



Repair & Strengthening



Reference Details

Owner Bismarck Parking Authority, Bismarck, USA +++ **General Contractor** Rocky Gordon & Co., Bismarck, USA +++ **Subcontractor** Capital City Const., Bismarck, USA +++ **Technical Consultant** CW Structural Engineers, Bismarck, USA +++ **Engineer** Walker Parking Consultants, Elgin, USA +++ **Consulting Engineers** Darg, Palanisami & Associates, Minneapolis, USA +++ **Architect** Trossen Wright & Associates, Saint Paul, USA

DSI Unit DSI USA, BU Monostrand, Bolingbrook, USA
DSI Scope Repair of damaged post-tensioned tendons and installation of column moment straps



DYWIDAG Monostrand Repair Methods Save Parking Structure

Structural Repair of the Galleria Parking Structure in Bismarck, North Dakota, USA

The Galleria Parking Structure is attached to the Radisson Hotel in downtown Bismarck, North Dakota. The structure was built in 1982 and is owned and operated by the Bismarck Parking Authority (BPA). The parking structure features a terrace level with an outdoor patio area that is not accessible to vehicles for parking.

Concrete planters located on the roof terrace level had been leaking for years. Furthermore, plants had to be replaced on a regular basis because the high degree of lime in the concrete tended to damage the plants. The BPA employed a contractor to remove the planters and install a new watertight roofing system. Concrete topping below the planters was to be removed as part of the work and the contractor decided to saw cut this topping into several pieces to speed its removal. Because the topping varied in thickness to allow drainage and the contractor was not aware of the variation in thickness, several post-tensioned tendons were cut by mistake.

The structural integrity of the parking structure was severely compromised, and the structure had to be immediately stabilized with a shoring system in order to avoid possible collapse. Two of the parking levels were completely shut down, and parking at ground level was limited.

Bismarck Parking Authority commissioned the experts at DSI USA to perform comprehensive repairs of the damaged post-tensioned tendons. The severed sections of post-tensioned strands were removed and replaced with new strand. DSI USA used coupler splices and special center stressing anchorages to attach the new strand to the existing strand. Subsequently, DSI USA carried out the necessary re-tensioning of the tendons and sealed the exposed strand at the splice locations.

One of the supporting columns required special attention during the repair. Most of the top reinforcing bars were cut at this column, causing an increased concern of puncture shear failure at this location. For this special problem, the engineering company Walker Parking Consultants designed special negative moment straps that were installed by DSI USA. The straps were laid on a bed of epoxy and fastened by DSI USA using anchor bolts per Walker Parking Consultants instructions.

Thanks to the competent help of DSI USA, the repairs were successfully brought to a close in January 2008.



For more information please call: + 49.89.309050.200 or fax: + 49.89.309050.252 or e-mail: [DSI Munich](#)