ENCROACHMENTS ON BRIDGES

Based on *Manual of Encroachment Permits*

All encroachments on bridges must be reviewed by the Office of Structures Maintenance and Investigations.

State Contract Plans

When planned for sufficiently in advance, bridge plans can include provisions for approved public utility facilities to be installed during or after construction. The installation may be made by the owner or, by separate agreement, included in the State contract. This should be coordinated with the District Utility Engineer. In any case, an encroachment permit is required when installed.

Requirements (in addition to standard utility requirements)

Location

- In cases where the intersecting road crosses the highway on an overcrossing structure, the State will make provisions, when possible, to carry such facilities in the structure.
- When permitted, encroachments shall preferably be located under the shoulder or sidewalk area (i.e., between exterior and first interior girder).
- Encroachments should not be exposed to view. No installation shall be permitted on the exterior of a bridge unless completely enclosed so as to appear to be an integral part of the bridge. Exceptions are rare and must be approved by the Office of Structures Maintenance and Investigations.
- On very wide structures that have an expansion joint in the median, provisions can usually be made to locate an encroachment between the two interior girders in the median.

Encroachment Application

- Must include an adequate sketch of installation and pertinent details, including:
  a) location on bridge,
  b) method of attachment to bridge,
  c) type of material transported,
  d) weight per meter of facility including load, encasement, etc.,
  e) maximum operating pressure,
  f) wall thickness of pipe.
- Gas pipelines require additional information as per PUC General Orders.
- Pipelines carrying highly volatile fluids must show the location of the nearest automatic shut-off valves each side of the structure. Shut-off valves are required to be within a reasonable distance of the structure.
- Pipelines conveying water, sewage and low volatile fluids shall include evidence of compliance with corrosion control requirements of the FHWA and State PUC.
- Electrical and communication conduits must also include maximum voltage and description of carrier conduit.

Encasement

- Pipelines carrying gas or other highly volatile fluids:
  a) Must be encased in a steel sleeve throughout the structure. Encasement should extend a minimum of 1.5 m beyond backface of abutment or in the case of structures with approach slabs, a minimum of 1.5 m beyond the limits of approach slab.
  b) The sleeve must have a diameter at least 100 mm larger than the largest outside diameter of pipe.
  c) The space between the pipe and encasement must be effectively vented at each end so that no pressure buildup is possible. It is not permissible to vent into the earth or backfill material because of explosion possibilities. Sniffer pipes should be installed at the end of and on the outside of wingwalls.
  d) Exception – in rare instances it may be impractical (e.g., curvature, space) to provide encasement. Subject to Office of Structures Maintenance and Investigations' approval, the wall thickness of the carrier pipe must then be increased.

- Pipelines conveying water, sewage and low volatile fluids:
  a) If pipeline passes over a freeway, primary road or railroad, it must be encased. Other locations where encasement is required will be determined by the Office of Structures Maintenance and Investigations.
  b) A box girder cell may be considered the encasement if:
     1) access is available for the full length of the pipeline in the structure;
     2) the carrier is metal pipe; and
     3) provisions are made to adequately drain the cell in the event of pipe rupture. Special attention should be given to pipelines under pressure.
  c) The encasement shall extend at least 6 m beyond the back face of abutment and a minimum of 1.5 m beyond the backfill area such that any leakage in the pipe will not flow under or around the bridge abutments, or in the case of structures with approach slabs, a minimum of 1.5 m beyond the limits of approach slab.
  d) Exception – in rare instances it may be impractical (e.g., curvature, space) to provide encasement. In lieu of encasement, other safeguards may be required.
- Electrical and communication lines shall be encased in rigid metallic conduits or other approved material. All electrical conduits shall be grounded in accordance with Electrical Safety Orders of Cal-OSHA.
- When encasement is not otherwise required, the needs of the encroachment should be considered if there is impaired clearance or proximity to unusual hazards (e.g., high tension power lines, flood channels, subsiding ground).

Access to Encroachment Facilities in:

- Undercrossing structures or bridges over waterways is prohibited from the surface of the traveled way. Manholes in the shoulder area or sidewalk area may be authorized.
- Overcrossing structures, by means of manholes, may be authorized where necessary and feasible.

Basic Specifications

- Exposed pipes or sleeves shall be painted or covered with an approved coating. Such coating shall match the color of the structure and shall be maintained to the satisfaction of Caltrans. The cost of repainting or protection of the encroachment shall be borne by the permittee.
- High pressure systems:
  - a) Shall conform to American Pipeline Institute (API) specifications and to ASTM specifications covering sizes and types not covered by API.
  - b) If operating pressures are over 1.38 MPa:
    - 1) Wall thickness shall conform to PUC General Orders.
    - 2) For gas pipelines, maximum allowable hoop stresses shall be 40 percent of the specified minimum yield strength .
    - 3) Maximum allowable hoop stresses for other high volatile fluids shall conform to ANSI, except that the maximum hoop stress under the "test pressure" shall not exceed 90% of the yield strength.
    - 4) A pressure test at 1.5 times maximum operating pressure will be conducted for 24 hours.
    - 5) Radiographic inspection shall be made for all field welds.
- Sewer lines will not be steel pipe unless corrosion protective measures are provided.
- Electrical and communication conduits shall conform to PUC General Orders. High voltage lines will not be permitted where the lives of the traveling public could be endangered.
- Other pipelines may be steel, cast iron, ductile iron or other approved material.

Vehicular Tunnels and Tubes

- No public utility or other encroachment shall be permitted within a vehicular tunnel or tube. An existing encroachment in an existing tunnel or tube that is incorporated in a new highway improvement may be allowed to remain under special circumstances with the approval of the Longitudinal Encroachment Committee. Whenever feasible, the encroachment should be relocated.