There are two essential moments in the story of Texas’s independence. First, despair: the Battle of the Alamo, the 13-day siege in February and March of 1836 during which Mexican General Antonio López de Santa Anna defeated and killed the so-called “Texian” fighters. Then, triumph: Sam Houston’s victory over Santa Anna less than two months later at the Battle of San Jacinto, 22 mi east of present-day Houston.

The latter led to the creation of the Republic of Texas in 1836, followed by Texas’s admittance to the United States of America in 1845 as its 28th state. Houston’s crowning moment also led to the creation of the nation’s largest stone column monument, the San Jacinto Monument.

The monument was built on the rise in the middle of the battlefield that separated Houston’s troops from Santa Anna’s. In the days preceding the battle, Santa Anna was confident he would prevail. He had “spent a lot of his campaign money on victory medals minted before he left,” says Larry Spasic, the president of the San Jacinto Museum of History. And his confidence was justified. Most of the fighting between the Mexican Army and the amateur Texan soldiers—mostly farmers and merchants—had gone decisively in favor of the Mexicans. Santa Anna believed his victory at the Alamo was the battle that counted. He was eager to finish mopping up and get back to Mexico City.

The decisive battle for Texas’s independence—which occurred on April 21—lasted just 18 minutes. As Spasic explains, Santa Anna’s men were exhausted. They had stayed up all night erecting a “flimsy barricade of pack saddles, salt bags, and branches.” Reinforcements had marched all night to reach him.

Santa Anna expected the battle to commence in the morning, a commonplace occurrence in the great military engagements in Europe. Houston also knew this but allowed his forces to get plenty of rest. He delayed the attack until the afternoon, a point at which Santa Anna had allowed his troops to relax.

When Houston’s motivated forces charged in the late afternoon—“raining down what they felt was justice for what happened at the Alamo,” says Spasic—against a tired, poorly supplied force, the fight was over quickly.

Santa Anna escaped by horse but was later captured by Houston’s troops. Most of them wanted to hang Santa Anna; instead, Houston spared him and persuaded his opponent to sign a treaty removing his troops to the south. Santa Anna did so, and as the retreating Mexican Army got bogged down in bad weather, they eventually departed Texas altogether.

One hundred years after the battle, Texas planned a statewide, yearlong centennial. Houston financier and developer Jesse Jones, who helped organize the centennial, wanted to create a lasting memorial to honor all who had fought for Texas’s independence. At the time, Jones was one of the most powerful men in the country: he had been chair of the Resolution Finance Corporation, the federal financial institution responsible for helping steer the country out of the Great Depression, between 1933 and 1939, and the U.S. Secretary of Commerce between 1940 and 1945.

Jones knew that even at the end of a massive centennial, nothing would remain of the celebration except pictures and memories, says Spasic. “He did not want this to disappear.”

Though the design of the memorial is credited to Houston architect Alfred C. Finn, Jones himself was the monument’s real author. For inspiration, he turned to his two favorite memorials in the nation’s capital. “If you set the Washington Monument on top of the Lincoln Memorial, and then you put a star representing
the single Mexican state of Tejas that was able to withstand the dictatorial powers of General Santa Anna on top, that was the idea [that] came up," says Spasic.

While the Washington Monument is a smooth, archetypical obelisk, the San Jacinto is a more jaunty, fluted, Art Moderne column capped with a bold star. At just under 570 ft, it is one of the tallest stone memorial columns in the world. Because the $1.5-million project was partially funded by the Works Progress Administration (WPA), federal authorities had some say in its design, and they wanted the tower to remain smaller than the Washington Monument, which stands 555 feet.

"Like any good Texans, we assured them, sending them measurements that fed into the notion that it would not be as tall as the Washington Monument," Spasic says. Not surprisingly, given the state's penchant for proclaiming itself the biggest and best at everything, the Texans' measurements deliberately began at the first floor above ground (yielding a height of 549 ft) instead of from grade. The difference? An extra 15 ft. Once the project was under way, it was too late to change the design. (The actual height is 567.31 ft.)

Visitors to the monument "expect to hear a tall Texas tale," Spasic says. "If you don't have one to tell, they get rather irate about it. This is one of the true stories we can tell."

Jones may have essentially designed the monument, but he relied on his engineer, Robert J. Cummins, and the W.S. Bellows Construction Corporation, to get it off the ground. The large 124 by 124 ft base structure features beveled edges in plan. Its size was necessitated by the nature of the foundation soil, a red clay that required the engineer to use an integral mass footing. According to a 2007 article "Building a Memorial to Match the Battle," in the journal *Houston History* (Barbara Eaves; University of Houston Center for Public History, volume 4, number 2, pages 31–37), the foundation had to be wide enough to support the structure of the column and to resist hurricane-strength wind pressure.

The foundation was designed by Raymond F. Dawson, a University of Texas at Austin professor and the geotechnical engineer for the project. Once the site of the base was excavated, a concrete seal slab 3 in. thick was placed to prevent the red clay from drying out, which would have increased the potential for shrinking and swelling of the soil, as well as to serve as a floor for the placement of the reinforcing steel.

According to a 1938 article in the *Journal of the American Concrete Institute* written by Architect Alfred C. Finn, left, and engineer Robert J. Cummins, center, stand atop the under-construction monument, above. Inside the tower, a scaffold was built to construct the forms and place the monument's concrete. On the outside of the shaft, a pair of scaffolds were used to set and point the stone, below.

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C.A. Bullen, the project's contractor, the reinforcing steel consisted of 426, 110 ft long, 2 in. square bars. Because the bars were easily bent, a "structural cradle was made to pick up the bars at two points, 65 ft apart." The bars, Bullen continued, were then lashed to an 85 ft pole to keep them from bending; two 45 ft tall boom cranes later placed them in the mat. Any bars that were bent in transit were later straightened by pulling them through a "railroad rail bender with a truck," the article stated.

