An attractive new pedestrian bridge over a busy roadway stitches together Dallas' Southwestern Medical District.

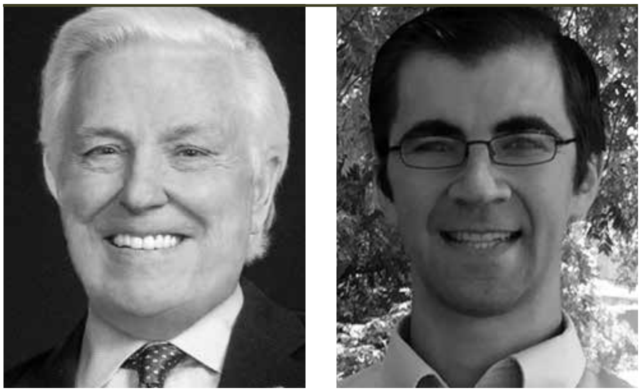
A Healthy CONNECTION

BY THOMAS TAYLOR, PE, AND DAVE THOMAS, SE, PE

THE SOUTHWESTERN MEDICAL DISTRICT— which is actually northwest of downtown Dallas—hosts nearly 2.6 million patient visits per year.

Home to medical facilities including Parkland Memorial Hospital, Children's Medical Center of Dallas and the vast University of Texas Southwestern Medical Center complex, the district grew even larger in the last couple of years with Parkland's addition of a new 2.5-million-sq.-ft, 862-bed hospital.

The new building is located across the busy six-lane Harry Hines Boulevard from the existing facilities. That's where a new 830-ft-long curving pedestrian bridge comes in. The high-visibility location mandated attractive structure that would contribute to the overall architectural expression of the hospital—but as a public hospital, an economical solution was essential and always the primary driving criteria. Structural steel truss framing was chosen as the solution to achieve both goals.



Thomas Taylor is principal design engineer and **Dave Thomas** is an associate, both with Datum Gojer Engineers.

Due to a tight budget and the need to build over a busy roadway, both the fabricator and erector, Irwin Steel and Bosworth Steel Erectors, were added to the team early in the process to advise structural engineer Datum Gojer Engineers on economics and constructability. During this process, the team determined that the most economical construction approach would be to erect the bridge in segments. The original concept was to ship the segments as fully fabricated boxes, but this wasn't possible due to the size of the boxes and the constraints along the delivery path. There are a total of 15 segments of varying lengths, with 60 ft being the most typical. All of the vertical and diagonal truss members are 8-in. round hollow structural sections (HSS) with varying wall thicknesses, providing a uniform appearance along the length of the bridge. The top and bottom chords of the trusses are W14 members.

The floor and roof structures were also trussed. While the floor slab would have laterally braced the floor against wind forces once poured, the structure was exposed to torsional stresses due to the curved sections and lateral erection and wind forces during construction. The horizontal trusses in the floor and roof provided added stiffness during construction and contributed to resisting the torsional stresses in the curved sections.

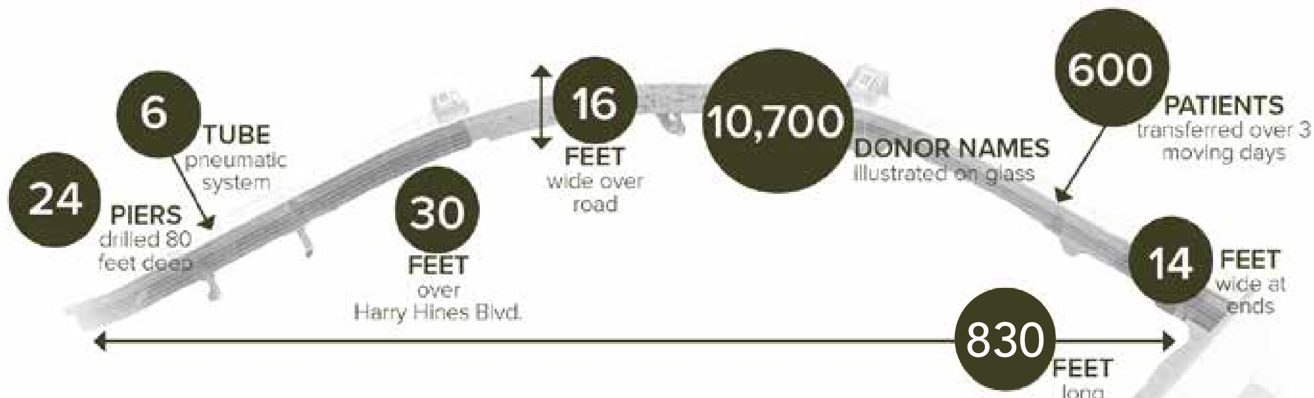
The solution was to prefabricate the wall truss sections of each bridge segment in the plant and deliver them to the site to


PRAXIS

The completed bridge.


