“THINKING THROUGH MAKING”

The role of physical models for architects

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I INTRODUCTION

Architecture by definition is the science of the 'art or practice of designing, planning and constructing buildings'.[1] In other words, architecture can be seen as an elegant combination between arts and sciences. The knowledge to combine both is based on a research process; a first step for any architect prior the design process which often happens to be neglected. This phenomenon often happens due to the economic that architecture offices have nowadays. However, I feel that this is the step within each architect should position himself in order to make a coherent design. A large number of research approaches are available for the formulation of various research methodologies and it's important for every individual to use the right one in order to achieve his/her goal. The digital technologies that have been developed the last decades enabled to build 2D drawings and 3D models in a very short time. Although, previous generations always suggest us to read books in hard copies in order to 'feel' the story, in my opinion, making a physical model could offer the same 'feeling'. Model making is crucial in architecture, it explores the 3 dimensional senses and flares up architect's imagination. Each technique, scale and material as methodological-research brings all the senses working together.
In addition to that, architecture can have an abstract character and can be difficult to be grasped by people not related to architecture or clients. Presenting the research process to them would offer a better understanding of the process as well as the final design.

Personally, in the beginning, it was difficult to me to be conscious about my own methodological-research. The course of lecture Series on Research Methods presented different ways of research methodologies available in the field of architecture and offered a specific overview of each chair within the faculty of the TU Delft. The different lectures given by the professors of the different studios showed the influence of the type of research methodology and the final architectural position, statement or outcome. In that sense, research itself became a challenge and it gave me the opportunity to research about my own research methodology rather than focus in the final physical result that is asked by the studio. This offered me a clear way of researching for the upcoming projects which was unclear until now and rather intuitively.

Within the graduation studio 'the city room' leaded by the chair of Interiors Building Cities, this year's theme is the 'Intimate city'. At this stage we are asked to design and build a physical model of an intimate public interior beyond the scope of the domestic with an openness to appropriation; or more specific, space without function or a sense of place within itself. Further on as graduation assignment, based on our personal research of an intimate city-room, students are free to develop their own program, function and localization within the city of Antwerp. The chair of Interiors Buildings Cities is, as it is described, designing buildings in places for the people. The project should be a piece of architecture that takes into consideration the city, the existing surroundings, the relation between outside and inside, materialization, which is our role as professional. [2] This thesis is a research about the role of different type of physical models and its functions within the research methodology through the design process. As David Gomm said: "*Models can appear in different roles along the process of creating architecture. As designs unfold, models tend to progressively increase in scale and detail, each successive model taking us ever closer to the design resolution".*[3]

II RESEARCH-METHODOLOGICAL DISCUSSION

Within the field of architecture, 'thinking through making' is a research approach that is considered as the development of building physical models along the design process. My graduation project within the studio of Interiors building cities so far already reflects this idea of making models as a research method; models that I have always been consider as a final product. Writing the Research Methods paper allowed me to conceive the role of thinking through making as a research methodology; a methodology that I used to practice unconsciously. Every type of model - conceptual models, site models, design development models, structural models, interior space models, lighting models, mock up prototypes – apart from their value as a tool to design development, each has his own precise research purpose in a highly practical and convenient manner. More specific, by altering the scale, size, material, precision in a model, that would consequently have an effect on the research purpose of light qualities, proportions, reflection, colors, perspective, materialization or surroundings relations. As we see, some could argue that the result of such a research methodology has a beneficial outcome compared to the research through two dimensional drawings or three-dimensional virtual modeling.[4] This process allows a specific research step after which to move on to the next research purpose with another type of physical model.[5] My research methodology of "Thinking through making and the role of different physical models" that I would like to elaborate through this work has an even more close relation to the background of my graduation studio.

As it is presented below, physical architectural models are well-known as a research tool in the history but luckily, it is still considered as one of the fundamental nowadays. Example of the importance of physical models within the current state of architecture, is the book "Das Architectur Modell – Werkzeug, Fetisch, Kleine Utopie", an editon in which all the physical models of the DAM (Deutsches Architekturmuseum) exhibition of 2012 are represented. It was the first time that architecture models were presented as an effective research methodology; building physical models was regarded as an ambitious tool that offers the opportunity to try and experiment new ideas.[6] Furthermore, Megan Warner in her book "Model Making", describes the physical models as uniquely acknowledge and fascinating tool for architects despite the digital technologies and virtual programs of nowadays. He considers the materialization as essential but even more the research of the barrier of limitations or opportunities, which become obvious through building a physical model.[7]


