

A photographic appreciation of the Mackinac Bridge.

Visiting an Old Friend for the First Time

BY LAWRENCE F. KRUTH, P.E.

WITH A TOTAL LENGTH of five miles, including a suspended portion of 8,614 ft between cable anchorages, the Mackinac Bridge, joining Michigan's upper and lower peninsulas, is among the longest suspension bridges in the world. Its 3,800-ft main suspended span is exceeded in the U.S. only by San Francisco's Golden Gate Bridge (4,200 ft) and the Verrazano-Narrows Bridge (4,260 ft), connecting Staten Island and Brooklyn in New York.



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Built beginning in 1954 and completed in 1957 by the American Bridge Division of the United States Steel Corporation, the Mackinac Bridge consists of more than 100,000 tons of structural steel. At the peak of construction, more than 3,000 people were employed at the bridge site.

After living in Michigan for more than 25 years, I was given an opportunity last August to make a trip to the top of the south tower of the suspension bridge. It's the kind of offer that is on every engineer's wish list, especially those involved in the steel industry.

Getting to the top of the tower begins at the bridge deck level where you enter through a small access door. The door is no more than a small hatch made from plate hinged and locked to prevent access. Next to the door is the dedication plaque placed by American Bridge in 1955.

After entering the tower, you immediately enter the elevator for a trip to the upper portion of the tower. The elevator originally went nearly to the top of the tower, but no longer goes that high. Installation of new drive motors now restricts vertical travel distance of the elevator. Douglas Steel's field operations manger, David Hannah, held the door as I entered the elevator. (Elevator may be too generous of terminology for this device,



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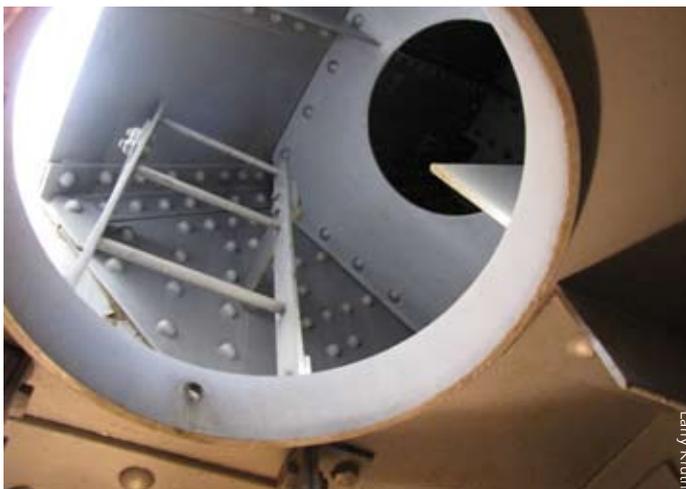
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which is approximately half the size of a phone booth.) In addition to Hannah and myself, our guide for the trip also rode with us to the highest vertical access point provided by the elevator.

Upon exiting the elevator we travelled through a series of hatches both horizontal and vertical, climbing up ladders through openings so small that my shoulders would not fit through them without raising my arms over my head. (This reminded me of my tour of the USS Silversides, a World War II submarine anchored in Lake Michigan in Muskegon, Mich.)

Overall the bridge includes 4,851,700 rivets. Traveling through the internal portion of the south tower, I was amazed by the many rivets that were installed in such small areas by the ironworkers back in the 1950s. It also was amazing to see the mill marks on the steel members indicating that U.S. Steel rolled them in my hometown of Pittsburgh. The H-USA marking indicates they were a product of the Homestead Works.

Finally, we came to the vertical access point to the top. To access the top, it was necessary to climb



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Why the Mackinac Bridge Enthralls Us So

If the longest three U.S. suspension bridges were siblings, the Mackinac Bridge would be the one who moved to the edge of the wilderness while the older Golden Gate Bridge and the younger Verrazano-Narrows Bridge opted for the hustle and bustle of city life. Strong structural similarities remain, but the frontier-like setting of the Mackinac Bridge gives it a very special feel.

All three are toll bridges, dutifully providing safe and convenient access that would otherwise be quite challenging. But consider this: the Golden Gate Bridge serves the San Francisco Bay Metropolitan Statistical Area (MSA), with a population of 4.3 million, and has an annual traffic count of 39 million. The Verrazano-Narrows Bridge is within the New York/Northern New Jersey MSA, which has a population of 18.9 million. Its annual traffic amounts to about 70 million. The Mackinac Bridge, connecting Michigan's upper and lower peninsulas, is in an area that falls outside the larger population concentrations considered by the U.S. Census. The three counties in the immediate area have a combined population of nearly 70,000. Even so, as a part of the I-75 corridor that runs north from Detroit to Ontario, at Sault Ste. Marie the Mackinac Bridge still serves approximately four million vehicles per year.



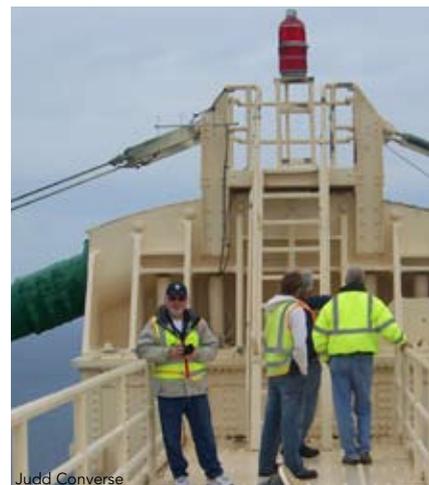
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an unprotected ladder through three very small, round vertical access hatches.

Upon exiting to the top of the south tower, the view made the whole trip worthwhile. The bridge's two towers rise 552 ft above the water level of the Straits of Mackinac. Standing at this location where only a few people had stood before, on a structure that many ironworkers risked their lives to build, was awe-inspiring.

Looking straight down from the tower at this height was breathtaking. The bridge deck consists of two lanes in each direction. The exterior lanes are concrete and the interior lanes are steel grating. The parked red Mackinac Bridge Authority van that took us to the south tower was evident.

As our group explored the area at the top of the tower, we observed many of the fine details of construction. The suspension cables were clearly wrapped with the spinning wire. The saddles for the suspension cables were a marvelous work of engineering and construction. Small angles were mounted to the exterior of the tower to act as anchoring points for the suspended platforms used to paint the tower. The entire Mackinac Bridge is constantly being painted and inspected by the Mackinac Bridge Authority.

Too soon, it was time to leave. I would like to thank the Mackinac Bridge Authority for their hospitality, and also David Hannah, Douglas Steel's field operation manager, and especially Judd Converse, one of Douglas Steel's ironworker foremen, who made it possible for me to cross another item off of my "bucket list." **MSC**



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