Case stories

Rio Verde viaduct - Third tallest pillars in Europe

Repairs to the Rio Verde viaduct were performed from a special, purpose built cradle and working platform that wrapped round all four sides of the piers and supported by wire ropes connected to winches at ground level.

The hydrodemolition technique, which uses high-pressure water jets to remove damaged concrete, has played a vital role in the repairs and strengthening of the Italian multi-span Rio Verde Viaduct. The viaduct is one of the tallest in Europe and carries the busy dual two lane A15/E33 Autostrada della Cisa over a steep sided valley in the municipality of Pontremoli. Conjet hydrodemolition equipment was used to remove damaged concrete from the faces of the viaduct's rectangular concrete pillars, which rise up to 136m from the valley bottom to the steel deck, followed by replacement with a new and thicker concrete skin.

CONJET AB
P.O. Box 507
SE-136 25 HANINGE
SWEDEN
PHONE:
+46 (0)8 55 65 22 40
FAX:
+46 (0)8 55 65 22 60
E-MAIL:
conjet@conjet.com
WEBSITE:
www.conjet.com

The Rio Verde viaduct - a giant structure in need of maintenance

The 960m long twin steel deck viaduct, which is supported on eight reinforced concrete hollow pillars is a major structure in the link between Parma and La Spezia on Italy's Mediterranean coast, 100km south of Genova. The spectacular viaduct was opened in 1975, but inspection by maintenance engineers showed the bridge pillars were suffering from extensive calcium chloride decay, forcing the Italian Highways Authority and the Highway Engineering Department of Cisa Ltd to carryout extensive repairs and strengthening.

SEI-Idrojet use a purpose-built platform to access the pillars

The specialist hydrodemolition contractor SEI-Idrojet, working for the main viaduct repair contractor A.B.C.Construczioni S.P.A, carried out the concrete removal on one pillar at a time. The repairs were performed from a special, purpose built cradle and working platform that wrapped round all four sides of the pillars. The pillars are 21m long and 8.5m wide at the base and tapering to 2.5 wide at the apex.

The ends of the platform were adjustable to compensate for the changing width of the pillars. The whole platform was supported and raised and lowered on wire ropes, which went up to pulleys on a steel support cradle at the top of the pillar and back down to four synchronised winches anchored at ground level.

Conjet's role in the project

Conjet modified a standard robot feedbeam to fit onto and run along a rack on the inner sides of the platform in the fixed space between the pier and the platform. A Conjet Computer Control Unit, also mounted on the platform, was used to control the feedbeam and integral nozzle.

A Conjet 345-400kW Powerpack at ground level provided the high-pressure water at 1000bar and flow of 200l/min to the feedbeam's nozzle. The feedbeam and nozzle, travelling back and forth along the platform's rack, selectively removed damaged concrete to a depth of 70mm and below any exposed reinforcing. The process continued on one face of a pillar as the platform was slowly raised to the top. On completion of removal of the concrete from one face, the platform was lowered and the Conjet feedbeam moved to another side of the platform for the process to be repeated on all four faces.

The Rio Verde viaduct is one of the tallest in Europe supported on piers up to 136m high and carries the dual two lane A15/E33 Autostrada della Cisa over a steep sided valley in the municipality of Pontremoli.

The hydrodemolition system was devised and controlled by SEI-Idrojet operations manager Enrico Mariotti.

Taking in an additional team to fixate new reinforcement

On completion of concrete removal another team followed on fixing additional reinforcement in stages to all sides of the tapering pier. Shuttering panels 1.8m high were then fixed round all faces to support a new 220mm thick skin of self compacting concrete pumped into the formwork from ground level. After the concrete had set the formwork was removed and repositioned for the next 1.8m lift for the process to be repeated to the apex of the pillar.

Enrico Mariotti, SEI-Idrojet operations manager

On completion of repairing and strengthening a pillar with an additional layer of concrete, the working platform was dismantled and re-erected on the next and then subsequent piers for the hydrodemolition and concrete repair process to be repeated.

The Conjet modified feedbeam and nozzle, travelling back and forth along the platform's rack, selectively removed damaged concrete to a depth of 70mm and below any exposed reinforcement.

A Conjet Robot 365 at work on the bottom of a high-rise pillar.

Exposed reinforcement, ready for the application of a new layer of concrete

Distributor/Agent

Applied Waterjet Technology

Conjet

CONJET AB

P.O. Box 507
SE-136 25 HANINGE
SWEDEN

PHONE:
+46 (0)8 55 65 22 40

FAX:
+46 (0)8 55 65 22 60

E-MAIL:
conjet@conjet.com

WEBSITE:
www.conjet.com

CE, EMC certified

Pictures are illustrative only and do not necessarily show the configuration of the products on the market at the given point in time.
These products must be used in conformity with safe practice and applicable statues, regulations, codes and ordinances.
Subject to change without prior notice.

3312 8010 54 2013