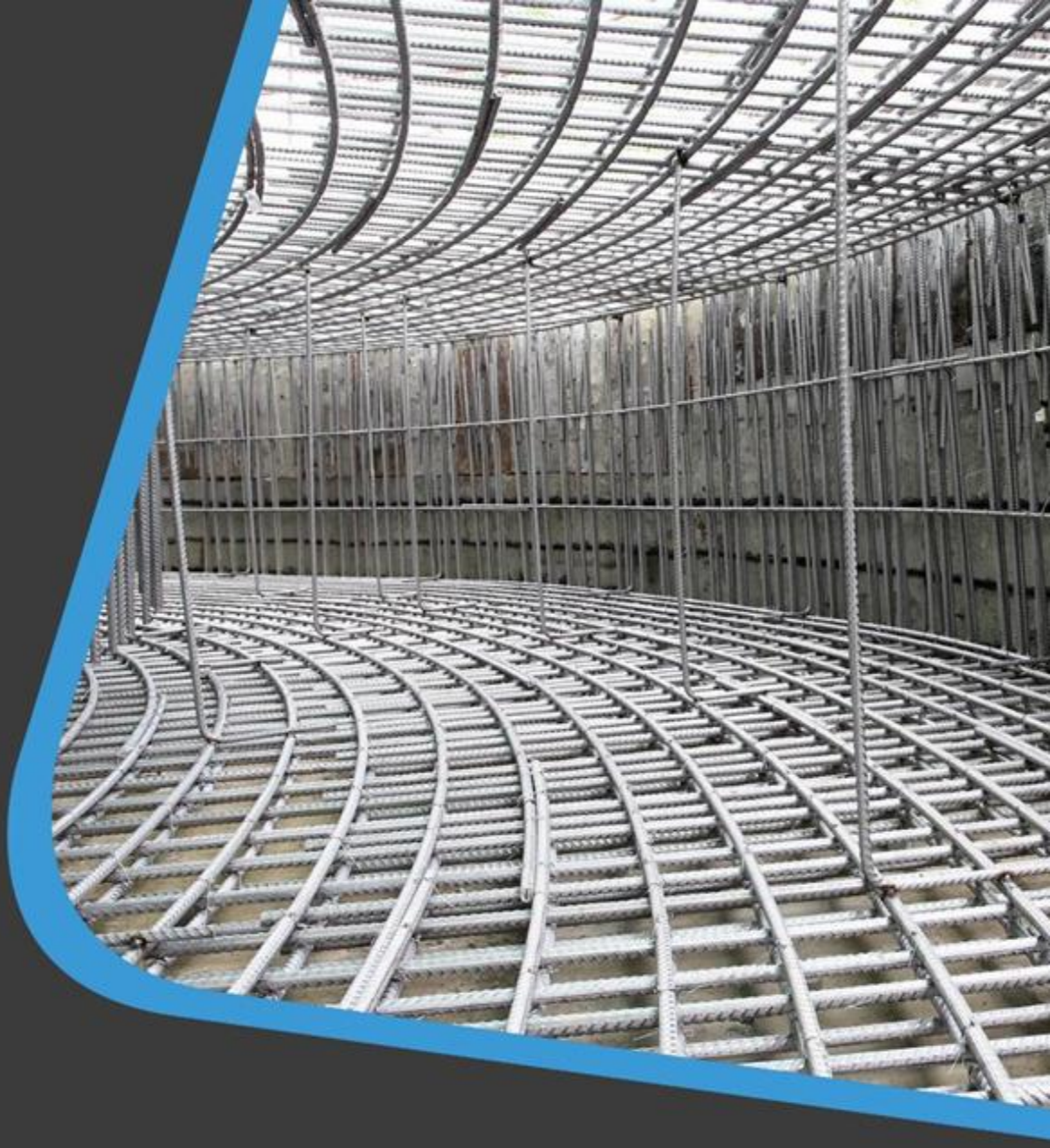

CADS RC

Productivity Tools and Detailing Macros

CADS

GLOBAL CONSTRUCTION
SOFTWARE AND SERVICES

AUTODESK
Authorised Developer

Microsoft
Partner

CADS RC Productivity Tools and Detailing Macros

VERSION 2027

USER GUIDE

Program version	:	2027
User Guide Issue	:	**6**
DATE OF ISSUE	:	Aug 2026

Upgrade Note Records

For future reference, please record the details of Upgrade Notes as you receive them in the table below:

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Contents

1 Introduction 1-10
1.1 Program Descriptions 1-10
1.1.1 CADS Beam Detailer 1-10
1.1.2 CADS Column Detailer 1-10
1.1.3 CADS Spread Footing Detailer 1-10
1.1.4 CADS Circular Bar Arrangement Detailer 1-10
1.1.5 CADS Pile Cap Detailer 1-11
1.1.6 CADS Octagonal Pile Cap Detailer 1-11
1.1.7 CADS Pad Base Detailer 1-11
1.1.8 CADS Stair Flight Detailer 1-11
1.1.9 CADS Beam Link 1-11
1.2 Installing CADS RC Productivity Tools and Detailing Macros 1-11
1.3 Loading CADS RC Productivity Tools and Detailing Macros 1-12
1.4 Authorising CADS RC Productivity Tools and Detailing Macros 1-13
2 CADS Beam Detailer 2-14
2.1 Program Operating Environment 2-14
2.2 Calculation of the Curtailment of Support Bars 2-14
2.3 Loading the Beam Detailer 2-14
2.4 Allocating the Beam Member Title 2-15
2.5 Defining Beams for Detailing 2-16
2.5.1 Beam Detailer Configuration File Selection 2-16
2.5.2 Selecting the Beam Span Type 2-17
2.6 Entering the Beam Dimensions 2-19
2.7 Defining the Bar Arrangements 2-20
2.7.1 Top, Bottom and Stirrup Bars - General Values 2-20
2.7.2 Top Bar Arrangements 2-21
2.7.3 Bottom Bar Arrangements 2-25
2.7.4 Stirrup Bar Zones 2-28
2.7.5 Stirrup Bar Arrangements 2-30
2.8 Drawing the Beam Detail 2-33
2.9 CADS Beam Detailer Global Configuration Centre 2-34
3 CADS Column Detailer 3-44
3.1 Program Operating Environment 3-44
3.2 Loading the Column Detailer 3-45
3.3 Defining Columns for Detailing 3-45

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3.3.1 Allocating the Column Member Title 3-46
3.3.2 Column Detailer Configuration File Selection 3-47
3.4 Tabulation 3-48
3.5 Defining the Column Geometry 3-51
3.6 Defining the Bar Arrangements 3-53
3.6.1 Column Main Bar Arrangements 3-53
3.6.2 Column Tie Bar Arrangements 3-55
3.7 Importing a Column Detail from CADS Column Designer 3-63
3.7.1 Locating and Selecting the File to Import 3-63
3.8 Drawing the Column Detail 3-64
3.9 CADS Column Detailer Global Configuration Centre 3-66
4 CADS Spread Footing Detailer 4-71
4.1 Program Operating Environment 4-71
4.2 Loading the Spread Footing Detailer 4-72
4.3 Allocating the Spread Footing Member Title 4-73
4.4 Defining Spread Footings for Detailing 4-74
4.4.1 Configuration File Selection 4-74
4.5 Defining the Spread Footing Dimensions 4-76
4.6 Defining the Bar Arrangements 4-77
4.7 Drawing the Spread Footing Detail 4-80
4.8 CADS Spread Footing Detailer Global Configuration Centre 4-81
5 CADS Circular Bar Arrangement Detailer 5-84
5.1 Program Operating Environment 5-84
5.2 Loading the Circular Bar Arrangement Detailer 5-85
5.3 Defining Circular Bar Arrangements for Detailing 5-85
5.3.1 Allocating the CADS Circular Bar Arrangement Detailer Member Title 5-86
5.3.2 CADS Circular Bar Arrangemet Configuration File Selection 5-87
5.3.3 Defining the Circular Bar Arrangement Geometry 5-87
5.3.4 Defining the Circular Bar Arrangements 5-89
5.3.5 Miscellaneous Inputs 5-90
5.3.6 Preferred Stock Lengths 5-90
5.4 Drawing the Circular Bar Arrangement Detail 5-92
5.5 CADS Circular Bar Arrangement Global Configuration Centre 5-93
6 CADS Pile Cap Detailer 6-95
6.1 Program Operating Environment 6-95
6.2 Loading the Pile Cap Detailer 6-95
6.3 Allocating the Pile Cap Member Title 6-96
6.4 Defining the Pile Cap for Detailing 6-98

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6.4.1 Pile Cap Configuration File Selection 6-98
6.5 Defining the Pile Cap Defaults 6-99
6.6 Selecting the Type of Pile Grouping 6-100
6.7 Defining the Pile Cap Dimensions 6-101
6.7.1 Defining the Column Dimensions 6-104
6.8 Defining the Pile Cap Bar Arrangement 6-105
6.8.1 Main Reinforcement 6-106
6.8.2 Secondary Reinforcement 6-108
6.9 Starter Bars 6-109
6.10 Importing Data from Pile Cap Designer 6-112
6.10.1 Locating and Selecting the File to Import 6-112
6.10.2 Loading the Job File 6-112
6.11 Drawing the Pile Cap Detail 6-113
6.12 CADS Pile Cap Detailer Global Configuration Centre 6-114
7 CADS Octagonal Pile Cap Detailer 7-121
7.1 Program Operating Environment 7-121
7.2 Loading the Octagonal Pile Cap Detailer 7-121
7.3 Allocating the Octagonal Pile Cap Member Title 7-122
7.4 Defining the Octagonal Pile Cap for Detailing 7-124
7.5 Defining the General Detailing Options 7-124
7.6 Defining the Dimensions 7-126
7.7 Defining the Bar Arrangement 7-127
7.7.1 Top and Bottom Bar Options for Layers T1, T2, B1 and B2 7-127
7.7.2 Side Bar Options 7-128
7.7.3 View Options 7-129
7.8 Drawing the Octagonal Pad Base Detail 7-131
8 CADS Pad Base Detailer 8-132
8.1 Program Operating Environment 8-132
8.2 Loading the Pad Base Detailer 8-133
8.3 Allocating the Pad Base Member Title 8-134
8.4 Defining the Pad Base for Detailing 8-135
8.4.1 Padbase Detailer Configuration File Selection 8-135
8.5 Setting the Pad Base Detailer Defaults 8-137
8.6 Choosing the Bar Arrangement Layout 8-139
8.6.1 Tabulated Base Output and Dimensions 8-139
8.7 Reinforcement Arrangements 8-140
8.7.1 General Bar Arrangement 8-140
8.7.2 Detailed Bar Arrangement 8-142

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8.7.3 Side Bar Arrangement 8-143
8.7.4 Longitudinal Bar Shape 8-143
8.7.5 Transverse Bar Shape 8-144
8.7.6 Column Detail Arrangements 8-144
8.8 Pad Base Dimensions 8-145
8.9 Pad Base Reinforcement 8-146
8.10 Starter Bars 8-147
8.10.1 Rectangular Column 8-147
8.10.2 Circular Column 8-149
8.11 Importing Design Data 8-150
8.11.1 Locating and Selecting the File to Import 8-150
8.11.2 Loading a Transfer File from CADS Base 2 8-150
8.11.3 Loading a Job File from CADS Pad Base Designer 8-151
8.11.4 Common Information on Importing Data 8-151
8.11.5 Batch Drawing using Transfer Files from CADS Base 2 8-151
8.12 Drawing the Padbase Detail 8-153
8.13 CADS Pad Base Detaler Global Configuration Centre 8-154
9 CADS Stair Flight Detailer 9-158
9.1 Program Operating Environment 9-158
9.2 Loading the Stair Flight Detailer 9-159
9.3 Defining the Stair Flight for Detailing 9-161
9.3.1 Stair Flight Detailer Configuration File Selection 9-161
9.4 Setting the Stair Flight Defaults 9-163
9.5 Selecting the Stair Flight Options 9-164
9.6 Defining the Stair Flight Dimensions 9-168
9.7 Defining the Stair Flight Bar Arrangement 9-171
9.7.1 Defining a Typical Bar Set 9-172
9.7.2 The Stair Flight Bar Sets Explained 9-172
9.8 Drawing the Stair Flight Detail 9-178
9.9 CADS Stair Flight Detailer Global Configuration Centre 9-179
10 CADS Beam Link 10-183
10.1 Program Operating Environment 10-183
10.2 Loading Beam Link 10-183
10.3 Importing CADS Beam Designer Files 10-184
10.3.1 Selecting the Beam to be Detailed 10-185
10.3.2 Selecting the Beam Spans to be Detailed. 10-185
10.3.3 Allocating the Beam Member Title 10-187
10.3.4 Selecting the Section Detail Positions 10-188

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10.3.5 Placing the Beam Detail on the drawing 10-188
10.4 Configuration Options 10-189
10.4.1 Beam Link Configuration File Selection 10-189
10.4.2 General Configuration 10-190
10.4.3 Grid Configuration 10-191
10.4.4 Section Marker Configuration 10-192
10.4.5 Label Configuration 10-193
10.4.6 Bar Dimension Configuration 10-194
10.4.7 Write Prototype Settings 10-195

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1 Introduction

Chapter Objectives

This chapter provides an overview of each of the Detailing Macros and Productivity Tools available for use with CADS RC. Instructions for installing and authorising the software are also included.

1.1 Program Descriptions

1.1.1 CADS Beam Detailer

CADS Beam Detailer provides an automated method of producing reinforcement drawings for concrete beams. It features Single, End and Interior span types. Detailers can choose many different bar arrangements with percentage span calculations and bar dimensions automatically determined from the entered span data.

1.1.2 CADS Column Detailer

CADS Column Detailer provides an automated method of producing reinforcement drawings for concrete columns. It features Rectangular and Circular Column types with or without columns above. Detailers can choose many possible bar and tie arrangements (including spiral ties) with bar dimensions automatically calculated from the entered column data.

1.1.3 CADS Spread Footing Detailer

CADS Spread Footing Detailer provides an automated method of producing reinforcement drawings for rectangular concrete spread footings. It features Top and Bottom or Bottom Bar only arrangements with the option to include column starter bars. Bar dimensions are automatically calculated from the entered footing data.

1.1.4 CADS Circular Bar Arrangement Detailer

CADS Circular Bar Arrangement Detailer provides an automated method of detailing circular bar arrangements like those found in circular tank slabs using lapped stock length bars. Single or multiple rings can be detailed for flat or sloping slabs.

