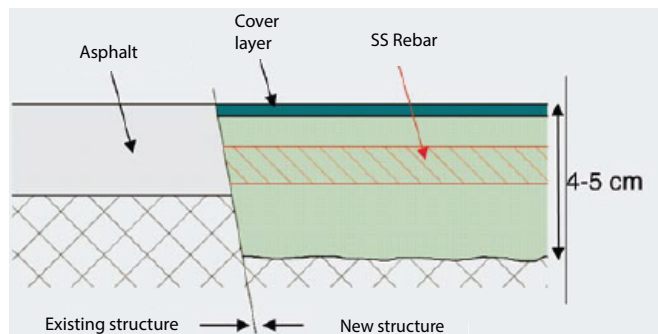
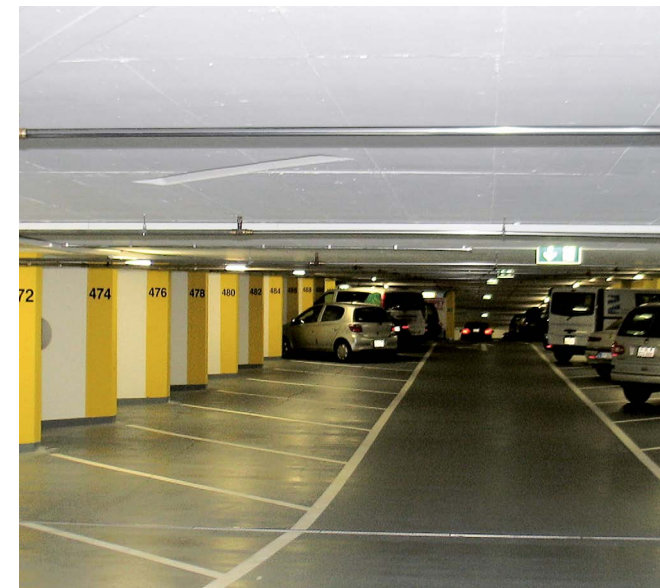


Refurbishment of a multi-storey car park

Bern, Switzerland

The Swiss capital Bern can have cold winters with heavy snowfall, which makes the use of de-icing salts indispensable. In the case of the Town House Car Park, erected in 1966, arriving cars carried chloride-containing water and melting snow into the garage, where the salt accumulated. The result was the penetration of chloride into the concrete. An initial refurbishment aimed at stopping any further exposure to salt. To this end, a protective asphalt layer was applied, however, without prior chloride removal. As the layer was not 100% tight, it was progressively undermined by further ingress of salt-containing water. The resulting massive corrosion of the reinforcement jeopardized the load bearing capacity of the

floor ceiling and led to the delamination of the asphalt. In 2006, a second re-furbishment had to be carried out. It encompassed the removal of the asphalt and the chloride-contaminated upper concrete layer, a replacement of the reinforcement followed by the pouring of fresh concrete. In addition, new shear walls were built to improve the load bearing capacity of the floor ceiling. The obvious solution - a thicker layer with increased concrete covering of the steel reinforcement - was not an option because any loss of overall height would have been unacceptable. The structural engineers specified type EN 1.4003 ferritic stainless steel for the reinforcement and an additional surface coating. The added fresh concrete layer could be kept to a minimum and did not add to the overall height of the slab. Despite a concrete cover of only 15 mm, the combination of stainless steel reinforcement and the surface coating of the parking decks provided a reliable solution for the next 50 years.



Left: Cross-section of slab before and after; Right: Delamination of the asphalt

Details

Environment:	Chloride-exposed covered environment
Structural engineers:	Diggelmann + Partner AG, Bern
Owner/developer:	City of Bern
Fabricator:	Marti Bau, Bern
Stainless steel grade:	EN 1.4003
Product type:	Top12-500 reinforcement bar (EN 1.4003)
Dimension:	12 mm
Producer or supplier:	Swiss Steel AG
More information:	swiss-steel.com