

## **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 Connecticut DOT 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.

### Truck Aprons

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

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

- GS-031 – “Roundabout Truck Apron – General Design Sheet (Sheet 1 of 2)”
- GS-034 – “Roundabout Truck Apron – Reinforcement and Hardware (Sheet 2 of 2)”

<https://portal.ct.gov/DOT/Highway-Standard-Drawings/Highway-Standard-Details>

- 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** = ok
      - 12' L / 15' W = **1 : 1.25** = ok
    - 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 plastic chairs
- 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, traffic may be allowed to traverse the truck apron once the concrete has cured for at least seven (7) days after final placement. When using the designated mix (PCC03540), the concrete should attain about 65% strength after this time, or 2,300 psi.

### Splitter Islands

The standard design for this application is 8” Jointed Reinforced Concrete Pavement (JRCP) on 14” Processed Aggregate Base. 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 plastic chairs when needed

### Items

The following pay items are recommended for use to accompany Section 4.01 – “Concrete for Pavement”, which is now a special provision held by the Pavement Design Unit ([Special Provisions](#)):

- 0401000 – CONCRETE FOR PAVEMENT (CY)
  - Complete in place, includes all concrete work as specified in Section 4.01 (reinforcement and joints paid separately).
  - See Item No. 0601020A – “Stamped Concrete” below also. These two items are often packaged together.
- 0401101 – MAT REINFORCING FOR CONCRETE PAVEMENT (SY)
  - Need to specify galvanized steel as a note on the plans because no particular material type is required by the standard specifications under this item.
  - May be used to pay for bar mat reinforcing or welded wire fabric (WWF is not recommended for most concrete pavement applications including truck aprons – acceptable for sidewalk/splitter island use).
- 0401201 – TRANSVERSE CONTRACTION JOINT (LF)
  - Includes the cost of furnishing load transfer devices (dowel bars) as well as incidental materials such as dowel basket supports. It is expected that no supplemental items are needed.
- 0401202 – TRANSVERSE EXPANSION JOINT (LF)
  - Not expected to be necessary for new roundabout construction as previously noted but may be needed for rehabilitation of existing roundabout truck aprons.

The following additional items may be considered for use, but should be coordinated with Section 4.01:

- 0601020A – STAMPED CONCRETE (SF)
  - This special provision item has historically been used to pay for the concrete pavement itself in addition to the stamping work. If included, please ensure that the special provision clearly states that the cost of work does/does not include the concrete pavement so that use of Item No. 0401000 – “Concrete for Pavement” can be determined.
- 0602030 – DEFORMED STEEL BARS – GALVANIZED (LB)
  - This bridge item has historically been used to pay for steel reinforcement of structural concrete. If used for the concrete pavement truck apron reinforcing, please include a note on the plans that this item will be used for payment since it is not the standard item included in Section 4.01. Item No. 0401101 – “Mat Reinforcing for Concrete Pavement” should be used unless specified otherwise.