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Title: New scripts for old buildings: conserving both identity and energy

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Abstract

The ambition of a transition to a sustainable society brings forth the dual challenge to preserve historical buildings and simultaneously improve the energy performance of our built environment. While engineers claim that a dramatic reduction of energy use in the built environment is feasible, it has proven to be a difficult and twisting road.
In this paper we focus on historical buildings, where difficulties of energy reduction are paramount, as such buildings provide local identity and a connection to our past. It is a EU policy objective to conserve and redesign heritage buildings like prisons, military barracks, factories, stations, and schools. Such redesign should also ensure reduction of energy use without compromising historical identity. In this paper we conceptually and empirically investigate how the two conflicting aspirations unfold.

In particular we elaborate the *obduracy* and *scripts* of buildings, to clarify how they resist change and invite a specific use. We analyse the tensions between identity and energy conservation in a case study of a restoration project in Franeker. This building has recently undergone a restoration, with energy efficiency as one of its goals.

Scripts and networks are traced by a combination of methods, such as studying layout, materials and building history, and qualitative interviews with restoration-architects and users. We identified three types of strategies to conserve identity and energy: design strategies; identity strategies and network strategies. Such strategies are also relevant for other efforts where conservation and innovation have to be reconciled.

1. Introduction: buildings as champions of obduracy

The ambition of a transition to a sustainable society brings forth the dual challenge to preserve historical buildings and simultaneously improve the energy performance of our built environment. In this paper we investigate this double challenge; our guiding question is 'how do (historical) buildings survive?' Clearly, the built environment possesses a considerable resistance to change, or obduracy. In a sense, resistance to change is the explicit aim of buildings, but in cases of energy improvements it can also be a counteracting force. What is this obduracy and how is it produced and maintained? What does it imply for transition efforts? Such questions are pertinent for transition studies, as well as for general studies of technical change.

Although we live in a 'human-built world' (Hughes 2004:223) and products of building technology are all around us, few innovation or STS-literature is targeted on buildings and building technology. Indeed, cities form 'enormous socio-technical artifacts' (Aibar and Bijker, 1997), that pose rich and complex research sites. Some examples of recent research are the following. The study of Hommels focuses on large infrastructural projects in three main cities in the Netherlands (Hommels 2001:221). Kirkman links agency and obduracy in the built environment. (Kirkman 2009:234-258) with the following statement:

> *'Understanding the degrees and causes of differential obduracy would go a long way toward defining the scope of effective action on the part of moral agents' (Kirkman, p. 253).*

Apparently, buildings possess a considerable resistance to change, or obduracy. This is particularly the case for historical buildings that have sometimes survived ages or even millennia. When we take the continuous man-made and natural attacks on these monuments into account, we could call historical buildings true 'champions of obduracy'.

The production of this obduracy is a continuous undertaking, because a building has to withstand ongoing attacks on its solidity. Influences of the weather, plans to redesign the exterior or interior, new functions that have to be incorporated, new demands concerning energy use, all these can lead to various changes of the building: adding or removing parts, degrading materials, renovating, maintenance, or even restoring to an earlier state.

Resistance to change is partly located in the materials used for the building, partly in the values we as humans attach to historical buildings. Many professionals involved in architecture or heritage conservation cherish values and ideas that resist change, for example by using styles referring to past architectural traditions or by publishing pleas for conservation. The degree and causes of malleability and obduracy in our built environment need to be investigated, as Kirkman proposes (Kirkman 2009:234-258). This will help understand the dynamics of obduracy in the built environment.

To grasp the duality of continuity and change, this paper argues for a more symmetrical treatment of the concept of obduracy than we usually find in the literature. Resistance to change, under the name of *lock in,* is primarily used to denote a negative concept, a backward resistance against modernization that has to be broken down in order to build progress. Contrariwise, in the case of historical buildings, we need to strengthen obduracy (and deal with it constructively) in order to preserve them, while at the same time we need to change these buildings in order to reduce their energy consumption and to facilitate new uses. There appears a certain tension between preserving and changing; questions arise how much change

a historical building can sustain without losing its historical values. Therefore, in this paper we focus also on what obduracy achieves, instead of what it hinders only. We will argue that the approach of Actor Network Theory, with its analysis of heterogeneous networks and its symmetrical approach of technology and actors, offers a good starting point.

