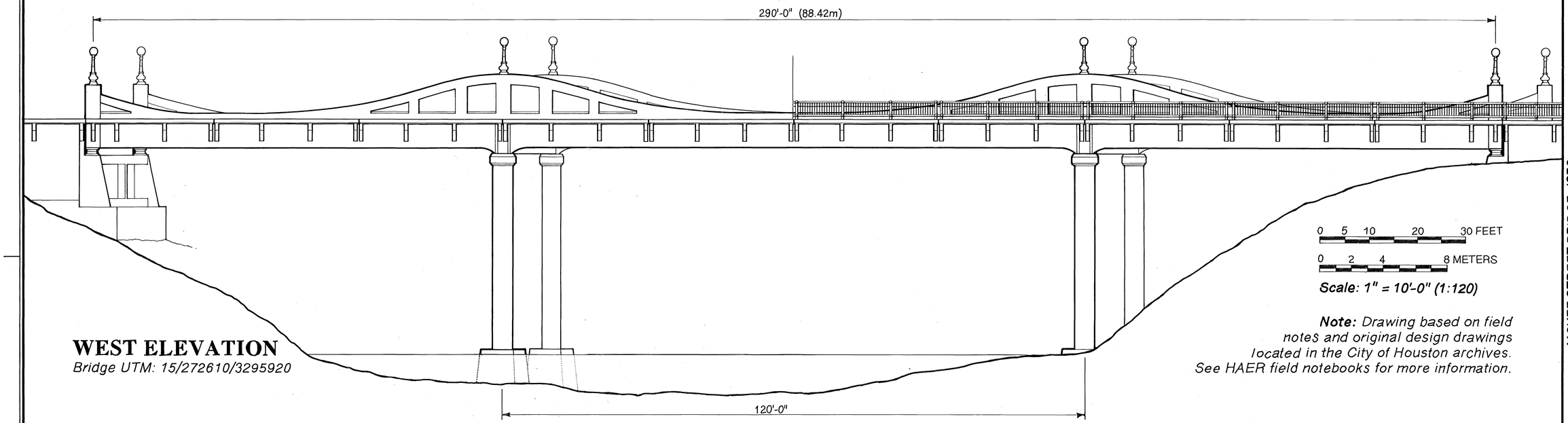
TRIM LINE

McKEE STREET BRIDGE
1932
HOUSTON, TEXAS



WEST ELEVATION
Bridge UTM: 15/272610/3295920

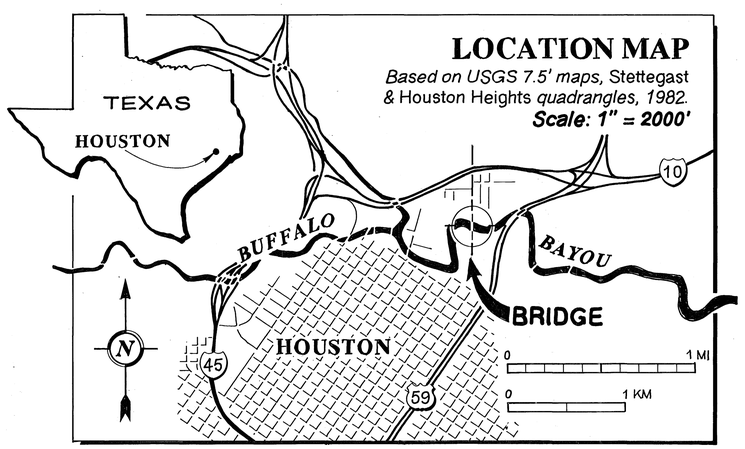
0 5 10 20 30 FEET
0 2 4 8 METERS
Scale: 1" = 10'-0" (1:120)

***Note:** Drawing based on field notes and original design drawings located in the City of Houston archives. See HAER field notebooks for more information.*

Spanning Buffalo Bayou in Houston Texas, the carnival-colored McKee Street Bridge is one of the few examples of a structure in which cantilever and anchor members form a true continuous girder. The bridge is also distinguished by cantilevered concrete sidewalks and steel picket and pipe railings, highlighted by a "ring" motif — a common decorative feature of the 1930s.

