AMENDMENTS

to

2012
Manual of
STANDARD SPECIFICATIONS

Adopted by
Standard Specifications Committee

Amendment

No. 6

Published by

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FORWARD

This document modifies a portion of the 2012 “Manual of Standard Plans”. All other provisions in the manual remain in full force and effect.

DELETIONS - Delete the following specifications and plans.
   Plan 256 - Concrete pavement patch
   Plan 261 - Concrete pavement joints

ADDITIONS - Add the following specifications and plans (copies attached hereto).
   Plan 256 - Concrete pavement patch
   Plan 261 - Concrete pavement joints

The deletions and additions are approved.

AGC
Representative: ____________________________ Date

APWA
Representative: ____________________________ Date
Concrete pavement patch

1. GENERAL:
   A. If a pavement panel and its curb and gutter are of monolithic construction, the curb and gutter will have to be removed with the pavement panel or the curb and gutter may remain if a partial panel removal meets distance requirements shown on sheet 2.
   B. Partial panel removals only apply to rehabilitation of existing pavements and not to projects constructing new or original pavement. Repairs to pavements on new projects require full panel placement.
   C. Additional requirements are specified in APWA Section 32 01 19.

2. PRODUCTS
   Not Used

3. EXECUTION
   A. Partial Panel Removal:
      1) Make core holes at all corners of panel.
      2) Make the first saw cut full depth around panel edges. Steel reinforcement may be encountered during sawing. Finish sawing the selected mid-point of the panel using the core holes as beginning and end points of the saw cut. Do not cut into the adjacent panel.
      3) Make second tapered saw cut.
      4) Remove center of panel.
      5) Remove remaining perimeter concrete including any corner concrete.
   B. Full Panel Removal:
      1) Make core holes at all corners of panel.
      2) Make full depth saw cut around panel edges. Steel reinforcement may be encountered during sawing.
      3) Make second tapered saw cut.
      4) Remove center of panel.
      5) Remove remaining perimeter concrete including any corner concrete at the core holes.
TYPICAL PANEL REMOVAL

THIS DRAWING SHOWS CONCRETE PANEL REMOVAL OVER EXCAVATIONS

CONCRETE PANEL REMOVALS ARE SHOWN AS HATCHED AREAS

OBLIQUE

EDGES OF PANELS

1

PARTIAL PANEL REMOVAL

FULL PANEL REMOVAL

INSTRUCTIONS:

A  PARTIAL PANEL REMOVAL
B  FULL PANEL REMOVAL

1  DRILL >4-INCH DIAMETER HOLES AT CORNERS OF REMOVAL AREA
2  FIRST SAW CUT FULL DEPTH, DO NOT CUT INTO ADJACENT PANEL
3  SECOND TAPERED SAW CUT FULL DEPTH, DO NOT CUT INTO ADJACENT PANEL
4  REMOVE WHOLE PANEL IF REMAINING WIDTH OR LENGTH IS LESS THAN 1/2 PANEL WIDTH OR LENGTH

SECTION A-A

Concrete pavement patch
Concrete pavement patch

1. GENERAL:
   A. Reproduce existing pavement joint layout even if repairs straddle an existing joint.
   B. Additional requirements are specified in APWA Section 32 01 19.

2. PRODUCTS
   A. Base Course: Untreated base course, APWA Section 32 11 23. Do not use gravel as a base course without ENGINEER’s permission.
   B. Bars: 60 ksi yield grade steel, ASTM A615, epoxy coated or galvanized deformed or smooth, with diameter and length indicated.
   C. Adhesive: Epoxy adhesive grout, APWA Section 03 30 10 for gluing bars in drilled holes in concrete.
   D. Bond Breaker (Grease): Paraffin wax, lithium grease, or other semi-solid, inert lubricant.
   E. Concrete: Class 4000, APWA Section 03 30 04.
   F. Concrete Curing Agent: White pigmented membrane forming compound (Type II Class A or B), APWA Section 03 39 00.
   G. Water Repellant: Penetrating compound, APWA Section 07 19 00.