Fig. 1 : Concept model

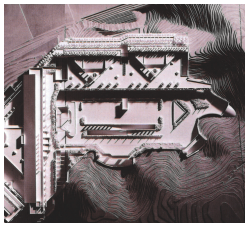
Fig. 2 : Site Model

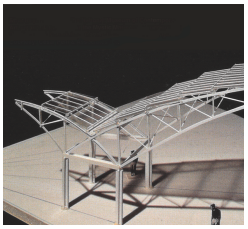
Fig. 3: Structural model

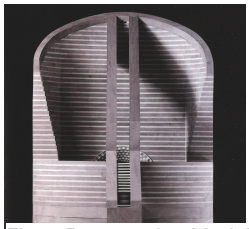
Fig.4: Presentation Model

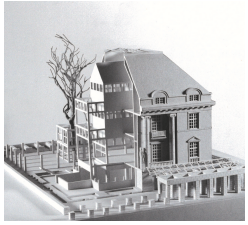
Fig. 5 : Cross section model

III RESEARCH-METHODOLOGICAL REFLECTION

At this point, some may wonder how this methodology has been used and evolved within the history or architecture. The first recorded physical model which was a representation of an ancient Greek temple had been discovered by the Greek historian Herodotus back in the fifth century. However, this research approach was not often applicable at that time due to the inaccuracies in translating scales that could have led to dramatic errors. Nonetheless, the frequent repetition of the architecture elements of that era – such as the columns – allowed their easy authentic replication from building to building, rather than small scale test models. Therefore, there was no reason to consider the building of physical models as a research tool until a new architecture era;[8] the renaissance. From that period and on, the number of physical architectural models as well as urban and landscape models started to increase. Expensive large scale models built out of wood, plaster and clay frequently including additional elements became a clear research tool for the design development; they became not only a way to complement drawings but a communication method as well.[9] As the British designer Christopher Wren, who designs of St Paul's in London stated: *"a good and careful large model should be constructed for the the encouragement and satisfaction of the benefactors who comprehend not designs and drafts on paper."*[10]

Fig. 1 : Model of the Royal Naval Hospital, London, 1699

In the twentieth century there is a significant reappearance of the physical models, with the brightest example that of Walter Gropious, the Bauhaus founder, who in 1919 favorised physical models as research methodology to research and test ideas quickly. From this point and on the physical model was re-established as vital research methodology of architecture in the design development and the conception of many building of the modernist era. As reference the Dutch architect Gerrit Rietveld's who defines architecture about studies of space. During the early twentieth, the research based on the type of material and the space through the physical models was crucial. It allowed to visualize and articulate their concept in a clear, provocative and atypical way. This study transformed the dependence of drawing in an experimental and explorative nature which allow the understanding of special possibilities.[11]

With the increase of the new technology digital three-dimensional models has become a powerful method for designing. Along these lines, it is valuable to mention that each architectural practice has its own interpretation on the use of digital models; some use it, fully or partially, as a research method, while others just as tool to produce a final presentation image. However, as Juhani Pallasmaa states in his book, The Thinking Hand, “even in the age of computer-aided design and virtual modelling, physical models are incomparable aids in the process of the architect and the designer. The three-dimensional material model speaks to the hand and the body as powerfully as to the eye, and the very process of constructing a model simulates the process of construction”.[12]

There is the pertinent question of why to use the tradition physical models and how they can be merged with the technology of nowadays. I believe that physical models offer the more experimental and rigorous manners of designer than other facilities. It is important to mention that many parts of a project can only be understood and become clear through three dimensional representations and as Akiko Bush states “that part of our attraction to models lies in the fact that ‘the world in miniature grants us a sense of authority; it is more easily maneuvered and manipulated, more easily observed and understood. Moreover, when we fabricate, touch, or simply observe the miniature, we have entered a private affair; the sense of closeness, of intimacy is implicit.”[13] Nowadays, the combination between digital technology and traditional physical model making proposed a shift in the way we engage the design process of architecture. Those tools as modeling computer programs give our field the possibility to conceive designs which would have been very difficult to develop in a traditional way. Those CAD technologies can be translated into laser cutting or computer numerical control (CNC) milling and three dimensional printing and have the enormous advantage to increase the design innovation and production of the architectural skill merged with the traditional way.[14] The overlapping of different model technique can only enrich the result of the research methodology further.[15] The comparison of this approach with the different type and scale models described in the second paragraph, both express an architecture space. However, they are used in a different moment of the design process for another purpose. The integration of digital methods in a model is closer to the final communication step of the process of model making.

