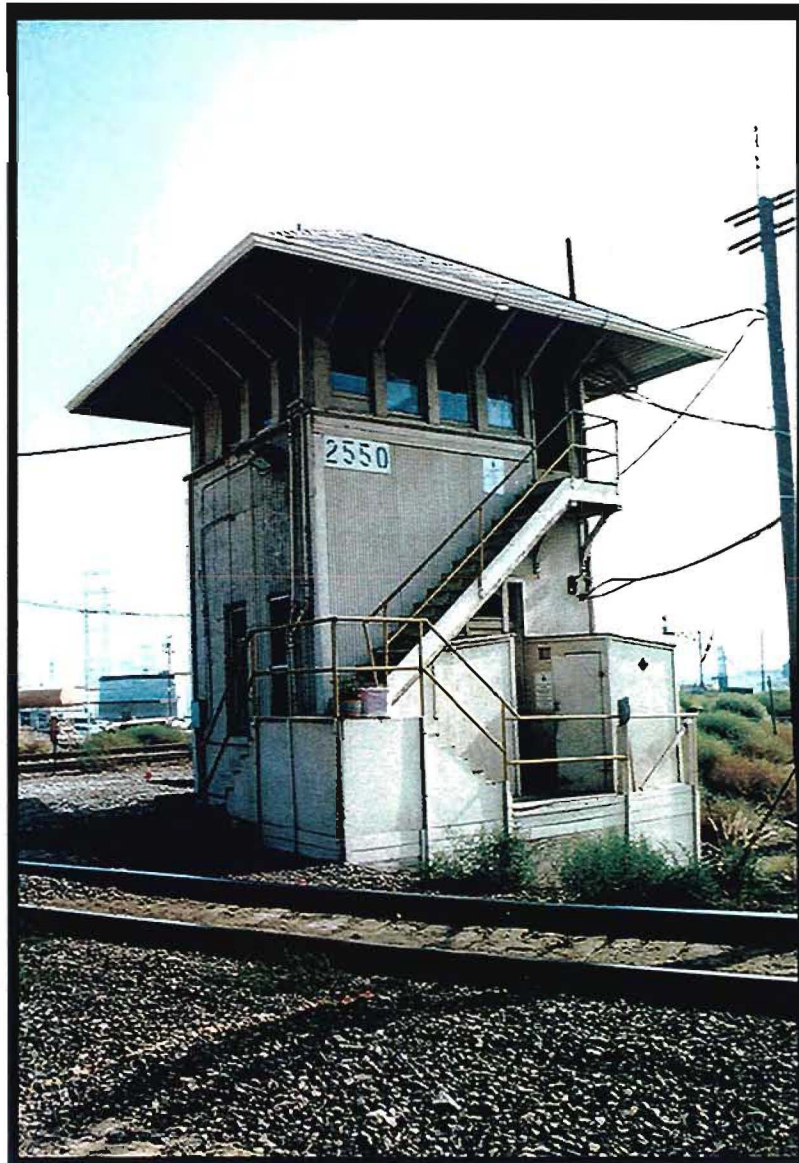


THE ALAMEDA CORRIDOR PROJECT

REDONDO JUNCTION TOWER

1906-2001



**REDONDO JUNCTION
LOS ANGELES, CALIFORNIA**

**Prepared by
Applied EarthWorks, Inc.**

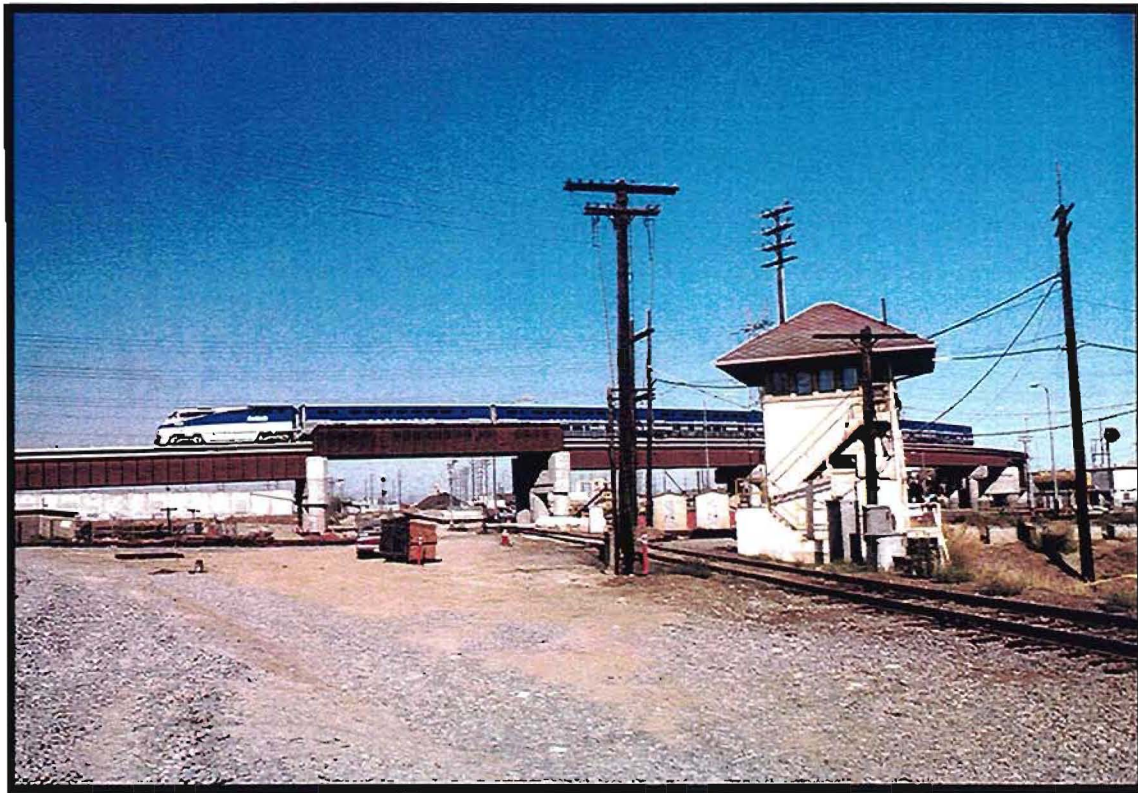
**For
Alameda Corridor Transportation Authority
August 2001**



