

A THEORY OF ARCHITECTURAL PRACTICE: OPEN BUILDING INTERPRETED BY BAUMSHLAGER & EBERLE

Beisi JIA, Dr. ¹

¹Associate Professor, Department of architecture, The University of Hong Kong, Pokfulam Road, Hong Kong, jia@arch.hku.hk

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Summary

Baumshlager & Eberle's design works can be characterized as typological, regional, tectonic and highly crafted, using both modern and traditional technology. This paper argues that the significance of their work relates to the Open Building concept and the theoretical work of N.J. Habraken. Their work provides a high platform for study, the findings of which may bridge the gap between Open Building research and theory on one hand, and the high quality of architectural design on the other. This paper analyzes their conceptual and methodological approaches by comparing them with the research findings of Open Building over the last 20 years. It concludes that the quality of architectural work relies on the interpretation of the particular social, cultural and technological conditions of the specific place in which a building is situated. The architects need to have an open mind towards the diverse, technological potential of different cultures, arising from the past, and the future. Open Building is a strong, conceptual contemporary methodology because uncertainty arising from the constantly changing circumstance. It is also because the life cycle of material and components have become important concerns within the architectural profession and have increasingly changed our views about architecture. It is also a very useful tool for organizing people involved in the building process, without undermining the role of the architectural profession.

1. Introduction

Vorarlberg, the most western part of Austria, is geographically located at the junction of three economic powers, Germany in the north, Switzerland in the west and Italy in the south. Its economy is represented to-day by numerous small high-tech industries, which have developed very quickly over the last forty years. Traditionally, being a less developed area, it is proud of its culture, which has been able to optimize an area of minimum resources and create a very prosperous one. The traditional buildings here also have their own character: wooden Alpine houses built with high quality craftsmanship. The developing economy and population growth has led to large-scale urban sprawl, and, at same time, has stimulated a demand for high quality architecture.

After graduation from architectural school in Vienna in the late 1970's, Dietmar Eberle had the idea of doing something "real". "We had five people to start, not just designing, but also building: doing carpentry, wiring, pouring concrete, everything made by our own hand." After he participated in the building of more than one hundred wooden houses of various types, he set up a design firm with Carlo Baumschlager. This experience had a decisive impact on the direction chosen by the firm, pragmatism of being closely remaining in reality. They started by designing small, reasonably-priced, detached houses, and slowly developed a typology for mass housing developments with compact, flat-roofed buildings, with which the team Baumschlager/Eberle distinguished themselves in Vorarlberg. Today, they are involved in the construction of many, large, multi-storied buildings, including, hospitals, office blocks and industrial buildings, schools, community centers, and shopping centres, throughout many European countries.

Their architectural characteristics can be summarized as having a “strict economy with respect to material and artistic/architectonic means and a keen of cultural and social responsibility.” (Frampton, P. 19) In their own words, they gained a wide knowledge of buildings, especially in respect of housing and they paid strict attention to ensuring that highly skilled of craftsmanship was employed, in respect of the materials used and the quality of construction. This can be immediately verified just by a glance at the three latest publications of their work by *Springer*, to which people are very easily attracted by the beauty and elegance inherent in their designs. Their tectonic achievement deserves the highest recognition on a world-wide scale. (Frampton, P. 19)

However, there are some aspects of their work, which, although frequently referred to by Eberle in his speeches, have not been thoroughly studied and properly presented, viz. the issues of sustainable building, spatial flexibility and participatory design methodology. Eberle is aware of Habraken’s work, and is knowledgeable about the technological developments in housing since the 1960’s. However, in considering those features of Open Building which are represented in their work, they seem directly generated from experience and the reality, which they are dealing with everyday. In fact they prefer to be seen as working for the “building trade” rather than the architectural profession. Firmly rooted in practice, with more than 200 buildings completed in the last 20 years, they have demonstrated a particular skill in which flexibility, sustainable building, a high level of craftsmanship, and the beauty of the architecture are expertly integrated together in a reasonably-priced, simple compact building. Their experience and know-how is significant for both researchers and practitioners in respect of the implementation of the Open Building concept, which aims to achieve the successful combination of research and practice.

