

# **SIKA AT WORK** HOSPITAL OF BRASSCHAAT, BELGIUM

HEAVYWEIGHT CONCRETE: Sika® ViscoCrete®



**BUILDING TRUST** 

### HOSPITAL OF BRASSCHAAT, BELGIUM

#### PROJECT DESCRIPTION

The hospital of Brasschaat had planned to expand their facilities with an X-ray room. In order to protect visitors and employees against the radiation the concrete has to be very dense and impenetrable. For such radiation shielding usually heavyweight concrete is used. As the supplier for the heavyweight concrete the contractor of this project, DCA from Beerse, had chosen the concrete plant Van Pelt from Schoten.

Heavyweight concrete uses heavy natural aggregates such as barytes or magnetite or manufactured aggregates such as iron ore and/ or lead shot. The density depends on the type of aggregate used and can achieve between 3,000 kg/m<sup>3</sup> and close to 6,000 kg/m<sup>3</sup>.

#### **PROJECT REQUIREMENTS**

The main requirement for his project was a heavyweight concrete with a density of minimum 3,200 kg/m<sup>3</sup>. To fulfill this requirement the concrete plant Van Pelt used magnetite aggregates, a very heavy, ferrous material from Northern Sweden named "MagnaDense". The density of these aggregates is higher than 4,700 kg/m<sup>3</sup>.

Heavyweight concrete requires also special attention on practical level. Based on its high density it's impossible to achieve from the maximum capacity of the batching plant, reason is that the increase of the mixing resistance which will be too high. Additionally the truck mixers with a regular capacity of 11 m<sup>3</sup> could only be loaded with maximum of 7 m<sup>3</sup> of heavyweight concrete due to legal restrictions. This resulted in a decrease of production capacity which was tackled by using two batching plants. Only with good planning Van Pelt could guaranty the needed output of 40 m<sup>3</sup>/h on the jobsite.





Furthermore heavyweight concrete is always a challenge regarding the workability and pumpability. The concrete has to have the right consistency in order to be easily pumpable and to avoid segregation of the heavyweight aggregates.

#### **SIKA SOLUTION**

Without an admixture like plasticizer or superplasticizer the concrete wasn't flowable enough to fulfill above mentioned requirements. Therefore the concrete producer Van Pelt turned to Sika to improve and maintain improved consistency of the heavyweight concrete. Sika has tested the mix-design with a superplasticizer of the 3rd generation: Sika® ViscoCrete® 2420 con. 20%. For further optimization Sika designed a mix-design for the heavyweight concrete and determined the right dosage of admixture which on the one hand allowed the concrete to be pumped and on the other hand to maintain a stable mix without the use of any stabilizer.

#### SIKA MIX-DESIGN

348 kg CEM III/A 42.5 N LA 200 kg sand 0/1 680 kg sand 0/7 1,800 kg heavyweight aggregates 0/20 180 liter water 1% Sika® ViscoCrete® 2420 con. 20%

#### SIKA PRODUCTS

The following Sika product has been used: Sika® ViscoCrete® 2420 con. 20%



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## HOSPITAL IN BRASSCHAAT, BELGIUM



#### **PROJECT PARTICIPANTS**

Owner:AZKlina V.Z.W., BrasschaatMain Contractor:DCA N.V., BeerseConcrete producer:Van Pelt, SchotenSika Project manager:Kristof Weyns

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