SECTION 28

DECK JOINTS
28 DECK JOINTS

28.1 GENERAL

Joints in bridge decks are provided to perform one or more of the following functions:

- to allow the deck to expand and contract in length due to changes in temperature and loading or due to the shrinkage and residual creep of the concrete
- to allow the ends of the deck to rotate as the deck deflects under load
- to allow for transverse movements on skewed and/or curved bridges
- to allow for any differential settlement of the substructure

The majority of expansion joints consist of the joint gap, the armour of its edges and a seal or cover for the joint gap. The armour of the joint edges and the joint seal can be supplied either as separate items or as a combined joint system.

The edges of small movement deck joints on bridges do not usually have armouring.

The function of the joint seal is to provide one or more of the following:

- to provide a smooth riding or walking surface across the joint gap
- to prevent penetration of solids into the joint gap
- to prevent penetration of water through the joint gap

When the specified joint system to be used is not fully waterproof, provision shall be made for the protection of all elements below the joint gap, i.e. metal parts of girders and/or bearings from corrosion and concrete surfaces from staining.

28.2 DETAILING OF JOINTS

Deck joints currently used by the Authority may be divided into the following various categories:

28.2.1 Small Movement Joints

The presentation of these types of joints shall be in accordance with the details shown in RTA Standard Bridge Drawing Numbers RTAB035 and RTAB035A.

28.2.2 Compression Seal Joints

The presentation of these types of joints shall be in accordance with the details shown in Figure 28.2.2.

28.2.3 Steel Fabricated Interlocking Finger Joints

Generally, where a proprietary item is not used and this type of joint is required, the joint shall be presented on the drawings in a detailed format to facilitate manufacture and installation. Where proprietary items are detailed, the drawings shall include a suitable note to allow the Contractor to use an alternative type of joint providing that all the performance requirements, as stipulated on the drawing, are met.
Figures 28.2.3(a), (b) and (c) illustrate the correct method for detailing steel fabricated interlocking finger joints and associated concrete safety barrier cover plates.

28.2.4 Elastomeric Strip Seal Joints

The presentation of these types of joints shall be in accordance with Figure 28.2.4.

28.2.5 Proprietary Aluminium Saw Tooth Joints

This type of joint incorporates a compressed rubber seal below the saw teeth to seal the joint gap and examples of this type of joint are CIPEC Wd and ETIC EJ. Use of this type of joint is limited to straight and square bridges as the angles of the fingers are fixed. Use of this type of joint on skewed bridges may present a hazard to traffic.

28.2.6 Modular Joints

Modular type joints provide for large movements on larger bridges. The design of the joint must conform to the requirements of RTA Specification B316 and the joint recess shall be detailed completely to suit the type of joint used. Access must be provided beneath the joint for maintenance purposes. If there is insufficient space beneath the joint to provide for access, steel interlocking finger type joints should be used.

28.2.7 Other Joint Types

Joints covered by this category include moulded neoprene joints reinforced by plates and angles (Waboflex, Transflex, ICL-NR), combined steel fingers and neoprene support systems (PSC-FT). Presentation of these types of joints shall be in accordance with Figure 28.2.5.

In all cases where joint systems are required to be anchored into the concrete by the use of anchor bolts, dowels, cast-in anchors or other similar devices, the details for the location of such anchoring devices shall be clearly shown on the relevant concrete detail sheet. Where the location of anchoring devices causes interference with the desired location of reinforcement in the concrete member, the reinforcement shall be adjusted slightly to accommodate the anchoring devices where appropriate.

In all cases, where there exists the possibility that water has the potential to pond behind a joint gap, provision shall be made to drain the ponding water so that the integrity of the joint is not compromised.

28.3 REHABILITATION OF JOINTS

28.3.1 Small Movement Joints

The method of rehabilitation of these types of joints shall be in accordance with the details shown in RTA Standard Bridge Drawing Number RTAB035B – Repair of Small Movement Joints with Sealants and RTA QA Specification B312.

28.3.2 Other Joint Types

The rehabilitation of all bridge deck joints requires careful consideration. In all instances, the relevant WAE drawings for the bridge and the original joint should be obtained prior to the detailing of any joint rehabilitation or replacement and the WAE drawings used when undertaking a detailed inspection of the joint(s) in question and when calculating joint movements taking into account bridge configuration and articulation.

