ABSTRACT

Past, present and future are all relevant to the buildings. Three levels of analysis have been used to cover these phases. The objective of my research was to identify the qualities of buildings which are relevant when trying to shift from decay to preservation. The influence of construction engineering, the way we can learn from it now, and the way in which a building is able to accommodate change determine the chances of a building’s long term survival – the outcome of the interaction of continuity and change: Continuity + Changeability = Durability. This has been worked mine research method: Analysing Buildings from Context to Detail in time (ABCD© research method).

An application of the ABCD© research method has been used at the residential district of Jeruzalem, Frankendaal, Amsterdam. This research created new opportunities for Frankendaal. After the second World War in Holland housing shortage led to flexible options for new dwellings. Duplex was one of those. First the house was separated in two dwellings, later it could be joined. The urban settlement Jeruzalem was built in 1952 by Merkelbach & Elling and included 792 duplex dwellings. The building system of concrete prefabricated elements determined the design and provided opportunities for future changes. In 1987 the wooden window frames on the rear elevation were replaced, loggias were closed up, the concrete was painted and the end elevations were fitted with cladding. When refurbishment is an option firstly, these changes made would be undone. The original architectural design could be regained by fitting internal thermal insulation. The duplex houses have not been combined. In 2002 the site became the victim of the new approach of the housing association, rather like that of a commercial project developer. It was decided to save some blocks of houses especially the Jeruzalem blocks. In 2005 the plans were postponed for financial reasons. In 2009 a new plan has been made and finally in 2010 part of the site became a state listed monument. In the end of 2010 the firm of Hooyschuur Architects started to take apart one of the houses and started to develop a restoration plan on the basis of those results for all the dwellings listed as monuments.

KEYWORDS

Post war, refurbishment, prefabrication, exposed concrete, monument, durability, research method

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1 INTRODUCTION

The built environment is continuously changing and such changes are particularly important when regenerating buildings. These changes add something to existing buildings and make new programmes possible. The existing buildings - history - determine continuity and form a clear additional, time-dependent layer. In general, the large number of buildings built between 1940 and 1970 cannot be listed (in the Netherlands) as national monuments and are therefore essentially unprotected especially the residential post-war areas. Furthermore, buildings from this period in particular are currently being considered for regeneration or threatened with demolition. Apart from studying relevant literature and other sources I studied seven buildings to develop a method for analysing buildings to be able to understand them. The research resulted in the Analysing Buildings form Context till Detail in time research method (ABCD\textsuperscript{2}/twothirty) that was guided by the next three research themes [Zijlstra 2009]. Those will be explained first. Secondly, the research of Jerusalem Frankendaal in Amsterdam will be worked out more in detail and finally some conclusions and future aspects will be discussed. Unique in this case is that after a period of more than ten years of theoretical planning the restoration will be based on the practice of taking apart one house carefully and make a total plan for all the dwelling on basis of these results.

2 RESEARCH THEMES

The ABCD\textsuperscript{2} research method was guided by the following themes:

2.1 Observation - with an engineer’s eye

I considered engineering and technology and the views of both architectural critics and practising architects about technology by studying the relevant literature and sources. Technology evolved after the Second World War as a result of the use of new materials, changes in legislation and standards, and the industrialisation of the construction process. This last aspect was primarily relevant to residential construction projects. Building practices changed after 1940, however, the role of technology in the process did not change materially. Comments about the contribution, or lack thereof, of technical progress to a higher architectural quality were always personal visions primarily shaped by personal taste and habits. Architects developed from supervisors to architect-managers of the entire construction process. Time schedules became an important instrument and working together with structural engineering and building services consultants became steadily more important. The cooperation between these parties affected the overall result, and all needed each other. Consequently, regular teams of architects and consultants developed, e.g. Peter Rice and Renzo Piano. The best results were developed based on synergy between the two disciplines [Rice 1994].

2.2 Research analysis

When designing completely either new objects or objects to be incorporated into an existing structure it is important to learn from the past. Not to copy it, but to analyse it and apply the lessons learned while respecting the present context. We have to evaluate knowledge and methods and develop our own design method. This applies to architecture students as much as to practising architects. This learning aspect is emphasised when a design commission concerns an existing building, but even a new build project always has a context. When dealing with an existing building that building provides the primary context and immediately becomes an element of the key points of the architect’s brief. In my view, studying criticism, experiences and interviews, and thoroughly analysing the work of others is not adequately included in the education and training of architects as designers. It would appear that architecture (the study of the requirements for constructing buildings) education should teach students and practicing architects the skills to do this, and appreciate the rewards.
2.3 Regenerative conclusions

This theme defines the approach I took when developing the conclusions of my thesis. Regeneration concerns changes which add a new period, a new generation, to the lifecycle of buildings. Life means change and the past means that we progress in a spirit of tradition and memory. Furthermore, change cannot happen without continuity. Changes to buildings are affected by both financial and technical considerations. As a student, the examples set by Gunnar Asplund and Carlo Scarpa showed me that although designing new buildings (even when embedded in the existing context) is an exciting challenge, making changes within the context of an existing building is actually a far greater challenge (Fig. 1). The existing adds a layer of history which can never be created in a true new build project. That’s when refurbishment truly becomes durable: Continuity + Changeability = Durability.

