

# Maintenance and Restoration Costs of Historic Buildings

István Vidovszky PhD



Budapest University of Technology and Economics  
Faculty of Architecture  
Building Economics

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## Definitions



**heritage building:** for the community valuable building in consequence of its 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**restoration:** technical improvement and modernizing of buildings of deteriorated or out-of-date technical state

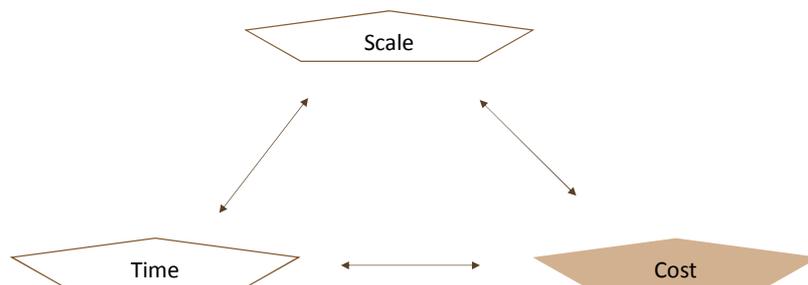
**reconstruction:** restoring and completing an existing building of deteriorated state

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## Cost - project constraint



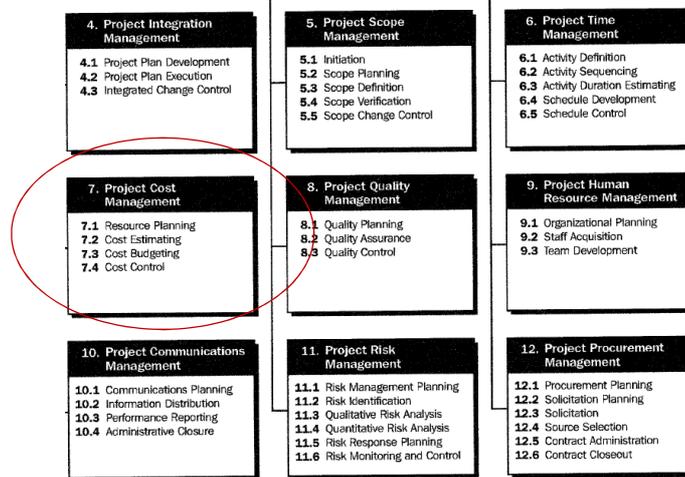
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## Project management knowledge areas

according to PMBook Guide



Costs in general

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## 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*

Costs in general

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**Costs in general**

## Cost information

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

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**Costs in general**

## Cost information

- 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)

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## Advantages of the costs standards

The screenshot shows the BKI website interface. At the top, there is a search bar and navigation links for 'Login', 'Planer-Vorzugsliste', and 'Daten an BKI liefern'. Below the navigation, there are tabs for 'Kostenplanung', 'Energieplanung', 'Büromanagement', 'Gebäudemanagement', 'Über uns', 'Aktuelles', and 'Warenkorb'. The main content area displays a carousel of building images and a list of products under the category 'Statistische Kostenkennwerte 2015 für 74 Gebäudearten - Neubau'. Two products are visible: 'Kindergärten, nicht unterkellert, einfacher Standard' and 'Kindergärten, nicht unterkellert, mittlerer Standard'. Each product has a 'Jetzt kaufen' button and a 'Details' button. The price for both is 25,00 EUR zzgl. 19% MwSt.