In this paper we have two ambitions. First, we want to review and mobilize perspectives on building, energy use and obduracy (section 2). In particular, we review the contributions of Science and Technology Studies (STS) that investigates heterogeneous networks and employs a symmetrical approach of technology and actors. We also elaborate the notion of 'energy script'. Second, we present a case study of a Dutch renovation in which scripts were re-designed (section 3). We conclude with a discussion about strategies to reconcile the dual challenge of conserving identity and energy.

2. *Approaches to protect historical buildings while conserving energy*

2.1 Introduction

How to protect historical values is a classic problem in the discourse around restoration practices, as views on heritage protection change over time. Lately, the incorporation of energy efficiency when restoring historical buildings is a topic that is gaining more interest.

The conservation of our heritage buildings is a European wide policy objective. Historical buildings are not only works of art, but embody an important source of local identity and form a connection to our past. Protection agencies aim to preserve historical qualities for future generations. Their work is guided by restoration theory, a philosophy developed and codified in the course of the 19th and 20th century. European covenants, such as the Venice Charter[i], express shared views on the conservation and restoration of built heritage. Today, many users expect a building with modern comfort as well as a historical appearance. Moreover, new functionality is needed for building types that have outlived their original function. For example, how to use buildings such as old prisons, military barracks, factories, or railway stations? These new functions and new demands pose a challenge to restoration design and practices.

Another, perhaps conflicting EU policy objective is the reduction of energy use in the built environment, in order to reach climate policy goals. Roughly 40% of the consumption of energy takes place in buildings, either in the production or consumption phase. However, energy efficiency is especially difficult to achieve in the case of historical buildings, because of strict regulations aimed at protecting historical values. Recently, there has been growing interest in energy efficient restoration practices in the Netherlands, as is shown by the 'energy-neutral' restoration of Villa Diederichs in Utrecht, the 'Boostencomplex' in Maastricht and De Tempel in The Hague.

2.2 Design and society

Within STS various contributions address questions of architecture and design. Woodhouse and Patton, for example, (Woodhouse and Patton 2004:1-12) introduce the concept of '*design by society*'. This relates firstly to the complex network of people that is participating in the design process; secondly to the social norms, values and assumptions that are reproduced in the products of design; and thirdly to the challenge of moving design into public debate, in order to take account of social and other costs of innovation in an early stage.

Others argue that design thinking has something to offer to our understanding of the role of buildings in society. Moore and Karvonen state that design thinking can complement the often-pessimistic analyses with tools to help citizens to design their lives (Moore and Karvonen 2008:29-46). In doing so, design thinking offers the 'politics of hope', that Coutard and Guy are looking for (Coutard and Guy 2007:713-734). In their design perspective, Moore and Karvonen propose a geohistorical framework to categorize assumptions and attitudes about how to improve social and material conditions of the built environment.

A methodical approach is taken by Kjetil Fallan, who proposes to use STS-methods and especially script analysis to 'de-scribe' design history (Fallan 2008:61-75). However, Fallan's article ends after describing script analysis as method and does not in fact use it in practice. Following up on this idea we apply script analysis on restoration projects.

When we move from building and architecture in general to *historic* buildings, we find less studies; one of the pioneers here is Albena Yaneva. She uses an Actor-

Network perspective (ANT) perspective when following the renovation process of the Alte Aula in Vienna. ((Yaneva 2008:8-28); Latour and Yaneva give an ANT's view of architecture (Latour and Yaneva 2008:80-89). The focus here is on buildings as a network.

2.3 Heterogeneous networks

Buildings are not seen as isolated phenomena, but as part of a network. In general, technical objects and human actors mutually shape each other as they interact, or in the words of Michel Callon: "*the stability and form of artifacts should be seen as a function of the interaction of heterogeneous elements as these are shaped and assimilated into a network*" (Callon,(M. 1980:358-376).

