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Published in:

Structures and Architecture Beyond their Limits

DOI:

[10.1201/b20891-30](https://doi.org/10.1201/b20891-30)

Publication date:

2016

Document Version:

Peer reviewed version

[Link to publication](#)

Citation for pulished version (APA):

Beim, A., & Hvejsel, M. F. (2016). The Ecology of Urban Tectonics: studied in everyday building culture of Hans Christian Hansen. In *Structures and Architecture Beyond their Limits* (pp. 242-249). Taylor & Francis.
<https://doi.org/10.1201/b20891-30>

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The ecology of urban tectonics – studied in everyday building culture of Hans Christian Hansen

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ABSTRACT: Can material interest and tectonic aspiration inform the urban scale and how can urban context call for tectonic qualities in ordinary buildings? Can we speak of an ‘ecology of urban tectonics’ where the scale of the urban context relates to the tectonic scale of construction details? These questions are examined in selected work by the Danish Architect, Hans Christian Hansen (1901–1978). His buildings hold a strong building culture that is deeply rooted in a regional understanding of materials, traditions of construction and the urban context. Hansen addressed construction and material use in ordinary buildings and translated the challenges of contemporary building industry into long lasting architectural designs. One could argue that his buildings define an ecological tectonic imperative by addressing the urban scale in a direct unimpressed, but highly original manner – in this case defined as an ‘urban tectonic’ approach. The paper analyses two ordinary buildings to discuss whether Hansen’s ‘urban tectonic’ can inform the challenges of today’s everyday architecture – a growing inability to utilize construction elements as spatial features that link the urban fabric to the human scale.

1 INTRODUCTION

This paper is related to previous research activities and publications by the authors that examine the phenomenon of tectonics – across its theoretical backdrop (Semper, Bötticher and Frampton et al.), analyses of historical and contemporary architecture, empirical investigations of buildings, e.g. construction methods, material culture, design methods etc. Yet, it is our experience that the notion of tectonic at large is associated with exclusive architecture that is built of high quality materials, that is structurally rich, and holds refined details. Also, it is our understanding that architects, as a profession, have difficulties to extract, mature, and apply tectonic knowledge to everyday practices. Our studies show that this circumstance challenges the development and range of our discipline, a problem we raised already in 2015, in a theme issue of the *Nordic Journal of Architectural Research* titled; *Everyday Tectonics?* (Hvejsel et al. 2015).

The intention in this paper is to push the understanding of tectonics further, into the scale of urban context and thereby to discuss it as part of an everyday practice and regional building culture. This in order to test its theoretical and practical boundaries, and to bring a critical layer to the research field by pursuing the application of knowledge extracted from significant historical examples in the development of future practice based methods. By introducing the notion of ‘urban tectonics’ inspired by the work of Eduard F. Sekler, these questions will be studied and discussed in selected public buildings from the 1960’ies by the Danish Architect Hans Christian Hansen (1901–1978).

2 WHAT IS EVERYDAY BUILDING CULTURE – HOW CAN IT BE CHARACTERIZED AND WHY BOTHER

In light of the increasing globalization that indeed embraces the construction industry – can we then speak of today's building cultures (and architecture per se) as rooted in particular regional construction traditions, or as defined by certain cultural habits? And how do we understand the notion of 'everyday' as part of this discussion?

At first glance these questions may seem of minor importance in comparison to the big scale, urgent architectural tasks given by: the climate changes, emergent scarcity of natural resources, an overall environmental pollution, and population growth that affects urban development worldwide (UN 2014:1-8). Yet, questions concerning everyday building culture may address some important issues that are useful, if not necessary to take into consideration when we as architects are to offer robust and holistic answers to how buildings, new settlements, or existing urban fabric are to be designed. In other words, a thorough understanding of an 'everyday building culture' may be a supporting element in order to address core problems in the construction industry and to form buildings that hold spatial quality based on rich tectonic and ecological principles. But how do meta-level concepts as *everyday building culture*, the *regional* and the notion of *ecology* link together? When studying them closer they happen to share a series of common features that can be defined as constituting elements. This also in architecture (in particular sustainable architecture). The commonalities they share that often happen to be mutually interdependent are: culture /tradition, locality, and scale. (Beim & Madsen 2014)

