REINFORCING STEEL IS CARRIED THROUGH THE LONGITUDINAL CONTRACTION JOINT

CROSS-SECTION

LONGITUDINAL CONTRACTION JOINT

DOWELED CONTRACTION JOINTS

TRAFFIC LANE

TRAFFIC LANE

CURB & GUTTER

SHOULDER

8 M MIN - 25 M MAX

PLAN-VIEW

— DOWELS: 16 MM Ø PLAIN STEEL BARS 750 MM IN LENGTH, AND SPACED ON 750 MM CENTERS

 Aires END REINFORCING STEEL 75 MM FROM JOINT

NOTE: DOWELS REQUIRED IN TRANSVERSE CONTRACTION JOINTS IN ALL REINFORCED CONCRETE PAVEMENTS

NOT TO SCALE

REINFORCED RIGID PAVEMENT WITH TWO TRAFFIC LANES

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OCTOBER 2016

FIGURE
14-3A-M
DOWELS: 16 MM Ø PLAIN STEEL BARS
750 MM IN LENGTH, AND SPACED ON 750 MM CENTERS

END REINFORCING STEEL 75 MM FROM JOINT

NOTES: REINFORCING STEEL IS CARRIED THROUGH THE LONGITUDINAL
CONTRACTION JOINT ONLY.

DOWELED CONSTRUCTION JOINTS IN CONCRETE PAVEMENTS
WITH 4 OR MORE LANES.
REINFORCING STEEL IS CARRIED THROUGH THE LONGITUDINAL CONTRACTION JOINT

CROSS-SECTION

STEEL REINFORCEMENT

LONGITUDINAL CONTRACTION JOINT

CURB & GUTTER

TRAFFIC LANE

DOWELED CONTRACTION JOINTS

8 M MIN - 25 M MAX

PLAN-VIEW

DOWELS: 16 MM ø PLAIN STEEL BARS
750 MM IN LENGTH, AND SPACED ON 750 MM CENTERS

END REINFORCING STEEL 75 MM FROM REAR FACE
OF CURB. DOWELS REQUIRED IN TRANSVERSE
CONTRACTION JOINTS IN ALL REINFORCED
CONCRETE PAVEMENTS.

NOT TO SCALE
NOT TO SCALE

LAYOUT OF JOINTS AT THE INTERSECTION OF REINFORCED RIGID PAVEMENT

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FIGURE: 14-5A-M
CROSS - SECTION

CONSTRUCTION OR CONTRACTION
JOINT WITH TIE BARS

DOWELED CONTRACTION JOINTS

PLAN - VIEW

— Dowels: 16 MM Ø Plain Steel Bars
            750 MM in length, and spaced on 750 MM Centers

— Tie Bars: 16 MM Ø Deformed Steel Bars
            750 MM in length, and spaced on 750 MM Centers
DOWELS: 16 MM Ø PLAIN STEEL BARS
750 MM IN LENGTH, AND SPACED ON 750 MM CENTERS

TIE BARS: 16 MM Ø DEFORMED STEEL BARS
750 MM IN LENGTH, AND SPACED ON 750 MM CENTERS
ALL TRANSVERSE CONSTRUCTION JOINTS IN NON-REINFORCED PAVEMENTS TO BE DOWELED BUTT JOINTS.

LAST TRANSVERSE CONTRACTION JOINT IS DOWELED.

LONGITUDINAL CONTRACTION JOINTS REQUIRED:
1. IF PAVING LANE WIDTH EXCEEDS MAXIMUM JOINT SPACING
2. IF 400 MM OR LESS FROM FREE EDGE OF PAVED AREAS GREATER THAN 33 M WIDE, TIE WITH 16 MM Ø 750 MM LONG DEFORMED TIE BARS.
WHERE PAVEMENT EXTENSION IS FEASIBLE, OUTSIDE EDGES WILL BE DOWELED, THICKENED EDGE OR WITH TIES FOR SLABS LESS THAN 200 MM THICK.

LONGITUDINAL CONSTRUCTION JOINTS BETWEEN PAVING LANE: DOWELED THICKENED EDGE, OR KEYED.
NOTE: IF NON-REINFORCED PAVEMENT IS LESS THAN 225 MM DO NOT USE KEYED JOINTS.

EXPANSION JOINTS WILL BE USED TO PROTECT ABUTTING STRUCTURES OR AT INTERSECTIONS WITH NON-PARALLEL PAVING LANE WHEN NEW PAVEMENT IS LESS THAN 250 MM THICK AND PLACED IN COLD WEATHER.

