

# International Comparison of Elemental Classifications

Joe MARTIN, United Kingdom

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## SUMMARY

The RICS in conjunction with CEEC (Comite European des Economistes de la Construction) have developed a Code of Measurement for Cost Planning. The code provides a standard basis for the sub-division of costs and for measuring buildings to facilitate pan European budgeting, cost comparison and analysis at management level. The structure of the code is organised to permit the use of existing national elemental classification systems at a more detailed level. This paper gives the background to and details of the CEEC Code and, in order to show how it can be applied in other countries, relates it to the ASTM Unifomat II Elemental Classification. The CEEC is made up of organisations representing construction economists from Belgium, Ireland, Netherlands, France, Switzerland, Germany, Denmark, Spain, Italy and the UK.

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## 1. BACKGROUND

The European Committee for Construction Economics CEEC was set up over 20 years ago as a pan European group of professional associations in the area of construction economics. The Royal Institution of Chartered Surveyors (RICS) represents the United Kingdom.

Two important aims of the CEEC are harmonisation of working methods and the exchange of information.

Harmonisation doesn't have to mean we all end up doing things in exactly the same way. Indeed this would be the end of any innovation. The Code of Measurement for Cost Planning [6] produced by a CEEC working group creates a co-ordinated overall framework, enabling exchange of data at high level, while still permitting differing national approaches and new innovative local developments.

The need for the code became apparent following a conference in Lousanne at which representatives from each CEEC member country were invited to describe the main method used to estimate a construction cost based on a quantitative description and to apply that method to a common example.

The common example was a new building for a research institute of advanced technologies, to be built at the university campus of Roskilde, some 30 km west of Copenhagen. The building comprises 1800m<sup>2</sup> office space. The degree of detail provided corresponds to layout drawings on scale 1:300 with an outline specification and an elemental bill of quantities. The quantities were based on the Danish elemental classification and provided a common basis for all estimates.

The objectives of the exercise were to:

- Compare approaches to cost planning
- See how element classification varied
- Compare cost data sources
- Compare how costs were adjusted for:
  - o Scale
  - o Location
  - o Time

The use of elements for early cost estimates (conceptual estimates), cost planning, cost analysis, is well established in most of the countries involved as is the use of costs/m<sup>2</sup> for benchmarking costs.

It was accepted that, while the resultant cost plans and presentations would be indicative of the practices and procedures in each country, they would also be very much influenced by the personal practice and experience of each estimator.

The results presented and the ensuing discussion produced some interesting results:

- All countries used elemental estimating or cost planning systems
- The elements used were similar, but are grouped and coded with vastly differing cost classification systems
- Each country considers their system of classification and measurement as superior to the others
- The often-used comparison of square meter prices is misleading as the floor areas are measured differently.

It was accepted that the results of the estimates would not be directly comparable for a range of reasons:

- Quality assumed from the outline specifications
- Differences of standard specifications between countries
- Differences in national, and local, building regulations and codes
- What was included in the total costs
  - o Taxes
  - o Fees
  - o Land costs
  - o Etc
- The measurement of the floor area.

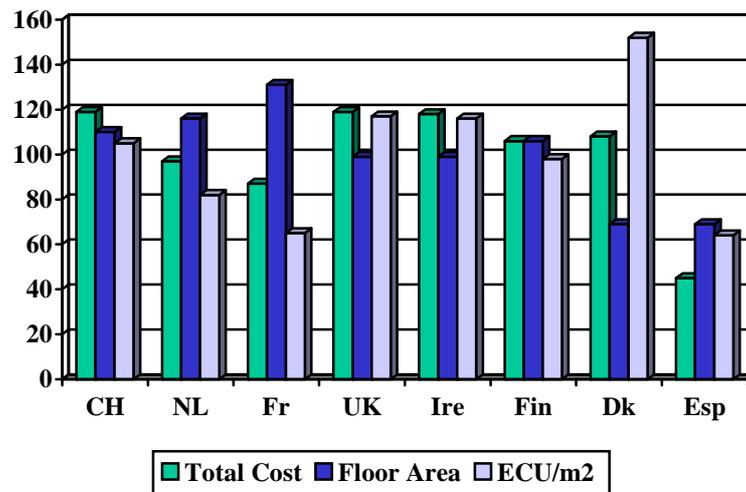
Notwithstanding these reservations the temptation to compare the results and to infer something about the relative costs of construction in different European countries was overwhelming. The results are shown in the following table.

