

Sedgwick County, Kansas, uses unique designs to aid construction of both concrete bridges and culverts



Concrete Bridges and Culverts Create STRONG OPTION

By David Rushton and Lynn Packer

Sedgwick County's engineers oversee the most bridges of any county in Kansas, including 652 bridges with a length of 20 ft or more and 7500 culverts with shorter lengths. That volume and diversity is both a blessing and a curse. Fortunately, we have developed creative design approaches to help facilitate construction of all types of structures.

The range of work provides a lot of opportunities for design, but it also creates a continual maintenance operation. As a result, we have been designing more concrete bridges recently, as we find steel creates maintenance problems. Part of our success in that regard centers on our design of post-tensioned haunched slabs because they create a superior product.

Post-Tensioned Haunched Slabs

The cast-in-place concrete spans feature post-tensioning running both longitudinally and transversely. The use of post-tensioning allows us to create spans about twice as long as a typically reinforced concrete, haunched slab could provide. The longest span used with the post-tensioned, haunched slab to date has been 106 ft.

Sedgwick was the first county in Kansas to use this design, and we have created approximately 24 of these projects since our first one in 1989. It has become a popular option with the Kansas Department of Transportation (KDOT), which created a family of designs based on this concept for span lengths from 50 to 92 ft. Thus, consultants working in our county can download drawings from the KDOT website and have our design at hand.

We build many bridges of all types and sizes including concrete slab spans, concrete girder

spans, and precast concrete spans—whatever best suits the situation.

Box Culverts

For our culvert projects, we typically use precast reinforced concrete box (RCB) structures below ground for controlling rainwater runoff throughout the county, in both rural and more developed areas. The program provides definitive advantages in economy and speed of construction that benefit citizens through more efficient use of funds and shorter traffic disruptions.



Installation of culverts is simple and quick.

The use of precast box culverts began in 1999 but really took off in 2002. Our second project involved a 114-ft-long double 10- by 4-ft culvert that was installed by our maintenance crews. It was a big undertaking, but it sold us on this approach. Today we're doing multiple applications each year.

In 2004, our budget allowed us to purchase 500 linear feet of 6- by 3-ft RCBs that we store in the yard. We took this approach following two deck failures, one through unexpected deterioration and one from an accident. If the boxes had been available then, we could have

had the culverts replaced in two days rather than the month or more that each required.



Precast concrete box culverts provide fast construction, economy, and erosion prevention.

We've now created a precast concrete "soil saver" with the help of our local precaster, Wichita Concrete Pipe. A soil saver prevents erosion when a sudden or steep drop in flow-line elevation is necessary in a channel. It basically consists of a RCB cell cut in half and placed on end at the upstream end of the culvert. It's physically attached to the culvert to prevent hydraulic uplift.

To date, we have completed two projects with lengths of 21 and 14 ft. They have proven to be cost effective and functional. The best part is that the soil saver can be delivered with the other precast concrete components, rather than having to have it installed after the fact and slow down completion.

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