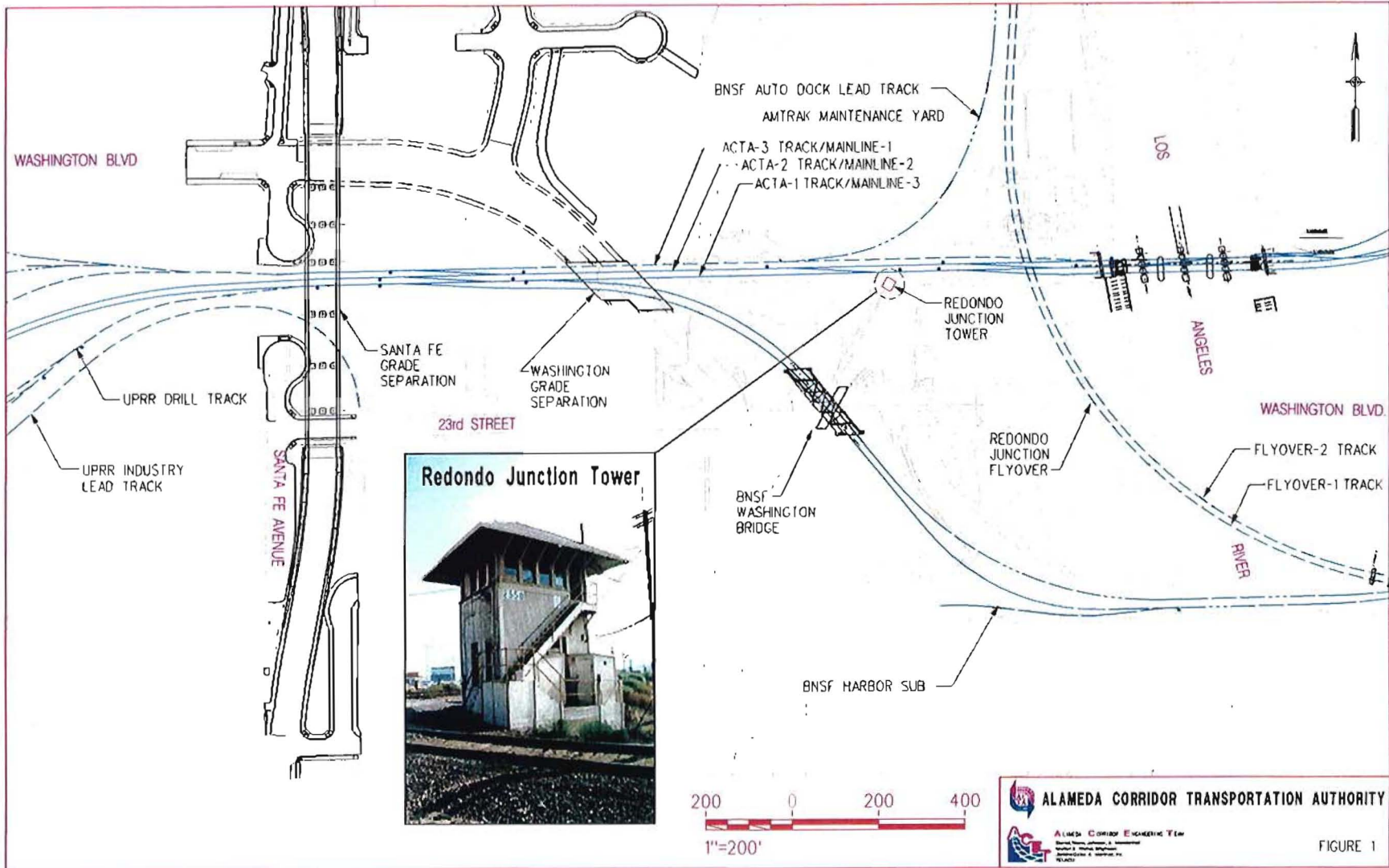
Introduction

Redondo Junction Tower is the last wooden signal tower operating in California (Figure 1). Originally constructed in 1906, Redondo Junction Tower along with several generations of operators served the Los Angeles area 24 hours a day, seven days a week for nearly a century. Most recently, the tower and its operators controlled passenger and freight line crossings associated with the Burlington Northern Santa Fe (BNSF), Union Pacific (UP), Amtrak, and Metrolink rail systems. Operators at Redondo Junction performed signal and switching operations mainly through the use of a circa 1906 electric interlocking machine known as an "interlocker." The interlocker is a type of hand-operated signal and switching device in use at only one other location (Hobart Tower). However, as of August 2001, the practical life of Redondo Junction Tower and its equipment reached completion: technological advances such as automated signal systems and major improvements in the design and engineering of local railroad grades have rendered most tower functions obsolete.

The Alameda Corridor Transportation Authority commissioned this pamphlet to commemorate the end of one era (represented by the interlocking switching tower at Redondo Junction) and the beginning of a new era (signified by computerized central switching and the newly opened Redondo Junction Flyover). Within the following pages the reader will find a brief description of the life and times of the Redondo Junction Tower.



Redondo Junction Flyover



Acknowledgements

The Alameda Corridor Transportation Authority and Applied EarthWorks, Inc. wish to thank the following individuals and organizations for their help, research, and consideration in the preparation of this commemorative pamphlet:

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Editorial assistance by Harley Martin, Senior Planner, Alameda Corridor Engineering Team.

Photo Credits:

"Redondo Junction;" "Redondo Junction Flyover;" "Tower operator, Lewis A. Ketring at communications desk;" "Mile-long freight train approaching Redondo Tower;" "Lower floor interior, Redondo Junction Tower;" "Master mechanic and supervisor's offices;" "Cantilever signal light controlled from Redondo Junction Tower;" "Search light signal controlled from Redondo Junction Tower;" "G-R-S electric interlocking machine 1906 model, Redondo Junction Tower" (x2); "Abandon Redondo Junction Tower, July 9, 2001" Photos Courtesy of David Livingstone

"Redondo Junction Tower with steam engine, ca. 1930s" Donald Duke Collection

"Redondo Junction Tower, Christmas 2000" Courtesy of Allan Gilbert

"Tower Operator, Sheila Dohopolski" Courtesy of Allan Gilbert

"Redondo Junction Tower B&W-1 and -2" by William Dewey

"Southern Pacific Co. standard drawing of interlocking tower, 1910" (x2) Courtesy of Bruce Petty and Shasta Co. Archives

