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## **RESOURCES OF DEMOCRATIC ARCHITECTURE**

The Danish architectural studio Vandkunsten has existed for more than a generation. In all these years our engagement has been driven by especially one motivation: The vision of a participatory architecture supporting informal social community. The following examples show an interesting loop in history because the sustainability agenda unexpectedly seems to be able to re-introduce long time abandoned dreams of open building systems and radical visual qualities generated by user-controlled transformation.

### ***Tinggaarden: The image of democracy***

Tinggaarden from 1972 is, situated in a suburb south to Copenhagen, the 'mother' of all later building and planning by Vandkunsten. It was inspired by the structuralist movement of the late '60's, generating social hierarchies by free and organic growth based upon small scale units built according to individual needs. This was performed as a polemic opposition to the rational post-war mass-housing industry. This project became a model for a Danish housing for a period of twenty years: Small scale and low industrial level. Actually this meant a setback of the industrial development which has caused backfire in the recent years where the sustainability agenda has been introduced and where industrial production has proven to be a part of the solution rather than a part of the problem. Tinggaarden efficiently provided the image of a democratic vision of autonomous individuals organized in super-local councils, constantly changing, exchanging, expanding, and remodelling their homes. Many shared that dream and the place became a well functioning community for a trendy, leftist segment. A considerable number of the original habitants are still living there. However, the buildings was never altered in any way thanks to the un-flexible concrete building system and the early official recognizing of the architectural work which meant that no one was allowed to change anything.

During the following thirty years the social focus remained central in the works of Vandkunsten but the initial dreams of sharing the design process with the users of the buildings was downsized as part of a more pragmatic attitude towards the monopolistic Danish concrete industry. Today, however, an unexpected potential for reviving the dreams of a more democratic building culture is evoked from the need to employ reversible construction and material salvaging as design strategies for resource saving.

### ***Teglværkshavnen: Amenity as resource protecting factor***

Sometimes buildings can be sustainable in the long-term sense of the word just by the way it is situated. Teglværkshavnen (2007) is a generic, low-budget, mixed private and social housing scheme. It might be situated in any suburb but in this specific case it is placed on the waterfront. The building system is the usual pre-fab concrete system and the housing units offer a quite average spatial disposition and no particular flexibility. However, everyday luxury is provided for the occupants: The scheme is partly built on pillars in the water with a common, public swimming and boating facility underneath the housing blocks. It has a community house at a majestic position as the end of the access promenade through a series of shinto-red gates. Everyday luxury is provided on a low budget by prioritizing the site planning and the complex foundation at the expense of the equipment of the buildings' facades and interiors.

### ***Åblelunden: Adaptability by distributing design competences***

Åblelunden from 2008 is a generic housing block type and basically a bread-and-butter project for a developer who wanted to offer low budget private owned apartments. The building system, chosen and imposed by the client, is the prevailing Danish precast concrete system and the facades are sandwich concrete panels with a load-carrying inner wall panel and an exterior statically passive panel. Despite its tonnage this system in many cases provides the lowest possible total building costs because the building is rapidly closed and no scaffold is needed.

The building has a low energy consume for operations due to the compact volume. The more subtle sustainability strategy is to allow future changes by leaving the interior space dividing to the occupants. Scenarios were tested by letting members of our own staff at Vandkunsten design an apartment each according to their individual needs. This procedure resulted in a number of examples which were later used in the marketing. By stepping down from the traditional position of the architect, a life-prolonging robustness of the building was demonstrated. As architects we chose to spend all our efforts and salary adding exterior identity to the building by articulating the rough facade system into a characteristic jigsaw-puzzle-like assembly pattern.

### ***Focus on reversibility***

This distribution of design competencies is a strategy for maximum protection of the energy capital in a building erected within a static, non-reversible building regime like concrete with cast connections. However, from an ideal position one

important aspect of sustainability is missing with the pre-cast concrete building system which constitutes the structural platform in most of Vandkunstens' buildings: Reversibility of construction enabling reuse or recycling of building elements. This agenda is raised by the fact that the energy consumption needed for operational purposes such as heating and HVAC-systems is getting under control due to high insulation standards and air-tight assembly. This shifts the focus of CO<sub>2</sub> reduction towards energy consumption for building processes such as mining, manufacturing, construction and lifetime maintenance operations which constitutes the substantial part of the total building related energy. The energy for building processes is embodied in the constructive organization and materials of buildings and can be considered as a CO<sub>2</sub>-capital worth protecting by employing strategies for durability. Reversible construction is the most prominent technical strategy as it enables buildings to be transformed, adapted to new use or to be disassembled and reused in parts.

### ***Bolig+: Adaptability is the key to survival***

Bolig+ was a 2009 competition proposal for a residential scheme in Aalborg. The brief was aiming towards energy neutrality but focused only on operational parameters, so we decided to expand the scope to include process parameters. Two main strategies were implemented with didactical consequence: 1. An adaptable spatial composition with maximum versatility allowing functional conversions over time, e.g. between residential and working purposes. This resulted in a generic warehouse typology with a central spine of access and conducts. 2. Technical adaptability by means of a strictly hierarchical organization of building parts assembled according to various lifecycles. This resulted in a distinctly layered building which might easily be changed by shifting occupants or owners. A disassembly diagram was developed in order to document the technical adaptability and the reusability of the building parts and components. By its capacity for transformation the Bolig + scheme might exhibit a significantly fluctuating visual identity which is beyond the control of the original architectural designers.

### ***The potentials of reversible construction***

**Tectonic potential:** The reversible construction principles inspire the investigation of a field which might be named 'tectonics of mechanical connections'. In the industrial montage the tectonic, defined as the meeting of elements in *the joint*, represents the core of architectural articulation of buildings. The poetics of disassembly will evolve, mostly in the scale of the detail, in which components such as clamps, winged screws, springs and consoles will be important components in the architectural vocabulary. The paradigm of reversibility unfolds on skins and

surfaces, on treatment of materials, profiling of components, and above all in joints and connections.

**Industrial potential:** Reversible construction methods establish a logistic infrastructure suitable for a distributed production of building parts. The assembly hierarchy and the mutual independency of elements will fertilize the market for specialized and optimized sub-delivery products.

**Democratic potential:** With reversible construction the users obtain a radically increased degree of freedom to re-configure the buildings. When conversions to new or changed functions are made easier and cheaper, changes may happen with a higher frequency. The original design from the architect's hand will be elaborated and the value of the authorship to the architectural opus will be reduced as arbitrary altering by the users soon will make its marks on the building. These changing conditions for architectural authorship will force architects to imagine their design as a framework for dynamic scenarios. Architecture must base its aesthetics upon a concept of beauty different from that of the fully controlled opus and learn how to arrange conditions for change in such ways that attractive spaces and visual beauty can be achieved.

### ***Conclusion: 1972 revisited***

Whereas the radicalness of the Tinggaarden scheme was not honoured by the building system, the focus on energy saving in building processes might lead to a development of both a reversible construction technology and a change in attitude towards the nature of architectural design. A building becomes a dynamic project rather than a static object; a work that unfolds gradually and unpredictably over generations of time by means of industrially produced reversible systems enabling an extensive reuse of components and materials. If the architectural profession embraces reversible assembly methods a great leap forward can be taken towards a new democratic and sustainable building culture with a powerful visual potential.