***Total cost, floor area and cost/m<sup>2</sup>***

	<b><i>Total Cost</i></b> <b><i>ECU</i></b>	<b><i>Floor Area</i></b> <b><i>m<sup>2</sup></i></b>	<b><i>ECU/m<sup>2</sup></i></b>
Switzerland	2,917,000	2875	1,015
Holland	2,372,700	3007	789
France	2,138,300	3412	627
UK	2,910,370	2585	1,126
Ireland	2,900,006	2585	1,122
Finland	2,607,000	2758	945
Denmark	2,639,000	1800	1,466
Spain	1,111,650	1800	618

Note the costs are at 1998 prices in European Currency Units (ECU) the for-runner of the Euro so that the exchange rate for all countries except UK and Switzerland were fixed.

Indexing the results produced the following graph



**Index of total cost, floor area and cost/m2 (averages =100)**

Even though there had been a long held suspicion that comparing costs between countries was dangerous the results came as a bit of a shock, particularly as cost per m2 tended to be the lingua franca in any discussions about costs in different countries.

The CEEC set up a committee to try and find some way of harmonising the data in order to arrive at a set of truly comparable costs in the future.

After several abortive attempts the CEEC delegate from Switzerland, Martin Wright of PBK AG offered to coordinate the work by bringing in representatives from various countries with clearly defined elemental classification systems to:

- Compare the lists of elements.
- Produce a grouping of elements that could be defined from all the individual elemental systems.
- Define any other cost groupings that might, on occasion, be included in total building costs.
- Allow for the clear identification of the scope of costs included in total costs on an individual project.
- Define the measurement of floor areas in such a way that the floor area used on an individual project can be identified with clarity.

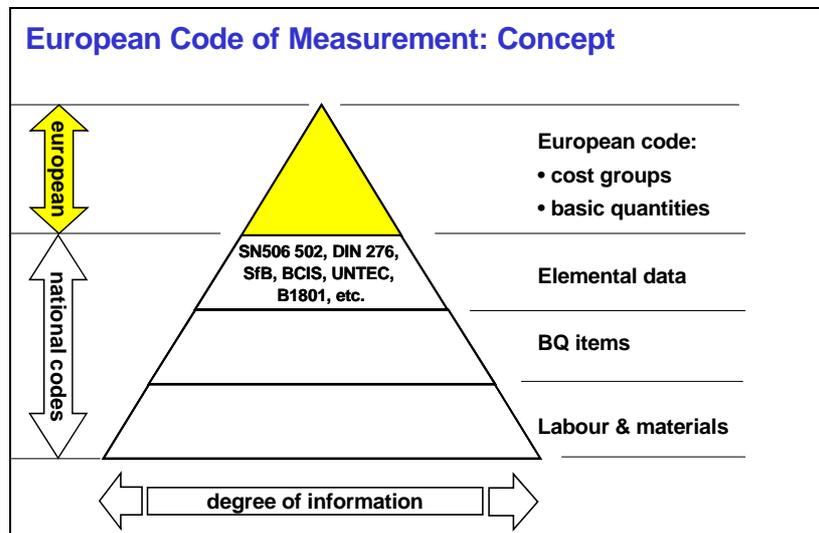
Acknowledgement must be given to Martin Wright for really bringing the code together and driving the whole process through to completion.

## **2. THE CEEC CODE OF MEASUREMENT FOR COST PLANNING**

The CEEC-Code provides a standard basis for the sub-division of costs and for measurement of basic quantities of buildings for international budgeting, comparison and analysis at

management level. The structure is organised to permit the use of existing national classifications at a more detailed level of information (subsidiarity principle).

### Relationship of CEEC code to National classifications



The current situation can be summarised as follows:

- In European countries different rules and definitions exist for assessing costs and quantities
- Due to the differing national definitions data is difficult to interpret and comparative data likely to be inaccurate
- Comparative data is an eminently important basis for decisions by Construction Economists, Investors, Planners, Administrators and Politicians

The CEEC code aims to clarify matters by defining the typical areas used and cross-referencing to local definitions. As a result if areas are measured differently, the differences can be identified, permitting adjustment of square meter prices.

The current Code is presented in English, French and German.

## 2.1 Areas

Definitions of quantities have been restricted to twelve basic quantities for site areas, floor areas and functional units. Elemental quantities have not been defined, as local definitions may be more suitable for analysis of elemental unit rates.