Similarly, we propose to see a restoration project as a local network of heterogeneous actors (Law, J. and Callon, M. 1992:21-52). The historical building itself forms a part of this network; it is an *actant*, because it influences actions of other actors. Actors include architects, owners, heritage protectors and municipalities. Examples of actants are architectural drawings, or material building parts, such as bricks and mortar, tiles or fixtures.

The concept of 'apparatus' used by Foucault in *Discipline and punishment* (Foucault 1979) resonates quite strongly with the heterogeneous network concept. According to Foucault an apparatus is '*a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions*'. He refers to 'the system of relations between the elements of an ensemble as the '*apparatus*'. Foucault links buildings and their specific architectural form with the disciplining of bodies in society.

A more recent take on the heterogeneous elements is provided by Michelle Murphy (Murphy 2006), who uses the term 'assemblages' to describe the loose interacting elements of office workers, health inspection, feminists, research tools and building elements. She defines an assemblage as *an arrangement of discourses, objects, practices and subject positions that work together within a particular discipline or knowledge tradition'*. However, Murphy stresses that while Foucault focuses on discipline, her analysis is directed at "*the material technologies of resistance that interfered with and rematerialized the office as described here*". (Murphy, p. 188)

Manuel DeLanda, drawing on the philosophy of Deleuze and Guattari (Deleuze 1987), elaborates assemblage theory in more detail in 'A new philosophy of society'(DeLanda 2006). He explicitly opposes the 'seamless web' metaphor and poses his views as an alternative.

Reflecting on these three approaches of the built environment, it appears that Callon offers a description of the construction of a network; Foucault is using the concept primarily to analyse disciplining of human bodies, whereas Murphy highlights resistance and change of the assemblages. In our research we build on these approaches, and focus on the use of script analysis to study the obduracy or resistance to change of buildings, as produced by heterogeneous networks.

2.4 Scripts

Aiming to describe in more detail the role of artifacts and their embedded program, we turn to the concept of scripts. According to Akrich (Akrich 1992:205-224) technology is infused with a script in which the designers define the 'right' way to use an artifact. For example, electrical systems that were exported to Africa included elements that defined and restricted the actions available to the user. Simultaneously, the specific relation between user and electricity supplier was produced. (Akrich

1992:259-264) An extensive literature is devoted to user scripts (Oudshoorn and Pinch 2003) as well as gender scripts (Allhutter 2012:684-707; Oudshoorn et al. 2002:471-483; Peine and Herrmann 2012:1495-1512)). In the same way, architects and engineers imbue buildings with numerous indications for their use, thereby reproducing a historically developed lifestyle.
Tzonis and Lefaivre discuss the social history of architecture and argue the importance of including the consequences of built objects for human relations and societies, instead of limiting historical research to architectural styles. (Lefaivre and Tzonis 1990).
Furthermore, a building is usually designed for a specific function, thereby co-constructing cultural relations, discipline, division of labor, or the expression of wealth and power. (Fallan 2008:61-75; Latour 1992:225-258; Moore and Karvonen 2008:29-46; Foucault 1979). In this vein, we develop the concept of an energy-script, the ways that buildings inhibit or invite the use of energy.
Scripts act as choreographies that guide the actors in their daily movements and actions. Scripts define or pre-figure:

- Relation with users
- Expression of status
- Specific functions
- Power relations between users and/ or external network actors
- Division of labour
- Gender roles
- Class roles

However, scripts are not rigid, possibilities for resistance remain. Wyatt (Wyatt et al. 2002:23-40) identifies a taxonomy of non-users in a study of internet use. Depending on their motivation and situation, non-users are divided in *resisters, rejectors, excluded, and expelled*. In the same vein, Fallan states that users can misunderstand, ignore, discard of reject the 'instruction manual' (Fallan 2008:61-75). In a restoration project the embedding of new functions require a redesign of the building script. The building then becomes a palimpsest, where older scripts are faintly visible through the new layout. Murphy's study of the Sick Building Syndrome is mainly dedicated to the changing of assemblages by users. (Murphy 2006)

