

Abstract  
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Title: Flex-floor – Structural aspects of a new floor system

The Flex-floor is a new floor system developed by the Dutch company Dycore. This new type of floor has a network of internal holes in order to place pipes. These pipes can be moved easily because the internal holes are accessible from the outside. In this way flexibility is achieved. The Flex-floor is built up out of two parts. The upper part of the floor is cast into a steel mould to obtain holes and the lower part is an ordinary concrete slab. The connection of the two parts is reinforced by stirrups. The network of internal holes will affect mainly the shear capacity and the stiffness of the Flex-floor. Because the Dutch building regulations don't account for slabs with a variable cross sectional area, additional research was carried out for proving an equal amount of safety as used in the Dutch building regulations.

Analyses based on the Dutch code were carried out to determine a lower bound shear capacity. An upper bound estimation of the shear capacity was obtained by running 2D- and 3D-simulations in DIANA. Finally four large scale tests were carried out to determine the structural behavior in reality.

The full-scale tests showed that the shear capacity was governed by the quality of the connection between the upper and lower part of the Flex-floor. This quality is determined among others by the roughness of the contact surfaces and the amount of entrapped air. Comparison of the calculations and the test results gave a maximum difference of 40% in shear capacity. By adapting the strength parameters of the connection, it's possible to account for the quality of the connection.