3. EXECUTION
   A. Base Course Placement: APWA Section 32 05 10. Match existing aggregate base thickness. Maximum lift thickness before compaction is 8-inches when using riding equipment or 6-inches when using hand held equipment. Compaction is 95 percent or greater relative to a modified proctor density, APWA Section 31 23 26.
   B. Joint Preparation: Use a rigid drill frame to drill holes in the vertical center of the adjacent concrete panel. Drill holes parallel to the panel surface. Provide the specified space between drill holes. For dowel bars, drill the holes parallel to the thoroughfare centerline. Limit deviation from parallel to 1/4 inch in the length of the dowel bar. Clean vertical surface of the adjacent concrete.
   C. Reinforcement: Remove dirt, dust, and rust from bars. Do not install tie bars that interfere with dowel bars.
      1) For tie bars, place adhesive at the back of each hole so adhesive flows out, around, and fully encases each inserted bar. DO NOT coat one end of the bar and then insert the bar into the hole. Prevent loss of adhesive upon insertion.
      2) For dowel bars, place grease at the back of each hole so grease flows out, around, and fully encases each inserted bar. Grease the bar before insertion.
      3) Grease protruding dowel bar prior to concrete placement.
   D. Bond Breaker: Place bond breaker on all pavement joints that compose existing joints, both transverse and horizontal.
   E. Concrete Placement: Repack loose tie bars and dampen base course uniformly. Place concrete, consolidate along face of existing concrete panels and under reinforcement, keep vibrators away from reinforcing steel, and prevent segregation. Match adjacent surface texture.
   F. Cure: Apply a curing agent in total coverage in 2 directions after texturing. Keep cure temperature even throughout extent and depth of concrete patch.
   G. Traffic: Not allowed on patch until concrete strength is achieved.
   H. Surface Distortions: After cure, remove surface distortions that exceed 1/4-inch deviation in 10 feet. Apply water repellant to surfaces receiving grinding.
BACKFILL AND PANEL TIE-IN

SEE BAR TYPE TABLE (BELOW)
MATCH EXISTING THICKNESS
VARIES
PORTLAND CEMENT CONCRETE
AGGREGATE BASE
SUBGRADE COMPACT THIS AREA ALL SIDES

MATCH EXISTING THICKNESS VARIES
T/2
CONCRETE
BASE COURSE
EXCAVATION BACKFILL (PLAN 381)

BACKFILL

REMOVE WHOLE PANEL IF DISTANCE IS LESS THAN 5 FEET

5'-0"
MIN

REMOVE WHOLE PANEL IF DISTANCE IS LESS THAN 6 FEET

6'-0"
MIN

DIRECTION OF VEHICULAR TRAVEL

BAR TYPE TABLE

<table>
<thead>
<tr>
<th>BAR TYPE</th>
<th>BAR TYPE TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>❌</td>
<td>30&quot; LONG No. 5 TIE BARS AT 30&quot; CENTERS</td>
</tr>
<tr>
<td>⬅️</td>
<td>30&quot; LONG No. 5 TIE BARS AT 15&quot; CENTERS</td>
</tr>
<tr>
<td>⬅️</td>
<td>18&quot; LONG No. 10 TIE BARS AT 12&quot; CENTERS (NO BACKER ROD OR STRESS CUT)</td>
</tr>
<tr>
<td>⬅️</td>
<td>18&quot; LONG DOWEL BARS — SEE TABLE 1</td>
</tr>
</tbody>
</table>

TABLE 1

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS</th>
<th>DOWEL DIAMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td>LESS THAN 9&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>≥ 9&quot; AND &lt; 11&quot;</td>
<td>1.25&quot;</td>
</tr>
<tr>
<td>11&quot; OR GREATER</td>
<td>1.5&quot;</td>
</tr>
</tbody>
</table>

PANEL TIE-IN

Concrete pavement patch

August 2016

Plan 256
Sheet 2 of 2
Concrete pavement joints

1. GENERAL
   A. ENGINEER will select joint type if not shown on drawings.
   B. If separation appears at a connection to an existing pavement or street fixture during the one year correction period, blow separation clean and apply joint sealant per Plan 265.