"Southern Pacific freight train passing by the Tower" Courtesy of MBI Media

"Amtrak passenger train passing by the Tower" Courtesy of MBI Media

"Metrolink commuter train passing by the Tower" Courtesy of MBI Media

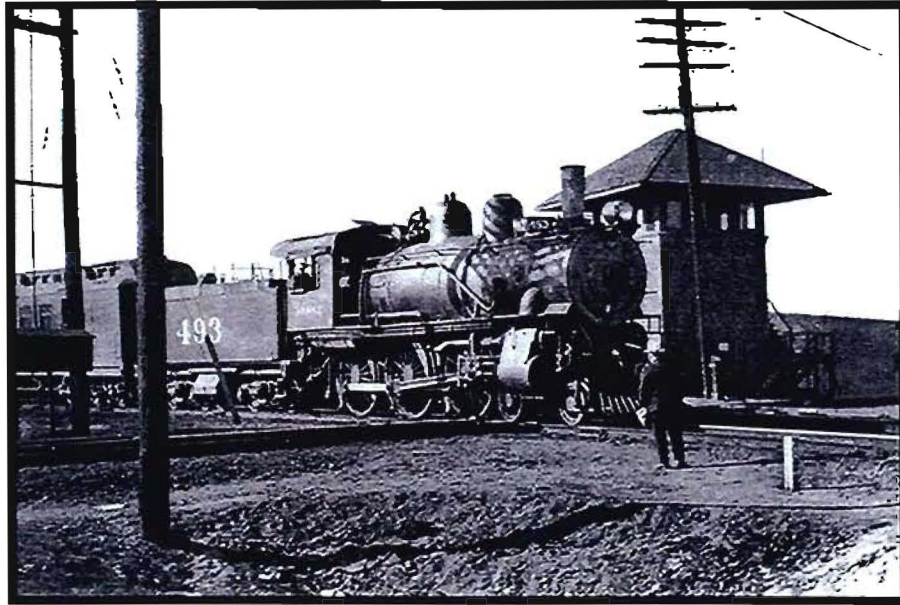
"Railroad signal, 1871" from U.S. Patent Office, Washington, D.C.

Historical Context

From 1887 to 1897, the place known today as Redondo Junction was officially called Ballona Junction, named in conjunction with a railroad and port planned by the Ballona Harbor and Improvement Company. During the late 1880s the company hoped to connect the wetlands at Ballona Slough to the Santa Monica Bay by constructing a harbor 500 feet wide and 2 miles long, and serviced by a wharf 1,000 feet in length with dockage for steamships. The plan also included a railroad line running from Ballona Harbor inland (through Ballona Junction) and into downtown Los Angeles. With the assistance of the Atchison Topeka and Santa Fe Railroad Company (Santa Fe), contractors built the railroad line first. Known as the Los Angeles and Santa Monica Railroad Company, the new line linked Ballona Harbor with rail terminals in Los Angeles via the Santa Fe railway at Ballona Junction. Although extensive dredging operations continued at Ballona Harbor for nearly two years, strong ocean currents quickly re-deposited the excavated sand, thereby foiling all efforts. By 1888 all harbor-building operations ceased. Within a few years, the new rail lines met a similar fate. Through its subsidiary company (the California Central Railway) the Santa Fe abandoned its Ballona Harbor line in 1892.

During the Ballona Harbor effort, a more successful venture occurred at Redondo Beach. Beginning in 1888 using land purchased earlier from the Rancho Dominguez, the Redondo Beach Railway Company (through its parent railways the Southern California and the Santa Fe) quickly and efficiently constructed a harbor and wharf at Port Redondo. The Redondo Beach company also laid a 5-mile rail line that linked up with the main Santa Fe system. By the end of 1889 the wharf and harbor were operational: 85 steamships and over 8,000 tons of freight had arrived at Redondo for transfer via Santa Fe rails to downtown Los Angeles. When it was realized that Ballona Harbor could not succeed, and that the prospects fared better at Redondo, the Santa Fe system renamed Ballona Junction, calling it Redondo Junction. On August 15, 1897 Redondo Junction became the official designation for the place that would eventually include the Redondo Junction Tower.

The Redondo Junction Tower was built in 1906 under an agreement between the Santa Fe Railroad Company and the San Pedro, Los Angeles & Salt Lake Railroad (the SPLA & SL, now part of the Union Pacific). The SPLA & SL built the two-story structure for a total cost of \$18,640. Although operated by Santa Fe personnel, the SPLA & SL covered all operating expenses. The two railway companies erected the signal tower for the purpose of controlling freight trains connecting to the Southern Pacific lines at Alameda and East 25th Streets. From East 25th the lines ran through the Butte Street (or "J") Yard, into Redondo Junction and eastward across the Los Angeles River. The lines coming out of the Butte Street Yard crossed the Santa Fe tracks at Redondo Junction. The Santa Fe lines connected Redondo Beach and all points in between with the downtown L.A. terminal. By 1913, Redondo Junction Tower reported over 100 train actions per day.



Redondo Junction Tower with steam engine, ca. 1930s

In 1906 the Santa Fe acquired complete ownership of all Southern California Railway leases south of Barstow; these properties, which included the lines running between Redondo Beach and L.A., became known as the Los Angeles Division of the Coast Lines, Atchison, Topeka and Santa Fe. The trackage running between Redondo Junction (Los Angeles) and Wilmington were assigned the name "Harbor District," a main branch line 28.0 miles in length. In cooperation with other railway systems (such as the Southern Pacific and the Pacific Electric), the Harbor District line utilized a number of wood frame signal towers including: Redondo Junction Tower (established 1906), Nadeau Park Tower (est. 1897 at Slauson Avenue and Alameda Street), Slauson Tower (est. 1908 on Slauson Avenue at Long Beach Boulevard), and West Thenard Tower (est. 1937 on Alameda Street south of Sepulveda Boulevard).