2. The tectonics of the Open Building approach

2.1 Architecture of particularity

The question of architecture, as opposed to science, is not about the generalization of certain principles, which can be applied everywhere. Architecture is always bound by the specific social, cultural and technological conditions of a particular location. Eberle comments that: “Architecture is based on three things: social and cultural understanding of our society, technology and its background, science, and an ability to make a formal decision”. Architects are dealing with an approach towards building known as ‘*Gestaltigkeit*, or the ability to create a living space or form of high, tectonic quality, appropriate to, and in keeping with the area.

Baumshlager & Eberle’s buildings are: “deeply rooted in the region, that is to say in its climate, its material resources, its craftsmanship and, above all, in its building regulations. All these factors together play a decisive role in determining, in large measure, the generic nature of what is realized.” (Frampton, p.9) They intend to permit regional differences play a decisive role in their design. In different regions prevailing structures, planning permission regulations, craftsmanship and the building process itself, are different. “We always try to identify the key problem and then from that, we find a direction, to meet the problem on many levels, i.e. cultural and social etc.” (Dietmar Eberle: Lecture at HKU on 24th October, 2003) For instance they make the distinction between an urban site and an open site. In respect of the urban site, that is already functioning well and contextually supplying an appropriate, useable vocabulary, then they see there is no point in creating something absolutely new. Their objective is to maintain the existing structures and to re-interpret them. However, in an open context, in which there are no suitable points of reference, a much more subtle set of instruments are employed to arrive at a viable solution. Through the careful comparison of all the residential buildings they designed in Vorarlberg, it was found that variations to compact floor plans, a typology used in many buildings, are simply the result of particular circumstances, ranging from the type of site, the clients, the users the objective and the function of the building.

Of course sensitivity to a site and being able to integrate this into a building is not unique to Baumshlager & Eberle. The same attitude is also found in much of Habraken’s work on urban tissues. The difference is that they each use the particularity of the context in which each building

stands so intensely that each represents a unique piece of work with a high tectonic quality. In addition, they all hold the belief that a building has to be ecologically and economically sensible.

2.2 Good architecture is sustainable architecture

Baumshlager & Eberle are also known for winning several important green architecture awards in Europe. Green architecture is certainly not a new invention and it is not uncommon to find conflicts between it and economic feasibility. Their contributions are found in successfully bringing ecology, economy, beauty and high craftsmanship into one simple whole. "What does sustainable architecture mean? In a global scene, we have to look at the problems and what we have. We need to look at building as a process. We need to correct and complete information about people, energy and resources... If we understand this, then it is clear to me that design is not about creating new things, but rather about creating a building, which will last at least 200 years." (Dietmar Eberle: Lecture delivered at HKU on the 24th October, 2003) Basically there are three strategies used to approach economic, green architecture: compact form, effective outer wall, and sensitively adapted new technology.

A compact form (Fig.1) has less façade. It uses less material and it means it embodies less energy. If the building is well insulated, especially in North climate, the loss of energy for heating can be minimized in a compact form. If the requisite heating and air conditioning systems are also included, the energy required overall can also be kept to an absolute minimum. The compact form provides a convenient solution to the problem of constructing many apartments. It is also an economical solution, because it permits an optimal ratio between the area of the internal space and the area of the façade. The building façade in Vorarlberg, and in many European countries, is the most expensive part of the construction.

In their compact buildings, Baumshlager & Eberle developed an energy concept (Fig.2) that functioned on the basis of re-cycling heat and controlling ventilation. This system used the heat stored by the people living in apartments, and utilities -which contain or release heat, thereby reducing the need for additional heating. Ventilation is regulated by mechanical means; the heat extracted from the exhausted air is used to heat the fresh, but cold air blown into the building. The system also contains heat "conductors" which can harness heat energy from the earth. It is also used to cool the air in summer. Whenever necessary, this basic heating system is augmented by conventional heating systems so that the desired room temperature is actually achieved. Using this system the level of energy consumption required for heating can be reduced by up to 70%. The actual use of openings, such as windows, by the user, is also significant in terms of energy saving. One of the apparent characteristics of the work of these two architects is the unusual and elegant façade elements, which are actually operable by the users.



