FULL DEPTH PRECAST DECK PANELS – A PRECASTER’S PERSPECTIVE

GOAL / OBJECTIVE

• COLLECTIVELY, WE (OWNERS, DESIGNERS, PRECASTERS, & ENGINEERS) NEED TO DEVELOP FULL DEPTH DECK PANELS THAT ARE A COST EFFECTIVE ALTERNATIVE, CREATES EFFICIENT CONSTRUCTION METHODS, AND PROVIDES A LONG LASTING, MAINTENANCE FREE BRIDGE DECK.

OVERVIEW

• CONCRETE CHARACTERISTICS
• TOLERANCES
• JOINT DETAILS
• SURFACE FINISH
• SHEAR POCKETS
• PANEL GEOMETRY
• FORMWORK

CONCRETE CHARACTERISTICS

• HIGH PERFORMANCE CONCRETE
  • PERMEABILITY – ASTM C1202 – 56 DAY DURATION
  • SCALING – ASTM C 672 – 80 DAY DURATION (50 CYCLES)
  • FREEZE-THAW – ASTM C 666 - 180 DAY DURATION
  • CREEP – ASTM C 512 - 28 DAY DURATION
  • STRENGTH – ASTM C 39 – 28 DAY DURATION
• CONCRETE MIX TESTING
  • ALLOW TIME PRIOR TO PRODUCTION
• STORAGE REQUIREMENTS
  • MINIMIZE STORAGE NEEDED PRIOR TO ERECTION
  • CALCULATE / ESTABLISH TIME FOR CREEP/SHRINKAGE TO OCCUR

TOLERANCES

• PRECAST CONCRETE TOLERANCES
• CRSI TOLERANCES
• ACTUAL DUCT O.D.
• COVER REQUIREMENTS
JOINT DETAILS

- Pour back strip with projecting bars

- Formed faces/shear keys with epoxy

- Match cast faces with thin epoxy bond

Riding surface

- Panel finished surface as riding surface
  - Issues with panel irregularities & differential camber
- Panel with sacrificial thickness for grinding / grooving
  - Best results for rideability
  - Faster approach to put panels in service versus an overlay
  - Quality of the concrete for the riding surface is inherent to the panel concrete
- Panel with roughened surface for bonding to overlay

Panel to girder shear connections

- Two foot spacing over each girder line (AASHTO req.)
- Steel beams – studs can be shot after panel placement
- Concrete beams – studs can be grouted in place
- Concrete beams – studs can be cast in top of girders
- Shear pocket spacing could be increased

Deck panel geometry

- Trucking issues typically require 8'-0" to 10'-0" max width
- Keep dimensions relatively consistent to reduce costs
- Consider panel weights for shipping
- Differential camber between pieces may occur
FORMWORK

- MATCH CAST FORM WORK IS EXPENSIVE (ESP.W/ PRESTRESSING) AND TIME CONSUMING

- RIGID/MACHINED SIDE FORMS FOR SHEAR KEY – SHOULD ELIMINATE THE “NEED” FOR MATCH CASTING

- MAXIMIZE PANEL LAYOUT FOR PRESTRESS BEDS

- LOCATE PRESTRESS STRAND ON 2-INCH SPACING