J. G. McKenzie, an engineer with the City of Houston, designed the bridge to provide adequate clearance for small craft navigating a sharp bend in Buffalo Bayou. The continuous through-girder configuration allowed him to provide adequate horizontal and vertical clearance with a 120' main span. The angle of the crossing resulted in the unusual plan for the bridge: a 23-degree left-forward skew. McKenzie designed the girders to follow the calculated bending moment curve, (see sheet 3 of 4), which resulted in variable depth girders.

The bridge cost $122,000, money raised by the City of Houston from a 1929 bond issue. When completed in 1932, the bridge had the longest main span of its type in the United States.



The Texas Historic Bridges Recording Project II is part of the Historic American Engineering Record (HAER), a long-range program documenting historically significant engineering, industrial, and maritime sites in the United States. The HAER program is administered by the National Park Service, U.S. Department of the Interior. The Texas Historic Bridges Recording Project II was co-sponsored during the summer of 2000 by HAER under the general direction of E. Blaine Cliver, Chief; and the Texas Department of Transportation, Environmental Affairs Division, Dianna F. Noble, P. E., Director.

The field team, measured drawings, historical reports, and photographs were prepared under the direction of Eric DeLony, Chief of HAER. The team consisted of Pete Brooks, Architectural Supervisor (Yale University), Jennifer M. Chrusciel (Kent State University), Wenhai Li, (ICOMOS-People's Republic of China), Megan C. Olson (Washington State University), Tim S. Reynolds (University of California at Berkeley), architects; Dr. Mark M. Brown, Dr. Peggy J. Hardman, Dr. Robert W. Jackson, Dr. Joseph King, historians; Dr. Dario A. Gasparini and Stephen G. Buonopane, consulting engineers.

DELINEATED BY: *Pete Brooks, 2000*

TEXAS HISTORIC BRIDGES RECORDING PROJECT 2
HISTORIC AMERICAN ENGINEERING RECORD NATIONAL PARK SERVICE UNITED STATES DEPARTMENT OF THE INTERIOR

MCKEE STREET BRIDGE, 1932
MCKEE STREET SPANNING BUFFALO BAYOU
HARRIS COUNTY
HOUSTON
TEXAS

SHEET 1 OF 4

HISTORIC AMERICAN ENGINEERING RECORD
TX-80

TRIM LINE

TRIM LINE

McKEE STREET BRIDGE CUTAWAY

1. Steel Picket & Pipe Hand Rail
2. Sidewalk Slab
3. Expansion Joint
4. Cantilevered Sidewalk Beam
5. Steel Lamp Standard
6. Conduit Pipe for Lamps
7. 8" ⍁ Curb with galvanized steel edge
8. Brick Paving
9. Sand Cushion
10. 6" Deck Slab
11. Inset Panel
12. Floor Beam—11 ½" x 42"
13. Stringer—10" x 24"
14. Bent Beam—18" x 74", centerline dimensions
15. Bearing Block
16. Column—3'-6" x 8'-6", centerline dimensions
17. Builder's Plaque
18. Steel Roller Bearing
19. Abutment
20. Footing
21. Pilings—48 untreated, 50' long logs at each footing

SKEW:
Girders—23° Left-forward
Beams & Stringers—No skew
Footings—23° Left-forward; 23° rotation from bridge ℄.
Columns—23° Left-forward; 0° rotation from bridge ℄.

Variable Depth Continuous Girder

Buffalo Bayou

N

FEET 30 20 10 0 — 8 METERS 4 3 2 1 0
30 20 10 5 0 — 1 2 3 4 8

1" = 10'-0" 1:120

Note: Drawing based on original design drawings located in the City of Houston archives and field notes; see HAER field notebook for more information. All bridge materials concrete, unless otherwise noted.