Figure 1. Compact housing form in Hötting West

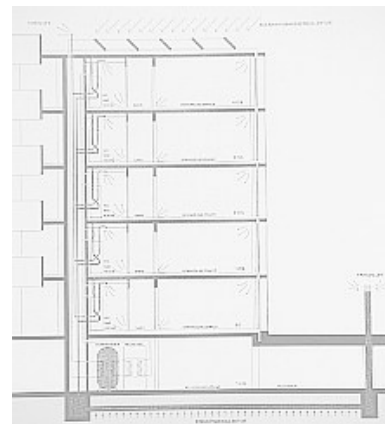


Figure 2 Ventilation and energy diagram

2.3 Building with structural hierarchies

In order to achieve a sustainable building ('lasting at least 200 years,' to quote Eberle) with the efficiency of embodied energy, the building should be conceptually and technologically separated into five systems according to the life cycle of materials, the spatial and structural hierarchies, and social responsibility. This conception echoes Habraken's thinking on the separation of 'Support' and "Infill", although Eberle has never used the term, Open Building, per se. Life cycle is the key issue to separate systems (Table 1) "Organize the building in such a way that you don't mix up these systems. This makes change easy and gives you a great deal of flexibility when you deal with separate systems."

Table 1 Five systems of building classified by life time*

Systems	Lifetime (year)	Explanation
Infrastructure	200-1000	"All the outdoor public infrastructure stands much longer than buildings A City infrastructure may have a history of 1000 years; we have to be very careful about this when we design a building."
The load bearing structure, staircase	100	"The load bearing structure, combined with staircases, and in relation to all the safety problems, can stand more than 100 years without any change. (Unless an error occurred in design.)"
Façade, service core	50-60	"The façade and the main interior outlet piping system inside. It should last 50-60 years. We don't frequently change façades in our culture, as it is very expensive to do so"
Function layout	20	
Interior	10	Ceiling, lighting, finishing, etc.

(* summarized from an interview with Eberle.)

The purpose of separating the systems is to accommodate time and changes into the design. It is also to extend the life -time of major structures, which are embodied with a large share of the resources and energy. However, the purpose of this strategy is certainly not confined to its environmental significance. It is also about user participation and economic management. The separate systems have a larger capacity to meet the various criteria and demands of owners and users. Actually in respect of Baumshlager & Eberle, the separation of the five systems allows them to focus intensively on specific areas, whilst leaving other tasks for other people to deal with.

2.4 A skin, a core and a continuous space

Inspired by the conceptual division of Support and Infill in Habraken's theory, there has been a great deal of work done, focusing on Infill development and experiments in the Open Building movement. There is relatively less development and less understanding on the subject of Support, with the exception of a few studies on pre-fabrication technology. In contrast, Baumshlager & Eberle work intensively and exclusively on the issue of Support, whilst leaving the issue of Infill, as a technique, almost untouched: "Since I don't know the actual floor plans of any building I have designed, my interest is in the staircase, the common space." These two opposing, strategic directions – infill development and Support development not surprisingly, are based on the same understanding of the diverse and changing needs and circumstances of our world to-day. Both recognize that it is the responsibility of the architectural profession to take this diversity and change into consideration.

