

Lucas Oil Stadium



CASE STUDY

HKS, INC.



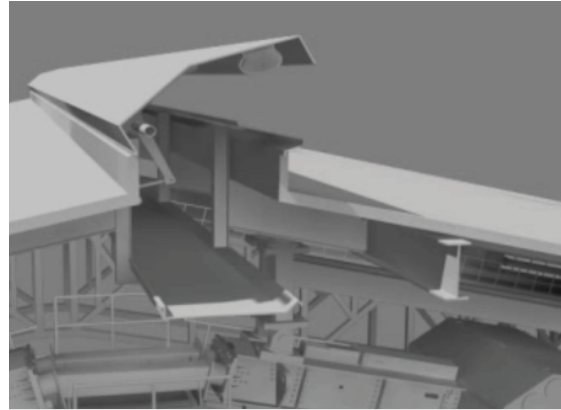
Gabled, Side Opening Retractable Roof and Operable Window Wall

The World Champion Indianapolis Colts will move to an elegant new home in 2008, into what will be known as Lucas Oil Stadium. Located in downtown Indianapolis, the stadium was envisioned as an architectural match to the existing cityscape, at least as much as a 12-acre stadium footprint can blend in. A retractable roof, a necessity considering the hundreds of “non-football events” planned, would also need to be envisioned within the proposed architectural mindset. A “window wall” was also included, offering a commanding view of the city in either opened or closed positions.

The design team, including Uni-Systems, came up with a gabled, side-opening roof, with its peak running north and south down the center of the field, parallel to the sidelines. The retractable roof panels open at the center peak and roll down along the slopes of the roof, allowing for a giant open space above the playing field.

Because Lucas Oil Stadium is to be utilized in a myriad of ways, (trade shows, conventions and more) the roof and window seals had to be perfect. Thus, when the roof and window wall close, the stadium interior must be completely

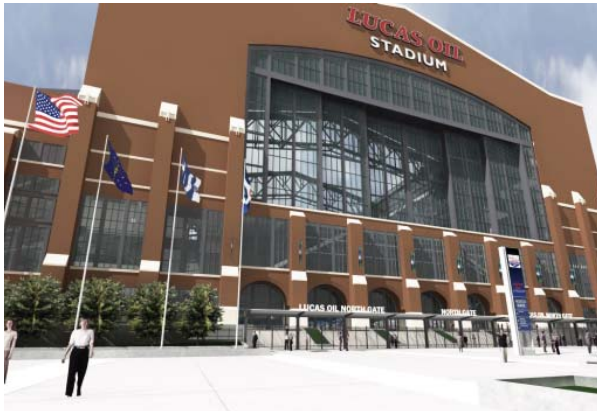
RETRACTABLE ROOF TECHNICAL DESCRIPTION



The retractable roof at Lucas Oil Stadium is comprised of two roof panels, each approximately 160 feet long by 600 feet wide, that weigh a total of 2.5 million pounds. The panels meet at the top of the roof to form the peak when in the closed position, and slide down along 5 parallel rails to rest over the lower half of the roof when in the open position. When the retractable roof is closed, a large movable cap covers the entire peak of the roof and provides a weather-tight seal between the two panels.

Each of the two roof panels has two cable drums over the two outboard rails and has four cable drums over the three inboard rails, for a total of 16 cable drums per roof panel. Each cable drum is driven by four 7.5-horsepower motors for a total of 64 motors per roof panel. The motors are controlled by sophisticated variable frequency drives that work together and ensure that all cable drums maintain the correct cable tension to share the roof loads equally. As the retractable roof panels roll downhill to the open position, the electric motors must restrain rather than drive the load, and in the process act as generators in order to keep it from running away. Each VFD is equipped with an integrated regenerative drive that turns the generated power back into regular 60Hz current and feed it back into the power grid. This system keeps the roof panels under control as they roll downhill to the open

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immune from cold, rain - even a light breeze.

Uni-Systems designed the roof with a large overhang, including an overlapping edge and a seal that runs the length of the interface between the bi-parting roof panels. A large trough located just under the sealed overlap triples the protection for the stadium interior from even the hardest rainfall.

The impressive, moveable window wall stands 85 feet high and 36 feet wide. The six glass-clad panels combine to create a more than 3,000 sq. ft. window. The three, stacked pairs of windows opening down the center and, when in the closed position, the entire perimeter of each wall panel will be sealed with rain-tight and air-tight seals.

These multiple layers of protection will ensure that spectators remain fully protected, and fully engaged, with the action inside the stadium - no matter what the weather is doing outside.



position, and provides a little extra energy, which can be used to drive the motors back uphill.

Lucas Oil Stadium is equipped with an 85-foot tall movable glass wall, made up of six panels that open to provide a 36-foot-wide window in the end-zone wall. Each panel is supported by two hardened steel wheels, each driven by a three-horsepower motor. At the touch of a button, the six wall panels move simultaneously between the open and closed position in four minutes.