

# VALUE ASSESSMENT OF RECLAIMED MATERIALS

The role of the assessor on the estimation of value

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## I INTRODUCTION

This Position Paper is written for the Lecture Series Research Methods as a theoretical framework for the graduation design studio Architectural Engineering and has the objective to clarify what research methods I have used in my design project already and how I can further elaborate during the design process. Through clarifying the used research methodologies, I reflect on the way design is approached and opt to become more aware of the knowledge that is already obtained and what needs further elaboration. This heuristic awareness helps to strengthen and enrich the architectural design and throughout this also people's lives are strengthened as well (Groat & Wang, 2002). David Wang describes the relation between research and design and the up following relation with people as that research methodologies grapple with the multiple connections between human experience and build form (Groat & Wang, 2002). During the lecture series, it was also confirmed that the way we do research, including the methods we choose, determine the outcome significantly.

As a designer, my focus lays on the connection between human experience and the physical build form. While designing, I let myself guide by contextual factors and social needs to design spatial solutions. Previously, I saw myself as someone who designed architecture that was closely related with its (social) environment. However, during the course I was confronted with the fact that on so many levels my design was still disconnected, because I was relying on my own knowledge and believe, which weren't based on the actual world, but on the pre-assumptions of and my ideas about the environment around me. The lecture about Typology<sup>1</sup> made me understand that even if one thinks that the design is established from the user's perspective and relates to the physical context, often the design still answers to the prejudices in our mind. One could state that we as designers as well as human beings stereotype on a variety of levels and therefore designers don't provide innovative and inclusive designs. This realization made me aware that for every design assumption I need to think further and ask myself questions about what and why I am assuming certain things; I need to dig deeper to get to the true relation with the people I am designing for and context around that I want to adapt to or interact with.

The studio of Architectural Engineering has a completely other focus and approach on architectural design. The studio takes engineering as an answer to design issues. Therefore, the graduation students start with a sustainable (technical) fascination to build the design up on. The studio encourages innovative technical solutions for sustainability problems. Therefore, my research is not so much done on the social and spatial context of the design case, but investigates a technical answer to the context. This context is Amstel III, a former business district in Amsterdam that will be redeveloped into a mixed-use residential area over the upcoming twenty years. Due to this rapid development and growing population existing office buildings need to make place and therefore enormous amounts of materials and energy come to waste. Through design and research, I opt to find an answer on how to reuse the existing building components for a sustainable development of the area. Where my theoretical research focusses mostly on the quantification and qualification of the building components, my design research focusses on how reclaimed building components can provide identity to the place and stimulate neighbourhood cohesion as well. The relation between the two is the manner in which the reuse of materials can influence people's experience and behaviour.

The research is guided by several methodologies following each other in different stages of the process. These included as well quantitative analysis through Material Flow Accounting (MFA) as well a qualitative approach that determined the value and therefore the reuse potential of individual components. Combining these two ways of measurement a toolbox for design is established that subsequently may feed the design of the graduation. This paper will set out the applied methods and argue about the relation between quantitative and qualitative research methods. To this the following research question will be guiding: *What are the influences of quantitative and qualitative research methods on building components reuse potential?*

<sup>1</sup> Robert Alexander Gorny, *On Types and Typology: A critique of typological thinking*. (Delft: Lecture Series on Research Methods, 7 March 2019)

## II QUANTITATIVE AND QUALITATIVE RESEARCH METHODS

The study for the research paper<sup>2</sup> consists of several steps and accompanying method(ologie)s. Firstly, I inventoried the existing building components through data analysis of key figures on materials, visual observation of the exterior and plan analysis. Through the combination of these three methods it was possible to create an estimation of the available components within the area (fig. 1). Here, it was more important to understand the order of magnitude of the components than the exact numbers. To understand the flows of materials that go in and out Amstel III during the redevelopment, the data is mapped in a flow scheme based on the principle of MFA, that include a system boundary, generic actor and system inputs and outputs (fig. 2).