The first aspect *Culture/ tradition*: By their very physicality buildings relate to history, time and traditions in particular ways, since they are formed by the very knowledge, practices, construction techniques, and inheritable crafts that are ruling at the time of their creation. Very importantly, in addition to this buildings are valued and engaged with across time periods, which depends on people's expectations to the physical appearance or function of the building structures. In this case the physical or material dimensions of architecture influence *Cultures* and *traditions*. The sociologist Richard Sennett has studied these phenomenon in depth defined as *material culture*, and he describes it as a complex of dynamic and permanent perspectives: "[...] culture's time is short, in another way it is long. Because cloth, pots, tools, and machines [buildings] are solid objects, we can return to them again and again in time; we can linger, as we cannot in the flow of a discussion. Nor does material culture follow the rhythms of biological life. Objects do not inevitably decay from within like the human body. The histories of things follow a different course, in which metamorphosis and adaption play a stronger role across human generations." And he concludes: "Material culture provides in sum a picture of what human beings are capable of making". (Sennett 2008: 15) *Culture/tradition* can then be described as a dialog between the permanence of the physical edifice and the cyclic order of human life and Nature.

The cyclic order of Nature also happens to affect the aspect of *Locality*: This relates to the fundamental climate conditions (seasons, light/sunshine, air pressure, temperature etc.); the weather; access to local materials, specific topographies, and how we as humans engage with these conditions. The English/American architectural theorist Kenneth Frampton highlights the environmental circumstances in his text: "Culture versus Nature: topography, context, climate, light and tectonic form" where he explains that the attention towards the *local* (regional) involves a directly dialectic relation with nature and the immediate environment. He exemplifies how the qualities of the site and its topography either can be treated from a sensitive environmental perspective or from a more rational perspective, which is part of a universal civilization. This opposition he explains further: "The bulldozing of an irregular topography into a flat site is clearly a technocratic gesture which aspires to a condition of absolute *placelessness*, whereas the terracing of the same site to receive the stepped form of a building is an engagement in the act of 'cultivating' the site". And he continues: "What is evident in the case of topography applies to a similar degree in the case of an existing urban fabric, and the same can be claimed for the contingencies of climate and the temporally inflected qualities of light. Once again, the sensitive modulation and incorporation of such factors must almost by definition be fundamentally opposed to the optimum use of universal technique." (Frampton 2002: 86-87) In that sense a greater awareness towards the particular environmental properties that are given by *Locality* also calls for an environmental concern at a larger scale. This implies actions in regard of minimizing the ecological impact of a given construction or architectural design.

Finally, and quite importantly there is the aspect of *Scale*: Which can be studied in the manifestation of the regional character as it shows in the appearance and proportions of the building elements. For example the proportions of bricks varies across neighboring countries that share similar building culture e.g.; Danish bricks: 228x108x54; German bricks: 240x115x71 and Swedish bricks: 250x120x62. (Taenkitegl 2016) These various ‘basic standards’ result in remarkably different masonry constructions and façade expressions that hold each their textural quality, appearing either ‘lighter’ or ‘heavier’ depending on how slender or fat the bricks happen to be proportioned. The Danish architect Steen Eiler Rasmussen (1898–1990) has described the aspect of scale and spatial context as a: “composition of prismatic bodies that are articulated by the means of materials and color.” And he elaborates by referring to the German art historian, A. E. Brinckmann who says: “A closer view of a situation begins with the perception of all the individual parts. When the eye perceives them in their entirety, it thereby has been given a measure [...] that serves to assess larger shapes and entire groups [spatial bodies].” Rasmussen elaborates Brinckmann’s idea further in his spatial analyses of a German town square and stresses the importance of peoples movements that provide different spatial views by which the building elements and the urban space (voids) are experienced, understood and inhabited. (Rasmussen 1957/75: 39-40) In other words, how the character of the regional culture conditions the very materials, building components, colors, proportions, details and their alignment.

