# Seismic Upgrade of a Football and Soccer Stadium

## Rose Bowl Stadium, Pasadena, California, USA

**Reference Details:**

**Owner** City of Pasadena, California, USA +++ **Client** Rose Bowl Operating Company (RBOC), Pasadena, California, USA +++ +++ **Architect** Rosebowl Resident Architect, Pasadena, California, USA +++ **Execution** John Armstrong Construction Co., Covina, California, USA +++ **Consulting Engineers** Brandow & Johnston, Assoc., Los Angeles, California, USA

**DSI Unit** DSI USA, Tucker, Georgia, USA **DSI Services** Supply and installation of DYWIDAG Multistrand Tendons with galvanized strands; Technical support

The Rose Bowl Stadium is nestled in the foothills of the San Gabriel Mountains north of Los Angeles. The Rose Bowl was originally designed in 1922 as a horseshoe stadium with the north, east and west sides built into an earthen berm.

The first addition to the stadium was completed shortly thereafter in 1933 where the south end was closed, completing the elliptical stadium with poured in place concrete columns and bracing to support the concrete seating deck above. In 1948 an independent cantilevered structure was added, offering an additional eleven rows of seating to the top of the stadium, supported by a series of 1.00 m columns, with a 15 cm wide expansion joint between the two concrete structures.

California is located at the boundary between two huge tectonic plates, the so-called San Andreas fault. As the two plates slide past each other, earthquakes occur. For this reason, seismically retrofitting of the Rose Bowl Stadium was indispensable. As earthquake codes were developed and modified over the years, the Rose Bowl had already undergone a series of seismic strengthening programs in the past. In 1982 the south end was strengthened with concrete shear walls.

During the summer of 2005, the cantilevered structure built in 1948 was reinforced. Engineers at Brandow and Johnston Associates proposed a post-tensioned cabling system using DYWIDAG Multistrand Tendons to hold the 1948 addition to the 1933 concrete structure on the south side. DSI USA performed this latest strengthening.

DSI was contracted to:

1. Design special anchorages for DYWIDAG Multistrand Tendons and prepare the installation shop drawings.
2. Prepare and evaluate alternative reinforcement measures.
3. Supply and install DYWIDAG Multistrand Tendons with galvanized 0.5" strands.

DSI executed and completed the project in 3 months, a full month ahead of schedule, to the complete satisfaction of the client. Immediately after completion of the reinforcement work, sporting and other events took place in the Rose Bowl Stadium according to schedule.



© 2007 DYWIDAG-Systems International

for more information please call: + 49 89 - 30 90 50 - 200 or fax: + 49 89 - 30 90 50 - 252 or e-mail: info@dywidag-systems.com