3. TRANSVERSE EXPANSION JOINTS WILL BE DOWELED EXCEPT TRANSVERSE EXPANSION JOINT 25-33 M BACK FROM EDGE WILL BE USED IF SLIPPAGE AT INTERSECTION IS REQUIRED (SUCH AS AN ANGULAR INTERSECTION OF PAVEMENTS).

2. LONGITUDINAL EXPANSION JOINTS WILL BE THICKENED EDGE.

TRANSVERSE CONTRACTION JOINT SPACING WILL BE MAXIMUM EXCEPT AS REQUIRED TO KEEP SLAB LENGTH LESS THAN OR EQUAL TO 1.25 TIMES SLAB WIDTH. DOWELS MAY BE REQUIRED IF PAVEMENT IS REINFORCED.
16 MM Ø DEFORMED STEEL TIE BARS 750 MM LONG AND SPACED 750 MM ON CENTERS. USED ONLY IN JOINTS 5 M OR LESS FROM FREE EDGES OF PAVED AREAS GREATER THAN 33 M IN WIDTH.

LONGITUDINAL

EITHER ONE PIECE OR THREADED SPLIT-TYPE DOWEL MAY BE USED

PAINT & LIGHTLY OIL ONE END OF DOWEL

D* DENOTES DOWEL DIAMETER

TRANSVERSE

SEE JOINT SEALANT FIGURE 16-7

SEE JOINT SEALANT FIGURE 16-7

CONTRACTION JOINTS FOR PLAIN CONCRETE PAVEMENTS

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FIGURE
16-3-M
DOWELED TRANSVERSE OR LONGITUDINAL

D* DENOTES DOWEL DIAMETER

SEE JOINT SEALANT
FIGURE 16-7

EITHER ONE PIECE OR
THREADED SPLIT-TYPE
DOWEL MAY BE USED

PAINT & LIGHTLY OIL
ONE END OF DOWEL

SEE JOINT SEALANT
FIGURE 16-7

BUTT JOINT

NOT TO SCALE
SEE JOINT SEALANT
FIGURE 16-7

SLOPE 1:4

0.2h_d

0.1h_d

h_d

A TOLERANCE OF ± 2 MM MAY BE ALLOWED FOR KEY DIMENSIONS AND LOCATION

KEYED LONGITUDINAL

SEE JOINT SEALANT
FIGURE 16-7

SLOPE 1:4

h_d

1.25h_d

0.25h_d

0.625h_d

0.125h_d

2 M MIN.

A TOLERANCE OF ± 2 MM MAY BE ALLOWED FOR KEY DIMENSIONS AND LOCATION

KEYED THICKENED EDGE LONGITUDINAL

CONSTRUCTION JOINTS FOR PLAIN CONCRETE PAVEMENTS

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FIGURE
16-4B-M

NOT TO SCALE
THICKENED EDGE LONGITUDINAL

SEE JOINT SEALANT
FIGURE 16-7

SEE JOINT SEALANT
FIGURE 16-7

EXISTING PAVEMENT

NEW PAVEMENT

25 MM

150 MM

MIN

16 MM Ø DEFORMED STEEL BARS 600 MM LONG, SPACED ON 450 MM CENTERS, AND PLACED PARALLEL TO THICKENED EDGE.

NOTE 1: PLACEMENT AND CONSOLIDATION OF THE NEW CONCRETE UNDER EXISTING PAVEMENT SHOULD BE CARRIED OUT IMMEDIATELY PRIOR TO CONSTRUCTION OF THE NEW PAVEMENT. PLACEMENT OPERATIONS SHOULD BE TIMED SO THAT THE INITIAL CONCRETE IS STILL PLASTIC WHEN THE REMAINDER OF THE CONCRETE PAVEMENT IS PLACED.

SPECIAL JOINT BETWEEN NEW AND EXISTING PAVEMENT TRANSVERSE AND LONGITUDINAL

NOT TO SCALE

CONSTRUCTION JOINTS FOR PLAIN CONCRETE PAVEMENTS

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FIGURE
16-4C-M
DOWELED JOINT BETWEEN NEW AND EXISTING PAVEMENT

THICKENED EDGE JOINT BETWEEN NEW AND EXISTING PAVEMENT

* NOTE: THIS TYPE JOINT SHOULD BE USED ONLY WHEN EXISTING PAVEMENT IS TO BE REPLACED IN A SHORT PERIOD OF TIME, SINCE WITHOUT LOAD TRANSFER IT WILL DETERIORATE QUICKLY!
SEE JOINT SEALANT
FIGURE 16-7

