The CEEC Code of Cost Planning, Introduction and Practical Examples

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**Key words:** Construction economics, cost planning of buildings, cost analysis, life cycle costing, costs in use

**SUMMARY**

The European Committee for Construction Economics CEEC (Comité Européen des Economistes de la Construction) was established over 20 years ago as a pan-European Federation of Professional Associations in the field of construction economics.

The principal objectives of the CEEC include the harmonisation of practice and information exchange at a European level. To this end, standards are being developed that will ensure the exchange of data while, at the same time, permitting national standards and innovative parallel developments to co-exist.

The CEEC Code of Measurement for Cost Planning provides a long-sought for basis for meaningful European cross-border cost comparison of buildings. References to national standards enable analysis and comparison of building projects based on available data. The European Committee for Construction Economics (CEEC – Comité Européen des Economistes de la Construction) focused on this cost planning instrument to improve cost assessment at a pan-European level. The Code defines standard cost groups and basic quantities. The cost groups cover both the construction costs as well as costs in use and form a framework for life cycle cost analysis. The basic quantitative units are used for the establishment of common European cost indicators. The current version of the CEEC Code will be further developed over the years to come. National standards that have not been included to date will be incorporated in the future and the level of detail of the code will be enhanced.
The CEEC Code for Cost Planning: Introduction and Practical Application

Martin WRIGHT, Switzerland and Christian STOY, Germany and Switzerland

1. INTRODUCTION

The primary purpose of planning, constructing, maintaining and operating buildings is to serve peoples’ needs (cf. MBO). Accordingly, occupants, owners and, if applicable, managers, all play a vital role (cf. SIA 2000). It is their needs that decide either for or against an investment, with their decision-making process being influenced by a variety of factors. It is the intention of every rational owner (or investor) to achieve the optimum balance between costs (e.g. costs in use) and benefits (e.g. gross rental income) associated with a given property (cf. Schulte et al. 2000,15). The aim is to maximize long-term success and optimize the use of capital. To this end, both costs and benefits must be projected at an early stage and subsequently continuously monitored.

Today, investors can avail themselves of a number of nationally defined instruments for the planning of these costs. However, up until now, no such standards were available at a European level for the cross-border cost planning of building projects.

The European Committee for Construction Economics CEEC, established over 20 years ago as a pan-European Federation of Professional Associations in the field of construction economics, has been dedicating its efforts to rectifying this shortcoming. The principal objectives of the CEEC include the harmonisation of practice and information exchange at a European level. To this end, standards are being developed that will ensure the exchange of data while, at the same time, permitting national standards and innovative parallel developments to co-exist.

The CEEC Code for Cost Planning has created a standard high level summary for the classification of construction costs and the costs in use of real estate (cf. Figure 1). In addition, the Code defines the basic quantities that enable the development of uniform cost indicators and thus a meaningful cost comparison. The structure of the Code is designed in such a way as to allow existing national standards to be applied at a more detailed level (principle of subsidiarity).
This paper provides an introduction to the CEEC Code outlining the current situation in Europe and demonstrating the practical application of the Code by use of an example. The first section identifies the differences in the basic quantities defined in the various national standards, which are a serious impediment to cost planning. The second section provides an overview of the CEEC Code and provides examples of definitions for cost groups and basic quantities. Finally, in the third section the application of the CEEC Code is illustrated by use of an example, showing a cost comparison between a Swiss and a German office building.

Figure 1: Interaction between European and national cost classifications
2. STARTING POINT IN EUROPE

A seminar held at the Swiss Federal Institute of Technology in Lausanne (EPFL) in 1998 marked the starting point for the work towards a European standard for cost planning. The seminar focused on the fact that differing methods and standards for cost planning are in use throughout Europe, and endeavoured to identify both the similarities and differences used by the national approaches.

In collaboration with the CEEC, experts from Denmark, Finland, France, Ireland, Netherlands, Spain, Switzerland and the United Kingdom met to address these issues:

Using typical projects as examples, representatives of each country demonstrated the approaches to cost planning used in their respective countries. In addition, they applied their national standards to the determination of the building costs of a common “model” building. On this basis, differences and similarities in the approach to cost determination were highlighted.

The initial finding was that all countries use element-orientated cost planning processes. This approach entails the subdivision of a building into its individual functional components (e.g. roofs, walls, heating systems, etc.) using element-based reference quantities (e.g. roof area, internal wall area, etc.) and composite unit rates for the components to estimate their construction costs. The overall construction costs are the sum of the costs of all individual building components. It also transpired that the contents of the various elements were quite comparable, even though their country-specific coding and grouping revealed significant differences.