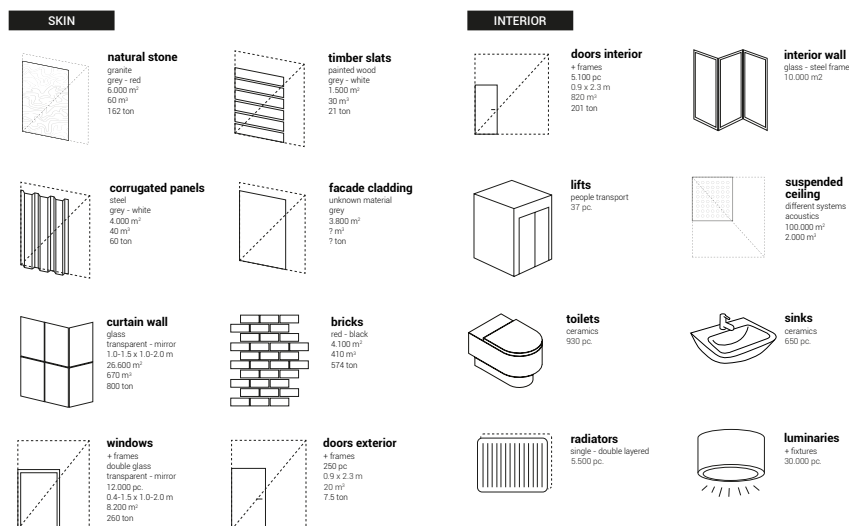


Fig. 1: inventory building components Amstel III (author, 2019)

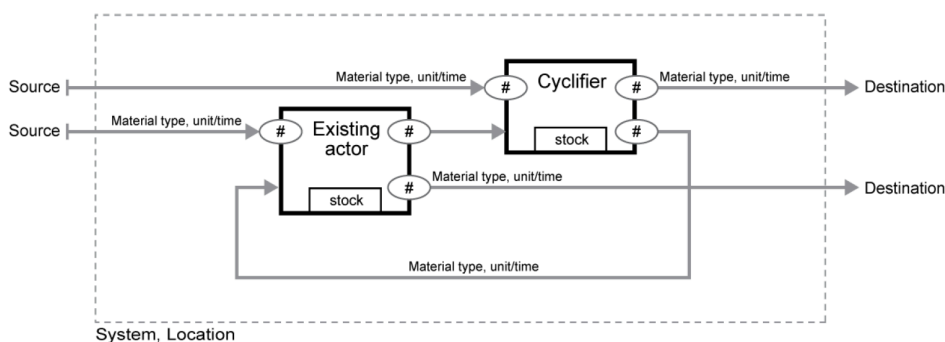


Fig. 2: Idealized MFA diagram showing the impact of a 'cyclifier' to the system (Jongert, Nelson & Korevaar, 2015)

The first part of the research is quantitative based, which is most often associated with objectivity (Lucas, 2015, p. 36). Although, this gives a good understanding of the available components in terms of numbers, it says little about the state and meaning of the components and the materials it consists of. In relation to architecture and the human experience a more qualitative measurement is necessary to estimate the materials potential value. Application for reuse of materials requires knowledge on the physical characteristics of the materials itself, but also on the possibilities for reuse of the existing building material (Vandkunsten Architects & Manelius, 2017). However, this qualitative character of the research also indicates the subjectivity of the outcome. Where the method for quantitative research measures by a defined scale, the scale for the value assessment is set by the researcher, which could result in a variety of answers which are difficult to be compared (Groat & Wang, 2002, p. 219). Therefore,

<sup>2</sup> The research paper is part of the graduation studio AE

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it is important to outline the way this part of the research is established to create an open and honest discussion (Lucas, 2015, p. 43).

The value assessment is not only about the quality of the material itself, but also relates to the origin and the future destination. Where the value of reclaimed components and materials often lay in the sustainable qualities, such as embodied energy and the depletion of resources, for the feasibility it is also important to consider the ease of detachment, refurbishment, sales potential and production costs (Addis, 2006). Considering the architecture objective, also actors as identity, aesthetics and personal experience are influencing the value of an individual component.

How to establish this value assessments is an epistemological question which wonders between rationalistic reasoning and empiric research. Empiric research considers that knowledge can only be obtained through sensory perceptions and experience. However, this is not always seen as dependable information, because of the reliability of sensory perceptions and personal variables that can be influence by mood, preferences and culture. One could question whether experience is always a solid basis for drawing conclusions about reality. As Lucas (2015, p.10) states in its introduction, the positioning of yourself as researcher is one of the most fundamental questions to start the (design) research with. Wandering between hard data and subjective observations and interpretations can make it difficult to formulate an objective assessment. Since there is not one right answer in a value assessment, it is essential to argument clearly what your personal position is and how the assessment answers to that.

