

Railroad Through Desert Built by the Southern Pacific Railroad Under Traffic Contract with the City of Los Angeles

by Board of Public Service Commissioners of the City of Los Angeles

The region through which the Aqueduct had to be built, from the Coast range north, was an unoccupied desert, in which very little forage or water could be obtained for teams. The amount of freight that had to be transported in this region was estimated to be about 20 million ton-miles. North of Mojave it was computed that 210,000 tons had to be moved an average distance of about 65 miles, or nearly 14 million ton-miles of freight. If this hauling were done by wagons, the forage for the animals engaged in the work would of itself be a very large item. A freight team will not make over 20 miles a day, or a round trip of 10 miles, and will consume at least 25 pounds of forage for the animal per day. With an average haul of 65 miles, each animal would require 162 pounds of forage for the round trip, or nearly 10 percent of the total weight that it could haul.

Bids were called for in December, 1907, for the transportation of freight by teams, and the lowest bid offered was 28 cents per ton mile. This was for the portion of the line on which the roads were the best. Numerous bids were subsequently obtained for the hauling of freight over the level desert roads, particularly west of Mojave, and 25 cents per ton-mile was the lowest figure obtained except in one small and unusual contract.

Rail Transportation

It therefore became necessary to study the question of rail transportation, and a preliminary railway location was made from Mojave to Owens Lake. The amount of freight to be hauled, together with the estimated costs of constructing, operating and subsequently selling as salvaged material the track that was laid, resulted in the conclusion that the City could build such a railroad and operate it at a cost of 10 cents per ton mile for freight, or about one-third of the amount that was bid by contractors.



SP rails near Olancha

As the work on the Aqueduct progressed, the City purchased its own live stock and wagons and thoroughly organized the wagon transportation business from Mojave west, and it was found that by using 12-animal teams with one driver and two wagons, freight could be transported at a cost of from 12 to 15 cents per ton-mile, when it had to be moved in great bulk, and this was done over the good roads in the flat country west of Mojave and Lancaster, for which region no railroad was built.

For a long haul of 130 miles from Mojave north, it was decided that it was necessary to have a railroad. The Owens Valley region was served by a narrow gauge railroad, which comes south from the Central Pacific at Reno and Hazen and passes over two high summits, one of which is 7,000 feet in elevation, but this road did not come south of Owens Valley points. This road is a portion of the Harriman system. It was believed that the building of a broad gauge railroad from Mojave north to Owens Valley would make this agricultural and mining region tributary to Los Angeles, and would ultimately result in a standard railroad connection through to the Central Pacific, which would be decidedly to the advantage of Southern California. For this reason it was desirable to have this road

built by a railroad corporation, rather than by the City, as the City would be forced to abandon the line after it was through with it for construction purposes.

Southern Pacific Interested

Preliminary negotiations were entered into with the Santa Fe Railroad, Southern Pacific Company, and the Western Pacific Railroad, but the only organization that showed interest in the situation was the Southern Pacific Company. The general route of the road necessary for the construction of the Aqueduct was outlined, with a schedule of dates, showing when it would be necessary for the road to be built to certain points in order to facilitate the work, and figures on this basis were obtained from the Southern Pacific Company. The road was considered as extending from Mojave to Olancho, a distance of 100 miles, by the line of the City's survey, and 118 miles by the route proposed by the Southern Pacific Company. The Southern Pacific line made a detour to the east of the Freeman Division, which made it necessary for the City to build and operate six miles of branch line in the Red Rock Canyon of the Jawbone division. This extra cost of the Red Rock Spur was added, in the comparative estimate, to the figures of the Southern Pacific Company. While the Southern Pacific line, in this estimate, was considered as stopping at Olancho, where the City road would stop, as a matter of fact it continued 20 miles beyond Olancho through Lone Pine to Owenyo, and the estimate, therefore, should show a much more favorable figure for the Southern Pacific proposition.

