



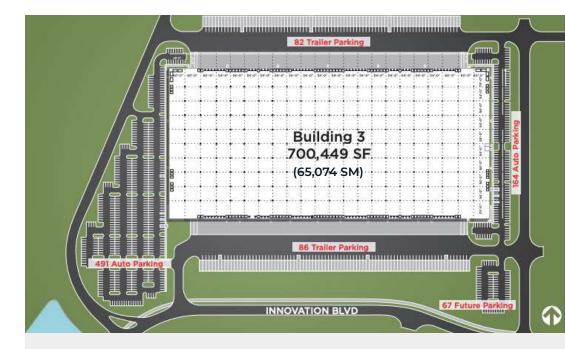
Meeting the Rigorous Concrete Requirements for Sunbeam's New Distribution Center

Introduction

Sunbeam Development Corporation began investing in Indianapolis in 1967 and has since expanded its portfolio to include several multi-million dollar developments including the I-70 West Commerce Park—the location of the new distribution center, Sunbeam Building 3.

Already home to four major distribution centers, I-70 West Commerce Park is strategically located at the Crossroads of America on Interstate 70—just nine miles (14.5 kilometres) from the Indianapolis International Airport and the second largest FedEx Hub in the United States.

Indianapolis is the most centrally located city in the United States—80% of the U.S. and Canada can be reached within one day's drive. As such, it is North America's premier location for logistics and distribution centers.



The Stats

- Building Size: 700,449 square foot (65,074 square metres)
- Footings: 2,300 cubic yards (1,759 cubic metres)
- **Slabs:** 15,295 cubic yards (11,694 cubic metres), 7" (18 cm) unreinforced floors, 4,000 psi (2.8 MPa) concrete slab made with CarbonCure
- Pavement: 3,300 cubic yards (2,523 cubic metres)
- Walls: Precast insulated concrete
- Concrete supplier: Irving Materials, Inc. (imi)
- Construction Manager: Shiel Sexton

Sunbeam Building 3 (Source: <u>Cushman Wakefield</u>)

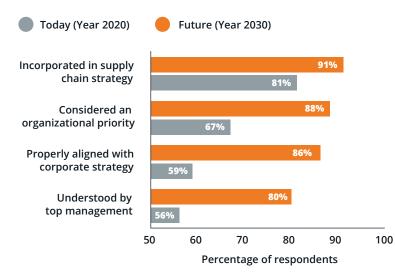
The Growing Importance of Distribution Centers

Distribution centers like Sunbeam's are in high demand due to the thriving eCommerce industry. Over the next ten years, warehousing and distribution are expected to play an even bigger role in supply chain strategy.

As consumer shopping behavior becomes increasingly digital, distribution centers and warehouses represent an exciting opportunity for the construction industry—and particularly for concrete producers. Such sites require a lot of concrete.

A changing perspective of Warehousing and Distribution

WAREHOUSING AND DISTRIBUTION IS...



Source: Supply Chain Quarterly

Sunbeam | Shiel Sexton | Irving Materials | CarbonCure



A Sustainable Approach to Sunbeam Building 3

Sunbeam's construction manager Shiel Sexton built many of Sunbeam's successful Indianapolis projects including Sunbeam Building 3. Both companies value green building practices.

In recent years, Shiel Sexton has successfully scaled its green building program to a wide variety of construction projects ranging from USD \$1 million small office remodel to a USD \$70 million high-tech research and development building.

"We were introduced to CarbonCure by our concrete supplier, Irving Materials Inc. (imi), who had used it on similar distribution center projects," said Kevin Hunt, President and COO at Shiel Sexton. "We were pleased to deliver solutions that met Sunbeam's sustainability commitment, and we trusted imi to provide concrete that exceeded the required quality standards."

CarbonCure can significantly reduce the environmental impact of a large distribution center like Sunbeam Building 3 while making no discernible difference to the quality or performance of the concrete itself.

"Sunbeam is committed to sustainability in our development and quality for our tenants," said Jamie Christman, Vice President at Sunbeam Development Corporation. "The sustainability and quality of our product aligns with our generational approach to development. CarbonCure allowed us to continue to deliver on both fronts."



- Waste CO₂ is collected from local industrial emitters by gas companies, purified, and delivered to concrete plants.
- 2. CarbonCure's technology injects CO₂ into the concrete during mixing, where it chemically converts to a mineral.
- 3. The mineral improves strength, enabling concrete producers to optimize mix designs while maintaining quality.
- Private and public projects built with CarbonCure concrete reduce embodied carbon, without compromises.