LONGITUDINAL
THE BOND-BREAKING MEDIUM WILL BE EITHER A HEAVY COATING OF BITUMINOUS MATERIAL NOT LESS THAN 1/16 INCH IN THICKNESS WHEN JOINTS MATCH OR A NORMAL NONEXTRUDING-TYPE EXPANSION JOINT MATERIAL NOT LESS THAN 1/4-INCH IN THICKNESS WHEN JOINTS DO NOT MATCH.
CONTRACTION JOINT

CONSTRUCTION JOINT

EXPANSION JOINT

\[ W = \text{WIDTH OF SEALANT RESERVOIR (19 MM)} \]
\[ D = \text{DEPTH OF SEALANT (1.0 TO 1.5 x W)} \]
\[ T = \text{DEPTH OF INITIAL SAWCUT OR INSERT TYPE JOINT FORMER (CONTRACTION JOINT)} \]
\[ \text{a. 1/4 SLAB THICKNESS FOR PAVEMENTS LESS THAN 300 MM} \]
\[ \text{b. 75 MM FOR PAVEMENTS 300 TO 450 MM *} \]
\[ \text{c. 1/6 SLAB THICKNESS FOR PAVEMENTS MORE THAN 450 MM *} \]

* DESIGNER MAY WANT TO CONSIDER REQUIRING 1/4 SLAB THICKNESS

NOTE: TOP OF SEALANT WILL BE 3 TO 6 MM BELOW TOP OF PAVEMENT.

NOT TO SCALE
CONTRACTION JOINT

CONSTRUCTION JOINT

EXPANSION JOINT

W = WIDTH OF SEALANT RESERVOIR (19 MM)
D = DEPTH OF SEALANT (1.0 TO 1.5 x W)
T = DEPTH OF INITIAL SAWCUT OR INSERT TYPE JOINT FORMER (CONTRACTION JOINT)
   a. 1/4 SLAB THICKNESS FOR PAVEMENTS LESS THAN 300 MM
   b. 75 MM FOR PAVEMENTS 300 TO 450 MM *
   c. 1/6 SLAB THICKNESS FOR PAVEMENTS MORE THAN 450 MM *

* DESIGNER MAY WANT TO CONSIDER REQUIRING 1/4 SLAB THICKNESS

NOTE: TOP OF SEALANT WILL BE 3 TO 6 MM BELOW TOP OF PAVEMENT.
CONTRACTION JOINT

CONSTRUCTION JOINT

EXPANSION JOINT

D, W, AND T DIMENSIONS: AS RECOMMENDED BY MANUFACTURER
D = 37 MM MINIMUM
W = 19 MM MINIMUM

TOP OF PREFORMED SEAL WILL BE 3 TO 6 MM BELOW PAVEMENT SURFACE

COMPRESSIÓN SEAL MUST BE IN COMPRESSION AT ALL TIMES.
SEE JOINT SEALANT FIGURE 16-7

\[ \frac{h_d}{4} + 25 \text{ MM} \]

REINFORCING STEEL

REINFORCING STEEL IS CARRIED THROUGH THE JOINT

NOTE: SAW CUT WILL NOT EXTEND BELOW THE REINFORCING STEEL.

LONGITUDINAL

SEE JOINT SEALANT FIGURE 16-7

\[ \frac{h_d}{4} + 25 \text{ MM} \]

REINFORCING STEEL IS NOT CARRIED THROUGH THE JOINT

D* DENOTES DOWEL DIAMETER

EITHER ONE PIECE OR THREADED SPLIT-TYPE DOWEL MAY BE USED

PAINT & OIL ONE END OF DOWEL

TRANSVERSE

SEE JOINT SEALANT FIGURE 16-7

\[ \frac{h_d}{4} + 25 \text{ MM} \]

16 MM Ø DEFORMED STEEL TIE BARS 750 MM LONG AND SPACED 750 ON CENTERS

TIED LONGITUDINAL

NOT TO SCALE
DOWELED TRANSVERSE

DOWELED TRANSVERSE OR LONGITUDINAL

NOT TO SCALE
SEE JOINT SEALANT - FIGURE 16-7

REINFORCING STEEL IS NOT CARRIED THROUGH THE JOINT

\[ \frac{h_d}{4} + 25\text{ MM} \]

SLOPE 1:4

75 MM

16 MM Ø DEFORMED STEEL TIE BARS 750 MM LONG, SPACED 750 MM ON CENTERS

0.2h_d

0.1h_d

A TOLERANCE OF ± 2 MM MAY BE ALLOWED FOR KEY DIMENSIONS AND LOCATION
A VERTICAL TOLERANCE OF ± 6 MM IS ALLOWED FOR PLACEMENT OF THE TIE BAR

KEYED AND TIED LONGITUDINAL

SEE JOINT SEALANT - FIGURE 16-7

REINFORCING STEEL IS NOT CARRIED THROUGH THE JOINT

\[ \frac{h_d}{4} + 25\text{ MM} \]

SLOPE 1:4

0.25h_d

0.125h_d

REINFORCING STEEL

0.625h_d

2 M MIN

A TOLERANCE OF ± 2 MM MAY BE ALLOWED FOR KEY DIMENSIONS AND LOCATION.

