BIG BRICK HYBRIDS

Learning by building beyond the mandate.

Lieven Nijs

BLAF architecten
UGent, RWTH Aachen

INTRODUCTION

"Il faut avoir le courage de le reconnaître, en fait d'architecture, soumis à beaucoup de préjugés, à un certain nombre de traditions, habitués à la confusion, les idées comme les principes nous manquent; et plus les monuments que nous élevons se chargent de details, plus ils sont riches par la reunion de nombreux éléments, plus ils trahissent l'oubli des grands principes et l'absence d'idée chez les artistes qui concourent à leur execution."[1]

In 1872 - a time of societal turns and technological progress - architect, theorist and 'builder' Viollet-Le-Duc described the forces at play when discussing 'the method of architecture'. One might say that much like in any epoch, during the last two decades the global societal and environmental challenges have forced architecture-related disciplines into deep introspection and action, resulting in an explosion of regulations, technological developments and discourses. With every approach leading to different solutions, the outcome is confusion, luring architects to reside in the agency of others.

The architecture practice of BLAF architecten (Lokeren, 2003) is stretched between engagement and building. The inseparability of both, for BLAF, is the condition for being able to speak of a practice. Engagement is the origin of each architectural project, building its finality. In between lies the battlefield -the dirty kitchen- of the design and realization.

BLAF's 'learning by building' addresses multiple practice based knowledge fields of architectural design and construction: vernacular and recent historical hybrid building practice (Vobis), the geometry and anatomy of architecture (Pezo Von Ellrichhausen; Atelier Bow-Wow), material and construction technology (Deplazes), comparative case study testing (Baumschlager & Eberle; Nagler), and the critical deconstruction of regulations,

1 E.E. Viollet-le-Duc, *Entretiens sur l'Architecture* (A. Morel, 1872).

standards and conventions (Blocksdorf). As both a premise and a method, practice based research and development is situated beyond the mandate. By digging into the genealogy of the Big Brick Hybrid series, this article aims to identify and make transferable some of the tacit design principles and the practice based research rationale behind numerous iterations of comparable projects.

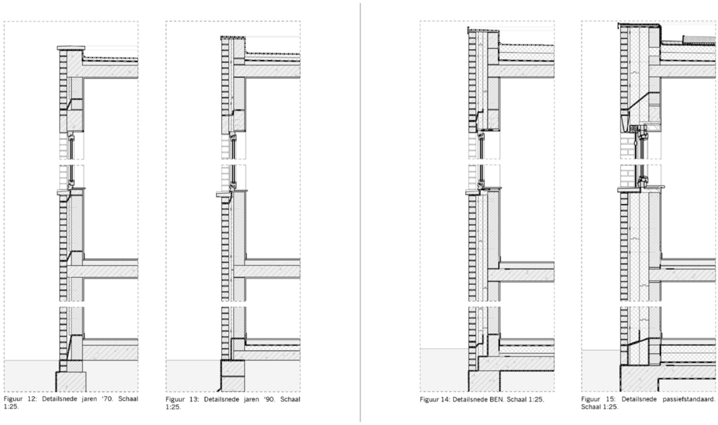
Big Brick Hybrids
btL house (top left); tmEK house (top right); jtB house (bottom left); wsT house (bottom right). Photos Stijn Bollaert

In the first section of this article - 'Paradoxes' -, I will identify some of the discussions and challenges at play when addressing brick faced building design. The nature of the paradoxes is that seemingly opposed phenomena or forces emerge simultaneously, co-exist, differ and argue, without leading to one definite answer.

In the second section of the article - 'Productive Concepts' - I will subsequently highlight some of the ideas and principles that have led to self-reflection in the developing practice of BLAF, and their conceptualization into further projects. Together they have added to the genealogy of the Big Brick Hybrids, operating as a series of projects within the oeuvre of BLAF, from the long term engagement of one particular practice with one particular design question.

PARADOXES

Load-bearing and Cladding



The evolution of the cavity wall system between 1970 and today
"Architectuurdetails door tijd en ruimte. Deel 1: Spouwmuren uit metselwerk van 1945 tot heden."
Bex; Cammans; Verniers. KUL 2022.

Within the construction principle of the brick-faced cavity wall, the structural role of the outer leaf is midway between load-bearing and cladding. Built through the stacking of bricks, the outer cavity leaf is not very different from load-bearing masonry (both solid construction). However, due to its structural dependencies, it flirts with the construction principle of cladding.

The structural integrity of the thin outer cavity leaf is limited. Secondary structures and ties, mostly made of steel, allow the facade masonry to stay stable under the vertical forces of its own weight, and to transmit the horizontal forces, caused by wind-pressure, to the inner structure. Equally important for the stability of the facade leaf is mortar. The historical parallel between the rise of the cavity wall system and the falling into disuse of lime mortar, can be attributed to the 'need for speed' in construction after the second world war, that precipitated the generalized use of (the much 'quicker') cement mortar.[2] At the same time, the break-through of cement mortar has without a doubt been accelerated by the structural dependency of the 'weak' outer cavity leaf.

Design practices engaging with the construction of very energy-efficient building skins were the first to reveal the shift away from brick as a façade material of choice, since the introduction of EPB[3] in 2006 . The installation of energy performance regulations, the race to zero carbon, design for deconstruction, and the lack of trained craftsmen, challenge the ambiguous structural role of the facing brickwork within the cavity wall system. With the width of the cavity expanding due to increasing insulation thicknesses, the outer cavity leaf has become ever more dependent on the steel armoring and cement mortar for its structural integrity, adding to the complexity, the cost, and the error-proneness of facade masonry construction. Feasibility and executability have cleared the way for lightweight cladding materials, either mounted on a ventilated structure (wooden planks, fibre-cement scales, aluminum panels, corrugated plates, etc.) or applied directly on thermal insulation (render, tiles etc.). Subsequently, the shift away from the cavity wall system for the construction of energy-efficient buildings adds to the thesis that the brick faced cavity wall can no longer be considered a state of the art solution.