Despite the common ground, the overall cost indicators from the same “model” building arrived at different results, which could not be solely explained by differing national costs. The problem was found to be that neither the reference quantities nor the overall scope of costs were in fact not really comparable.

As a common denominator, the floor area was used as the relevant basic unit in all countries. However, it emerged that there were significant deviations in the various definitions of floor area, which rendered the resulting comparison of cost indicators invalid. Figure 2 illustrates just how different the results of the floor area determinations were (for the same “model” building).

Figure 2 demonstrates the relevance of uniform definitions for basic quantities, which are required in addition to cost group definitions. The results from Denmark and Spain on the one hand and France on the other hand indicated a deviation of almost 100%.
In addition it was discovered that costs calculated covered differing scopes and, depending on the country the following costs were included:
- Building construction and external works (all countries)
- Professional fees for planning (all countries except France)
- land costs (only Switzerland and Denmark)
- the cost of finance (only Switzerland and Denmark)

The resulting comparison of costs per square meter were thus highly misleading!

A number of requirements were identified for the development of a common CEEC Code:
- The CEEC Code must have a high level structure for standard summaries.
- The CEEC Code must allow the integration of existing national standards.
- The CEEC Code must define both cost groups and basic quantities.

3. CEEC CODE OF MEASUREMENT FOR COST PLANNING

The initial development of the CEEC Code was carried out by a CEEC working group consisting of representatives from Germany, Ireland, Switzerland and the United Kingdom. Input was also provided by the national associations from Belgium, Finland, France, the Netherlands and Spain.

Based on the results achieved by this working group the Code was approved by the General Assembly of the CEEC in 2003 and introduce as a European standard for cost planning in 2004. The contents are explained in greater detail in the following sections. Given their
volume and scope, the illustrations are limited to the basic structure and to examples of the definitions of typical cost groups and basic quantities.

### 3.1 Cost Groups

The cost groups of the CEEC Code provide a common structure for summarising the costs of real estate (building and land). Covering overall investment costs (including initial costs and costs in use) the Code takes a more comprehensive approach than is the current practice in a number of countries. This enables long-term cost planning beyond the planning and execution phase.

The entire usage period of a property, including operation and maintenance, whether incurred on a regularly recurring basis (e.g. electricity costs) or a sporadic basis (e.g. costs for replacements and repair) can be analysed using this classification.

The CEEC Code summarises cost under four main headings, which are further subdivided into the cost groups.
- **Construction costs**: including the production costs of the building and external works and incorporating both the costs of preparatory work, structures, technical installations and finishes.
- **Design and incidental costs**: these include the design team fees, ancillary costs for insurance coverage, permits and charges, etc., as well as budget contingencies.
- **Costs in use**: the costs of operation, maintenance, disposal and decommissioning of the property. Excluded are the users’ operation-specific personnel and material costs not directly associated with the building.
- **Land and finance**: these cost groups cover costs of land, the cost of capital and finance (including the financing costs during the construction phase) while also allowing for income from the amounts received from grants and subsidies.

The classification enables the comprehensive assessment of the costs of a property, while at the same time permitting the exclusion of individual cost groups. The use of the CEEC Code emphasizes the differing scopes of national practice. The Code states specifically: “Not all cost groups or basic quantities will be applicable to every country. Where cost groups or basic quantities are not used, this will be clear and avoid misunderstandings on scope and content” (CEEC 2004).

A number of general comments regarding cost comparisons should be made before addressing the classification details.

The CEEC Code sets out additional information that is necessary for a meaningful cross-border cost comparison:
- Cost information should always include base date and exchange rates.
- In the case of costs in use, the time period being evaluated should also be included.
- Information on the scope and quality must be included.
- Where possible, the project time scale for construction, including planning and approval, should be stated.
- If all costs cannot be directly allocated to the CEEC cost groups, this should be noted. In such cases, the combination of cost groups is foreseen (e.g. the combination of cost groups C + D in Spain).
- The limits of any costs (e.g. costs within site boundaries) should be clearly stated.