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1.1.5 CADS Pile Cap Detailer

CADS Pile Cap Detailer provides an automated method of detailing pile cap bar arrangements. A wide variety of arrangements are available and even for the more unusual details you will probably find a suitable one which can be modified using the CADS RC bar editing facilities. The Pile Cap detailer also allows you to specify starter bars to incorporate with the base.

1.1.6 CADS Octagonal Pile Cap Detailer

CADS Octagonal Pile Cap Detailer provides an automated method of detailing octagonal pile cap bar arrangements. The Octagonal Pile Cap detailer also allows you to specify starter bars to incorporate with the base.

1.1.7 CADS Pad Base Detailer

CADS Pad Base Detailer provides an automated method of detailing pad base bar arrangements.

1.1.8 CADS Stair Flight Detailer

CADS Stair Flight Detailer provides an automated method of detailing the reinforcement arrangements for a single flight staircase. The basic detail the program draws is of the form recommended in the “Standard method of Detailing Structural Concrete” published by the Institution of Structural engineers and the Concrete Society.

1.1.9 CADS Beam Link

CADS Beam Link provides an automated link between the CADS Beam Designer and CADS RC. The program will read the Beam Designer project and automatically produce a placement drawing, bar bending schedule and bar weightings.

1.2 Installing CADS RC Productivity Tools and Detailing Macros

CADS RC Productivity Tools and Detailing Macro's use a common installation procedure. Information on installing the Detailing Macros can be found in the accompanying CADS Detailing Applications Installation Guide.

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1.3 Loading CADS RC Productivity Tools and Detailing Macros

All of the Productivity Tools and Detailing Macros are loaded from the CADSRC pull down menu.

First load CADS RC by selecting CADS RC from the CADS Application Pull Down Menu.

From the CADS RC Pull Down Menu select the Outlines option and then the Detailers option. Alternatively, you could select the Detailers Icon from the Outline Toolbar or type in the appropriate command, as shown below. The Productivity Tools and Detailing Macros will remain loaded until the current AutoCAD editing session is ended.

Menu: CADS RC – Outlines - Detailers

Type: CADS_RC_MACROS

Toolbar:

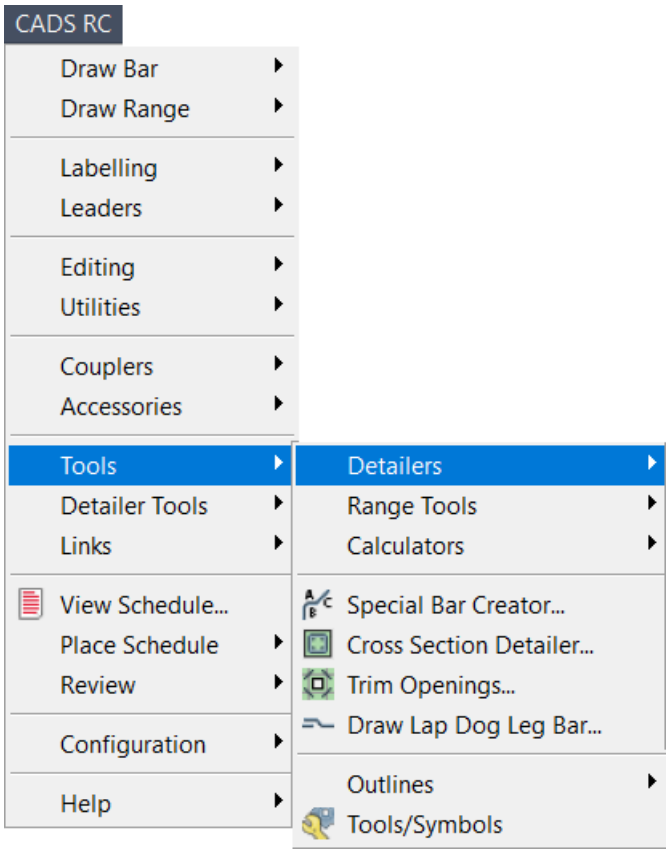

Figure 1.3:1 Loading the Detailers from the CADS RC Pull Down Menu

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1.4 Authorising CADS RC Productivity Tools and Detailing Macros

The first time that you load any of the Productivity Tools or the Detailing Macros the Licence Input Dialog will be displayed as the program is loaded into memory.

For instructions on how to authorise the software, refer to the accompanying CADS Detailing Applications Installation Guide.

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2 CADS Beam Detailer

Chapter Objectives

CADS Beam Detailer provides an automated method of producing reinforcement drawings for concrete beams. It features Single, End and Interior Span Types. Detailers can choose many different bar arrangements with percentage span calculations and bar dimensions automatically determined from the entered span data.

2.1 Program Operating Environment

CADS Beam Detailer works in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Beam Detailer can be used.

CADS Beam Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

2.2 Calculation of the Curtailment of Support Bars

The Beam Detailer allows the top and bottom support bars to be curtailed. The amount of curtailment can be specified as either a fixed distance or calculated as a percentage of the clear span between the column faces.

For the bottom support reinforcement, the curtailment calculation is based on the current beams clear span. For the top support reinforcement, the curtailment calculation is based on either the current beams clear span or the adjacent beams clear span whichever is the greater.

2.3 Loading the Beam Detailer

The Beam Detailer is loaded by selecting the Outlines option from the CADSRC pull down menu and then picking the Detailers option.

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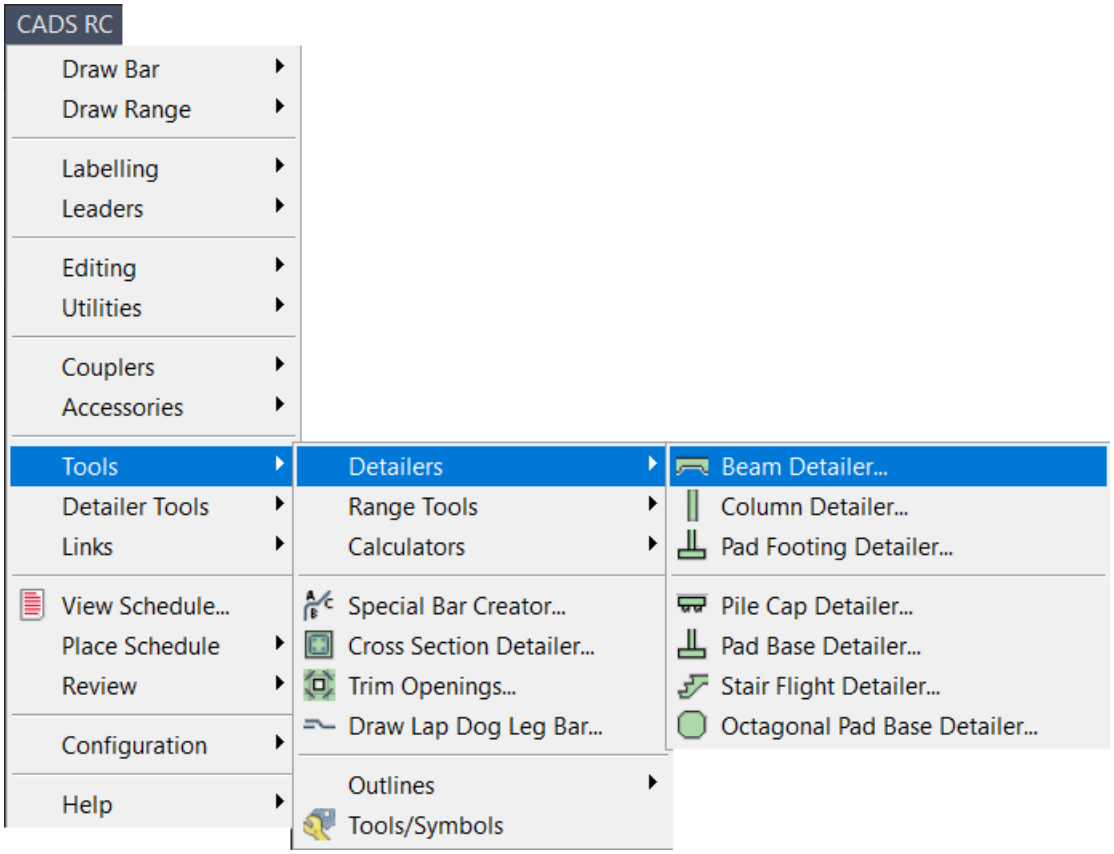

Figure 2.3:1 CADS RC Detailers Selection Menu

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 2.3:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

To load the Beam Detailer, highlight the line 'CADS Beam Detailer' and then pick the Load button.

2.4 Allocating the Beam Member Title

Once the CADS Beam Detailer has been selected the Set Member Title Dialog is displayed, as shown in Figure 2.4:1. At this point you can select an existing member title or create a new member title. The beam reinforcement bars will be assigned to the selected member title. You can now continue by picking the OK button. For further information on Member Titles refer to the CADS RC User Guide.

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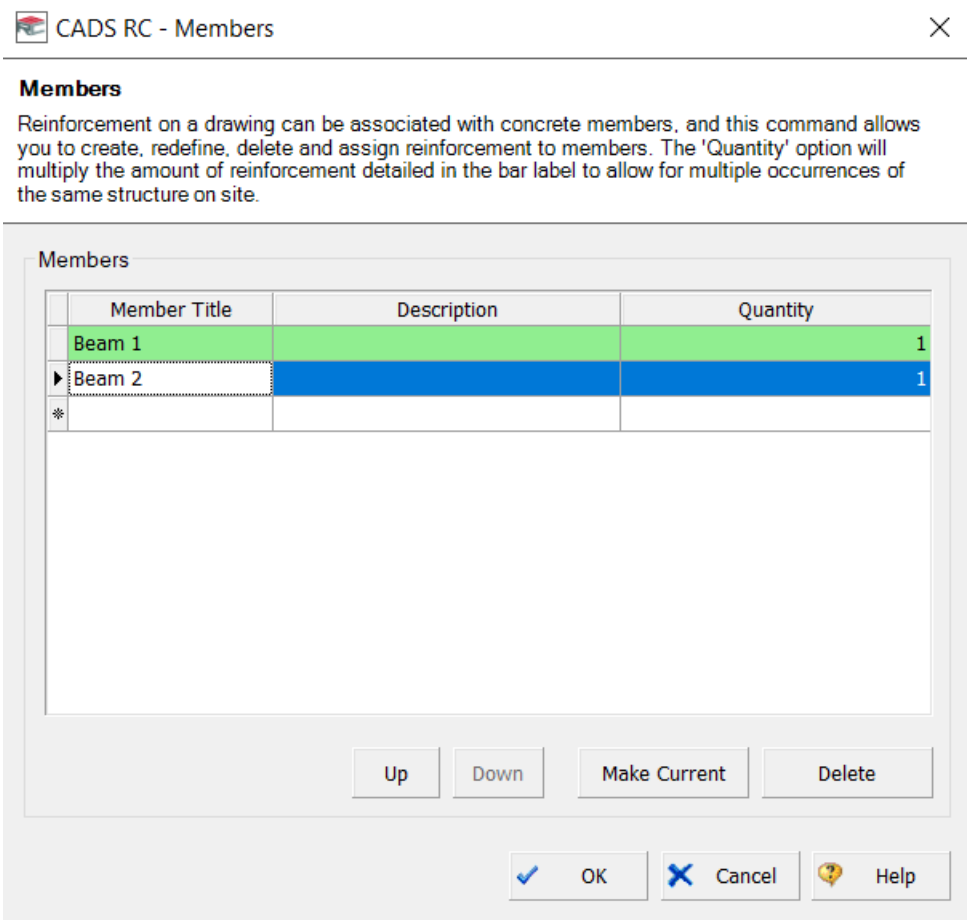

Figure 2.4:1 Set Member Title

2.5 Defining Beams for Detailing

The Beam Detailer requires five areas of data to be defined in order that the desired beam arrangement is produced. This consists of

- Beam Type (single span, end span or interior span);
- Beam Dimensions (span, depth, width etc.);
- Top Bar Arrangement;
- Bottom Bar Arrangement;
- Stirrup Arrangement.

2.5.1 Beam Detailer Configuration File Selection

When the Member Title has been defined the Beam Type Selection Dialog is displayed, as shown in Figure 2.5.1:1.

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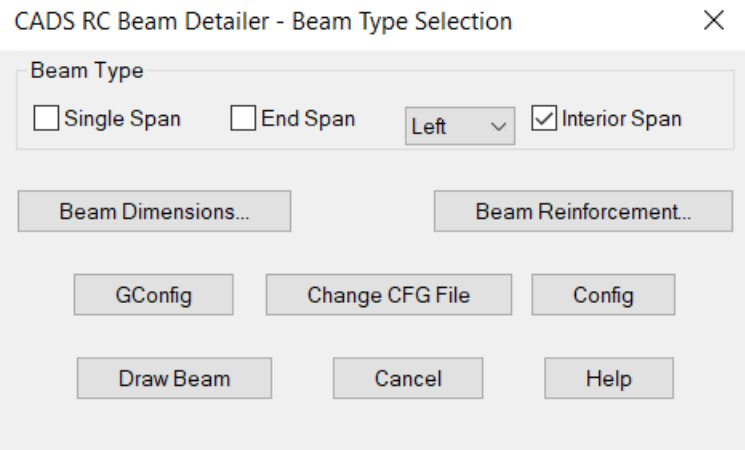

Figure 2.5.1:1 Beam Type Selection Dialog

This dialog contains a Change CFG File button that allows the required configuration file (*.def file) to be selected in order that suitable default data is displayed, as shown in Figure 2.5.1:2.

Currently the UK version of this software only offers one default file BMD_UK.DEF. This file is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used.

