Precedent Analysis

UT Solar Decathlon 2009
Werner Sobek
R128 I Housing Project I Stuttgart, Germany I 2002

R 128 by Werner Sobek
Philosophy

Architecture which claims to formulate an attitude appropriate to our time and the future, must be a form of architecture that finds its forms and materials not by reference to traditional forms and materials. We should not ask "how did we use to work and live" but "how shall we work and live in the future". The answer to this question requires an unconditional anticipation of what the future holds in store.

The expected type of architecture should have a radically different and positive relationship with the natural environment, its users and its inherent technology. House R 128 is an excellent example of such architecture.
Werner Sobek, the architect of R 128, was born in May 16th, 1953, in Aalen, Germany. From 1974 to 1980, he studied structural engineering and architectural at the university of Stuttgart. From 1980 to 1986, he was post-graduate fellow in the research project "Wide-Span Lightweight Structures" at the University of Stuttgart and finished his PHD in 1987 in structural engineering.
Sobek's background in both of the fields of engineering and architecture gives him the power in integrating technology into architecture design.

He founded his own engineering firm Werner Sobek Ingenieure in 1992. His projects are famous for first-class engineering in combination with a perfect design.

Professor of Engineering at University of Stuttgart since 1995, Werner Sobek merged the two renowned chairs of Frei Otto and Jörg Schlaich at the University of Stuttgart into the Institute for Lightweight Structures and Conceptual Design (ILEK) in 2001.
R 128, one of Sobek's most famous works, represents a new way of living. This emission-free house, which requires no energy input for heating and is completely recyclable, features all-glass facades on all four sides; its salient characteristics are perfect transparency and the successful integration of function, structure and design. This unique experiment will be a pioneering example for the architecture of the future.
The house is located in the southern German city Stuttgart, which is the sixth big city in Germany. The name of the house is derived from its location at Reomerstrasse 128, which is a small and steep piece of land at the edge of the vale of Stuttgart.
In its present form, R128 cannot be reproduced in just any place or environment. It is floating high on a hill overlooking the city of Stuttgart. The property of itself is difficult to access because of its steep slope and narrow approach. Surface area and height of the building were limited by building regulations covering its situation in a nature protection zone. The total height of the building is 11.2 m, with four floors.
Architectural Concept

Werner Sobek had the idea of developing an emission-free house, which requires no energy input. The transparency and the light weight of the building minimize the energy required. Modular design and prefabricated components made it possible to build the house quickly and recycle itself completely. Thus, design, technical installations and climatic concept were defined as a unity.
The shape of the building was dictated by a desire for simplicity and formal restfulness. This resulted in the clean lines of a cube, which allows both optimum utilization of the existing surface area and also the required prefabrication and standardization of components. Transparency and brightness of the interior are fundamental components of the design concept.
The absence of internal partitions, coupled with the all-glass facades, provide a visual continuity between the horizontal internal and external spaces. Mobility and reduction to the essential were the main characteristics of the furniture design. The book shelf consists of movable stand-alone units, while the bathtub is also free-standing and can be connected anywhere. The table consists of pieces of glass panels mounted by point fixings.
Structural Building Systems  The structural frame of the house consists of a bolted steel skeleton with four floors. This system both minimizes the weight of the structure and allows a precision of mechanical engineering.

Primary Structure  The structure of the four storied building rests on a grid of 12 columns (3.85 m * 2.90 m).

Secondary Structure  The façade of the building consists of triple-glazed panels extending over the height of each storey.
Twelve support columns are arranged on a plan grid and linked by rails in two directions.
The structure carrying the façade plates is laid out on the same grid pattern.
Various functions in the house are controlled via on-touch sensors, voice control or touch screens.
The ceiling panels incorporate light, an acoustically absorbent surface, and a heating/cooling panel.
The combined refrigerator unit is fitted on its face with a concealed microwave sensor can sense movement and supply a corresponding analog output signal. The signal is processed by a microcontroller circuit.
All pipes and cables for electricity and water supplies, communication systems and waste water are run in folded ducts along the inside of the façade. This system ensures the highest degree of functionality and maximum recyclability. Bathrooms and toilets are fitted with infrared reflecting photocell units. The opening and closing of doors as well as the flushing of toilets are effected by a swipe of the hand. Showers and washbasins are fitted with non-touch controls also operated by hand swipe.
Columns and beams are bolted together on site. The floors are prefabricated plastic-covered wood panels placed between the floor beams without the use of screws or bolts.
Kit of Parts – Building Components in a larger scale: The frame and floors are reinforced by diagonal tensile braces.

The reflective coating and the filling of the spaces between the glass with inert gas, extremely low heat transmission values are achieved together with outstanding light transmission values.