ERA-NET Eracobuild project

One Stop Shop - "From demonstration projects towards volume market: innovations for one stop shop in sustainable renovation"

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Project Report WP 3.1

Methodology for innovations in supply side for sustainable renovation

Additional case descriptions

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1. Barriers to the implementation of window replacement

To illustrate problems occurring in typical renovation activities, a very simple renovation case is illustrated: the replacement of one front façade window in an apartment building in Antwerp, Flanders (2nd floor). This work was executed by a contractor in January 2012. The cost of material was very low compared to the needed craftsmen: the work involved three craftsmen during two days. The following figures explain what happened and illustrate what daily problems can be observed.

Figure 1 shows the original situation: the single-glazed steel windows on the second floor are already heavily deteriorated; other apartments in the same building already did some window renovation. Prolonged lack of maintenance already led to drip contamination on, and degradation of the façade.

Figure 1: Original situation.

Figure 1/2 shows that the craftsmen were inventing on-site how to deal with the existing situation. The new windows were left outside because they were too large to enter the building. Neither parking nor a safety perimeter was arranged in advance. The original single glass panes were destroyed with a hammer. Obviously, the craftsmen could not avoid glass pieces falling on the street and on the new windows. A man stayed downstairs to 'watch' for falling pieces and to do some cleaning with a brush. Cutting machinery was used to cut the steel windows (see Figure 3). No special fire safety precautions were taken (the apartment was inhabited and stacked with furniture), neither was eye protection used.

Figure 2: Destruction of original windows by hammering.

Figure 3: Destruction of original windows by cutting.

The destruction of the original windows led to degradation of the outside cement layer of the façade. Notably, the upper left- and right-hand corner, as well as the lower right-hand corner broke to pieces. During the whole renovation, no attempts were made to restore the façade. After the destruction of the original windows, the craftsmen did nothing for several hours. Obviously, there were waiting for an elevator machine that did not arrive on time. Figure 4 shows the assembly of the new windows after the elevator arrived. It was dark with freezing outdoor temperatures before the first window could be placed.

Figure 4: Window assembly on the first day.

Figure 5 shows that at the end of Day 1 the installation of the (only) façade window system was not yet complete. Since this was the living room of the inhabitant, the apartment remained not fit for residence until the evening of the next day. Construction trash was left to linger on the street, later all trash was assembled in one container with no selective recycling.

Figure 5: End of Day 1: Trash on the street (left); windows placed (right).

Figure 6: Day 2

The building process continued until the end of day two. On day two the craftsmen engaged in finishing plasterwork on the inside. No attempts were made to repair the façade on the outside, although the craftsmen were responsible for damages. At the end, the owner still had to do a major cleaning.

The final result is shown in Figure 7: the new window system has absolutely no uniformity with the windows on the other floors. The renovation is not expected to have led to an increase in value of the building. The owner is left with mediocre energy performance, lack of airtightness due to cement cracks and extra costs for reparation. The government will get the bill for this renovation, since more than 40% is recovered from tax reduction or grants for energy saving measures.

Figure 7: final result: eclectic renovation anno 2012 in Antwerpen.

Here only one renovation measure (replacement of windows) already led to detecting more than ten quality deficiencies. Such visible evidence does not really convince clients to invest more in (more) renovation (measures), in contrast it increases the perception that renovation is a high-risk activity. It appears that with implementing single measures such as window replacement, quality is not guaranteed. Yet, such window replacements take place regularly and are promoted by policy measures and web platforms[1]. It is important to look for less intrusive and less costly solutions.

2. An example of integrated renovation in Roosendaal

To promote available technological, system and service innovation, a renovation project in Roosendaal was visited with the One Stop Shop user group on 8 September 2011. Presentations were provided by main actors involved in this renovation project (including the client) and afterwards the site was visited, guided by the building engineer and the project manager.

