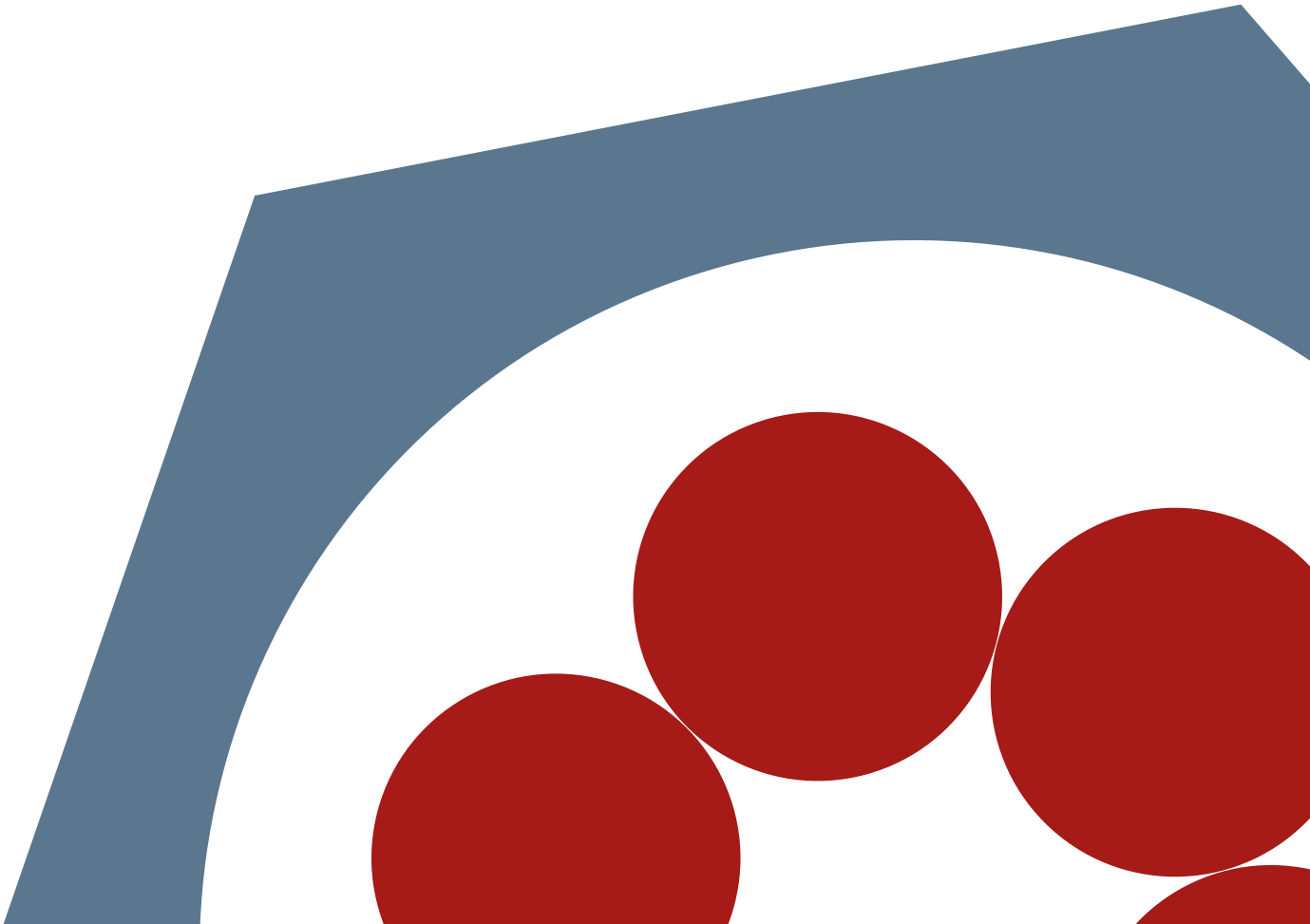
Paris Airport Charles de Gaulle (CDG)

Stands reconstruction with rapid-hardening concrete Concretum® Q-FLASH 2/20



Repair of stands at Paris Airport Charles de Gaulle (CDG)

Project overview

On Paris' largest airport Charles de Gaulle (CDG), with more than 65 Mio passengers per year, each and every pavement area is continuously used by airplane traffic. Additionally, construction works and temporarily diverted taxiways constrain operations. There is hardly any time or space for repair and maintenance of deteriorated areas of the concrete pavement.

Thanks to the highly flexible application of Concretum® rapid-hardening concrete Q-FLASH 2/20, concrete bays can be reconstructed as a whole or in parts. Adjacent areas are not affected and can be used for traffic without restrictions. Using a volumetric continuous concrete batching truck, Concretum® rapid-hardening concrete Q-FLASH 2/20 is batched and placed just in time. Depending on the bay size and the required time for placing, the open time of the concrete is adjusted to suit the contractor's requirements. Already 30 minutes after placing the concrete, the area can be loaded, and just 4 hours after concrete batching, the splitting tensile strength of the concrete reaches the required value of 3.3 N/mm².