Ceramic industries have moved in line with this shift towards cladding and 'dematerialization', along the path of the further development of brick slips, known since the 19th century, and, in wood construction cultures, adequately referred to as 'brick veneer'. Despite the assets of brick slips for prefabrication, the construction speed and economy, their application remains counter-intuitive and also controversial in terms of circularity. Gluing brick slips

2 "Industriële Metselmortels", Febelcem Dossier Cement, juni 2002

3 EPB - Regelgeving Energieprestaties en Binnenklimaat

to a carrier - mostly water-resistant, rigid insulation - results in degrading the ceramic material to mixed waste at the end of its lifecycle. Many of these systems are yet to encounter the challenge of the shift towards bio-based, non-rigid insulation.

Visible and Invisible

'the brick dress'
Engelbrecht, M. "Femme de Maçon". 1730

In 'Brick. An exacting material", Jan Peter Wingender identifies the ambiguous role of the cavity wall brick facade between load-bearing and cladding adequately as 'the brick dress': "The brick dress can express individuality, or can endeavor harmony. It can accentuate, correct or conceal the anatomy of the body.".[4] With the notion of the brick dress, Wingender ties in with Semper's tectonics of dressing, which entails the intentionality of the expression of 'the ideal' rather than the necessity of construc-

4 Jan Peter Wingender, Brick : an exacting material (Amsterdam: Architectura & Natura Press, 2016).

tion, "[…] either for reason of greater durability, better preservation of the inner wall, economy, the display of greater magnificence, or for any other reason.".[5]

All through the history of construction, the distinction between the visible ('the ideal') and the invisible ('the necessary') faces of brickwork has been a design concern, and has nourished, among others, the debate on truthfulness of construction.

From the Romans on, in solid load-bearing constructions, the distinction between the visible and the invisible is reflected in the construction of the 'appareil mixte'[6] (diaphragm walls with rubble infill), the use of 'voorwerkers' and 'achterwerkers'[7] (sorting the best bricks for the visible work, the rest for the invisible), and 'Verblendsteine'[8], slips and tiles (the production of high quality facing ceramic products). Ever since the first description of 'hollow' walls (Atkinson, 1805)[9], the cavity has triggered the imagination of architects and engineers, leading to a wide range of experiments and in practice explorations. The virtual disconnection of the visible and the invisible layer of the construction by means of the cavity, from the 19th century on, ultimately solved multiple problems. The two-step rain protection resulted in healthier interior living conditions. And in terms of the economy of materials and construction, the cavity has allowed for the development of bigger modules of 'lower quality' for the invisible masonry from the 1900's on (later developed into construction blocks), boosting the speed of construction and reducing

5 Gottfried Semper, The four elements of architecture and other writings, RES monographs in anthropology and aesthetics, (Cambridge England ; New York: Cambridge University Press, 1989).

6 L. Cloquet, Traité d'architecture : éléments de l'architecture, types d'édifices, esthétique, compositon et pratique de l'architecture (Paris: Librairie polytechnique, 1898).

7 Ronald Stenvert, Biografie van de baksteen : 1850-2000 (Zwolle Amersfoort: WBOOKS ; Rijksdienst voor het Cultureel Erfgoed, 2012).

8 Wilko Potgeter, Die Erfindung des Verblendsteins : Bautechnik des Backstein-Rohbaus im Zeitalter der Industrialisierung, Berichte zur Bauforschung und Konstruktionsgeschichte, (Petersberg: Michael Imhof Verlag, 2022).

9 D. Bernstein, J. P. Champetier, and F. Peiffer, La maçonnerie sans fard : méthodes récentes de maçonnerie apparente, Collection Architecture et technologie,, (Paris: Editions du Moniteur, 1982).

its costs, as the finest, most expensive craftsmen, only had to be hired for the facade work.

Despite the performance of the cavity wall, the precise function of the cavity - because of its invisibility – for a long time remained covered with obscurity, and has been extensively questioned, studied, and discussed. With the introduction of insulation materials during the 1970’s oil crises, the usefulness of the ventilated cavity was questioned. And even today advanced dynamic simulations of the hygrothermal behavior of both new and historical brick-faced walls, show that the cavity wall complex is highly dependent on parameters that can not be generalized.

The expression of the brick facade leaf, like its structural role, is equally ambiguous. As mentioned in ‘the paradox of Load-bearing and Cladding’, the structural collaboration with the inner leaf of the cavity wall is key for the stability of the facade leaf. As a result, the dependency of the outer cavity leaf is here and there exposed in its expression. It has been stated among others by Andrea Deplazes, that the expression of the thin, structurally dependent, outer cavity leaf, often leads to no more than “the unsatisfactory deception of the solid wall”.[10] Expansion joints, ventilation joints, and window reveals remind us of the presence of the cavity. As does the stretcher bond, which is the simplest and most economical application for stacked bricks in the thin façade leaf. They all make the invisible visible.

From a historical perspective, cavity wall constructions, load-bearing constructions, and clad constructions have co-existed for over a century, and still do in our historical building stock. Regardless the construction, the eventual expression of the facade was always a design question, subject to many considerations. Load-bearing brick walls

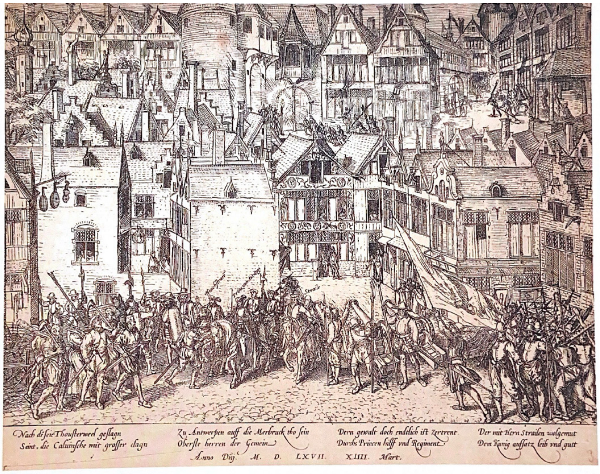
10 ‘The Pathos of Masonry’, in Andrea Deplazes and Eidgenössische Technische Hochschule Zürich. Departement Architektur., Constructing architecture : materials, processes, structures : a handbook, Fourth, revised edition. ed. (Basel: Birkhäuser, 2018)

were often finished or clad with high quality bricks or tiles, allowing for the design of bonds and patterns that had little to do with the tectonic expression of the load-bearing masonry itself. Equally so, cavity facade leaves were often designed to express load-bearing brickwork (i.e. by including 'false' headers in the brick bond or making deeper window reveals), to avoid the association with cheap or weak construction. Today, 'the expression of real, solid masonry' is promoted as one of the assets of lightweight ceramic cladding systems. So, to many archaeologists' surprise, there is no "truth" in the visible expression of brick masonry.[11]