Table 1 below has been taken directly from the CEEC Code and provides a trilingual summary of the cost groups.
<table>
<thead>
<tr>
<th>Cost groups</th>
<th>Groupes de coût</th>
<th>Kostengruppen</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONSTRUCTION COSTS</td>
<td>COÛTS de CONSTRUCTION</td>
<td>BAUKONSTRUKTIONEN</td>
</tr>
<tr>
<td>A Preliminaries</td>
<td>Installations de chantier, échafaudages</td>
<td>Baustelleneinrichtungen und allgemeine Kosten</td>
</tr>
<tr>
<td>B Substructure</td>
<td>Fondations, infrastructure de base</td>
<td>Struktur bis Oberkante Bodenplatte</td>
</tr>
<tr>
<td>C External superstructure/envelope</td>
<td>Structure externe/enveloppe</td>
<td>Struktur außen oberhalb Bodenplatte</td>
</tr>
<tr>
<td>D Internal superstructure</td>
<td>Structure interne</td>
<td>Struktur innen oberhalb Bodenplatte</td>
</tr>
<tr>
<td>E Internal finishings</td>
<td>Finitions intérieures</td>
<td>Innere Bekleidungen</td>
</tr>
<tr>
<td>F Services installations</td>
<td>Installations</td>
<td>Installationen und Transportanlagen</td>
</tr>
<tr>
<td>G Special equipment</td>
<td>Equipement spécifiques</td>
<td>Spezielle Ausrüstungen</td>
</tr>
<tr>
<td>H Furniture and fittings</td>
<td>Mobilier, Agencement</td>
<td>Ausstattungen und Einbauten</td>
</tr>
<tr>
<td>I Site and external works</td>
<td>Aménagements extérieurs</td>
<td>Außenanlagen</td>
</tr>
<tr>
<td>J Construction contingencies</td>
<td>Divers et imprévus (construction)</td>
<td>Bau-Reserven</td>
</tr>
<tr>
<td>K Taxes on construction</td>
<td>Taxes sur les coûts de construction</td>
<td>Steuern auf Baukonstruktionen</td>
</tr>
<tr>
<td>L Design Team fees</td>
<td>Honoraires de conception et de construction</td>
<td>Planungshonorare</td>
</tr>
<tr>
<td>M Ancillary costs and charges</td>
<td>Charges et Frais Généraux</td>
<td>Baunebenkosten</td>
</tr>
<tr>
<td>N Project Budget contingencies</td>
<td>Réserves (variation économique)</td>
<td>Budget Rückstellungen und Reserven</td>
</tr>
<tr>
<td>O Taxes on design and incidental costs</td>
<td>Taxes sur Charges et coûts auxiliaires</td>
<td>Steuern auf Planungs- und Baunebenkosten</td>
</tr>
<tr>
<td>COSTS IN USE</td>
<td>COÛTS D'EXPLOITATION</td>
<td>NUTZUNGSKOSTEN</td>
</tr>
<tr>
<td>P Maintenance</td>
<td>Maintenance</td>
<td>Unterhalt</td>
</tr>
<tr>
<td>Q Operation</td>
<td>Coûts d'exploitation</td>
<td>Betrieb</td>
</tr>
<tr>
<td>R Disposal</td>
<td>Vente et rendement</td>
<td>Veräußerung</td>
</tr>
<tr>
<td>S Decommissioning</td>
<td>Démolition</td>
<td>Rückbau</td>
</tr>
<tr>
<td>T Taxes</td>
<td>Taxes</td>
<td>Steuern auf Nutzungskosten</td>
</tr>
<tr>
<td>LAND AND FINANCE</td>
<td>BIEN-FONDS FINANCES &amp; GRUNDSTÜCK UND FINANZIERUNG</td>
<td></td>
</tr>
<tr>
<td>U Land costs</td>
<td>Coût du bien-fond</td>
<td>Grundstückskosten</td>
</tr>
<tr>
<td>V Finance</td>
<td>Finance</td>
<td>Finanzierung</td>
</tr>
<tr>
<td>W Grants and subsidies</td>
<td>Aide et subsides</td>
<td>Beiträge und Subventionen</td>
</tr>
<tr>
<td>X Taxes on land</td>
<td>Taxes sur le bien-fonds et finance</td>
<td>Steuern</td>
</tr>
</tbody>
</table>
In addition to listing the cost groups, the CEEC Code also provides precise definitions, as demonstrated below for cost group E, “internal finishings” (cf. Figure 3) and assists users by listing references to individual national standards. Where a national standard does not provide the relevant cost groups this is stated.

<table>
<thead>
<tr>
<th>Cost Group</th>
<th>Definition</th>
<th>National Standards</th>
</tr>
</thead>
</table>

**Figure 3:** Definition of cost groups of the CEEC Code (2004) (extract)

### 3.2 Basic Quantities

As indicated above, it was imperative to define the basic quantities for cost planning. The CEEC Code creates clarity by working with multilingual definitions and cross-references to existing national standards. As a result, differing national measuring approaches can remain in existence, but the differences can be readily identified. The resulting cost indicators can then be suitably interpreted.