Cost of Railroad Construction

The estimated cost of building the road by the City was \$1,390,000.00 with a salvage value of \$350,000.00. The rail figured upon for the City road was 50-pound, which would be too light for a commercial railroad. After figuring on interest, equipment, operating expenses and salvage, the cost of the transportation of freight over the City road was estimated at \$1,634,237.00. Under the tariff schedule submitted by the Southern Pacific Company, the cost of transportation was \$837,358.00, to which was added the cost of the Red Rock Road \$88,000.00, operating the Red Rock Railroad \$18,200.00, distribution of freight on the Freeman Division at an excess cost of \$63,000.00, (due to the less favorable location of the Southern Pacific Road,) making a total of \$1,006,558.00. This showed a net saving to the City of \$627,679.00 from acceptance of the Southern Pacific bid.

In addition to the local freight to be moved north of Mojave, there was a large amount of material and supplies to be moved over the existing main line. Nearly one-half of this consisted of cement, which had a short haul from Tehachapi to Mojave of 17½ miles. Machinery and steel for the siphons would have to be shipped from the East, over transcontinental lines, amounting in all to possibly 20,000 tons. The suggestion was made by the railroad people that if they could obtain the routing of this eastern freight, a still lower bid could be made on the transportation of the local freight from Mojave north. The statement was made that this eastern freight would be handled at the minimum schedule rates and as low as any other transcontinental road would transport it. The reduction that was offered in the local freight rates, from Mojave north, in case this eastern freight could be controlled in this manner, amounted to fully \$140,000.00.

At a conference on November 25th, 1907, between the Board of Public Works; a Committee of the Chamber of Commerce, the full Board of Water Commissioners, Engineers Mulholland and Lippincott and Attorney W. B. Mathews, it was decided that no arrangements for building the new road or transporting the Aqueduct freight over the same, or routing the outside freight, should be made with any company except after advertisement for bids, the contract to be awarded to the lowest regular responsible bidder.

Formal specifications were prepared and advertisement made, and on the 10th day of April, 1908, a contract was entered into with the Southern Pacific Company for construction of the railroad and the transportation of local freight, the routing of the transcontinental freight being given to the Southern Pacific Company.

Saving in Freight Rates

To summarize, the Board of Public Works received bids for the transporting of freight by wagon haul of 28 cents per ton-mile; the estimate of their engineers for the building and operation of a City railroad would result in a cost of 10 cents per ton mile; and a contract was entered into with the Southern Pacific Company for the building of this road and the handling of freight at an average cost of 4½ cents per ton-mile.

The Southern Pacific Company built this road nearly a year in advance of the contract time schedule, and the tariff sheets, that were embodied in the contract for the City, became the rates which were paid by all private parties for the transportation of freight over this line during the period in which the Aqueduct was built.

The federal laws, regulating railroad rates and prohibiting special rates, make specific exceptions in favor of federal, state or municipal institutions. The City of Los Angeles obtained from the Santa Fe Railroad and the Southern Pacific Company one-half class rates on local freights shipped for the construction of the Los Angeles Aqueduct, on lines other than the one which was constructed specifically for the City. In cases where the commodity rate was lower than the class rate, the City received the benefit of the commodity rate. All freight moving to the Los Angeles Aqueduct west of Salt Lake and El Paso, and south of Portland, was considered as local freight. The Southern Pacific Company also made Mojave, Lancaster, Saugus and Owens Valley stations on the Nevada and California (old narrow gauge) Railway, Pacific Coast terminal points for all transcontinental freight for the Los Angeles Aqueduct. The granting of these special freight rates meant the saving of many thousands of dollar on the construction of the Aqueduct.

Red Rock Railroad

The Red Rock Railroad was a branch line built from Cantil Siding, which is 23 miles north of Mojave, up the Red Rock Canyon to the line of the Aqueduct, a distance of nine miles. The freight carried over this road supplied the north end of the Jawbone division, and about 15 miles of the Freeman division. The road was built because of the exceedingly sandy character of the wagon road in the canyon, which made the hauling of freight on wagons almost prohibitive.

A contract was made with the Southern Pacific Company in September, 1908, for the construction of this road. It provided that material for the building of the road should be sold at cost, but that grading and bridge work should be done at cost plus 10 percent. It also contained a provision for the sale of all salvaged materials, when the road was dismantled, the prices to be subject to arbitration.