Aerial Photography, Inc.

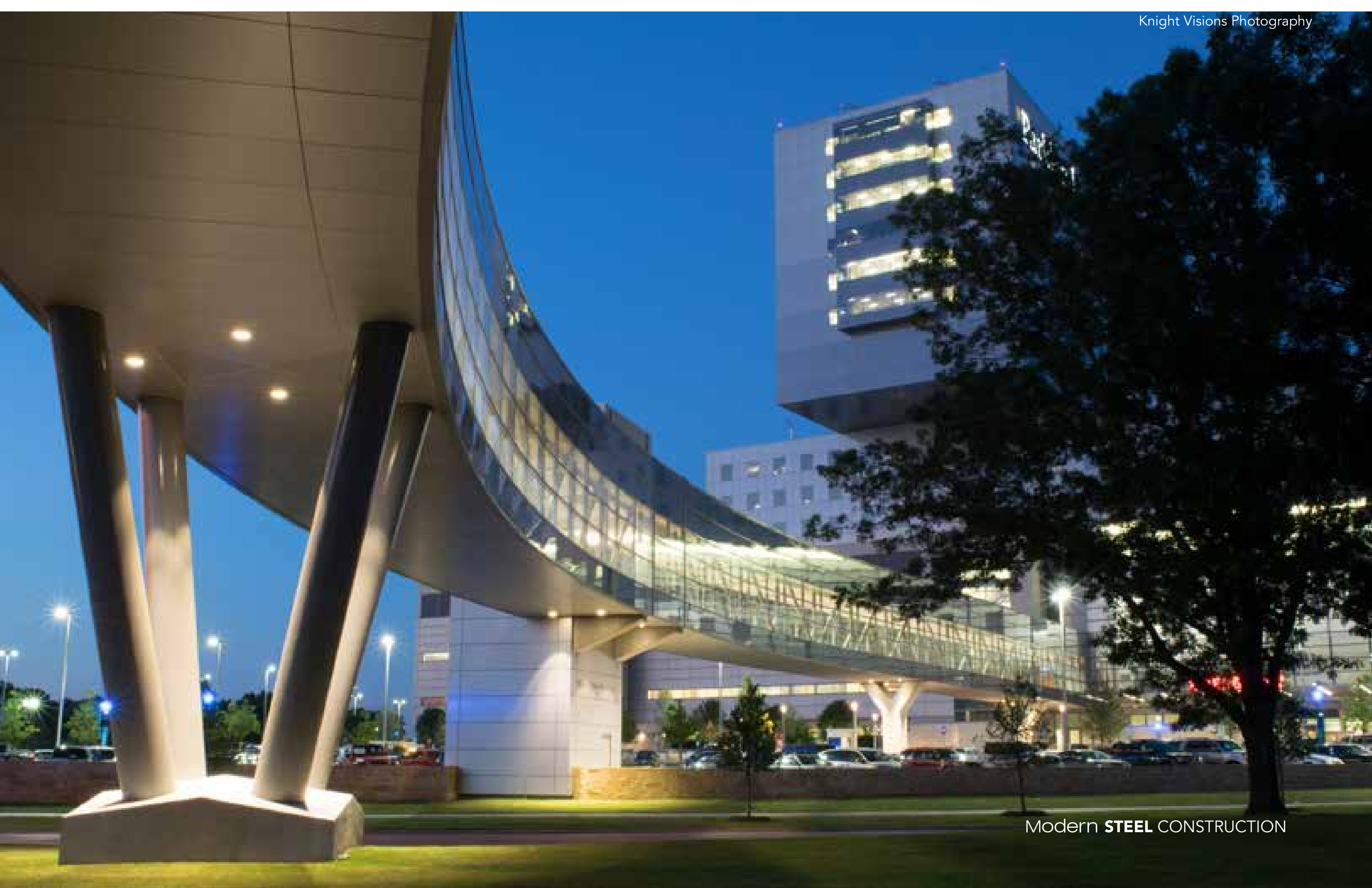
Installing one of the truss segments.



The bridge, by the numbers.

The new bridge links buildings on the Southwest Medical District campus near downtown Dallas.

The sculptural HSS support in the middle of Harry Hines Boulevard.


Knight Visions Photography


Datam

Two truss segments.

Erection was broken into three phases: east, center and west.

Interior glass and exposed trusses.