Where WAE drawings for the existing joint installation are not available, the joint or joints shall be fully inspected and all necessary site measurements obtained prior to the detailing of
any joint rehabilitation or replacement. Items to be measured accurately include span lengths and material type, location of fixed and expansion bearings, joint opening width, width of joint recess on both sides of the joint and the location of any fixtures used to anchor the joint as appropriate. Careful consideration should also be given to the condition of the fixtures used to anchor the joint as well as the condition of the material immediately adjacent to the joint recess as rehabilitation works to these items may be required to ensure that the joint replacement or rehabilitation will ensure satisfactory operation of the joint for the remaining design life of the bridge.
**SECTION THROUGH EXPANSION JOINT**

Before installation, the seal shall be sealed.

End of compression seal shall be detailed in accordance with Figure 28.2.1, with the locations of the seal supports being adjusted to suit the proposed seal performance requirements:

- Heavy duty open-cell compression seal or equivalent
- Compression movement = ___ mm
- Expansion movement = ___ mm
- Length = ___ mm

General notes:

- The calculated temperature movement of the joint gap is approx. ___ mm per 1°C.

**FIGURE 28.2.2**

Installation of seal shall be carried out in accordance with the manufacturer's instructions.

**PLAN OF DECK JOINT AT ABUTMENTS A AND B**

Expansion joint angles shall be detailed in accordance with Figure 28.2.2. The calculated temperature movement of the joint gap is approx. ___ mm per 1°C.

**SCHEDULE AS SHOWN**

Installation of seal shall be carried out in accordance with the manufacturer's instructions.
EXPANSION JOINTS AND COVER PLATES - SHEET A

SCALE OR AS SHOWN.

DENOTES NOMINAL DIMENSIONS AT 16°C AT INSTALLATION.

THE CALCULATED TEMPERATURE MOVEMENT OF THE JOINT GAP IS APPROX ±13mm PER 5°C.

DECK EXPANSION JOINT PERFORMANCE REQUIREMENTS FOR MOVEMENT:

109mm (BRIDGE EXPANSION)
171mm (BRIDGE CONTRACTION)

TOP SURFACE OF FINGER PLATES SHALL BE FINISHED WITH 2 COATS OF ANTI-SLIP, TWO PACK POLYAMIDE CURED HIGH BUILD EPOXY COATING.

FOR OTHER GENERAL NOTES RELATING TO THIS SHEET, SEE SHEETS No ... AND ...

PREPARED
CHECKED
DESIGN DRAWING
ISSUE DATE
REVISION PREP AUTH
ROADS AND TRAFFIC AUTHORITY OF NSW
CHECK THIS DRAWING IS CONFIDENTIAL AND SHALL ONLY BE USED FOR THE PURPOSE OF THE NOMINATED PROJECT.

PLAN ELEVATION FOOTWAY DECK ABUTMENT COVER PLATE TYPE A COVER PLATE TYPE B COVER PLATE TYPE C COVER PLATE TYPE D COVER PLATE TYPE E M10 x 20 LONG STAINLESS STEEL COUNTERSUNK HEAD MACHINE SCREWS M10 x 20 LONG STAINLESS STEEL COUNTERSUNK HEAD MACHINE SCREWS 45 3 290 APPROACH SLAB ANCHOR SPACING: 16 AT 200 = 3 200 ANCHOR BOLT ASSEMBLY SPACING: 59 SPACES AT 180 = 10 620 5 TYP M10 x 20 LONG STAINLESS STEEL COUNTERSUNK HEAD MACHINE SCREWS 10 STEEL FACRICATED INTERLOCKING FINGER PLATES AT 1 080 100 x 16 PLATE ATTACHED TO EVERY SECOND FINGER PLATE USING M8 x 28 LONG FLAT HEAD CAP SCREWS ANCHOR BOLT ASSEMBLY

SECTION 1

SECTION 2

SECTION 3

M20 x 300 LONG GALVANIZED HIGH STRENGTH STEEL ANCHOR BOLTS TO AS/NS 1252 WITH SUITABLE FERRULES, PLASTIC SLEEVES AND CORONET WASHERS. BOLTS SHALL BE GREASED PRIOR TO PLACEMENT. FERRULES MUST BE FINGER TIGHT AND FIRM AGAINST PLASTIC SLEEVE PRIOR TO PLACEMENT OF CONCRETE. AFTER CONCRETE HAS ACHIEVED MINIMUM 28 DAY STRENGTH BOLTS SHALL BE TENSIONED TO 145kN.
GENERAL NOTES

SCALE 1:200 AS SHOWN.

