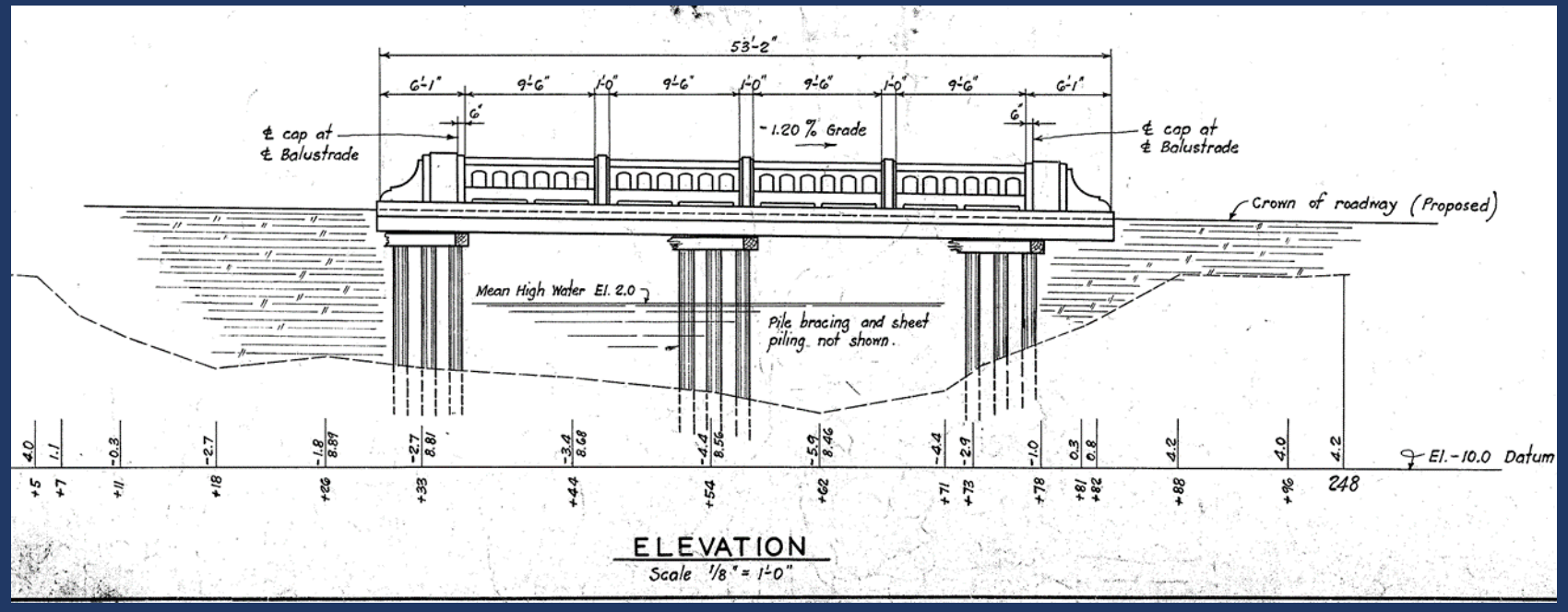
Bridging Maryland, Becoming Engineers



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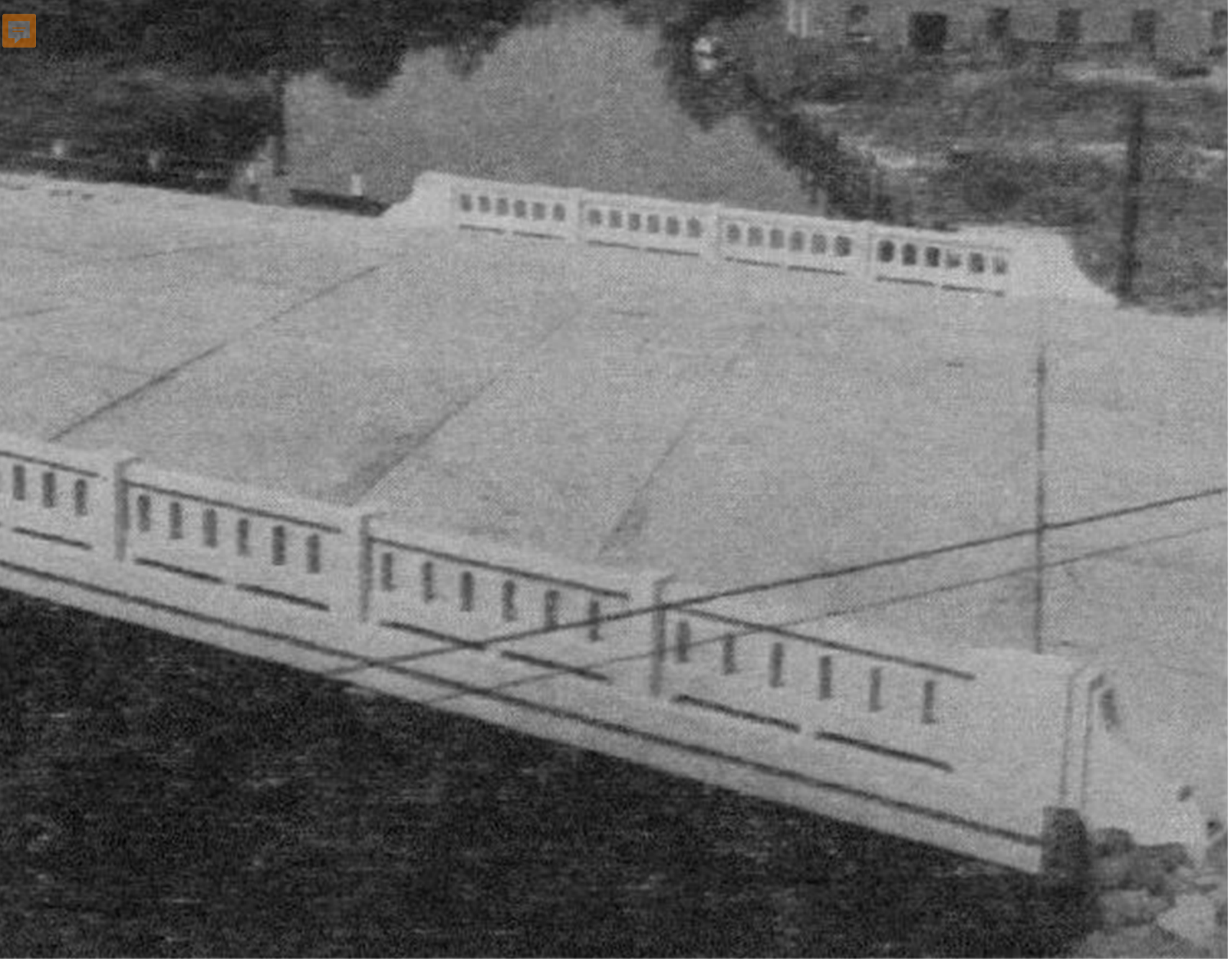
A Lesson in the Engineering Design Process Linked to a Historic Maryland Bridge

Part 3



test and **evaluate**

The next step in the Engineering Design Process is Test and Evaluate.

Walter C. Hopkins, the Chief Bridge Engineer at the Maryland State Roads Commission, tested the Salisbury Boulevard bridge to find out how the bridge withstood heavy pressure on its deck.

By placing gauges on the bottom of the bridge, he could record the stress the bridge experienced when a truck carrying a heavy load crossed the bridge.

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CHALLENGE PART 2

test and evaluate

Determine what you want to test.

Pick a question below or develop your own question.

- How long does the glue need to dry? If you use more or less glue, how long does it take to dry?
- What is the best method for holding the bridge together while the glue dries?
- How much weight does the bridge hold?
- What happens to the piers when different forces are applied? What happens if they are shorter?
- What happens if you place your bridge in a pan of water compared to a pan of soil or sand?

Record the data that results from your test!

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optimize
the design

After you have analyzed your test results, think about how you could improve the design.

It is okay if your model did not meet your original expectations because we learn more when we make mistakes.

- Could you build a bridge that is longer or wider?
- Would it need different piers or abutments?
- How could you minimize the amount of material needed?
- What would happen if you built a bridge using only one size of craft sticks?

