Cantilever Construction

[STRETCHING OVER THE RIVER]

CONSTRUCTION OF THE CANTILEVER

Before cantilever construction could begin, the 400’ tall pylon was constructed near the center of the river and the 612’ 6” back spans were assembled on temporary steel towers using specialized construction gantries.

To construct the cantilever portion of the structure, two rows of concrete segments (typically three segments at a time) are erected and then a structural member called a delta frame is placed between the two rows of segments. With the exception of the one closest to the pylon, delta frames serve as a structural anchorage point for a stay cable and support the section of bridge on either side of the stay. The next step is to cast a median slab between the two parallel sets of boxes and install high strength steel strands that lock the boxes, delta frame and slab together. Now the stay cable can be installed and stressed to carry the loads to the pylon (see back page).

This process is repeated twenty times until the cantilever reaches the first pier on the north shore of the Maumee River, completing the main span and stay cable erection. During the construction period, the segments, delta frame and stay system is designed to support its own weight as well as that of the construction equipment.

Because of the design, the span does not require support from underneath during construction, and temporarily forms a cantilever that projects from the pylon out over the north side of the river, including the shipping channel.

CONSTRUCTION FAST FACTS

- Main span segments are 12’ 2” deep, approximately 58’ wide and weigh up to 100 tons
- Delta frames weigh up to 85 tons
- The stay cables are supporting a total load of 112,000,000 lbs.
- The outside diameter of the stainless steel sheathing is 18” for stays 1 – 6 (closest to the pylon) and 20” for stays 7 – 20
- The sheathing weighs about 24,000 lbs. for the longest stay and 2,000 lbs. for the shortest
- The sheathing is 70’ long for the stay closest to the pylon and over 650’ long for the highest stay

[STAYING POWER]

A method called cantilever construction is being used to erect the portion of the Veterans’ Glass City Skyway’s main span from the pylon in the middle of the river to the north riverbank. The main span will have 20 stay cables supporting the 1,225 feet of bridge over the Maumee River.
**INSTALLATION OF STAYS**

As each stay is constructed, the stainless steel sheathing that surrounds and protects the stay’s strands is suspended from the high line (fig. B) on both sides of the pylon. Each stay cable is comprised of epoxy-coated steel strands. Depending on the design loadings, stay cables may have as few as 82 or as many as 156 strands.

Spools of steel strand are positioned on each side of the pylon. Each strand begins at a delta frame and is guided through the sheathing to the pylon. At the pylon every strand passes through the stay cradle in its own individual pipe – this prevents strands from rubbing together within the cradle.

The strand is pulled through the sheathing on the opposite side of the pylon. It is secured and tensioned in anchorage hardware at a delta frame. When all the strands for a stay cable have been installed, another group of segments and a delta frame can be added to the cantilever portion of the bridge over the river.

- **A** Three segments and a delta frame are erected over the shipping channel.
- **B** Stainless steel sheathing is suspended from the high wire.
- **C** Strands are guided from the delta frame through the sheathing to the pylon.
- **D** Strands are separated into individual pipes in the pylon’s stay cradle.
- **E** Strands are guided through sheathing on the opposite side of the pylon back to the anchorage assembly at the delta frame to be secured and tensioned.
- **F** A view of the delta frames from underneath the bridge.

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[S T R E T C H I N G O V E R T H E R I V E R]

For additional background materials on the Veterans’ Glass City Skyway, call the project Hot line at 419-244-7696 or visit our Web site at www.lookuptoledo.org for the latest project updates.

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