The brick faced cavity wall has lived through the introduction of thermal insulation, the changing anatomy of window frames and sills, cold bridges, mobile sunscreens, fire protection compartmentation, air tightness, foils, tapes, acoustic standards, sealants, connectors and disconnectors, and even a radical change in the construction sequence and logistics, without – literally – losing face. Despite its constantly growing complexity, the appearance of the cavity wall has remained reassuringly intact for about 150 years. In other words, it is exactly the invisibility of the cavity that was the key to the long-lasting success of the cavity wall construction system.

11 Kent Archaeological Society.1982.Researches and Discoveries in Kent: The Custumal of Kent An unrecorded Achievement of Edward Hasted A Celtic Bronze Coin from the Canterbury.Archaeologia Cantiana.98:237-258.

Permanence and Temporality



'Urban petrification'
"Oproer in Antwerpen na de Slag van Oosterweel". 1567

Belgium considers itself a brick and stone country. However, like in most European regions, wood has been our predominant construction material until the 17th century. The construction of wooden houses in the Southern Netherlands consisted mainly of half-timbered frames filled and clad with sod cutting or wickerwork and clay. Construction wood however became scarce, as the result of centuries of ruthless deforestation. 17th Century archives testify of local legislations dictating the mandatory reuse of construction wood in case of storm damage or demolition, to save it from becoming firewood, and the prohibiting of moving wooden construction elements from local forestry to other municipalities. Constructions in wood were literally considered as 'furniture': the deconstruction, moving and reconstruction of wooden buildings was common practice.[12] Wooden buildings were 'designed for

12 Rosan Meijer; Veronique Van Humskerke; Hannelore Vandebroek, Van houten skelet

deconstruction': the construction methods facilitated the reuse of materials. The material was considered as a common. This 'ecosystem' of legislation, material economy, construction and design, indicates that wood construction in the pre-industrial era was essentially circular.

Although it is clear that a circular economy of bricks has equally always existed, the use of brick masonry for infrastructural constructions, religious and institutional buildings, has always added to the connotation of brick with permanence. City fires, urbanistic legislation and the local production of bricks (and natural stone) as an alternative for scarce or imported construction wood, have gradually pushed wood as a building material further to the background. With the petrification of our cities, brick has installed – first in party walls, as the replacement of the wickerwork in half-timber frames, and eventually in load-bearing facades – a new understanding of permanence and continuity of construction.[13] By the start of the 20th century, the use of construction wood in our region was limited to roof timber and beamed floors, the expertise in wood construction had faded, and the building economy had been taken over by masons as the primary contractors for construction works.

Since the institutionalizing of 'sustainability' as a design concern, wood -as a bio based material- has found its way back to construction in our region, both as a facade cladding material and for structural use. But on the globalized market, the use of maintenance-free tropical hardwood for outdoor conditions is still contested, despite the PEFC/FSC label.[14] And the life extension treatment

tot strodak: houtbouw in de Kempen, BKRK (Antwerpen: Geheugen Collectief, 2016).

13 Rutger J. Tijs, Tot Cieraet deser Stadt : bouwtrant en bouwbeleid te Antwerpen van de Middeleeuwen tot heden :een cultuurhistorische studie over de bouwtrant en de ontwikkeling van het stedebouwkundig beleid te Antwerpen van de 13de tot de 20ste eeuw (Antwerpen: Mercatorfonds, 1993).

14 Jane Elizabeth Hutton, Reciprocal landscapes : stories in material movement (London ; New York: Routledge, Taylor & Francis Group,, 2020).

of fast-growing European wood – by thermal or chemical modification, or with paint, oil etc. – also comes with an environmental cost, and maintenance. For the structural application of wood, construction has shifted from the use of demountable – temporary – assemblage to the not so demountable use of nails and glue.

In present day brick masonry, all components have become controversial in the face of sustainable construction. Cement (mortar) is debated because of its embedded CO2 and energy, and the environmental impact of the extraction of the raw materials and production. But most importantly, due to its strong adhesion – its permanence – cement mortar makes the reuse of bricks impossible. This means that ever since the generalized application of the cavity wall system, we have deprived bricks of future reuse. The embodied CO2 and energy in steel is equally controversial. Moreover, steel cavity ties and facade carriers are known to be detrimental for the lifespan -the permanence- of the masonry of the outer cavity leaf, as well as for the energy-efficiency of the facade (micro cold bridges). And last but not least, fired bricks are also known to be 'CO2 bombs'. Even more paradoxically, we have shifted to more energy- and resource-efficient perforated bricks. But together with the reduction of the material and the embedded energy and CO2, both the quality – thus the longevity – and the reusability of a brick are reduced.

Although a lifecycle of a century can compensate for the upfront carbon emissions of bricks[15], the forementioned explains why, in the last decade, the building industry extensively focused on the demountability of brick masonry. Dry-stacked masonry systems tackle the problem of the mortar, and facilitate the reuse of bricks. Business models like 'brick as a service' can moreover add to the guaranteed reuse. The biggest problem is that the appli-

15 NMD, april 2022

cation of dry-stack systems is to be found in cavity wall constructions, as with the omitting of the mortar, the thin outer dry-stacked cavity leaf is even more dependent on the cavity ties and secondary steel structures than its predecessor.