### III INFLUENCE OF THE ASSESSOR ON THE VALUE ASSESMENT

The origin of MFA lays in 1969, when Robert Ayres, a physicist, and Allen Kneese, an economist, presented a first version of what later in the 1990s would become Material Flow Analysis (Fischer-Kowalski et al., 2011). Where the system started as an economical tool, it was complemented with the analysis of materials to research the Russian economy, including raw materials, air and water flows during the Cold War. In the 1990s, an empirically productive strain of MFA research emerged worldwide and it became clearer that material flows in a country are highly interwoven (Fischer-Kowalski et al., 2011). In the scope of sustainable development and design, the understanding of flows and their effects is of utmost importance. By now, design and engineering firms are using the flow of materials as a structural element in their practice (Jongert et al., 2011). The city can be presented as an ecosystem in which several vital flows determine the life and wellbeing of the people living there. This persepective has recently been adopted by several renowned Dutch architecture offices, e.g. Van Bergen Kolpa Architecten, Doepel Strijkers architecten, Superuse Studios, De Urbanisten (Roggema, 2016). The strength, and at the same time weakness of this accounting system is that it can be broken down into much more detailed information. The ability to highly aggregate information is valuable, but the system is also questioned because of its reductionist character (Fischer-Kowalski et al., 2011).

The MFA method is an interesting way of mapping data and placing it in a physical context. Through its graphical visualisation of numerical data, the results are more easy to understand and interpret. The importance of visualization in understanding environments and communication of data is especially highlighted in the lecture of Fransje Hooijmeijer<sup>3</sup>. By inserting actions ('cyclifier' in fig. 2) in the scheme, direct result for the flow of materials is made visual. In the case of my own research, the first MFA diagram indicates the component flow within Amstel III if a linear building economy is assumed (fig. 3). Implementing actions to reuse materials results in a lowering of as well the output as the input of other materials in the area (fig. 4).

Additionally, the MFA diagram is influenced by what kind of components are *chosen* to be reused; quantities are decided upon based on its value that may be influenced by other actors, such as level of environmental benefit and cost effectiveness, than the amount (mass and volume) of material.

<sup>3</sup> F. Hooijmeijer, *Territorial Scales* (Delft: Lecture Series on Research Methods, 21 March 2019)

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Here, numerical analysis meets a more subjective assessment that is partly based on observations, which is hard to compare since it is not measured in a comparable unit.

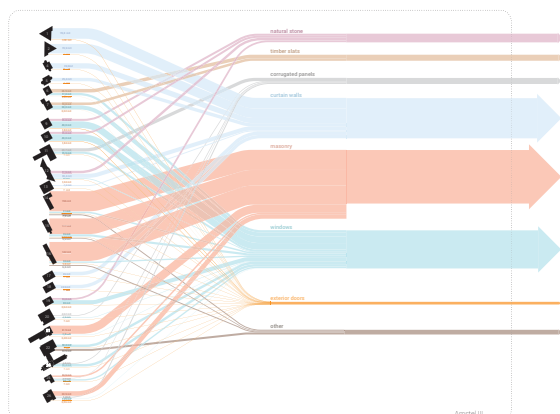


Fig. 3: MFA diagram for component flow linear process (author, 2019)

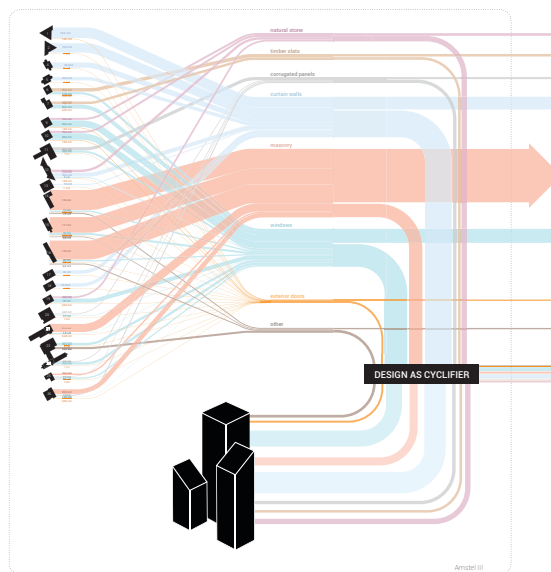


Fig. 4: MFA diagram for component flow after inserting cyclifier in the process (author, 2019)

Several literature studies discuss the actors that influence the reuse potential of reclaimed materials in a theoretical framework (Addis, 2006; Gorgolewski, 2008; Guy & Esherick, 2006; Vandkunsten Architects & Manelius, 2017). Vandkunsten Architects has done research on the implementation of reclaimed materials into new design. To determine the successfulness of their products an assessment chart (fig 3) is used to rate the products on a diversity of characteristics. Especially interesting is that besides the actors that determine the value of the components, also the potential objective is shown. This indicates that for example *Cultural Potential*, *In Use Performance* and *Sales Potential* are highly affecting the value for a person that makes the value assessment from a sales, economical and narrative perspective. As stated before, this positioning is crucial to determine a subjective conclusion.