In sum, Sennett, Frampton and Rasmussen refer to vital qualities that articulate our understanding of *everyday building culture* – as a matter of linking culture /tradition, locality, and scale by means of building constructions. These qualities may seem to be fundamentals in architecture yet they occur to be some of the biggest challenges in the creation of ‘everyday architecture’ of today due to the increasing number of stakeholders, economies and technologies that govern everyday building practice. Exactly how to use and value structural elements in an architectural context as spatial features that link the urban scale and the human scale in this diversified context is indeed a tectonic challenge.

It is our hypothesis that the buildings of Hansen offer both spatial and tectonic richness that reach far beyond their own boundaries of time and matter. These buildings are built as *everyday architecture* at the time when industrialization gained evident speed. They witness an ingeniously ability on behalf of the architect to engage with the industry and to exploit and develop the architectural potentials by means of tectonic cleverness. Consequently, we turn to Hansen’s work to study if it offers strategies for an ‘urban tectonics’ that link *culture /tradition, locality, and scale* and to look into ‘what can we learn from Hansen today’?

3 URBAN TECTONICS AND THE QUESTION OF SCALE

Although the notions of ‘urban’ and ‘tectonics’ rarely (never?) have been linked in architectural theory, it is obvious that unifying the two offers a useful framework for questioning the role of architectural construction as part of the urban fabric. In general, a lack of spatial consideration of the human scale poses a major challenge to the architectural discipline. Especially, when we address grand scale developments of social housing and technical facilities that can be described as ‘everyday architecture’ – building structures that form our cities for the most part. This sector is dominated by the construction industry and often the resulting constructions are experienced mere as rational frameworks rather than inviting places for residing (Hvejsel et al. 2015). Here in particular, a tectonic approach, – understood as the architect’s ability to nurture and utilize constructive elements as spatial devices – could enrich the experienced quality of urban space. The landscape architect, Torben Dam points at the potential in developing tectonic theory and practice that could become providers of meaning and increased experienced quality in urban space (Dam, 2007). This potential we address in this paper by means of Hansen’s works as follows below.

The work of Eduard Sekler is very interesting, if we want to discuss tectonics as part of urban space. Sekler’s works must be seen within the framework of the emergence urban design as a discipline at Harvard Graduate School of Design. From the 1950’s onwards a series of acknowledged architects and CIAM members such as, Josep Louis Sert and Sigfried Giedion where affiliated with the school. They reacted to the need for addressing the architecture of the city, as

the American cities began to grow uncontrollably (Krieger & Saunders 2009, Mumford 2002, Mumford & Sarkis 2008). Through his teaching at Harvard Sekler made a significant contribution to the development of urban design as a discipline and to a critical discussion of the role of architectural theory and practice herein (Giedion & Sekler 1959, Sekler 1965). Concurrently, Sekler has contributed significantly to the development of tectonic theory within architectural discourse. If studied in conjunction, Sekler's work in urban design education and research on the role of architecture in relation to his contribution to tectonic theory points at tectonic dimensions relating to the urban scale; 'urban tectonics'. This has recently been discussed in the paper '*Urban Tectonics: Repositioning the human scale in urban design education*' that treats the notion of 'urban tectonics' in architectural and urban design education (Hvejsel et al. in press).

For the urban design education at Harvard GSD Sekler developed the seminar series: '*The Human Scale – Advanced Seminar for the Master's Class*' using the human scale as a didactic element (Giedion & Sekler 1959). The students modeled historical and contemporary examples to grasp the significance of scale in architecture and urban design alike. Sekler wanted to teach his students that; "Urban design needs to be studied on many interacting levels, which reach from the most comprehensive to the minute" involving "such headings as interrelationship of space and volume, sight lines, proportions, dimensions and subjective scale, texture and color, movement and rhythm..." (Sekler 1954: 29). He highlighted that; "Treatment of urban spaces in these terms alone, however, would remain superficial unless they were tied at all times to an awareness of the social, cultural and economic conditions that led to the forms and spaces which are finally experienced. [...] They give it vitality and urbanity, and to understand them is as important for the urban designer as to understand the formal and spatial qualities, and the way in which we perceive them." (Sekler 1965: 29). This way central qualities and central knowledge in urban design were tied to the etymological account of tectonics that forms his seminal paper: '*Structure, Construction, Tectonics*'. Here he distinguishes between structure and construction understood as the mere components and practical realization of architecture and tectonic as; "the noble gesture, which makes visible a play of forces, of load and support in column and entablature, calling forth our empathetic participation in the experience" (Sekler 1964: 92).