![Figure 1. Castel Vechio in Verona refurbished by Carlo Scarpa.](image)

3 RESEARCH METHOD

The work for my PhD research didn’t only result in the relevant conclusion Continuity + Changeability = Durability, but also in the ABCD research method which will be applied to the subjects covered by ®MIT at the Faculty of Architecture of Delft University of Technology and could be used on international scale. It is a method to analyse the existing before changing it. That is the only way to regenerate buildings, residential urban areas, parts of cities and urban landscapes with conscience.

Analysing Buildings from Context till Detail in time aims to discover the qualities of a building, rather than its value. Observation, the first stage of the research, aims to obtain information from the literature, the building itself, archives and interviews with stakeholders. The second stage, analysis, includes structuring, analysing and interpreting the information. In the third stage, conclusions can then be drawn on the basis of the research themes discussed above. The information is structured in accordance with the research brief. In the long term, it will be possible to identify connections (concerning both buildings and building construction) between the results of Analysing Buildings from Context till Detail in time, using the research themes as defined before.

The information obtained in the observation stage is reduced to the contextual information which affected the design, creation, existence and preservation/decay of the building. As far as the typology is concerned, we should not only consider the functional or chronological classification of buildings based on building type. Instead, we should analyse the buildings on the basis of a spatial typology, as the spatial conditions will either remain the same or change when the function of the building changes.

4 ABCD® RESEARCH MATRIX

Context is the title of the first section in which the contextual aspects are discussed: commission; location; architect; typology and design process. The later sections, which consider the building itself
in greater detail, are initially ordered by time: arising, continuing and expiring. Within these, the elements of the building are analysed at three levels: space (interior and exterior); structure (load-bearing elements and elements which determine the structure); material (shaping the space through materials which affect light, colour, texture, surface, sound, impression, smell, size and weight); building services (climate control, comfort, maintenance and communications). By combining this the actual ABCD Research Matrix was created (Fig. 2).

![Figure 2. ABCD research matrix applied on the Provincial Library in Leeuwarden.](image)

5 JERUZALEM FRANKENDAAL AMSTERDAM

Learning from existing buildings by investigating them should be a regular element in architects’ education. A course on Restoration and Renewing, my working field at @MIT at the Delft Technical University, should not be limited to preservation, but especially address new designs, like refurbishments, in existing contexts where internal changes will always be necessary. Such changes can provide the impetus to ensure the survival of buildings. The method has been applied as well for urban residential area as well for solitaire buildings. In the field of this conference I will present the research I worked out for Jeruzalem Frankendaal in Amsterdam.

5.1 Context

The architects were B. Merkelbach (1901-1961), Ch.J.F. Karsten (1904-1979) and P.J. Elling (1897-1962). The commission in 1947 included the construction of 792 dwellings designed as duplex apartments (upstairs and downstairs) which could later be combined into larger houses. The urban design was developed by J. Mulder (1900-1988) within the Algemene Uitbreidingsplan (General Expansion Plan) for Amsterdam, under the supervision of Cornelis van Eesteren (1897-1988) [Mulder 1952]. Interesting urban planning features include the first use of an open cluster structure around courtyards within a strip layout; the greenery designed by M. Ruys (1904-1999) and the playgrounds designed by A.E. van Eyck (1918-1999) [Van Eesteren 1952]. The project was built from 1949 till 1952 [Schilt & Van Rossem 2002] (Fig. 3 and 4).

5.2 Buildings

The houses were designed on a grid of 6.30 metres. The use of pre-fabricated concrete meant that this could be realised in a single span, allowing freedom in the use of the space. The facades were built with 50 x 116 cm concrete panels. On the side facing the garden, the facade was divided by the vertical chimneys in fair faced brickwork, balconies and loggias. At the front, the flat facades were divided by the vertical rainwater pipes, and only the front doors which would continue to be used after the apartments had been joined into one house had concrete canopies. All elements were designed to suit the dimensions of the Dotremont-Ten Bosch building system. This was the only project built in the Netherlands using this system. It has similarities with the Airey system that was more often used in the Netherlands but the used system was based on concrete elements [Priemus 1970] (Figs. 7 and 8). This makes it more suitable for later refurbishment because no structural damage occurred by oxidation of the load bearing structure. The roof had a slight pitch to the front of the house, hence
rainwater fittings were only needed on this side. All window frames were made of wood. This included a large window frame at the backside and smaller frames at the front side (see Figs. 9 and 10).