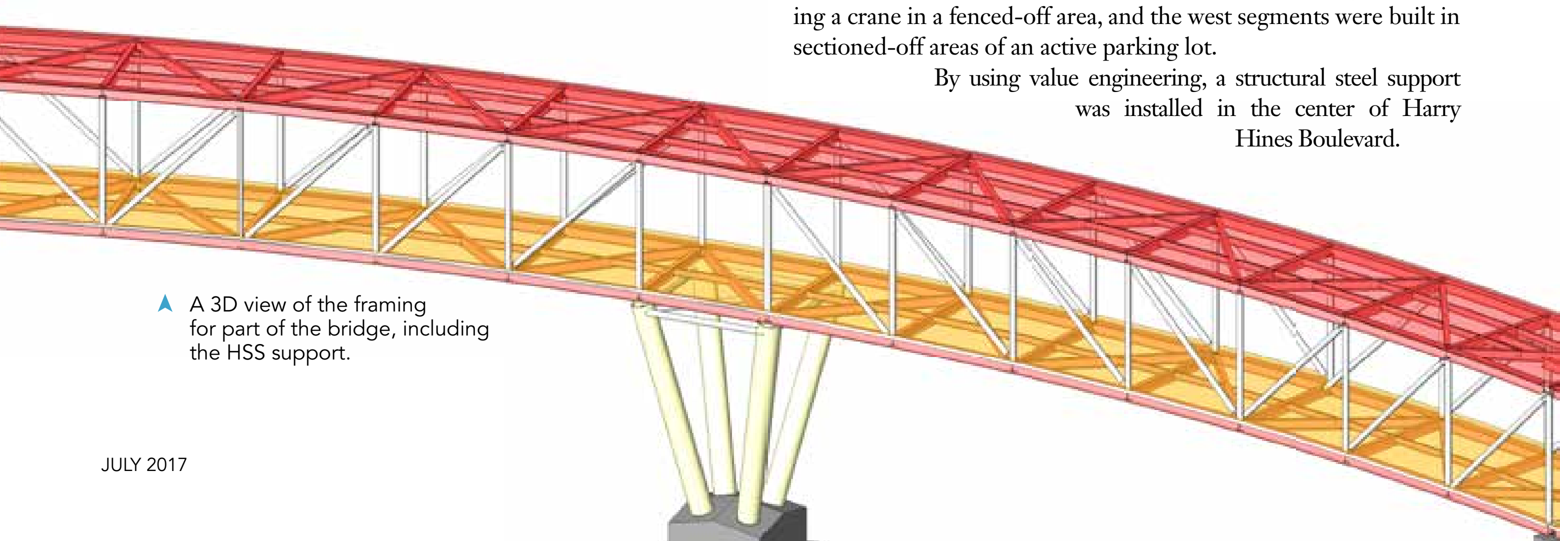

Azteca

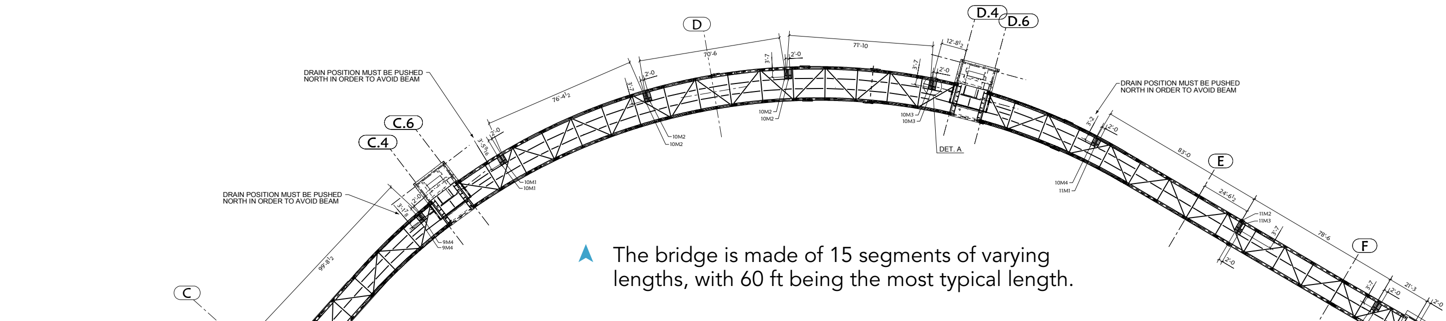

Datam

be assembled. The new hospital building was still under construction, but General Contractor Azteca worked with Bosworth to locate an area, intended for future parking, that was close to the bridge site and could be used for the assembly process. Irwin fabricated and shipped the wall trusses to the site, then connected the floor and roof elements to the trusses in this parking lot. Once a segment was completed, Bosworth lifted it into place. Traffic on Harry Hines could not be affected during peak periods, so erection times were closely coordinated with the City of Dallas and the Texas State Highway Department. Bridge segment placement required a full northbound closure/detour over one weekend and a full southbound closure/detour over another weekend. Each time, the work began on a Saturday afternoon and was completed by Sunday afternoon.