## Areas defined in CEEC code

Basic quantities	Quantités de base	Grundmengen
<b>SITE</b>	<b>TERRAIN</b>	<b>GRUNDSTÜCK</b>
#01 Site area	Surface terrain	Grundstücksfläche
#02 Footprint area	Surface bâtie	Gebäudegrundfläche
<b>FLOOR AREAS</b>	<b>SURFACES DE PLANCHER</b>	<b>GESCHOSSFLÄCHEN</b>
#03 Floor area not fully enclosed	Surface plancher externe	Außen-Geschoßfläche
#04 Gross external floor area	Surface plancher brute	Geschoßfläche brutto
#05 Gross internal floor area	Surface plancher nette	Geschoßfläche netto
#06 Area of internal divisions	Surface de construction	Konstruktionsfläche der Innenwände
#07 Area ancillary to main function	Surface utile secondaire	Nebennutzfläche
#08 Ancillary area for services	Surface installations	Funktionsfläche
#09 Circulation area	Surface dégagement	Verkehrsfläche
#10 Usable floor area	Surface utile principale	Hauptnutzfläche
<b>FUNCTIONAL UNITS</b>	<b>UNITÉS FUNCTIONELLES</b>	<b>FUNKTIONALE EINHEITEN</b>
#11 Primary functional units	1. Unités fonctionnelles	Primäre funktionale Einheiten
#12 Secondary functional units	2. Unités fonctionnelles	Sekundäre funktionale Einheiten

The full list of definitions in English are given in the Appendix the following is an excerpt from the tri-lingual definitions:

## Example of Tri lingual definitions of areas

<p><b>#04 m2 Gross external floor area</b></p> <p><b>Definition</b> The area of all floor space which is covered and enclosed to its full height, including the area of basements, measured to the outside face of outside walls and including the area of all internal walls, columns and the like measured at each floor level, excluding floor area not fully enclosed (see #03).</p> <p><b>Germany: DIN 277 / 1987</b> m2 Brutto-Grundfläche BGF a</p> <p><b>Ireland</b> m2 not defined</p> <p><b>Switzerland SIA 504 416 / 2003</b> m2 Geschossfläche GF / Surface plancher SP</p> <p><b>United Kingdom:</b> m2 RICS: Code of Measurement Practice GEA</p>	<p><b>#04 m2 Surface plancher brute</b></p> <p><b>Définition</b> Toutes les surfaces de plancher couvertes et comprises dans le volume ( fermées de toute part), comprennent les surfaces des sous-sols, mesurées contre la face extérieure des murs (HO, hors oeuvre) et comprennent les surfaces des murs internes, colonnes et toutes les surfaces mesurées à tous les niveaux.</p> <p><b>Allemande: DIN 277 / 1987</b> m2 Brutto-Grundfläche BGF a</p> <p><b>Irlande</b> m2 non définé</p> <p><b>Suisse: SIA 504 416 / 2003</b> m2 Surface plancher SP</p> <p><b>Royaume Uni</b> m2 RICS: Code of Measurement Practice GEA</p>	<p><b>#04 m2 Geschoßfläche brutto</b></p> <p><b>Definition</b> Die Summe der Grundrissflächen aller Grundrissebenen eines Bauwerks, die überdeckt und allseitig in voller Höhe umschlossen sind, einschließlich unterirdischer Flächen, wird bis zur Außenkante der Außenwände gemessen und schließt die Konstruktionsflächen für Innenwände, -stützen usw. jedes Geschosses ein. Außengeschoßfläche ist nicht enthalten (siehe #03).</p> <p><b>Deutschland: DIN 277 / 1987</b> m2 Brutto-Grundfläche BGF a</p> <p><b>Irland</b> m2 nicht definiert</p> <p><b>Schweiz: SIA 504 416/2003</b> m2 Geschossfläche GF</p> <p><b>Grossbritannien</b> m2 RICS: Code of Measurement Practice GEA</p>
<p><b>#05 m2 Gross internal floor area</b></p> <p><b>Definition</b> Gross external floor area less the area of the external walls</p> <p><b>Germany: DIN 277 / 1987</b> m2 not defined</p> <p><b>Ireland</b> m2 National Standard Building Elements 3rd edition</p> <p><b>Switzerland SIA 504 416 / 2003</b> m2 not defined</p> <p><b>United Kingdom:</b> m2 RICS: Code of Measurement Practice GIA m2 BCIS: Gross floor area</p>	<p><b>#05 m2 Surface plancher nette</b></p> <p><b>Définition</b> Surface de plancher nette sans la surface des murs extérieurs.</p> <p><b>Allemande: DIN 277 / 1987</b> m2 non définé</p> <p><b>Irlande</b> m2 National Standard Building Elements 3rd edition</p> <p><b>Suisse: SIA 504 416 / 2003</b> m2 non définé</p> <p><b>Royaume Uni</b> m2 RICS: Code of Measurement Practice GIA m2 BCIS: Gross floor area</p>	<p><b>#05 m2 Geschoßfläche netto</b></p> <p><b>Definition</b> Geschoßfläche brutto / Brutto-Grundfläche ausschließlic der Konstruktionsfläche der Außenwände.</p> <p><b>Deutschland: DIN 277 / 1987</b> m2 nicht definiert</p> <p><b>Irland</b> m2 National Standard Building Elements 3rd edition</p> <p><b>Schweiz: SIA 504 416/2003</b> m2 nicht definiert</p> <p><b>Grossbritannien</b> m2 RICS: Code of Measurement Practice GIA m2 BCIS: Gross floor area</p>

## 2.2 Costs

The Code defines groupings of costs that provides a framework to cover the global cost of buildings including the costs of development, land and life cycle costs which are defined in some national codes. This goes further than traditional practice in some countries and groups costs into four blocks:

- the construction costs,
- design and incidental costs,
- costs in use,
- land and finance.