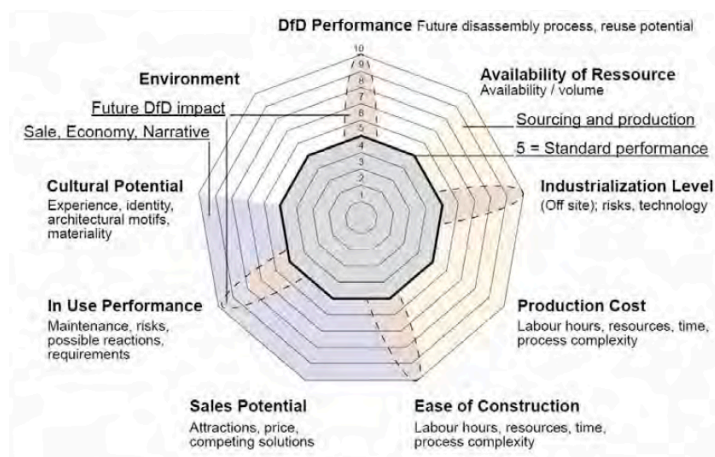


Fig. 3: Assessment chart with main value categories, used by Vandkunsten Architects & Manelius (2017) to determine the value of their products. Grey zone in the radar diagram indicates that the values are below conventional performance, colour coding in the outer boundaries indicate the value for certain perspectives.

Even in such a system where value is translated into numerical values, the estimation of this value is still depending on the perception of the assessor, since the researcher is the main measurement device

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in qualitative research based on analysis of visual material (Groat & Wang, 2002, p.223). The graduation research started from an environmental objective. Therefore, values relating to environmental benefits might weight heavier than costs and cultural potential, while from a design point of view this identity aspect is highly important. When not considering just the designers point of view, but also the future users, the value assessment might even point in a completely different direction. To assess this, a different way of heuristic thinking is required, which considers the experience and perception on independent human beings.

### IV WHO IS THE ACCESSOR?

How one person can interpret and experience a material differently from the other is related to the story surrounding the object. The human experience is described by MacGregor (2012, p 270) as a result from a person's personal history: *'how you read history depends on where you're reading it from'*. Eireen Schreurs approaches the experience of material from the perspective that material is bound to certain properties; where they are made of, and the ways in which these materials facets are central to an understanding of culture and social relations<sup>4</sup>. This teaches me among others to consider multiple points of view to make an assessment from; understanding and knowledge of future users influences the assessment and therefore the outcomes for implementations of materials.

The understanding of human experience and perception can be considered as phenomenology, which is a qualitative research method that is used to describe how human beings experience a certain phenomenon. In her lecture Berkers questions: *'what is quality from the perspective of the inhabitants?'*<sup>5</sup>. A phenomenological study attempts to set aside biases and preconceived assumptions about human experiences, feelings, and responses to a particular situation (Giorgi, 2012). In several lectures the believe was given that by studying the design process of architecture, one can develop its skills and knowledge on the actual users, and not the imagined ones<sup>6</sup>. The importance of research to a design is hereby indicated. Architects need research to improve the practices with knowledge about its own discipline or combine it with other disciplines.

Modern architecture discourse poses that the designer is more involved with the people designed for. This exclusion of the so-called top-down approach requires for an in-depth analysis of the users. From here on making the step towards an approach where the future users are more incorporated in the design process. This also means including their perceptions in my personal research, to bind the design to the context, environment, physical place and people. To establish this people-based research and value assessment of building components, the preferences of the users can be gathered through praxeological research, which can include interviewing the several user groups.

Concluding on the research related question, one could state that the relation between quantitative and qualitative research can be found in the distinction between objective and subjective research. Whereas, the qualitative, associated with subjective perception, can be justified, when the perception of the assessor is considered and made clear to the reader and answers to the users in a design case. As formulated in one of the lectures: the task of the critical observer involves a critical recognition of the historicity of perception<sup>7</sup>. Therefore, the influence of value assessment on the quantitative analysis starts with the persecution of the researcher.

<sup>4</sup> Eireen Schreurs, *Material Culture*. (Delft: Lecture Series on Research Methods, 28 March 2019)

<sup>5</sup> M. Berkers, *Praxeology* (Delft: Lecture Series on Research Methods, 21 February 2019)

<sup>6</sup> M. Berkers, *Praxeology* (Delft: Lecture Series on Research Methods, 21 February 2019); Robert Alexander Gorny, *On Types and Typology: A critique of typological thinking*. (Delft: Lecture Series on Research Methods, 7 March 2019)

<sup>7</sup> M. Berkers, *Praxeology* (Delft: Lecture Series on Research Methods, 21 February 2019)

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