The definitions are limited to 12 basic quantities for site, floor areas and functional units (cf. Table 2). As yet, no definition has been provided for the element-based quantities (e.g. roofs, external walls, internal walls). For this purpose, national standards may still be used although differing national definitions make comparison at a more detailed level more difficult.

In addition, certain overall considerations regarding basic quantities are set out:
- All quantities are to be measured net up to the appropriate finished surface of construction.
- Sloping areas are generally measured on the slope (and not as projected in relation to a plan area).

Along with these general comments, all 12 basic quantities are defined and cross referenced to the national standards. Figure 4 illustrates the definitions of gross internal and gross external floor areas.
<table>
<thead>
<tr>
<th>Basic quantities</th>
<th>Quantités de base</th>
<th>Grundmengen</th>
</tr>
</thead>
<tbody>
<tr>
<td>SITE</td>
<td>TERREIN</td>
<td>GRUNDSTÜCK</td>
</tr>
<tr>
<td>#01 Site area</td>
<td>Surface terrain</td>
<td>Grundstücksfläche</td>
</tr>
<tr>
<td>#02 Footprint area</td>
<td>Surface bâtie</td>
<td>Gebäudegrundfläche</td>
</tr>
<tr>
<td>FLOOR AREAS</td>
<td>SURFACES</td>
<td>DE GESCHOSSFLÄCHEN</td>
</tr>
<tr>
<td>#03 Floor area not fully enclosed</td>
<td>Surface plancher externe</td>
<td>Außen-Geschoßfläche</td>
</tr>
<tr>
<td>#04 Gross external floor area</td>
<td>Surface plancher brute</td>
<td>Geschoßfläche brutto</td>
</tr>
<tr>
<td>#05 Gross internal floor area</td>
<td>Surface plancher nette</td>
<td>Geschoßfläche netto</td>
</tr>
<tr>
<td>#06 Area of internal divisions</td>
<td>Surface de construction</td>
<td>Konstruktionsfläche der Innenwände</td>
</tr>
<tr>
<td>#07 Area ancillary to main function</td>
<td>Surface utile secondaire</td>
<td>Nebennutzfläche</td>
</tr>
<tr>
<td>#08 Ancillary area for services</td>
<td>Surface installations</td>
<td>Funktionsfläche</td>
</tr>
<tr>
<td>#09 Circulation area</td>
<td>Surface dégagement</td>
<td>Verkehrsfläche</td>
</tr>
<tr>
<td>#10 Usable floor area</td>
<td>Surface utile principale</td>
<td>Hauptnutzfläche</td>
</tr>
<tr>
<td>FUNCTIONAL UNITS</td>
<td>UNITÉS FUNCTIONELLES</td>
<td>FUNKTIONALE EINHEITEN</td>
</tr>
<tr>
<td>#11 Primary functional units</td>
<td>1. Unités fonctionnelles</td>
<td>Primäre Einheiten</td>
</tr>
<tr>
<td>#12 Secondary functional units</td>
<td>2. Unités fonctionnelles</td>
<td>Sekundäre Einheiten</td>
</tr>
</tbody>
</table>
### Figure 4: Definition of basic quantities of the CEEC Code (2004) (extract)

#### 4. COST COMPARISON OF A SWISS AND A GERMAN PROPERTY

To demonstrate the application of the CEEC Code, and highlight problems which may arise, a cost comparison between a German and a Swiss building was carried out. The purpose was to determine, which of the major differences are relevant in terms of cost. This involves a typical cost comparison task as it is frequently presented to construction economists in practice.

Both examples are outlined below together with the associated construction cost analyses. As an illustration of the national differences, country-specific cost planning standards and the selection of the properties are presented.

