

The Energy Innovation Center

By Ted Sofis

For many years, the Connelley Vocational School stood at the top of Bedford Avenue on “The Hill,” as it is locally known, overlooking downtown Pittsburgh, PA. The vocational school was where the City of Pittsburgh Public School students learned auto repair, welding, carpentry, and other trade skills. Over the past few years, this massive complex with its classrooms and workshops has undergone a complete transformation to serve a new role as the Energy Innovation Center. The project involved the renovation and reconfiguring of the structure and the adjacent workshop areas to adapt it to meet the needs of a modern twenty-first-century building (refer to Fig. 1). The purpose of the renovation was to provide firms with both office and developmental facilities and to serve as an incubator for energy-based startup companies.

The general contractor, Mascaro Construction, faced a long list of challenges over the course of the renovation work, one of which involved the wall overlooking the Allegheny River, the Strip District, and Lawrenceville below. The old school building was built on the top of the hill, with the back of the building

facing a cliff. Behind the old building was a deteriorated wall at the rear base of the structure, with a steep slope below and then another wall with a 100 ft (30 m) straight drop down to the busy highway, Bigelow Boulevard. Access was restricted and the original wall had been cast-in-place before the building was built. The engineers wanted the wall replaced, but due to access problems, such a solution would be prohibitively expensive. Michael Renna, the Project Manager for Mascaro Construction, stated that the original wall was part of the foundation and its removal and replacement was not a viable option. So they looked at other possibilities and after some consideration, decided to install pin piles and rehabilitate the wall with shotcrete.

Sofis Company was asked to look at the project and price a shotcrete repair. Again, the access presented problems. The slope was too steep for conventional scaffolding and there was no access around the building for equipment, so it would not be possible to use access equipment such as man-lifts. With nothing above to attach cables to, the best option was to use outriggers to hang our swing stages from. The outriggers with counter weights were carried down the building’s stairwells to a back door in the rear of the old school. After the outriggers were put in place with the appropriate counterweights, the swing stages were hung in place (refer to Fig. 2 through 5).

The next step involved chipping out the deteriorated concrete, preparing the substrate, and installing anchors and mesh. By using dry-process shotcrete for the repair, we were able to efficiently transport material around to the back of the building. A prepackaged shotcrete repair mortar, Shotcrete MS, manufactured by Quikrete, was used on the project. With the logistical issues out of the way, the shotcrete placement work proceeded and the wall repairs were completed.

The shotcrete repairs to the wall will give the old wall an extended functional life. The renovation of an old school building and its transformation into the Energy Innovation Center will provide efficient and affordable space for new start-up businesses in the coming years. In addition to the obvious advantage of being able to



Fig. 1: The building complex has undergone extensive renovations to transform it into the Energy Innovation Center and will serve as an incubator for energy-based startups

Shotcrete Corner

place shotcrete on vertical walls without forming, the flexibility to efficiently transport material to access hard-to-reach areas was of tremendous value. This enabled access to congested and



Fig. 2: Due to restricted access and nothing above to suspend cables from, outriggers were used to hang swing stages for the shotcrete rehabilitation work



Fig. 3: Shotcrete is placed with Pittsburgh landmarks the Gulf Tower and Koppers Building in the background



Fig. 4: Nozzleman on suspended swing stage, turning to his side, to get enough distance from the wall to get a good spray pattern

restricted areas that are so common in the rehabilitation of old structures.



Fig 5: Nozzleman and cutdown man working together to complete upper areas of the eastern wall

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Ted Sofis and his brother, William J. Sofis Jr., are the Principal Owners of Sofis Company, Inc. After graduating from Muskingum College, New Concord, OH, with his BA in 1975, Ted began working full time as a shotcrete nozzleman and operator servicing the steel industry. He began managing Sofis Company, Inc., in 1984 and has over 40 years of experience in the shotcrete industry. He is Chair of the ASA Publications Committee, a member of multiple other ASA committees, and an ACI Examiner. Over the years, Sofis Company, Inc., has been involved in bridge, dam, and slope projects using shotcrete and refractory installations in power plants and steel mills. Sofis Company, Inc., is a member of the Pittsburgh Section of the American Society of Highway Engineers (ASHE) and ASA.