The simplified association of brick with permanence (and urbanity), and of wood with temporality (and rurality), has recently yet again been reshuffled by the notion of circularity. The association of circularity with temporality questions the legitimacy of the notion of permanence in architecture, and is thereby leading to new paradoxes. Contradictory to what we learn from history and inherent material properties, today we are extensively focusing on the life extension of wood (permanence) and the demountability of brick (temporality), without zooming out from the construction elements to the construction system.

'brick for permanence and the future ruin'
St-Elizabeth's Hospital renovation, Washington DC
Photo unknown

PRODUCTIVE CONCEPTS

The (Future) Ruin

Many before us have addressed the ruin as an architectural concept. For BLAF, the concept of the ruin is closely related to architect bOb Van Reeth's frequently paraphrased notion of "The Intelligent Ruin", which contrasts the material permanence of architecture with the temporality of its use. The ruin thereby touches on what today, within various approaches of sustainability, we would call durability, permanence, and continuity, as well as adaptive reuse, transience and circularity.

In the BLAF practice, the concept of the 'future ruin' became tangible for the first time in the dnA house project. The construction of the newly built house was one of many iterations on the construction possibilities of the building skin, and to a great extent informed by both the practice of post-insulating brick faced buildings in renovation projects as well as by the exploration of the 'brick veneer' construction method (timber frame construction with a thin brick façade) in the dhL house.

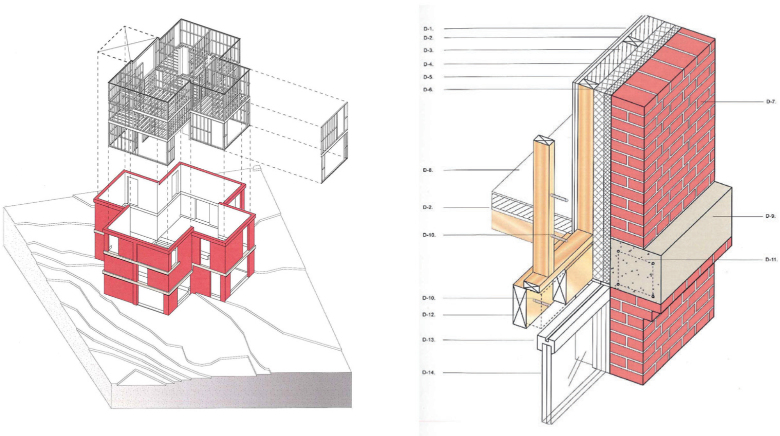
'The Future Ruin' (l'abri souverain) of dnA house, exterior (left) and interior (right)
Photos Stijn Bollaert

From these practices we observed how well designed, built with quality materials and craftsmanship, load-bearing brick buildings often prove to be highly valued, and easily adaptable. However, the question of how to post-insulate these buildings to meet the new energy-efficiency standards, in BLAF's case according to passive house principles, became a serious design concern, because even more challenging than the construction of new sustainable buildings is the transformation of our existing building stock. Due to the fact that the structural, physical and aesthetic role of the load-bearing masonry facade are contained in one and the same constructive layer, adding insulation to these existing buildings from the outside is often a heart breaker. And from the inside, it is often a deal breaker. The penetration of wooden floor beams in load-bearing facade walls, the intersections of adjacent walls, and the structural embossments on the inner surface of the masonry make the execution of the air-tightness that comes with the post-insulation excessively complex, error prone, and therefore expensive. As a way out, the addition of a dramatized cavity space the setting back of a climatized box inside the brick shell (the box-in-box) was often the solution, that had been put into practice by many.

From the problematic post-insulation of existing brick buildings (both the solid load-bearing and the cavity wall system), we moved on to an 'improved version' of the load-bearing brick shell as a design concept for new buildings, taking into account the layeredness of construction, and the combination of both the associations and performance inherent to the materials. The brick shell of the dnA house was designed to be structurally and thermally independent from the other layers of the construction: the timber frame and thermal insulation. The shell carries the load of the roof; together they create a bell, an 'abri souverain'.[16] The inner surface of the brick shell was above

16 Amy Gardner (1997) Auguste Perret: Invention in Convention,Convention in Invention, Journal of Architectural

all kept flat, to enhance the easy and continuous application of the thermal insulation from the inside. The beams and columns, necessary for the stability of the shell, were integrated in the masonry, resulting in an exterior relievo of buttresses and cornices, expressing the structural scheme of the shell, and safeguarding the flat inner surface of the walls.



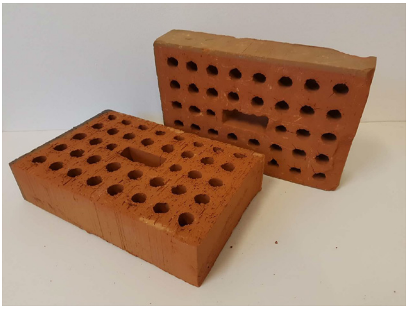
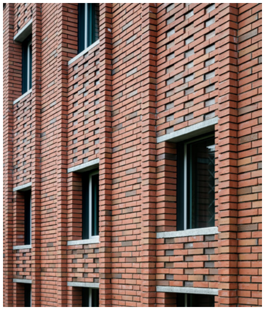
dnA house: the construction principle of the post-insulated self-bearing shell

Stepping away from the cavity wall construction system for the dnA house, allowed for the adjustment of the construction sequence of the façade. Building the self-bearing façade walls and the roof first, created optimal workshop-like conditions for the wood construction on the inside, protected from the wind and rain. With the brick shell taking the wind forces, the structural collaboration of both the inner and the outer construction was no longer needed, and the amount of wood used for the inner structure was significantly reduced.

In its in between stage of the 'freshly built ruin' (Kirkeby, 1977) the brick shell of the dnA house triggered many reflections. The definitive disconnection of the layers of the construction of the house -the permanent and the temporary, the solid and the filigree, the stone and the wood, the durable and the circular, the past and the future, the carbon and the bio based, the wet and the dry construction, the public and the private-, offered a glimpse at its future state of ruin. It marked the potential zero point from which any future lifecycle of the building can be re-imagined. The dnA house, as a 'seismic point' in our search to tackle the cavity wall lock-in, has instigated the further research of the brick shell 'ruin' as both a construction and a design concept.