2.5 Scripts and restoration

Just as other artefacts, buildings are designed on the basis of ideas about their use and users. Consequently, historic buildings reflect politics, worldviews and lifestyles from the period of their design and production, expressing ideas and expectations about the behaviour of their users. Architectural history thus needs to be supplemented by sociological background information about the period under study. In the actual buildings, scripts can be traced in the materials and layout. As mentioned, users can resist these scripts.
New lifestyles and new functions require redesign. However, the layout and materials of the building may prove resistant to the desired changes; this is part of their obduracy. Therefore, in a restoration plan, the script of a building is rewritten to incorporate these new demands. Many historical buildings have undergone multiple restorations, which then leads to a series of *scripts*. Each restoration also reflects the actual restoration philosophy of that period. We take scripts to be written, designed and enacted by architects, owners, and users, and influenced by heritage protectors and 'the public'. In this paper we study discrete scripts, because restorations mark a specific point in time, where there is an analyzable 'before' and 'after'. However, in other instances smaller scale changes proceeding from user influence could show a

more evolutionary development, or 'piecemeal engineering'. This, however, is beyond the scope of this article.

2.6 Energy scripts

As an addition to the notion of 'script', we argue that the notion of 'energy script' is useful to analyse how buildings are used and (re-) designed. Take for instance the *calefactorium,* the only heated sitting room in a medieval convent. This room was often situated next to the refter, (refectorium) the eating room for the choir monks. At the other side of the refter the kitchen was situated, so that the dining room could profit from two heated rooms. Right above this calefactorium we often see the scriptorium, or writing room. The work of copying manuscripts could thus take place in a room that had at least some heat. The layout ensured that the available warmth was directed at often-used rooms (refectorium, scriptorium, calefactorium), but note that the working monks did not have these facilities at all. They had their own quarters, which were unheated. We see that the distribution of warmth follows the division of labour and class lines. Similarly, the 'kemenade' is a heated room in a Dutch castle; often the bedroom of the lord is placed above this room. A castle had other heated rooms, for example the kitchen and the knight's hall had a fireplace.

> ***Energy scripts*** I define tentatively as *how the distribution of heat and power within a building co-choreographs its functional use and while inviting or discouraging energy use*.

Drawing on the literature on gender scripts I aim to analyse the energy scripts of a selection of historical buildings. My expectation is that these scripts can help us to better understand the energy use of a building and its users. Although appliances are not a fixed part of such a script, but as Dolores Hayden and Ruth Schwartz-Cowan show in their studies of gender scripts, there have been 'paths not taken' that could for example have led to a less energy intensive kitchen. Second purpose of this concept is to find ways to design energy scripts that invite an energy efficient use of a (historic) building. Lastly, this approach could shed light on the social construction of the 'resident' or 'house consumer' as an end-user.

3. Restoration in Franeker: a case of conserving identity and energy

3.1 Data and method

In the past two years we studied a diverse set of energy efficient restorations in the project 'Energieke restauratie', funded by SIA-RAAK. Recently, our competition for energy conscious commissioners resulted in 45 entries, all claiming to unite historical value and energy efficiency. We also followed the development of several new energy efficient restoration plans. In total, our dataset consists of 65 historical buildings. We conducted qualitative interviews with restoration-architects, owners, energy advisers, and heritage protectors. The transcripts were coded and analyzed with NVivo. To study historical aspects of the buildings we rely on archival material and building history. Technical research was performed, i.e. thermography analysis, and/or energy transmission calculations.
On the basis of these data a script analysis was performed. Script analysis according to Fallan is:

> *to put on paper the text of what the various actors in the settings are doing to one another. The de-scription, usually by the analyst, is the opposite movement of the in-scription by the engineer, inventor, manufacturer, or designer.'(Fallan 2008:61-75)*

Thus, looking at our case studies, we search for instances where the inscriptions of architects and energy advisers, heritage protectors and users can be found. We identified several obduracy-strengthening strategies in the restoration projects under study. We group these under the headings of *network-strategies*, *identity-strategies* and *design strategies*.

