Two Bridges Built Using Black Locust Wood
Squibb Bridge
Brooklyn, NY
Underslung Suspension Bridge:

- Highly efficient form
- Material palette from BBP
- Small dia. Black Locust
- Steel cables & connections

PLAN

VIEW A-A

TWO BRIDGES BUILT USING BLACK LOCUST WOOD
TWO BRIDGES BUILT USING BLACK LOCUST WOOD

DECK PLAN

VIEW B-B

SECTION A-A
Black Locust Timber:

- Sustainable
- Small diameters – harvested young
- Fast growth
- Locally sourced
- Rot resistant – no coating required

- Strong
- Low shrinkage (11.4% vol.)

Galvanized steel cables & hardware
TWO BRIDGES BUILT USING BLACK LOCUST WOOD
## Ratios of dry to green clear wood properties

<table>
<thead>
<tr>
<th></th>
<th>Modulus of Rupture</th>
<th>Modulus of Elasticity</th>
<th>Compression Parallel to Grain</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.40</td>
<td>1.11</td>
<td>1.50</td>
<td></td>
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</tbody>
</table>

(AMT D2555)
Locust Borer

*(Megacyllene robiniae)*

Lunch

*UGA3067015*
Timber Piles – standard and proprietary connections
TWO BRIDGES BUILT USING BLACK LOCUST WOOD
Structural Systems - Triakonta:
Turning a Black Locust Log, Cornell University, 2010

Triakonta Compression 1

<table>
<thead>
<tr>
<th>Displacement (cm)</th>
<th>Load (kNNewtons)</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0.25</td>
<td>250</td>
</tr>
<tr>
<td>0.5</td>
<td>500</td>
</tr>
<tr>
<td>0.75</td>
<td>600</td>
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</table>
Structural Systems – Prestressed Segmented Arch:
Annular band connections on communication towers up to 40 m tall.
- Capped end connections
- Modular kit-of-parts
- Simple fabrication & erection
TWO BRIDGES BUILT USING BLACK LOCUST WOOD

Four Bar Linkage

CABLE DEVIATOR

VIEW B-B
TWO BRIDGES BUILT USING BLACK LOCUST WOOD
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Squibb Bridge
Brooklyn, NY
TA Footbridge
Vassar College, Poughkeepsie, NY
Pressure treated wood deck, on unpainted steel beams

Advanced corrosion, significant section loss
Elevation

Axial force in lattice members (kips)
Axial force in chords & arch rib (kips)

AASHTO Strength-I Combination
Yield modes of failure for doweled connections
(Timber Framers Guild)

Mode V (peg shear failure)
(Miller, Schmidt, & Bulleit)
Axial force in lattice members (kips)

AASHTO Strength-I Combination

Axial force in chords & arch rib (kips)

Computed shear force per peg shear plane
TWO BRIDGES BUILT USING BLACK LOCUST WOOD
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Testing Full-Size Members for Squibb Bridge
(Univ. of Maine)

150 mm diameter x 1.83 m logs
(6” dia. x 72”)

50 mm x 200 mm x 2.49 m beams
(4” x 10½” x 98”)

TWO BRIDGES BUILT USING BLACK LOCUST WOOD
### Compression Strength: Two rounds of testing

<table>
<thead>
<tr>
<th>Compression Parallel to Grain</th>
<th>n</th>
<th>Ultimate Compressive Strength</th>
<th>Modulus of Elasticity</th>
<th>Moisture Content</th>
<th>Specific Gravity</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean (ksi)</td>
<td>COV (%)</td>
<td>PTL</td>
<td>Mean (ksi)</td>
</tr>
<tr>
<td>FPL White Oak</td>
<td>20</td>
<td>3,560</td>
<td>18</td>
<td>2,321 *</td>
<td>1,250</td>
</tr>
<tr>
<td>FPL Black Locust</td>
<td>20</td>
<td>6,800</td>
<td>18</td>
<td>4,434 *</td>
<td>1,850</td>
</tr>
<tr>
<td>Squibb Bridge</td>
<td>45</td>
<td>5,219</td>
<td>12.2</td>
<td>4,051 *</td>
<td>1,770</td>
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<tr>
<td>TA Foot bridge</td>
<td>41</td>
<td>7,156</td>
<td>20.8</td>
<td>4,424 *</td>
<td>1,327</td>
</tr>
</tbody>
</table>

* PTL = lower 5% at 75% confidence

(ASTM D2915)
Compression Strength: Two rounds of testing

Use caution drawing comparisons.
It may not be reasonable to combine the data sets.