative use of composite steel concrete construction is the ICON building in Vaxjo, Sweden. Rising to a height of 67 meters, ICON Växjö consists of apartments, offices, a hotel and a school covering a floor area of 37,000 m² in total on 20 floors.

The structural frame of the building is made of concrete filled steel columns and horizontal floors consisting of precast hollowcore slabs supported on innovative steel concrete composite beams integrated in the floor. This structural system is characterized by a high level of prefabrication thus offering numerous benefits including a significant improvement of productivity.

BIM modelling was crucial to secure a smooth exchange of information between the different participants of the project during the design and construction of the building. A 3D model of the structural frame of the building has been created in TEKLA. In the planning stage, the best structural shape of the stability system and column cross sections was found in cooperation with the architect via IFC models. The model was also used to find clashes between the structural and architectural designs. The 3D BIM model smoothly communicated with the softwares used for the structural design of the composite frame.

The presentation will provide information about the innovative composite frame and its benefits. It will also illustrate how smooth project management using BIM allowed the design and erection of the structural frame to been completed in a record time of ??? months.
Artūras Vitkus
*Peikko Group, Product Manager, DELTABEAM® Frame*

Arturas Vitkus is a DELTABEAM® Frame manager at Peikko Group, where he is responsible for the slim floor structure system development and support. He obtain Structural Engineering degree from Vilnius Gedimino Technical University in Lithuania and have more than fifteen years of experience in structural design of steel and composite structures. Arturas Vitkus is focused on slimfloor and light weight structural solutions with effect on sustainability and building efficiency. Arturas Vitkus as well works in cooperation with Peikko R&D department in development of innovative composite structures and solutions.
Learning Objectives

1. Typical structural frame systems in Nordic countries
2. Why prefabricated structures and slimfloor solution are sustainable
3. Introduction to Nordic Composite Frame
4. Real project example for Composite Frame
Typical structural scheme in Nordic countries

- Prefabricated Elements
- Braced Frame
- Slim floor structure
- Single floor columns and continuous beams (SE, NO)
- Multifloor columns and single span beams (FI)
- Steel/Concrete Columns and steel beams (SE, NO)
- Composite columns and beams (FI)
SUSTAINABILITY COMPOSITE BEAM IMPROVES EFFICIENCY BY MAKING FLOORS SLIMMER

- More floors for given height of a building (or extra room height)
- Smaller heating and cooling consumption
- Building lifespan expanded with flexible layouts
- Less vertical components
- When building downward, the excavation depth is also minimized
- Optimized prefabricated components → less waste
- Using hollow core slabs → less concrete → less weight → reduction in the size of foundations
- No need for additional fire protection
ICON - Project data

- Town: Växjö, Sweden.
- Building occupancy: Hotel, School, Residential, Office.
- Area: 37000m².
- 3 structural blocks separated by movement joints.
- Total Construction time: 2016-2019
- Block 2 (20 storeys) construction time: 2016 11 – 2017 05 (7 months)
- Assembly team – 22 persons (10 for block 2)
Gravity load bearing system slim floor-composite frame

Multistorey column and single span beam

Single storey column and continuous beam
Composite slim floor beam and composite column
Connections between composite frame
Connections between composite frame
Connections between composite frame
Stability – Location of concrete core
Stability – Braced grids
Stability
Connection Design
BIM – integration with building services
Cantilever
Cantilever
Pictures
THANK YOU

Artūras Vitkus
Product Manager, DELTABEAM® Frame
Structural Engineer
Mob. +370 679 43871
arturas.vitkus@peikko.com