Distribution Center Concrete Requirements

The concrete criteria architects require for distribution centers are unique. Instead of prioritizing the usual strength and durability requirements, distribution center designers prioritize the floor slabs.

Abrasion and abrasion resistance are key criteria for distribution center concrete since the floor slabs are put through so much wear and tear with heavy machinery traffic.

Curling and shrinkage are also critical due to the sheer quantity of joints required in a large floor space. If the joints curl up, the machinery will hit them creating a maintenance nightmare not just related to the floor slab but also to the machinery. A large distribution center could face routine maintenance costs of up to USD \$100,000 per year as a result of poor flooring.

Finally, and most importantly, the floor slabs in distribution centers must also be incredibly flat and level to enable the efficient operation of the heavy machines that utilize it.

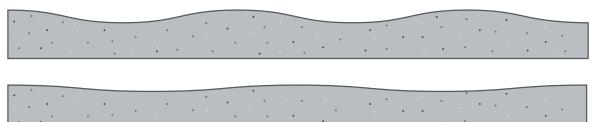
Concrete Flatness and Levelness

A concrete slab's flatness and levelness is expressed by the so-called F-numbers (Face floor profile numbers): FF and FL

Flatness (FF) is how close to geometric planarity a slab is. Levelness (FL) is the amount of slope (or pitch or tilt) in a slab. This is the degree to which the surface of the slab approaches true horizontal perfection.

Usually, FF tells you how well the finisher worked the surface and FL tells you how skillfully the contractor set the side forms and struck off the concrete.

Less Flat



More Flat

True Planatarity

imi Puts CarbonCure to the Test

While imi has been using CarbonCure in its mix designs for several years, the team recognized the unique requirements of Shiel Sexton and Sunbeam and performed comprehensive testing of the concrete for the project.

"We poured a 30 yard test slab and conducted abrasion, shrinkage, set time, bleed, compressive and flexural strength tests, comparing the CarbonCure mix to a control mix. The CarbonCure mix performed as well or better than the control on all properties" said Darrin Litteral, QC Manager at imi.

The team hired a third-party engineer, Christopher R. Tull, P.E. at CRT Concrete Consulting to validate the comprehensive testing performed on the concrete for Sunbeam Building 3. Christopher conducts tests at different warehouses across the Midwest to confirm whether the concrete mix is appropriate for different types of sites.

Following his analysis of imi's CarbonCure concrete for the Sunbeam site, Christopher Tull wrote, "After reviewing all of the information contained herein, CRT concludes that the CarbonCure mix is an appropriate mixture to be used in industrial floors."

The Sunbeam Building 3 project had requirements for 400 psi (2.8 MPa) in 28 days and 700 psi (4.8 MPa) flexural in 56 days. CarbonCure hit the 700 psi requirement in just 28 days so the team was very comfortable with it.

"We were not only getting great strength results, but we also improved performance on our shrinkage test," said Darrin Litteral, QC Manager at imi. "You can achieve great strength results all day, but if the shrinkage results are high, then that in itself is an issue" said Darrin. "Our shrinkage test with CarbonCure out-performs what is required for flooring specifications which is typically 0.04 per ASTM C-157."

The FF/FL numbers were also impressive on the Sunbeam project at FF 69 and FL 51. To compare, typically stores require FF 20 / FL 17; gymnasiums require FF 40 / FL 30, and TV studios require FF 100 / FL 50. The specification for the Sunbeam project was FF 50 / FL 35.

The finisher who worked on the floor slab wasn't aware of the addition of CarbonCure to the concrete mix for several pours.

"This finisher had worked on big slabs for 25 years and he said that this was the best concrete he'd worked with in years. The finishability, the nonstickiness, and the cream that came off the top was the best he'd seen," said Tim Brogan, Project Executive at Shiel Sexton.



Sustainability Results

The Sunbeam project saved 428,260 pounds (194,256 kilograms) of carbon dioxide from both the sequestration of recycled CO_2 into the concrete mix and the reduction of carbon-intensive cement in the concrete mix. This is equivalent to 254 acres (103 hectares) of forest absorbing CO_2 for one year.

As distribution center projects increase over the course of the next decade, imagine the difference CarbonCure concrete could make?





Build for the Future. Build with CarbonCure.

CarbonCure has been used on thousands of projects ranging from healthcare to higher education, home developments, and corporate campuses.

For more information about CarbonCure concrete, visit carboncure.com.

To build with CarbonCure concrete on your next project in Indiana, visit **irvmat.com** or **shielsexton.com** to learn more.