Play in the Passivehouse Hill

New nursery in the Heidenau Municipal Park

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Idea

Before 1995 there was a nursery situauted on the Diesterwegstraße in Heidenau. The building was in such a bad condition that it had to be demolished. It needed to be replaced with a Municipal park which had an integrated playground. The childrens accommodation was next door in the Grammar school.

In 2007 the town of Heidenau decided to build a new nursery for 72 children on the north side of the park. At this time the park had a hill where the nursery was planned. We used this geographical feature to develop the initial idea which was to intergrate the building into the hill. The construction of the nursery fits perfectly into the area and becomes a part of the scenery.

The idea of an organic form can be experienced on all the levels of the design. The plan follows a curved line and the undulating wave of the roof appears to be “growing”, fitting perfectly into the landscape.
The building is sympathetic to the surrounding area and intergrates well with the exsisting park. This design also allows for the preservation of the trees to the south and the west of the site.

Plan Design

The site of the nursery lies directly on the Diesterwegstraße and opens up to the south. It is a single storey building which is designed to have a minimal barrier to the outside thus increasing the connection to the external spaces. In addition the fire protection is kept to a minimum and the nursery can be accessed by the disabled easily. The entrance is found underneath the highest point of the undulating roof. On the opposite side of the nursery it is possible to get to the childrens play area.

From the entrance you reach the foyer and a multi-functional space. You can feel the importance of this exposed space, emphasized in the ‘head’ of the building. The room, which can be used for sport, dance and theatre, is 5.6 metres high and is mostly glazed giving a view out onto the park.

The way the plan is designed offers an interesting addional option of utilisation. The multi-functional space together with the foyer, vestibule, storeroom, toilet and kitchen form there own seperate unit and can therefore be used independent of the nursery by inhabitants of the surrounding area.

As well as the multi-functional space, there are four south facing group-rooms. They are extensively glazed and each has a large door to the terrace outside. They always follow the same basic module, a group space with an attached sanitary space built for children. Above the toilet is a gallery which can serve as play area.

The functional and secondary rooms run, like a spine, along the northern side of the nursery.

The inner use is reflected in the outwardly visible facade. The north view, with the functional areas lying behind it, appears closed. However, the south facade appears very open with its big glass windows. Timber sliding elements provide the solar protection for these windows.

Building Construction

The nursery is an ecological passivehouse. Only building materials that were recommended by the Federal Ministry of Environment were used. At some points we needed to use non-ecological materials and the buiding owner was willing compromise. The walls, roof and floor have very good insulation (U-Value 0.11).

The outerwalls are built with bricks with a Perlite filling. On top of this is a vapour permeable structure made of mineralwool insulation which is covered by a colourful scumble larch timber facade. In between these two materials is a ventilation layer. This wall construction is suitable for that of a passivehouse and has a U-Value of 0.11. All wooden windows and the curtain wall system are triple glazed and therefore qualify for use in a passivehouse.

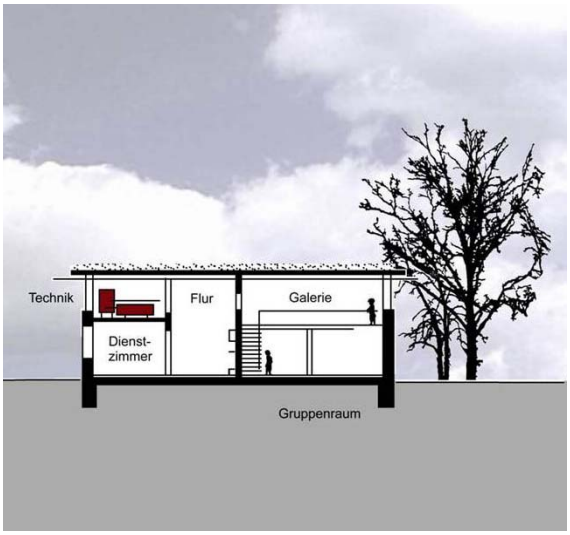
The roof is a corrugated flat roof with a 3% slope to the north with a structure of timber purlins, insulation made from cellulose and a green roof construction as the top layer. The extensive greenroof holds approximately 50% of the rainwater on the roof and contributes to the improvement of the microclimate of the property. Hemp as a material for the sound absorption and flax or coconut palm fibres for the fastenings of joints complete the whole ecological concept.

Energy Concept / House Technology

The thermal quality of the house corresponds to the quality of a Passivehouse. Thus it has a very low energy consumption of 15 kWh/m². The rest of the heat (normally takes 7kW to heat up but will need 23 kW when heating was turned off) is provided by district heating. In addition to natural ventilation by windows, a ventilation system was inserted which has a heat recovery system. It provides fresh warm air in cold winter days. The fresh air is sucked into the house under the roof on the north side and passed over a heat exchanger. The exchanger has an efficiency of 90% and the fresh air is warmed up by the exhaust air before being distributed by air channels which are hidden from view by a false ceiling. Therefore the energy remains in the house and the air is fresh over and over again.

The airsupply, and therefore also the exhaust air streams, in the main stay areas (Multi-function room, foyer, grouprooms) are variable and adjustable. The regulation occurs as a function of the CO_2-value in the rooms or ambient temperature in comparison to allowed maximum or minimum value. The ventilation system has several steps: from the basic ventilation of 510 m³/h to the maximum ventilation of 1270 m³/h. The supplied air has a maximum temperature of 45°C, and a minimum of 17°C.

To reheat the building after the ventialtion system has been switched off takes one to two hours and therefore automatically starts before the children arrive for nursery. All of the building is ventilated at the same time. During the summer when the outside temperature is over 18°C the air inlet into the nursery is closed but air is allowed to leave from the sanitary rooms and the kitchen.



The ventilation and heating technology is accommodated above the secondary rooms on the functional northern wall and can be seen from the hall. The kind of warm delivery system in the space is adapted to the respective requirements of that space. The four group rooms have wall surface heating, in personal rooms there are flat radiators and in the multi-functional space a skirtingboard heater. All the systems are thermostatically adjustable and have a low temperature so that the children can not burn themselves.

A thermal solar-energy collector with a cover rate of 70% provides the hot water. The main components of the collectors are the flat collectors (12m²) on the roof and a storage tank (750l).

With an ecological construction method and the technology of a passive house this nursery provides high quality living conditions for the children as well as being friendly towards the environment.

The involved professionals

Engineer:	Körner und Hackel, Dresden
House Technician:	Hawemann Solar, Radebeul
Landscape Planning:	Frau Etzien, Dresden