3.2 Restoration of 'R.C. Vereenigingsgebouw' in Franeker

Viewed from the Martiniplantsoen, which is the former churchyard behind the Martinikerk in Franeker, the old Jugendstil building is returned to its former glory. The lettering says 'R.C. Vereenigings' to the left and 'Gebouw' to the right of the building, meaning 'roman catholic society's - building'. From his recess at the first floor Saint Anthony, the saint from Padua that looks after lost possessions, is overlooking the square. Behind him on the roof, a small shed houses the heat pump installation. The shed is not historical, but also not visible from the ground.
Local architect and carpenter Nicolaas J. Adema (1860-1946), who was an active member of the RC church, designed the building in 1907. It was meant to house the activities organized for the local Roman Catholic youth by the *Antoniusvereniging (Society of Saint Anthony)*. Now readers have succeeded the catholic youth that once organized their festivities in the central hall. The building is surrounded by new building parts, which house a café, a shop and several offices.

The arch like entrance at the right, proudly announcing the year of building 1909, is now no longer used. We have to turn left and enter the building through a narrow alley. Just across once stood the Catholic church, from which the pastor was sternly overseeing the youthful activities. Since the restoration in 2003 the alley connects the square with a primary shopping street. The municipality hoped to attract more visitors to this less popular area by connecting the square with the shopping street. Entering the newly built façade in the alley we encounter a welfare café and - shop, in front of us a stair goes up to offices on the first floor. These new additions are built as annex to the south- and west side of the building, leaving the original walls intact. The main building now houses the public library.

A large breakthrough in the former southern wall takes us to the main hall of the library. This spacious reading room used to house the activities of the Catholic youth, such as plays, lectures, music and festivities. (Although dancing was prohibited by the Catholic church.) In the sixties, the building was used as dancing hall. These activities used stage lighting or modern day disco lights, which means there was virtually no daylight in the main hall. Obviously a reading room needs good lighting, therefore the restoration architect proposed to enlarge the windows in the east wall, bordering the alley. '*Luckily these windows could be enlarged, otherwise the functionality would not have been right for us,*' users tell us. They are quite satisfied with the result: '*a lot of natural light is coming in. The offices also have large windows, so we can do a lot without using artificial lighting.*' At the outside of the building, this intervention led to a more attractive alley, as blind walls are experienced as uninviting and socially unsafe. However, the intervention in the building was rather radical: '*these windowframes were bricked for a large part, so we took a saw to a listed building and emptied the blind friezes right down to the floor …*' (architect)

More light is let in through the now restored skylight located above the main hall, bordered by a beautifully decorated ceiling. During the restoration these Jugendstil decorations emerged from behind the ply board. The decorations were painstakingly restored, while behind the curving wooden panels new ventilation shafts could be

incorporated. Incorporation of such new technical systems however can be difficult, as the architect tells us: *'I can tell you that in such a building there are more surprises than you care for, especially because everything is very compact. You can design what you want, but when you are set to work everything turns out to be very narrow. The space between those tubes is approximately zero.'*

Another 19th century feature we see in the main hall are the cast-iron columns, which proved to be very rusty: '*here you see a beautiful authentic cast-iron construction, and when I came here the first time, I crashed through the floor, so it was completely rotten (*architect*)*. The columns were completely removed and replaced by a modern support structure. At the appropriate places the columns were reinstated, however they now have a purely aesthetic function. '*We installed a wholly new steel construction; these things were picked apart, stored, and painted. Then a wooden framework was put into place, we used a bit of glue and put those things neatly into place. And this is what we call restoration.* (Interview architect) However, according to the architect this intervention was necessary to prevent the problems from recurring.