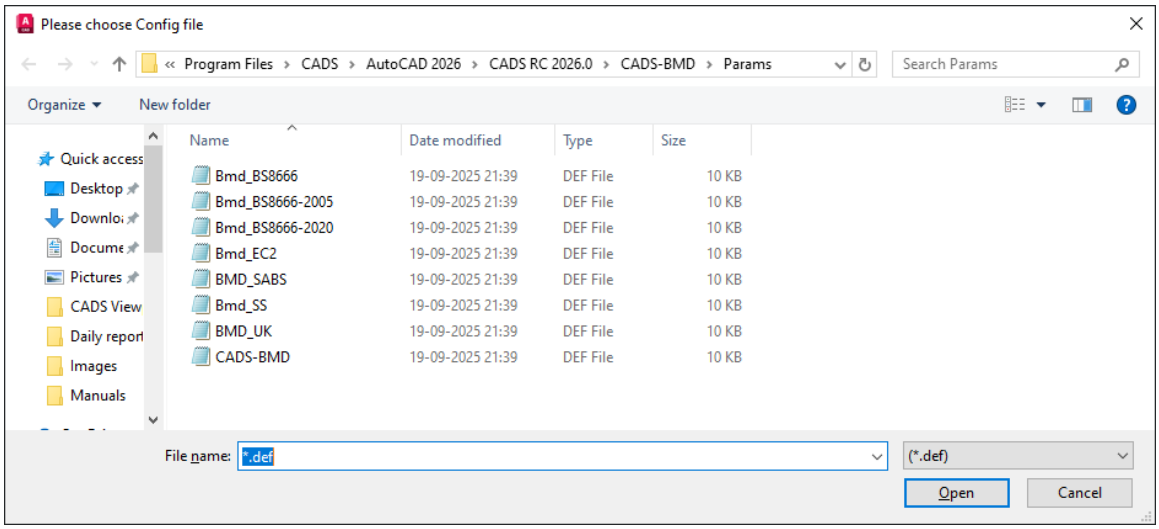

Figure 2.5.1:2 Default Beam Configuration Options.

Should other configuration options be required, please contact the CADS support department who will be happy to advise.

2.5.2 Selecting the Beam Span Type

The type of beam span can be selected from the Beam Type Selection dialog (Figure 2.5.2:1). Single, End or Interior span types can be selected by activating the relevant check box. End spans may be defined as left or right by picking the relevant option from the adjacent pop-down list. At

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any time during the set-up procedure the beam span type can be altered or checked by picking the Beam Selection Button that is available from the majority of the beam detailer input dialogues.

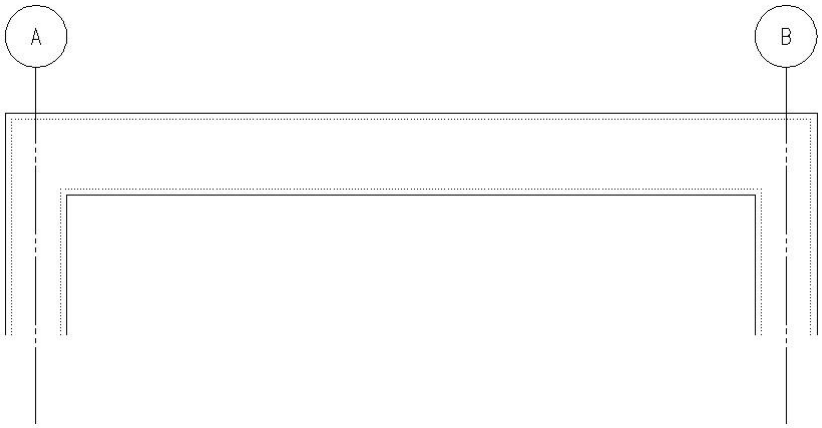

Figure 2.5.2:1 Single Span Beam Type

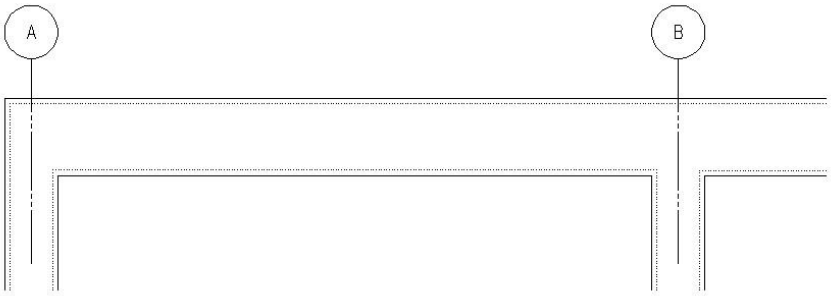

Figure 2.5.2:2 End Span Beam Type

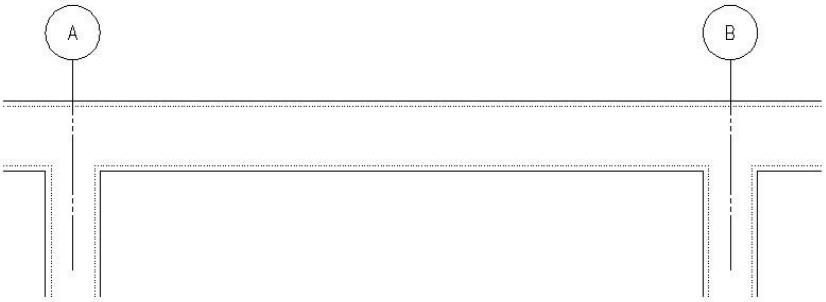

Figure 2.5.2:3 Interior Span Beam Type

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2.6 Entering the Beam Dimensions

The beam dimensions can be amended or checked by picking the Beam Dimensions Button that is available from the majority of the beam detailer input dialogues.

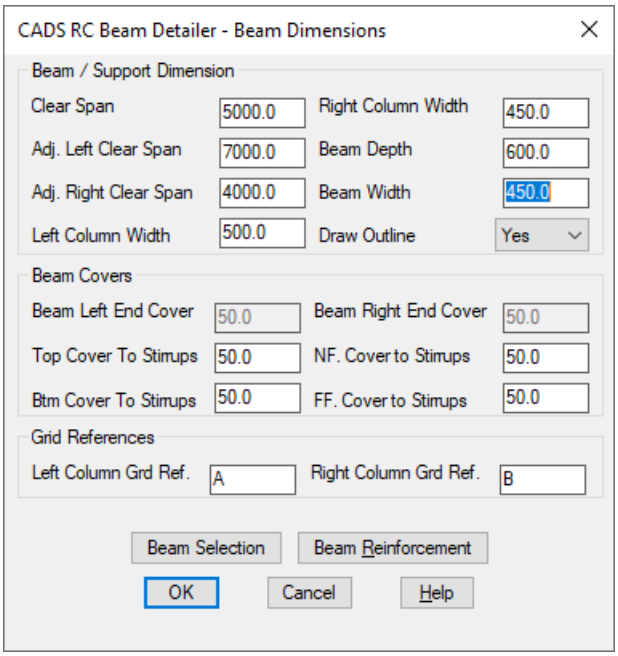

Figure 2.6:1 Typical Beam Dimension Dialog

The types of beam dimension data that are required are dependent upon the beam span type selected. Therefore, some beam dimension fields will not accessible for certain beam span types.

When defining an end or interior beam the, CADS Beam Detailer program needs the adjacent span data in order to calculate the correct curtailment dimensions for the top support bars.

Beam Dimension input data is as follows:

- Clear Span - This is required for all span types and is the clear span between column faces of the beam to be detailed;
- Adjacent Left Clear Span - This is required for interior and right end span types and is the clear span between column faces of the beam to the left of the beam to be detailed;
- Adjacent Right Clear Span - This is required for interior and left end span types and is the clear span between column faces of the beam to the right of the beam to be detailed;
- Left Column Width - This is required for all span types and is the overall column width at the left end of the beam being detailed;
- Right Column Width - This is required for all span types and is the overall column width at the right end of the beam being detailed;

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- Beam Depth -— This is required for all span types and is the overall depth of the beam to be detailed;
- Beam Width - This is required for all span types and is the overall width of the beam to be detailed;
- Draw Outline - This is required for all beam types. When set to Yes, the detail produced will include the beam outline, set to No the detail produced will only contain the reinforcing entities that can be placed into an existing general arrangement drawing.
- Beam Left End Cover - This is required for single and left end span types and is the end cover applied to top and bottom bars;
- Beam Right End Cover - This is required for single and right end span types and is the end cover applied to top and bottom bars;
- Top Cover to Stirrups - This is required for all beam types and is the cover applied to the beam link leg in the top of the beam;
- Bottom Cover to Stirrups - This is required for all beam types and is the cover applied to the beam link leg in the bottom of the beam;
- Near Face Cover to Stirrups - This is required for all beam types and is the cover applied to the beam link leg in the near face of the beam in elevation;
- Far Face Cover to Stirrups - This is required for all beam types and is the cover applied to the beam link leg in the far face of the beam in elevation;
- Left Column Grid Ref. - This is the grid reference for the left column grid line and is drawn in the centre of the beam when the draw outline is set to yes;
- Right Column Grid Ref. - This is the grid reference for the right column grid line and is drawn at the centre of the beam when draw outline is set to yes.

2.7 Defining the Bar Arrangements

The Beam Detailer program divides the beam reinforcement into three zones. These are for the Top, Bottom and Stirrup (Link) Reinforcement. The beam outline dimensions, covers and curtailments control the lengths of the bars placed in the three reinforcement zones. If complex link arrangements are required the user may have to define certain bar dimensions in order to achieve the correct layout of bars.

2.7.1 Top, Bottom and Stirrup Bars - General Values

Selecting the Beam Reinforcement button displays the Reinforcement Selection Dialog where the bar grade and bar mark prefix can be defined for the Top and Bottom Reinforcement Bars and the Stirrup Bars.

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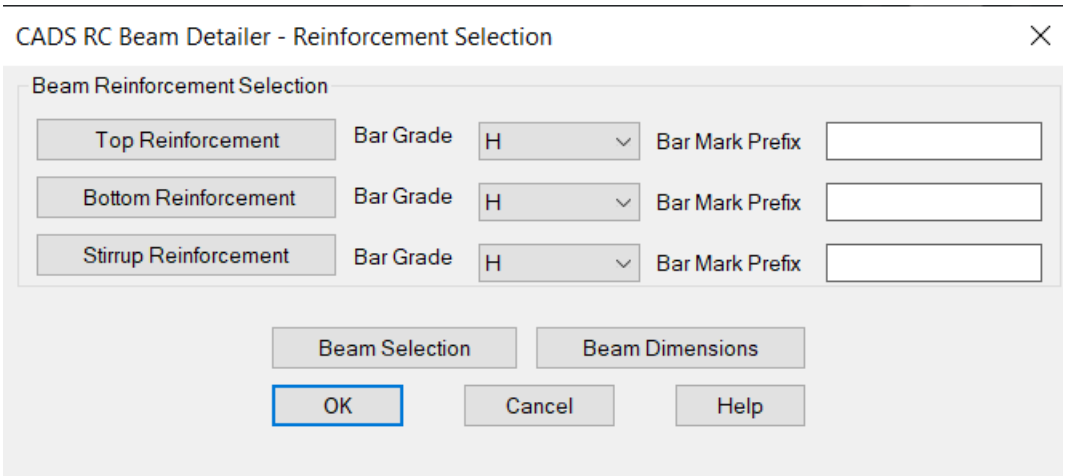

Figure 2.7.1:1 Reinforcement Selection Dialog

2.7.2 Top Bar Arrangements

Pick the Top Reinforcement button to access the Top Reinforcement dialog where the top bar arrangements can be defined.

The bar arrangements can be conFigured manually by selecting which bars are required in the beam. Alternatively, these can be set automatically by picking the Pre-set Arrangement button. This displays the Pre-set Arrangements options for the type of beam selected. All that is then required is to set the number of bars, percentage span for curtailments etc.

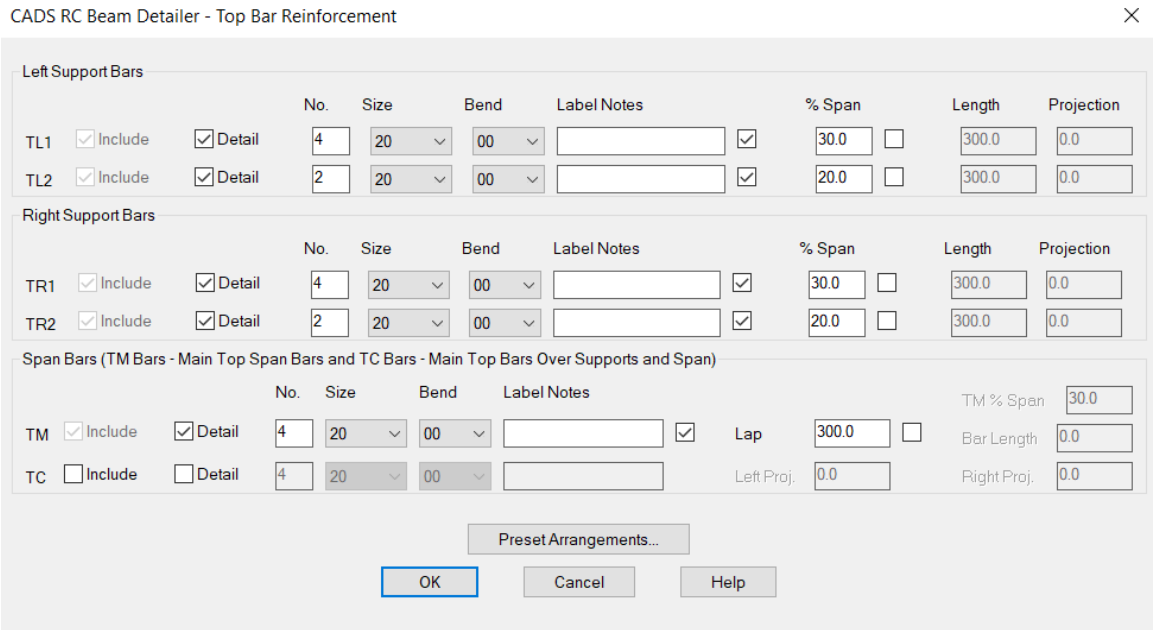

Figure 2.7.2:1 Top Bar Reinforcement Dialog

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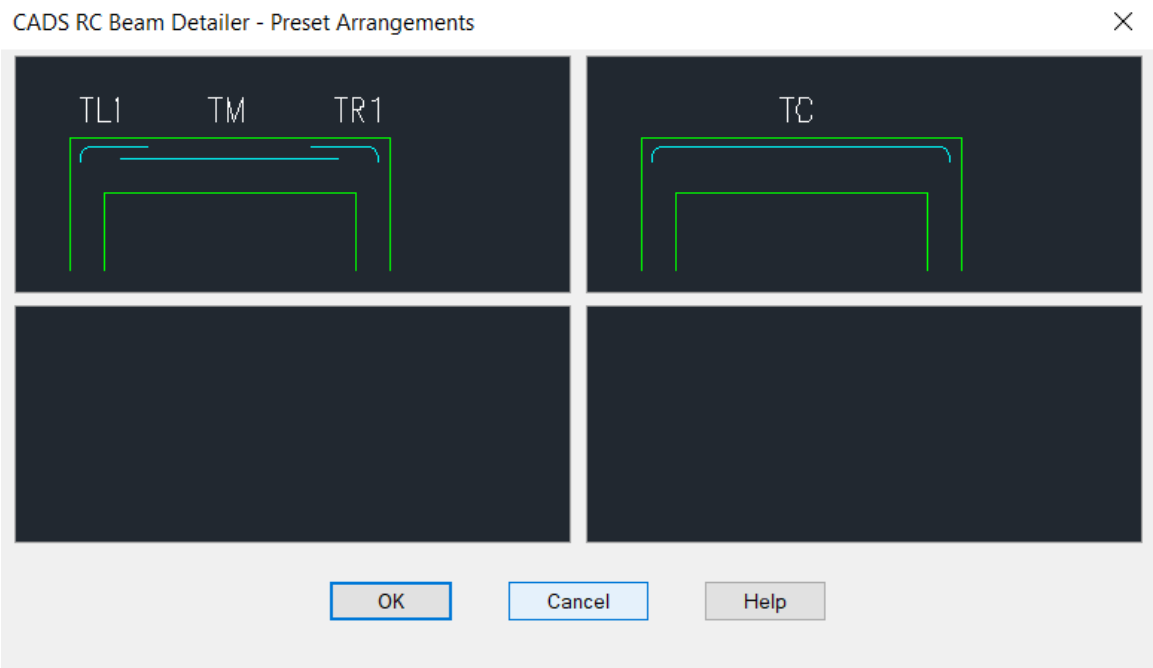

