Add the following subsection under 1.4.9 Bridge Temporary Works:

1.4.9.7 Bridge Raising

Provide enough information in the contract document that enables the Contractor's Engineer to design supporting elements for a bridge raising and stability of the structure during this operation.

Different construction procedures could be employed in raising a bridge. More common procedures are using false work or chip thru construction. A check needs to be made whether the bridge should be open to permit loads while under construction. Take a concrete sample of each column to verify the column's concrete strength.

Bridge raising using falsework:

- Total dead load (structural member, super imposed load, utilities, signs, posts and ….)
- Design live load is HS-25 when bridge would be under traffic,
- Bridge can not be open to traffic during bridge raising,
- Use 1.5 load factors for dead and live in designing falsework,
- Use 1.5 dead load factor and live load factor 1.35 for permit load when bridge should have been open to permit loads,
- Temporarily pinned, pin and loop concrete barriers to protect the structure and falsework from damage by the adjacent traffic. Provide at least 1 foot clearance between the barrier and the bent (falsework).

Bridge raising using chip-in method:

Chip-in method is one of the popular construction methods for raising bridges. In this method concrete at the center of each column is removed to provide enough room to place jack and shim. Then the contractor removes the rest of the concrete and cuts the reinforcing steel. After the bridge deck is brought to the desired elevation, reinforcing steel is spliced and the void between the two portions of column is filled with non-shrink concrete.

Some of design assumptions are:

- Total dead load (structural member, super imposed load, utilities, signs, posts and ….)
- Design live load is HS-25 when bridge should be open to traffic during chip-in process, however traffic should not be permitted on the lane adjacent to columns that chip-in is in progress
- Bridge shall not be under traffic during bridge raising,
- Use 1.5 load factor for dead loads and all super imposed dead loads,
- Use 1.35 live load factors when bridge should be open to traffic after bridge raising,
- Bridge can not be open to permit loads unless adequacy and stability of bridge was check for permit loads. In this case use 1.35 load factors for permit load.
- Temporarily pinned, pin and loop concrete barriers to protect the structure from damage by the adjacent traffic. Provide at least 1 foot clearance between the barrier and the bent.

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