

## E. Q. Sullivan

Chief Engineer, Division VIII, California Division of Highways

October 1, 1923 - August 3, 1950



E.Q. Sullivan was born in San Diego in 1887, and completed high school in 1907. In the summer of 1907 he went to work for the Santa Fe Railroad in San Bernardino as a "stake puncher" on a survey party, remaining that job until 1908.

During that year he progressed to chief of a small survey party. He started engineering studies at UCLA in 1908, and in the following summer vacation, he worked for Santa Fe as an inspector on construction work.

Following his sophomore year, he stayed out for a year to save enough money to complete his engineering program, working for Santa Fe as an inspector and surveyor on construction projects.

When he graduated from UCLA in 1913, he worked for a private engineer in Los Angeles as construction superintendent on a number of jobs, one of which was the North Main Street railroad bridge in Riverside, which was later written up in *Engineering News Record* in which the opinion was expressed that this was the first reinforced concrete bridge for railroad use in the United States.

In the late fall of 1913, he went to work as construction superintendent for Paramount Pictures constructing their studios. In the spring of 1914, he passed the first civil service examination that had been offered by the state, and went to work for the state on August 3, 1914, at about half the pay he had received at Paramount, as Assistant Resident Engineer in Division II. He worked progressively as superintendent and resident engineer on day labor and contract construction of roads and bridges until his appointment as Assistant District Engineer in 1922.

On October 1, 1923, when Division VIII was established, he was appointed Acting Division Engineer in Bernardino, taking over Riverside, Imperial and San Bernardino Counties from Division VII. He was told at that time by the chief engineer of the Division of Highways that the object in creating Division VIII was to relieve Division VII of the burden of locating and constructing the interstate connections to Southern California.

At that time, the road that was to become U.S. 66 [the National Old Trails Road], the road from Blythe to Redlands, that was to become U.S. 60, and the road from Yuma, across the sand dunes of Imperial Valley, that was to be numbered U.S. 80, were the three interstate connections.

In his autobiography, published in *California Highways and Public Works* when he retired on August 3, 1950, he stated, "The roads were practically impassable. The only road that carried any appreciable traffic was [the future U.S. 66 - National Old Trails Road]. This road was two ruts in the sand; where the ground was hard, it was two rows of chuck holes. "

"It required 2 1/2 days to go from San Bernardino to Needles, a distance of 240 miles."

"A plank road eight feet wide had been built across the sand dunes on the Yuma to San Diego road, but I was instructed to find a better solution since this plank road had already grown to be inadequate even for the slight traffic of 1923. The plank road was designed to be raised or lowered to conform to the shifting sand. The maintenance cost was extremely excessive."

"This design was a standard design throughout the world for similar conditions; no attempt had ever previously been made to build a road on a permanent line and grade across moving sand dunes. The solution to the problem was found after two years of research. The research consisted of construction of a wind tunnel and a thorough, experimental study of the behavior of moving sand. At the same, field studies were undertaken and careful observations and measurements were recorded of the sand dune behavior on locations across the dunes."

"The solution to the problem was a combination of proper alignment relative to prevailing wind direction plus profile elevation relative to the height of moving dunes. At that time, there was no literature on this subject, and, for many years, engineers from all over the world visited Division VIII to observe this road and to consult on similar problems in their countries. Engineers came from Egypt, Australia, Chile, Peru, and South Africa."

Based on the findings of the sand dune research, a project was initiated to construct a 20-foot wide asphaltic concrete road on top of a built-up sand embankment above the level of adjacent sand dunes, with oiled side slopes to prevent wind erosion. The new road, built under the direction of E.Q. Sullivan, was officially opened on August 12, 1926.

Throughout his 27-year career with Division VIII, later District 8, Sullivan concentrated on development of desert highways surfaced with light bituminous pavements and the study of movement of wind-born sand and dust as it affects highways and drainage areas. Under his direction, the interstate highways entering Southern California were paved during the late 1920's.

Over the years he wrote numerous papers for magazines and engineering journals on the subject of the movement of wind-born sand and dust, resulting in extensive correspondence with engineers of foreign countries.

Upon his retirement in 1950, T.E. Stanton, head of the Materials Laboratory in Sacramento, who, as Assistant State Engineer, had interviewed Sullivan in 1923 for the position of Division VIII Chief Engineer, in a letter to Sullivan, wrote, "Your pioneering a quarter of a century ago in the road or plant mix type of construction in which local granular material is uniformly mixed with asphaltic road oils and thereafter consolidated to form an excellent uniform compact and dustless surface for traffic over hundreds of miles of roads where the cost of the more expensive type surfaces would be prohibitive, at least with the funds available, merits special commendation. The state and nation owes you a great debt of gratitude for your outstanding contributions."