CONCRETE EXPOSURE CLASSIFICATION: B1.
MINIMUM 28-DAY COMPRESSIVE STRENGTH OF ALL CONCRETE SHALL BE 50MPa.
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GENERAL NOTES

- Steel plate shall be Grade 250 to AS/NZS 3678.
- High strength steel bolts shall be property class 8.8 to AS/NZS 1252.
- High strength steel washers shall conform to AS/NZS 1252.
- Countersunk head 8.8 high metric machine screws shall be property class 4.8 to AS/NZS 1252.
- Bolting category for high strength steel bolts shall be 8.8/TF in accordance with AS/NZS 1252.
- All welding shall conform to the requirements of AS/NZS 1004.4, with additional requirements as given in RTA Specification B204.
- All components, except stainless steel items, shall be hot-dip galvanised after fabrication in accordance with RTA Specification B241.
- Damaged galvanised surfaces shall be re-galvanised in accordance with RTA Specification B241.
- Edges to be protective treated shall be rounded to a radius of 1.5mm unless specified otherwise.
- All components, except stainless steel items, shall be hot-dip galvanised after fabrication in accordance with RTA Specification B241.
- Welding symbols comply with AS/NZS 2159.
- Welding symbols comply with AS/NZS 1101.3.
- Welding symbols comply with AS/NZS 1101.3.
- Welding symbols comply with AS/NZS 1101.3.
- Welding symbols comply with AS/NZS 1101.3.
GENERAL NOTES

PERMANENT SEAL ELEMENT TO BE INSTALLED IN ONE LENGTH.

STEEL PLATES SHALL BE GRADE 250 TO AS 3678.

SLOTTED COUNTERSUNK HEAD SCREWS SHALL CONFORM TO AS/NZS 1427.

ALL STEEL COMPONENTS EXCEPT STAINLESS STEEL ITEMS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE SPECIFICATION.

EDGES TO BE PROTECTIVE TREATED SHALL BE ROUNDED TO A RADIUS OF 1.5mm UNLESS SPECIFIED OTHERWISE.

DENOTES NOMINAL DIMENSION AT 20°C.

THE CALCULATED TEMPERATURE MOVEMENT OF THE JOINT GAP IS APPROX 1mm PER ±3°C.

JOINTS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

EXPERIENCES NOMIC DIMENSIONS AT 20°C.

THE CALCULATED TEMPERATURE MOVEMENT OF THE JOINT GAP IS APPROX 1mm PER ±3°C.

JOINTS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

FIGURE 28.2.4

EXPANSION JOINT DETAILS

AUSFLEX SERIES

ALUMINIUM TYPE 100F EXPANSION JOINT WITH ALUMINIUM SIDE RETAINERS AND ELASTOMERIC GLAND OR APPROVED EQUIVALENT.

M10 x 20 LONG STAINLESS STEEL COUNTERSUNK HEAD MACHINE SCREWS 4 REQUIRED PER COVER PLATE.

M10 x 40 LONG STAINLESS STEEL OR EQUIVALENT TAPPED INTO DIA 12 x 43 DEEP Pre-HILED HOLE AND EXPANDED USING THE CORRECT SETTING TOOL AND BUMPER AS REQUIRED PER COVER PLATE.

ANCHOR BOLT SPACING

MT 2 x 40 LONG, HIGH STRENGTH STRUCTURAL ANCHOR BOLTS TO AS 1252 WITH SUITABLE FERRULES.

 THREADS OF BOLTS SHALL BE LUBRICATED WITH DURATEX PRIOR TO PLACEMENT OF FERRULES. FERRULES MUST BE FINGER TIGHT AND FIRM AGAINST PLASTIC SLEEVE PRIOR TO PLACEMENT OF CONCRETE. BOLTS SHALL BE TIGHTENED VIA THE AHDIY TEST PULL TEST METHOD IN ACCORDANCE WITH AS 1511 AFTER ADEQUATE CONCRETE PLACEMENT HAS BEEN ACHIEVED.