Redondo Junction Tower, Christmas 2000

The Tower Operators

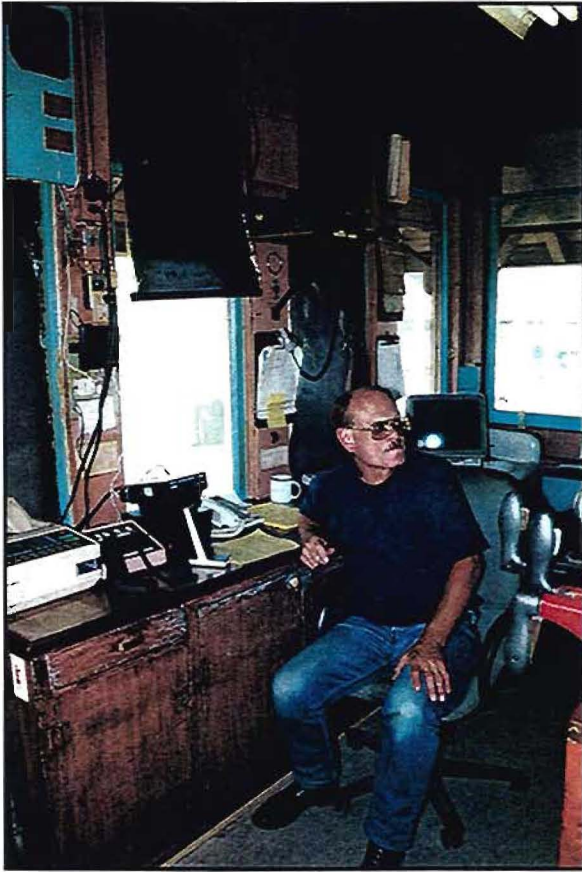
Redondo Junction Tower serviced rail traffic within the Los Angeles Industrial District from late 1906 until July 2001. During the final weeks of operation, tower personnel controlled the movement of approximately 21 passenger trains and 25 freight trains daily. Both male and female operators staffed the tower in three, 8-hours shifts, maintaining signal and switching operations 24 hours a day, 7 days per week. Although technically classified as Railroad Clerks, Santa Fe personnel (and recently, Burlington Northern Santa Fe) staffed the tower under the title of either Operator or Train Traffic Controller. When Redondo Junction Tower ceased operations on July 8, 2001, all Redondo tower operators either retired or moved into other, non-operator positions within the Burlington Northern Santa Fe railway. Because no other signal towers exist within the BNSF western states system, the position of Tower Operator ended with the closure of Redondo Junction Tower. During the preparation of this publication, several tower operators provided insight into the personal side of Redondo Junction.

Sheila Dohopolski was among the last of the women to staff Redondo Junction Tower. Ms. Dohopolski worked as Tower Operator on the night shift for the past 6 1/2 years. According to Sheila, railroading was always a part of her family: her father worked for the Santa Fe for over 30 years, serving



as Yard Master at nearby Hobart Yard. Sheila's grandfather saw duty on the Union Pacific. Sheila began working for the Santa Fe as a clerk when she was only 18. After a time, she left the Santa Fe to raise two daughters. Just over 6 years ago, Sheila restarted her service career with the Santa Fe, staffing the Redondo Junction Tower in the capacity of night shift operator. One of Ms. Dohopolski's most pleasant memories while working as Operator occurred last Christmas when in the spirit of the season, she lit up the exterior of the tower with Christmas lights. Engineers and conductors voiced their appreciation over the radio and waved and cheered as they passed by the festive tower. Sheila manned the tower on its final day of operation. Each freight train that passed through the Junction decelerated more so than usual so that engineers and conductors could wave their last farewells and bid "Good Luck!" to Tower Operator Sheila Dohopolski.

Tower operator, Sheila Dohopolski

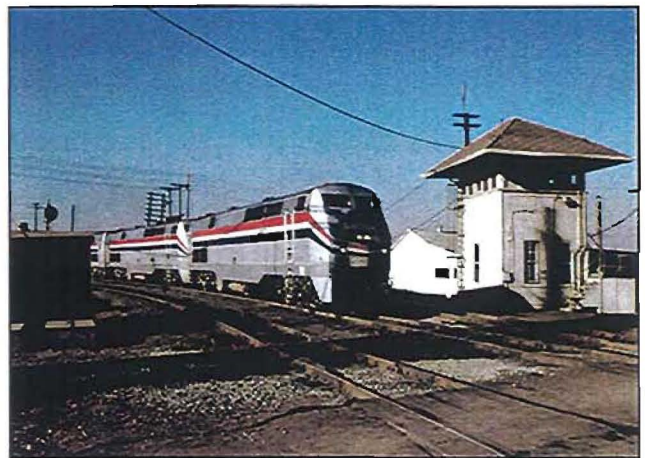


Tower operator, Lewis A. Ketring at communications desk

Lewis A. Ketring worked for the Santa Fe and BNSF for over 42 years. For much of that time, Lewis manned the Redondo Junction Tower as its day shift Operator. Mr. Ketring also descended from two generations of railroaders. His father and both grandfathers worked for western railway companies. Lewis would tell those interested in such matters that every day at Redondo Junction was a special day. For instance, Mr. Ketring admitted a certain fondness for the business of running mile and a half long freight trains and sleek commuter liners through the junction. No train was the same. Each had its own story, its own cargo, and its own busy passengers with unique destinations. Freight trains arrived daily from the L.A. Harbor: Fully loaded with double-stacks of heavy cargo containers, they snaked their way across Santa Fe Avenue, rumbled through the Junction, 8,000 feet or more in length, and headed eastward across the Los Angeles River Bridge. Lewis knew many of the engineers driving the heavy cargo wagons. Lewis also served as Tower Operator during Redondo Junction's last day. Many railroaders, young and old, will miss Mr. Ketring.



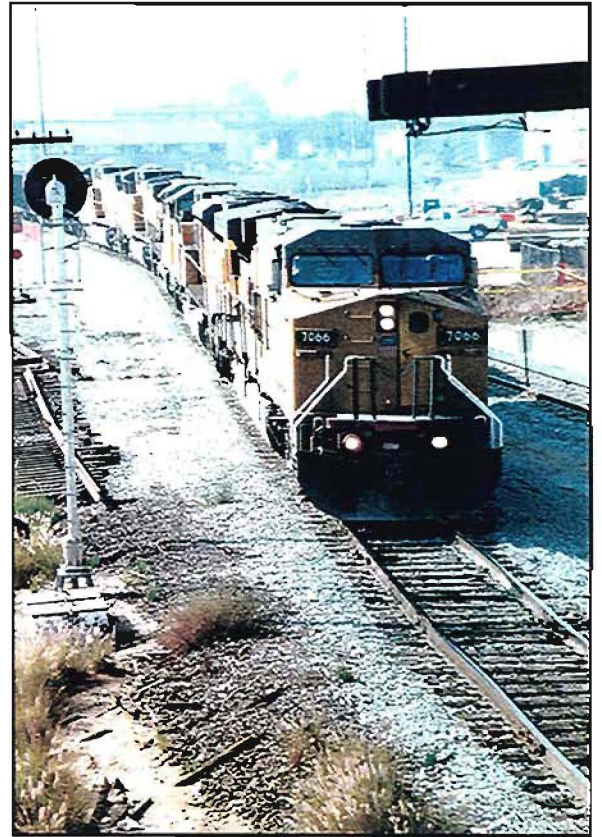
Southern Pacific freight train passing by the Tower.