We now turn to the right, and walk trough the enlarged window frames in the former west wall of the main hall. These windows are now forming portals through which the annex at the west side of the building can be reached. An interior alley is created, which serves as demarcation as well as connection of new and old. The outside walls have been insulated; the new windows are modern double-glazed.
A little bit forgotten is the former entrance hall. This little hallway was considered especially valuable, so it could not be altered in any way. Jugendstil items, such as the tiling with floral motives were restored. Unfortunately, it is a very cold and drafty room, so it cannot be used as an office. In this small room the old script was discarded, and lacking a satisfying new script the room is now used for storage. From a highly prominent script, emphasised by the decorations of the outside arch and the decorated inside, it developed into a mere storage room.

Going up to the roof we find a completely new shed. The old building did not have enough spare room for large heating installations, so to house the heat pump a small shed was built on the roof, hidden behind the statue of St. Antony, invisible from the street. '*The historic value has been somewhat violated here, we just built a shed around it. But no one can see it. So we thought this was a workable compromise.*' (architect)

3.3 Actors: Restoration as a game

Where or when does a restoration process start? Maybe it started when the former owner sold the Vereenigingsgebouw to a project developer, who wanted to demolish the building altogether, replacing it with a new high-rise building with a supermarket in the ground floor strip. Protests came from the local historical society, from citizens reminiscing about their youth connected to the building; subsequently the building acquired a monumental (listed) status, thereby successfully preventing demolishment. The municipality wanted to buy the building, and looked for a potentially useful program. Through a complicated property exchange chain the municipality succeeded, the developer got the old library location to build a supermarket; the library joined a consortium with other social services and eventually relocated to the Martiniplantsoen.

From a heritage viewpoint, this development was a new chance to save the building. A host of stakeholders came to be involved in the project, such as the shop owners in

the neighbourhood, the board of the Catholic parish (also an earlier owner), the local housing corporation, a welfare institution, and the local historians. The municipality was very active in involving all these stakeholders in a 'sounding board' and secured funding for the project through a national subsidy scheme.
In the next phase restoration designs were drawn up. The process of restoration design has its own challenges. We see in this case (as in others) a series of small battles over specific aspects of the historical building. The important 'value-bearing' characteristics, which are described in the justifying description [1]are at stake in the struggle about the design and implementation of the restoration. In this 'justifying description' the historic values of the building are summarized. Therefore, convincing the heritage committee of the values of the new design, including measures to safeguard historic values, is critical to get a building license (monumentenvergunning). To foster cooperation the municipality approached the national heritage board in a very early stage of the process.

Views of restoration principles vary across time and across individuals: '*Every heritage civil servant has his own view, as well as every architect and commissioner. So it is a kind of game, you have to choose your own route in this, and sometimes you succeed and sometimes you don't.*' (Interview architect) The architect backed up his design with technical arguments (voorbeelden zoeken in interview Adema). In the crucial meeting with the heritage committee a lot of time was spent on highly critical aspects of the new design. Because time ran out - other applicants were probably already waiting in the hallway - other (presumably) less controversial design interventions then were passed without much discussion.

Through the sounding board all official stakeholders in Franeker were part of the process, the only potential obstacle in this stage were citizens objecting to the building license. To prevent this, the architect used a very effective strategy, namely to approach all neighbours, talk them through the restoration design, hoping this would convince them to withhold (afzien van) from taking formal steps in the licensing procedure. This was crucial, because the process was on a very tight schedule due to the subsidy conditions. No one filed an objection to the building license.

How do actors evaluate the restoration of the R.C. Vereenigingsgebouw in Franeker? Evaluations vary according to the perspective of the actor. Heritage professionals consider the result of the restoration as excellent; and the public chose the library as the most beautiful library in Fryslan. However, the present users have some critical remarks, both on the functionality and the energy performance of the building. Noise, drafts, lack of functionality of the former hallway, difficulties with access due to multiple steps and the lack of storage space are other user criticisms. The beautifully tiled entrance hall now serves no representation function anymore; it just houses piles of cardboard boxes. Furthermore, according to the users the energy performance of the building is disappointing, primarily because of the high amount of electricity used. '*What can I expect from energy efficiency and calculations? Calculations are always wrong. We find that we have a very low use of natural gas, but due to the heat pump and the ventilation system a very high electricity use.*' (users) This is due partly to the problems with the heat pump installation.

