CONNECTICUT

CTDOT CONNECTICUT TRANSPORTATION

GUIDANCE FOR CONCRETE TRUCK APRONS IN ROUNDABOUTS

Introduction

This document is intended to provide guidance on concrete pavement structures to be used for truck aprons and splitter islands in CTDOT roundabout projects. It may be used by State and/or consultant personnel that are responsible for designing these transportation facilities.

Please contact the Pavement Design Unit at 860-594-3287 if you have any questions.

Guide Sheets

Please see the following Highway Guide Sheets, available at the link below:

- GS-031 – "Roundabout Truck Apron – General Design Sheet (Sheet 1 of 3)"
- GS-034 – "Roundabout Truck Apron – Reinforcement and Hardware (Sheet 2 of 3)"
- GS-035 – "Roundabout Truck Apron – Reinforcement and Hardware (Sheet 3 of 3)"

https://portal.ct.gov/dot/highway-design/highway-standard-drawings/highway-standard-details?language=en_US

Truck Apron Recommendations

The standard structural design for this application is 12" Jointed Reinforced Concrete Pavement (JRCP) on 10" Processed Aggregate Base (PAB). The recommendations below assume this pavement type and thickness:

- Joint Types
    - Use all contraction joints within the truck apron
        - Current rigid pavement design practice is to eliminate expansion joints by reducing joint spacing as shown below
- Joint Spacing

    - Limit slab length to width ratio to 1.5 maximum
        - For example,
            - 15′ L / 12′ W = **1.25 : 1** = good
            - 12′ L / 15′ W = **1 : 1.25** = good
        - Maximum joint spacing should be 15 feet in all cases
        - Lay out joint spacing on plans to determine optimum joint length
        - Attempt to make slabs as square as possible
- Load Transfer (Dowel Bars)
    - Use 14″ long, 1.5″ diameter smooth galvanized dowels for 12″ thick concrete
        - Coat dowels in bond breaker material on both ends
        - Space dowels at 12″ O.C. and a minimum 6″ cover from edge of slabs
        - Place dowels normal (perpendicular) to joint
        - Place dowels using galvanized dowel baskets
        - Place dowels so that 7″ is embedded on either side of the joint
- Reinforcement
    - Use approximately 0.2% steel reinforcement per cross-sectional area
        - Greater risk of joint lockup with curved slabs; reinforcement controls cracking
        - Reinforcing steel should be placed within top 1/3 of slab and have a minimum cover of 2″ in all areas
            - Two layers of reinforcing can be considered when there is an expectation of loss of support based on existing conditions such as high groundwater table or poor drainage conditions
        - Use deformed galvanized bars for all steel reinforcement
            - Welded wire fabric is generally not recommended to be used for concrete pavement truck aprons due to constructability issues
        - Use #5 curved bars, 12″ O.C. in longitudinal direction
        - Support #5 curved bars on #4 radial bars placed approximately 4′ O.C. (measured on the outside arc of the apron) in the transverse direction
            - The minimum spacing of #4 bars in the transverse direction shall be 1′ O.C. measured on the inside arc
        - Support bars with concrete blocks
- Curb Ties

    - Tying curbs to concrete is not absolutely necessary
        - If it is preferred to tie curbs to concrete due to plows or other impacts, the spacing between the curb sections must match the spacing of the concrete slab for proper expansion/contraction. Tie bars shall all be deformed and galvanized.
- Utilities
    - Avoid placement of utility manholes, gates, etc. on concrete apron
        - If utility access must be on installed, then details should be provided for how to form expansion/contraction joints around the utility
- Traffic
    - It is not necessarily required for the concrete to reach the full 28-day cure time before allowing traffic onto the truck apron. Ideally allow the concrete to reach 90% design strength, or around 3,200 psi for PCC03540 mix, which takes around fourteen (14) days.
    - In situations where staging does not allow for full cure times, vehicular traffic shall be excluded until seven (7) days have passed from the concrete placement. The Contractor's Quality Control (QC) testing must also demonstrate a compressive strength of 2,500 psi after 7 days of curing.

<u>Splitter Island Recommendations</u>

The standard design for this application is 8" Jointed Reinforced Concrete Pavement (JRCP) on 14" Processed Aggregate Base (PAB). The recommendations below assume this pavement type and thickness:

- Joint Types
    - Use all contraction joints within the splitter islands
- Joint Spacing
    - Provide joint spacing details on plans
    - Attempt to make joint spacing result in sections of concrete that are as square as possible
    - Limit spacing to 15 feet max. (or 1.5 length to width ratio)
- Reinforcement
    - Use approximately 0.2% steel reinforcement per cross-sectional area
        - Greater risk of joint lockup with irregularly shaped slabs; reinforcement controls cracking

- Reinforcing steel should be placed within the top 1/3 of the slab and have a minimum cover of 2" in all areas
- Use #4 deformed galvanized bars, 12" O.C. in single direction
  - May be substituted for welded wire fabric, sized W5xW5 at 3"x3" spacing
- Support bars with concrete blocks

Items/Specifications

The following pay items are needed for this work, which are listed in the "Colored Stamped Concrete" special provision. Please see special provision Item No. 0401008A – "Colored Stamped Concrete" held by the Pavement Design Unit for additional information (Special Provisions):

- 0401008A – COLORED STAMPED CONCRETE (CY)
- 0401101A – MAT REINFORCING FOR CONCRETE PAVEMENT (SY)
- 0401201A – TRANSVERSE CONTRACTION JOINT (LF)
- 0401302A – LONGITUDINAL CONTRACTION JOINT (LF) – not necessary for single width slab aprons, may be required for aprons that exceed the length to width ratio/joint spacing requirements above (>20 feet wide, for a 15-foot max. slab length)