PROJECT PROFILE

David L. Lawrence Convention Center

Collapse Investigation | Pittsburgh, PA

CLIENT

Sports and Exhibition Authority of Pittsburgh and Allegheny County

BACKGROUND

Constructed in three phases between 2000 and 2003, the 1.5 million-square-foot Convention Center in downtown Pittsburgh features five exhibit halls, two lecture halls, fifty-one meeting rooms, a grand ballroom, and thirty-seven loading docks. The floor of the loading dock where the collapse occurred was constructed using precast concrete members supported by steel beams connected to a support member with bolted web clip angles.

On February 5, 2007, a 30- by 59-foot portion of the second-floor loading dock collapsed at the David L. Lawrence Convention Center. While no one was injured as a result of the collapse, a manlift parked on the loading dock fell through the hole onto the street below, and a tractor-trailer truck sank into the hole and became wedged between the remaining concrete slabs on the loading dock. The SEA needed engineers to investigate the cause of the collapse and determine whether the rest of the building was at risk of a similar failure.

SOLUTION

After completing a detailed inspection of the failed members, WJE engineers reviewed the design drawings for the building and compared them to the as-built construction. Using finite element modeling techniques, they investigated the as-built design and included the effects of temperature and the weight of the truck in their analyses. With the information gathered from this investigation, the engineers studied the effects of temperature on the performance of the web clip angles.

After determining the cause of the loading dock failure, WJE assessed the conditions of structural systems throughout the rest of the building and recommended retrofitting all beam end connections like the one that failed in order to prevent future collapses. To further assist the SEA, WJE reviewed the engineer of record's designs for reconstruction of the collapsed area and provided quality assurance services during the reconstruction and the installation of the retrofit. Finally, WJE provided litigation consulting to SEA.

WJE ENGINEERS ARCHITECTS MATERIALS SCIENTISTS