ASSESSMENT TOOL FOR RENOVATIONS reSBToolCZ

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Summary

This paper presents reSBToolCZ, the first multicriterion assessment tool for existing buildings and their refurbishments which takes into account their cultural-historical value.

The assessment scheme comes from a general platform of SBToolCZ and adjusts selected criteria in a way that the assessment reflects cultural-historical value of buildings and recognizes it as a quality that is an inseparable part of sustainable development.

Keywords: sustainable assessment, historical monuments, embodied energy, sustainable indicators, sustainability

1 Introduction

SBToolCZ is a Czech methodology for evaluation of complex quality of buildings [1]. It is based on an international methodology SBTool (www.sbtool.cz). reSBToolCZ for existing residential buildings and their renovation is an assessment method which evaluates building and location qualities with reference to sustainable development and cultural-historical values. Analogically as in the SBToolCZ for new residential buildings, building's impact on environment is being assessed as well as socio-cultural aspects, functional and technical quality, economics and management and also location of the building.

The main aspect that, in contrast to new buildings, affects renovations of existing buildings is their cultural-historical value. It has a fundamental influence on potential renovations and also on the scale of improvements of the overall building profile. It is obvious that it is necessary to approach to a building with cultural-historical value and a building with minor cultural-historical significance (Fig. 1) differently.

Assessment methods that nowadays exist for evaluating existing buildings do not consider their cultural-historical value.

2 Priciples of assessment of building refurbishments

The assessment of refurbishments is based on an idea that if we want to reach sustainability, we have to take into account cultural historical value. This premise comes from an opinion that if we want to reach sustainability of our living, we should have in mind also our culture and history so we could be able to learn from them. Previous mistakes are less more likely

to be made again if we are aware of them. In this point of view, the cultural-historical value has its undisputable position in multicriterion and sustainability assessment of buildings.

In the light of the above mentioned facts, two main goals were implemented for the proposal of the multicriterion assessment method for existing buildings:

- Assessing the complex quality of new buildings and renovated/reconstructed buildings in a way that the resulting quality of both will be comparable;
- Systematically taking into account the cultural-historical qualities of buildings.

This approach allows us to evaluate all existing buildings without a necessity of their classification into any groups, no matter what historical quality they represent.

It is necessary to keep in mind the possibility that a number of existing buildings have neither cultural-historical quality nor the potential of environmental improvement.

Such buildings will be assessed with the reSBToolCZ method as well but the benchmarks in the criteria will not be affected by cultural-historical values. So there will not be any relative setup of the benchmarks (by improvement potential) and the buildings will be assessed practically the same way as new buildings. It is necessary to take into account also the possibility that sometimes the best solution for the existing building is its demolition.

2.1 Improvement potential

The criteria where it is necessary to take into account cultural-historical values are implemented relatively according to the building quality. This relative set up of benchmarks is called the improvement potential. This represents the scale of possible improvement in terms of the criteria influenced by the cultural historical value.

Benchmark settings are relative which means that they are always set up ad hoc building from to building according to the evaluation of original state and definition of the BAT solution for the building. Then the proposed solution lies in the interval between the original state and the BAT <original state; BAT>. The difference between these two points is called the improvement potential (Fig. 1).

Valuable facades or decorative interiors that influence the building's envelope are common matters of architectural protection. That is why all the criteria from the environment that are connected to the façade are set up with a help of improvement potential:

- E.01 Primary energy consumption;
- E.02 Global warming potential;
- E.03 Acidification potential;
- E.04 Eutrophication potential;
- E.05 Ozone depletion potential;
- E.06 Photochemical ozone creation potential.

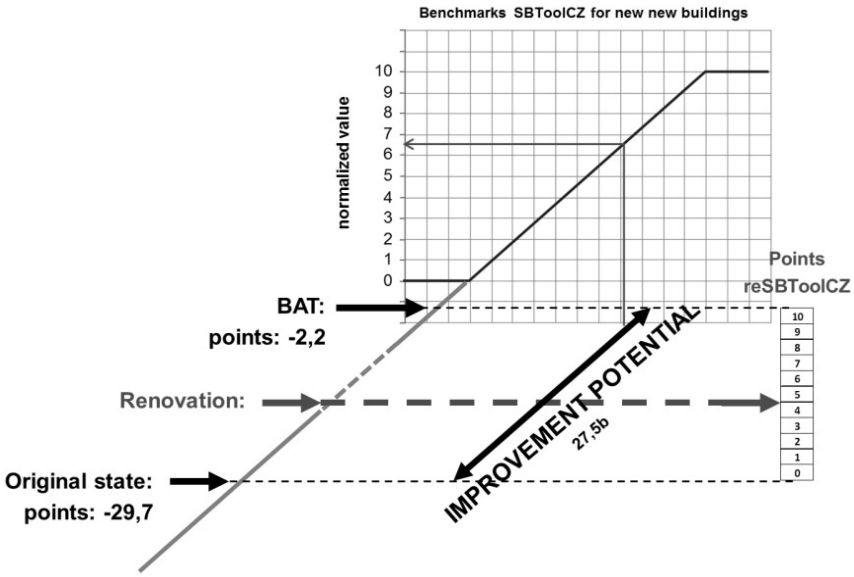

Fig. 1 *Benchmark setting with the help of improvement potential. Graph shows the layout of benchmarks for new buildings. ReSBToolCZ point evaluation of original state, BAT and designed renovation can be seen on the stretched normalization line.*

3 Case studies

3 buildings were tested on the criteria that are set up by improvement potential. Each of the buildings represents different level of cultural-historical protection. All of them are residential buildings.

First building A is a building without any cultural historical protection (Fig. 2). The secon building B is a residential building in reservation zone in the heart of Prague (Fig. 3). The third building (C) represents an architectural monument – experimental residential housing from 1965 in Prague.

In each of the buildings is the improvement potential different but only for buildings with cultural-historical value is the principle of relative benchmarks setup applied (buildings B and C). Building A does not represent any significant cultural-historical value so at the end, if it gets low rating, we might interpret the results also in a way that it could be more sustainable to demolish it and build a new building instead.

Fig. 2 *Residential building without any cultural-historical significance (A)*

Fig. 3 *Building in reservation zone (B)*

Fig. 4 *Architectural monument (C)*

Tab. 1 *Comparison of three criteria results of examined buildings when assessed with SBToolCZ for new buildings and reSBToolCZ for refurbishments – with a help of the improvement potential. Improvement potential is applied only for buildings with recognized cultural-historical value (B, C)*

Points are given in a scale from 0–10 (10 is the best)	**Points gained if assessed by SBToolCZ for new buildings**			**Points gained when assessed with reSBToolCZ**		
	Building A	Building B	Building C	Building A	Building B	Building C
E.01 Primary energy consumption	0,0	1,1	0,0	0,0	9,1	8,6
E.02 Global warming potential	0,0	0,3	0,0	0,0	9,1	8,7
E.03 Acidification potential	0,0	2,0	3,2	0,0	9,5	9,2

4 Conclusions

ReSBToolCZ is in a context of existing assessment methods for buildings completely new scheme and it differs from all currently used methodologies.

The proposed assessment method uses preservation techniques of cultural heritage protection. Interventions into the reconstruction of a building must be in compliance with these principles. Nevertheless, it is probably necessary to extend the view of cultural heritage protection to wider social demands and take it in as an inseparable part of a sustainable building. ReSBToolCZ is still coming through a development process but the basic principles and general approach are already given.

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