SEALANTS BEAT THE BIG CHILL

Repairing expansion joints in the screeds of a frozen foods warehouse took special hi-tech products, a few precautions and an ingenious stratagem.

by Natasha Calandrino

Even a polar bear might feel the cold in the arctic temperatures of one of Italy's largest frozen foods warehouses, the Frigoriferi del Nord in Trezzano sul Naviglio, near Milan. Major food companies store their frozen food items here before distribution to individual retail outlets. The temperature is kept at a constant –30°C (-30°F), so cold that no bacteria can survive (Photo 1).
The employees who load and unload the merchandise can only work an hour at a time with half hour breaks in between to prevent the risk of serious damage to their health.

Under such extreme conditions materials themselves undergo molecular transformations, in that they become rigid and fragile. At the Frigoriferi del Nord fragility was exactly the problem that had to be solved. The heavy loads of merchandise transported on forklifts in the intense cold formed cracks along the expansion joints in the concrete floor (Photo 2). Making the repairs required a product that could bond strongly to the concrete, yet withstand the heavy warehouse traffic over time despite the extremely low temperatures. For this reason epoxy resin products were used that retain their physical and mechanical performance characteristics, permanently sealing the cracks in the joints.

PHOTO 1

First the degraded concrete was removed and the substrate scrubbed. It was then necessary to cover any traces of dust, consolidate the substrate and create the temperature conditions that would allow the epoxy resin to cross-link. Since the whole site could not be heated, a small tunnel-like structure was built to be placed over each section of the joint as it was being repaired. This was electrically heated to a temperature of +30/35°C (Photos 3 and 4). To consolidate the substrate and coat the dust particles, a bonding primer was needed that could penetrate deeply when brushed onto the substrate: EPOJET was used, an epoxy adhesive for new over old concrete that provides monolithic sealing of cracks in screeds and polymerizes without shrinkage. EPOJET has excellent dielectric properties and high mechanical strength

PHOTO 2

PHOTO 3

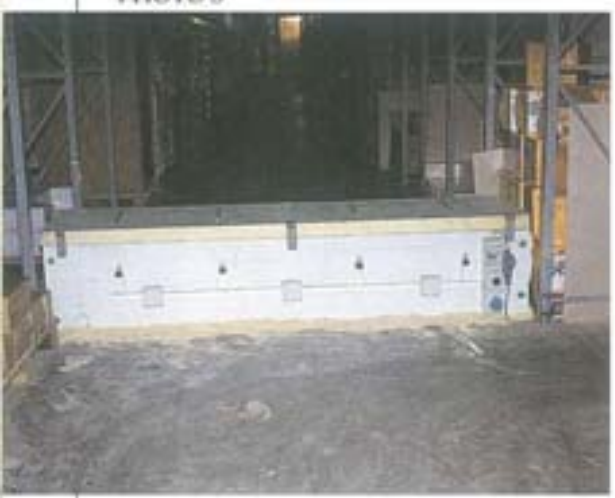

PHOTO 4

(Photo 5). Immediately afterwards the joint was reconstructed with KERAPOXY SP, a three-part epoxy sealant, completely filling the joint that measured 15 cm (6") wide and 5 cm (2") deep (Photo 6).

Once the heated tunnel was removed, however, the joints would be exposed to a thermal shock of over 60°C (120°F), from +30/35°C to –30°C (from +92°F to –30°F) which could cause small shrinkage cracks in the seal. An ingenious stratagem was employed to compensate for any shrinkage of the material. Several cuts 2 or 3 cm deep were made into the surface with a razor blade in various spots along the length of the joints. Only 24 hours later tons of frozen food were once again rolling over them (Photo 7). ❑

PHOTO 5

PHOTO 6

PHOTO 7

The Technical Data Sheets for the products mentioned in this article are contained in Mapei Binder No. 3, "Building Specialty Product Line".

TECHNICAL DATA

Project: Frigoriferi Del Nord
Trezzano Sul Naviglio, (Milan) Italy

Repaired: 1997

Contractor: ICBM di Bertazzi, Assago, (MI) Italy

Architect and Project Coordinator: Ing. Giuseppe Biondi, Milan, Italy

Coordination: Mapei Technical Service

Repair products:*
EPOJET
KERAPOXY SP

*These materials are part of Mapei's European product lines