

Project Report

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



Paris Airport Charles de Gaulle CDG



Stands



Taxiways



Apron



> 5'000 m²

rapid-hardening concrete
Concretum® Q-FLASH 2/20

On-site Production

Use of a mobile volumetric concrete mixing truck
to batch Concretum® Q-FLASH 2/20



Project Overview

Situated as Paris' largest airport, Charles de Gaulle (CDG) accommodates a substantial 57 million passengers annually (2022). Across its vast area, each pavement segment contends with constant airplane movement. This challenge is compounded by the presence of ongoing construction projects and temporarily diverted taxiways. As a result, the ability to address deteriorated sections of the concrete pavement through essential maintenance and repairs is significantly limited.

Utilizing the flexible Concretum® Q-FLASH 2/20 rapid-hardening concrete, concrete bays can be fully or partially reconstructed, leaving adjacent areas operational. A volumetric continuous concrete batching truck ensures precise, on-time

placement. Adjusting the concrete's open time to fit the bay size and placing duration meets contractor needs. Within 30 minutes of placement, the area becomes load-bearing, and in just 4 hours post-batching, concrete achieves the required 3.3 N/mm² splitting tensile strength. Subsequent to seamless collaboration with Socotras contractor, repairs proceeded incident-free, enabling prompt return to regular airplane traffic.

CONCRETE PRODUCTION

The site is being prepared for casting after breaking out and removing the old concrete slab. Concretum® Q-FLASH 2/20 is being produced on-site using a volumetric mobile mixing truck. The machine is fully loaded with cement, aggregates, water, and admixtures, having a capacity of approximately 9 m³ of fresh concrete. While producing concrete, the truck can be reloaded with cement and aggregates by an automated reloading system.



■ Damaged spots/areas in the apron/stands area

On-site production offers the benefit of reducing open time by eliminating transportation and security gate processes. Thirty minutes after producing the concrete, the slab including surface treatment is finished, and the hardening process starts. We determine the development of compressive and splitting tensile strength (see Diagram 1). After four hours, the splitting tensile strength exceeds 3.3 N/mm², meeting Charles de Gaulle Airport's requirements for hand-over. Additionally, just thirty minutes after setting, the compressive strength is higher than 20 N/mm², allowing the slab to be loaded.



STEP-BY-STEP CONSTRUCTION ILLUSTRATIONS



Breaking out existing slabs and removing old concrete



Preparing site and drilling dowelbars



Concrete production on-site using a volumetric mobile concrete mixing truck, placing concrete, compacting concrete with vibrators



Finishing surface with roller screed and applying broom finish



Applying curing compound



Cleaning site and hand over to air traffic control

CONCRETUM® Q-FLASH 2/20

Concrete temperature influences open time and strength development. Measurements are taken at the slab center and subbase as shown in Diagram 2. The temperature difference within the 40 cm slab can be as low as 7–8 °C, ruling out heat-induced cracking.

Concretum® Q-FLASH 2/20 meets all flexibility, strength, and durability requirements, regardless of limitations and conditions.

CONCRETE SPECIFICATIONS

Product	Concretum® Q-FLASH 2/20
Exposure class	XC4, XD3, XF4
Strength class	C50/60
Consistency class	S3
Max. aggregate size	20 mm (crushed)
ASR	resistant

CONCRETE PROPERTIES

Compressive strength 1 h after setting	> 25 N/mm ²
Splitting tensile strength 4 h after setting	> 3.3 N/mm ²
Shrinkage ϵ_{SH} (specimen: 120 × 120 × 360 mm)	≤ 0.25 %
Heat of hydration (NF EN 196-9)	214 J/g (equivalent to low heat cement)

Diagram 1: Strength development (compression and splitting tensile strength) of Concretum® Q-FLASH 2/20

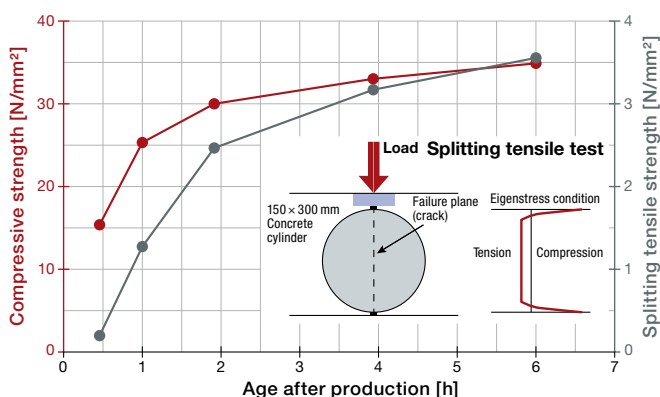
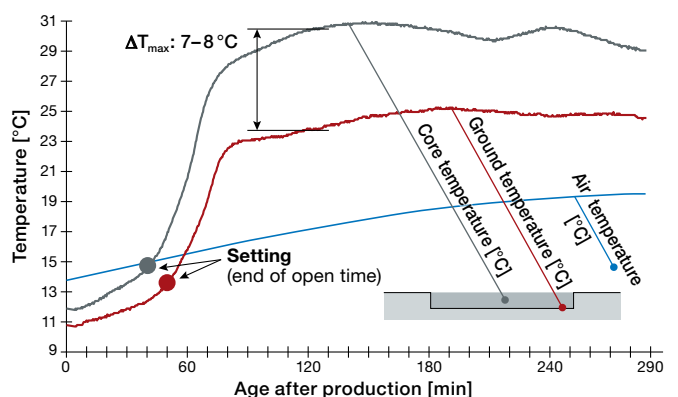


Diagram 2: Temperature measurement during the hardening process of Concretum® Q-FLASH 2/20



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