The concept of support in respect of the two architects already mentioned, includes the outer wall, the inner access (staircase, landing, and corridor) and the utilities (kitchen and bathroom) in a building structure. (Fig.2) The outer wall facing the public space and presenting an image and identity of the collective living in the building, belongs to the public domain. The façade is the crucial space, which defines the relationship between the public exterior and the private interior spaces. As with the service core in kitchen and bathroom, it is difficult and costly to manage significant changes. Experience gained prior to the inception of the *Hötting West* housing project demonstrated a mature typology of support, which they applied in many other projects later on

with sensitive adjustments to suit each particular scheme. (Fig.2) Basically there are two very simple built structures in the plan. In the middle of building there is a stairwell surrounded by closets and ancillary rooms. On the outer fringe there is a surrounding wall, which serves as structural as well as an enclosure. There are no divisions of rooms between these two structures. To omit or to add a room, all one has to do is to remove or insert a partition wall. This is a highly significant development in respect of ground-plan typologies: there is a fixed service zone and there is also the possibility of adapting the living area to individual requirements. Very diverse domestic arrangements can be realized in such an apartment. It is left entirely up to the individual to decide whether he or she wants to have any room at all, or a number of rooms of equal size.

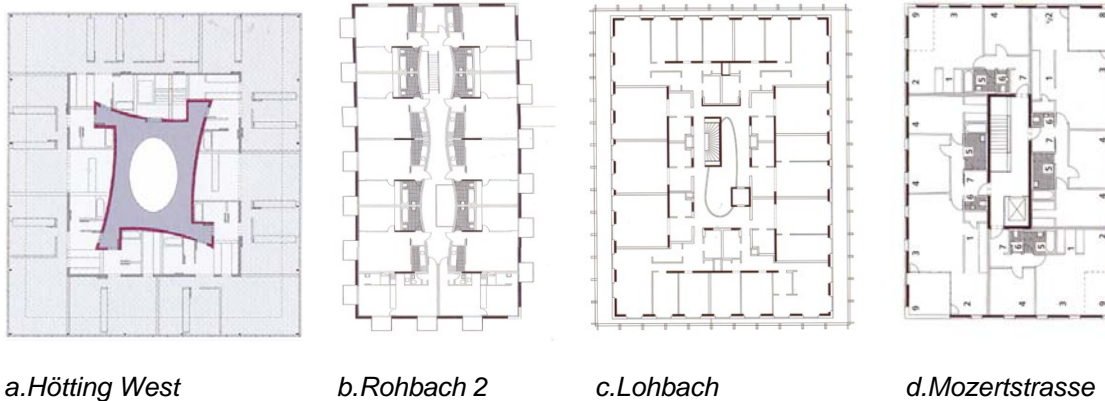


Figure 3 Floor plans for four projects showing variations of the same typology

Normally staircases with semi-public space had to be constructed in an extremely economical style, for very compact typologies. In Baumshlager and Eberle's work, this aspect receives particular attention. (Fig.4) They saw it as an area of great potential for architects – that of substantially improving the inner zone of a building by creating an atmosphere that delineates the transition from the public to the private spheres. The staircase has a skylight and a small, enlarged, landing through which each apartment can be accessed. With careful detailing of the space, choice of material, and type of construction, a simple economic social housing scheme, can be transformed into a sophisticated dwelling of greatly improved ambience.

These architects see the façade of a building as being of particular importance, since it is the structure, which provides the key to saving energy, the complicated inter-relationship between the exterior and the interior, the private and the public, as well as being responsible for creating the crucial syntactical enrichment of the public outdoor space. It is expensive to build, with high embodied energy, technically complicated and difficult to maintain. Therefore, it is treated as part of the support, which according to Habraken, is designed by the architects according to the collective decision made by community. It is not an area where individual or private needs dominate. However, they also see that it is important and crucial for the users to be able to operate and be in control of part of the façade, i.e. to adjust the lighting, ventilation, shading, and views. Consequentially the outlook of the building changes according to the actions and the wishes of the buildings' occupants. In this sense the façade accommodates the most flexible elements in the building and changes constantly. (Fig.5) A variety of technologies and materials have been applied, which have resulted in intensifying this flexibility.

