



Bolting Technology Helps Construct NYC Transportation Hub

When the world experiences the new artistic World Trade Center Transportation Hub Oculus Pavilion – designed by Spanish architect Santiago Calatravs – for the very first time on Thursday, they’ll see grand fingers extending to the sky from the structure, which represents Calatravs’ vision of a dove being released into the air by a child’s hands. Each day a quarter of a million people will make their way through the connection to 11 subway lines and the underground PATH rail lines that connect New York and New Jersey.

However, few visitors will realize that HYTORC, the world’s oldest and largest manufacturer of industrial bolting systems, played a very unique role in its construction. The project required HYTORC’s supremely accurate bolting engineering technology and tools to assemble the steel rib structure of the neo-modern functional piece of artwork. Above ground the fingers form the Oculus and extend vertically to connect to two 350-foot arches. The fingers then extend outward over the street-level plaza.

Two HYTORC tools were used on this project:

- The STEALTH – used for assembly of the oculus – is used for applications that involve limited clearance and / or non-standard or extra length studs. Powered by a hydraulic pump, these bolting systems offer unprecedented repeatability and reliability. They are available in six sizes ranging from a minimum of 278 foot-pounds to a maximum of 34,700 foot-pounds of torque.
- The jGuns – used for the cranes – are the world’s best selling pneumatic torque guns. The dual speed guns provide a high speed rundown and a powerful and accurate final torque – a rare combination for a single bolting system. These tools can be used with custom fixtures that can make any bolting job safer, faster and more accurate.

The challenge in this project was maintaining the artist's vision of the seamless lines of the fingers. The design required the bolted joints to be internal, with almost zero access for the tools and fasteners. In addition, the extreme angles caused by the design meant that any mistake in reacting the tool could have caused it to become irreversibly wedged into the structure, an outcome that had to be prevented. Working with the bolting crew, HYTORC came up with a solution using two sizes of Stealth tools that not only achieved the desired torque, but allowed them to work blindly in the confines of the fingers.

HYTORC has a history of working on projects involving the World Trade Center site. Note its previous work on the [Freedom Tower](#).

If you are interested in writing a story about HYTORC's involvement in the Transportation Hub, please contact Mike Bieger at 845-294-3342, x311.