#### 4.1 German and Swiss Cost Groups

The German cost planning standard DIN 276 (1993) breaks down costs at three levels. On the first level, it differentiates between the structural parts of the building and its technical installations. On the second level, the specified cost groups are broken down into so called macro elements (cf. Figure 5). As a general principle, the allocation follows the idea that a building is segmented on the basis of its structure and layout.
It is only on the third level that DIN 276 (1993) provides the building elements required to allow allocation according to the CEEC Code. The macro element 330 “external walls”, for example, comprises the following elements:

- Loadbearing external walls (DIN cost group 331, CEEC group C)
- Non-loadbearing external walls (DIN cost group 332, CEEC group C)
- External columns (DIN cost group 333, CEEC group C)
- External doors and windows (DIN cost group 334, CEEC group C)
- External cladding units (DIN cost group 335, CEEC group C)
- Internal wall linings (of external walls) (DIN cost group 336, , CEEC group E)
- Prefabricated facade units (DIN cost group 337, CEEC group C)
- Sun screens (DIN cost group 338, , CEEC group C)
- External walls, other items (DIN cost group 339, CEEC group C)

Similarly to DIN 276, the Swiss cost planning standard, the EKG (SN 506502 2000), also involves a cost classification by elements. This also includes all costs incurred during the construction of a building. In contrast to the German standard, it is applicable to both construction and civil engineering works.

On the first level, the costs are broken down into so-called element groups (single-digit codes A to Z, cf. Figure 6). Elements follow directly at the second level (two-digit numerical codes). These are used for allocation to the CEEC Code.
### Figure 6: Swiss cost groups in accordance to EKG Elementkostengliederung (SN 506502 2000)

Both cost standards adhere to the concept of an element-oriented cost classification on which the CEEC Code is also based.

### 4.2 German and Swiss Basic Quantities

In addition to the cost definition, the definition of the reference quantities must also be examined more closely in connection with a cost comparison. This is necessary for the development of typical reference data at a more detailed level.

Both the German and the Swiss standard work with the “gross external floor area” as the reference unit for the costs of the building. However, they use different definitions of area.

The German definition differentiates between three types of “gross external floor area” (cf. DIN 277-1 1987a).
- Area A: covered and fully enclosed on all sides
- Area B: enclosed on all sides but not covered
- Area C: covered but not enclosed on all sides

The Swiss “gross external floor area” only includes the areas in Area A (cf. SIA 416 2003).

The CEEC Code defines a standardised gross floor area and references this back to the appropriate definitions in the national standards. The gross external floor area is the ground projection plan area – covered and enclosed on all sides – of all accessible floors including the base surface area of structural elements” (SIA 416 2003). This only covers the German Area A.
4.3 Selection and Brief Description of Examples

A typical use of the CEEC Code for the comparison of a German and a Swiss office building is illustrated in the example below.

The major cost databases in Germany and Switzerland were available for the selection of buildings to be analysed:
- BKI (Baukosteninformationszentrums Deutscher Architektenkammern)
- crb (Schweizerische Zentralstelle für Baurationalisierung)

While the German cost database offers more than 1,000 buildings analysed at various levels of detail, the Swiss database provided only approximately 75 buildings, which were however all analysed in detail (at element level according to SN 506502 2000). The large number of German analyses is however not relevant in the present assessment since the overwhelming majority of the buildings is not available at a sufficiently detailed level. The allocation of German buildings to the CEEC Code requires the third level according to DIN 276 (1993). Only 321 German buildings are available on this third level.

The available buildings were first narrowed down by selection of buildings with office usage. In this process it emerged that only 29 German and 2 Swiss buildings included more than 80% of office space or space used for offices. All other buildings are mixed-use office buildings or include substantial amounts of other types of usage.

Additionally, in order to identify comparable buildings, a selection was made from among the remaining data with respect to the following characteristics:
- Year of construction
- Type of construction
- Absolute size (measured in m² gross external floor area)

On the basis of the selection processes described above, two buildings were identified showing largely similar characteristics. They are used for the comparison of cost indicators below:
- Germany: 1300-062 “Office building with bank branch office” (cf. BKI 2004)
- Switzerland: 065/113 “Administrative centre” (cf. crb 2004)

Figure 7 contains a brief description of these two office buildings and the associated data in accordance with CEEC Code conventions. Neither of the buildings is used solely for offices. The German building also includes bank premises while the Swiss building also accommodates a police station. However, the majority of the area of both buildings is in fact used for offices.
Figure 7: Project information of examples in accordance to the CEEC Code (2004)

In addition to the aforementioned descriptions, both databases provide detailed descriptions of elements. Due to scope, a discussion of these is omitted here. These descriptions are particularly helpful for the interpretation of the cost comparison (see section “Comparison of Cost Indicators of Examples”) since they provide a precise overview of the building.

4.4 Cost Data and Basic Quantities of Examples

The analyses are restricted to construction cost data analysed in accordance with the national classifications. The CEEC cost groups for “costs in use” and “land and finance” were not included in the available data and were excluded from the analysis.