The internal partition walls are made of gypsum, and, therefore, the thickness and density of these walls is variable, to achieve different sound insulation. Most the partition walls were erected after the apartments were sold or leased out. The architects seemed to pay little or no interest in the actual layout of the space, apart from whether or not the clients and users were pleased with the degree of flexibility in respect of the possible uses and function of the space: "A housing problem is about establishing the border between individuals and community. It is about

establishing the levels of community in spatial terms.” (Dietmar Eberle: Lecture at HKU on the 24th October, 2003) Architectural intervention has to be clearly defined, focusing on the ultimate quality of a few support elements, whilst leaving interior partitions to the contractors, interior designers and the residents.

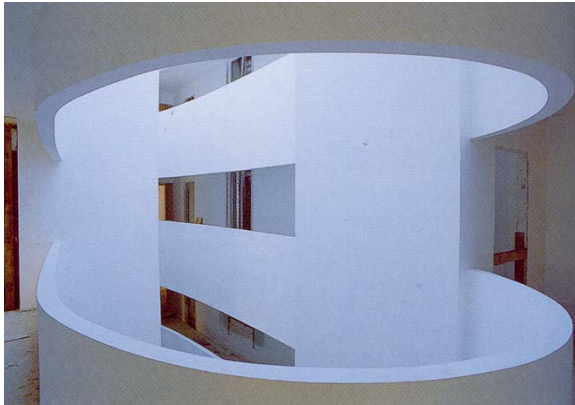


Figure 4 Sky-lighted staircase in Hötting West



Figure 5 Operable façade in Hötting West

2.5 Making the best use of existing technology

Most of the buildings by Baumshlager & Eberle involve advanced technology in a variety of fields, such as façade systems, building services and structure. As with many architects, they see technology as one of the conditions, and the implementation of the conditions is a cultural issue rather than a technical one. This is because a building is a highly complex structure. No single dimensional creation can produce a good building. The act of building, itself, is too expensive an undertaking to be treated as a technological experiment: “We don’t want revolution, but improvement. We studied and worked together with the factories and the suppliers, to make something better out of something already exist.” (Dietmar Eberle: Lecture at HKU 24th, October, 2003). Paraphrasing Adolf Loos in Frampton’s writing about them, ‘there is no point in inventing a detail unless it is an improvement’. (2003 p.9)

There are many successful examples technology improvements to be seen in the buildings of these architects, which illustrate how they have investigated a new technology and even created a mock-up model of this before they put it into their buildings, and kept within the limits of the pre-requisite budget. In an interview with Eberle, he expressed concerns about architectural development having been driven by technology in the 1960’s and the 1970’s:

“These buildings had many problems. Architects designed them because they were impressed by the technology. The first problem was the high cost. All these experiments were much more expensive than building by the usual method. . The second issue was that they created a very specific atmosphere, in fact, a very technical atmosphere. I am sure that nobody liked it. We should not build to serve technology; we should build for the people. The third issue was the disparity between the life- time of the building and the life- time of the technology.... As we know there are five systems in a building, one overall technical solution for all the systems is not the answer. Also, because, in the technical system you always invest a lot at the beginning, you cannot, and you don’t want to change it in 30 to -40 years time. Such a change would be too expensive. When you separate the five systems and all the available technology for each of them, you can use anything available, even years after a building is completed. You can really work on the specific project under a specific circumstance.”

2.6 Design is a collective activity involving many people

“Architecture is team work; it is about discussion, public consultation with multiple disciplines, it is not like art or artists who usually work as individuals.” “Building is never a single person’s work,

although it may look as if it is.” (Eberle: Lecture at HKU on the 24th October, 2003) The distinguishing factor of the design procedure of these two architects in comparison with others, is that they are dialogical. It is most important to acknowledge the creative potential of the client. For Baumshlager & Eberle design is a re-interpretation of convention rather than a willful invention of form as an end in itself. (Frampton, 2003 p.9) Whilst most architects start a project by sketching a scheme on paper, they start with contacting all the people and experts who could potentially be involved in the project. Eberle summarized the five conditions of design in respect of an ecological building as: (1) a team of experts; (2) compact form; (3) use of the energy from existing environment; (4) identify people who know the technology; and (5) find a client who wants to build an ecological building. Three of the five are about people, excluding the architects themselves. The reason for this is very simple: “the myth of the architect –genius, who solves all problems with his talent and creates great architecture, is long gone. We have to deal with such complex assignments, that solutions can no longer just be pulled out of a hat: the danger of making expensive mistakes is just too great, and these mistakes can only be kept to a minimum by maintaining contact with all involved, by gathering information and by staying in touch.” (Waechter-Böhm, 2000.p.12) In their office, there is a well- structured inventory of information they need to have prepared prior to the commencement of all projects. It is as follows:

1. People involved in the project
2. Project as related to the urban and natural context
3. Technical and legal issues on structure, gravity, durability, and safety
4. Façade system
5. Function and layout (5-20 years)
6. Anticipated users of the project
7. Possible material and construction

The information collected is produced in the form of a booklet. The actual drawing begins only at the very final stage of the information gathering. The collection of information requires considerable thought, since a solution should emerge when all the information has been collated and is clearly presented. The quality of the final building is almost defined by the booklet. Eberle further explains this design strategy:

- “You should be well acquainted with the capacity and/or capability of those people involved, at the very beginning. You should not do anything, which is beyond their capability, because it does not make sense... The true design work is collaboration and finding the right people, and making sure they will bring all their knowledge to your project. Then the rest is only work (drawing etc, but not design). ... We don't have any idea about sketching, but we have an idea about gathering information. For us it is important to work on different categories of information at the same time.”
- “If I find someone thinking about a drawing and constantly changing it over a long period of time, I ask him to stop: There must be something wrong, or something there we still don't know.”
- “For communication purposes, writing is needed more than drawing, because many experts cannot read architectural plans properly. Plans are not important in this situation.

3. Concluding Discussion

This paper is a summary of the analysis on the conceptual and methodological approaches of the design works of Baumshlager & Eberle. The purpose or aim of the paper is to demonstrate the difference between open building research and design implementation in this particular office. In conclusion, by examining the inter-relation between the two, the following points have been identified:

1. It is clear that the quality of the architecture has a close relationship with the particular social, cultural and technological background of the specific area in which a building is situated. The particularity of a building is important for the architect in practice because the complexity of the project he is required to deal with is enormous. The practical

- application differs from the research, which tends to generalize a problem and find a single solution for a variety of different circumstances.
2. Buildings by the two aforementioned architects demonstrated that a sustainable architecture can be achieved with simple and economic solutions. They suggested that economy is one of essential concerns for most buildings and architects tend to use simple, effective solutions before progressing onto technical and financial complexity.
 3. The fact that buildings are separated into systems according to the life cycle of the material used, their spatial and structural hierarchy, and their 'social responsibility', is an essential concept in the Open Building concept. It appears as an issue of importance in the works of Baumschlager & Eberle.
 4. These two architects focus strongly on the issue of Support, whereas Open Building research focuses on the issue of Infill. This finding may suggest that whilst the architectural practice and research in Open Building appear to be proceeding in differing directions, they remain complementary to each other. It also suggests that the research sphere in respect of Open Building can be widened to include, at least, the support elements.
 5. Because architects have to deal with the particularity of each project, they prefer to have a wider choice of technological solutions. They are interested in the integration of a technology, which has multiple possibilities. It may suggest that research carried out on a specific technology, or on a specific method of integrating that technology may have its implementation limitations. An instrument or tool for multiple purposes may be an alternative for Open Building research.
 6. Creating a sustainable building design in this office is about understanding, organizing and optimizing the existing resources, which include all the people being involved in the early stages of the design. Open Building has developed a strong methodology, which involved the future residents or owners of a proposed building in participating in its design using drawings and sketches as early as the 1970's. It may have the potential to develop a management tool for organizing information and including people in the design process.

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The paper is mainly based on two interviews to Eberle in November 2003 and September 2004, and a field trip to Vorarlberg taken by the author last fall. Sentences in quotation marks without given resource in the text are from the interviews.