This permits overall project appraisal and if items are not included in individual countries this will be clearly apparent and avoid misunderstandings on the overall scope of the costs.

## Cost groupings defined in the Code

Cost groups	Groupes de coût	Kostengruppen
<b>CONSTRUCTION COSTS</b>	<b>COUTS DE CONSTRUCTION</b>	<b>BAUKONSTRUKTION</b>
A Preliminaries	Installations de chantier, échafaudages	Baustelleneinrichtungen und allgemeine Kosten
B Substructure	Fondations, infrastructure de base	Struktur bis Oberkante Bodenplatte
C External superstructure/envelope	Structure externe / enveloppe	Struktur außen oberhalb Bodenplatte
D Internal superstructure	Structure interne	Struktur innen oberhalb Bodenplatte
E Internal finishings	Finitions intérieures	Innere Bekleidungen
F Services installations	Installations	Installationen und Transportanlagen
G Special equipment	Équipement spécifiques	Spezielle Ausrüstungen
H Furniture and fittings	Mobilier, Agencement	Ausstattungen und Einbauten
I Site and external works	Aménagements extérieurs	Außenanlagen
J Construction contingencies	Divers et imprévus (construction)	Bau-Reserven
K Taxes on construction	Taxes sur les coûts de construction.	Steuern auf Baukonstruktionen
<b>DESIGN AND INCIDENTAL COSTS</b>	<b>HONORAIRES ET FRAIS GÉNÉRAUX</b>	<b>PLANUNGS- UND BAUNEKENKOSTEN</b>
L Design Team fees	Honoraires de conception et de construction	Planungshonorare
M Ancillary costs and charges	Charges et Frais Généraux	Baunebenkosten
N Project Budget contingencies	Réserves (variation économique)	Budget Rückstellungen und Reserven
O Taxes on design and incidental costs	Taxes sur Charges et coûts auxiliaires	Steuern auf Planungs- und Baunebenkosten
<b>COSTS IN USE</b>	<b>COUTS D'EXPLOITATION</b>	<b>NUTZUNGSKOSTEN</b>
P Maintenance	Maintenance	Unterhalt
Q Operation	Coûts d'exploitation	Betrieb
R Disposal	Vente et rendement	Veräußerung
S Decommissioning	Démolition	Rückbau
T Taxes	Taxes	Steuern auf Nutzungskosten
<b>LAND AND FINANCE</b>	<b>BIEN-FONDS &amp; FINANCES</b>	<b>GRUNDSTÜCK UND LAND</b>
U Land costs	Coût du bien-fond	Grundstückskosten
V Finance	Finance	Finanzierung
W Grants and subsidies	Aide et subsides	Beiträge und Subventionen
X Taxes on land	Taxes sur le bien-fonds et finance	Steuern auf Grundstück und Land

The costs are again cross-referenced to existing local definitions and systems.

Excerpt from the tri-lingual definitions of cost groups are shown below:

