Project Report

Reconstruction with Rapid-Hardening Concrete
Concretum® Q-FLASH 2/20 since 2004

Zurich Airport ZRH

- Runway
- Stands
- Taxiways
- Apron

Track record

CHOICE OF PROJECTS

In 2004, Zurich was the first airport worldwide to start using Concretum® rapid-hardening concrete. Compared to the previously used quick concrete products, the technical superiority of the Concretum® technology was clearly demonstrated. The Concretum® concrete quantities have constantly increased since 2004 owing to the material's outstanding durability and reliability. Within a short time, Concretum® rapid-hardening concrete has evolved as an established technology used by various project participants for a wide range of reconstruction works.

Since 2004 more than 20'000 m² of concrete pavements were replaced with Concretum® rapid-hardening concrete on runways, taxiways, aprons, and stands, both manually and with pavers. In 2010 alone, 4'000 m² of concrete surfaces were replaced with Concretum® rapid-hardening concrete at ZRH.

More than 20 years of experience has allowed for a realistic assessment, and proven performance, of the durability of the finished concrete slabs. The excellent long term durability of Concretum® rapid-hardening concrete has been demonstrated to have no limitations regarding type and size of its applications. Consequently, Zurich Airport employs Concretum® rapid-hardening concrete for purely both operational and economical reasons. Due to the limited space at the airport and the constantly increasing number of aircraft movements this is more important than ever.

The rapid-hardening concrete is produced in one of the ready-mix concrete plants located near Zurich Airport and most of the works are performed during the night flight restrictions between 23.00 hrs and 06.00 hrs.

Metric to imperial system – unit conversion | 1 cm = 0.39 in | 1 m = 3.28 ft | 1 m² = 10.76 ft² | 1 m³ = 1.31 yd³ | 20 °C = 68 °F | 1 N/mm² = 1 MPa = 145.04 psi

Concrete specification Zurich Airport

The specification of Zurich Airport for concrete works places very high demands on the rapid-hardening concrete regarding its fresh concrete properties, fast strength development as well as the high durability of renewed concrete surfaces.

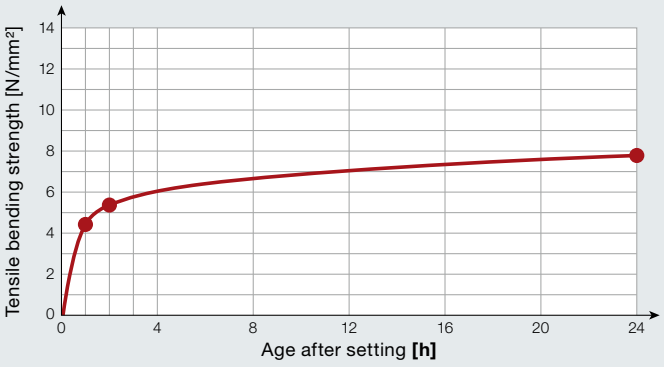
The specification requires a minimum compressive strength of 16 N/mm² to be achieved before the runway can be returned to service. In order to perform reconstruction works during the short nightly closures, it is crucial that the concrete reaches this strength as soon as possible after finishing the re-surfacing. Concretum® Q-FLASH 2/20 reaches a compressive strength of 20 N/mm² in a maximum of two hours after setting. Additionally, the consistency of Concretum's Q-FLASH 2/20 rapid-hardening concrete can be customized to allow for various mixing and placement methods – manually or machine laid.

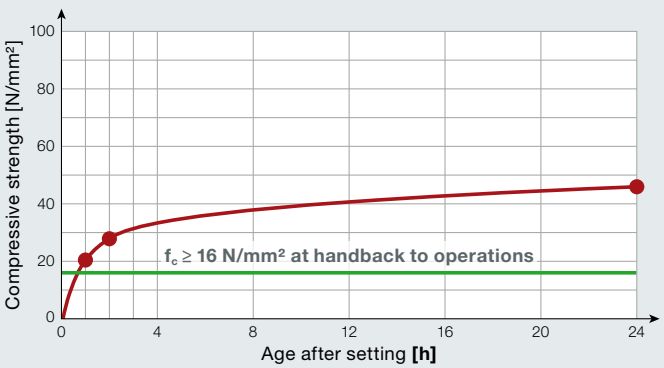
The open time of the rapid-hardening concrete can be precisely modified to account for the transportation distance and project needs. The adjustable and predictable behavior allows for various applications of the material. The open time can be as brief as 45 minutes, for short transport distances, and small concrete pours, or as long as two hours for larger pours. The concrete slab replacements using Concretum® Q-FLASH 2/20 at Zurich airport in 2004 were examined in 2015 and the surface, as well as the concrete structure, exhibited no damages or defects. The results have revealed a superior performanced and durability and consequently Concretum's rapid-hardening concrete is an ideal long term solution for the replacement of damaged pavements during short closures.

CONCRETE SPECIFICATIONS

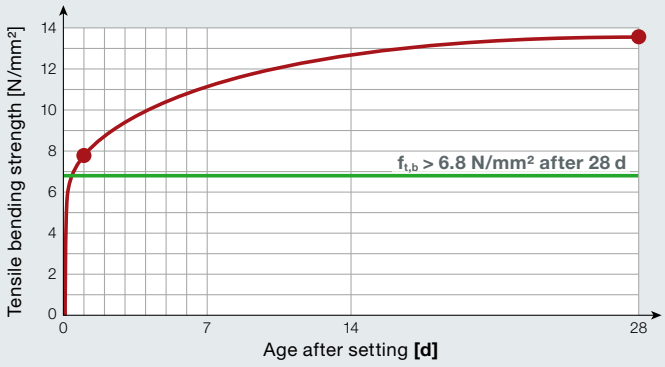
Product	Concretum® Q-FLASH 2/20
Exposure class	XC4, XD3, XF4
Strength class	C50/60
Consistency class	S1/S2 (C1/C2)
Max. aggregate size	32 mm (round)
Alkali-Aggregate-Reaction	resistant

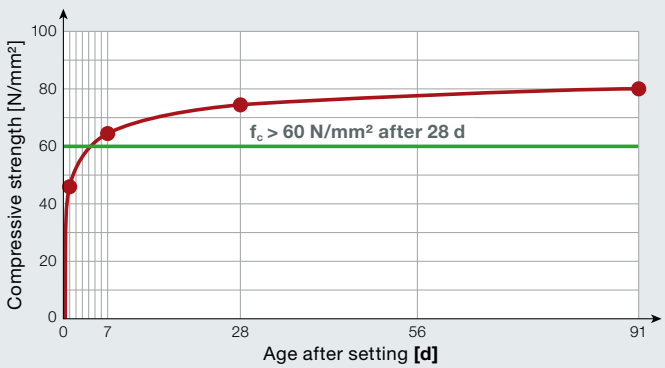
Early age strength development





Long term strength development





2004

Implenia

First Concretum application:
Taxiway BRAVO

2009

Delta stands and Taxiway

TIBAU AG

2010

STRABAG

Runway 14/32

2020

Apron

KIBAG

Preparation for runway rehabilitation

WALO Implenia Eberhard Marti LETECH

2021

2014

Tango stands

2015

Assesment
of the 2004 slab

Replacement works with
the paver, India stands

2018

Runway 10/28

2019

Runway stands
and Taxiway

Taxiway

2022

Runway 10/28

2023

Threshold 32

ongoing

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concretum

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September 2023