Amtrak passenger train passing by the Tower.

No history of Redondo Junction Tower would be complete without recounting one of California's worst train wrecks. It occurred in winter darkness just a few yards from Redondo Junction Tower. The tower operator on duty that terrible night reported the details to Santa Fe official Loren B. Joplin. Years later, Investigator Joplin recounted the tragic affair in the journal *Warbonnet* in an article entitled, "A Bad Night at Redondo Junction." The story went something like this:

On Sunday evening January 22, 1956, the Santa Fe's commuter train, the *San Diegan*, departed Union Station filled to capacity with close to 200 passengers. That night, all operations seemed normal: Having slowly pulled out of Union Station, the engineer throttled up as he cleared Mission Tower; the train quickly gained speed as it rolled southward along the L.A. River straightaway. Heading towards the Redondo Junction signal zone, the train continued its acceleration. But here is where something went terribly wrong. Normally, a train would be required to slow to 15 mph as it entered the Junction's signal controls and the 90-degree curve situated next to the tower. However, the engineer claimed that night that he "blacked out" just before reaching the curve. The Redondo Junction tower operator watched helplessly as the speeding passenger train failed to negotiate the steep curve. In a shower of sparks, the *San Diegan* flipped over on its left side and slid along the rails. Rescue teams and news crews rushed to the scene. In the end, 30 passengers died and 117 were injured. Today, safer passenger trains and longer grades with higher speed tolerances have greatly reduced this type of accident.



Mile-long freight train approaching Redondo Junction Tower



Metrolink commuter train passing by the Tower.

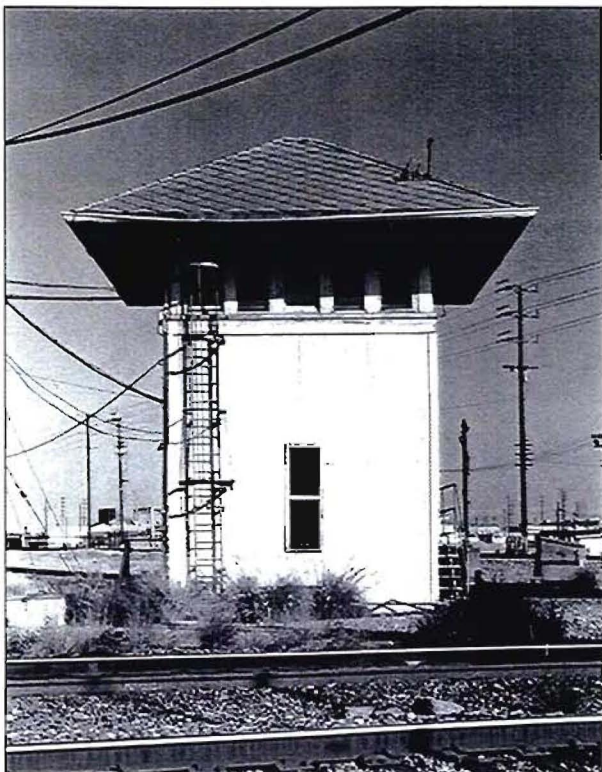
Tower Architecture

Redondo Junction Tower is a Prairie style, redwood-frame building which measures roughly 14 feet by 15 feet by 20 feet high. The tower rests on a poured-and-formed concrete foundation. The main structure is framed with 3-inch by 6-inch oversize (rough-hewn) redwood; and the original siding consists of 4-inch redwood shiplapping laid horizontally (and now covered with plywood). Redondo Junction Tower originally housed a Model 2 (type) G-R-S Electric Interlocking Machine, multiple communications systems and a lavatory.

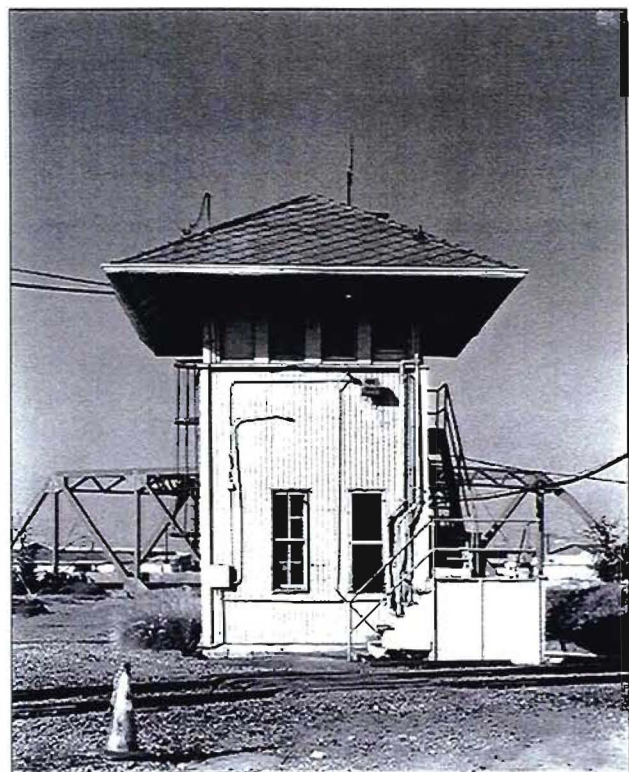
The tower structure consists of two floors: The first (lower) floor houses the interlocking machine's electrical components; the second (upper) floor consists of a manned observation deck with 16 windows providing a 360 degree view of Redondo Junction and environs. The upper floor also contains an electric interlocking machine and switching levers, a communications desk, and circa 1906 handcrafted oak cabinetry. A wooden stairway connects the upper and lower floors via the exterior of the building. Each floor is accessed on the south and west side via solid hardwood and glazed doors.