Obviously, one can argue that the solid walls in reclaimed bricks of the dnA house were built with cement mortar and consolidated concrete beams and columns cast on site. It means that in the dnA house, the reclaimed bricks have reached their final destination. The conscious approach of that paradox was BLAF's reaction on the behavior of the brick industry, extensively focusing on the development of new products for the 'dematerialization' of the brick façade, without questioning the construction system in which their application is to be found. According to BLAF, practices of adaptive reuse and renovation had convincingly proved that the lifespan of brick masonry is its most valuable asset. Interestingly, within this approach, the resistance and incompatibility of the ruin is generally taken on as an asset for the new design, rather than as a problem. Rather than the singular brick, the brick shell can be a product of the circular economy.

The realization of the dnA house was rather satisfactory, except for the economics of the brickwork. One might say it took too many bricklaying to build the shell. A retake of the construction concept of the brick ruin with large bricks, to reduce the cost of the bricklaying, was an obvious next step. With no such products on the Belgian market, together with a manufacturer we dove into the production aspects of bricks, we decided on the size and the recipe for the brick, and had the production set up for a Big Brick. The concept of the Big Brick 'ruin' was further explored in three case study houses: btL house, tmEK house, wsT house.

BLAF Big Brick 1.0 (left), btL house, tmEK house, wsT house; BLAF Big Brick 1.0 (right), btL house

Geometry

Geometry as a design concept initially entered the BLAF practice through the notion of 'volume efficiency', or the understanding of compactness within the principles of energy-efficient design. Compactness is highly paradox-ical, both in EPB and PHPP[17] assessment. Big buildings being geometrically more compact than small ones, may lead to the impression that building a bigger house is a smart thing to do, or that energy demand reduction in a big house is less important than in a small one.

Led by the passive house principles, in the BLAF prac-tice, both the compactness and the 'smallness' were tak-

17 Passief Huis Project Pakket

en on as equally serious challenges for the transition of our energy supply system, aiming at low absolute energy consumption of houses, rather than the relative.[18] The assumption in the Flemish EPB of the 'economic optimum' as a motivation to set unambitious targets for energy demand reduction (first and most important step of the Trias Energetica[19]), has nipped the passive house agenda in the bud. During the rollout of EPB, research consistently showed that a passive house was 15 to 25 % more expensive than the same house according to EPB standards. Of course it was. But why the same house? Was EPB not blatantly ignoring the asset of design? And had it not already been proved that the energy investment in extra building materials (mostly insulation and glazing) are marginal compared to the energy savings during the building's use?[20] Building according to the passive house principles, we were triggered by EPB to prove that the extra budget could easily be compensated by a design approach, that would not lead to 'the same house'. It is exactly there, in the search for smallness and compactness, material economy and affordability, that the geometry of the floor plan and the building envelope started playing an important role.

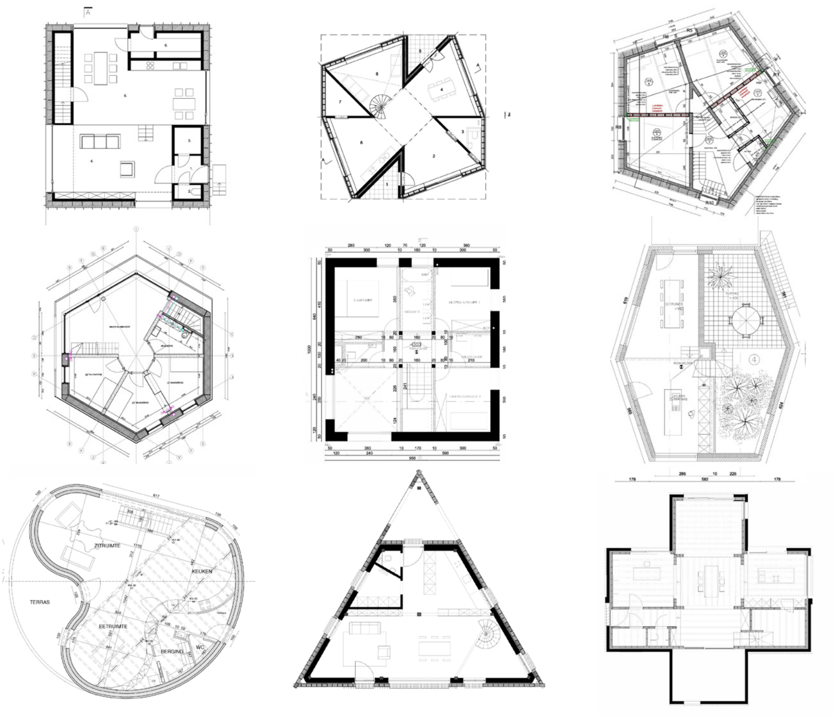
With the sphere being the ultimately compact volume, we started adjusting the box shaped house (gbL house) to more faceted variants with circle-like floorplans, so that their extrusion would result in more compact prisms. In timber frame construction, the geometry of the floorplan is translated into logical spans and beam patterns, using direction changes and triangulation to generate stability. From rectangles to trapezoids (wsT house), pentangles (deW house), hexagons (jtB house), octagons and 'blobs', the regular geometries drastically enhanced our under-

18 Griet Verbeeck, "Sufficiency: waarom energie-efficiëntie niet genoeg is " (paper presented at the Pixii Expert Day: Sufficiency, 2023).

19 Duijvestijn, Delft 1972

20 Griet Verbeeck, "Optimisation of Extremely Low Energy Residential Buildings". KUL Arenberg, 2007

standing of the relation between the rationality of the inner structure, its performance, and its material use.



