

The Finnish Construction 2000 classification system

Spaces, Building Elements, Production Sections and Building Products classifications and Structures between them in Building Information Models, in Specifications and in Cost Estimation and Control.

Background and aims of this paper

The *Construction 2000* classification is not only a set of classification tables, but a tool supporting BIM and design procedures as well as cost estimation and production planning and control. Quite opposite to most countries, the Finnish construction industry has a tradition of controlling both the quality and the costs by building elements. It is especially suitable for use in BIM.

Construction 2000 has two major properties. Firstly, it specifies a series of *classification* tables to be used for grouping purposes throughout the construction process. The tables itself are quite normal and suit well with ISO 12006-2 Standard (Framework for classification). Secondly, it states the *methods*, a series of breakdown structures, to be used for BIM, specifying, cost management and production planning purposes. It takes advantage of public or company-specific structure and price files and project-specific bills of quantities. The structure files include: *product structures* describing design solutions of elements and *resource structures* describing solutions of production sections.

The structures are composed of consumption of building products and other resources per an element type or a production item. The actual unit costs are collected from resource price files using resource structures. Together the elemental bill and structures constitute both a *product model* and a *project* or *production model* for a construction object.

The Finnish building project process

In order to be able to understand the Construction 2000, one has to know the essential characteristics of the Finnish building process. The principal part of building projects is that of multiple lump sum contracts (without bill of quantities). Differing from the general practice elsewhere, the specifications and cost estimates are in Finland based on building elements.

Finland has traditionally had a large standard system, covering General Conditions for Building Contracts (YSE), The Code of Building Practice (RYL) and a large selection of model documents, which have been used as references in projects. The cost estimates have also been based on public and company-specific price files for a long time.

The Code of Building Practice (RYL) was revised according to the Construction 2000. An elemental building specification model support both classification and the Code of Building Practice.

Structure of Construction 2000

Construction 2000 will structure the physical building and the construction project completely from several points of view. The classification tables covered by Construction 2000 are:

- Spaces (users end product)
- Building Elements BE (physical end product)
- Project Related Tasks (management and design tasks)
- Production Sections PS (work sections and procurement packages)
- Resources: labour, building products, site equipment and overhead

Space classification breaks the building down into space groups and space types. They are an essential in programming of the project, when the user and the designers define the functional and qualitative requirements. The principal users of the space classification are the client, the property owner and the designer. The space classification is used in room programs of project briefs, in room specifications and in the Finnish Target Price estimating method based on spaces.

Building elements classification consists of pure physical building and service elements. The element classification consists of site, building (base building) and space (infill) elements. All elements have quantity measurement rules. Elemental classification is used in Building Information Models, in building specifications and in elemental bills and estimates.

Project tasks classifications break the project down into project and construction management and design tasks. Main users are project and construction managers and cost estimators.

Production sections classification breaks the project down into procurement packages and production operations – conceptual trades or work sections. Production sectors have quantity measurement rules too. Production items are used in production bills and estimates as well as in schedules and procurement plans. The designer or the supplier may complete the elemental building specification with separate work specifications for same production sections.

Resources break the production down to labour, building products, site equipment and overhead and are the pricing criteria. The resource classification tables are used as a primary breakdown argument in resource structures and estimates and in resource price files.

The key concept of *Construction 2000* is *structure*, which prevails between two classes. *Product structures* are produced in the building and mechanical *design* process where building elements are broken down into building products. The product structure breakdown is used in BIM, building specification and elemental estimation.

A second structural breakdown is used in production. This is *resource structure* where the elements are broken down, first into production sections and methods and them into resources. This is used in tender or production estimating and control.

