



Executive Agency for Competitiveness and Innovation
(EACI)

LCC-DATA

Life-Cycle-Costs in the Planning Process. Constructing Energy
Efficient Buildings taking running costs into account

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Classification system for facility management
information

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Definitions and Abbreviations

Definitions

Necessary definitions

Abbreviations

Necessary abbreviations

Executive Summary

The deliverable gives an overview of existing cost classifications and recommended system for use in LCC-DATA data base.

In addition to cost classifications with descriptions, a list of building information entries is proposed for systematising the buildings for improved benchmarking.

The cost classifications may be changed when the project get feed backs from national and international standardisation committees and international associations.

Introduction

The main goal of the project “LCC-DATA” is to simplify the data access as well as storage possibilities to ease and extend the use of LCCA in construction, and hence improve the decision process towards more sustainable buildings. The project consists of 6 work packages. Work package 2 is entitled “Development of LCC cost classification framework, systems for information exchange and database” and its purpose is to develop a cost classification system and a database. The deliverable shows how the structure of the database has been elaborated. It constitutes the first deliverable (D4) of WP2.

The first step for the development of a LCC classification framework has been to draw up an overview of existing cost classification systems at national and international level. The existing cost classification systems have then been compared. The comparison shows that the same items are found in the different systems. However the assignation of those items into main- and sub-categories differs from a classification system to another. The database that will be developed through the project has to be adaptable to existing cost classification systems. For this reason, the framework that is proposed consists of a list of cost items that are not gathered into categories. The database requires also building related entries that will allow the user to compare his building project to similar projects.

In the following pages, the approach that has been followed for the elaboration of the structure of the database is presented, from the collection of existing classification systems to the choice of the parameters required for the database.

The proposed classification of level 1 is the same as proposed in LCC for byggverk (SBI 2005:01).

An appendix for more detailed use of the system will be developed through the project period, based on comments and experience with the use.

1 Existing cost classification systems

The existing cost classification systems that have been found are shortly presented below.

1.1 *International*

The following documents have been elaborated by international committees:

ISO/DIS 15686-5 *Buildings and constructed assets – Service life planning – Part 5, Life cycle costing* (2006)

Davis Langdon *LCC as a contribution to sustainable construction: a common methodology* (2007)

CEEC *Code of Measurement for Cost Planning* (2004)

The ISO/DIS 15686-5 presents its structure by those words “*Figure 3 is a generic menu of possible costs to be used to help define the specific scope of the assessment in any particular case, at the outset. It provides a structured basis for comparative analysis that is intended to accommodate local practices. It is not necessary for every item included in*

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the figure to be considered and some additional costs may be required for certain projects”

The methodology presented by Davis Langdon includes “*a typical cost classification and indicative check-list of cost items (based on ISO/DIS 15686 Part 5, figure 3)*”

CEEC compares classification systems for cost planning used by construction economists in some European countries (Belgium, Switzerland, Germany, Holland, Ireland and United Kingdom) and focuses on construction costs.

1.2 Austria

2 Austrian standards have been studied;

ÖNORM B 1801-1 *Building costs – cost breakdown* (1995)

ÖNORM B 1801-2 *Civil engineering and building construction costs – Building data – User costs* (1995)

The standard ÖNORM B 1801-1 defines categories of investment costs for building constructions. The second standard, ÖNORM B 1801-2, shows categories for running costs of buildings. Those standards can be used together for the calculation of life-cycle-costs of buildings.

1.3 Czech Republic

In Czech Republic, it has not been found national standard or norm that defines and categorises life cycle costs for buildings.

Different commercial tools and database for budgeting construction works exist, e.g. CSP (Ceník stavebních prací), Kros plus, and RTS Stavitel+.

The structure used by business accounting systems could be a starting point for a life-cycle-costs classification system for buildings. The accounting system items are defined by 3-digit numbers, where the first two digits are firmly defined by the legislation. The third digit is up to the each company to fill in. It results in some variation among the accounting outputs of specific companies. CityPlan issues a proposal for conversion of business accounting system items to life-cycle-cost classification items based on their own business accounting system. Business accounting system items include often more than one item from the life-cycle-cost classification and vice versa. The challenge is to share out and allocate those items in a proper way.

1.4 Greece

As for Czech Republic, it was not possible to find available cost classification systems for facility management in Greece.

A national standard for categorisation of construction costs for building works is registered: *ATOE Analytical cost breakdown system of construction works* (yearly updated), published as an Official journal of Greek Government from the Ministry of Environment, Urban Planning and Public Works. This system is used for all public

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procurement processes in the construction works in public sector. This cost category
mostly used also by the private sector.

The costs classified in accordance to ATOE can be used as an input for LCC calculations
but will only provide information about construction costs.

No standard classification system exists in terms of operational and maintenance costs.

Software developers for construction works' cost analysis (*such as ALCONSOFT*) have
been approached, declaring that they consider construction costs at the design stage and
do not take into consideration the costs in the whole life time of the project.

1.5 Germany

It exist 2 national standards in Germany that are relevant to life-cycle-costs for buildings:

DIN 276-1 *Building costs - Part 1: Building construction*

DIN 18960 *User costs of buildings*

1.6 Norway

The following Norwegian standards are of interest for the project:

NS 3453 *Specification of building costs* (1997)

NS 3454 *Life cycle costs for building and civil engineering work - Principles and
classification* (2000)

NS 3032 *Energy and power budgets for buildings* (1986)

The standard NS 3453 fixes a pattern for specification of building costs and states costs
to be included in the budgeting of a construction project. It applies together with
standards NS 3451 *Table for building elements* and NS 3420 *Specification texts for
building, construction and installations* and constitutes a tool of reference for quotation
price.