5.3 Future plans

From 2000 till 2010 different plans came up to restructure the whole neighbourhood of Jeruzalem Frankendaal. The plans varied from complete demolishing to partly refurbishment. In between 2000 and 2006 plans were made but financially impossible. The National Heritage Committee wasn’t able to list post war buildings at that moment. For instance in 2003 there was a shortage of 23 million Euro’s. Finally in the beginning of 2010 six blocks became national listed monuments and in the end of 2010 Hooy schuur Architects started to dismantle the façade of one of the dwellings to investigate the possibilities of a durable refurbishment and a financially sound restoration plan (see Fig. 13).

Figures 3 and 4. Site plan and original appearance of one of the courtyards.

Figures 5. Floor plans of the houses.

Figures 6. The houses under construction.
Figures 7 and 8. On the left the Dotremont-Ten Bosch building system and on the right the Airy system, based on the system of Sir Edward Airey from Leeds UK. The Airy system used steel and concrete. The Dotremont-Ten Bosch system used concrete only.

Figure 9 and 10. Left the original presentation of the façades and right the façade covered with wood and brick around 1987.

Figures 11 and 12. Ronald Plasterk, minister of culture, listed six blocks of Jeruzalem Frankendaal as national monument in 2010 [RCE 2010].
Figure 13 The façade ready for inspection in February 2010.

Figures 14 and 15. The façade taken apart and investigated and new concrete panels are tested for the new in December 2010.

6 CONCLUSIONS

Reasons to work out this case study were:
- the duplex design, based on the assumption of change
- a building system using small prefabricated concrete elements
- the location in a garden village near the centre of Amsterdam in the general expansion plan
- the first courtyard layout and the integration of environment and architecture
- the question why only a few houses had been combined by 2002
- the inappropriate renovation (devaluation) in 1987
- plans for demolition and refurbishment on-going from 2000
- the first post war residential neighbourhood listed as a national monument in 2010
- plans to refurbish these houses by taking apart one carefully and develop a plan on basis of those results in 2011.

The building system determined the design and provided opportunities for future changes. So in 1987 the three housing associations replaced the wooden window frames on the rear elevation by plastic frames, the loggias were closed up, the concrete was painted and the end elevations were fitted with...
cladding (Fig. 10). In 2000 they decided to demolish the houses and get them replaced by new ones. After a lot of protest, debate and struggle the residents succeeded in ‘Saving Jeruzalem’. So in 2003 Bertus Mulder of the Werkplaats voor Architectuur was commissioned to make a plan for the regeneration of the houses. I got the chance to practice my ABCD research method at this project. The research was finished before Bertus Mulder started his refurbishment project. Conclusions of my report where adopted by Mulder and made proposals possible for mature solutions. Firstly, the changes made in 1987 would be undone. The support structure, determined by the building system, made it possible to join dwellings either horizontally or vertically. The original architectural design could be regained by fitting internal thermal insulation. The originally designed window frames could be reproduced because the drawings of it still existed.

The residents did not feel the need for refurbishment. They were happy with the low rent and the unique location. The target group of the duplex houses moved from families to single people, the elderly and students. The site became the victim of the new approach of the housing association, rather like that of a commercial project developer, to make money from the site through new building projects. However, under pressure it was decided to regenerate the houses. In 2005 the plans were postponed for an indeterminate period for financial reasons. Nothing has been done since, only the proposal to nominate the project as a listed monument continued and succeeded in February 2010 [RCE 2010] (see Figs. 11 and 12). In 2010 Jos Kroon of Hooyschuur Architects started to find out what the possibilities are for a sustainable and durable refurbishment using the outcomes of the ABCD research. He at first dismantled one façade and secondly investigates in consideration with the present-day possibilities He deals with different contractors how things can be worked out and tests have been done (see Figs. 14 and 15). He works out a restoration plan for the whole project on a sound and durable basis. The housing associations and the local government are responsible for funding.

The ABCD research made clear that this project has possibilities to survive in a durable way by refurbishment. It is used twice during the process once in 2002 to result in a plan based on the original façade design and secondly in 2010 to find out how the dwellings were constructed originally so a new generation at the life time cycle of Jeruzalem Frankendaal will be added.

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