# World's largest Sliding Finger Joints for the Audubon Bridge

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## 1. Introduction

The John James Audubon Bridge currently under construction in Louisiana will be the longest cable stayed bridge in North America when it opens in 2010. With a main span of 482m (1,583 ft), the bridge requires expansion joints at either end of the main span deck that will allow very large longitudinal movements. The largest joints will facilitate movement of up to 1,240mm (49in), while smaller ones will allow movements of 710mm (28in) and 310mm (12in) respectively. These exceptional movement requirements made the design and fabrication of the joints very challenging (see Fig. 1).

## 2. Bridge design and movements to be accommodated by the joints

The bridge has a 22m (72ft) wide steel deck, supported on two bridge bearings at each end of the main span. Shear keys located between these bearings prevent transverse movement of the deck and therefore of the expansion joints. Details of the calculated movement requirements of each joint are given.

## 3. Selection of expansion joint type

The bridge owner expressed a clear preference for low maintenance finger joints. A simple cantilever finger joint could be used at the one location where movement requirements are low, but for the main joints more complex sliding finger joints are required. These feature support to the ends of the „male" fingers from a steel plate below to which the „female" fingers are fixed. Pre-tensioning of the male fingers ensures they remain in contact with the supporting plate at all times, minimising the risk that the fingers will spring up and form a traffic hazard. In this case the pre-tensioning is achieved by steel springs below the fingers. No major anchorage to the bridge structure is required, and the design can accommodate vertical movements easily.

## 4. Design of the joints

Design in accordance with AASHTO was specified by the bridge designer.

### 4.1 Preliminary considerations

It was considered prudent to devote some thought to the later stages in the supply and service life of the joint before proceeding to detailed design. These included the problems of handling and transporting very large joints weighing up to 24 tonnes and the need to replace parts of the joints at a later stage.

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