HISTORIC AMERICAN ENGINEERING RECORD TX-80

SHEET 2 OF 4

TEXAS

HOUSTON

MCKEE STREET BRIDGE, 1932
MCKEE STREET SPANNING BUFFALO BAYOU
HARRIS COUNTY

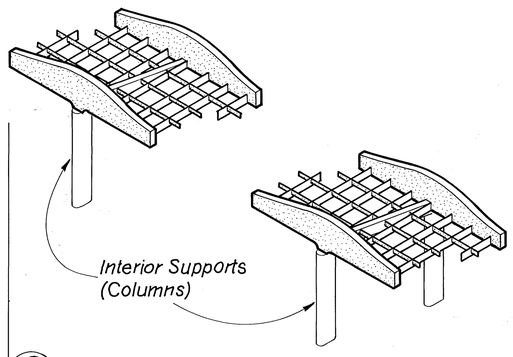
DELINEATED BY: Pete Brooks, 2000

TEXAS HISTORIC BRIDGES RECORDING PROJECT 2
CULTURAL RESOURCES PROGRAM
UNITED STATES DEPARTMENT OF THE INTERIOR

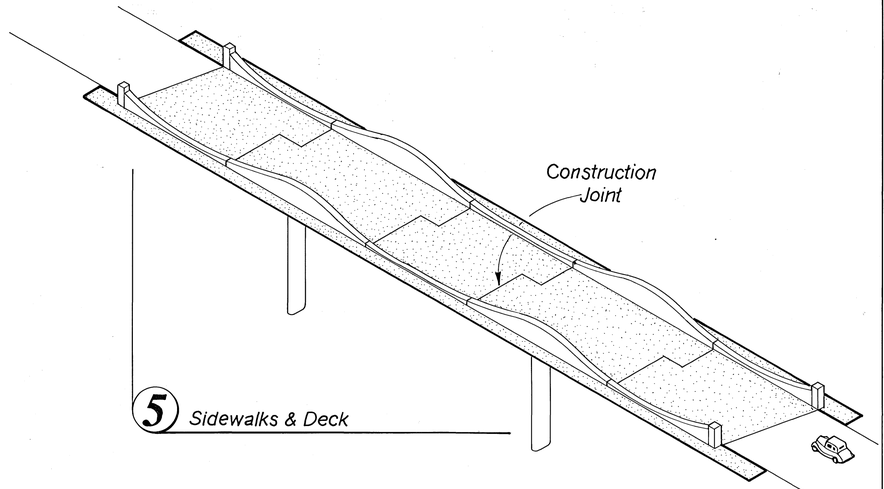
IF REPRODUCED, PLEASE CREDIT: HISTORIC AMERICAN ENGINEERING RECORD, NATIONAL PARK SERVICE, NAME OF DELINEATOR, DATE OF THE DRAWING