In both cases it is the deliberate awareness on behalf of the architect/urban designer to empathetically relate the structure of architecture and city to the human body and mind that define the key to its construct. Hence, we can begin to understand the smallest details in architecture as tectonic means for creating spaces for well-being and multiple qualities at the urban scale. In '*The City and the Arts*' Sekler explains that cities lack to offer a variation of choice if they have an inappropriate form. Following his account for the tectonic, they also lack of spatial detailing that embraces the human scale: "Every lack of differentiation in its physical pattern means a negation of choice, and thus a negation of true urbanity. An inhuman anonymity then results, that of particles in an amorphous mass, whereas a genuinely urbane anonymity is comparable to the condition of a mosaic, in which each cube contributes to the full splendor of the whole without losing any of its own lustre – in fact, the individual *tessera* only asserts its real significance within the total complex." (Sekler 1960: 76).

If we refer back to Sennett, Frampton and Rasmussen's ideas that articulate our understanding of *everyday building culture* in regard of urban space, and look into how these are related to Sekler's work we discover that the question of scale is vital for development of an 'urban tectonics'. Thus it seems apt to return to the initial questions: 'What can we learn from Hansen's work today', and (how) does his work outline an 'urban tectonic'? Sekler's theories can be applied as a critical lens by which we can study how Hansen was able to treat *culture/tradition, locality*, and *scale* as part of everyday architecture and how he made people experiencing it.

4 EVERYDAY BUILDING CULTURE OF HANS CHRISTIAN HANSEN (1901-1978)

The architecture of Hans Christian Hansen is little known to the international community of architects. But his work has also been unfairly neglected when accounting for the great modern heroes of Danish architecture. Just recently, examples of his work have been presented in great length in the Danish architectural magazine; 'Arkitekten' where Even B. Olsted presented a thorough tectonic study of his legacy. The article also presents the thesis work of Olsted, who

designed an extension of the Hanssted School by Hansen, which he based on a design strategy derived from thorough analyses of Hansen's work. The article includes a number of recent images of some of his school buildings and technical facilities – buildings that in sum have a surprising contemporary appearance. (Keiding 2013: 39-55)

Throughout his professional career Hansen was employed in the Department of the City Architect in Copenhagen. He was trained way as carpenter in 1919 before he went to Odense Technical School where he graduated in 1923. Accordingly he attended the School of Architecture at the Royal Danish Academy of Fine Arts in Copenhagen, where he received his diploma as architect in 1928. The very same year he was employed in the Department of the City Architect in Copenhagen. At that time Poul Holsøe was the City Architect and during his reign the Department attracted young talented architects, who he fully supported and gave liberty to design buildings of exemplary high architectural standard. Despite the hierarchical and collective character of the Department, Hansen had the possibility as a project leader to put a significantly independent mark on the cityscape of Copenhagen. Also, he received a number of prizes that recognized the originality and high quality of his work.

Some of the largest and most interesting buildings Hansen designed in the period from the late 50'ies to the early 70'ies a time period when the building industry was changing radically towards industrially based construction procedures and products, and numerous new materials were introduced. In the 1960s, he designed a number of technical buildings that are characterized by an exquisite sense of materiality. They are also monumental to certain degree expressing a supple nature without deceiving the principles of modernism in the modest version. (Ejlertsen 1992) Two of these technical structures; Bremerholm Transformer Station and Bellahøj Transformer & Control Station are studied in terms of culture/tradition, locality, and scale and will be discussed from the perspective of an 'urban tectonics'. The transformer station at Bremerholm shows an excellent adaptation shaped to disappear in the context of the narrow streets, whereas Bellahøj Transformer & Control Station is a significantly larger facility that sets its mark in an open suburban area.