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## 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

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

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## Investment costs

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

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## Investment costs- DIN 276

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

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## Investment costs – according to DIN 276

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

(level 100 in detail - sampe)

<b>100 Building plot</b>	
110 Plot price (value)	
120 Incidental costs of ownership	
	121 alignment
	122 cost of legal procedures
	123 notary costs
	124 estate agent pay
	125 duty
	126 valuation, and related expertise
	127 authorization fees
	128 plot alteration, withdrawal from cultivation
	129 other incidental expenses
130 Liberation costs of the plot	
	131 indemnification
	132 resolving form restrictions
	139 other

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## Investment costs – ÖNORM B1801-1

Fields of cost:	<ul style="list-style-type: none"> <li>•0: Basement</li> <li>•1: Exploration</li> <li>•2: Building – Superstructure</li> <li>•3: Building – Building installation</li> <li>•4: Building – Finishing works</li> <li>•5: Furnishing</li> <li>•6: Exterior establishments</li> <li>•7: Fees</li> <li>•8: Overheads</li> <li>•9: Reserve</li> </ul>
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Group of fields:	<p>2+3+4 field = Building costs</p> <p>1+2+3+4+5+6 field = Construction costs</p> <p>1+2+3+4+5+6+7+8+9 field = Establishment costs</p> <p>0+1+2+3+4+5+6+7+8+9 field = Total costs</p>
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## Advantages of the costs standards

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

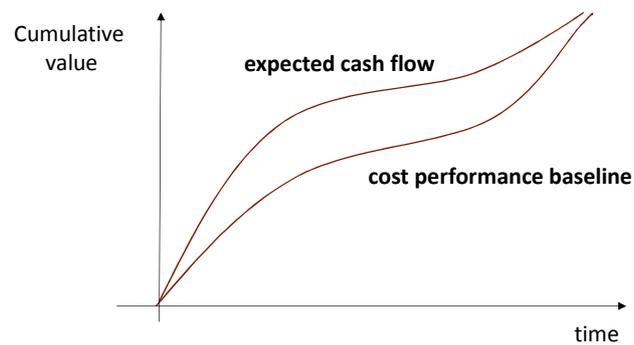
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## Cost analyses and financial planning