Figure 2.7.2:2 Single Span Top Bar Pre-sets

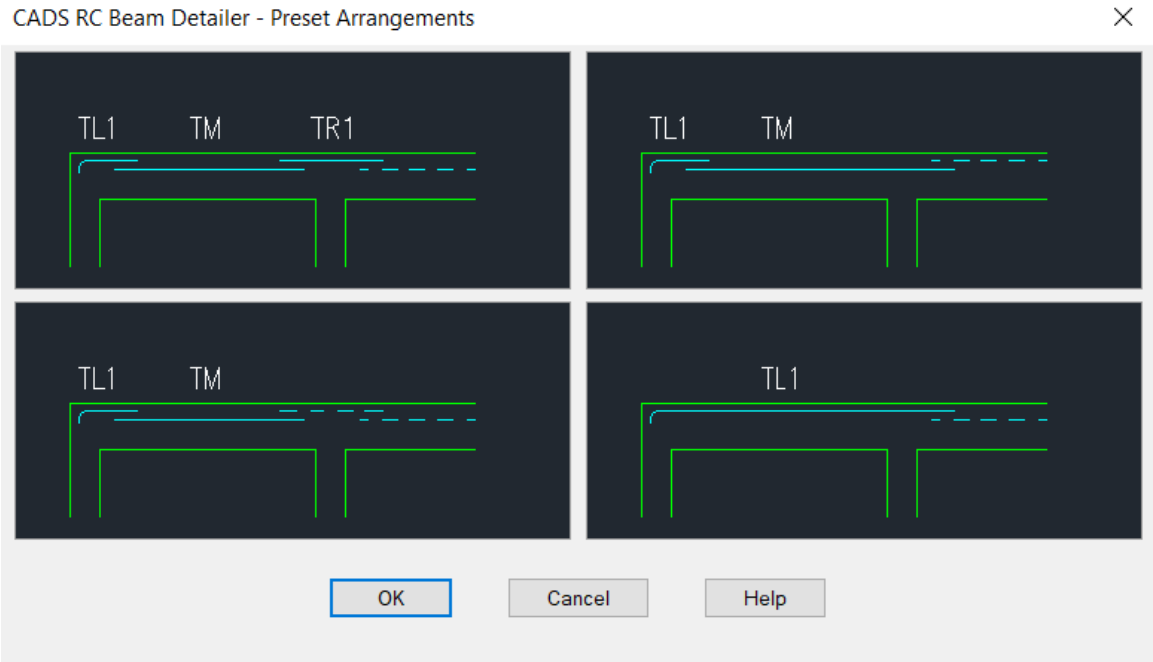

Figure 2.7.2:3 End Span Top Bar Pre-sets

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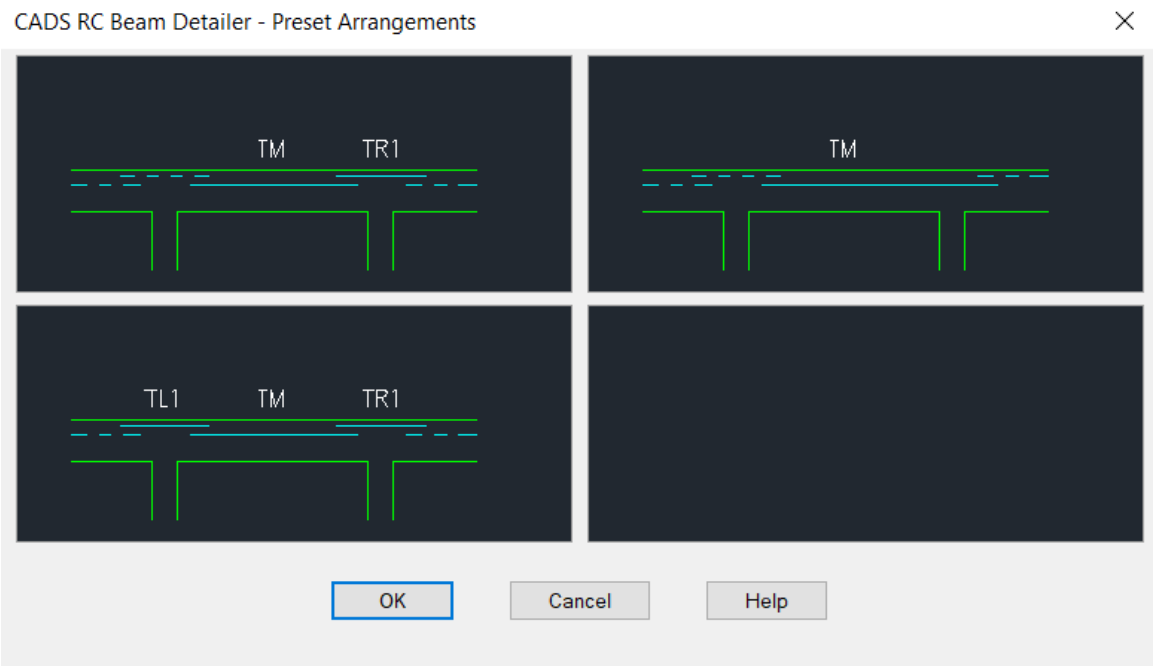

Figure 2.7.2:4 Interior Span Top Bar Pre-sets

Six additional sets of bars are available for use in the top of the beams. These bar sets are optional and can be omitted from the beam in order to achieve the desired bar arrangement.

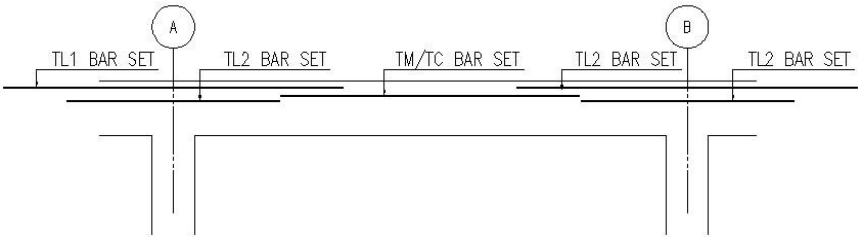

Figure 2.7.2:5 Top Bar Sets

Each of the bar sets has Detail and Include options that determines whether the bar set is to be included in the beam detail or not.

The Detail and Include options can be used in combination. Listed below are the combination options available and an explanation of the effects on the beam being detailed:

- Detail option selected -The bar set will be detailed based on the data entered;
- Include option selected with Detail option not selected - The bar set will not be detailed. However, the data for the bar set will be used to determine the length of the bars that lap with it. For example, if an interior or left end beam has been detailed with the right support bars shown in that span when the adjacent right span beam is detailed the left support bars are already present in the previous beam and do not need to be drawn. However, the information for these bars is required to determine the correct lap and bar length for the span bars in the adjacent right beam;

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- Include and Detail options not selected - The bar set will not be detailed and the data not used in any bar dimension calculations.

The following top bar data fields are available in all the beam types:

- No. Bars - Enter the number of bars required in the bar set;
- Size - Select the bar size for the bar set;
- Bend Type-Select the shape code for the bar set;
- Label Notes – Type in any note to be included in the bar label for the bar set.

TLl, TL2, TR1 and TR2 Bar Set Additional Inputs

These bars are used primarily over left and right supports and lap with the TM bar set, as shown in Figure 2.7.3:1 They have the following additional input fields to define their location within the beam:

- % Span - Enter the percentage of the span at which point the bar set is to curtail, the distance is taken from the relevant column face. When used in interior or end span beams the % span is based upon the greater of the clear or adjacent span value defined in the beam dimensions;
- Length - Enter the length from the column face at which the bar is set to curtail;
- Proj. – End Span Beams only. This option allows the bars to be projected past the end of the beam by the distance typed into the field. The projection setting is only used with the End Span Beams where there is no adjacent spans. For instance, this could be used to tie the beam bars into an adjacent span by entering a projection equal to the lap required.

TM Bar Set Additional Inputs

This bar set is the main span reinforcement in the top of the beam. It has the following inputs to define the location of the bars within the beam:

- Lap – The TM bars lap with the TL1 and TR1 bars, see Figure 2.7.3:1, enter the lap length required between the two bars;
- Length - Enter the required bar length which is placed equally about the mid-span;
- % Span – The TM bar can be placed as a continuous bar over the column into the adjacent beam. The curtailment point of the TM bar in the adjacent span is entered as a percentage of the clear span. The percentage span is based on either the current beams clear span between column faces or the adjacent beams clear span whichever is the greater.

TC Bar Set Additional Inputs

This bar set is used only on single span beam types where a continuous top bar is required. The TC Bar uses the following input to define its location within the beam:

- Left and Right Proj. - The TC bar can be projected past the end of the beam by the distance typed into this field. For instance, this could be used to tie the beam bars into an adjacent span by entering a projection equal to the lap required.

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2.7.3 Bottom Bar Arrangements

Pick the Bottom Reinforcement button to access the Bottom Reinforcement dialog where the bottom bar arrangements can be defined.

The bar arrangements can be conFigured manually by selecting which bars are required in the beam. Alternatively, these can be set automatically by picking the Pre-set Arrangement button. This displays the Pre-set
Arrangements options for the type of beam selected. All that is then required is to set the number of bars, percentage span for curtailments etc.

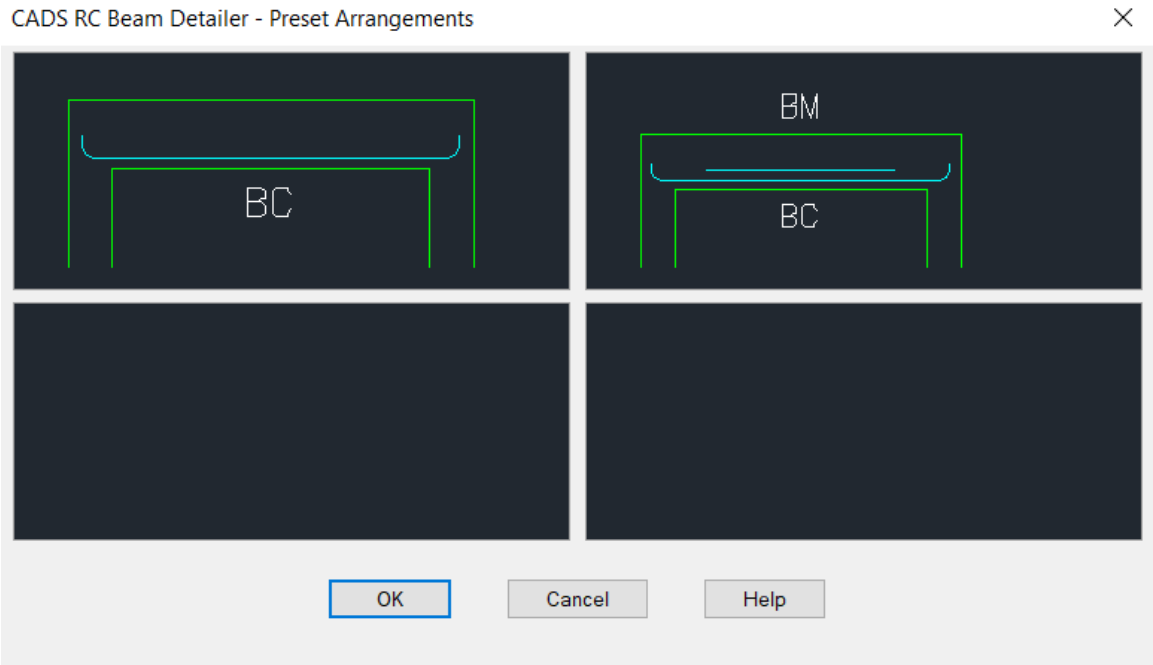

Figure 2.7.3:1 Single Span Bottom Bar Pre-sets

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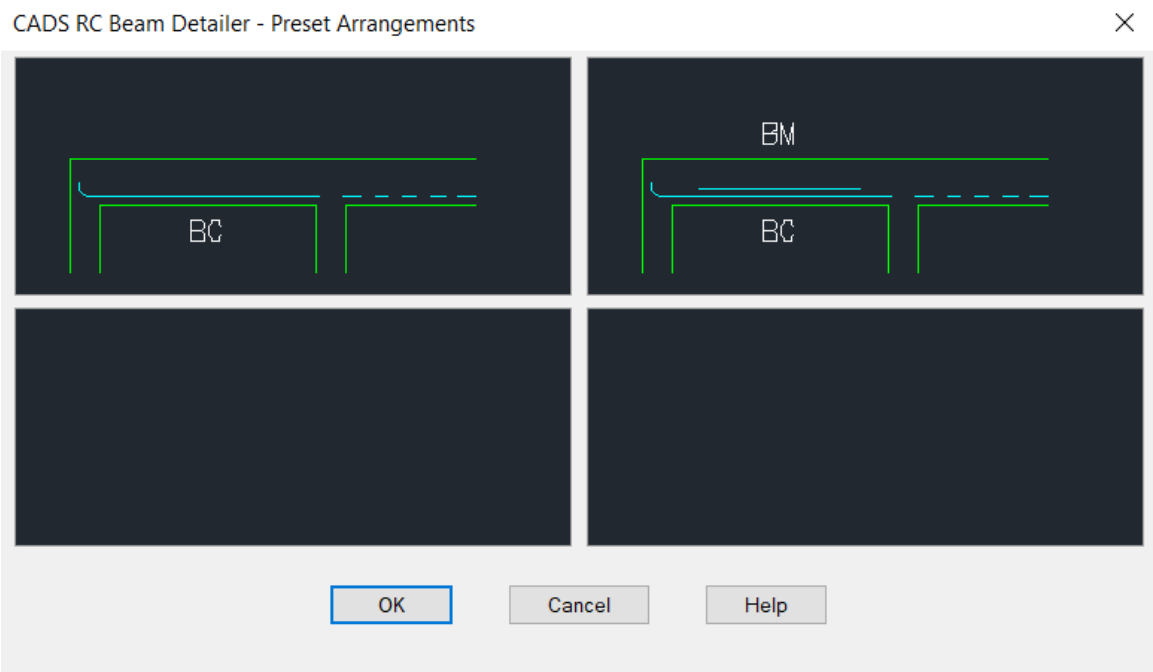

Figure 2.7.3:2 Interior Span Bottom Bar Pre-sets

Two bar sets are available for use as the bottom bars for the beam, these bar sets are optional and can be omitted from the beam in order to achieve the desired bar arrangement.