4.1 Case 1 - Bremerholm Transformer Station, Bremerholm 6, Copenhagen City (1962-1963)

Client: CPH Lighting Authority, Architect: City Architect of Copenhagen F.C Lund & Hans Christian Hansen

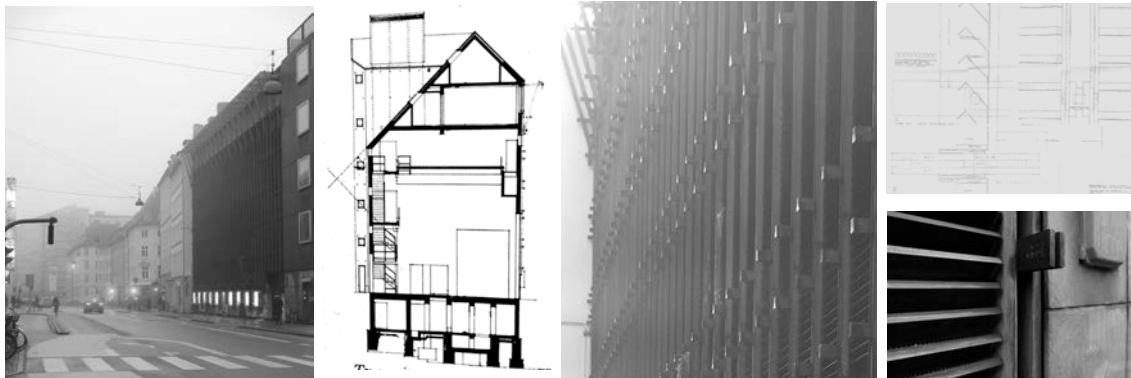


Figure 1. Bremerholm Transformer Station, 1962-63. The very material properties and the detailing of the bronze lamellas, capture the subtle light reflections of the gray Danish winter sky and the low sun angles.

“Only a few architects who have worked in this part of town, have managed to respect the district's precious qualities and adding new values at the same time. When the guardian of virtue, the City Architect, has been commissioned to a construction job here, of course it invokes a special attention. If the task had been solved with excessive caution it would have been understandable. But [...] on the other F.C. Lund and Hans Chr. Hansen would not be the ones to be cowed by public attention.” (Skriver, P. E. 1964) By these vivid terms Poul E. Skriver the editor of *Arkitektur DK* depicts the new technical building at Bremerholm when it was just completed.

The Bremerholm Transformer Station is situated in the very city center of Copenhagen just 300 meters from the Royal Theatre, the National bank and the Parliament. The transformer station was planned in the early sixties when Copenhagen was subject to economical growth, which led to an increasing demand for electricity supply in the city. The 1.400 m² building was

designed strictly in accordance with the technical requirements of the facility where the transformers took up the space of the first three storeys. The fourth and fifth floors were planned for secondary technical equipment and administration. The facility has been functioning until 2013 when the Danish energy supplier, DONG Energy decided to move the transformers outside the city. Subsequently it was stripped for all the heavy machinery and in 2014 it was sold to a rare investor, an architect who is known for investing in unconventional property to transform it into alternative purposes. Bertelsen & Schewing Architects have now developed a project that includes retail, offices and housing. The façade therefore has to be ‘opened up’, added more windows, transparency and access for the public. Alas the building is not listed.

Culture /Tradition - Due to particular technical requirements concerning robustness, safety and noise reduction the transformer station is based on a structural principle where the structural elements are separated. That is the deep and heavy concrete foundations for the transformers, which are placed on huge metal springs in the ground, the heavy splinter-proof in-situ concrete walls that protect the technical equipment and the elegantly detailed bronze screen that face the street and the public. In particular the bronze screen is interesting to study since it repeats the same principle of joined parts. It is based on a modular panel system that looks industrialized but which it is not. The panels are mounted on site thus the construction details hold some complexity. The modules consist of two parallel vertical S-profiles that are 2 M long and 2mm thick onto which the 29 horizontal lamellas are attached. The profiles measure 8 cm high and 6.5 cm wide. The lamellas are made of 1 mm bent bronze sheets and are 7.5 cm high. The exposed bending of 2.4 cm that emphasizes the horizontality proves the characteristic fluted expression of the façade. The modules are bolted directly to bronze brackets that are placed into the concrete walls. The brackets that intentionally stick out 11 cm from the façade line consist of three elements; two longer ones and a short one in the middle each of them are 1.6 cm wide. Splitting up the bracket gives an airier and more ornate appearance in comparison to a poor alternative of one 5 cm solid bracket. The construction principles of the bronze façade are clearly derived from Hansen’s knowledge of woodwork principles and joining of wooden elements. It leaves an impression of structural logic and elements that are demountable if needed.