Iterations on geometric floorplans

The iterations on the geometry of the house thus became a ‘shortcut’ in the design, to embed our principles and ideas on energy-efficient design as from the first step. And it has further recalibrated the design of the house. The geometry is responsible for the land use of the house in its ‘administrative landscape’ (allotments and ribbons), the orientation towards the planetary energy system (the sun), the more vertical organization of the program, and, ever more importantly, the calibration of the interior space in time and space by its materiality.

Compact interior spaces of houses with geometric floorplans
gbL house (top left); jtB house (top right); jmO house (bottom left); hkZ house (bottom right)
Photos Stijn Bollaert

Hybrid Construction

Design practices engaging with the construction of very energy-efficient building skins were the first to reveal the shift away from brick as a façade material of choice, since the introduction of EPB in 2006 . In 2014 BLAF debunked this shift as a pragmatic choice to tackle the increasing complexity of the cavity wall system, rather than as a positive choice in favor of other materials. The book “Passive + Architecture” from 2015, heralding the introduction of the Brussels Region Passive House Standard by displaying good practices, contained no more than one brick faced building: the dnA house.

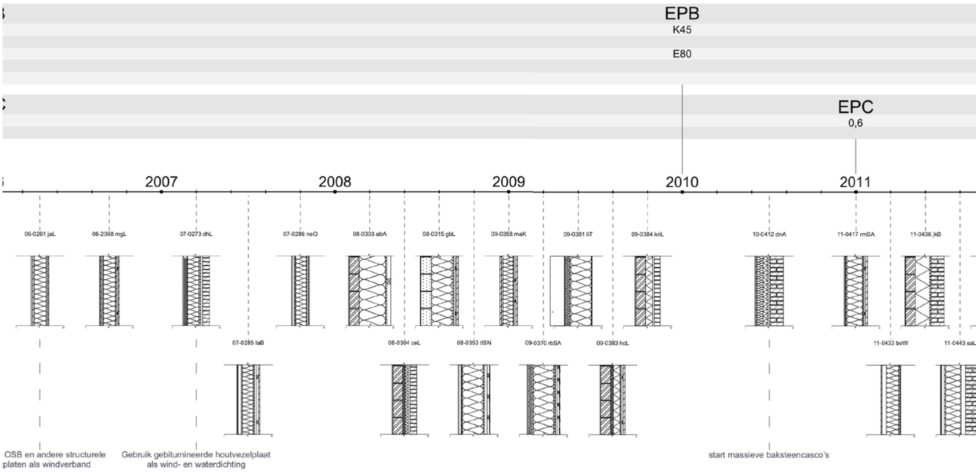
From a background in the design of timber frame constructions, and in design according to the passive house principles -not the standard-, BLAF have extensively explored, through practice, variations on construction methods for 'sustainable' architecture, since 2003.

1. Constructions with wooden structures (filigree or solid) and light facade cladding
2. Constructions with solid structures and light facade cladding
3. Constructions with solid structures and a solid facade 'dress' (cavity wall)
4. Constructions with wooden structures (filigree or solid) and a solid facade 'dress' ('brick veneer')

From these variants and their iterations, we developed a multi-directional approach of the layeredness of construction and the precise meaning and role of each material in the complex, i.a. the cavity. It has among others led to the observation that the brick faced cavity wall, as a 'closed' system, today causes many lock-ins that add to the conclusion that it can no longer be considered as an adequate,

state of the art system. These reflections triggered our search for the combination of economic, sustainable, ecologic, energy-sufficient, simple and circular wall compositions, and have eventually lead to the proposition of the Big Brick Hybrid construction concept (following the dnA house case study project).

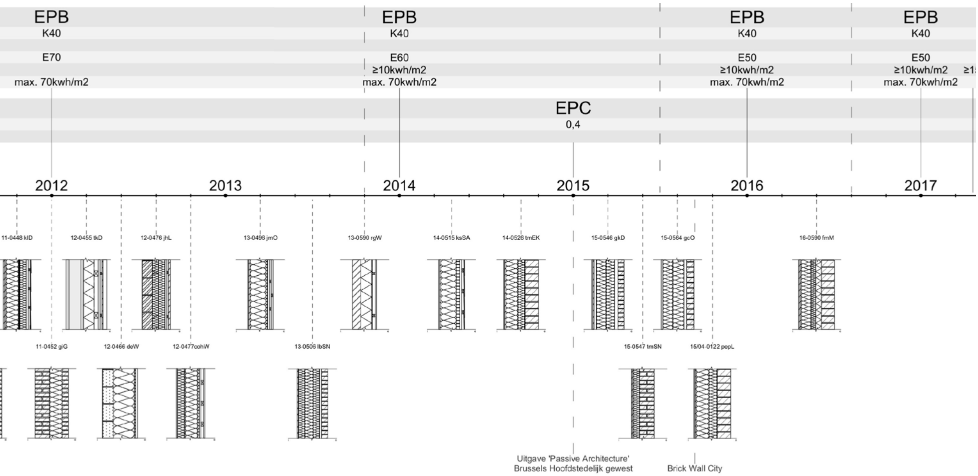
Much like in cavity wall constructions, the necessity of the ventilated cavity remained an important question within the construction mode of the Big Brick Hybrids. But because of its big share in the construction complexity, it had been no less than our goal to omit it. To do so, firstly we focused extensively on the air tightness and vapor regulation on the inside of the wood construction. Together with the flatness of the inner surface of the shell, they allowed for the placement of the insulation in full contact



Iterations on hybrid wall compositions
from "30 Ways To Build a Wall". N.Claeys, UGent 2019

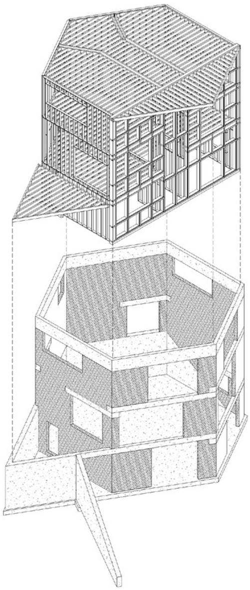
with the brickwork and thereby reduce the risk of condensation on the inside of the brick shell. Moving from the traditional solid, stone thick masonry of the dnA house to the perforated mono-wall big brick, called for precaution of water infiltration from the outside, resulting in Big Brick Hybrid projects to be realized with a ventilated cavity. A next step was taken in the jtB house, where for the first time we used lime-hemp insulation. Because of its exceptional capacity to buffer and release moisture coming from both the outside (rain) and the inside (vapor) of the construction, thereby protecting the wood construction from rotting, we took the informed risk to fill the entire cavity with half-dried loose lime-hemp, thereby drastically optimizing the simplicity of the execution.

