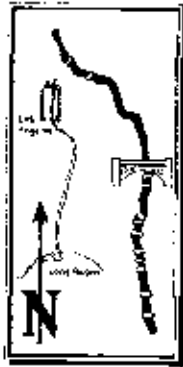




A rendering of the First Street Viaduct, with the (now under construction) Metro Gold Line extension in the median. There will be only one traffic lane in each direction, not two, as in this rendering.

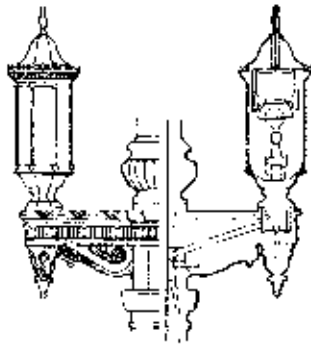
# First Street Viaduct: (Almost) Ready for the Future



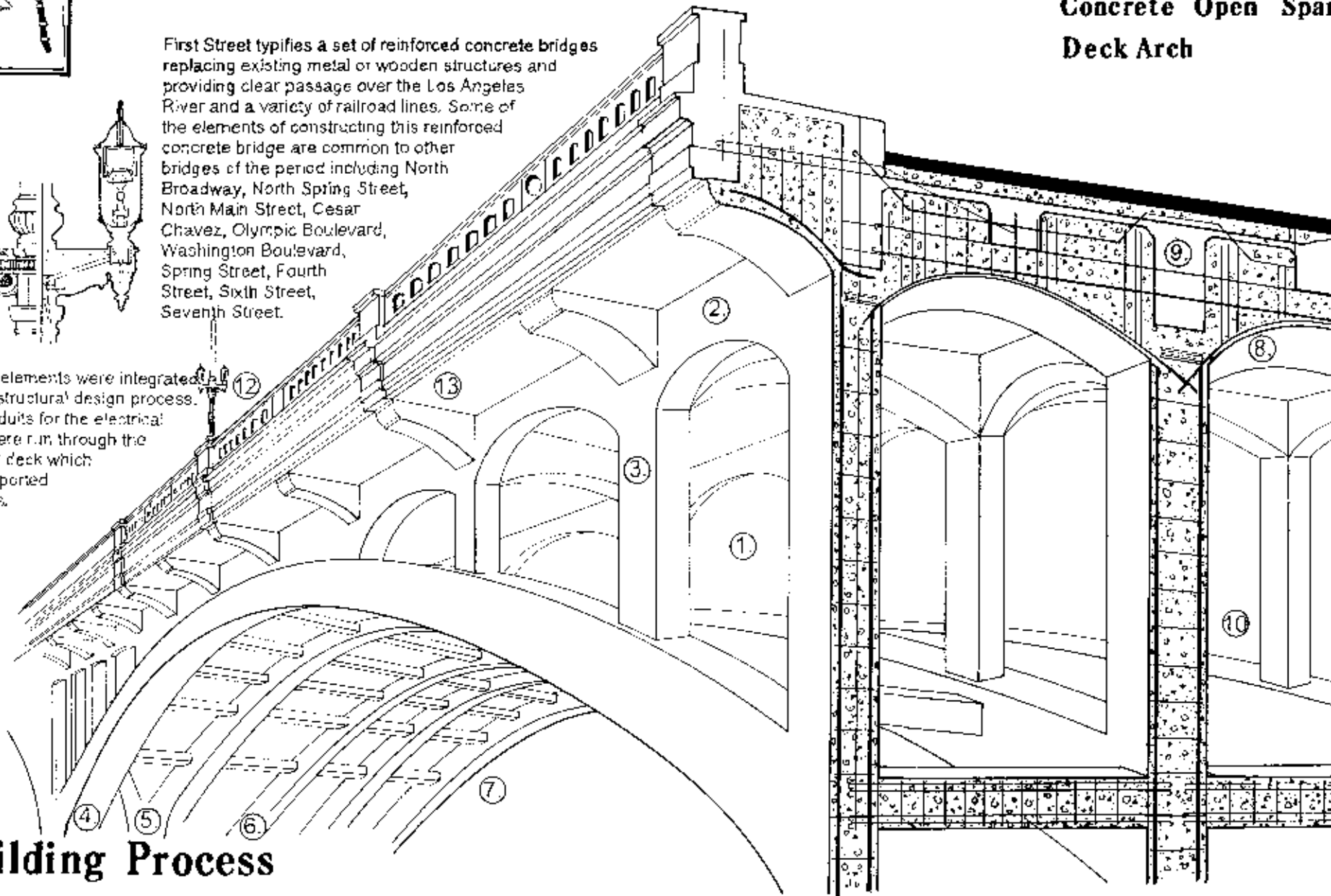
## BRIDGE CONSTRUCTION FIRST STREET VIADUCT

A Case Study of a  
Concrete Open Span  
Deck Arch

First Street typifies a set of reinforced concrete bridges replacing existing metal or wooden structures and providing clear passage over the Los Angeles River and a variety of railroad lines. Some of the elements of constructing this reinforced concrete bridge are common to other bridges of the period including North Broadway, North Spring Street, North Main Street, Cesar Chavez, Olympic Boulevard, Washington Boulevard, Spring Street, Fourth Street, Sixth Street, Seventh Street.



Lighting elements were integrated into the structural design process. The conduits for the electrical wiring were run through the railing or deck which also supported the posts.



### Building Process

**Analyze Geology and Pour Foundations**

The overbed analysis determined the necessary depth of the piles and concrete foundations.

**Pour Concrete Arches**

Formwork was then erected for the pouring of the continuous arches.

**Pour Concrete Columns**

The formwork for the supports, or piers, followed after the completion of the arches.

**Pour Decking**

The roadbed was poured on top of the completed support structure.

Public Works/Bureau of Engineering produced these wonderful analytical sketches of the First Avenue Bridge, as part of a collection of renderings of many engineering marvels in the City. Sketches courtesy the Los Angeles City Archives. Photos courtesy Public Works/Bureau of Engineering.

# History Comes Alive!

Tales From the City Archives

by Hynda Rudd,  
City Archivist (Retired),  
and Club Member



■ **The venerable downtown bridge is being retrofitted for better clearances, and for the Metro Gold Line.**

*Another in an occasional series on popular Los Angeles bridges and viaducts.*

The beautiful First Street Viaduct (bridge), 1,300 feet long and completed in 1929, is at the moment going through a retrofitting, a contemporary maturation to meet modern Los Angeles' needs.

According to Public Works' Bureau of Engineering, "In January 2002, the Metropolitan Transportation Authority (MTA) received approval for the Los Angeles Eastside Corridor Project ... sometimes called the 'Gold Line Extension.'" This will extend the currently existing Pasadena to Union Station Light Rail Transit to link East Los Angeles and Atlantic Boulevard to the city of Pasadena. A portion of