TRIM LINE

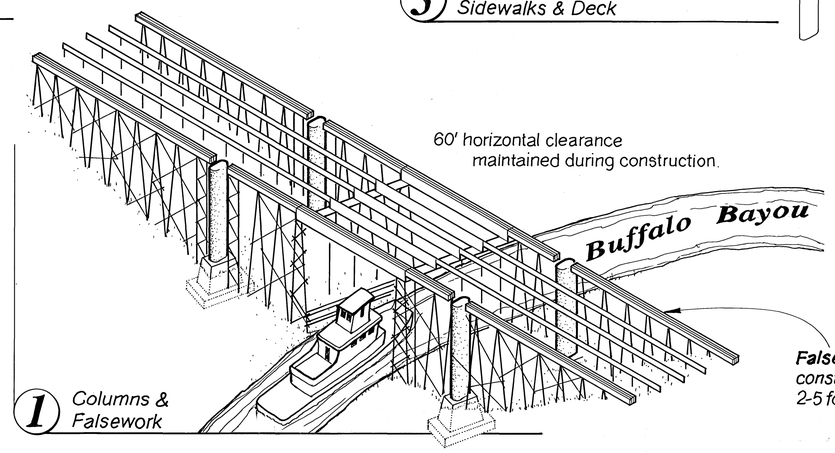
McKEE STREET BRIDGE CONSTRUCTION



2 Interior Support Spans



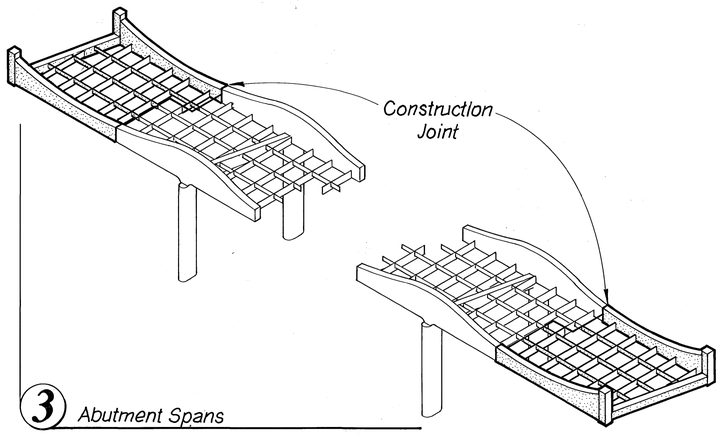
5 Sidewalks & Deck



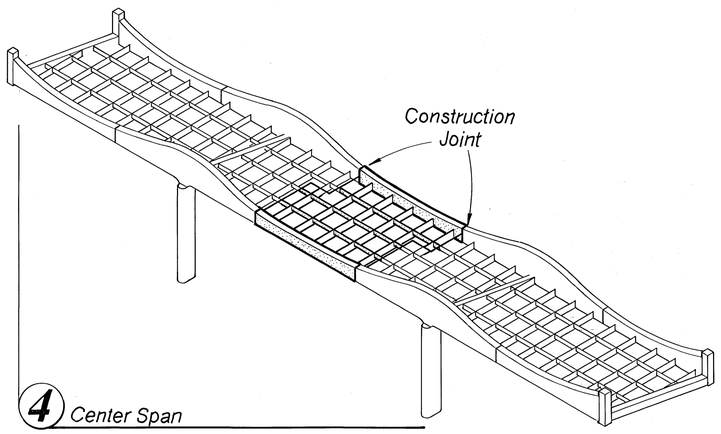
1 Columns & Falsework

Falsework *remains in place throughout construction process; omitted in steps 2-5 for clarity.*

Note: *Drawing based on original design drawings (Dwg. Nos. 1416-C-3 & 1416-C-6) located in the City of Houston Archives. For more information see HAER field notebooks.*



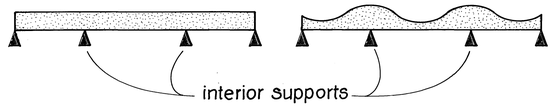
3 Abutment Spans



4 Center Span

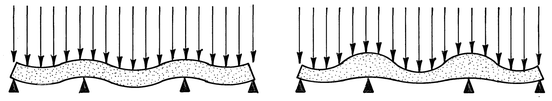
CONTINUOUS GIRDER COMPARISON

Constant Depth ***Variable Depth (McKee Street Bridge)***



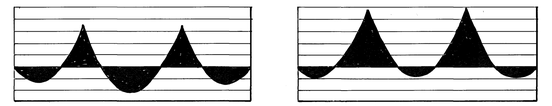
Load Applied

When uniformly loaded, both girders bend.



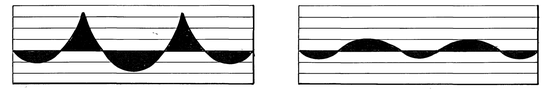
Moment Diagram

Bending produces moment. For both types of girder, maximum moment occurs over the interior supports. However, the variable depth girder has reduced moment at the center of the span.



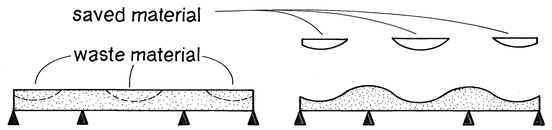
Bending Stress Diagram

The distribution of material reduces the relative bending stress across the entire length of the variable depth girder. The increased depth at each end of the McKee street bridge girder does not contribute to this effect.



Materials

A variable depth girder is a more efficient use of material, but often results in more labor-intensive construction.



