



Project description

The Rustenhove rest and nursing home is located in the rural municipality of Ledegem, Belgium. After completion, the project will provide residence to 126 seniors.

The existing part of the retreat consists of three main wings of three floors which come together under an angle of 120°.

The building project embraces, on the one hand, a thorough renovation of two wings of the existing building and, on the other hand, the construction of a new wing as well as the construction of an additional level above the existing building. The total project comprises approximately 8,360 sqm. The new wing also has a basement in order to provide space for technical services.

The new wing has a twisted façade which folds open towards the street – it gives the façade a dynamic emanation to emphasise the innovative nature of the provided health care. The closed twisted façade of the 1st and 2nd levels is accompanied by a sloped curtain wall at the head of the building. Behind this façade one finds the living rooms. This way the residents may experience the special façade also from the inside and above this they can obtain an overview of the activity on the car park, the inner garden and the main reception area. The entrance is situated on the ground floor, under the curtain wall. It is an open space working as a crossroads: it provides the entrance to the new wings but at the same time also offers access to the existing wings via an existing connection tunnel.

Structural description

The slabs of the ground floor and 1st and 2nd floor cantilever in relation to each other follow three arcs of circles. These circles meet each other at the transition between the living room and bed wing and their radius decreases with the level (46.85 m for the ground floor and 30.80 m for the second floor). The edge of each floor is supported by a concrete wall with the form of the envelope of a cone. To make sure that the analyses of the internal loads of the wall were correct, the wall surface was divided into a regulating structure. This way

it was also possible to make a shell model as well as a model made up of columns. The increase of the internal loads caused by global imperfection was analysed by means of a second order calculation; thereby, reduced stiffness was applied to take into account the effects of cracked concrete.

The in situ poured slab above the ground floor with a thickness of 35 cm supports this concrete bracing wall as well as the superjacent masonry corridor wall while spanning 7.20 x 9.50 sqm. At the back, the new construction cantilevers 3 m over the existing connection tunnel by means of a slab with a thickness of 61 cm. And at the front and side, the slab is 50 cm thick to take the loads of the column of the superstructure and to transfer them to two sloped round columns in the façade and the load bearing wall of the tunnel. Punching reinforcement was therefore required.

The slab above the first floor is an in situ poured slab with a thickness of 35 cm based on the span of 8 m x 9 m, the back side cantilevering by 3 m and the long-term deflections. The slab above the 2nd floor – spanning 8 m by 10 m – serves as a transfer level for the recessing load bearing façade of the 3rd level.

Due to the fact that the glass façade is a delicate finish as regards deflections, an accurate study of the deformations was made by mean of a CDD calculation. The influence of the cumulated deflections of the two transfer levels as well as the influence of the different stages of construction were thereby taken into account. The maximum additional deflection was limited to L/500.

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Project information

Owner	Woon- en Zorgcentrum Rustenhove vzw
Architect	architektenburo Johan Ketele bvba
General Contractor	Algemene Ondernemingen Himpe
Engineering Office	VK Engineering
Location	Ledegem, Belgium
Construction Period	2007 to 2015

Short description | Rest and Nursing Home "Rustenhove"

After completion, the Rustenhove rest and nursing home will comprise of approximately 8,360 sqm. The main technical challenges of this project concerned the entrance building, which contains a supporting concrete wall with the form of a cone envelope. The increase of the internal loads caused by global imperfection was analysed by means of a second order calculation. In addition, a study of the deformations was made. The influence of the cumulated deflections of the two transfer levels as well as the influence of the different stages of construction were thereby taken into account.