2. PRODUCTS
   A. Joint Filler: Type F1 extending to the bottom of the concrete slab, APWA Section 32 13 73.
   B. Backer Rod: Type 1, oversized approximately 25 percent to fit tightly into each joint and compatible with hot poured sealant, APWA Section 32 13 73.
   C. Joint Sealant: HAS1, APWA Section 32 13 73.
   D. Bond Breaker (Grease): Paraffin wax, lithium grease, or other semi-solid, inert lubricant.

3. EXECUTION
   A. Joints:
      1) Saw crack control joints (contraction joints) before shrinkage cracking takes place. Do not tear or ravel concrete during sawing. In cool weather, the joint sawing may be delayed only for the time required to prevent tear or raveling of the concrete. Cut joint to dimensions shown or recommended by sealant manufacturer and acceptable to ENGINEER.
      2) Remove dirt, oil, and curing compounds from backer rod and stress cut reservoirs and seal joints immediately after cleaning.
CONTACT (C) JOINTS

**JOINT C-1**

SEE NOTE 1B

BITUMINOUS CONCRETE

5 FEET

T + 3" T

**JOINT C-3**

JOINT SEALANT (TYPE HAS1)

1/2"

JOINT FILLER (TYPE F1)

1/2"

**JOINT C-2**

CONCRETE PAVEMENT STREET FIXTURE OR STRUCTURE

APPLY 2 COATS OF BOND BREAKER TO FRONT FACE OF EXISTING CONCRETE

5 FEET

T + 3" T

**JOINT C-4**

AGGREGATE INTERLOCK BELOW

**BACKER ROD DETAIL 1**

JOINT SEALANT (TYPE HAS1)

3/8"

1 1/8"

T/3

T

INITIAL STRESS RELIEF SAW CUT OR NOT REQUIRED IF A COLD JOINT

**STRESS CUT DETAIL 2**

JOINT SEALANT (TYPE HAS1)

1/8"

SAW CUT

T

T/3

Concrete pavement joints

May 2016

105

Plan 261

Sheet 1 of 5
Concrete pavement joints

1. GENERAL
   A. ENGINEER will select joint type if not shown on drawings.
   B. If separation appears at a connection to an existing pavement or street fixture during the one year correction period, blow separation clean and apply joint sealant per Plan 265.

2. PRODUCTS
   A. Bars: 60 ksi yield grade steel, ASTM A615, epoxy coated or galvanized, with diameter and length indicated.
   B. Joint Filler: Type F1 extending to the bottom of the concrete slab, APWA Section 32 13 73.
   C. Backer Rod: Type 1, oversized approximately 25 percent to fit tightly into each joint and compatible with hot poured sealant, APWA Section 32 13 73.
   D. Joint Sealant. HAS1, APWA Section 32 13 73.
   E. Bond Breaker (Grease): Paraffin wax, lithium grease, or other semi-solid, inert lubricant.
   F. Adhesive: Epoxy adhesive grout, APWA Section 03 30 10 for gluing bars in drilled holes in concrete.