[1] (in Dutch: *redengevende omschrijving*, my translation),

3.4 De-scription of the restoration project

In this section we discuss the preservation of historical values and the energy performance of the public library in Franeker after restoration.
How are historic values described and preserved in this specific building in Franeker? Looking at the justifying description for the *RK Vereenigingsgebouw* (ref) we find that the majority of value-bearing qualities are of an aesthetic nature.
Aesthetics are explicitly mentioned in the following aspects:
- *the aesthetic qualities of the design*
- *the particular use of material and ornaments*
- *the coherence of exterior and interior decorations*
- *the architectural wholeness/ completeness of the exterior*
- *the architectural completeness of parts of the interior*[ii]

Many original details and ornaments were painstakingly restored in this project, for example the ornaments (tiles) in the entrance hall and the decorations on the ceiling in the main hall. New ventilation shafts have been carefully integrated behind this restored ceiling. The wholeness/ completeness of the exterior however seems to be compromised by the large breakthroughs on three sides of the building. And how should we evaluate the restoration of the cast-iron columns that were preserved but lost their load-bearing function. Could we call these columns architecturally complete, now that they have become a mere decorative element?
In the justifying description we find one reference to *ideology*:
- *a special expression of a social and religious (development)*

In the new situation the social arrangements and functions have been thoroughly changed, however, the building is still used for a public function.
Furthermore, we take into account the references to *context* in the justifying description:
- *the history of architecture:*
- *the (oeuvre) of the architect*
- *the status of the urban environment*

The RK Vereenigingsgebouw is the oldest Jugendstil building in Fryslan, therefore especially relevant to preserve. Adding the new alley alters the status of the urban environment, so that now the square behind the church is connected to the main shopping street. This creates opportunities for new attachments, new links between parts of the urban environment.

Our second issue in this section pertains to the energy performance of the building. A range of measures is taken to provide day lighting to the offices and reading rooms, such as enlarging the windows on the alley-side and restoring the roof light. New technology requires a lot of space, which conflicts with other envisaged purposes. By careful embedding new ventilation shafts behind the ceiling in the main hall integrates this new technology in the building. Another solution to the lack of space is to build a shed on the roof. However, as it is not visible from the street, this is not considered a problem from a heritage viewpoint.
Thanks to the heat pump heating the building requires little (natural) gas. However, the yearly electricity use is considered very high, which is probably due to the installed heat pump. Thus the overall evaluation of the energy performance of the library by the users is negative.

In this case in Franeker the obduracy of the historic building is strengthened by restoring and preserving aesthetic and contextual values, while designing for new users.

4 Conclusion and Discussion: Obduracy strengthening strategies

In this paper we raised the question how obduracy is produced and maintained in the built environment. When can obduracy be overcome, to introduce new functions or cater for new demands? When is strengthening of obduracy paramount, in order to preserve the historical values? We now want to move from the dynamics of obduracy in this particular case to a more general discussion of the dual challenge of conservation and change in buildings. The first step is to summarize the strategies for such reconciliation. We identify three categories of obduracy strengthening strategies: design, identity and network strategies.

Design strategies

In a restoration plan, the script of a building is rewritten to incorporate new demands of users, owners and other actors. Twenty strategies to design an energy efficient restoration plan are described by Nusselder (Nusselder et al. 2008). The following are especially relevant for our study: priority for minimal changes (2), use of adjacent unheated spaces as thermal buffer (8), new installations (9), insulation (10) and making use of spaces with high ceilings (13). Further design strategies, as proposed by Van de Ven, 2010, include using original characteristic elements, such as disused rooflights; traditional materials with good insulation capacity, such as thatch; and to combine old radiators with new low-temperature heaters(van de Ven et al. 2011).

