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## August 1936: The cables of the Golden Gate Bridge

By [Andrew Wade](#) 17th August 2016 12:18 pm

**Eighty years ago this publication reported on a genuine icon of engineering, and one that remains as captivating today as it was all those years ago: San Francisco's Golden Gate Bridge.**

The Golden Gate had been under construction since January 1933, and by the time a three-part feature appeared in *The Engineer* across July and August of 1936, the structure was nearing completion. Parts I and II had looked at the design, excavations and pier-building that the Golden Gate required, but the final installment focused on the cabling operation of the giant suspension bridge.

According to our predecessors, by the summer of '36 the spinning of the main suspension cables was three-quarters done, and there was "ample warrant for the official assurance" that the bridge's completion date of May 1937 would be met. With a total length from abutment to abutment of 8,981 feet (2,737 m), and a main span of 4,200 feet (1,280 m), the cabling of the bridge was an enormous undertaking.

"Each main suspension cable is made up of sixty-one strands, and contrary to previous practice, the strands differ in size, depending on their respective positions in the cable – the number of individual wires therefore in the several strands ranges from 256 to 472 wires, and each wire is 0.196in in diameter."

In total, each cable consisted of 27,572 individual wires weighing 10,750 tons, with the two cables together containing around 80,000 miles of wire. After spinning, the strands were compacted by squeezing machines that used 12 hydraulic jacks to apply around 4,000 lbs of pressure per square inch. The cables were also banded at regular intervals and then wrapped from the outside with an "envelope of steel wire".

Lessons had been learned from the George Washington Bridge that spanned the Hudson from Manhattan to New Jersey, completed just a few years earlier in 1931. Indeed, the same contractor actually provided the cables for both structures, with improvements made in the intervening period. However, it was in the technique of the actual spinning where the Golden Gate far surpassed its East Coast contemporary.

The GW's spinning had involved carriages with single wheels making complete runs from one side to the other, stringing two wires in a given strand at about 650 ft per minute. When work began on the Golden Gate, carriages were equipped with two spinning wheels. On top of this, a transfer station was set up in the centre of the span, so carriages only travelled halfway across the bay, swapping their wires with those of the carriage that had come from the opposite side, before returning to their own anchoring point. At any given time a total of four carriages were operating, increasing the work rate even further.

"During a co-operating round trip of two carriages they were able to string a total of eight wires from anchorage to anchorage, while the four carriages duplicated that performance. Thus, in a given period, sixteen wires were strung on the Golden Gate Bridge, as against four on the George Washington...On the GW the rate of stringing reached as much as 61 tons in the course of a day on a cable, while it was found possible to string 271 tons per diem per cable in the case of the Golden Gate."

Due in no small part to these novel spinning techniques, construction finished ahead of schedule the following April, with the bridge officially opening on May 27 1937. Reports from our predecessors in 1936 heralded the fact that not a single death or even a permanent injury had occurred up to that point but, alas, that statistic was not to hold. Ten men perished as the bridge neared completion in 1937, when a platform that was attached to a rolling hanger on a track collapsed. Initially saved by the safety net in place beneath, the platform proved too heavy, and the net gave way. Just two of the 12 ironworkers survived the 200 ft drop to the Pacific below.

Over the course of the bridge's construction 19 other workers were saved by the nets, going on to form the infamous Half Way to Hell Club. The Golden Gate itself remained the longest suspension bridge in the world until 1964, and the tallest until 1998.

While its dimensions may have been surpassed, its place in the public consciousness has not, and it remains arguably the most famous bridge ever constructed.

**You can read more about the history of bridges and the inventor of *in-situ* cable spinning in [this feature](#) from our 160th anniversary commemoration**

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JW 17th August 2016 at 1:53 pm

And it is still ranked 13th longest in the world – some achievement for 1937! To be pedantic, the bridge does not go above the Pacific Ocean, but the Golden Gate Strait – the bridge got its name from said strait and not because of its colour (as some may think). The Golden Gate Strait is between the Pacific and San Francisco Bay and is a very deep channel with strong currents in the middle. But whatever, it's a beautiful piece of engineering set in a beautiful part of the world.

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