IV POSITIONING

Referring to the essay above, model making in other words, is a simple medium to build an imaginary design in order to have three-dimensional space overview. If we combine this thinking through making methodology with the material culture as presented by Eiren Schreurs in her lecture, we can see the potential to conduct further research on the embodied parameters such as anthropology, sociology, psychology, history and archeology in this research methodology.[16]

On the other hand, I feel that what might be missing from my research methodology is a representation of hapticity. Even though the investigation of experience is substantial in the field of architecture, the visual outcome of the physical models most of the time is a static image with no embodied experience. Within the following case studies, the existence of experience is prominent. Peter Zumthor’s Thermal bath in Vals (Switzerland) emphasizes in the experience of different senses. The roughness of the local stones in combination with the surrounding mountain landscape that merge in colour or the difference between warm and cold temperature in different bath – qualities hard to be presented through a physical model. Similarly, Henri Labrouste’s, La Bibliotheque National, Richelieu in Paris (France) in which the quietness combined with the smell of the old books lead to a certain behavior from each individual. Finally, Mayer van den Bergh museum in Antwerpen (Belgium) in which the sequences of spaces in combination with the sound of the cracking wooden floors emphasize the notion of movement in the space. All those senses, touch, temperature, sounds, smell and movement – a total

haptic experience - which are essential for the atmosphere of a space, are almost unable to be perceived through my research methodology.

Other tools like audio or video recording could be useful to research those other senses. Something which is not encouraged by the chair of interior building cities yet. After this reflection on research methods and methodologies, where the importance of experience became very visible, I can imagine myself testing physical models through a collection of successive photos, all combined in a time lapse video, as an attempt to investigate the qualities and the movement through the space. Further emphasis could be provided by the combination of the video with a recorded soundtrack.

In conclusion, the research methodology of “Thinking through making and the role of physical models for the architect” feels almost mandatory within the Chair of Interiors. Something for which I don’t complain as it is something I like doing and is a methodology I have been familiar with since my bachelors. However, in order to fully benefit from this research methodology, it is necessary to be critical and reflective on the model making process and treat it as research process rather than part of a to-do list for an assignment. In that way, model becomes a part of a valuable research methodology rather than an ordinary object or architectural creation.

Fig. 7 : Personal final presentation model Msc2, Theater OPEN, Dublin

V BIBLIOGRAPHY

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VI IMAGE REFERENCES

- Figure 1 : Book, Porter, Tom, and John Neale. Architectural Supermodels Physical Design Simulation. Architectural Press, 2000

- Figure 2 : Cf fig. 1

- Figure 3 : Cf fig. 1

- Figure 4 : Cf fig. 1

- Figure 5 : Cf fig. 1

- Figure 6 : Book, Moon, Keren. *Modeling Messages the Architect and the Model*. The Monacelli Press, 2005.

- Figure 7 : Author’s own

VII ENDNOTE

[1] Definition of Architecture in English by Oxford Dictionaries, https://en.oxforddictionaries.com/definition/architecture

[2] TU Delft, Architecture of the interior, https://www.tudelft.nl/en/architecture-and-the-built-environment/about-the- faculty/departments/architecture/organisation/chairs/architecture-of-the-interior/

[3] Porter, Tom, and John Neale. Architectural Supermodels Physical Design Simulation. Architectural Press, 2000, p.19

[4] Thomas, Katie Lloyd. Material Matters: Architecture and Material Practice. Routledge, 2007. P.90

[5] Job Floris and Hans Teerds. *One models and images, an interview with Adam Caruso. OASE 84, 2011, P. 129*

[6] Cachola Schmal Peter, et al. *Das Architektur Modell: Werkzeug, Fetisch, Kleine Utopie,* DAM, Deutsches Architekturmuseum, 2012, p.8

[7] Werner, Megan. Model Making. Princeton Architectural Press, 2011. P.12

[8] Dunn, Nick. Architectural Modelmaking. Laurence King, 2014. P.31

[9] cf 6, p.32

[10] cf 3, p.8

[11] cf 6, p.33

[12] Pallasmaa, Juhani. The Thinking Hand: Existential and Embodied Wisdom in Architecture. Wiley, 2010. P.57

[13] Busch, Akiko. The Art of the Architectural Model. Design Press, 1991. P.11

[14] Moon, Keren. *Modeling Messages the Architect and the Model*. The Monacelli Press, 2005. P.188

[15] cf 6, p.48

[16] Schreurs Eireen, LSRM, Lecture about the “Material Culture”, 18.10.18