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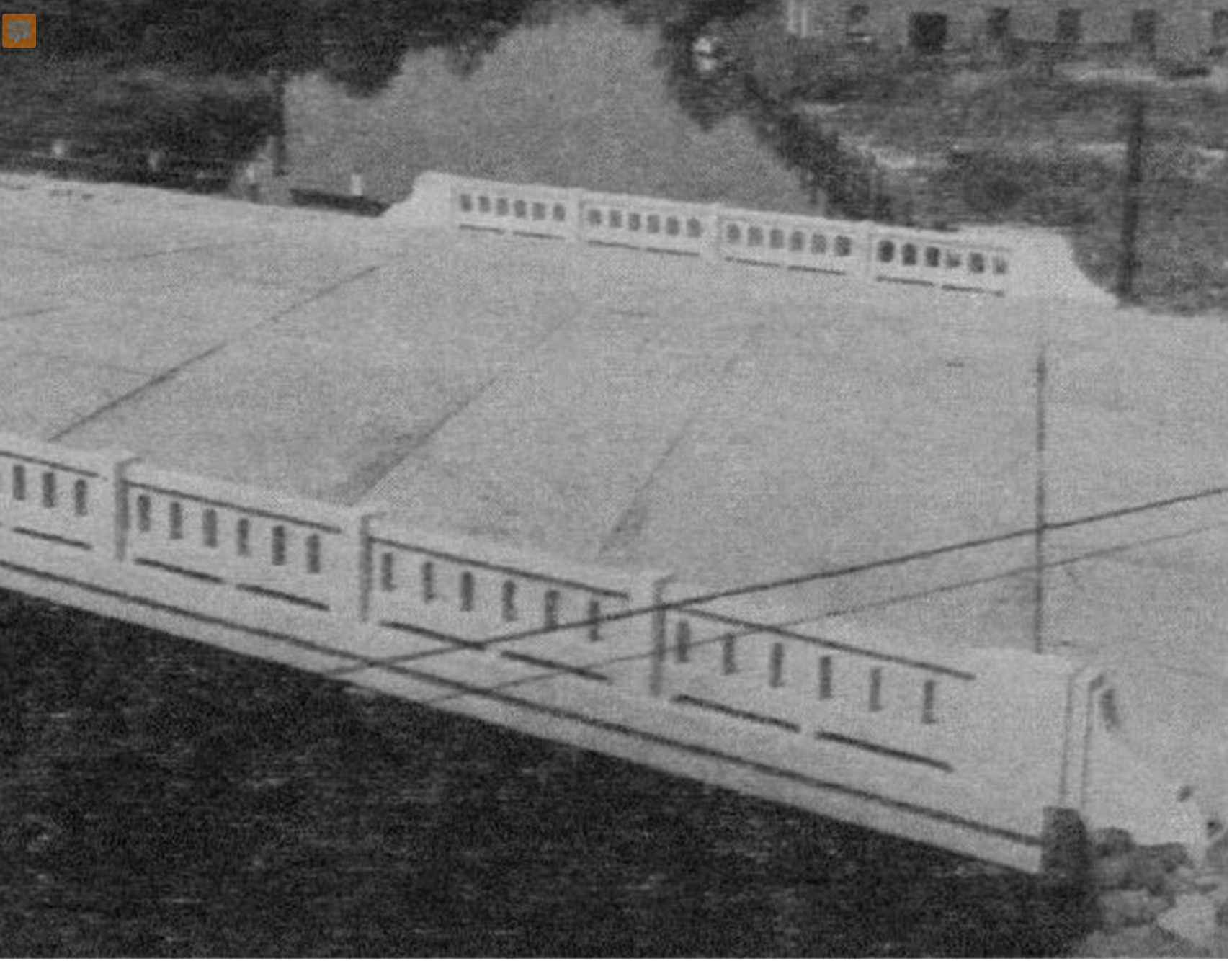

share the solution

In 1939, Chief Engineer Hopkins shared the results of his test at a conference. Later his conference presentation was published in a book, and he also wrote articles about timber-concrete composite bridges.

The timber-concrete composite bridge served Salisbury Boulevard for over 80 years!

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Share Your Solution!

Now is your opportunity to document

your design,

how you tested it, and

how you made it better.

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Slide Image Sources

Bridging Maryland, Becoming Engineers: A Lesson in the Engineering Design Process Linked to a Historic Maryland Bridge, Part 3

Slide 1: MDOT SHA Bridge Archives, Bridge No. 2200400 carrying US 13 Business (BU) over East Branch of the Wicomico River.

Slide 2: Two-Span Composite Bridge over Wicomico River, Salisbury, Md. In Walter C. Hopkins, Treated Timber in Heavy Duty Composite Highway Bridges, published in the Proceedings of the Annual Meeting of the American Wood Preservers' Association, Vol. 26-35, 1939, pg. 272.

Slide 3 and 4: MDOT SHA.

Slide 5: Two-Span Composite Bridge over Wicomico River, Salisbury, Md. In Walter C. Hopkins, Treated Timber in Heavy Duty Composite Highway Bridges, published in the Proceedings of the Annual Meeting of the American Wood Preservers' Association, Vol. 26-35, 1939, pg. 272.

Slide 6: No image.