the Gold Line Extension will include work on the First Street Viaduct from Alameda Street to Indiana Street in Boyle Heights.

There is also a second need for this undertaking. Several of the early bridges have structural deficiencies. Many of the problems with the First Street Viaduct include inadequate bridge width, inadequate vertical and horizontal clearances at the Santa Fe Avenue and Myers Street under crossings. These problems also need retrofitting to protect bridge piers at the same locations. The preliminary schedule for designing the changes was from 2002 through September 2005. The con-

struction began in the fall of 2005, lasting through the fall of 2007, and would be accomplished at the same time as the Gold Line Extension.

The viaduct was widened 26.3 feet with the dual tracks of the Gold Line on the bridge's centerline. There will be only two car lanes, one in each direction. The existing left-turn lanes at both ends of the viaduct will be removed.

I would once again like to thank Clark Robins, Deputy City Engineer, for the wonderful diagrams from Los Angeles River Bridges and City Engineer Dung Tran for assisting me with this fascinating history.

**Reinforced Concrete Spandrel**

**Reinforced Concrete**

The bridge engineers exploited concrete's high compressive strength in their designs. To ensure consistency of strength and other properties specified mix designs were followed. After combining Portland cement, water, and aggregates, the worker would subject the concrete to a slump test. With the mix's consistency confirmed, the concrete was poured and left to cure – the construction process during which the cement chemically bonds with water molecules (hydration) over the course of several days – resulting in the hardened material of bonded aggregates.

Identifications
1. Open Spandrel
2. Spandrel beam
3. Spandrel Column
4. Outer Rib
5. Highway Rib
6. Railway Rib
7. Strut
8. Expansion Joint
9. Shear Key
10. Reinforcement
11. Decking
12. Lighting Standards
13. Cantilevered Sidewalks

**Complete Architectural Details**

Details such as light fixtures, railings, trolley lines, and ornament were constructed last.



The First Street Viaduct, leading commuters to the gleaming downtown, on a clear Southern California day.



The First Street Viaduct, circa 1930.

*Did You Know?*

**In 1908, the original Phillippe's Restaurant opened.**

Did You Know is provided by Larry Williams, Bureau of Contract Administration.