

# Sub-Zero SOLUTION

Coating an external floor or deck can be demanding, but when it has to withstand snow, ice, sub-zero temperatures and both abrasion and impact damage from incoming helicopters, a very special solution is sought.

By Graham James OBE,  
Director of Flexcrete Technologies Limited



**T**his was the case for a challenging project at Locarno Airport in Switzerland for Rega, the Swiss Air-Rescue Service which comes to the medical aid of people in distress. This privately run, patron funded organisation conducted almost 14,000 rescue missions in 2012, primarily dealing with winter sport, road, occupational and Alpine accidents, and has 12 helicopter bases and one partner base throughout Switzerland.

Rega's objective is to be able to reach almost any location in Switzerland within 15 minutes' flying time, and one such base is at Locarno Airport in the canton of Ticino, occupying a highly challenging operational area. The majority of the rescue operations carried out by Rega's Ticino base involve ski accidents, as well as rescue hoist operations in the mountains and from lakes and rivers, for example avalanche rescues or evacuations from cable cars. Other missions include search flights for missing people or interhospital transfer flights for the transportation of organs, blood and medical supplies. The Ticino crew fly over 500 missions a year, with cross-border missions into neighbouring Italy common.

The Ticino base was renovated between 2011-2013 and the works comprised construction of a new building and helipad for the take-off and landing of Rega's rescue helicopters. Due to the location of the helicopter base at the foot of the Swiss Alps, the climatic conditions are extremely aggressive, particularly in winter when the helicopters have to land with snow skids due to the snow and icy conditions.

#### DEMANDING PROJECT

A hard-wearing, waterproof flooring system was required for the protection of the 450m<sup>2</sup> helipad and due to the harsh weather, the chosen system needed to be able to withstand freeze/thaw attack without deterioration. Following consideration of a range of finishes, a cementitious flooring system was specified. The chosen solution was devised by UK cementitious coating manufacturer Flexcrete Technologies Limited and local contractors Swissnanotech Sa and Steri-X Service Sa.

This was an extremely demanding and time sensitive project as the work was carried out in the harsh winter months when temperatures typically plummet to sub-zero and Locarno is often covered in a blanket of snow and ice. The work also

had to be completed as quickly as possible to enable Rega to resume their normal duties from the helicopter base. Time was of the essence as Rega is on stand-by 24 hours a day, 365 days a year, ready to respond to emergency calls - both in Switzerland and further afield.

#### TEMPORARY STRUCTURE

To enable application of the flooring system and to allow adequate curing, a temporary structure was erected around the helipad and heaters were used to ensure a temperature above 8°C was maintained. The concrete was freshly cast and the helipad needed to incorporate a 1cm per metre slope to facilitate the flow of stormwater. The application had to be completed within very tight tolerances to

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The helipad was ready to resume operations within just 15 days

ensure the fall was perfectly even to eliminate any potential for ponding to occur. The helipad incorporates an automated heating system which melts snow and ice to ensure safe take-off and landing. As the Rega helicopter base is located at Locarno Airport, Health and Safety was a crucial consideration and it was important that any products used would not release hazardous solvents or heavy odour during application.

The installation of the helipad lighting was a critical stage of the contract as the lights had to be set to a perfect level using Flexcrete's Fastfill rapid setting repair mortar before the application of Cemprotec E-Floor. Fastfill is a single component, rapid setting, Portland cement-based structural mortar for the durable repair of concrete which cannot be taken out of service for long periods, or in areas subjected to heavy wear such as roads, runways, bridges, decks, floors and footpaths. It can be used as supplied up to 100mm deep or bulked out to a depth of 300mm with sharp sand or aggregate.

In terms of surface preparation for the helipad, all excess cement, surface laitance and loose material were removed, before ultra high pressure water blasting techniques were used to remove dust and saturate the surface. Cemprotec EF Primer was then applied to seal and stabilise the substrate. A single component product, Cemprotec EF Primer enhances the adhesion of Flexcrete's Cemprotec cementitious coatings and prevents rapid drying and out-gassing at the concrete interface on porous substrates.

Following priming, the whole surface was levelled with Cemprotec Levelling Coat - a two component epoxy and polymer modified cementitious screed which is used in conjunction with Cemprotec E-Floor. It is specially formulated to rapidly harden to form a durable surface which can be overcoated within 24 hours.

The whole surface was finished with a 2mm application of Cemprotec E-Floor. Cemprotec E-Floor is a self-smoothing, water-based cementitious system which cures to form a

dense, hard-wearing, waterproof surface with exceptional resistance to abrasion, impact, chloride ions and aggressive chemicals such as aviation fuels and de-icing fluids. Crucial for this project, it is able to resist freeze/thaw attack and develops high early strength, enabling rapid reinstatement of traffic.

#### EXCELLENT ADHESION

As Cemprotec E-Floor is pre-packaged, it only requires mixing on-site and due to its waterborne composition, it is a low hazard product releasing no harmful solvents or odour. Cemprotec E-Floor can be applied without risk of osmotic blistering to green concrete, wet substrates and floors with no effective waterproofing membrane. During this project, the E-Floor system demonstrated excellent adhesion to the underlying concrete. Cemprotec E-Floor incorporates the benefits of copolymer and epoxy resin technologies, and this chemical combination results in a durable coating with excellent protection and low permeability to water even at 10 bar positive pressure. Designed for concrete floors and decks subject to trafficking in the most demanding internal and external environments, when mixed it exhibits a high degree of flow to enable ease of application by pouring or pumping techniques. It remains stable on exposure to UV light without risk of yellowing or chalking.

As the helicopters use snow skids at certain times, it was important that the area between the guide for the sliding hangar door and the rainwater gully was completely flat. This void was filled with Fastfill repair mortar, bulked out with aggregate to a semi-pourable finish, before completing with Cemprotec E-Floor to produce a perfectly even finish, free of any protruding edges to avoid the possibility of the snow skids catching and ensuring the safe entrance and exit of the helicopters into the hangar. As Fastfill is a non-shrinking, rapid hardening, polymer modified mortar with excellent bond and a high strength finish, it ensured long-term integrity of the reinstatement at this critical point.

Flexcrete Technologies Limited, Swissnanotech Sa and Steri-X Service Sa complied with extremely exacting standards for this demanding project and ensured the ideal tolerances were achieved on the deck. Line marking was completed directly over the E-Floor system and the helipad was finished and ready to resume normal operation within just 15 days of the project being started. The Cemprotec E-Floor system will provide Rega with an exceptionally durable, protective surface on the helipad for many years to come. ■