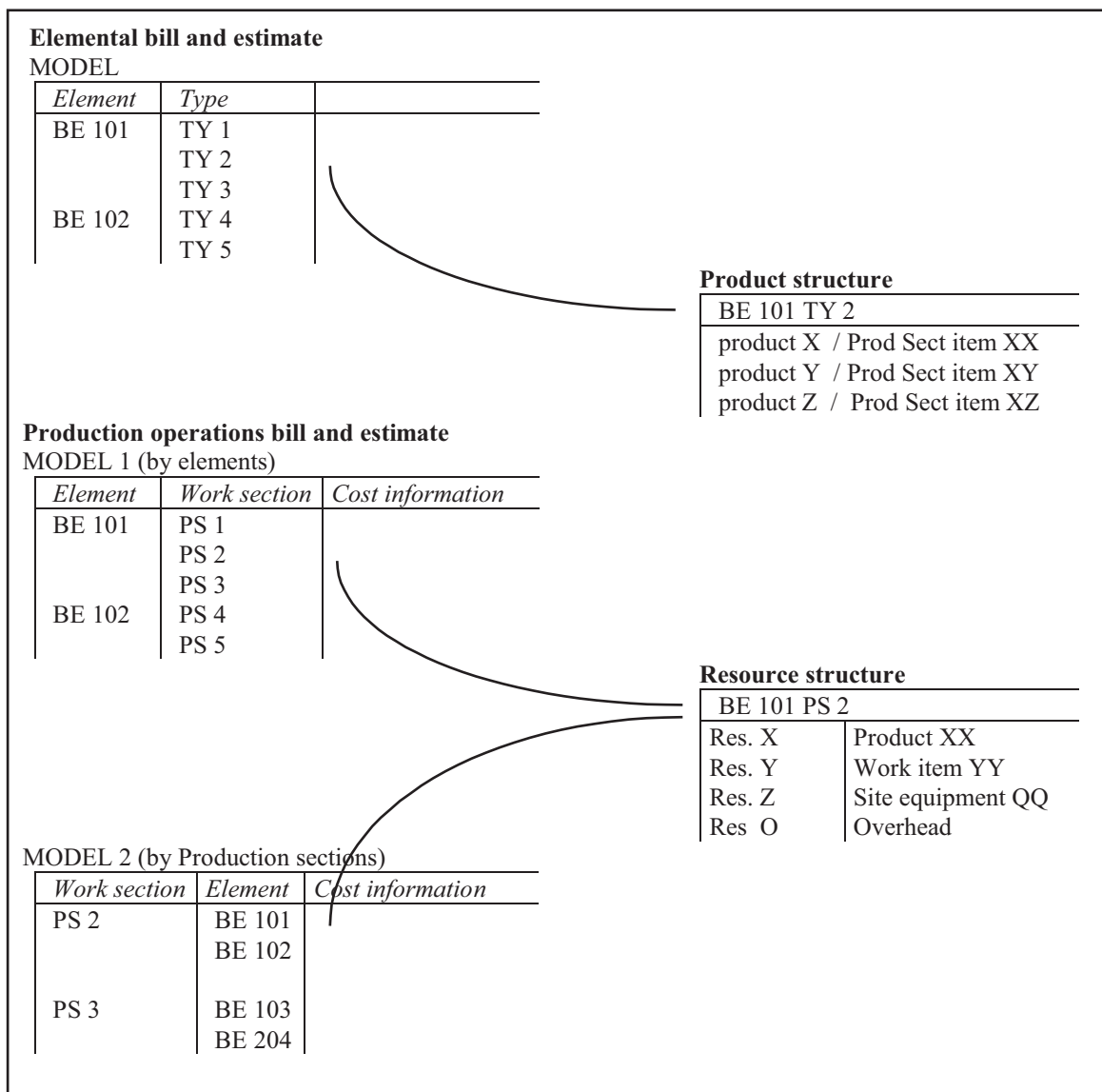
Practical application areas of Construction 2000

For *client or owner* and *construction project management* the classification tables are used in design briefs, in pre-contract cost planning, in bills of quantities and in definitions of the contents and limits of trade contracts.

For *design* documents, the classification tables are used in BIM and building and work specifications.

The *construction companies* use the classification tables for bills of quantities and cost estimates, for tender and production cost estimates, for cost control during the project and for cost accounting and statistics. The contractors use the tables on site for work and procurement planning, as well as for collecting data and supervising the production.

For *information service*, the tables are used in general and public publications e.g. the Code of Building Practice, product files and indices, and work method and consumption files. The tables are used also to define and index the contents of textbooks, handbooks, research reports etc.



Elemental bill may be broken down into product structure, production operations bill into resource structure, and activities bill into activities structure.

Litterature

Construction 2000 Classification. Construction 2000 Classification Committee, Haahtela-kehitys Oy. Rakennustieto Publishing, Helsinki, 2010. https://www.rakennustieto.fi/material/attachments/5k2Ih5ORz/5tdjhFNSR/Construction_2000_Classification_netti.pdf

<https://www.rakennustieto.fi/index/english/productsandservices/finnishbuildingclassificationsystem.html>

General conditions for building contracts. YSE 1998 document. RT 16-10660en. Building Information Ltd.

