Maintenance and Restoration Costs of Historic Buildings

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Definitions

heritage building: for the community valuable building in consequence of it's age, unique character, or the linked intellectual values (theoretical category)

(protected) monument (listed building): by the state (representatives) declared value(s) of the building (state protection, local protection, etc.) (legal category)

historic building: contrary with the usual contemporary way of design and construction the structural or functional system of the buildings is representing a preceding (historic) period as a general historic value
**Definitions**

**maintenance**: ensuring good technical conditions of a building, with as many preventive interventions as it is possible

**restoration**: technical improvement and modernizing of buildings of deteriorated or out-of-date technical state

**reconstruction**: restoring and completing an existing building of deteriorated state

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**Cost - project constraint**

[Diagram showing the relationship between Scale, Time, and Cost]
**Project management knowledge areas**

according to PMBook Guide

![Diagram of project management knowledge areas]

**Sustainability & costs**

(responsibilities of the client)

- responsible **attitude** of the client **regarding to costs**
- balance of the financial **resources** and the level of the **claims** (->costs)
- establishing / monitoring / updating **cost plans**
- **resource analyses** / **resource planning**
- cost effective **operation**

- **case sensitive** -> **heritage area** – **different challenges**
Cost information

- WBS = work breakdown structure
- resource needs
- resource norms
- estimated time of activities
- Information based on preceding projects
- company administration data (accounting, etc.)

Costs in general

- resource needs (e.g. calculating volume)
- resource norms (norm databases – e.g. ÉKS, ÉKN, ÉN, BKI etc.)
- estimated time of the work activities (volume x norm – by calculation)
Advantages of the costs standards

Costs in general

• payment per hour
• company costs (office, administration)
• procurement (method, system)
• material and utensils in store
• technological preparedness (expertise, tools)

Cost information

Historic data
• cost data on the basis of preceding projects
• company time norm system (based on preceding projects)
• own company cost norm system (based on preceding projects)

Administrative data of the company
## Investment costs

<table>
<thead>
<tr>
<th>cost type</th>
<th>content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. service fees</td>
<td>expertices, planning fees, fee of the quality surveyor, etc.</td>
</tr>
<tr>
<td>2. procedure fees, tax</td>
<td>Fees and dues, local taxes</td>
</tr>
<tr>
<td>3. cost of the plot</td>
<td>building plot, public utilities, traffic</td>
</tr>
<tr>
<td>4. construction cost</td>
<td>one or more item according to contract</td>
</tr>
<tr>
<td>5. furnishing</td>
<td>installation, furniture, pieces of art</td>
</tr>
<tr>
<td>6. operation costs</td>
<td>fees of the public services, cleaning of the building, maintenance, gardening</td>
</tr>
</tbody>
</table>

### Costs in general

**Maintenance and Restoration Costs of Historic Buildings - Vidovszky**

<table>
<thead>
<tr>
<th>Costs in general</th>
</tr>
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</table>

- 100 building plot
- 200 preparation and exploration
- 300 building – building structure
- 400 building – building installation and electrical systems
- 500 garden and exterior establishments
- 600 furnishing and arts
- 700 overhead costs, services and other
Investment costs – according to DIN 276

...as a template for WBS as well...

(level 100 in detail - sample)

Investment costs – ÖNORM B1801-1

Fields of cost:
• 0: Basement
• 1: Exploration
• 2: Building – Superstructure
• 3: Building – Building installation
• 4: Building – Finishing works
• 5: Furnishing
• 6: Exterior establishments
• 7: Fees
• 8: Overheads
• 9: Reserve

Group of fields:
2+3+4 field = Building costs
1+2+3+4+5+6 field = Construction costs
1+2+3+4+5+6+7+8+9 field = Establishment costs
0+1+2+3+4+5+6+7+8+9 field = Total costs
Advantages of the costs standards

- comparability (e.g. in case)
- systematic conception-making (complex cost frame)
- supporting budgeting activity

Cost analyses and financial planning

Cumulative value

effective cash flow

cost performance baseline

time
### Financial schedule

- **financial source plan**

![Graph showing financial schedule]

<table>
<thead>
<tr>
<th>Currency</th>
<th>Time</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

### Phases of cost analyses

<table>
<thead>
<tr>
<th>Phase</th>
<th>Cost analyses</th>
<th>Basis of calculation</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. preparation</td>
<td>Preliminary cost estimation</td>
<td>Architectural program</td>
<td>e.g. market benchmarking</td>
</tr>
<tr>
<td>2. start-up</td>
<td>Building model-based cost estimation</td>
<td>Draft plan, competition plan</td>
<td>e.g. surface based calculation – based on general cost norms</td>
</tr>
<tr>
<td>3. planning</td>
<td>Structural-based cost estimation</td>
<td>Building consents</td>
<td>e.g. structural element based calculation with structural element or construction activity related general cost norms</td>
</tr>
<tr>
<td>4. quotation</td>
<td>Detailed cost calculation</td>
<td>Construction plan or detailed technical specification (tender plan)</td>
<td>e.g. structural element and/or construction activity based calculation with structural element or construction activity related company cost norms (historic data)</td>
</tr>
</tbody>
</table>

3/23/2016
### Cost analyses and financial planning

<table>
<thead>
<tr>
<th>Phase of cost analyses</th>
<th>Basis of comparison</th>
<th>Phase of financial planning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. preparation</td>
<td>Preliminary cost estimation</td>
<td>Preliminary financial source analyses</td>
</tr>
<tr>
<td>2. start-up</td>
<td>Building model-based cost estimation</td>
<td>Financial planning, preliminary financial schedule</td>
</tr>
<tr>
<td>3. planning</td>
<td>Structural-based cost estimation</td>
<td>Budgeting, detailed financial schedule</td>
</tr>
<tr>
<td>4. Quotation</td>
<td>Detailed cost calculation</td>
<td>Financial monitoring</td>
</tr>
</tbody>
</table>

### How and how not to treat our built heritage?

- **Costs in general**
  - Maintenance and Restoration Costs of Historic Buildings - Vidovszky
How and how not to treat our built heritage?