The comparison of the German and the Swiss cost data requires a definition based on uniform reference units. The CEEC Code provides floor area definitions and definitions of functional units for this purpose (cf. Table 2).

Given the available data, the determination of reference units for both the German and the Swiss property is only possible in part (cf. Figure 8). In the databases, only the number of workplaces and the gross external floor area are available for both properties. It must be noted, above all, that only the German gross external floor area for area A can be used and not the total for areas A, B and C (see section “German and Swiss Basic Quantities”).

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CEEC Code of Measurement for Cost Planning

<table>
<thead>
<tr>
<th>Standard form of cost analysis</th>
<th>Office building with bank branch office</th>
<th>Administrative centre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project reference</td>
<td>BKI: 1300-062</td>
<td>crb: 065/113</td>
</tr>
<tr>
<td>Country of origin</td>
<td>Germany</td>
<td>Switzerland</td>
</tr>
<tr>
<td>Location</td>
<td>Konstanz</td>
<td>Langenthal</td>
</tr>
<tr>
<td>Currency/Price base data</td>
<td>€</td>
<td>€ (1 € = 1.56 CHF)</td>
</tr>
<tr>
<td>Evaluation period (from / to)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Period for costs in use (year)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Quantity used for analysis</td>
<td>Gross external floor area</td>
<td>Gross external floor area</td>
</tr>
<tr>
<td>Refurbishment area (%)</td>
<td>0 %</td>
<td>0 %</td>
</tr>
<tr>
<td>Programme</td>
<td>Start on site 1990</td>
<td>Start on site 1990</td>
</tr>
<tr>
<td>Description of works and quality</td>
<td>Basement: plant rooms, lift room, storage and toilet areas.</td>
<td>2 basement floors: parking, lift room, delivery area, central archive, plant rooms and computer room.</td>
</tr>
<tr>
<td></td>
<td>2 upper floors with individual and open plan offices, partly including computer cabling, storage areas, tea kitchens and toilet areas.</td>
<td>Ground floor: entrance lobby, information, offices, police station.</td>
</tr>
<tr>
<td></td>
<td>Reinforced concrete frame, grid 4.25x16.20m, reinforced concrete floor slabs, suspended slabs, columns and walls with aluminium external cladding, glazing partly to open, partly fixed, raised floors, suspended ceilings, flat roof, built in fittings, electrical, heating, ventilation and sanitary installations, sprinkler system, light fittings and lift installations.</td>
<td>Floors below ground in reinforced concrete construction, partitions in brickwork, above ground steel framed construction with concrete suspended slabs, aluminium external cladding, flat roof, open staircases, floor finishes in lino and carpet.</td>
</tr>
</tbody>
</table>

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4.5 Comparison of Cost Indicators of Examples

In Figure 9 the cost indicators for the properties used as examples are shown in accordance with the CEEC Code. The German property produces significantly lower reference values. However, the differences must be further investigated with reference to the scope and quality of the work.

These differences illustrate the difficulties encountered comparing statistical data, where additional information is not available. However, they also demonstrate, that the CEEC code can be used to highlight differences, which in practice it is usually possible to clarify with the planning team concerned.

Figure 9: Absolute and construction cost indicators of examples in accordance to the CEEC Code (2004) (cost as at: 2005)
5. CONCLUSION

The purpose of the CEEC Code is to guarantee a uniform standard for comparing cost indicators across countries. The CEEC Code in its first version of 2004 fulfils this purpose, integrating national standards in doing so. The relevant components of the Code include, above all, higher-level cost and area definitions that are capable of validation.

The cost comparison of a German and a Swiss office building described as an example demonstrates that differences must also be investigated at a more detailed level. Here the CEEC Code does not yet offer assistance. There is, above all, a lack of suitable definitions of additional areas (for example a uniform definition of external wall area) that would permit a comparison of cost indicators.

Demands for the future development of the CEEC Code include support for cost comparison at a more detailed level. It would also be desirable to incorporate the standards of additional countries (for example from France and Italy) in addition to the national standards that have been integrated to date (for example Germany, Switzerland, United Kingdom and Ireland).

REFERENCES

DIN 277-2. 1987b. Grundflächen und Rauminhalte von Bauwerken im Hochbau: Gliederung der Nutzflächen, Funktionsflächen und Verkehrsflächen (Netto-Grundfläche) (Plan areas and volumes in buildings: Classification of utilization areas, operating areas and circulation areas (gross internal floor area)). Berlin: Beuth.
MBO Musterbauordnung für die Länder des Bundes (Model building code for the German federal states).

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