Note: *This schematic drawing based on sketches, diagrams and personal conversations with Stephen Buonopane, project engineer, summer 2000. Drawings not to scale.*

HISTORIC AMERICAN ENGINEERING RECORD TX-80

SHEET 3 OF 4

TEXAS

HOUSTON

MCKEE STREET BRIDGE, 1932
MCKEE STREET SPANNING BUFFALO BAYOU
HARRIS COUNTY

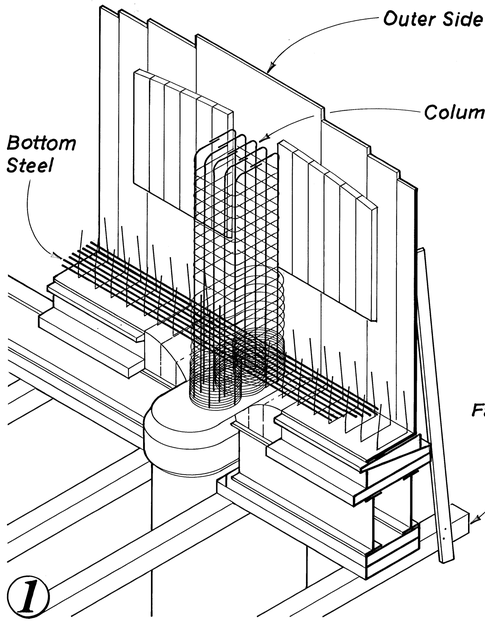
DELINEATED BY: Pete Brooks, 2000

TEXAS HISTORIC BRIDGES RECORDING PROJECT 2
NATIONAL PARK SERVICE
UNITED STATES DEPARTMENT OF THE INTERIOR

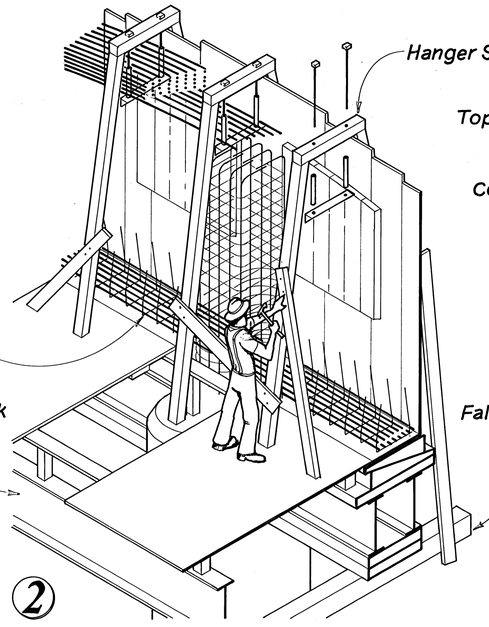
TRIM LINE

McKEE STREET BRIDGE REINFORCING

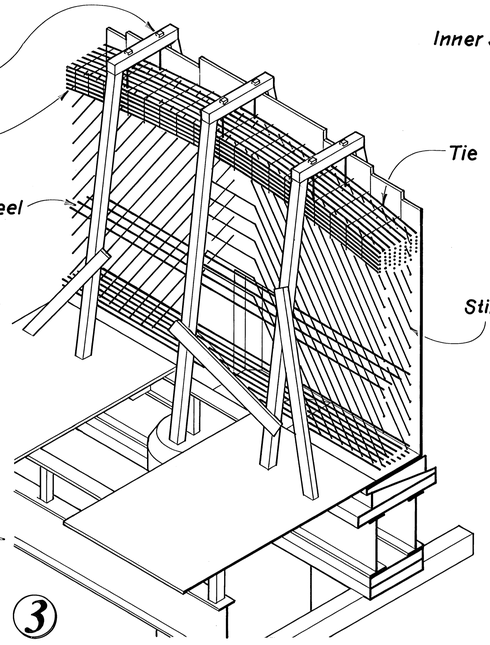
Main Girder Reinforcing Process



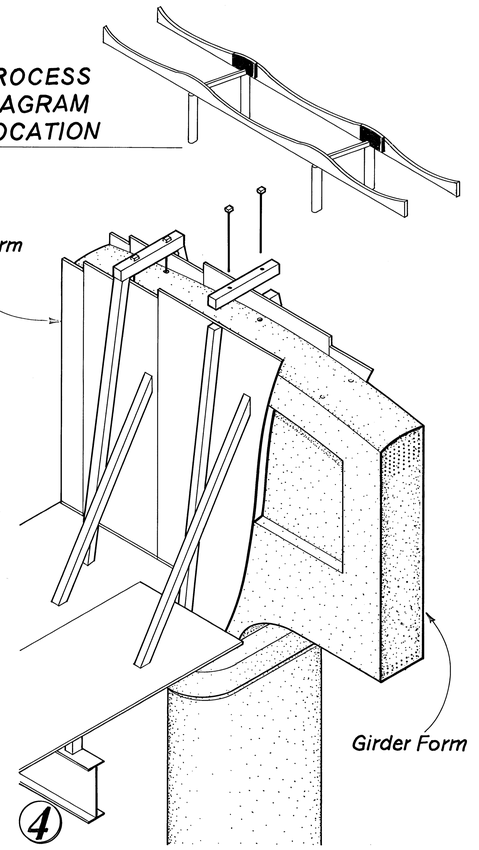
After placing girder bottom and outer side forms, the bottom steel (1 ¼"⌀) is set with 5/8"Ø ties on 1' centers. Column steel and ties are set previously, during the column pour, and tie the girders to bents.



Hanger supports for the top steel are constructed at 5' centers. Made of heavy timbers, ¾" steel bolts, 1"Ø pipe sleeves and 2 ½" angles, the hanger supports are placed outside the girder forms.

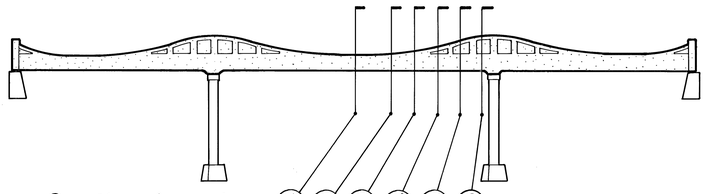