## Example of Trilingual definitions of Cost groupings with national references

E Internal finishings	E Finitions intérieures	E Innere Bekleidungen
<p><b>Definition</b> Internal floor, wall and ceiling finishes including screeds, raised floors, internal panelling and cladding, suspended ceilings, decoration and finishes to balconies.</p> <p><b>Belgium / Switzerland SN 506.502/2000</b> M3 Floor finishes M4 Wall finishes M5 Ceiling finishes</p> <p><b>Germany: DIN 276 / 1993</b> 336 Internal wall linings (of external walls) 345 Internal linings (of internal walls) 352 Floor coverings 353 Ceiling linings 364 Roof linings</p> <p><b>Holland</b> - Architectural costs (sub-division) - Construction costs (sub-division)</p> <p><b>Ireland</b> 35 Suspended ceilings 42 Wall Finishes Internally 43 Floor Finishes 44 Stairs,ramps finishes 45 Ceiling Finishes</p> <p><b>United Kingdom: BCIS</b> 3A Wall finishes 3B Floor finishes 3C Ceiling finishes</p>	<p><b>Définition</b> Les finitions des dalles et plafonds comprenant chapes, revêtements de sols, panneaux intérieurs revêtement de parois, plafonds suspendus, décoration, finition des balcons.</p> <p><b>Belgique / Suisse: SN 506.502/2000</b> M3 Revêtements de sols M4 Revêtements de parois M5 Plafonds</p> <p><b>Allemagne: DIN 276 / 1993</b> 336 Revêtement de mur extérieur, à l'intérieur 345 Revêtement de cloison 352 Garnitures de plafonds 353 Revêtement de plafonds 364 Revêtement de toit</p> <p><b>Hollande</b> - Dépenses architecturales (subdivision) - Coûts de construction (subdivision)</p> <p><b>Irlande</b> 35 Plafonds Suspendus 42 Finitions Murales Intérieurement 43 Finitions de Plancher(d'Étage) 44 Escalier, rampe Finitions 45 Finitions de Plafond</p> <p><b>Royaume Uni: BCIS</b> 3A Finitions murales 3B Finitions de plancher(d'étage) 3C Finitions de plafond</p>	<p><b>Definition</b> Innenbekleidungen der Böden, Wände und Decken einschließlich Estriche, Doppelböden, Innenpaneele und -verkleidungen, abhängehängte Decken, Dekorationen und Verkleidungen von Balkonen</p> <p><b>Belgien / Schweiz: SN 506.501/2000</b> M3 Bodenbeläge M4 Wandbekleidungen M5 Deckenbekleidungen</p> <p><b>Deutschland: DIN 276 / 1993</b> 336 Außenwandbekleidungen, innen 345 Innenwandbekleidungen 352 Deckenbeläge 353 Deckenbekleidungen 364 Dachbekleidungen</p> <p><b>Niederlande</b> - Architectural costs (sub-division) - Construction costs (sub-division)</p> <p><b>Irland</b> 35 Suspended ceilings 42 Wall Finishes Internally 43 Floor Finishes 44 Stairs,ramps finishes 45 Ceiling Finishes</p> <p><b>Grossbritannien: BCIS</b> 3A Wall finishes 3B Floor finishes 3C Ceiling finishes</p>

The Code also includes a standard format for the analysis of project costs, which could lead to the creation of an international databases with genuinely comparative data.



Completing the form clearly identifies what has and what hasn't been included in the costs and areas.

The framework may also provide an incentive to take into account global costs and assist in preventing investment decisions being made only on the basis of the short-term initial expenditure on construction.

CEEC has issued the Code as a consultative document. It is to be hoped that it will be put to practical use by Construction Economists, other Property Professionals, Investors and Clients throughout Europe and lead to a better understanding between all property professionals.

The full code is available from the RICS website [www.rics.org](http://www.rics.org) (search for 'ceec code')

### **3. CEEC CODE AND ASTM UNIFORMAT II [1].**

#### **3.1 Cost groups**

This paper contains the full list of definitions for the cost groups with the Uniformat II elements allocated. The additional costs identified in Appendix X2 to Uniformat II have also been included:

Z10 – Design Allowance

Z20 – Field Requirements, Office overhead & Profit

Z30 - Inflation allowance

In most cases the Uniformat II Level 2 elements mapped directly to the CEEC cost groups but in some cases it was necessary to use the Level 3 elements. These are perhaps worth detailing as it was found in compiling the Code that where this level of detail was required it identify some differences in practice between countries.

Basements – excavation has been allocated to 'substructure' and walls to 'external superstructure/envelope'. The UK practice is to treat basements as alternative solutions not as separate entities, although the costs should always be shown separately

- Superstructure – Floor construction has been allocated to 'Internal superstructure' and Roof construction to 'External superstructure/envelope'. Many of the European systems group elements to allow the external envelope to be easily identified.
- Special construction is loosely defined but some guidance has been included as follows:
  - Special Structures: envelope only, eg air supported structures, allocate to 'External superstructure/envelope'
  - Special Structures: part or whole buildings combine more than group as appropriate
  - Integrated Construction: combine more than group as appropriate or identify where costs have been allocated eg 'bathroom pods included in group F-services installation'

- Special construction systems: allocate by primary function, eg vibro-compacted piles to group B-Substructure, or security systems to group F-Services
- Special facilities: allocate to group G special equipment, or group H Furniture and fittings as appropriate
- Special controls and instrumentation: allocate to group F Services installation, or group G Special equipment as appropriate
- Selective building demolition: allocate to building elements as appropriate

### 3.2 Floor Area

As noted in the CEEC study one of the biggest differences in practice was the definition of floor area used for expressing costs per unit of floor area. There was a broad split between those using Gross Internal Floor Area and Gross External Floor Area but also a lack of consistency in defining either term. The CEEC code has tried to identify define all the components of the definitions so that for a particular project the area used can be clearly identified.