The road was completed in January, 1909, and was operated continuously for 22 months thereafter. It was dismantled in December, 1910, by the Southern Pacific Company, and the material sold to the railroad company and the U. S. Reclamation Service for approximately \$40,000.00, which is about 65 percent of the original invoice value of the track materials.

The net cost of the railroad to the city including \$15,000.00 for repairs, following, a severe washout, and loss on rolling stock, was \$96,810. The cost of operating the road which was on an average grade of

3.4 percent, was 8 cents per ton-mile, and the total cost for handling 45,059 tons of freight, including washout repairs, dismantling, equipment loss and construction and depreciation charges, was 33.7 cents per ton-mile. Of this amount 20.3 cents per ton-mile was charged for depreciation and construction charges. To have moved this tonnage up the Reel Rock Canyon by means of teams would have cost about 50 cents per ton-mile, and at least \$15,000.00 would have had to be spent on the wagon road to put it in even fair condition. The cost per ton-mile for operating the road was high, because of the shortness of the haul, the unavoidably heavy grades and the low tonnage which was transported.

Traction Engines

Despite the building of the railroads, an enormous amount of hauling was necessary from railroad stations to the various points along the line, and particularly for the portion of the line west of Mojave in what is known as the Antelope Valley. In the Jawbone division, there were well-graded mountain roads, but in the Freeman division and the Antelope Valley, the roads were adapted to a high efficiency for all kinds of wagon hauling. The transportation problem was one of the most serious in the work, on account of the volume of freight, the absence of water in the country, and the long distances.



Traction engine hauling lumber



Traction engine hauling hay

A type of traction engine had been developed in California known as the "Caterpillar," which has a broad continuous track, running over sprocket wheels in such a manner as to give a wide bearing surface and great traction power. One steamer and two gasoline engines of this type were purchased for experimental work on the Jawbone division. The manufacturers placed an expert mechanic in charge of them, and a trial of two or three months' duration was made, under varying conditions of road bed and gradients. At the same time bids were called for for the transportation of freight over these roads by teams. The best bids were 40 cents per ton-mile. The traction engines on this trial materially bettered these figures. They were

especially efficient in hauling heavy loads. Because of this apparent success of the traction engine, additional machines of this type were purchased, until 28 in all were obtained. The traction engines, when new, showed a substantial economy over the contract team transportation.

Reduced Efficiency of Engines

As the work proceeded, two things developed; first, as the traction engines became old, the number of breakdowns greatly increased and the corresponding cost of repairs ran up; second, it was found by experience that by purchasing live stock and wagons and thoroughly organizing the wagon transportation, the figures bid by contractors could be reduced. Teams of from 10 to 14 animals were

handled by one driver and hitched to from two to three heavy wagons. On the desert roads a ton could be hauled to the animal and 20 miles could be covered by a team in one day. This made the cost for team hauling with city stock about one-half the price bid by contractors, or between 12 and 13 cents per ton-mile. These two conditions operated to the disadvantage of the traction engine and resulted in its condemnation as a means of transportation. While the engine could be operated at as low a cost per ton-mile as the team, the cost of re-pairs was as great per ton-mile as the operating cost.

Caterpillars Abandoned

Every effort was made to improve on these conditions. Patterns were obtained for nearly all parts of the engine, castings were made in local shops at low cost, and all machine work was done at the City shops in Mojave. Despite these efforts, the repair bills on the engines were practically prohibitive. After an earnest effort to make a success of these engines, they were finally abandoned and the gas engines taken therefrom for use in places where gaso-line power was desirable. The frame work of some of the engines was used for steel forms for concrete work, and some of the "caterpillars" were sold to private parties for farming purposes. They were the only type of equipment that was purchased in the building of the Aqueduct that was unsatisfactory. In contrast with these disappointing traction engine experiences, the wagon haul record that was made by the Aqueduct organization was satisfactory. Large quantities of material were hauled over the desert roads at prices ranging from 12 to 15 cents per ton-mile, and over the mountainous divisions, where the roads were crooked and the grades ranged from 5 to 7 per cent, the hauling charges varied from 25 to 35 cents per ton-mile.