Polyurethane Sealants Provide Long-Term Resistance and Protection from Chicago’s Harsh Weather Climates

A major renovation project involving one of Chicago’s most widely known structures, the Amoco Building, utilized high-performance elastomeric polyurethane sealants during recent construction to replace the outside panels of the building. The Amoco Building, an 80-story, 2.3 million square foot structure formerly known as the Standard Oil Building, is the second tallest building in Chicago.

Since its original completion, the Amoco Building has changed names and changed faces over the years. Originally the building was clad in white Italian Carrara marble; however, the thin slabs of marble were unable to withstand Chicago’s harsh climate, and they began to warp and fall off as soon as the building was completed. In
a two-year project ending in 1992, the building was completely refaced with white granite from Chem-Rex/Sonneborn, Shakopee, Minn., was completed in 1997.

The polyurethane sealants used in the Amoco Building contain Mondur® polyisocyanates from Bayer Corporation, Pittsburgh. This most recent renovation work, which included the application of sealants, was completed by Chem-Rex/Sonneborn, Shakopee, Minn. According to Dennis Kelley, technical representative at Chem-Rex, color matching and excellent adhesion were the main reasons for choosing the polyurethane system.

“The concrete joints in large high-rises like the Amoco Building require sealants to provide protection from the adverse effects of the environment,” Kelley said. “As is typical in all struc-
tures, when the Amoco Building heats up in the summer, the substrates expand, and, when the building cools down in the winter, the substrates contract. These environmental effects can cause the joints to move anywhere from 25 percent to 50 percent.”

According to Kelley installation entailed cutting out the older sealant, grinding the sides of the joints, then reinstalling the new two-component elastomeric polyurethane sealant. “The polyurethane sealants provide elasticity between the joints, allowing expansion and contraction movement caused by various environmental factors,” Kelley said.

Two-component elastomeric polyurethane sealants, which provide “weatherproofing” features (keeping rain, snow, wind, etc. from going between the structure’s panels), are ideal for these applications because they bond to
a variety of building substrates, including metal, brick, concrete, glass and aluminum.

For these reasons, the Amoco Building renovation project called for an NP 2 multiple component high-performance polyurethane sealant, which is a two-component gun-grade sealant that produces a flexible, long-lasting seal. NP 2 bonds to most common construction materials without a primer and has been successfully tested for a joint movement of plus or minus 50 percent, according to ASTM C719.

“Due to the performance requirements and the color compatibility to the surrounding metal and facade work, it was more beneficial to use a polyurethane sealant as opposed to a silicon sealant,” Kelley said. “In addition, several staining tests were conducted on the struc-
tecture, proving that the NP 2 system would not stain on the building substrates.”

Completed in 1973, the Amoco Building was designed by famed architect Edward Durrell Stone and the firm of Perkins & Will. At the time of its original construction and for a short time after, it was the largest marble-clad building in the world.

About the Author
Bayer Corporation, Pittsburgh, is a research-based company with major businesses in health care and life sciences, chemicals and imaging technologies. The company is investing $9 billion in capital expenditures and research and development from 1995 through 2000. 1998 capital investment in research and development expenditures is projected to total $1.7 billion. Bayer Corporation is a member of the worldwide Bayer Group, a $32 billion chemical and pharmaceutical company based in Leverkusen, Germany.