Lower floor interior, Redondo Junction Tower



Redondo Junction Tower B&W-1



Redondo Junction Tower B&W-2

Redondo Junction Tower and the National Register

According to the *Alameda Corridor Historic Property Survey Report*, Redondo Junction Tower forms a part of a Historic District considered eligible for the National Register of Historic Places. Known as the Atchison, Topeka & Santa Fe Redondo Junction/Butte Street Yard District, it is located within the Central Industrial District of Los Angeles west of the Los Angeles River, north of Butte Street and east of East 15th Street.

The Atchison, Topeka & Santa Fe Redondo Junction/Butte Street Yard District consists of three main buildings: (1) The Redondo Junction Tower, (2) the (demolished) Redondo Junction Roundhouse and turntable, and (3) the Master Mechanic and Locomotive Supervisor's Offices. The roundhouse and the Master Mechanic and Supervisor's Offices are owned by the National Railroad Passenger Corporation (Amtrak); Redondo Junction Tower is owned by the Los Angeles Metropolitan Transportation Authority (MTA). The roundhouse was demolished in June 2000, the Master Mechanic and Locomotive Supervisor's Offices are scheduled for demolition in the near future, and the fate of Redondo Junction Tower remains uncertain.



Master mechanic and supervisor's offices

Interlocking Towers

Dozens of two-story wood, brick, or concrete signal towers once dominated the landscape along the various Southern California railroad right-of-ways. Locally, especially between the 1880s and the 1930s when railroad companies erected most of these signal towers, the flat basin lands between Alameda Street and the Los Angeles River were only sparsely populated; few residences and even fewer commercial and industrial buildings existed, making the two-story interlocking towers visible along the horizon for miles. Signal towers within the Alameda Corridor controlled freight and passenger crossings for all of the major railroad companies, including the Southern California Railway, the Pacific Electric, the Southern Pacific, the Union Pacific, and the Atchison, Topeka and Santa Fe.

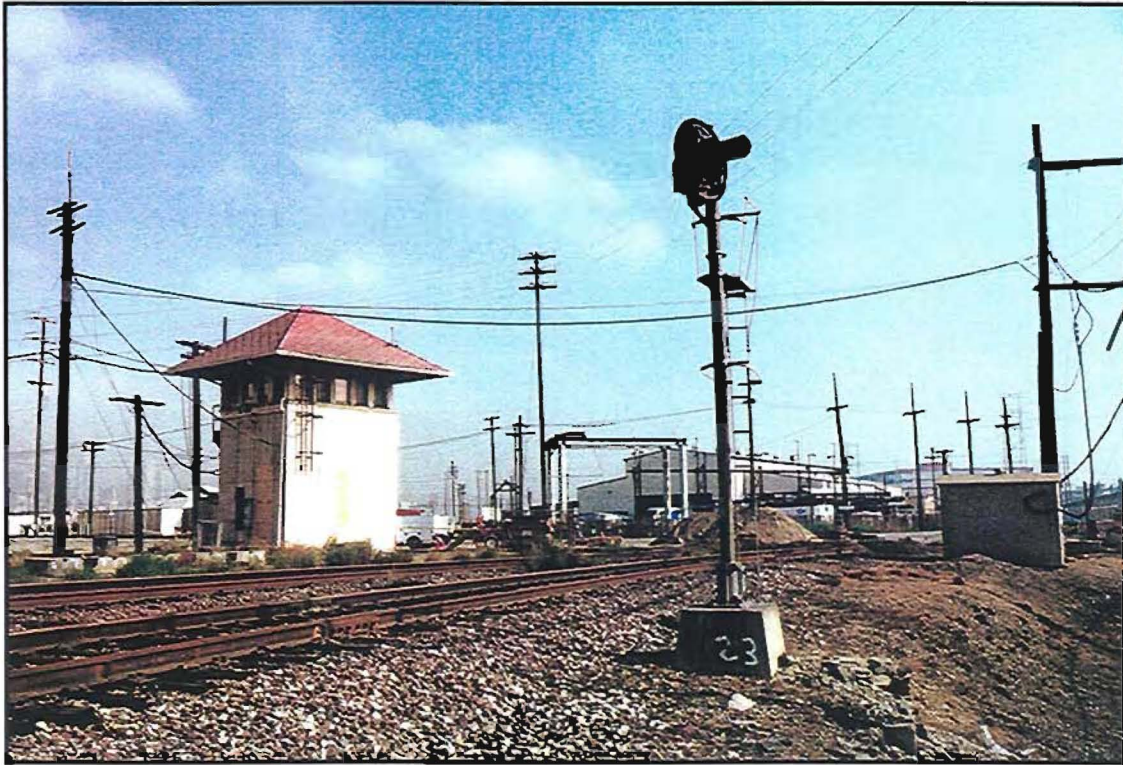
Interlocking Machines and Towers: Technical and Historical Background

As mentioned above, railways erected interlocking towers at numerous locations within the area now known as the Alameda Corridor and environs, including Nadeau Park, Redondo Junction, Hobart, Slauson, West Thenard and Dominguez Junction. The interlocking tower housed a mechanical device known as an interlocking plant or "interlocker." The interlocker is a machine composed of (1) a bank of levers arranged in rows inside the tower, either on the tower floor or mounted on a frame or stand that (2) connect through the exterior of the tower via pipes, mechanical arms, or electrical wiring, to a series of signals and switches that (3) control nearby track movement and signaling. From Redondo Junction Tower, operators used the interlocker to activate two types of signals: the cantilever signal and the searchlight.