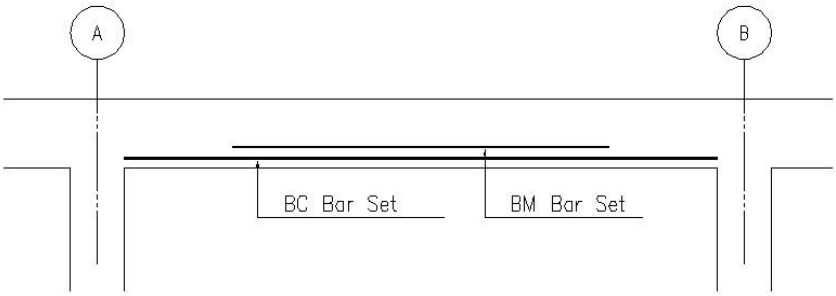

Figure 2.7.3:3 Bottom Bar Sets

Each of the bar sets has a Detail option that determines whether the bar set is to be included in the beam detail or not.

Listed below are the outcome of the combinations available when using the Detail option and an explanation of the effects on the beam being detailed.

- Detail Option Activated – The bar set will be detailed based on the information entered for that bar set;
- Detail Option Not Activated - The bar set will not be detailed and its data will not be used in any bar dimension calculations.

The following bottom bar data fields are available in all the beam types:

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- No. Bars - Enter the number of bars required in the bar set;
- Size - Select the bar size for the bar set;
- Bend Type-Select the shape code for the bar set;
- Label Notes – Type in any note to be included in the bar label for the bar set.

BC Bar Set Additional Inputs

This bar set is the main span reinforcement in the bottom of the beam. It has the following input to define its location in the beam:

- Left and Right Proj. - The bar can be projected past the column face into the column by the entered distance.

BM Bar Set Additional Inputs

This bar set can be used to define secondary bars in the bottom of the beam. It has the following inputs to define its location in the beam:

- % Span - Enter the percentage of the clear span at which point the bar set is to curtail, the distance is taken from the relevant column face;
- Length - Enter a length from the column face at which the bar is to curtail.

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2.7.4 Stirrup Bar Zones

Beam Detailer allows the stirrup bars to be defined as one zone or three zones with the beam span.

Pick the Stirrup Reinforcement button to access the Stirrup Reinforcement dialog where the number, length and bar centres of the stirrup zones can be defined.

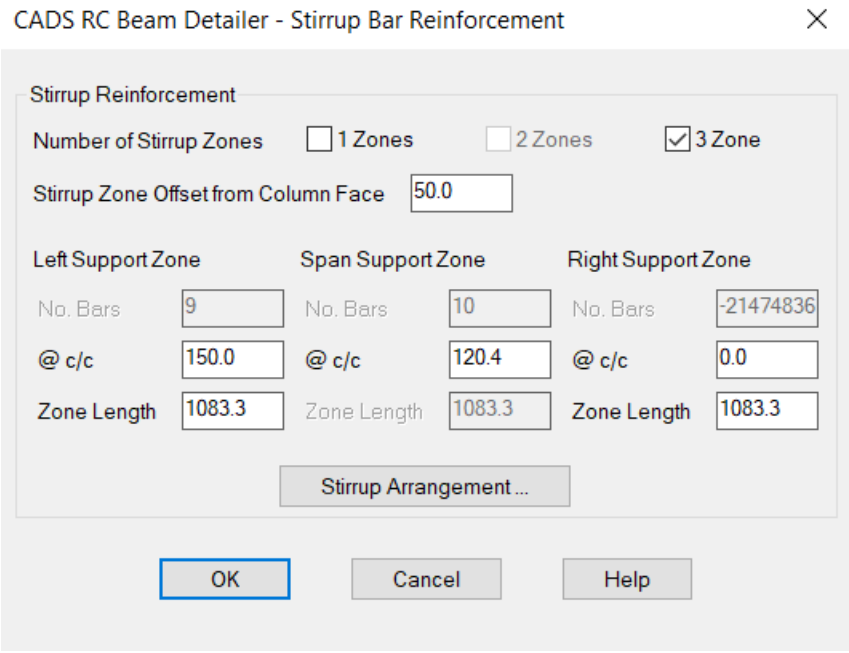

Figure 2.7.4:1 Stirrup Zone Data Dialog

Stirrup Zone Offset from the Column Face

The value entered in this field defines the offset distance from the right and left column faces to the start and end of the stirrup zones, as shown in Figure 2.7.4:2 and Figure 2.7.4:3.

One Stirrup Zone

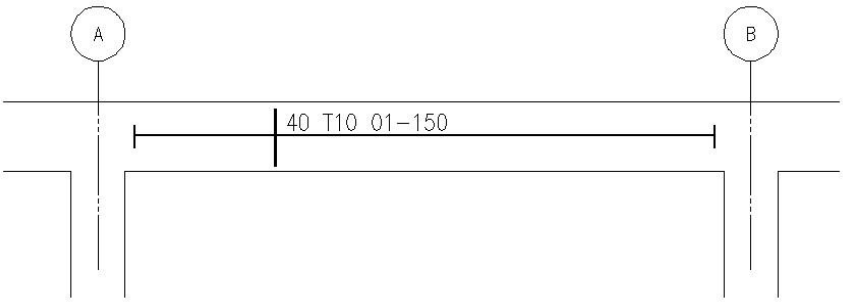

Figure 2.7.4:2 One Stirrup Zone

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When one stirrup zone is selected for the beam span the following Span Support Zone data fields are available for input:

- Zone Length - The zone length is automatically calculated as the Clear Span less the offset from the right and left column faces;
- No. Bars - Enter the number of stirrups required, this will automatically recalculate and display the average centre to centre distance;
- @ c/c - Enter the pitch of the stirrups. This will automatically re-calculate the number of bars.

Three Stirrup Zones

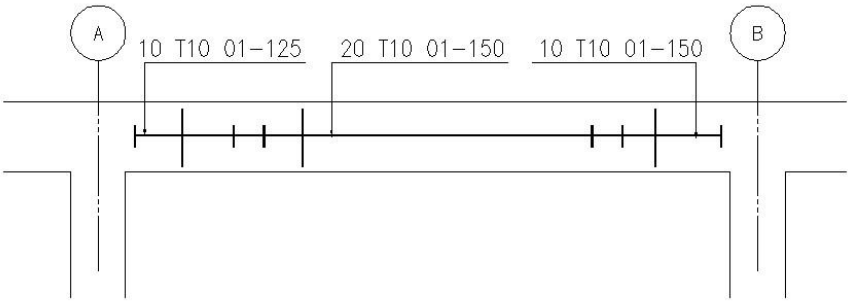

Figure 2.7.4:3 Three Stirrup Zones

When three stirrup zones are selected for the beam span the following inputs are available:

Left Support Zone

- Zone Length - Enter the required length for the left stirrup zone;
- @ c/c - Enter the pitch of the stirrups. This will automatically re-calculate the number of bars.

Span Support Zone

- @ c/c - Enter the pitch of the stirrups. This will automatically re-calculate the number of bars;
- Zone Length - This input is not accessible and has been greyed out. The support zone length is calculated automatically by subtracting the left and right zones and the two intermediate distances for the total clear span. The intermediate distances between the stirrup zones are set to the centre to centre values for the left and right stirrup zones. For instance, if the centres for the left stirrup zone are set to 125mm then the intermediate distance between the left and support zones will be 125mm.

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Right Support Zone

- Zone Length - Enter the required length for the right stirrup zone;
- @ c/c - Enter the pitch of the stirrups. This will automatically re-calculate the number of bars.

2.7.5 Stirrup Bar Arrangements

Pick the Stirrup Arrangement button to access the Stirrup Arrangement dialog where the stirrup bar arrangements can be defined.

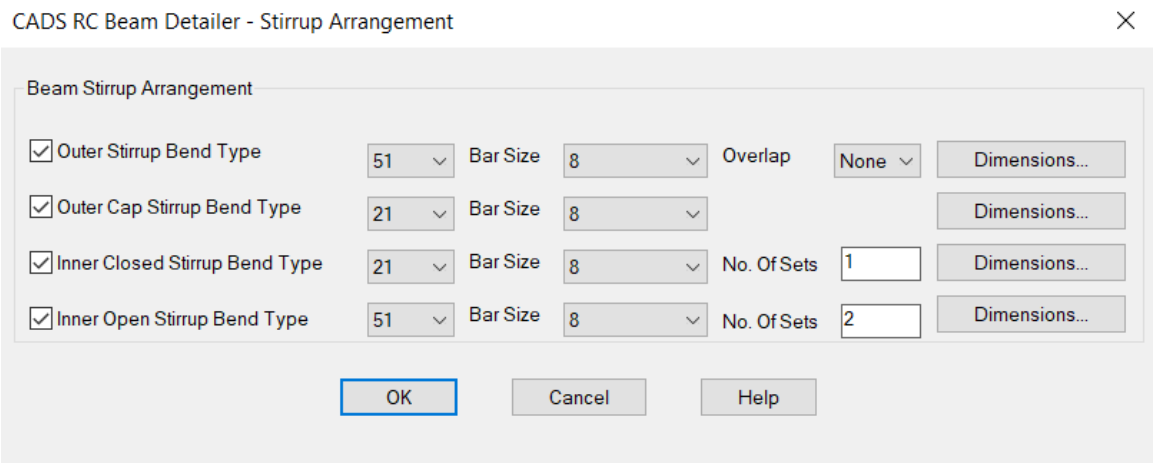

Figure 2.7.5:1 Stirrup Bar Arrangement Dialog

Four different stirrup bar types can be selected for use as stirrup bars. The bar sets are optional and can be omitted from the beam in order to achieve the desired stirrup bar arrangement if required.

Outer Stirrup Bend Type

The outer stirrup supports the all the shape codes available within CADS RC. The detailer should use their discretion to choose the appropriate shape code. The default bend type is shape code 61.

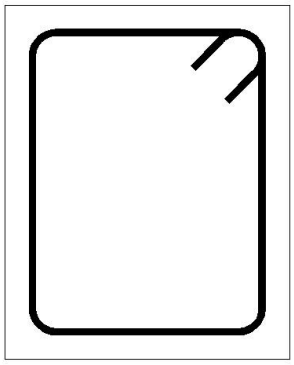

Figure 2.7.5:2 Outer Stirrup Bend Type

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The outer stirrup bend type can be included within the beam if the option is selected and the following data fields are completed:

- Outer Stirrup Bend Type - Select the required shape code from the pop down list.
- Bar Size - Select the required bar size for the outer stirrup shape code.
- Over Lap - The overlap controls the number of stirrup bars that are detailed across the width of the beam. The options available are None, 0.5 and 0.67. If set to None then a single stirrup is added, its outer face will be placed against the cover lines of the beam. If set to 0.5 or 0.67, then two stirrups are detailed with the width of each stirrup width being either 0.5 or 0.67 of the beam width minus the Near Face and Far Face cover distances.
- Dimensions - This displays the calculated bending dimensions of the outer stirrup shape code.

Outer Cap Stirrup Bend Type

The outer stirrup supports the all the shape codes available within CADS RC. The detailer should use their discretion to choose the appropriate shape code. The default bend type is shape code 38.

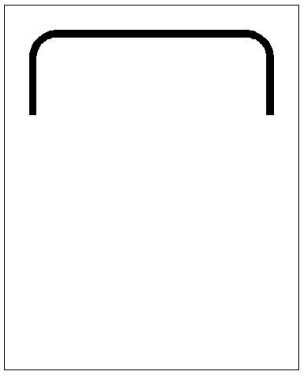

Figure 2.7.5:3 Outer Cap Stirrup Bend Type

The outer cap stirrup bend type can be included within the beam if the option is selected and the following data fields are completed:

- Outer Cap Stirrup Bend Type - Select the required shape code from the pop down list;
- Bar Size - Select the required bar size for the outer cap stirrup shape code;
- Dimensions - This displays the calculated bending dimensions of the outer cap stirrup shape code.

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Inner Closed Stirrup Bend Type

The inner closed stirrup supports the all the shape codes available within CADS RC. The detailer should use their discretion to choose the appropriate shape code. The default bend type is shape code 61.

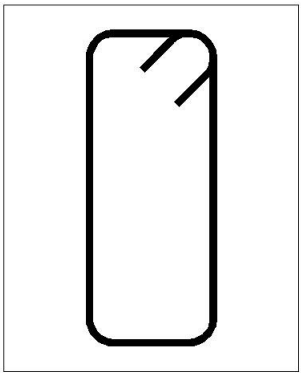

Figure 2.7.5:4 Inner Closed Stirrup Bend Type

The inner closed stirrup bend type can be included within the beam if the option is selected and the following data fields are completed:

- Inner Closed Stirrup Bend Type - Select the required shape code from the pop down list;
- Bar Size - Select the required bar size for the inner closed stirrup shape code;
- No. Of Sets – Specify the required number of stirrups to be detailed across the width of the beam;
- Dimensions – This displays the calculated bending dimensions of the inner closed stirrup shape code.