The standard NS 3454 defines how to categorize life-cycle-costs for building and civil
engineering work.

The last standard which is mentioned, NS 3032, fixes the required entries for the
realisation of an energy budget for a building. This standard can also be used for the
breakdown of energy consumptions. NS 3032 will be taken out of use, and replaced by
the new edition of NS3031.

1.7 Nordic countries

The Nordic project *LCC for Building and Constructions* ^{Feil! Fant ikke referansekinden.} started in
spring 2002 and finished at the end of 2004. The main goal of the project was to establish
a joint Nordic classification system for life cycle costs. The project resulted in a proposal
regarding a joint Nordic classification system for the implementation of life cycle costs,
Joint Nordic Proposal for classification of LCC (2005).

1.8 Slovenia

It has been registered 4 cost classification systems in Slovenia:

National regulation *Regulation on maintenance, standards for residential buildings and apartments* (2004)

Business accounting system *Database of running costs in municipal public buildings* (regularly updated)

M.Marinko *Calculation of construction works costs* (2007)

SAVE project *Benchmarking for municipalities* (1999-2000)

2 Comparison of existing cost classification systems

2.1 Comparison main structure, international systems

Table 1: International cost classification systems, comparison main structure

ISO 15686-5	Davis Langdon	CEEC (includes SiAd0165/2000, DIN18960/1999, UK-POCA)
Non construction costs	Acquisition-Non construction costs	
Income	Income	
Construction Costs	Acquisition-design and construction	Construction costs
		Design and incidental costs
Operation Costs Energy	Operation Energy	Costs in use P Maintenance Q Operation Energy R Disposal S Decommissioning T Taxes
Maintenance and replacement costs	Maintenance	
	Planned re-work	
End of Life Costs	End of life/disposal/hand-back	
		Land and finance

The international systems that have been found present generic cost classifications that are primarily indicative.

2.2 Comparison main structure, national systems**Table 2: National cost classification systems, comparison main structure**

Nordic proposal	NS 3454	ÖNORM B 1801-2	DIN 18960/1976
1 Capital costs	1 Capital costs	1 Capital costs	1 Capital costs
2 Administration costs	2 Management costs	2 Depreciation	2 Depreciation
		3 Taxes and fees	3 Administration costs
		4 Administration costs	4 Taxes
3 Operating costs	3 Operating costs 33 Energy	5 Operating costs 51 Energy	5 Operating costs
4 Maintenance costs	4 Maintenance costs	6 Maintenance costs	6 Maintenance costs
5 Development	5 Development costs	7 Other costs	
6 Consumption 61 Energy			
7 Cleaning			
8 Service	7 Service		
	8 Potential of the property		

3 Proposed entries for the common database

The common database will be based on building projects registered according to building related information and cost information. 0 and 0 show two lists of proposed entries for the common database.

3.1 Building related entries

Table 3List of building related entries proposed for the common database

Building related entry	
Country	List of countries
Location	Free text?
Type of building	Building types according to standards
Year of construction	
Year of renovation (if relevant)	
Capacity [persons]	No of persons
Heated floor area	Square m
Non heated floor area, e.g. parking area	Square m
Ratio window area/floor area [%]	
Window area per orientation	Square m
Type of solar shading	Predefined list to be developed
Main building material	Predefined list to be developed
Type of heating system	Predefined list to be developed
Heating control / regulation	Predefined list to be developed
Type of ventilation system	Predefined list to be developed
Ventilation air flow [m ³ /h]	
Ventilation – running time [hours/week]	
Ventilation control	
Type of cooling system	Predefined list to be developed
Installed lighting power [kW]	
Lighting control and automations	Predefined list to be developed
Energy consumption [kWh/yr]	
Energy consumption [kWh/m ² /yr]	
Water consumption [m ³ /yr]	

3.2 Cost items

Table 4: List of cost items proposed for the common database

Category	Description
Capital costs	All investments towards completion including decommissioning by the end use of the facilities.
Administration costs	Activities for administration, required payments and insurance costs.
Operating costs	Include daily, weekly and monthly activities that are repetitive within a one-year period for building and technical installation systems that shall satisfy given functional demands and requirements.
Maintenance costs	Include all activities and efforts put forward in a period of more than one year. For example, planned maintenance, replacement and emergency repairs, so that the building and technical systems satisfies the original level of quality and functional re
Development costs	Includes activities as a result from change in demand from core activities, the authorities, total refurbishment, or all activities to raise the construction standards in relation to the original level.
Consumption costs	Consumption includes resources in terms of energy, water, and waste handling.
Energy	All costs related to energy supplies including oil, electric and heating.
Heating	
Cooling	
Electricity	
Water and drainage	All costs related to water consumption including intake water, waste water including cleaning
Waste Handling	Includes all costs from internal transport, compression, source separation, collecting (hired container), transporting related to waste and taxes for landfill.
Cleaning costs	All activities inside and outside for satisfactorily meeting cleaning demands.
Service costs	All non-building related activities in support of the core activities.