Erection was broken into three phases: east, center and west. The east phase was on the new hospital side where the future parking lot could be used to assemble three segments with a crawler crane with minimal restrictions. The center segment was built in the median between the northbound and southbound lanes of Harry Hines using a crane in a fenced-off area, and the west segments were built in sectioned-off areas of an active parking lot.

By using value engineering, a structural steel support was installed in the center of Harry Hines Boulevard.


A 3D view of the framing for part of the bridge, including the HSS support.



➤ The bridge is made of 15 segments of varying lengths, with 60 ft being the most typical length.

➤ Erecting one segment during the day...

➤ ...and another at night.

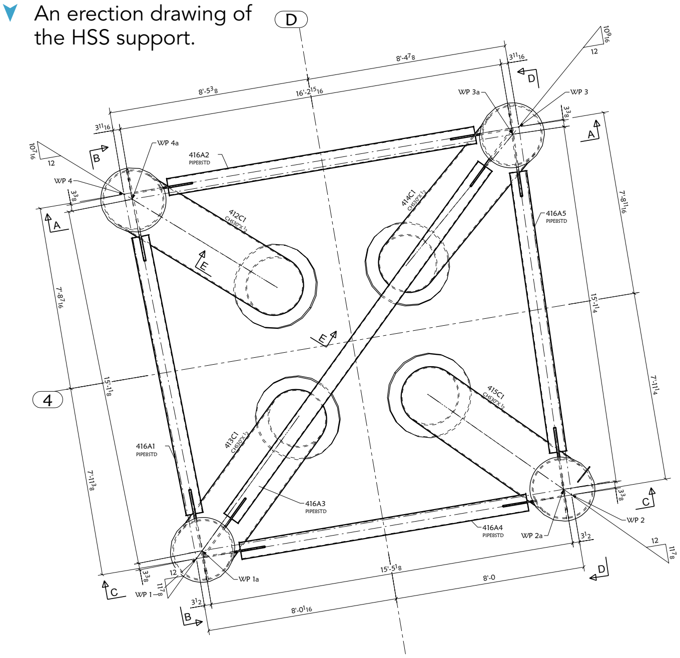
Andre Gray

Without it, a 250-ft clear-span curved truss would have been required, adding significant cost to the project. While there were concerns regarding the appearance of the support in the middle of the road—which was originally designed as a cast-in-place concrete structure with four columns curving upward from a single base—Datum Gojer proposed four steel columns to help resist torsional forces and to create an interesting steel "sculpture" as opposed to a more traditional column support. The architect approved the concept from an aesthetic standpoint, it was within budget and it solved structural issues in a visually pleasing way. It was also a more constructable option.

By teaming up and conceiving the most economical structure and construction process, the handsome architectural concept was built for $13 million, well under the initial budget of $20 million (the total cost of the hospital project was $1.2 billion). In addition, substantial completion was accomplished two months ahead of the contract date, and the final certificate of occupancy was received weeks ahead of the hospital's planned opening.

A segment awaiting erection.

An erection drawing of the HSS support.



The floor and roof framing was also trussed.

An overhead view of the bridge spanning over Harry Hines Boulevard.

Construction Notes

The complexity of installing the trusses over a the major thoroughfare required street closures and constant mindfulness of the traffic flow below. Prior to mobilizing, an investigation of the street and substrate was performed to verify that both were able to support the cranes and loads. From there, we developed a detailed lifting plan.

Safety cables were required on the truss sections prior to and during erection. After this process, the crane was assembled at a nearby laydown area and moved into place after all traffic controls were implemented. Once the crane was secured, the trusses were moved into position, the rigging was completed and the trusses were lifted into place during nighttime hours on preapproved weekends. The trusses remained under load until reaching their final location with permanent connections made and the area secured. At that time, the crane released the load, equipment was demobilized and the street was reopened to traffic.

— Contributed by Azteca

The day it opened, patients were transferred from the old hospital into the new one. Donor names, etched into tree patterns, adorn the glass walls of the bridge and mirror tree patterns on the new hospital. The bridge was so well received that one donor even contributed the entire cost of the bridge, which is now named the Mike A. Myers Sky Bridge.

Owner

Parkland Health and Hospital System, Dallas

General Contractor

Azteca Enterprises, Dallas

Architects

Moody Nolan, Dallas

Structural Engineer

Datum Gojer Engineers, Dallas

Steel Team

Fabricator

Irwin Steel, Justin, Texas

Erector

Bosworth Steel Erectors, Inc., Dallas