The jtB house, as a realized project, is the 'preliminary conclusion' of the practice based research on the open construction method for brick faced, wood construction building design. It entails the use of two main materials in their 'most appropriate' way: brick for permanence, durability, low maintenance, representation and 'pathos'; wood for temporality, adaptability, interior and ecology.



The deconstruction of the hybridity of the cavity wall resulted in the radical disconnection between the constructions of the shell and the infill, both in terms of stability and thermally. Together with the concepts of the future ruin and the geometry, the hybrid construction concept reveals the jtB house as a new ‘seismic point’ in the practice of BLAF.

jtB house
Photo Stijn Bollaert



The construction of the jtB house
Brick shell and timber frame

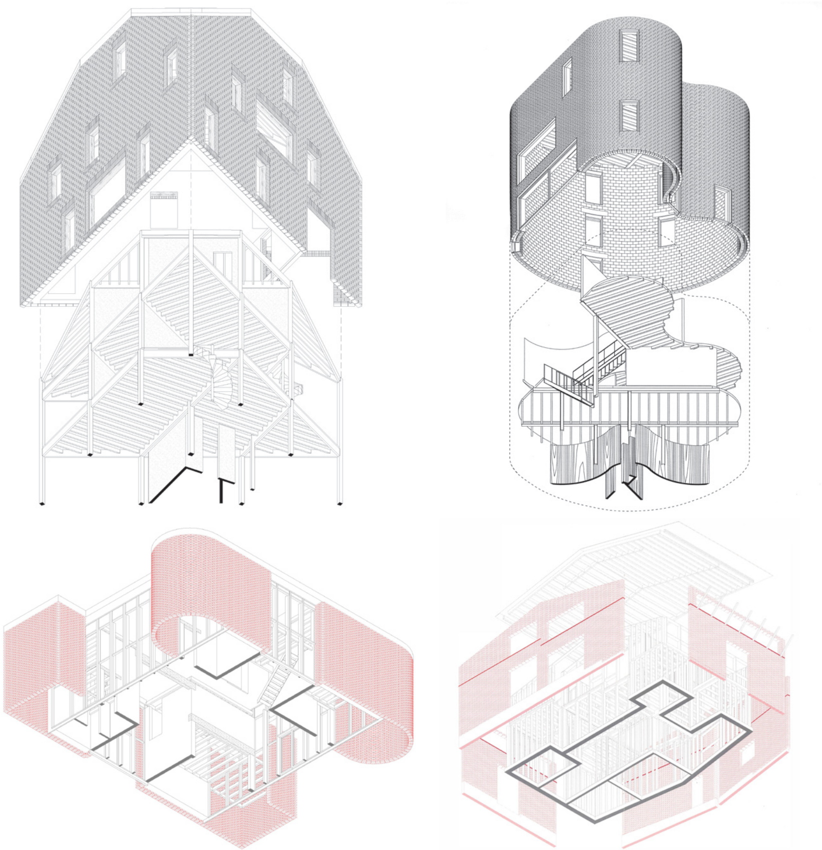
The construction of the jtB house
Brick shell and timber frame, limehemp insulation with no ventilated cavity (right)

BEYOND THE MANDATE

With this article I have set forth how the 'Big Brick Hybrids' entail more than the product development of a brick. As a series, the houses feature the repeated and multi-directional process of designing building a house as an epistemic trajectory, a knowledge acquisition process. By digging into the archaeology of this trajectory, and by identifying the paradoxes and concepts at play, this contribution aims to make the practice based knowledge - from the long-term engagement of one particular practice with one particular design question - transferable.

According to Viollet-Le-Duc, the way out of 'confusion' and the is the reliance of the architect on ideas and principles. In architecture practice, ideas and principles are instrumentalized into concepts, that allow for design decision making. Concepts cannot undo paradoxes, nor can they simply reside in them. They call for a position, and are thereby productive, as they set a path to further explore the extent of the speculative possibilities of design. They allow for simultaneous action and reflection, for propositions.

In the BLAF practice, the 'learning by building' - iterations based on ideas and principles leading to 'seismic points' , in their turn leading to concepts for future projects - is a methodology for knowledge production by design. The 'productive concepts' have instigated the shift from designing and building 'the same but different' – each time a house, promoting the tailor-made to meet the clients' private considerations – to 'different but the same' – optimizations of the same principles from a general concern. Each individual client becomes an accomplice in that process, a facilitator of the practice-based, unfunded research beyond the mandate.



The structural and thermal disconnection between the shell and the infill, conceptualized in drawings wsT house (top left); gjG house (top right); fmM house (bottom left); tmEK house (bottom right)

bibliographical references

Aalto, Alvar, and Jaakko Kontio. “The Brick”. Edited by Hanni Sippo. Helsinki: Alvar Aalto museum, 2001

Atelier Bow-Wow Graphic Anatomy. Tokyo: TOTO, 2007

Ballestrem, Matthias and Gasperoni, Lidia. Epistemic Artefacts: A Dialogical Reflection on Design Research in Architecture. Baunach: AADR, 2023.

Bernstein, D., J. P. Champetier, and F. Peiffer. La MaçOnnerie Sans Fard : MéThodes RéCentes De MaçOnnerie Apparente. Collection Architecture Et Technologie,. Paris: Editions du Moniteur, 1982.