KEYED THICKENED EDGE LONGITUDINAL

NOT TO SCALE

CONSTRUCTION JOINTS FOR REINFORCED CONCRETE PAVEMENTS

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FIGURE 17-2B-M
THICKENED EDGE LONGITUDINAL

SEE JOINT SEALANT
FIGURE 16-7

REINFORCING STEEL IS
NOT CARRIED THROUGH
THE JOINT

FORMED BUTT JOINT

2 M MIN

REINFORCING STEEL

2 M MIN

150 MM MIN OR
1.25h_d - h_e

16 MM Ø DEFORMED STEEL BARS 600 MM LONG, SPACED ON 450 MM CENTERS, AND PLACED PARALLEL TO THICKENED EDGE.

NOTE 1: PLACEMENT AND CONSOLIDATION OF THE NEW CONCRETE UNDER EXISTING PAVEMENT SHOULD BE CARRIED OUT IMMEDIATELY PRIOR TO CONSTRUCTION OF THE NEW PAVEMENT. PLACEMENT OPERATIONS SHOULD BE TIMED SO THAT THE INITIAL CONCRETE IS STILL PLASTIC WHEN THE REMAINDER OF THE CONCRETE PAVEMENT IS PLACED.

SPECIAL JOINT BETWEEN NEW AND EXISTING PAVEMENT
TRANSVERSE AND LONGITUDINAL
SEE JOINT SEALANT

Figure 16-7

Existing Pavement

Reinforcing Steel

\[ \frac{h_d}{4} + 25 \text{ MM} \]

New Pavement

2 M MIN

* NOTE: THIS TYPE JOINT SHOULD BE USED ONLY WHEN EXISTING PAVEMENT IS TO BE REPLACED IN A SHORT PERIOD OF TIME, SINCE WITHOUT LOAD TRANSFER IT WILL DETERIORATE QUICKLY!

Thickened Edge Joint Between New and Existing Pavement

SEE JOINT SEALANT

Figure 16-7

Reinforcing Steel

\[ \frac{h_d}{4} + 25 \text{ MM} \]

Drill & Grout Dowel

Existing Pavement

Either one piece or threaded split-type dowels may be used.

Dowelled Joint Between New and Existing Pavement

Not to Scale

Construction Joints for Reinforced Concrete Pavements

Date: October 2016

Figure 17-2D-M
LONGITUDINAL

SEE JOINT SEALANT

REINFORCING STEEL IS NOT CARRIED THROUGH THE JOINT

REINFORCING STEEL

\( \frac{h_d}{4} + 25 \text{ MM} \)

\( h_d \)

\( 1.25h_d \)

2 M MIN

75 MM

19 MM MIN

NOT TO SCALE

EXPANSION JOINTS FOR REINFORCED CONCRETE PAVEMENTS

DATE
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FIGURE
17-3-M
DEPT OF FROST PENETRATION INTO SUBGRADE

25 TO 33 M +/-

RECOMMENDED TRANSITION
(TO BE UNDERCUT AND REPLACED WITH MATERIAL SIMILAR TO ADJACENT FILL)
SHOULDER FLUSHING AND OBSERVATION RISES

MANHOLE MIN. SLOPE = 0.0015

ALTERNATE METHODS OF DISCHARGE

RUNWAY

MAX 150 M MAX 150 M

HIGH POINT

LATERALS AS REQUIRED

MAX DISTANCE BETWEEN MANHOLES 300 M

DISCHARGE TO SURFACE DRAINAGE SYSTEM

PLAN VIEW OF SUBSURFACE DRAINAGE SYSTEM

DATE OCTOBER 2016

FIGURE 20-6-M
TYPICAL INTERIOR SUBDRAIN FOR RIGID PAVEMENT
(NONFROST AREAS)
TYPICAL INTERIOR SUBDRAIN FOR RIGID PAVEMENT (FROST AREAS, DEPTH OF FROST > DEPTH TO PIPE)

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FIGURE:  
20-7B-M

NOT TO SCALE
TYPICAL EDGE SUBDRAIN FOR RIGID PAVEMENT (FROST AREAS)

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FIGURE 20-8B-M
TYPICAL EDGE SUBDRAIN FOR FLEXIBLE PAVEMENT (FROST AREAS)

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FIGURE
20-10B-M