Inner Open Stirrup Bend Type

The inner open stirrup supports the all the shape codes available within CADS RC. The detailer should use their discretion to choose the appropriate shape code. The default bend type is shape code 85.

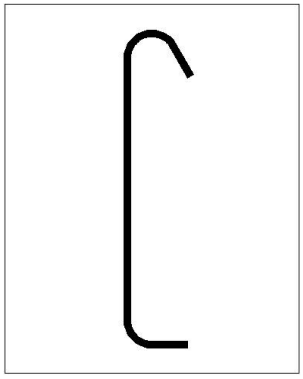

Figure 2.7.5:5 Inner Open Stirrup Bend Type

The inner open stirrup bend type can be included within the beam if the option is selected and the following data fields are completed:

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- Inner Open Stirrup Bend Type - Select the required shape code from the pop down list;
- Bar Size - Select the required bar size for the inner open stirrup shape code;
- No. Of Sets – Specify the required number of stirrups to be detailed across the width of the beam;
- Dimensions – This displays the calculated bending dimensions of the inner open stirrup shape code.

2.8 Drawing the Beam Detail

The Beam can be drawn on the screen in AutoCAD when all of the relevant information has been entered into the beam detailer dialogs. Return back to the initial Beam Type Selection dialog by picking the OK button and then pick the Draw Beam Button. The beam elevation and sections are drawn, the program the prompts for an insertion point on the drawing.

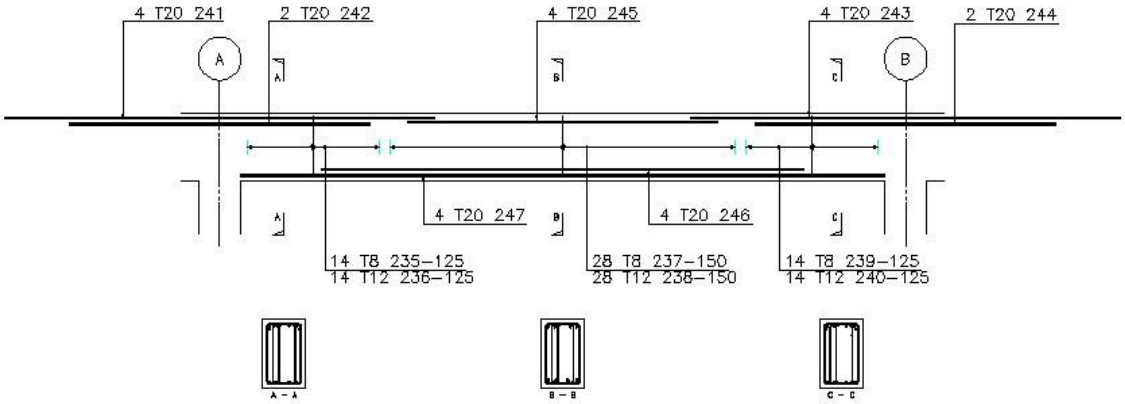

Figure 2.8:1 Typical Beam Detail and Sections

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2.9 CADS Beam Detailer Global Configuration Centre

The following chapter lists all of the configuration variables in CADS Beam Detailer

Setting		Value	Explanation
[TypesDimsInputData]	Type	Interior	Beam Type Currently Selected
	End	n/a	not applicable
	ClearSpan	3500.0	Clear span distance of beam being detailed
	AdjLeftClear	2000.0	Clear span of adjacent left span
	AdjRightClear	2000.0	Clear span of adjacent right span

Setting		Value	Explanation
[TypesDimsInputData]	LeftSupWidth	Interior	Beam Type Currently Selected
	RightSupWidth	n/a	not applicable
	BeamDepth	3500.0	Clear span distance of beam being detailed
	BeamWidth	2000.0	Clear span of adjacent left span
	Outline	2000.0	Clear span of adjacent right span
	CovLeftEnd	50.0	Cover to left end of beam being detailed
	CovRightEnd	50.0	Cover to right end of beam being detailed
	CovTopToStir	50.0	Cover to top of beam being detailed
	CovBtmToStir	50.0	Cover to bottom of beam being detailed
	CovNFToStir	50.0	Cover to near face of beam being detailed
	CovFFToStir	50.0	Cover to far face of beam being detailed
	CovLeftEnd	50.0	Cover to left end of beam being detailed
	LeftSupGridRef	A	Grid label annotation for left grid line
	RightSupGridRef	B	Grid label annotation for right grid line

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Setting		Value	Explanation
[RebarInputData]	TopRnfGrade	T	Steel grade for top layer of reinforcement
	TopRnfPrefix		Prefix for top layer of reinforcement
	BtmRnfGrade	T	Steel grade for bottom layer of reinforcement
	BtmRnfPrefix		Prefix for bottom layer of reinforcement
	StirRnfGrade	T	Steel grade for links
	StirRnfPrefix		Prefix for links

Setting		Value	Explanation
[TopRnfLeftSupTL1]	TL1Include	1	Include bar in curtailment calc, 1 = On, 0 = Off
Top Left Support Bar	TL1Detail	1	Detail support bar
On Layer 1	TL1Number	4	No of bars
	TL1Size	20	Diameter of bar
	TL1Type	20	Shape code
	TL1Notes		Default notes for bar label
	TL1PercentFlag	1	Calculate Curtailment switch 1 = On, 0 = Off
	TL1Percent	30.0	Curtailment Percentage of Span
	TL1LengthFlag	0	Calculate Curtailment as Percentage = 0, as Length = 1
	TL1Length	300.0	Length for curtailment calculation
	TL1Projection	0.0	End Beams only – distance bar projects beyond end of beam

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Setting		Value	Explanation
[TopRnfLeftSupTL2]	TL2Include	1	Include bar in curtailment calc, 1 = On, 0 = Off
Top Left Support Bar	TL2Detail	1	Detail support bar 1 = On, 0 = Off
On Layer 2	TL2Number	2	No of bars
	TL2Size	20	Diameter of bar
	TL2Type	20	Shape code
	TL2Notes		Default notes for bar label
	TL2PercentFlag	1	Calculate Curtailment switch 1 = On, 0 = Off
	TL2Percent	20.0	Curtailment Percentage of Span
	TL2LengthFlag	0	Calculate Curtailment as Percentage = 0, as Length = 1
	TL2Length	300.0	Length for curtailment calculation
	TL2Projection	0.0	End Beams only – distance bar projects beyond end of beam

Setting		Value	Explanation
[TopRnfRightSupTR1]	TR1Include	1	Include bar in curtailment calc, 1 = On, 0 = Off
Top Right Support Bar	TR1Detail	1	Detail support bar 1 = On, 0 = Off
On Layer 1	TR1Number	4	No of bars
	TR1Size	20	Diameter of bar
	TR1Type	20	Shape code
	TR1Notes		Default notes for bar label
	TR1PercentFlag	1	Calculate Curtailment switch 1 = On, 0 = Off
	TR1Percent	30.0	Curtailment Percentage of Span
	TR1LengthFlag	0	Calculate Curtailment as Percentage = 0, as Length = 1
	TR1Length	300.0	Length for curtailment calculation
	TR1Projection	0.0	End Beams only – distance bar projects beyond end of beam

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Setting		Value	Explanation
[TopRnfRightSupTR2]	TR2Include	1	Include bar in curtailment calc, 1 = On, 0 = Off
Top Right Support Bar	TR2Detail	1	Detail support bar 1 = On, 0 = Off
On Layer 2	TR2Number	2	No of bars
	TR2Size	20	Diameter of bar
	TR2Type	20	Shape code
	TR2Notes		Default notes for bar label
	TR2PercentFlag	1	Calculate Curtailment switch 1 = On, 0 = Off
	TR2Percent	20.0	Curtailment Percentage of Span
	TR2LengthFlag	0	Calculate Curtailment as Percentage = 0, as Length = 1
	TR2Length	300.0	Length for curtailment calculation
	TR2Projection	0.0	End Beams only – distance bar projects beyond end of beam

Setting		Value	Explanation
[TopRnfSpanBarTM]	TMBInclude	1	Include bar in curtailment calc, 1 = On, 0 = Off
	TMBDetail	1	Detail support bar 1 = On, 0 = Off
	TMBNumber	4	No of bars
	TMBSize	20	Diameter of bar
	TMBType	20	Shape code
	TMBNotes		Default notes for bar label
	TMBLapFlag	1	
	TMBLap	300.0	
	TMBBarLengthFlag	0	Calculate Curtailment as Percentage = 0, as Length = 1
	TMBBarLength	0.0	Length for curtailment calculation
	TMBPercent	30.0	Curtailment Percentage of Span

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Setting		Value	Explanation
[TopRnfSpanBarTC]	TCBInclude	0	Include bar in curtailment calc, 1 = On, 0 = Off
	TCBDetail	0	Detail support bar 1 = On, 0 = Off
	TCBNumber	4	No of bars
	TCBSize	20	Diameter of bar
	TCBType	20	Shape code
	TCBNotes		Default notes for bar label
	TCBLeftProjection	0.0	
	TCBRghtProjection	0.0	

Setting		Value	Explanation
[BotRnfSpanBarBM]	BMBDetail	1	Detail support bar 1 = On, 0 = Off
	BMBNumber	4	No of bars
	BMBSize	20	Diameter of bar
	BMBType	20	Shape code
	BMBNotes		Default notes for bar label
	BMBPercentFlag	1	Calculate Curtailment switch 1 = On, 0 = Off
	BMBPercent	12.5	Curtailment Percentage of Span
	BMBBarLengthFlag	0	Calculate Curtailment as Percentage = 0, as Length = 1

Setting		Value	Explanation
[BotRnfSpanBarBC]	BCBDetail	1	Detail support bar 1 = On, 0 = Off
	BCBNumber	4	No of bars
	BCBSize	20	Diameter of bar
	BCBType	20	Shape code
	BCBNotes		Default notes for bar label
	BCBLeftProjection	0.0	
	BCBRghtProjection	0.0	
	BCBPercentFlag	0	Calculate Curtailment switch 1 = On, 0 = Off

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	Setting	Value	Explanation
[LinkBars]	LinkZones1	1	
	LinkZones2	0	
	LinkZones3	0	Three link zones, 0 = Off, 1 = On
	LinkStirZoneOff	50.0	Distance stirrup zone offset from column Face
	LinkLeftEntNum	1	
	LinkSpanEntNum	1	
	LinkRghtEntNum	1	
	LinkLeftNumber	10	Number of links in left zone
	LinkSpanNumber	10	Number of links in span zone
	LinkRghtNumber	10	Number of links in right zone
	LinkLeftSpacing	150.0	Stirrup pitch left zone
	LinkSpanSpacin	150.0	Stirrup pitch span zone
	LinkRghtSpacin	150.0	Stirrup pitch right zone
	LinkLeftZoneLe	0.0	Length of left zone
	LinkSpanZoneLen	1900.0	Length of span zone
	LinkRghtSpacing	0.0	Length of right zone

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Setting		Value	Explanation
[LinkArrangement]	LinkOuterFlag	1	Outer stirrup bend type switch, 0 = Off, 1 = On
	LinkOuterType	61	Outer stirrup bend type - shape code
	LinkOuterSize	8	Outer stirrup bend type - bar diameter
	LinkOuterOverlap	None	Outer stirrup bend type overlap, options none, 0.5 or 0.67
	LinkOuterDim0	600.0	Outer stirrup bend type dim 0
	LinkOuterDim1	400.0	Outer stirrup bend type dim 1
	LinkOuterDim2	0.0	Outer stirrup bend type dim 2
	LinkOuterDim3	0.0	Outer stirrup bend type dim 3
	LinkOuterDim4	0.0	Outer stirrup bend type dim 4
	LinkOuterDim5	0.0	Outer stirrup bend type dim 5
	LinkOuterDim6	0.0	Outer stirrup bend type dim 6
	LinkOuterDim7	0.0	Outer stirrup bend type dim 7
	LinkOuterDim8	0.0	Outer stirrup bend type dim 8
	LinkOuterDim9	0.0	Outer stirrup bend type dim 9
	LinkOuterCapFlag	0	Outer cap stirrup bend type switch, 0 = Off, 1 = On
	LinkOuterCapType	38	Outer cap stirrup bend type – shape code
	LinkOuterCapSize	8	Outer cap stirrup bend type - bar diameter
	LinkOuterCapDim0	0.0	Outer cap stirrup bend type dim 0
	LinkOuterCapDim1	0.0	Outer cap stirrup bend type dim 1
	LinkOuterCapDim2	0.0	Outer cap stirrup bend type dim 2
	LinkOuterCapDim3	0.0	Outer cap stirrup bend type dim 3
	LinkOuterCapDim4	0.0	Outer cap bend type dim 4
	LinkOuterCapDim5	0.0	Outer cap bend type dim 5
	LinkOuterCapDim6	0.0	Outer cap bend type dim 6
	LinkOuterCapDim7	0.0	Outer cap bend type dim 7
	LinkOuterCapDim8	0.0	Outer cap bend type dim 8
	LinkOuterCapDim9	0.0	Outer cap bend type dim 9
	LinkInnerClosedFlag	0	Inner closed Outer cap bend type switch, 0 = Off, 1 = On
	LinkInnerClosedType	38	Inner closed stirrup bend type – shape code
	LinkInnerClosedSize	8	Inner closed stirrup bend type - bar diameter
	LinkInnerClosedSets	1	Inner closed stirrup bend type - number of sets of stirrups
	LinkInnerClosedDim0	0.0	Inner closed stirrup bend type - dim 0
	LinkInnerClosedDim1	0.0	Inner closed stirrup bend type - dim 1
	LinkInnerClosedDim2	0.0	Inner closed stirrup bend type - dim 2
	LinkInnerClosedDim3	0.0	Inner closed stirrup bend type - dim 3
	LinkInnerClosedDim4	0.0	Inner closed stirrup bend type - dim 4

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LinkInnerClosedDim5	0.0	Inner closed stirrup bend type - dim 5
LinkInnerClosedDim6	0.0	Inner closed stirrup bend type - dim 6
LinkInnerClosedDim7	0.0	Inner closed stirrup bend type - dim 7
LinkInnerClosedDim8	0.0	Inner closed stirrup bend type - dim 8
LinkInnerClosedDim9	0.0	Inner closed stirrup bend type - dim 9
LinkInnerOpenFlag	0	Inner open Stirrup bend type switch, 0 = Off, 1 = On