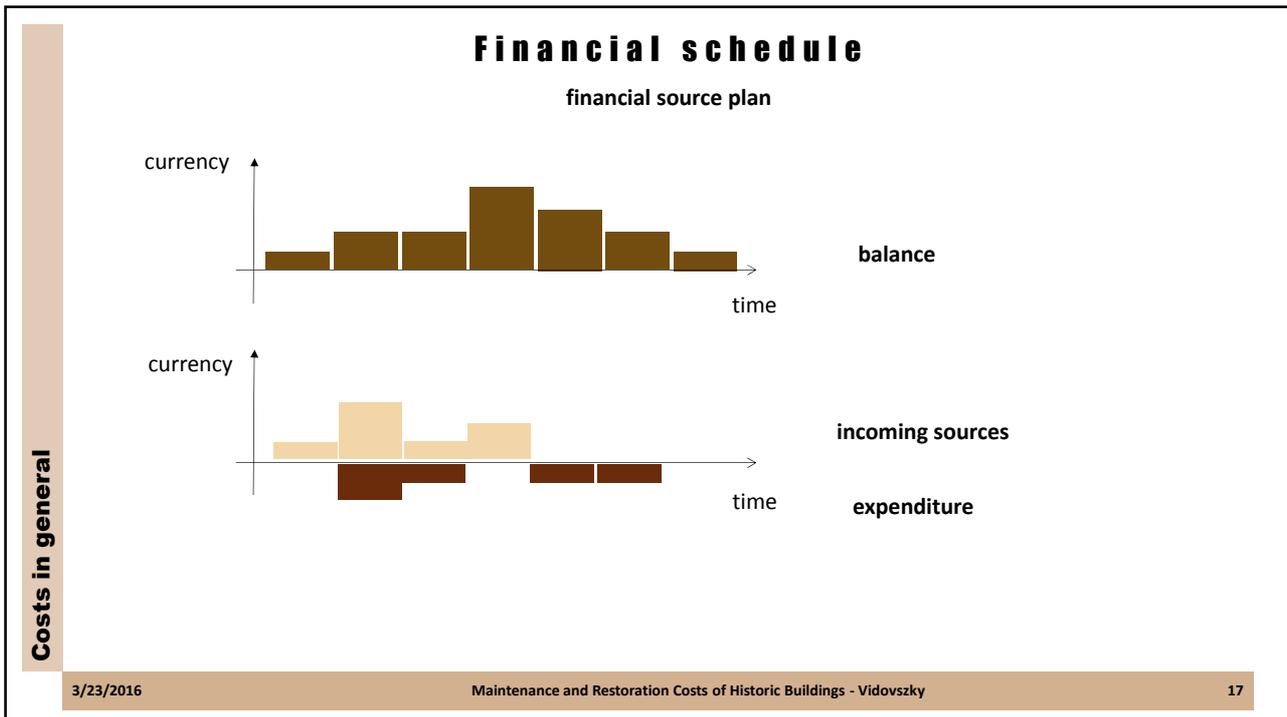


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### Phases of cost analyses

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

**Costs in general**

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## Cost analyses and financial planning

Phase of cost analyses	Basis of comparison	Phase of financial planning
1. preparation	Preliminary cost estimation	Preliminary financial source analyses
2. start-up	Building model-based cost estimation	Financial planning, preliminary financial schedule
3. planning	Structural-based cost estimation	Budgeting, detailed financial schedule
4. Quotation	Detailed cost calculation	Financial monitoring

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



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## 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...

Costs in general

## Maintenance - Restoration



MAINTENANCE – ORIGINAL STATE

RESTORATION - CONVERSION

Costs and heritage buildings

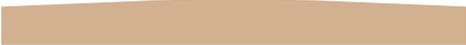
### Fields of Maintenance



### 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



LOWER ENERGY CONSUMPTION

MORE EFFICIENT PRESERVATION

### Costs and maintenance

proper maintenance = **better architectural environment**



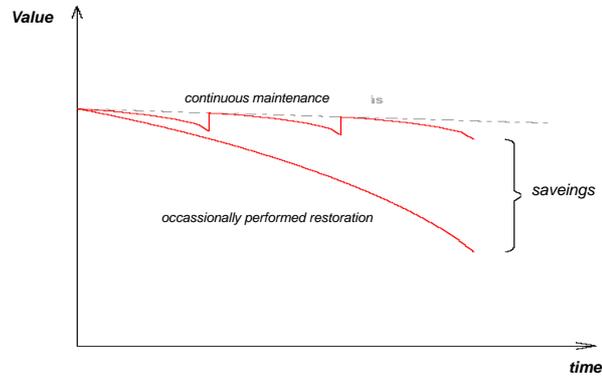
proper maintenance = **preserving original fabric**

proper maintenance = **cost efficiency**

## Efficiency - Costs

### theoretical model

Proper maintenance of historic buildings



## 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

compared cost

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

## Efficiency - Cost

„pilot” project - results

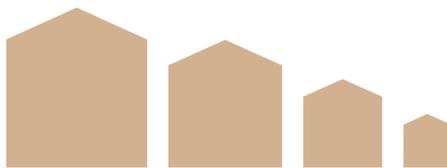
Insufficiencies – questions to be solved

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

Costs and heritage buildings

## Efficiency - Cost

large scale model



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



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Costs and heritage buildings

## Efficiency - Cost

model and reality

**Costs of the restoration projects** are strongly dependent on performance level ( $150.000 - 2.000.000 \text{ Ft/m}^2 = 500 - 7000\text{€}/\text{m}^2$ )

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.



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## 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

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cost  
reduction  
factors

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

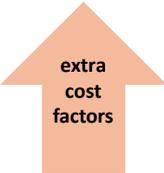


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## Cost increasing factors

### at restoration of historic buildings

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extra  
cost  
factors

- 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)

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## 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?*

*Is it worth/possible to convert a heritage building?*

*Does a heritage building mean a prestige?*



*Does a heritage building mean non-profitting expenditures?*

## Literature

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