The less you spend on maintenance the more you will spend at the end...

...on restoration...

...or as a loss...

Maintenance - Restoration

MAINTENANCE – ORIGINAL STATE

RESTORATION - CONVERSION
Fields of Maintenance

- Planned Preventive Maintenance
- Monument Sentinel Service
- Facility Management
- Industrial Establishments
- Historic Buildings
- Office Buildings, Thematic Parks

Priorities in case of maintenance

- Stability
- Building hull, building installation
- Preserving cultural goods
- Inside surfaces and aesthetics
Maintenance - restoration

Alteration – new function – optimization of the scale of the intervention (function close to the original)

Keeping the original (usually traditional) structural system - use of historic materials

Preservation of the existing structures as long as it is possible

Costs and maintenance

proper maintenance = better architectural environment

proper maintenance = preserving original fabric

proper maintenance = cost efficiency
**Efficiency - Costs**

**theoretical model**

Proper maintenance of historic buildings

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**Efficiency - Cost**

„pilot“ project

**Six historic buildings:**

+ treadmill
+ weekend-house
+ two villas
+ tenement house
+ (small) church
+ different sizes
+ (more or less) different functions
+ for minimum of 15 years neglected

survey with the naked eye (report about the present state)

**Reference building**

+ regularly checked
+ continuous maintenance

+ calculating annual costs on the basis of the maintenance works of the preceding years,
### Efficiency - Cost

„pilot” project - results

Table: Comprised cost

<table>
<thead>
<tr>
<th>Building type</th>
<th>Annualized cost of the restoration after 15 years of negligence (EUR)</th>
<th>Annual average costs in case of regular maintenance (EUR)</th>
<th>Savings (EUR)</th>
<th>Savings (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>treadmill</td>
<td>335</td>
<td>183</td>
<td>152,03</td>
<td>45%</td>
</tr>
<tr>
<td>cottage</td>
<td>2 359</td>
<td>1 337</td>
<td>1021,84</td>
<td>43%</td>
</tr>
<tr>
<td>smaller villa</td>
<td>2 518</td>
<td>2 095</td>
<td>423,72</td>
<td>16%</td>
</tr>
<tr>
<td>church</td>
<td>1 124</td>
<td>722</td>
<td>401,71</td>
<td>36%</td>
</tr>
<tr>
<td>larger villa</td>
<td>4 596</td>
<td>839</td>
<td>3757,56</td>
<td>82%</td>
</tr>
<tr>
<td>apartment house</td>
<td>2 555</td>
<td>419</td>
<td>2135,97</td>
<td>84%</td>
</tr>
</tbody>
</table>

**Insufficiencies – questions to be solved**

- stagnating norms
- small group of test samples
- inhomogeneous building stock
Efficiency - Cost

large scale model

+ large scale work
+ homogeneous building stock
+ more significant control group

Efficiency - Cost

model and reality

Costs of the restoration projects are strongly dependent on performance level (150.000 - 2.000.000 Ft/m² = 500 – 7000€/m²)

Even in case of continuous maintenance necessary to perform larger volume restoration works occasionally (e.g. because of the physical abrasion of the surfaces, war, revolution, natural disaster etc.)

The monitoring of extended buildings needs a development regarding to the methodology.

Below a minimal sum of expenditure not even the maintenance system works.
**Maintenance principles**

**consequences**

The right attitude seems advantageous.

The monument monitoring system is likely to be supported by proper statistical and case data.

**Maintenance principles**

**challenges**

- no universally accepted principals
- missing guidelines and standards in the field
- modest financial sources of the owners
- missing expertise and professional staff
**Principals and guidelines**

*maintenance in general*

- integration of maintenance aspects in planning process
- based on POE (post occupancy evaluation)
- durable materials, easy-maintainable surfaces

**Cost increasing factors**

*at restoration of historic buildings*

- applying compatible historic materials – rare materials (low-scale production)
- conservation, maintenance plans
- lower technical performances - more sensitive maintenance
- applying historic technologies – time consuming activities
- need of specialists on every fields (designers, skilled workers, instaurators etc.) – smaller market segment - higher work fees
- need for collateral interventions (e.g. stone impregnation, solidifying, etc.)
- archeology (in case of protection)
Heritage - challenge
at restoration of historic buildings

- compensation of extra expenditure - requirements for grants, tax reduction
- moral support – statement of higher prestige of the heritage buildings
- regulation of heritage protection – what is useful, tactful, etc. from the point of view of the community? where are the limits?

Heritage buildings on the real estate market

Higher price – same price – lower price?

Is it worth to own/rent a heritage building?
Is it worth to restore a heritage building?
Does a heritage building mean a prestige?

Is it worth/possible to convert a heritage building?
Does a heritage building mean non-profiting expenditures?
Literature


www:
- http://www.bki.de 2016.03.22.

Sources

2016.03.23. Maintenance and Restoration Costs of Historic Buildings - Vidovszky