Uniformat II is primarily a classification system but the example of an elemental estimate given in Appendix X2 shows costs per unit of Gross Floor Area (GFA) but does not define the term.

There is no definition in the other related ASTM documents: Standard Terminology of Building Economics (E833-02a) [2] or Standard Terminology of Facility Management (Building Related) (E1480-92) [3].

Looking elsewhere RSMeans' 'Square Foot Costs' [8] uses GFA for its commercial/industrial/institutional costs, which defines as: 'Floor Area includes the sum of floor plate at grade level and above. This dimension is measure to the outside face of the foundation wall. Basement costs are calculated separately.'

Floor area for residential costs are related to Living Area, which is defined as 'that area which is suitable for full time living. It does not include basement recreation rooms or finished attics....Living area is calculated from the exterior dimensions without need to adjust for exterior wall thickness.....Only floor area with a ceiling height of six feet or more.....is considered living area....'

There are also rules for measuring the floor area of buildings published by the American Institute of Architects (AIA) and Building Owners and Managers Association (BOMA) [5].

The measurement of floor area turned out to be one of the biggest differences between the national practices in Europe. The difference between external and internal measurement of a building can be over 10% so knowing which figure has been used in calculating costs per unit area is important.

If there is not a common practice in the USA there are the same dangers of using cost per unit area as a benchmark. Good practice would dictate that whatever definition is used it is clearly stated.

The CEEC code does not remove the differences in practice but it does identify that they exist.

#### **4. CEEC COST GROUP DEFINITIONS WITH UNIFORMAT II ELEMENTS**

##### **CEEC Code of Measurement for Cost Planning**

*With ASTM Uniformat II (E 1557-02) allocated*

**NOTE: includes additional costs items listed in Appendix X2 and references to ASTM Standard Terminology of Building Economics (E833-02a)**

##### **Cost groups**

##### **Principles for cost information**

Cost information should always include the base date, exchange rates and, in the case of costs in use, the period in time being evaluated. In addition the project time scale for construction including planning and approval should be stated.

Costs will generally be placed in the most suitable category; minor deviations due to restrictions of national coding should be noted.

In some countries it may be difficult to subdivide costs into the cost groups. In these cases groups may be combined for analysis purposes (e.g. groups C + D in Spain).

The limits of any costs (e.g. costs within site boundaries) should be clearly stated.

#### **CONSTRUCTION COSTS**

##### **A Preliminaries**

###### *Definition*

General site installations, preliminaries and temporary works which is not incorporated in the appropriate Cost Groups including cranes, temporary site accommodation, scaffolding, measuring, setting out, drying out, cleaning work, site security, temporary enclosures and contractors' on site management and contractors' risk.

*USA: ASTM Uniformat II (E 1557-02)*

Z60 Field requirements, Office overheads and Profit

Z30 Contractor's inflation allowance only. Other allowances should be allocated to group N

*Some of these terms are also defined in ASTM Standard Terminology of Building Economics (E833-02a)*

##### **B Substructure**

###### *Definition*

All building work up to the structural upper surface of the lowest floor slab including basement excavation and filling, pumping, supports to sides of excavation, foundations, walls below lowest floor slab, excluding drainage (see cost groups F and I).

**USA: ASTM Uniformat II (E 1557-02)**

A10 Foundations

A2010 Basement excavation (basement walls see cost group C)

## **C External superstructure/envelope**

### ***Definition***

All external building work above the substructure including roofs (together with associated beams, balustrades and the like), external walls (together with associated columns and beams), external windows (with external sun protection), external doors and external finishes but excluding internal finishes. Excluded are the costs of suspended or cantilevered balconies and frame costs where these cannot be separated from the internal structure (to be included in group D).

**USA: ASTM Uniformat II (E 1557-02)**

A2020 Basement walls

B1020 Roof construction

B20 Exterior enclosure

B30 Roofing

## **D Internal superstructure**

### ***Definition***

All remaining superstructure including suspended floors and balconies (together with any associated columns and beams, topping concrete and the like), stairs, internal walls and partitions, internal columns and beams (together with any external frame costs where these are not included in group C), internal windows and doors, internal screens, balustrades and handrails but excluding internal finishes.

**USA: ASTM Uniformat II (E 1557-02)**

B1010 Floor construction

C10 Interior construction

C20 Stairs

## **E Internal finishings**

### ***Definition***

Floor, wall and ceiling finishes including screeds, raised floors, internal panelling and cladding, suspended ceilings, decoration and finishes to balconies.

**USA: ASTM Uniformat II (E 1557-02)**

C30 Interior finishes

## **F Services installations**

### ***Definition***

Mechanical and electrical installations including heating, ventilation and sanitary installations, lifts, power, lighting, energy production systems, telecommunication installations, fire and security systems, building management systems and the appropriate control systems and commissioning.