3. EXECUTION
   A. Preparation Before Bar Insertion:
      1) Select joint layout to aid construction and to control concrete cracking.
      2) Use a rigid drill frame to drill holes on indicated centers. Drill parallel to the pavement surface. Remove dust from vertical concrete surface.
      3) Place adhesive at the back of each hole so adhesive flows out, around, and fully encases each inserted bar. DO NOT coat one end of the bar and then insert the bar into the hole. Prevent sealant flow-out upon bar insertion.
   B. Tie Bars: Remove dirt, dust and rust.
   C. Joints:
      1) Saw crack control joints (contraction joints) before shrinkage cracking takes place. Do not tear or ravel concrete during sawing. In cool weather, the joint sawing may be delayed only for the time required to prevent tear or raveling of the concrete. Cut joint to dimensions shown or recommended by sealant manufacturer and acceptable to ENGINEER.
      2) Remove dirt, oil, and curing compounds from backer rod and stress cut reservoirs and seal joints immediately after cleaning.
TIE-BAR (TB) JOINTS

JOINT TB-1
INTERLOCK FACE

JOINT TB-2
VERTICAL FACE

JOINT TB-3
MID PANEL

TABLE 1

<table>
<thead>
<tr>
<th>JOINT TYPE</th>
<th>PANEL LOCATION</th>
<th>TIE BAR DIAMETER</th>
<th>LENGTH</th>
<th>SPACING O.C.</th>
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</thead>
<tbody>
<tr>
<td>TB-1</td>
<td>INTERLOCK FACE</td>
<td>5/8&quot;</td>
<td>30&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>TB-2</td>
<td>VERTICAL FACE</td>
<td>5/8&quot;</td>
<td>30&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>TB-3</td>
<td>MID PANEL</td>
<td>1.25&quot;</td>
<td>18&quot;</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

O.C. = ON CENTER

Concrete pavement joints

July 2016

Plan 261
Sheet 2 of 5
Concrete pavement joints

1. GENERAL
   A. ENGINEER will select joint type if not shown on drawings.
   B. If separation appears at a connection to an existing pavement or street fixture during the one year correction period, blow separation clean and apply joint sealant per Plan 265.

2. PRODUCTS
   A. Bars: 60 ksi yield grade steel, ASTM A615, epoxy coated or galvanized, with diameter and length indicated.
   B. Joint Filler: Type F1 extending to the bottom of the concrete slab, APWA Section 32 13 73.
   C. Backer Rod: Type 1, oversized approximately 25 percent to fit tightly into each joint and compatible with hot poured sealant, APWA Section 32 13 73
   D. Joint Sealant. HAS1, APWA Section 32 13 73.
   E. Bond Breaker (Grease): Paraffin wax, lithium grease, or other semi-solid, inert lubricant.
   F. Adhesive: Epoxy adhesive grout, APWA Section 03 30 10 for gluing bars in drilled holes in concrete.

3. EXECUTION
   A. Preparation Before Bar Insertion:
      1) Select joint layout to aid construction and to control concrete cracking.
      2) Use a rigid drill frame to drill holes on indicated centers. Drill parallel to the roadway centerline and parallel to the pavement surface. Limit drilling deviation from parallel to 1/4 inch. Remove dust from vertical concrete surface.
   B. Dowel Bars:
      1) Remove dirt, dust and rust.
      2) Apply a bond breaker (grease) over entire surface length of dowel bars. This will allow concrete movement in expansion joints.
   C. Joints:
      1) Do not tear or ravel concrete during sawing. In cool weather, the joint sawing may be delayed only for the time required to prevent tear or raveling of the concrete. Cut joint to dimensions shown or recommended by sealant manufacturer and acceptable to ENGINEER.
      2) Remove dirt, oil, and curing compounds from backer rod and stress cut reservoirs and seal joints immediately after cleaning.
DOWEL (D) JOINTS

JOINT D-1

JOINT D-2

TABLE 2

<table>
<thead>
<tr>
<th>PAVEMENT THICKNESS (T)</th>
<th>DOWEL DIAMETER</th>
<th>LENGTH</th>
<th>SPACING O.C.</th>
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</thead>
<tbody>
<tr>
<td>LESS THAN 9&quot;</td>
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<td>12&quot;</td>
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O.C. = ON CENTER

BACKER ROD DETAIL

STRESS CUT DETAIL

Concrete pavement joints
Concrete pavement joints

1. GENERAL
   A. Keep at least 3 working power saws on-site when concrete is being placed.
   B. Lay out joints to aid construction and to control concrete cracking.