The top steel (1 ¼"⌀) is set in place with 5/8" Ø ties on 1' centers. 1 ⅛"⌀ inclined stirrups, anchored with 1 ¼"⌀ bars, tie the top, center and bottom steel together. (Column steel removed for clarity).



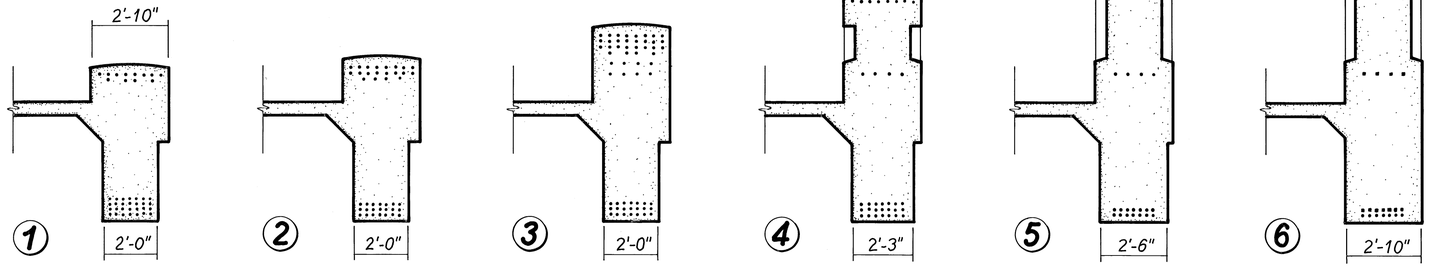
When all reinforcing steel, ties and stirrups are in place, the inner forms are placed and concrete poured. Finally forms, hanger supports and falsework are removed, revealing the girder form.

Note: Drawing based on original design documents found in the City of Houston archives; see especially Dwg. No. 1416-C. *For more information, see HAER field notebook. For clarity, beam and deck girder reinforcing have been removed from reinforcing process diagrams.*



Main Girder Reinforcing

Only main reinforcing steel shown: all at 1 ¼" ⌀; stirrups, ties and anchors removed for clarity.



Girder Sections

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UNITED STATES DEPARTMENT OF THE INTERIOR
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HOUSTON

McKEE STREET BRIDGE, 1932
McKEE STREET SPANNING BUFFALO BAYOU
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TEXAS

SHEET 4 OF 4

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