**USA: ASTM Uniformat II (E 1557-02)**

- D10 Conveying
- D20 Plumbing
- D30 HVAC
- D40 Fire Protection
- D50 Electrical

## **G Special equipment**

### ***Definition***

Special mechanical and electrical equipment in relation to the use of the building including fixed and mobile equipment, IT-Systems, production installations, professional kitchen equipment, cold stores and refrigeration, and the appropriate commissioning.

**USA: ASTM Uniformat II (E 1557-02)**

- E10 Equipment

## **H Furniture and fittings**

### ***Definition***

Fixed and mobile furniture and fittings including cupboards, gymnasium equipment, signage, curtains, loose carpets, consumable stores and artwork.

**USA: ASTM Uniformat II (E 1557-02)**

- E20 Furnishings

### **NOTE USA: ASTM Uniformat II (E 1557-02)**

*Elements F10 and F20 relate to undefined works and will need to be allocated on a project-by-project basis with appropriate notes.*

- F1010 Special Structures: envelope only, eg air supported structures, allocate to group C.
- F1010 Special Structures: part or whole buildings combine more than group as appropriate
- F1020 Integrated Construction: combine more than group as appropriate or identify where costs have been allocated eg 'bathroom pods included in group F services installation'
- F1030 Special construction systems: allocate by primary function, eg vibro-compacted piles to group B Substructure, or security systems to group F services
- F1040 Special facilities: allocate to group G special equipment, or group H Furniture and fittings as appropriate
- F1050 Special controls and instrumentation: allocate to group F Services installation, or group G Special equipment as appropriate
- F2020 Selective building demolition: allocate to building elements as appropriate

## **I Site and external works**

### ***Definition***

General Building work to site outside of buildings including site preparation, demolitions, external services supplies, drainage, external lighting, paving, gardening, fencing and minor buildings or civil engineering works.

**USA: ASTM Uniformat II (E 1557-02)**

- G10 Site preparation
- G20 Site improvements
- G30 Site mechanical utilities
- G40 Site electrical utilities
- G90 Other site construction

## **J Construction contingencies**

### ***Definition***

The total of any general provision for construction contingencies

**USA: ASTM Uniformat II (E 1557-02)**

*Not included but defined in ASTM Standard Terminology of Building Economics (E833-02a)*

## **DESIGN AND INCIDENTAL COSTS**

## **L Design Team fees**

### ***Definition***

Fees for consultants to the client including those for architect, structural, mechanical and electrical engineers, construction economists, quantity surveyors, town and country planners, surveyors, site managers, contract managers, planning supervision (health and safety) and specialist planners, but excluding the costs of documentation, copies of drawings etc. and excluding legal fees (cost group M)

**USA: ASTM Uniformat II (E 1557-02)**

- Z10 Design allowance

## **M Ancillary costs and charges**

### ***Definition***

General incidental costs to the client including the costs of models, documentation, copies of drawings etc., laying of foundation stone, topping out, inauguration, competitions, permits, planning charges, connection charges for utilities, insurances, third party compensation, client's involvement, legal fees in association with construction, compensating payments due to statutory requirements.

**USA: ASTM Uniformat II (E 1557-02)**

*Not included*

## **N Project Budget contingencies**

### ***Definition***

Contingency allowances included in the budget for risk items such as inflation, client changes and the like.

**USA: ASTM Uniformat II (E 1557-02)**

*Not included*

**O Taxes on design and incidental costs**

**Definition**

Value added tax and any other taxes on design and incidental costs.

**USA: ASTM Uniformat II (E 1557-02)**

*Not included*

**COSTS IN USE**

**P Maintenance**

**Definition**

Costs in use for repairs, refurbishment and restoration

**USA**

*Not defined but see ASTM Standard Terminology of Facility Management (Building Related) (E1480-92) and ASTM Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems (E917-02) and BOMA definitions.*

**Q Operation**

**Definition**

Cost in use for operation including, cleaning, water, energy, waste disposal, insurance, inspection and servicing of mechanical and electrical services, administration, management and caretaking.

**USA**

*Not defined but see ASTM Standard Terminology of Facility Management (Building Related) (E1480-92) and ASTM Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems (E917-02) and BOMA definitions.*

**R Disposal**

**Definition**

Cost of sale or other disposal of property

**USA**

*Not defined*

**S Decommissioning**

**Definition**

The cost of demolition and site clearance at the end of the life cycle taking into account any resale value.

**USA**

*Defined in ASTM Standard Terminology of Building Economics (E833-02a)*

**T Taxes**

***Definition***

Value added tax and any other taxes on costs in use.