2. PRODUCTS
   A. Bars: 60 ksi yield grade steel, ASTM A615, epoxy coated or galvanized, with diameter and length indicated,
   B. Wire: Steel. Sizes shown are minimum.
   C. Bond Breaker (Grease): Paraffin wax, lithium grease, or other semi-solid, inert lubricant.

3. EXECUTION
   A. Basket Assembly:
      1) Remove dirt, dust and rust from bars.
      2) Allow longitudinal movement of dowel bar in the basket assembly.
      3) Apply bond breaker (grease) to entire surface length of dowel bars. This will allow concrete movement in expansion joints.
   B. Basket Installation: Attach basket assemblies firmly to the existing or new aggregate base course. Place baskets so dowel bars are parallel to the roadway centerline and parallel to the pavement surface. Limit bar deviation from parallel to 1/4 inch.
   C. Joints:
      1) Longitudinal joint spacing is 12 feet maximum for concrete pavements.
      2) Transverse joint spacing measured in feet not to exceed 2 x T (slab thickness in inches) or 15 feet maximum. The maximum slab length to slab width ratio is 1.5 to 1.
      3) Extend transverse contraction joints continuously across the full width of the concrete. Make joints coincide with curb and gutter joints.
      4) Make adjustments in joint locations to meet inlet or manhole locations.
      5) Saw crack control joints (contraction joints) before shrinkage cracking takes place. Do not tear or ravel concrete during sawing. In cool weather, the joint sawing may be delayed only for the time required to prevent tear or raveling of the concrete. Cut joint to dimensions shown or recommended by sealant manufacturer and acceptable to ENGINEER.
      6) Remove dirt, oil, and curing compounds from joint reservoir. Seal joint immediately after cleaning.
Concrete pavement joints

1. GENERAL
   A. Lay out joints to aid construction and to control random cracking.
   B. If separation appears at a connection to an existing pavement or street fixture
during the one year correction period, blow separation clean and apply joint
sealant per Plan 265.

2. PRODUCTS
   A. Bars: 60 ksi yield grade steel, ASTM A615, epoxy coated or galvanized, with
diameter and length indicated.

3. EXECUTION
   A. Preparation Before Bar Insertion:
      1) Use a rigid drill frame to drill holes on indicated centers. Drill parallel to the
         pavement surface. Remove dust from vertical concrete surface.
      2) Place adhesive at the back of each hole so adhesive flows out, around, and
         fully encases each inserted bar. DO NOT coat one end of the bar and then
         insert the bar into the hole. Prevent sealant flow-out upon bar insertion.
   B. Tie Bars: Remove dirt, dust and rust.
   C. Joints:
      1) Saw crack control joints (contraction joints) before shrinkage cracking takes
         place. Do not tear or ravel concrete during sawing. In cool weather, the joint
         sawing may be delayed only for the time required to prevent tear or raveling
         of the concrete. Cut joint to dimensions shown or recommended by sealant
         manufacturer and acceptable to ENGINEER.
      2) Remove dirt, oil and curing compounds from backer rod and stress cut
         reservoirs and seal joints immediately after cleaning.
TYPICAL ISOLATION JOINTS AT STREET FIXTURES

INSTALL DEFORMED TIE BAR AT ALL CORNERS OF ISOLATION JOINTS THAT DO NOT INTERSECT A LONGITUDINAL OR TRANSVERSE JOINT

USE ROUND TYPE JOINT WHEN DISTANCE BETWEEN EXPANSION JOINT AND SLAB JOINT IS LESS THAN 18 INCHES

Example 1

Example 2

Example 3

Concrete pavement joints

May 2016

Plan 261
Sheet 5 of 5