

## **SECTION 29**

# **MISCELLANEOUS METALWORK**

## 29 MISCELLANEOUS METALWORK

### 29.1 GENERAL

Miscellaneous metalwork items used in bridge construction include :

- Protection Angles (at abutments and approach slabs)
- Expansion Joint Angles
- Dowels
- Anchor Bolt Assemblies
- Bearing Attachment Plates
- Bearing Cover Plates
- Concrete Safety Barrier Cover Plates (for expansion joints)

Each of the above items requires adequate detailing for both fabrication and installation and as such, provision shall be made on the relevant concrete detail sheet, or, if required, on a separate sheet.

When detailing items for fabrication, care shall be taken to observe the following :

- Materials shall be designated in accordance with the relevant Australian Standard eg Steel plate shall be to AS/NZS 3678-300  
Steel sections shall be to AS/NZS 3679.1-300
- Overall dimensions, as well as dimensions for location of holes, hole diameters, corner radii and the thicknesses of plates etc shall be shown.
- Metalwork dimensions shall be given to the nearest 0.1 mm for cross section dimensions and to the nearest 1 mm for length.
- Welding symbols comply with AS 1101.3
- All welding shall comply with the requirements of AS/NZS 1554.1
- Weld category shall be SP in accordance with AS/NZS 1554.1 unless GP welds are specified by the designer
- A suitable note to describe the required protective treatment of items eg Protection angle assemblies shall be hot-dip galvanized after fabrication.
- The total number required of each item shall be shown.

General Notes for the fabrication and protective treatment of minor fabricated steel items are provided on RTA Standard Bridge Drawing No RTAB029 and where appropriate, shall be used. These notes shall be supplemented by additional notes, if required, located on the sheet where these items are detailed.

Specific requirements for each of the above items are described in the following sub-clauses.

### 29.2 PROTECTION ANGLES AND EXPANSION JOINT ANGLES

The outline of protection angles and expansion joint angles shall be shown in-situ on the various views and sections on the relevant concrete detail sheets. Ideally, the fabrication details for the angle assemblies should be shown on the sheet for that part of the structure

that the assembly will be located on. Where the detailing of the assembly is not included on the relevant concrete detail sheet a suitable note shall be placed on the concrete detail sheet to reference the detailing of the assembly

eg For details of protection angles see Sheet No 12.

Figure 29.2.1 shows the correct method for the detailing of protection angles and expansion joint angles. RTA Standard Bridge Drawing Number RTAB030 provides details of the correct size and location for shear connectors, holes for formwork attachment and air holes (in accordance with Chief Bridge Engineer Circular Number 90/7).

In the case of skewed bridges, the ends of the protection angles and expansion joint angles shall be carefully examined to ensure that they do not interfere with the correct placement of concrete safety barrier reinforcement. Where interference is caused by leaving the ends of protection angles square, the ends of protection angles shall be cut to match the skew angle.

### **29.3 DOWELS AND DOWEL CAP ASSEMBLIES**

Dowel bars shall be fully detailed on the concrete drawing for that part of the structure in which they will be located. The location and projection of the dowel bar in relation to the concrete surface shall be detailed.

Alternatively, dowel bars may be fixed into formed holes and in these cases the diameter, depth and location of the holes shall be clearly detailed in conjunction with the details of the dowel bars themselves.

Where dowel bars are fixed into formed holes, a suitable note referring to the filling of the holes shall also be included.

The correct method of detailing dowel bar cap assemblies for plank deck bridges with spans up to and including 18.0 metres and standard approach slab applications is shown in RTA Standard Bridge Drawing No RTAB036 and it must be used where appropriate. For other applications, refer to Chief Bridge Engineer Circular 98/15.

### **29.4 BOLT ASSEMBLIES**

Bolt assemblies need not be fully detailed where the assembly being used is comprised of standard components, provided that all the necessary details of the assembly, ie thread length, nut or nuts and washers etc are stated on the drawing

with the component that they are required to anchor or fix. Where non standard bolt assemblies are used and cannot be adequately described, a general view of the assembly shall be shown with all components fully labelled, in close proximity to the item that they are required to anchor or fix, where this is possible. Where this is not possible, a suitable note referencing the location of the bolt assembly detail shall be given and a general view of the assembly shall be shown.

eg For details of anchor bolt assembly, see Sheet No 12

Where bolts are cast into the concrete, the location, length and projection of the bolt with relation to the concrete surface shall be shown on the concrete detail sheet for that part of the structure that the assembly is located in..

In the case of anchor bolts, they can be either cast-in or placed in formed holes. Where anchor bolts are to be placed into formed holes, the location, diameter and depth of the holes shall be clearly detailed on the concrete drawing together with a suitable note referring to the filling of the formed holes subsequent to bolt placement.

Where there are a large amount of differing bolt types and lengths required, it is preferred that a Bolting Schedule (in the form of a table) be included in the drawings. The Bolting Schedule should contain all necessary information about all of the bolt assemblies required, including Property Class, Bolting Category, length, thread length if non standard, nut type or types, washer type and the number required for each complete assembly. Where this method is used it is appropriate to refer to bolt assemblies on the drawings as Bolt Assembly Type A etc.

### **29.5 BEARING ATTACHMENT PLATES**

Fabrication details for both top and bottom attachment plates shall be detailed with the bearing to which they will be attached.

The method of fixing bottom attachment plates to the structure varies and may be any of the following:

- Cast directly into the concrete
- Fixed into formed holes by the use of dowels welded to the bottom surface
- Fixed to cast-in anchor bolts
- In each of the above cases, the anchorage requirements shall be shown and a suitable reference shall be made on the concrete detail sheet.