But the real challenge lay ahead. Cummins and Finn specified that the concrete foundation had to be placed in one continuous action. According to Eaves, the single placement was necessary because cold joints, which would develop during multiple placements, might cause the large mat to pull apart. Cummins and Bellows planned a variety of measures to ensure that the concrete could flow for hours on end. Two backup mixers were kept at the ready, as well as two batching plants, with sand and gravel at hand, along with spare cranes. "Had it cured unevenly and cracked, they would have had to break it up, pull it out, and repour it," says Spasic. "That would have bankrupted the W.S. Bellows Construction Company. They left nothing to chance."

The precautions didn’t end there. Bullen wrote, "A system of floodlights was installed for night work, with carbide lights on hand in the event of an electrical failure. As a precaution against rain a large circus tent was set up over the excavation with drainage ditches provided to take away the water from the tent."

Workers came from cities within 20 mi—a WPA requirement. Of the 150 crew members on the job, roughly 80 percent had no construction experience, necessitating several dress rehearsals. In the single 57-hour placement, the workers consumed 3,800 sandwiches and 5,700 cups of coffee. When the work was completed, the foundation was capable of supporting more than 146 million lbs.

The settlement of the monument’s column was extensively monitored from the beginning. According to Jean-Louis Briaud, Ph.D., P.E., D.GE, Dist.M.ASCE, a distinguished professor and the Spencer J. Buchanan Chair Professor and Regents Fellow of the Zachry Department of Civil Engineering at Texas A&M University, the monument has settled about 13 in. since it was completed.

As the octagonal shaft rises, it tapers from 48 ft square to 30 ft square at the observation tower. The walls are 4 ft thick at the base and 2 ft thick at the top. According to Bullen, building the obelisk required two structural steel towers, "consisting of four 8 in. H-columns and four 6 in. H-columns tied together with the necessary horizontal and sway bracing." The towers were built about 100 ft above the level of construction, he wrote, and supported a 50 ft square platform located in the interior.

A "system of differential drums and eight 5-ton hand
[winches]” enabled the platform to be raised “by cranking the [winches] at the rate of 1 ft. in five minutes,” Bullen wrote. Inside the tower, a working scaffold was erected for building the forms and placing the concrete; another scaffold was placed 15 ft lower for disassembling the forms.

Meanwhile, on the outside of the shaft, a 3 ft wide scaffold was erected from which masons could set the shell-lined Cordova limestone used to face the tower. Each stone weighed a maximum of 500 lbs; these were, Bullen wrote, “taken to the top working platform on the cage and lowered through trap-doors with mobile hand-operated stone derricks to the wall below, where they were set by the masons.” Ten feet below this scaffold sat another narrower structure, “which was used for cleaning and pointing the stone, thus completing all work as the scaffold went up.” In total the platforms supported 65 tons—including their own weight, the stones, and approximately 75 workers.

Spasic says that to create 6 ft of wall a day, it was necessary to place 3 tons of steel, set one carload of stone, place 75 yds of concrete, build 1,200 sq ft of forms, point 1,000 linear ft of stone joints, and raise 65 tons of working scaffold by 6 ft.

Jones hired William McVey to sculpt a series of eight panels depicting important moments in Texas history. The stone for these pieces weighed about 8,000 lbs each; they were set by means of a pair of 45 ft tall booms fastened to diagonal corners of the structural steel tower.

Perhaps the trickiest design feature was the 34 ft tall, 200-ton star that capped the monument. Initially, Jones and McVey considered putting a soldier on top of the column, then eagles. (Houston claimed eagles were always at hand when he made propitious decisions.)

Finn drew up a two-dimensional star, but Jones nixed it because it was too thin on the sides. The final, three-dimensional version appears as a star from 360 degrees—it has nine points, with each point formed by four sides.

Getting the material to build the star atop the column was as daunting as the design. According to Bullen, “14-in. eye beams were placed on the top slab and allowed to cantilever out over the walls about 6 ft.” The beams were placed over the wall to create a scaffolding, which was then linked to the observation deck by a 90 ft tubular tower. "A cage was placed in this construction tower and all materials were taken up the inside of the shaft to elevation 500 and then transferred to the outside cage and carried to elevation 570."

Workers brought 12-by-12 in. blocks of stone, each 3 in. thick and cut to fit the shape of the star, up to the top of the column. Bullen noted that because of the unusual shape of the form, no piece of stone was “set either plum or level.” In some cases, he wrote, “a form was built to hold up the stone, the stone laid on the form, the reinforcing steel placed on top of the stone, and another form built then the concrete placed.” Other times, the process was reversed.

White cement mortar was used in laying all the stones on the star to eliminate pointing. “It’s a beautiful star, a beautiful work of engineering,” Spasic says.

The memorial, weighing just over 70 million lbs, was completed and opened in 1939. The grounds of the site also include a 1,700 by 200 ft reflecting pool (somewhat shorter but a little wider than the Lincoln Memorial Reflecting Pool in Washington, D.C.). The base of the monument houses the museum.

Though it is located near the massive petrochemical complex that lines the Houston Ship Channel, the monument remains a popular draw, bringing in hundreds of thousands of visitors a year from across the state, around the country, and more than 50 nations each year. The San Jacinto Monument was designated a national historic civil engineering landmark in ASCE’s Historic Civil Engineering Landmark Program in 1992, and an inscription at the base of the monument makes its significance clear: “San Jacinto was one of the decisive battles of the world,” it says, paving the way for the statehood of not only Texas but most of the United States west of the Mississippi River. —T.R. WITCHER

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