**USA**

*Not defined*

**LAND AND FINANCE**

**U Land costs**

***Definition***

Cost of land including all cost associated with the acquisition, purchase or lease of the site and legal fees.

**USA**

*Not defined*

**V Finance**

***Definition***

The cost to the Client of finance including interest on loans, capital and site lease, bank charges and mortgage costs.

**USA**

*Not defined*

**W Grants and subsidies**

***Definition***

Any financial grants and contributions payable to the project.

**USA**

*Not defined*

**X Taxes on land**

***Definition***

All taxes in association with Land and finance

**USA**

*Not defined*

## 5. CEEC BASIC QUANTITIES DEFINITIONS

### CEEC Code of Measurement for Cost Planning

#### Basic quantities

##### Principles of measurement

All quantities shall be measured net up to the appropriate finished surfaces of construction. Unless otherwise stated, sloping areas shall be measured on the slope.

##### SITE

###### #01 m2 Site area

###### *Definition*

The area within the legal site boundaries measured on a horizontal plain and including areas of buildings, external works and untreated areas.

###### #02 m2 Footprint area

###### *Definition*

Area of the finished site, which is penetrated by buildings

##### FLOOR AREAS

###### #03 m2 Gross external floor area

###### *Definition*

The area of all floor space which is covered and enclosed to its full height, including the area of basements, measured to the outside face of outside walls and including the area of all internal walls, columns and the like measured at each floor level.

###### #04 m2 Gross internal floor area

###### *Definition*

Gross external floor area less the area of the external walls

###### #05 m2 Floor area not fully enclosed

###### *Definition*

The area of open sided balconies, canopies, cloisters (covered walkways), fire escapes, open parking areas, roof terraces and the like.

###### #06 m2 Area of internal divisions

###### *Definition*

Internal structural and non structural walls, partitions, columns, piers, chimneys, chimney breasts, other projections, vertical ducts and the like.

Note: this area includes partitions, which maybe nationally defined as lettable areas.

**#07 m2 Area ancillary to main function**

*Definition*

Toilet areas, toilet lobbies, cloakrooms, bathrooms, cleaners' rooms, bomb shelters and the like supplementary to the main function of the building.

**#08 m2 Ancillary area for services**

*Definition*

Lift rooms, plant rooms, tank rooms, fuel store, meter rooms and the like; and space occupied by permanent and continuous air-conditioning, heating or cooling apparatus and ducting.

**#09 m2 Circulation area**

*Definition*

Area of entrance halls, corridors, staircases, lift wells, lift lobbies, connecting links, fire corridors, smoke lobbies and other areas where used in common by occupiers.

**#10 m2 Usable floor area**

*Definition*

Gross internal floor area excluding all internal divisions, ancillary area for services, area ancillary to main function and circulation areas.

**FUNCTIONAL UNITS**

*Definition*

Functional units are typical units related to the particular use of a building.

Examples (not limited to):

- units of accommodation (domestic dwellings)
- numbers of students (schools)
- numbers of hospital beds (health care)
- number of hotel rooms
- seating places (theatres, restraints and concert halls)
- parking spaces (covered car parks).

The standard form of analysis permits the user to define two different units for each project, permitting for example the analysis of hotel cost per room and per bed.

**#11 no. Primary functional units**

**#12 no. Secondary functional units**

## REFERENCES

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## BIOGRAPHICAL NOTES

**Joe Martin** is Executive Director of the Building Cost Information Service Ltd (BCIS Ltd). He is a Fellow of the Royal Institution of Chartered Surveyors and a Member of the Chartered Management Institute. He has been responsible for setting up and developing the BCIS Ltd information data bases for capital and running cost of buildings, including the BCIS *Online* service which provides online access to price information on over 15000 projects. He has been involved in the development of price deflators, Key Performance Indicators, and capital and whole life cost benchmarks for the UK Government. He has been involved on many industry bodies including the Consultative Committee for Construction Industry Statistics, The Steering Group for Unified Classification for the Construction Industry, European Committee for Construction Economics (CEEC), International Construction Information Society Working Group 3 on Elemental Classification, The DTI Working Group on Indices, RICS Construction Design and Economics Practice Panel. He recently chaired the whole project cost group of the Cross industry response to the Barker report and worked with the NAO on their report *Using modern methods of construction to build homes more quickly and efficiently*.

## **CONTACT**

Joe Martin  
BCIS, RICS  
12 Great George Street  
Parliament Square  
London, SW1P 3AD  
UNITED KINGDOM  
Tel. + 44 20 7695 1500  
Fax + 44 20 7695 1501  
Email: [jmartin@bcis.co.uk](mailto:jmartin@bcis.co.uk)  
Web site: [www.bcis.co.uk](http://www.bcis.co.uk)