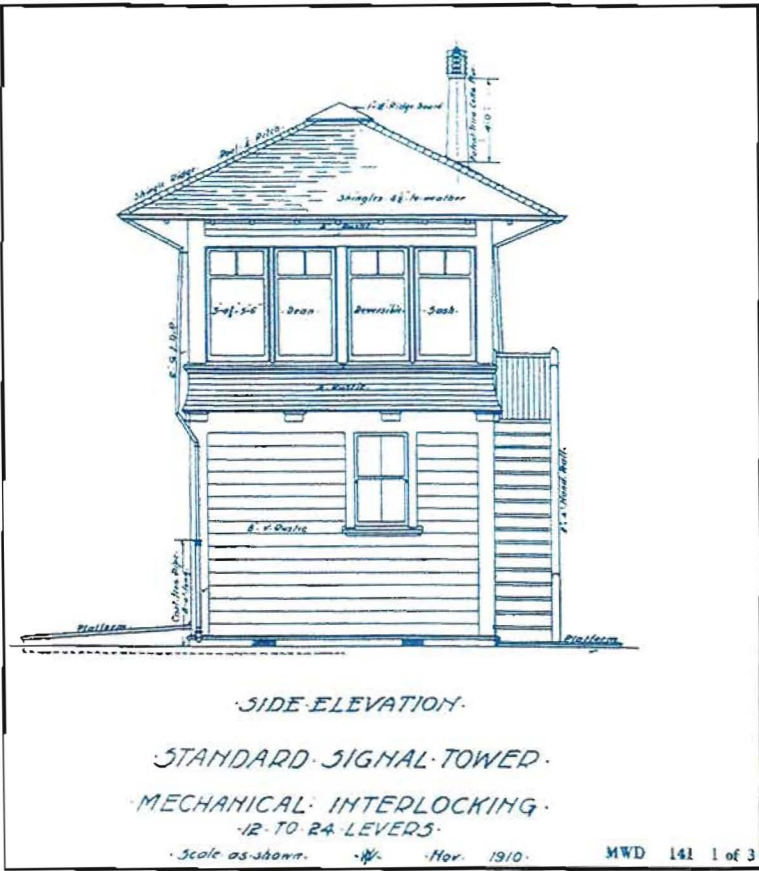
Cantilever signal light controlled from Redondo Junction Tower

The interlocker is housed in a structure known as an interlocking- or signal- tower. Each railway built a tower according to standard plans designed by engineers in the company's maintenance of way department. In its original configuration, the interlocking tower was normally a two-story building. The upper floor of the tower provided a viewing platform for the operator or towerman to observe approaching trains at nearby junctions, crossings, tracks, and signals. Often times, the upper floor contained the interlocking machine, while the lower floor housed a generator (such as at Redondo Junction, where at least into the 1920s, the lower floor housed a 6-horsepower gasoline generator). At Redondo, the lower floor also contained a workbench, tool room, storage batteries, terminal boards, amp meters, fax machine and two wooden desks. Up until the 1920s, towers varied in size from 12 feet by 12 feet, to more common sizes of 16 feet by 16 feet, and up to 16 feet by 28 feet, with very large structures measuring 50 to 100 feet long. The size of the tower was directly related to the size of the interlocking machine and its row of levers.

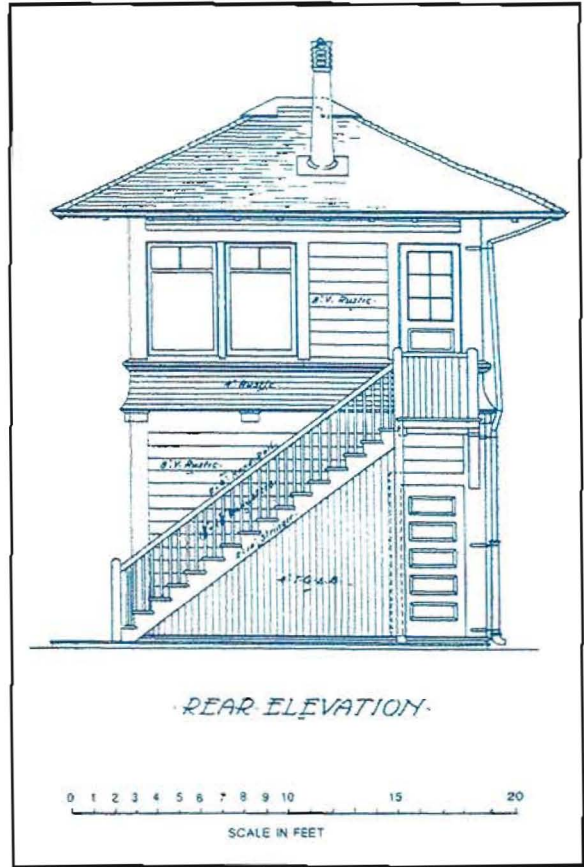


Search light signal controlled from Redondo Junction Tower

Interlocking machines first appeared in England during the mid-19th century. The prototype was a type of mechanical interlocker invented by John Saxby, with the first patents issued in 1856. However, it was not until 1867 when Saxby and Co. patented the first really dependable device, called the "preliminary latch locking." Authorities disagree on the exact date of the arrival to the United States of the interlocking machine. One source suggests that the first interlocker arrived in the eastern U.S. in 1870. That year, the London firm of Saxby & Farmer provided the equipment and managed the construction of America's first interlocker, a mechanical system installed on the Amboy and Camby Division of the Pennsylvania Railroad. In 1874, Toucey & Buchanan placed into service an experimental interlocker at Spuyten Duyvil, New York City. Subsequently, the idea of controlled switching caught on and soon most of the major U.S. railroads installed hundreds of interlockers. The interlocking machines proved invaluable. Through their dependable interconnecting system of switches and levers, they all but eliminated human error in track signaling and switching.



Southern Pacific Co. standard drawing of interlocking tower, 1910



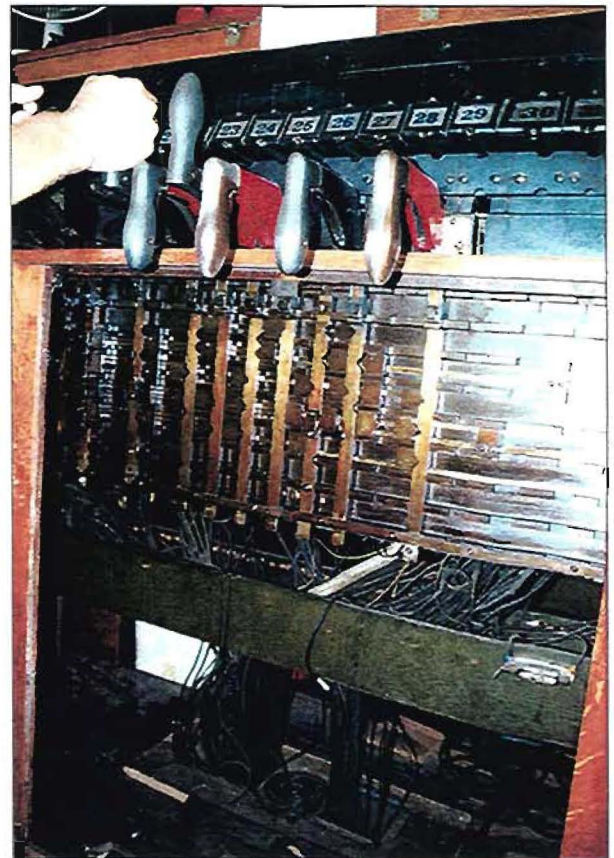
Southern Pacific Co. standard drawing of interlocking tower, 1910