The fixing of top attachment plates is dependant upon the type of structure in which they will be located and may be grouped into two broad categories:

- For concrete bridges, the top attachment plate is normally bolted to the bearing and fixed directly into that part of the structure immediately above the bearing by the use of dowels attached to the top of the plate.
- For steel girder bridges, the top attachment plate may be either welded or bolted to the girder and in this case the attachment shall be fully detailed on the girder sheets.

Care shall be taken to ensure that the holes provided in the attachment plates for the attachment of the bearings match those of the bearing to be used.

In all cases where attachment plates are used, the reinforcement in the substructure or superstructure item, as appropriate, shall be carefully examined to ensure the placing of both the attachment plate and the reinforcement can be achieved.

### **29.6 BEARING COVER PLATES**

Where bearing cover plates are used, fabrication and erection details should generally be shown on the relevant concrete detail sheet. Where this is not possible, a suitable cross reference shall be given

eg For details of bearing cover plates, see Sheet No 15

### **29.7 CONCRETE SAFETY BARRIER COVER PLATES FOR EXPANSION JOINTS**

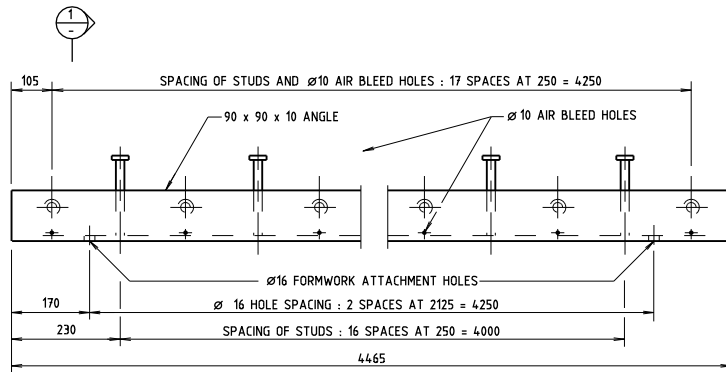
Concrete safety barrier cover plates for expansion joints shall be provided where the expansion joint gap, due to calculated ultimate effects, is greater than 50mm. Where possible, the cover plates shall be detailed on the same sheet as the expansion joint to which they relate and as a general rule they shall be detailed to be fixed normal to the concrete safety barrier regardless of the grade on the deck.

Fabrication details for concrete safety barrier cover plates shall include all the necessary dimensions and bend radii together with hole diameters for the selected method of fixing cover plates to the structure.

Details for the fixing of the cover plates to the structure ie cast-in ferrules, cast-in anchors etc shall be provided on the appropriate concrete detail sheet.

Cover plates shall be detailed to ensure that once fitted, the top surface of the cover plate is flush with the concrete surface on each side of the joint which it covers. Recesses provided in the concrete for cover plates shall be deep enough to accommodate the plate thickness used. The minimum plate thickness for expansion joint cover plates shall be 10mm unless a thicker plate is specified by the design engineer.

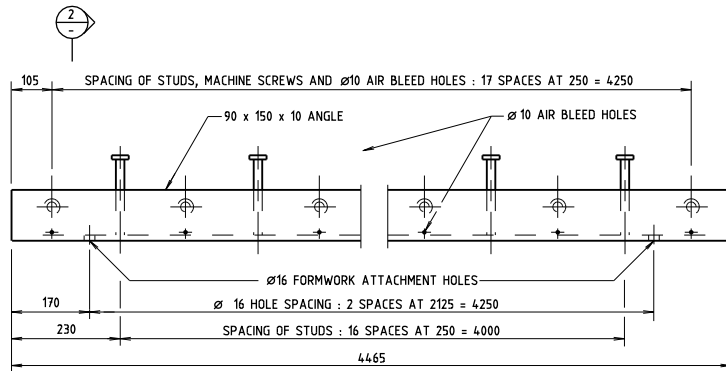
See Figure 28.2.3 (c) for the required level of detailing for concrete safety barrier cover plates.



PLAN

**PROTECTION ANGLE**

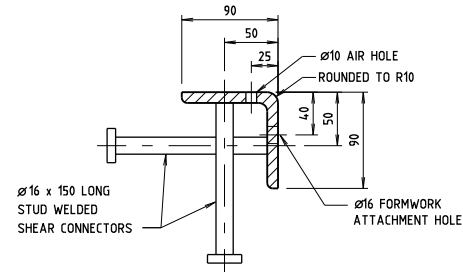
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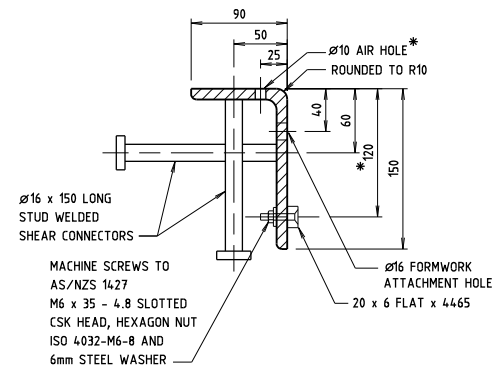
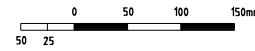
PLAN

**EXPANSION JOINT ANGLE**

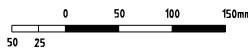
.. REQUIRED AT ABUTMENT A  
.. REQUIRED AT ABUTMENT B



SECTION 1



SECTION 2



\* DIMENSION IS BASED ON 100 HIGH COMPRESSION JOINT SEAL.  
ACTUAL DIMENSIONS SHALL BE ADJUSTED IF NECESSARY  
TO MATCH THE ACTUAL HEIGHT OF SEAL BEFORE FABRICATION  
OF THE EXPANSION JOINT ANGLE.

**FIGURE 29.2.1**