

ICRI 2009 PROJECT AWARD WINNERS

PROJECT OF THE YEAR: Low-Rise Category

PENTAGON RENOVATIONS— EXTERIOR WALL REPAIR AND INTERIOR STRUCTURAL REPAIR

Arlington, Virginia

Submitted by Concrete Protection & Restoration, Inc.

Owner

Pentagon Renovation
and Construction
Arlington, Virginia

Project Engineer/ Designer

Tadger-Cohen-Edelson
Associates, Inc.
Silver Spring, Maryland

Repair Contractor

Concrete Protection &
Restoration, Inc.
Baltimore, Maryland

Material Suppliers/ Manufacturers

CTS Cement
Manufacturing Corp.
Cypress, California

Cortec Corporation
St. Paul, Minnesota



The Pentagon, designated a National Historic Landmark in 1992, has never undergone a major renovation and, after more than 60 years, renovation is essential in order to meet current health, fire, and life safety codes and provide reliable structural, electrical, and mechanical systems. Absent a major renovation, the building's infrastructure will become increasingly unreliable and soon unable to effectively support the headquarters and nerve center of this national military establishment. Major building systems have deteriorated to such an extent that repairs are no longer effective and entire systems need replacement.

The construction of the Pentagon began on September 11, 1941, and over 4 million square feet (371,612 square meters) of floor space was completed in 16 months. The Pentagon is considered the world's largest low-rise office building. It is a five-story concrete structure with five distinct rings. Above the third floor, each ring is separated by an exterior space known as a lightwell. The speed of construction and a different standard of quality control left many areas of the lightwell walls with inadequate concrete cover over the reinforcing steel, sometimes less than 1/2 in. (12.7 mm). This lack of cover, combined with carbonation of the concrete, lead to corrosion of the reinforcing steel. As the steel corrodes, it expands up to ten times its original size, causing spalling of the concrete. It is estimated that there are 250,000 square feet (23,225.7 square meters) of spalled concrete in the lightwell walls.