

AOI Global Headquarters

Sugar Land, TX



Team

Owner:

Applied Optoelectronics, Inc, Sugar Land, TX

Architect:

Yong Architects, Inc., Houston, TX

Structural Engineer:

CJG Engineers (Structural), Houston, TX

General Contractor:

Skanska USA Building Inc, Houston, TX

Floor System:

Reinforced concrete wide-module joist system

Framing System:

Reinforced concrete wide-module joist system

Award:

2016 CRSI Award Winner—
Commercial Facilities Category

Photography:

Yong Architects, Inc., Houston, TX

Applied Optoelectronics, Inc. (AOI) of Sugar Land, Texas, has expanded its global headquarters campus to include offices for administrative and engineering personnel, cleanroom production labs, R&D labs, and other key in-house components.

Raised floor system and large plenum space were utilized to achieve high air exchange rate required in the cleanroom space, as well as accommodating the demanding MEP infrastructure. The owner and the design team were very engaged during the planning phase to document the spatial and MEP requirement of every existing piece of equipment to be relocated into the new building, and are designed to both accommodate present operation need and be flexible for future expansion. During construction, stringent cleanroom protocol was implemented to keep a clean building environment. The design team was very involved during construction to coordinate with different trades, and between owner's consultants (equipment, process gas, life safety, building informatics specialists, etc. as well as furniture and A/V system) and the contractor for general construction.

STRUCTURAL FRAMING SYSTEM

A reinforced concrete system with deep pan joists was selected to provide the most stable structure system. Its uniform structural strength allows for future growth and the addition of heavy machinery and equipment. During the construction process, measures were taken to minimize vibration in the cleanroom production lab area. Deep auger cast piles were also used to ensure foundation stability.

Curtain wall glass and composite metal panels were integrated with the structural system in creating the front façade. Reinforced concrete panels were poured on site for perimeter enclosure, which provided consistent and integrated waterproofing and a durable impact resistant exterior.

UNIQUE STRUCTURAL AND/OR ARCHITECTURAL DESIGN FEATURES

This is a highly customized project because the owner's production process and equipment requires very strict cleanroom protocol. Integrating specialized cleanroom spaces with office wings was another unique design challenge. The 3-story office wing and 2-story production wing are designed with an independent foundation and the structure provides separation and vibration isolation that was achieved through the use of reinforced concrete.

REASONS FOR CHOOSING REINFORCED CONCRETE

- Utilize the compressive strength of reinforced concrete to provide a stable and robust structural system. It's plastic and flexible nature allowed for cantilevered floor slabs to create a unique building façade, as well as overhang to provide shading for the expansive lobby storefront.
- Reinforced concrete also enabled the floor slab to cantilever at an angle to create a slanted wall without altering the column grid.
- A reinforced concrete system was chosen by both the owner and the design team because of its inherent benefits in providing a vibration-free and low-maintenance structure.

CRSI Concrete Reinforcing
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