An important practical question concerns how successful the restorations are from an energy perspective, and how this ties in with energy scripts and functional changes. The provision of light is a powerful instrument to choreograph activities of users. Providing for daylight creates new attractive places and at the same time decreases the use of electricity. The distribution of heating is often more problematic. In several of our cases the heat pumps did not perform as promised and furthermore used an amazing amount of electricity, offsetting the advantage of lower gas use. This observation is validated by several reports on the use of heat pumps in the Netherlands. Apparently, the main problem is not in the technology itself, but in the contracts: questions of who is responsible for what, as well as in the absence of adequate post-installation services.
In Franeker the following design strategies to improve energy efficiency were used:

- Energy & building technology
    a. New installations (heat-pump)
    b. Original elements re-installed (roof light)
    c. Careful inscription (ventilation shafts)
    d. Radical enlargements of windows in existing recesses (for daylight)
    e. Energy efficient glazing
    f. Insulation
- Functional changes
    a. Addition of annexes (new building parts added)

Identity strategies

Hommels (Hommels 2001:221) concluded that stressing original ideas, positioning the building as historical exemplar and registration as a monument all strengthen the obduracy of a building. In Franeker, the positioning of the building as the oldest Jugendstil building in Fryslan functioned as a powerful message to discourage

demolishment. Earlier use of the building as dancing hall meant that many citizens had cherished memories of this building. Finally, designation of the building as a listed monument ensured legal protection against demolishment.
In the phase of restoration design and implementation, many original elements were painstakingly restored. We mention the Jugendstil tiles in the hall, the decorations on the ceiling and the cast-iron columns. This reinforces the historical qualities, and extends the lifetime of these elements. In the case of the entrance hall, however, the preservation of historical detail led to a room that is too cold and drafty to use.
Summarizing, in Franeker we see the following identity strategies used:

- Stressing original ideas, embedded in design
- Positioning building as historical exemplar
- Insisting on lasting value of structure
- Registration as monument
- Stressing historical qualities in public communication

In the restoration process the historical values were strengthened, so that the building including its historical qualities can survive for another fifty years. Emphasising the historical values of the building has been a powerful instrument in producing and maintaining obduracy. Carefully preserving the items that give rise to these values ensures that future generations also can attach the same value to the Vereenigingsgebouw in Franeker.

Network strategies

While design strategies point to the materiality of a building, and identity strategies to its historical values, network strategies concern the human actors in the restoration project. Communication between actors is important in several stages of the restoration project. In Franeker we observed attention to communication processes in the acquisition stage, where the municipality actively sought new users and created a sounding board with stakeholders; in the design stage, where the architect actively sought approval by neighbours and where the municipality included the heritage board in an early stage of the project. These strategies serve to strengthen the network that surrounds as well as includes the building.
Summarizing, in Franeker we see the following generic network strategies:

- Communication with heritage board
- Active role of municipality
- Involve new stakeholders
- Attract new users

Clearly, human actors play an important role in the preservation of historical buildings, as well as in the transition to energy efficiency. New users were sought to give the building a new lease of life; the expertise of a diverse set of professionals, such as architects and energy experts, is needed to create a design for new uses and energy efficiency, while preserving historical qualities. Cooperation with civil servants and members of the heritage board ensured financial resources and necessary building licenses. Citizens played a role in supporting the listing of the building as a monument, voicing their opinion on the new layout in the sounding board, and refraining from issuing objections against the building license.

The energy transition of our built environment is a complex process in which change and continuity have to be reconciled. We reviewed the dynamics of obduracy in the energy efficient restoration of historical buildings developed the notion of 'energy script' and presented a case study of a renovation project in Franeker. The restoration of this building ensures the preservation of historical items and values for

coming years, while daily use and regular maintenance will protect the building from damages by climatological and biological sources. In this case several energy efficiency measures were taken, only partly successful. The strengthening of the obduracy of historical buildings is performed by different strategies, which we categorized as design strategies, identity strategies and network strategies. The preservation of identity and energy becomes part of a process of 'design by society', where a heterogeneous network of actors work together in redesigning and rebuilding the library.
We conclude that creative (re)design is a fruitful way to mobilize new actors to protect historical buildings. Design-, identity- and network strategies help to address the dual challenge of continuity and change, thereby protecting historical buildings for future generations.

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