Setting		Value	Explanation
[LinkArrangement]	LinkInnerOpenType	85	Inner open Stirrup bend type - shape code
	LinkInnerOpenSize	8	Inner open Stirrup bend type - bar diameter
	LinkInnerOpenSets	2	Inner open Stirrup bend type - number of bar sets
	LinkInnerOpenDim0	0.0	Inner open Stirrup bend type - dim 0
	LinkInnerOpenDim1	0.0	Inner open Stirrup bend type - dim 1
	LinkInnerOpenDim2	0.0	Inner open Stirrup bend type - dim 2
	LinkInnerOpenDim3	0.0	Inner open Stirrup bend type - dim 3
	LinkInnerOpenDim4	0.0	Inner open Stirrup bend type - dim 4
	LinkInnerOpenDim5	0.0	Inner open Stirrup bend type - dim 5

Setting		Value	Explanation
[BLGenCfg]	DefaultPath	None	Default path to import job files
General Configuration.	SectMarks	Standard	Section Points Choose between No sections (no sections per span) Standard section points (3 per span) Pick all section points (user to pick point on elevation where section is generated)
	ElevOffset	200.0	Section offset from elevation in plotted mm
	MinSectSpace	500.0	Spacing between sections in plotted mm
	ColumnLen	75.0	Column length on elevation in plotted mm
	CompactBars	1	Compact bar mark numbers, 0 = Off, 1 = On
	YcompactTol	10	Compact Tolerance in mm

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Setting		Value	Explanation
[BLGridCfg]	GridLineLay	grid	Grid layer
Grid Configuration	GridBallLay	0-35text	Grid text layer
	GridBallRad	10.0	Grid balloon radius in plotted mm
	GridTextHgt	5.0	Grid Text height in plotted mm
	GridDimOff	20.0	Grid dimension offset in plotted mm
	GridBallOff	15.0	Grid Balloon offset from dimension in plotted mm

Setting		Value	Explanation
[BLSectMrkCfg]	SectMarksLay	0-50text	Section marker layer
Section Mark Config	SectMarksLBlk	sectmkl.dwg	Left section marker block
	SectMarksRBlk	sectmkr.dwg	Right section marker block
	SectMarksOff	15.0	Section marker offset from elevation in mm
	SectMarkTxtSz	3.0	Section marker text size in plotted mm
	SectMarkFact	1.00	Section marker scale factor
	SectMarkFirstLab	A	Section marker first label letter, starting on left
	SectMarkLabOffset	3.0	Section marker label offset in plotted mm

Setting		Value	Explanation
[Miscellaneous]	DCLFile	cads-bmd.dcl	Current beam detailer dialog control file

Setting		Value	Explanation
[BarInfo]	StraightBar	20	Straight bar shape code
	HookBar	32	Hook bar shape code
	LegBar	34	Leg bar shape code
	StraightBarDim	A	Straight bar leg letter
	HookBarDim	A	Hook bar leg letter
	LegBarDim	A	Leg bar leg letter
	StraightBarView	Plan	Straight bar view to be generated on elevation
	HookBarView	Side	Hook bar view to be generated on elevation
	LegBarView	Side	Leg bar view to be generated on elevation
	HookDim1	A	First hook dimension letter, if used
	HookDim2	G	Second hook dimension letter, if used

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Setting		Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Min distance of bar label from elevation in plotted mm.

This ends the unsupported Gconfig items that are not currently accessible.
The following section has been shortened to only include the first two supported shape codes; these fields can be expanded to include up to 99 supported shape codes.

Setting		Value	Explanation
[SupportedLinkBars]	NumofSupportShapes	8	Current number of support shape codes, max 99
Make sure this is correct	Shape1	38	Set 1 shape code
	Shape1SameAs	None	Get settings from another shape
	Shape1Dim0	Depth	
Currently a maximum 99 shapes supported	Shape1Dim1	Width	
	Shape1Dim2	Depth	
	Shape1Dim3	0.0	
	Shape1Dim4	0.0	
	Shape1Dim5	0.0	
	Shape1Dim6	0.0	
	Shape1Dim7	0.0	
	Shape1Dim8	0.0	
	Shape1Dim9	0.0	
	Shape1VectX	1.0	
	Shape1VectY	0.0	
	Shape1Handing	R	
	Shape1VectX2	1.0	
	Shape1VectY2	0.0	
	Shape1Handing2	R	
	Shape1CapVectX	-1.0	
	Shape1CapVectY	0.0	
	Shape1CapHanding	L	
	Shape1ElevView	Left	
	Shape1ElevDirVect	Left	
	Shape1SectView	Side	
	Shape1InsertionPoint	Left	
	Shape1OverLapDim1	1	
	Shape1OverLapDim2	1	

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3 CADS Column Detailer

Chapter Objectives

CADS Column Detailer provides an automated method of producing placing drawings for reinforced concrete columns. It features Rectangular and Circular Column types with or without columns above. Detailers can choose many possible bar and tie arrangements (including spiral ties) with bar dimensions automatically calculated from the entered column data.

3.1 Program Operating Environment

CADS Column Detailer works in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Column Detailer can be used.

CADS Column Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

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3.2 Loading the Column Detailer

The Column Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

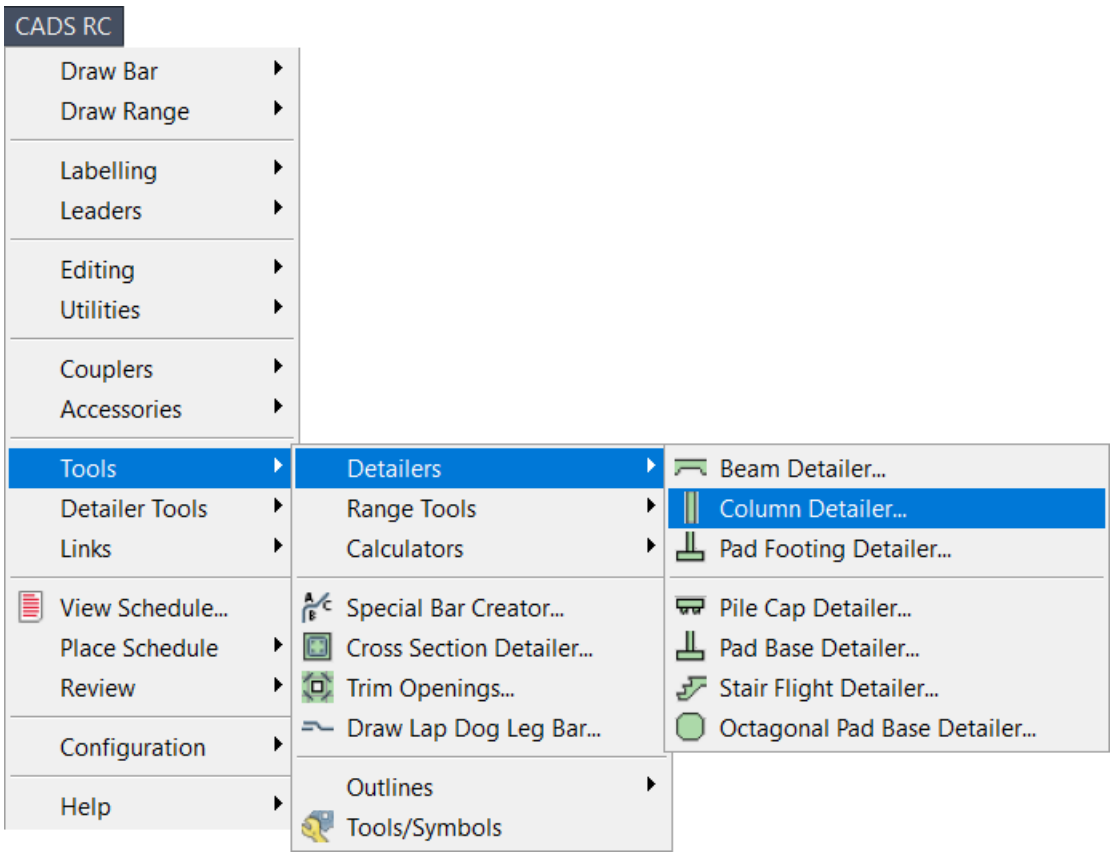

Figure 3.2:1 CADS RC Detailers Selection Menu

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 3.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

To load the Column Detailer, highlight the line 'CADS CO Column Detailer' and then pick the Load button.

3.3 Defining Columns for Detailing

The Column Detailer requires four main areas of data to be defined in order that the desired column arrangement is produced. They consist of:

- Column Type (single span, end span or interior span) ;
- Column Dimensions (span, depth, width etc.);

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- Main Column Bar Arrangement;
- Column Tie Arrangement, (links within the column).

When importing a column from the CADS RC Column Designer program the definitions will be set by default to the information imported. This may be changed as required except for the link arrangement.

3.3.1 Allocating the Column Member Title

When the Column Detailer is loaded the CADS RC Member Title Selection dialog is displayed. At this point you are able to select an existing member title or create a new member title. The bars created by the column detailer will be assigned to the current member title. When the desired member title has been selected you may continue by picking the OK button. For further information on Member Titles refer to the CADS RC user manual.

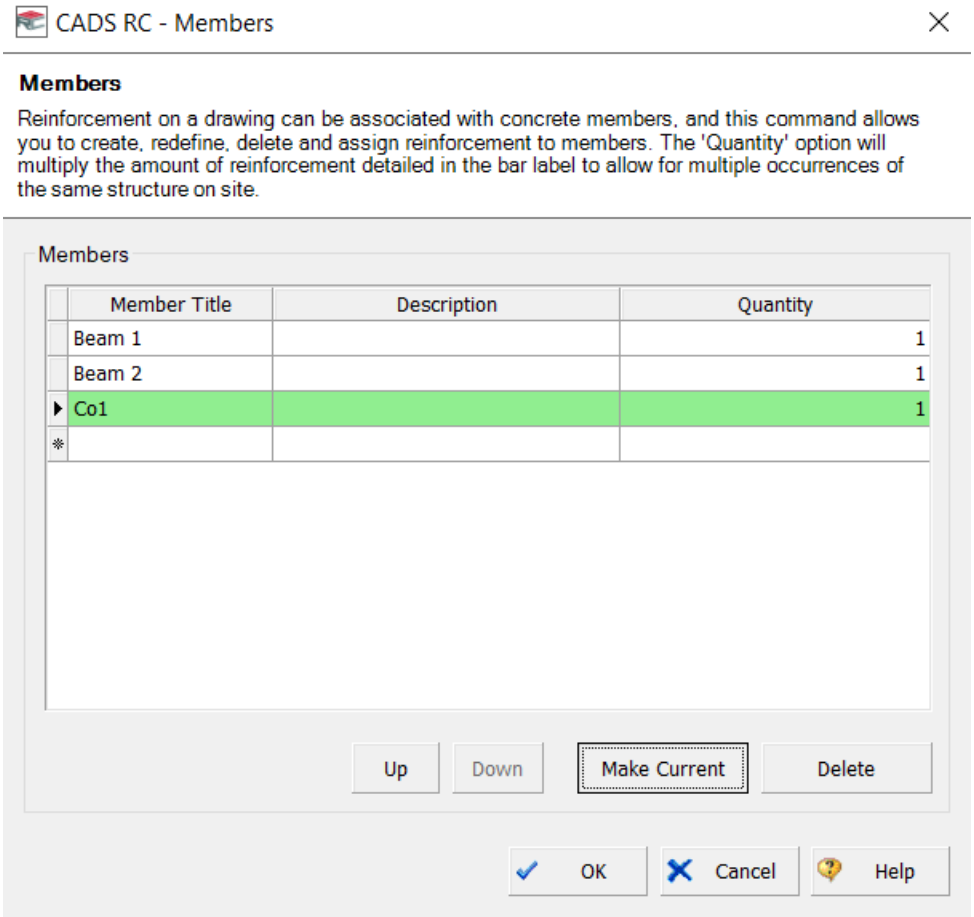

Figure 3.2:2 Member Title Selection Dialog

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3.3.2 Column Detailer Configuration File Selection

When the required member title has been defined the Column Type Selection dialog is displayed.

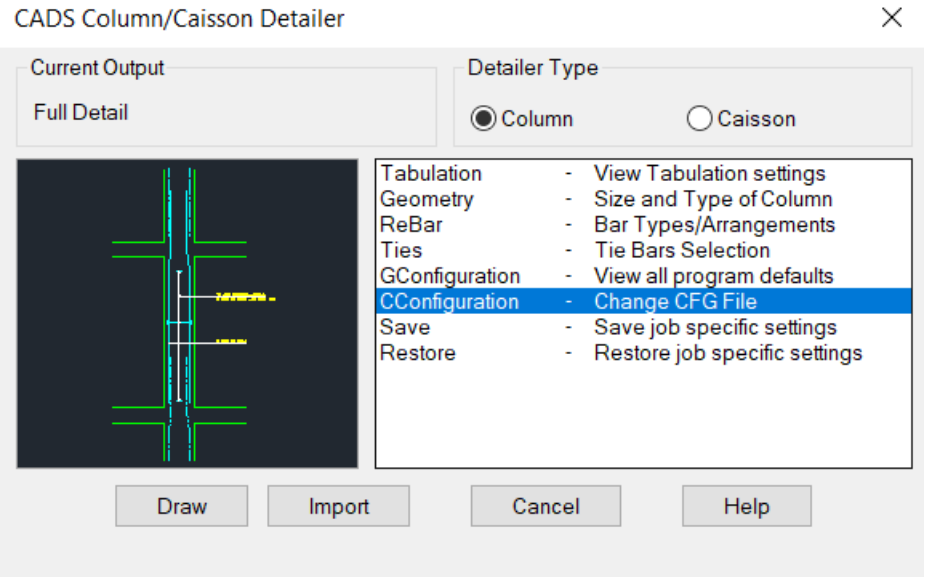

Figure 3.3.2:1 Column Type Selection Dialog

This dialog contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 3.3.2:2.

Currently the UK version of this software offers two configuration files CADSCO.DEF and COL_UK.DEF. The file CADS-CO.DEF is the default set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The file COL_UK.DEF is identical to the CADS-CO.DEF.