Bonneuil, Christophe, and Jean-Baptiste Fressoz. The Shock of the Anthropocene : The Earth, History, and Us. London ; Brooklyn, NY: Verso, 2016. Cover image 9781784780791.jpg.
Brand, Steward. How Buildings Learn. What happens After they’re Built. New York: Penguin Books, 1994

Cairns, Stephen, and Jane M. Jacobs. Buildings Must Die : A Perverse View of Architecture. Cambridge, Massachusetts: The MIT Press, 2014. Claeys, Nathan. “30 Ways to Build a Wall - Duurzaam, Energiezuinig En Experimenteel Bouwen Met Blaf Architecten.” MS, Ghent University, 2019.

Cloquet, L. Traité D’architecture : ÉLéMents De L’architecture, Types D’éDifices, EsthéTique, Compositon Et Pratique De L’architecture. Paris: Librairie polytechnique, 1898.

Deplazes, Andrea, and Eidgenössische Technische Hochschule Zürich. Departement Architektur. Constructing Architecture : Materials, Processes, Structures : A Handbook. Fourth, revised edition. ed. Basel: Birkhäuser, 2018. still image.

Gardner, Amy. “Auguste Perret: Invention in Convention, Convention in Invention.” Journal of Architectural Education (1997).

Guy, Simon. “Pragmatic Ecologies: Situating Sustainable Building.” Architectural Science Review 53, no. 1 (February 1, 2010): 21–28. https://doi.org/10.3763/asre.2009.0102.

Guy, Simon, and Elizabeth Shove. The Sociology of Energy, Buildings and the Environment:Constructing Knowledge, Designing Practice. Routledge, 2014.

Haraway, Donna Jeanne. Simians, Cyborgs, and Women : The Reinvention of Nature. New York: Routledge, 1991.
Helga Blocksdorf, Katharina Benjamin, Matthias Ballestrem. “#Constructive Disobedience.” TU Braunschweig, 2022.

Hendrickx, Arnaud. “De (Onder)Zoekende Praktijk.” In Wanneer Attitudes Vorm Krijgen, edited by I. Blancke S. De Caigny, M. De Cleene, P. Kemme, P. Pferdmenges, E. Schreurs, B. Tritsmans, M. Van Den Driessche. Architectuurboek Vlaanderen, 211-20. Antwerpen: Vlaams Architectuurinstituut, 2020.

Hutton, Jane Elizabeth. Reciprocal Landscapes : Stories in Material Movement. London ; New York: Routledge, Taylor & Francis Group,, 2020.
Jensen, Thomas Bo. “Per Kirkeby : Architecture.” Copenhagen : Edition Bløndal, 2019 Nagler, Florian. Building Simply : Guidelines. Boston: Birkhäuser, 2021.

Nijs, Lieven. “Baksteen: Bouwsteen Van Paradoxen.” A+ 294, Back to Brick, 2022, 72-76.

Peirs, G. La Terre Cuite - L’architecture En Terre Cuite De 1200 à 1940. Liege, 1979.

Potgeter, Wilko. Die Erfindung Des Verblendsteins : Bautechnik Des Backstein-Rohbaus Im Zeitalter Der Industrialisierung. Berichte Zur Bauforschung Und Konstruktionsgeschichte. Petersberg: Michael Imhof Verlag, 2022.

Rotor, Ghyoot M., Devlieger L., Billiet L., Warnier A. Déconstruction et réemploi. Presses polytechniques et universitaires romandes, Lausanne, 2018
Rotor, Devlieger L. (ed.) Behind the green door. Oslo Triennale Catalogue, 2014

Schwarz, Rudolf. Von Der Bebauung Der Erde. Heidelberg,: L. Schneider, 1949.

Semper, Gottfried. The Four Elements of Architecture and Other Writings. Res Monographs in Anthropology and Aesthetics. Cambridge England ; New York: Cambridge University Press, 1989.

Srinivasan, Ravi, and Kiel Moe. The Hierarchy of Energy in Architecture : Energy Analysis. Pocketarchitecture : Technical Design Series. London: Routledge, 2015.

Stenvert, Ronald. Biografie Van De Baksteen : 1850-2000. Zwolle Amersfoort: WBOOKS ; Rijksdienst voor het Cultureel Erfgoed, 2012.

Tijs, Rutger J. Tot Cieraet Deser Stadt : Bouwtrant En Bouwbeleid Te Antwerpen Van De Middeleeuwen Tot Heden :Een Cultuurhistorische Studie over De Bouwtrant En De Ontwikkeling Van Het Stedebouwkundig Beleid Te Antwerpen Van De 13de Tot De 20ste Eeuw. Antwerpen: Mercatorfonds, 1993.

Till, Jeremy. Architecture Depends. Cambridge, Mass.: MIT Press, 2009.

Vandebroek, H.; Meijer, R.; Van Humskerke, V. Van Houten Skelet Tot Strodak: Houtbouw in De Kempen. BKRK (Antwerpen: Geheugen Collectief, 2016).

Van Reeth, Bob, and G. A Bekaert. Bob Van Reeth: Teksten Van En Over. Gent: RUG. Faculteit Toegepaste Wetenschappen, 1983. Verbeeck, Griet. “Sufficiency: Waarom Energie-Efficiëntie Niet Genoeg Is “ presented at the Pixii Expert Day: Sufficiency, 2023.

Viollet-le-Duc, E.E. Entretiens Sur L´Architecture. A. Morel, 1872.

Wingender, Jan Peter. Brick : An Exacting Material. Amsterdam: Architectura & Natura Press, 2016

Practices in Research #04 - Beyond the Mandate - December 2023

online open access double-blind peer-reviewed journal for practice-based research in architecture.

double-blind peer review process : www.architectureinpractice.eu/pirjournal

front and back cover images : © 8000.agency

thanks to Orfée Grandhomme & Ismaël Bennani

ISSN: 2736-3996

Practices in Research Journal
Rue des Palais 153 - 1030 Brussels
T. +32 (0)2 244 44 35
info@architectureinpractice.eu
www.architectureinpractice.eu/pirjournal

In Practice
interuniversity research group
of practising architects

KU LEUVEN · LIÈGE université · Universiteit Antwerpen · UCLouvain · ULB UNIVERSITÉ LIBRE DE BRUXELLES