Figure: Damaged spots/areas in the apron/stands area

It can then be handed back to regular airplane traffic. Due to the excellent collaboration with the contractor Socotras, the repair works could be carried out without any incidents.

product	Q-FLASH 2/20
exposure class	XC4, XD3, XF4
strength class	C50/60
consistency class	S3
max. aggregate size	20 mm (crushed)
ASR resistance	resistant

compressive strength 1 h after setting	> 25 N/mm²
splitting tensile strength 4 h after setting	> 3.3 N/mm²
shrinkage ε_{SH} (specimen: 120 x 120 x 360 mm)	< 0.20 ‰
heat of hydration (NF EN 196-9)	214 J/g (equivalent to low heat cement)

Concrete production

After breaking out and removing the old concrete slab, the site was prepared for casting. Concretum® Q-FLASH 2/20 was produced on-site using a volumetric mobile mixing truck. A fully loaded machine, prefilled with cement, aggregates, water, and admixtures, has a capacity of approximately 9 m³ of fresh concrete. While producing concrete, the truck can be reloaded with cement and aggregates. The advantage of an on-site production is that the open time can be kept short (no transport, no security gate). Thirty minutes after the production of the concrete, the surface finish was applied, and the hardening process started. Compressive strength and splitting tensile strength development was determined (see figure below). Four hours after setting, the splitting tensile strength exceeded 3.3 N/mm² (hand-back), as required by Charles de Gaulle Airport. Only thirty minutes after setting, the compressive strength was higher than 20 N/mm², and therefore the slab could already be loaded.

Project facts

- > 5'000 m² rapid-hardening concrete Concretum® Q-FLASH 2/20
- First use of a mobile volumetric concrete mixing truck to batch Q-FLASH 2/20
- On-site production

Q-FLASH 2/20

The development of the concrete temperature determines the open time and the beginning of strength development. The concrete temperature was measured at the center of the slab (core) and at the ground (subbase) as shown in the figure below. The maximum temperature difference between the subbase and the center of the 40 cm slab was only 7 - 8 °C. Therefore, heat-induced cracking does not occur.

Concretum® Q-FLASH 2/20 fulfills all the requirements regarding flexibility, strength, and durability, independent of the given limitations and conditions.

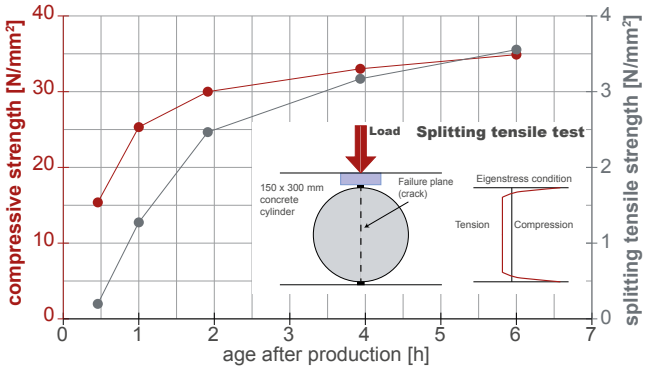


Figure: Strength development (compression & splitting tensile strength)

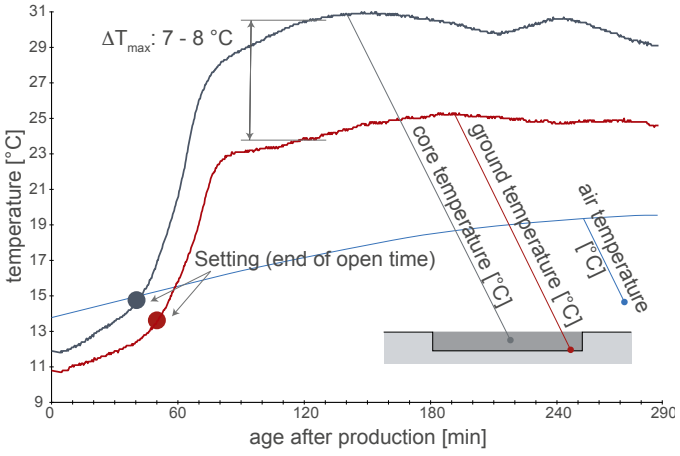


Figure: Temperature measurement during the hardening process of Q-FLASH 2/20

Step-by-step construction illustrations

- breaking out existing slabs
- removing old concrete

- drilling dowelbars
- preparing site

- concrete production with the volumetric mobile concrete mixing truck
- reloading the volumetric concrete mixing truck
- placing and compacting concrete with pokers

- finishing surface with roller screed
- broom finish

- applying curing compound

- cleaning site and hand over to air traffic control

https://www.youtube.com/concretumAG

concretum
the fastest concrete

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As of December 2019