

## 9.1 STAY-IN-PLACE PRECAST PRESTRESSED CONCRETE DECK PANELS FOR PRECAST CONCRETE GIRDER SUPERSTRUCTURES

### 9.1.1 GENERAL

This policy addresses the applicability and design criteria of Stay-In-Place Precast Prestressed Concrete Deck Panels (PDPs) used for constructing concrete decks on precast concrete girder superstructures. PDPs are partial-depth precast, pretensioned concrete deck panels that span between girders and are topped with cast-in-place (CIP) concrete to complete the deck.

### 9.1.2 POLICY

The use of PDPs is project-specific and requires approval at the Type Selection Meeting.

PDPs shall not be used for the following:

- Decks in Freeze-Thaw areas;
- Spliced precast girders that are post-tensioned after the deck pour;
- Deck bays that have longitudinal joints;
- Decks with a cross slope greater than 5%;
- Decks that require field drilling of PDPs, such as for utility supports;
- Decks where epoxy-coated strands are required unless a grit-impregnated epoxy-coated strand is shown on the plans.

PDPs must be designed in accordance with Articles 9.7.4.1 and 9.7.4.3 and Section 5 of the AASHTO LRFD Bridge Design Specifications (2017) and California Amendments, as well as with the following criteria.

- PDPs shall have a thickness of at least 3.75 inches, a maximum length of 9'- 0", and a width from 4 ft to 12 ft. The deck must have an overall thickness of at least 8 inches.
- PDPs shall use 3/8-inch diameter Grade 270 low-relaxation prestressing steel strand. The maximum tensile stress in the prestressing steel at release shall not exceed 70% of the specified minimum ultimate tensile strength of the prestressing steel. Strands must be placed at the centroid of the PDP cross section so that prestressing does not produce any eccentricity.

- PDPs shall be prestressed in the direction of the panel design span, which is perpendicular to the longitudinal axis of the girders. The prestressing strands shall be considered as the primary positive moment reinforcement in the deck slab for the initial stages at transfer and under construction loads within a non-composite section. The strands are permitted to be used as the primary deck slab reinforcement for the later stages of service and strength limit states for superimposed dead and live loads within a composite full-depth deck section. Reinforcing bars in the CIP portion of the deck shall be designed to provide capacity in the negative deck moment regions. Prestressing strands in PDPs shall be extended 4 inches into the CIP concrete portion of the slab.
- The upper surface of the PDPs shall be roughened with a 1/8-inch roughened finish to ensure composite action with the CIP concrete.
- Stirrups in any end blocks shall be terminated below the top of the girder, and supplemental horizontal shear reinforcement shall be placed at the girder centerline to avoid conflict between the stirrups and PDPs.
- Skewed bridge decks require special panel size and design at the abutment and bent areas. Where the bonded strand length would be less than 3'- 6", mild reinforcement must be used in lieu of the strand.
- The minimum clearance between longitudinal deck bars and the top of the deck panels shall be 1 inch.

### **9.1.3 REFERENCES**

1. AASHTO. (2017). AASHTO LRFD Bridge Design Specifications, 8th Edition, American Association of State Highway and Transportation Officials, Washington DC.
2. Caltrans. (2019). California Amendments to AASHTO LRFD Bridge Design Specifications, 8th Edition, California Department of Transportation, Sacramento, CA.
3. Caltrans (2024). *Bridge Standard Detail Sheets, xs01-180-1 to xs01-180-3*, California Department of Transportation, Sacramento, CA