MINIMUM BOLT TENSION SHALL BE 145kN.

BOLTS SHALL BE SET IN PLACE USING A TEMPLATE.

DIA 16 BARS RUNNING LONGITUDINALLY WITH JOINT (TYPICAL BOTH SIDES)

DIA 16 BARS RUNNING LONGITUDINALLY WITH JOINT (TYPICAL BOTH SIDES)

JOINT GAP 30mm

PLASTIC SLEEVE

CELLULAR POLYSTYRENE

M20 x 180 LONG GALVANIZED HIGH STRENGTH STRUCTURAL ANCHOR BOLTS TO AS 1252 WITH SUITABLE FERRULES.

THREADS OF BOLTS SHALL BE LUBRICATED WITH GREASE PRIOR TO PLACEMENT OF FERRULES. FERRULES MUST BE FINGER TIGHT AND FIRM AGAINST PLASTIC SLEEVE PRIOR TO PLACEMENT OF CONCRETE. BOLTS SHALL BE TIGHTENED VIA THE AHDIY TEST PULL TEST METHOD IN ACCORDANCE WITH AS 1511 AFTER ADEQUATE CONCRETE PLACEMENT HAS BEEN ACHIEVED.

MINIMUM BOLT TENSION SHALL BE 145kN.

BOLTS SHALL BE SET IN PLACE USING A TEMPLATE.
PLATES SHALL BE COATED WITH AN INORGANIC ZINC SILICATE PRIMER AFTER FABRICATION (SEE SPECIFICATION).

WITHIN THE DECK JOINT RECESS AND CAST-IN SUPPORTS FOR CONTROL BOXES, JOINT. THESE DIMENSIONS MAY VARY, DEPENDING ON THE PROPOSED JOINT.

C. THE WIDTH OF THE JOINT SHALL BE ADJUSTMENT FOR THE SUPERSTRUCTURE DURING INSTALLATION.

MODULAR DECK JOINT PERFORMANCE REQUIREMENTS FOR MOVEMENT:

(i) +120mm (JOINT EXPANSION)

(ii) MAXIMUM CLEAR GAP BETWEEN TRANSVERSE RAIL MEMBERS = 85mm.

ALL STEEL SURFACES OF THE DECK JOINT (INCLUDING ANCHOR BARS AND REINFORCEMENT) MAY BE VARIED TO SUIT THE PROPOSED JOINT, HOWEVER THE ANCHORAGE DETAIL DENOTES NOMINAL DIMENSIONS ASSUMED FOR A TYPICAL MODULAR TYPE DECK JOINT.

ANCHOR BARS WELDED TO JOINT IN ACCORDANCE WITH THE JOINT MANUFACTURER'S RECOMMENDATION.

STEEL BAR SHALL CONFORM TO AS 3679 GRADE 250.

STEEL PLATE SHALL CONFORM TO AS 3678 GRADE 250.

RELATIVE TO DIMENSIONS AT TIME OF JOINT INSTALLATION

GENERAL NOTES

ALL DETAILS OF ANY PROPOSED ALTERNATIVE MODULAR JOINT SHALL BE SUBMITTED TO THE PRINCIPAL AT THE TIME OF TENDER.

1. Expansion joints shall be filled with a suitable non-sticking material approved by the principal.

2. All steel surfaces of the deck joint, including anchor bars and plates, shall be painted with an appropriate coating after fabrication (see specifications).

DECK JOINT RECESS SHOWN ONLY

SECTION 1

DECK REINFORCEMENT EXTENDING INTO DECK JOINT RECESS (SHOWN ONLY)

MODULAR OR MULTI-ELEMENT TYPE DECK JOINT

DETAIL

SOUTHERN PARAPET ABUTMENT A AND B

DECK JOINT AT ABUTMENT A

DECK JOINT AT ABUTMENT B

DECK REINFORCEMENT EXTENDING FROM THE DECK AND ABUTMENT INTO THE RECESS SHALL BE DETAINED BY THE DECK JOINT MANUFACTURER TO SUIT THE PROPOSED DECK JOINT. DETAILS OF THE BAR EXTENDING ALONG THE JOINT RECESS SHOWN ONLY.

END OF WING WALL

ASPHALT EXPANSION JOINTS