In two adjacent areas in the neighbourhood De Kroeven in Roosendaal, 246 houses have been renovated to Passive House standards. The project is now completed with the construction of new Passive House apartments and other house types which replace 30% of the original housing stock. The full process from initiative to completion can be considered a very important process innovation and many difficulties have had to be solved along the way, which led to the introduction of architectural innovations such as prefab façades and service innovations such as performance guarantee contracts for inhabitants. In this case, the whole façade, roof and installations were renewed in five days per house, while upgrading the whole neighbourhood. A prefab façade system was used that allowed for high quality and low construction time. The housing estate convinced more than 100 inhabitants to adopt the same type of renovation, using a demonstration project as a vehicle for volume uptake of innovation. While the example does not suggest direct solutions for the problems discovered in the previous case, the example shows what is technically and socially feasible regarding housing renovation nowadays when more than one building or apartment is dealt with.

Figure 8: Prefab renovation of a housing estate in Roosendaal, the Netherlands (visited with Flemish One Stop Shop user group 08-09-2011). Left: houses before renovation; mid: prefab façade system used during renovation; right: after renovation. Source: IEA SHC Task 37.

Until the end of the One Stop Shop project (31st August 2012) the detected system and service innovation for housing renovation was not yet found in Belgian demonstration projects. Nevertheless, the Dutch

[1] In Belgium for example by: www.renovatie2020.be

example was very successful in the Netherlands. The involved housing association Aramis Alleewonen was very pleased to have contributed to a new energy efficient way of living for the households in De Kroeven. The city further engaged in the process of redeveloping the environment of the neighbourhood, based on inhabitants' wishes. The technological method and new processes also inspired innovation in new demonstration projects by other housing associations, for example in Kerkrade-West[2].

The Dutch policy situation has already adapted to cover the need for process innovation. For example, a 'block-by-block' approach for housing renovation was defined by Dutch policy makers[3] to stimulate supply chain collaboration of at least three market actors, and specific grants were installed for to cover process cost in pilot phases. For example, the Dutch 'Energy Leap' programme[4] regularly helps communities to renovate whole neighbourhoods towards a high energy standard.

The 'worst' case study presented before is in sharp contrast with what is technically, socially and politically feasible regarding housing renovation. Many technological innovations are already available on the market for housing renovation[5]. Innovation for housing renovation should therefore focus on delivering architectural, system, service and process innovation. The social component in innovation needs stronger attention.

More information:

Row houses 505 Alphenlaan in Roosendaal NL, IEA SHC Task 37 - Advanced Housing Renovation with Solar & Conservation, http://www.iea-shc.org/publications/downloads/task37-815-Roosendaal.pdf

Row Kroeven in Roosendaal NL, IEA SHC Task 37 - Advanced Housing Renovation with Solar & Conservation, http://www.iea-shc.org/publications/downloads/task37-820-Roosendaal.pdf

Presentations of the workshop "Substantial Energy Saving in Existing Housing Now", IEA Final Workshop, 14 October 2009, Antwerp, http://www.lehr.be/NL-I-Final%20Workshop.htm

[2] Quoted during a study day at Zuyd Hogeschool: http://www.dewijkvanmorgen.nl/files/4210/hszuyd_duurzaam+bouwen_flyer+a5_08+mrt.pdf (in Dutch), also proudly promoted by the contractor: http://www.bamwoningbouw.nl/nl-nl/news/1/3/234/extreem-zuinige-huizen-dankzij-innovatief-renovatieproject-in-kerkrade-door-bam-woningbouw-weert.aspx?flash=false (in Dutch)
[3] See: http://www.agentschapnl.nl/programmas-regelingen/blok-voor-blok (in Dutch)
[4] See: http://www.energiesprong.nl (in Dutch)
[5] For example, 7-9 September 2012 more than 130 companies present technological solutions for Passive Houses and low-energy housing renovations during the Passive House 2012 building fair in Tour&Taxis, Brussels.