Soon, interlockage evolved into four general classes of machines: pneumatic (1876), hydraulic (1882), electro-pneumatic (1891), and electro-mechanical (1909). Electricity played a key role in the interlocking systems from at least 1876, as noted in an editorial appearing in an 1876 edition of an

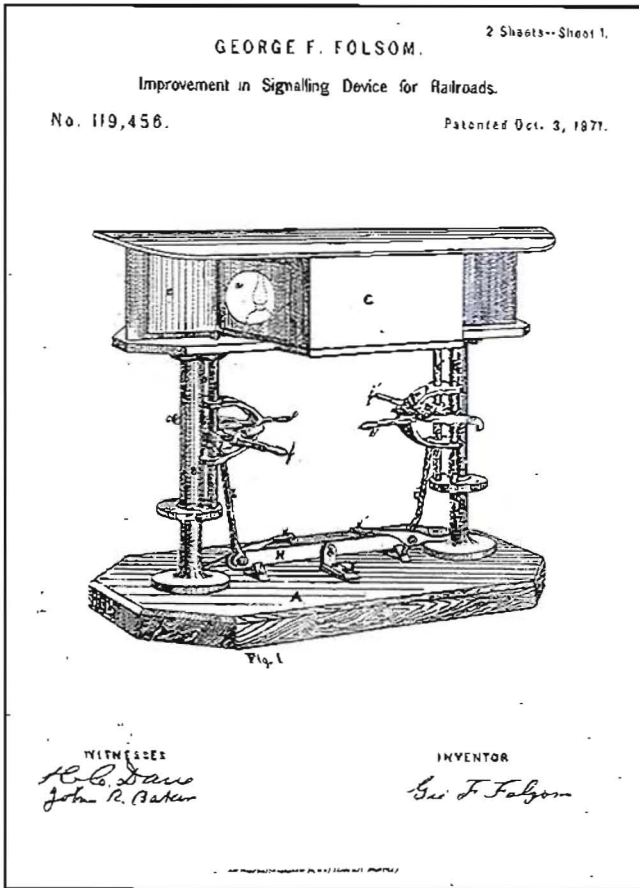
American industrial periodical called *The Railroad Gazette*. The final two phases of mechanical interlockage occurred in 1929 with the Chicago, Rock Island & Pacific Railroad's installation of an electric all-relay interlocking system--a "machine in which no electric lever locks or mechanical locking between levers is used." In 1930, the Big Four railroad consortium installed an all-relay plant at Cleveland, Ohio. Most other railroads followed the practice, well into the 1940s. During the 1940s, automatic interlocking and Centralized Traffic Control began replacing all previous signaling and switching systems. Today, these two systems dominate railroad signaling and switching. Centralized Traffic Control in combination with new grade separations and flyovers directly contributed to the obsolescence of Redondo Junction Tower.



**G-R-S electric interlocking machine,
1906 model, Redondo Junction Tower**



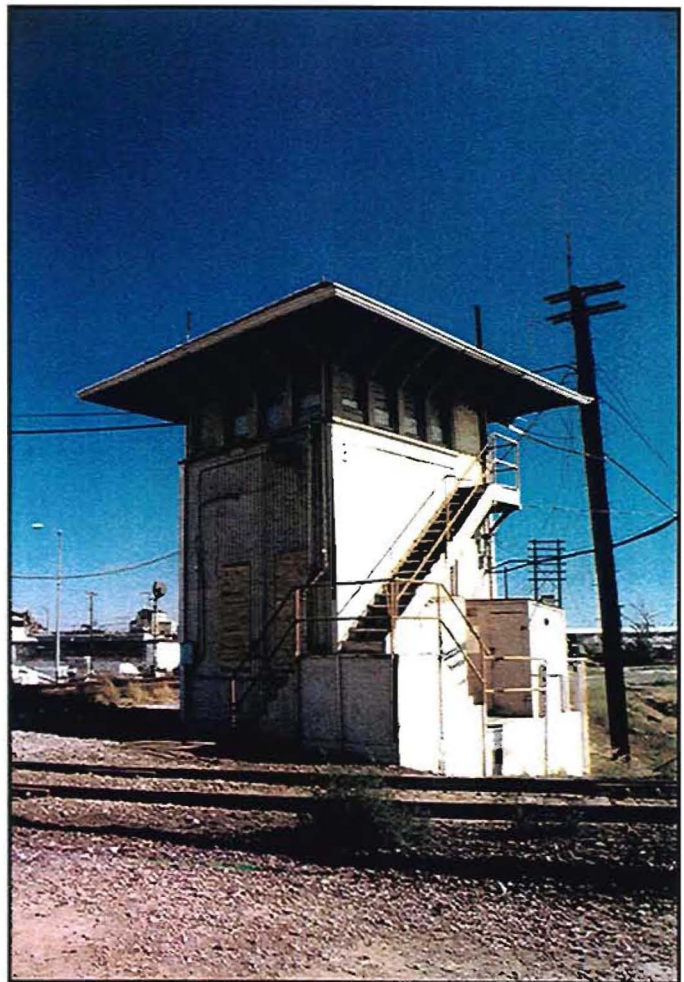
**G-R-S electric interlocking machine,
1906 model, Redondo Junction Tower**



Railroad signal, 1871

Epilogue

Redondo Junction Tower operated from late 1906 until July 7, 2001. During that time, Santa Fe and BNSF Railroad Traffic Controllers managed the tower's signal and switching functions and controlled the movement of countless freight and passenger trains. The advent of Central Traffic Control and safe, efficient grade separations placed most tower functions into the realm of engineering history. On July 9, 2001 Los Angeles MTA carpenters secured the tower, battening down all windows and doors. Currently, Redondo Junction Tower stands silent, a centenarian awaiting an uncertain future.



Abandon Redondo Junction Tower, July 9, 2001.

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