Construction 2000

Project Classification

1 BUILDING ELEMENTS

11 Site elements

- 111 Ground elements
- 112 Soil stabilisation and reinforcement elements
- 113 Paved and green areas
- 114 Site equipment
- 115 Site constructions

12 Building elements

- 121 Foundations
- 122 Ground floors
- 123 Structural frame
- 124 Facades
- 125 External decks
- 126 Roofs

13 Internal space elements (infills)

- 131 Internal dividers
- 132 Space surfaces
- 133 Internal fixtures
- 134 Other internal space elements (infills)
- 135 Box units

2 SERVICES ELEMENTS

21 Plumbing elements

22 Air conditioning elements

23 Electrical elements

24 Data transfer elements

25 Mechanical elements

3 PROJECT-RELATED TASKS

31 Project management tasks

- 311 Construction project preparation
- 312 Site supervision
- 313 Project administration

32 Design tasks

- 321 Spatial design
- 322 Building design
- 323 Expert tasks in design
- 324 Project information tasks

33 Construction management tasks

- 331 General construction management
- 332 Site management tasks

34 Site tasks

- 341 Site services
- 342 Site equipment operations

4 PROPERTY MANAGEMENT TASKS

41 Site tasks

- 411 Plot tasks
- 412 Connections
- 413 Site development

42 Financing and marketing

- 421 Financing tasks
- 422 Marketing tasks

5 USER TASKS

51 Space equipment

- 511 Movable
- 512 Business devices and machines

52 Maintenance of operation

- 521 Temporary activity
- 522 Taking into use

6 PROJECT PROVISIONS

61 Document and price level changes

- 611 Document changes
- 612 Price level changes

62 Other provisions

- 621 Risks
- 622 Special provisions

Construction 2000 Production Classification

- 1 Demolition and Preservation
- 2 Earth Construction
- 3 Site Construction
- 4 Concrete Construction
 - 41 In-situ Concrete Construction
 - 42 Precast Concrete Construction
 - 43 Special Concrete Construction
 - 44 Cast-in situ screeding
- 5 Masonry
 - 51 Brick and Block
 - 52 Natural and Artificial Stone
 - 53 Roof Tile Laying
 - 54 Tiling
- 6 Metal Construction
 - 61 Metal Frame construction
 - 62 Sandwich Panel Construction
 - 63 Prefabricated Metal Component
 - 64 Complementary Metal Construction
 - 65 Sheet Metal
- 7 Carpentry
 - 71 Timber-Frame
 - 72 Prefabricated Wood Panel
 - 73 Prefabricated Wood Component
 - 74 Boarding and Facing
 - 75 Wood Paneling
- 8 Glass Construction
 - 81 Glazing
 - 82 Special Glazing
- 9 Insulation and Proofing
 - 91 Thermal and Acoustic Insulation
 - 92 Waterproofing
 - 93 Fire Insulation
 - 94 Jointing and Sealing
- 10 Surface Finishing
 - 101 Plastering
 - 102 Leveling
 - 103 Painting and Wallpapering
 - 104 Floor and Wall Covering Installation
 - 105 Composition Flooring Installation
 - 106 Other Surface Finishing
 - 107 Finish Moulding Installation
- 11 Fitting out
 - 111 Fittings and Locking
 - 112 Fixed Furniture
 - 113 Equipment
 - 114 Accessories

Construction 2000 Building Product Classification

- 1 Site and subconstruction products
- 2 Frame construction products
 - 21 Concrete
 - 22 Metal products in general
 - 23 Masonry products, bricks and blocks
 - 24 Timber
 - 25 Roofs
 - 26 Building boards
 - 27 Insulators
 - 28 Construction elements
 - 29 Emergency shelter hatches
- 3 Structure completion products
 - 31 Windows
 - 32 Doors
 - 33 Curtain walls
 - 34 Interior wall products
 - 35 Suspended ceilings
 - 36 Access floors
 - 37 Fireplace accessories
 - 38 Accessories
 - 39 Fittings and attachments
- 4 Finishing products
- 5 Equipment and furnishings
- 6 Building technology products
 - 61 HEPAC products
 - 62 Electrical transfer and installation products
 - 63 Electrical appliances and equipment
 - 64 Electrical energy generation products
 - 65 Information technology products
 - 66 Transportation machinery
- 7 Construction equipment and tools
- 8 Property management and operating equipment