Elevation of the underside of the bevel cut 6-inch x 6-inch stringer is determined by the platform elevation and the run/rise of the walkway:

\[
405.66 + (30.13)(3.5\%) - \frac{5.5''}{12''/ft} = Elevation 406.26
\]

Elevation of the top of the F threaded stud:

\[
406.26' + (5 \frac{1}{2}' + 19 \frac{19}{16}'//12''/ft) = Elevation 408.35
\]

Length of wire rope from top of threaded rod to the inside crest of the flemish loop wire rope thimble (see suspender detail) is as follows:

Elevation 413.47 - (1.86''/12''/ft) - Elevation 408.35 = 4.965'

Wire Rope Length of Suspender F = 4.965' = 4'-11 9/16''

This 7-step calculation was performed 84 times — 21 times for each suspender pair to “rough out” the design; 21 times for the final design and to provide an estimate of the 1/2-inch wire rope needed; and 42 times to customize each suspender for the as-built conditions of the towers and saddles. Doran Sling and Assembly was provided with a “cut sheet” that identified the suspender lengths to within 1/16-inch. The suspenders were fabricated to this tolerance. Each suspender was identified by its correct location, for example, south cable, east side – F Suspender. A secure, weatherproof tag was used to distinguish each suspender. To make the field fabrication even easier, the project engineer had the suspender locations and spacing marked on the main cables at the Doran shop. This was calculated by applying the length of curve equation on page 50 to the as-built tower dimensions and distributing the distance evenly between the suspenders. For example, the south cable suspender spacing was as follows:

\[
\text{Suspender Spacing} = \ell \left( 1 + \left[ \frac{8}{3} \right] \frac{e^2}{e^2} - \frac{32}{5} \right) \frac{e^4}{\ell^4} + \left[ \frac{256}{7} \right] \frac{e^6}{\ell^6} \right) \frac{\text{Spacing}}{\text{# of suspenders} + 1}
\]

\[
\text{Spacing} = 110.47 \left( 1 + \left[ \frac{8}{3} \right] \left[ \frac{18.08'}{110.47''} \right] \left[ \frac{32}{5} \right] + \left[ \frac{18.08'}{110.47''} \right] + \left[ \frac{256}{7} \right] \left[ \frac{18.08'}{110.47''} \right] \right) = \frac{(110.47)(1.0675)}{22} = 5.36
\]

All this time-consuming measuring and “number crunching” would pay dividends in the time it would save in the aerial assembly and “tuning” of the bridge.

Aerial Bridge Assembly

All the planning, measuring, and prefabrication led to the aerial connection of the seven prefabricated bridge sections. This is shown in photos 72-77. The sections were hoisted via “come-along” winch hoists, as shown in photos 72-74. The pair of top overhead 9/16-inch structural strand guylines, (shown in photo 10, page 22), that run from top of tower to top of tower serve two purposes: first as guylines and secondly as a cable runway for the pulley sheaves used to pull the bridge panels into place. This is shown in photo 74. It is very important to recognize that during the aerial maneuvering of the 1500-pound bridge sections, the weight of the individual bridge sections was carried by the overhead 9/16-inch structural strand. The workers’ fall protection lines were connected to the main catenary cables. If the bridge sections dropped for whatever reason, the workers would not be carried down with it. When the bridge section was in the correct position, the male-female elements of the truss chords were bolted together. The weight of the bridge section was...
transferred to the main catenary cables by simply threading the rod of the suspender through the pre-bored hole in the 6-inch by 6-inch cross-stringer and installing the square washer and nut. This is shown in photo 75. With these simple tools and some muscle, the bridge sections were hoisted into place. The pre-fitted, pre-cut, pre-drilled spaced joints were married together. Details of these bolted-blocked section joints are shown in photos 80 and 81.

The #1 CCA.40 SYP KDAT 19% MC lumber was specified for structural, dimensional integrity, and weight purposes. Howls of protest were originally voiced over
Each 20-foot panel weighed 1,500 pounds. Handling the panels with the winch hoists required the operators to mount the panels. This added another 400-900 pounds. If #1 CCA treated lumber that was not dried after treatment was used, another 500 to 1,000 pounds would have been added due to the additional moisture in the wood. The assembled bridge skeleton prior to the installation of decking is shown in photos 78-80. Photo 81 shows the spaced chord connections and the sistered interior 2-inch by 6-inch connections between the bridge sections. The design plans had the interior walkway joists sistered connections offset in a 10-foot stagger. In order to simplify the prefabrication and transport, this was changed to a common 20-foot spacing.

**Final Cable Tuning**

When the catenary cable was uniformly and continuously loaded, the final tuning of the suspension system commenced. The following criteria were adhered to:

- The design walkway camber of 3.5 percent, which meets ADA standards.
- Clearance to the 100-year flood level.

The exact elevation of the catenary sag point was set by the project engineer utilizing the turnbuckles. Subsequent to this, each individual suspender threaded rod had to be adjusted to smooth out the camber of the bridge. As the threaded rods hang plumb, the 3.5 percent camber of the bridge was automatically set by the bevel cut on the