Locality – The dark colored bronze façade makes it appear closed and anonymous, and its unusual presence makes it difficult to decipher the function of the building, particularly in this exclusive part of the city. The insistent use of bronze may refer to the electrical facility inside, but maybe CPH Lighting Authority and the City Architect also asked for durable materials for this significant structure. Despite the dark color the vertical profiles; the extended brackets and the angled lamellas serve as multiple reflectors of various lighting conditions. The façade never looks the same and changes according to the cycles of seasons, night and day. As the bronze has weathered over time it has gained different hues, which adds extra layers to visual experience.

Scale – the structural grid of the facades is the dominating feature when observing the building or passing it by on foot/bicycle. Due to the narrow street the facade is predominantly experienced over X and thus appears as a huge relief. The modules and repeated details refer to the proportions of the nearby buildings and breaks down the façade into comprehensible elements.

4.2 Case 2 – Bellahøj Transformer and Control Station, Copenhagen NW (1961-1968)

Client: CPH Lighting Authority, Architect: City Architect of Copenhagen & Hans Christian Hansen

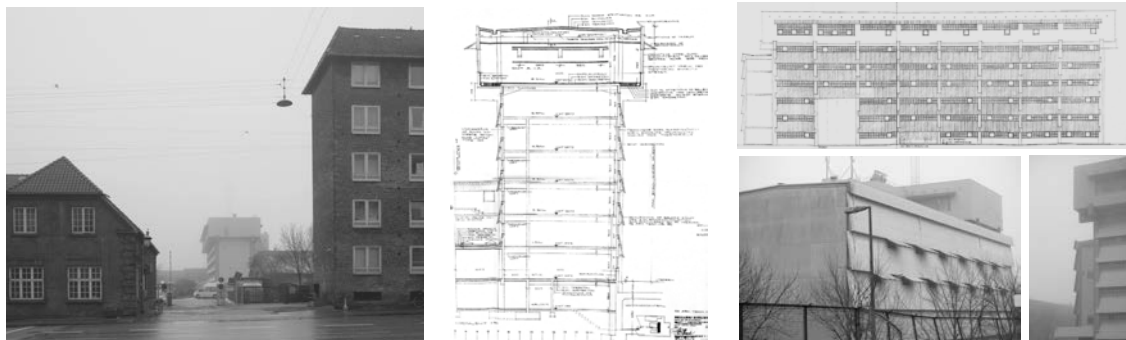


Figure 2. Bellahøj Transformer & Control Station, 1961-68. The large-scale façade features are readable from afar and the building volumes are both rational and highly expressive.

“... it has been argued that large plants, such as power plants, was so determinant in technical terms so the efforts of architect was at best indifferent and at worst harmful [...] the task of the building framework for the electricity supply of the city has not in itself been a very obvious topic for architectural attention. Due to the efforts of Hansen they [the technical structures] have been modulated and articulated by the surroundings of the city they were to be placed in.” (Sestoft 1972: 163) This precise portrayal both of the lack of interest into everyday architecture by the architects in general and the architectural skillfulness by which Hansen’s buildings were made, is offered by late Professor in architectural history Jørgen Sestoft, in the first in-depth article about Hansen’s work across schools, kindergartens, housing, and technical facilities. Sestoft was particularly interested in architecture made for industrial purposes and considered it a vital part of cultural heritage proofing the structural elements that form the ‘industrial society’.

The significantly large facility at Bellahøj is of a different nature than the Bremerholm transformer station. It is a 7-storey compact building complex, consisting of a main administration building with three connecting wings placed at the back at a 90 degree angle, which house the transformers. Also there are more facilities for workers and it has a control center situated at the top floor for monitoring all the other un-manned transformer stations of the city. It is still running today, but the technical machinery was considered ready for replacement in 2011.

Culture /Tradition – Serving quite larger and more recent facilities the buildings are constructed in order to facilitate the daily service and overall maintenance. The primary structure is built in crude reinforced concrete cast on site. The administration building has regular load bearing walls throughout the 7 storeys, whereas the transformer buildings have large open spaces that call for more radical structural solutions. One building has tall columns across two storeys that are paired in the middle of the building; another has columns along the facades that leave a five-story space open in the middle. The facades have few material elements: The exposed in-situ structure that shows as columns and the top floor over-size ‘control-box’ that structurally defines the gables and the eaves along the facades. Inclining panels in fiber cement are placed at concrete supports. Above these are rows of windows or glass bricks, where the opening partitions are painted in light green or blue colors. Together with the large blue gates the windows are the only color feature of the building. The structure is clearly defined by separating the various heavy load bearing construction elements and the light cladding elements. Again there is woodwork logic to the details; the assemblage of the elements is straight forward based on rational principles. The details appear amplified to serve the purpose of the huge structure.

Locality – In one way the coarse nature of the concrete gables and the horizontal fiber cement panels provides a rational building envelope leaving the visitor with the impression of a large unpretentiously covered shed. The inclining fiber cement panels cover and protect the construction for a great part. Also the cladding panels seem easy to replace in case they wear out. The inclination of the panels not only serve as protection against the weather, the horizontal sinus-shaped sheets also provide different reflections of daylight even at shady or dark winter days.

Scale – The transformer station is situated on the edge between dense urban housing areas and modern developments from the 50’ies and 60’ies. Big busy roads mainly frame the site.

The building volumes are centered on the site thus the huge building volumes are fully exposed and visible from all different angles. The structural elements show as ‘details’ from afar.

5 THE ECOLOGY OF URBAN TECTONICS

In the opening paragraph of his “*Towards a Critical Regionalism*”, Kenneth Frampton states: “Architecture can only be sustained today as a critical practice if it assumes an *arrière-garde* position, that is to say, one which distances itself equally from the Enlightenment myth of progress and from a reactionary, unrealistic impulse to return to the architectonic forms of the pre-industrial past” (Frampton 2002: 81). The notion of the critical *arrière-garde* reflects our interest in the work of Hansen and our motivation to critically study whether his work can inform the tectonic challenges that characterize today’s everyday architecture – where we see a growing absence in using construction elements as spatial gestures that link the urban fabric to the human scale. Thus, the paper has studied how meta-level concepts as *everyday building culture*, the *regional* and the notion of *ecology* link together and which commonalities they share. We have

found that these are: *culture /tradition, locality, and scale*. Methodologically we have used the notion of ‘urban tectonics’ inspired by Eduard F. Sekler’s work as a critical lens by which we have studied how culture/tradition, locality, and scale form part of Hansen’s *everyday architecture* centered on the human experience of the edifices. According to Frampton “only an *arrière-garde* has that capacity to cultivate a resistant, identity-giving culture while at the same time having discreet recourse to universal technique.” (Frampton 2002: 81). Also he stresses that the *arrière-garde* is NOT to be understood as a conservative or sentimental state of mind, but consists in a high level of critical self-consciousness. When studying Hansen’s buildings we find them humble and unfashionable yet they refer to a strong building culture that is deeply rooted in a regional understanding of materials, traditions of construction and the specific properties of a given urban context. The two transformer stations document a capability to reinvent traditions in construction and material use, and translate the challenges of contemporary construction industry he was facing into modest, long lasting building designs that link culture/tradition, locality and scale. One could argue that Hansen’s buildings define an ecological tectonic approach that addresses the urban scale in a direct unimpressed and highly original manner, outlining a strategy for an ‘urban tectonic’. This way his work sets an example in itself as built heritage, but in addition it sets a methodological example when valued in relation to Frampton’s notion of the *arrière-garde*. Hansen’s work witnesses a critical and reflective practice that enables him to act in everyday construction industry and to shape construction elements into spatial experiences that gesture the human scale. This way the notion of *arrière-garde* sets an example for future architectural research as well, as being responsible for feeding practice with critical reflective methods. It is our understanding that architects in general, as a profession, have difficulties to extract, mature, and apply tectonic knowledge to everyday practices, thus by creating methods that can ensure this reflective practice, research into tectonics has its merits and potential.

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