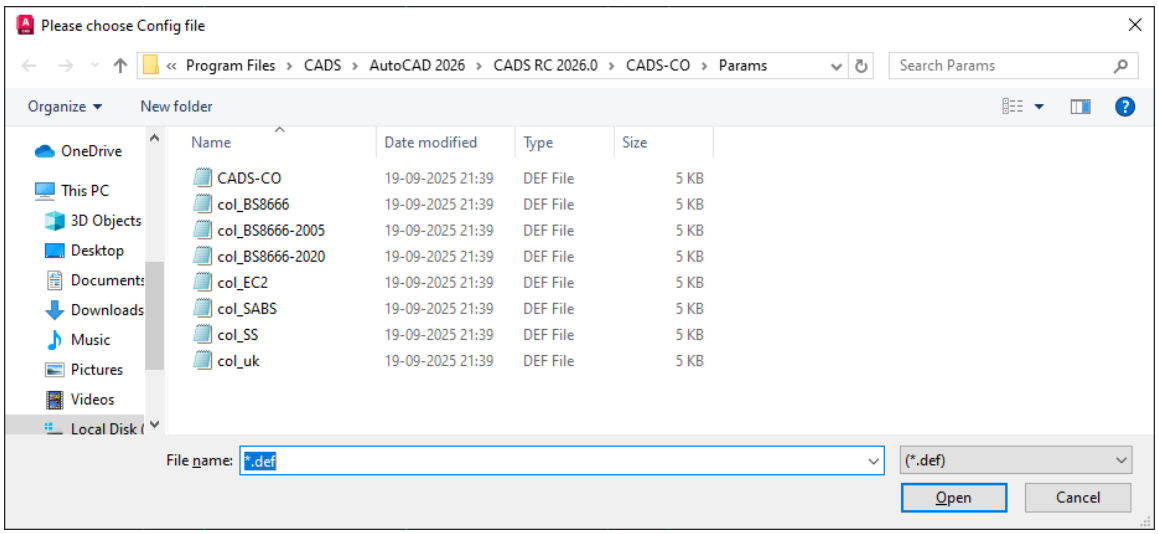

Figure 3.3.2:2 Default Column Configuration File Options

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Should other configuration options be required, then please contact the CADS Support Department who will be pleased to advise accordingly.

3.4 Tabulation

Instead of having to draw every column detail the tabulation output options can be used to group similar columns together. A typical 'sketch 'detail of the column elevation and section can be inserted on the drawing that in turn is referenced to the bar data which is laid out in tabular format. Different tabulation header options are available so that the bar label data can be laid out in one table.

To access the Tabulation Settings dialog double, click on the Tabulation – View Tabulation Settings option in the Main Column Detailer Dialog.

Note:

If you use the Tabulation Options to produce details and bar data tables you need to set the column mark and level data in the Geometry Dialog first, refer to chapter 3.7 Geometry – Size and Type of Column for further information.

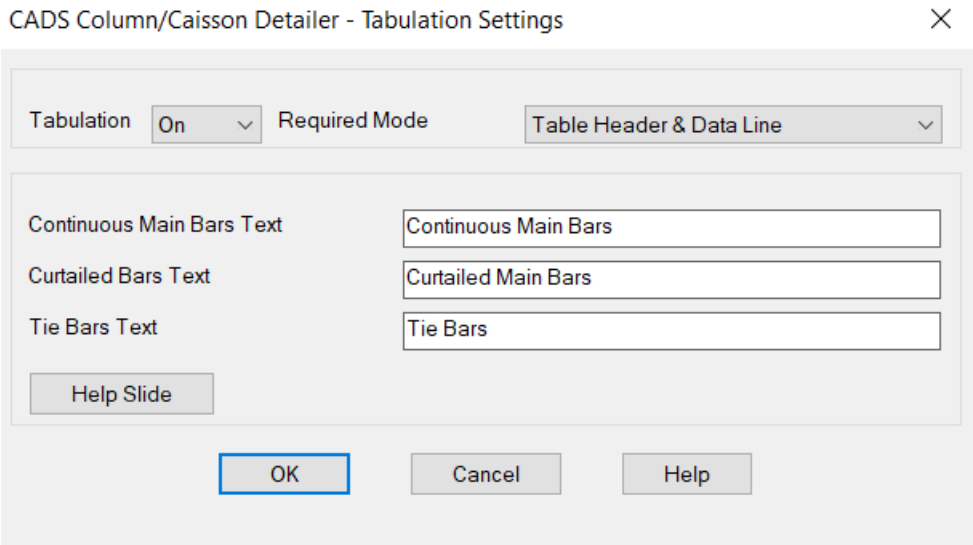

Figure 3.4:1 Tabulation Dialog

Tabulation

This option switches the tabulation output On or Off. Switch it on to place a bar data table on the drawing.

Required Mode

The required mode option allows you to select different table header and sample detail options:

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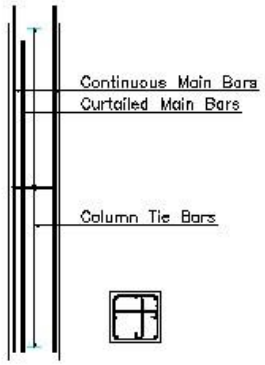
- Table Header & Data Line – Inserts a new table on the drawing with the header descriptions and bar label data but it does not insert a typical detail, see Figure 3.4:2;
- Sketch detail, Table header & Data Line – Inserts a new table on the drawing with header descriptions and bar label data. It also produces a typical detail of the column and its section with labels that are referenced to the table, see Figure 3.4:3;
- Data Line Only – Inserts only the bar label data in tabular format so that it can be appended to a previous table, see Figure 3.4:4.

Column Mark	Level	Column Main Bars		Column Ties	Extra Ties	Notes
		Continuous	Curtailed			
Type A	Gnd Flr	4 T25 219	8 T25 220	20 T10 221–200		No Notes
				20 T10 222–200		No Notes
				20 T10 223–200		No Notes

Figure 3.4:2 Table Header and Data Line



Column Mark	Level	Column Main Bars		Column Ties	Extra Ties	Notes
		Continuous	Curtailed			
Type 1	1st Flr	4 T25 214	4 T25 215	20 T10 216–200		No Notes
				20 T10 217–200		No Notes
				20 T10 218–200		No Notes

Figure 3.4:3 Sketch Detail, Table Header and Data Line

Type B	Gnd Flr	4 T25 224	6 T25 225	20 T10 226–200	No Notes
				20 T10 227–200	No Notes
				20 T10 228–200	No Notes

Figure 3.4:4 Data Line Only

Tabulation Text Lines

The tabulation text details are used if a sketch detail is requested by selecting the sketch detail, table header and data line option under the Required Mode option. The text fields are referenced to the data lines in the Bar Data Table, see Figure 3.4:5 for details on which bar sets reference which labels.

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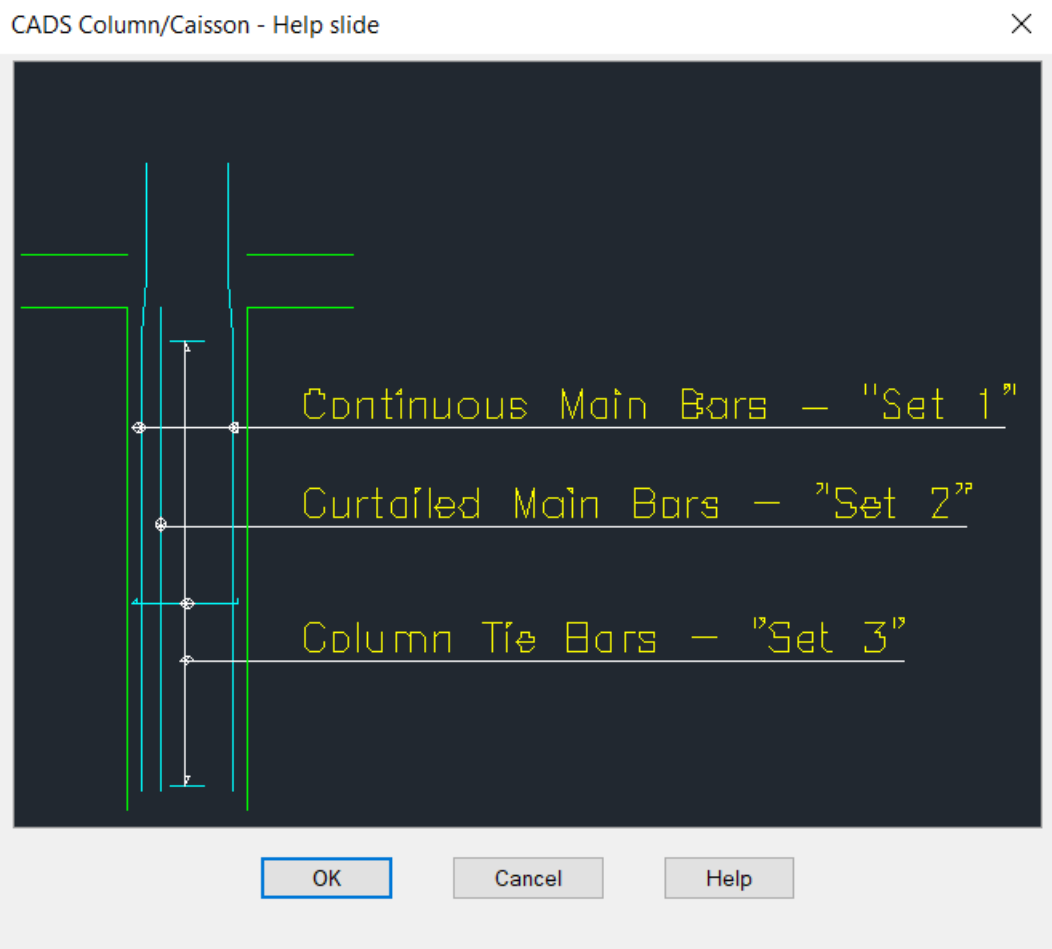

Figure 3.4:5 Tabulation Help Screen

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3.5 Defining the Column Geometry

Selecting the Geometry option from the Main Column Detailer Dialog displays the Column Type and Dimension Input dialog, see Figure 3.5:3, where the column type and dimensions are input. The column detailer supports rectangular and circular columns with or without a column above present.

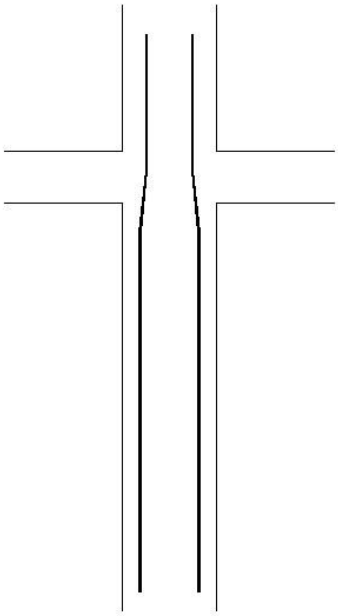

Figure 3.5:1 Column with column above

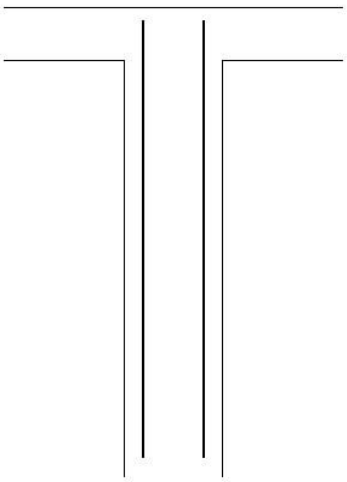

Figure 3.5:2 Column without column above

The column dimensions can be altered or checked in the Column Type and Dimension Input dialog which is available from the majority of the column detailer input dialogs.

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The Column Dimension Data is dependent upon the column type selected; therefore, some column dimension fields are not accessible for certain column types.

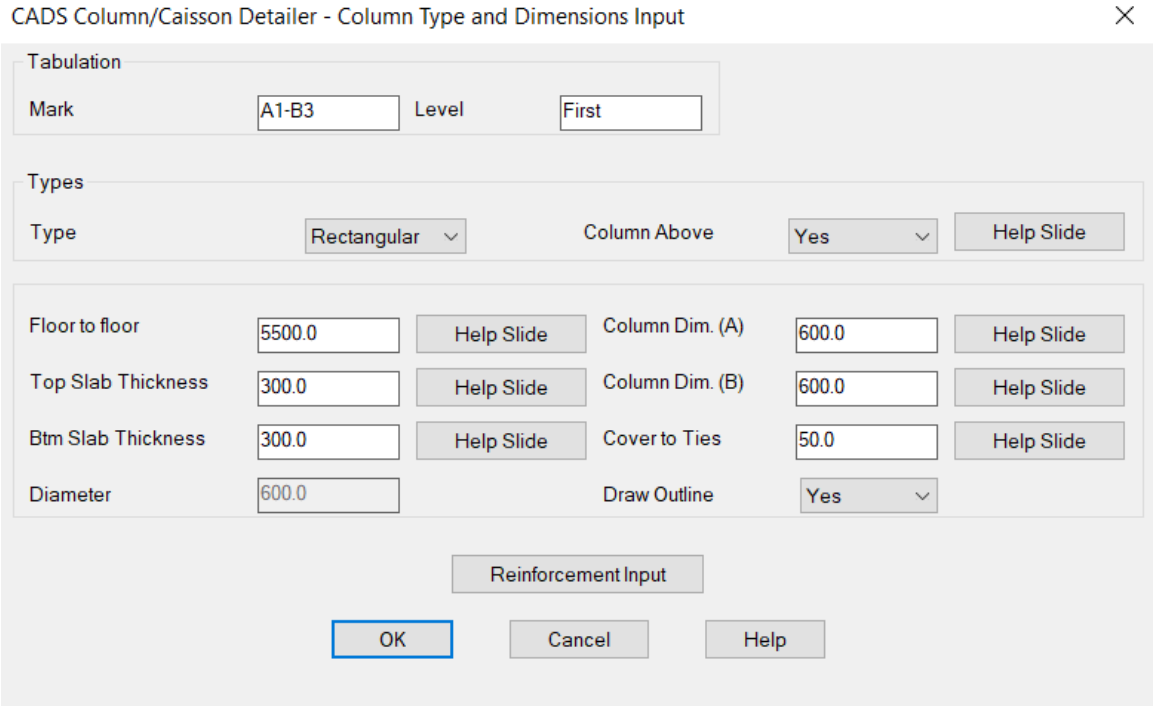

Figure 3.5:3 Column Type and Dimension Input dialog

The Column Dimension input data is as follows:

- Column Mark - This option is only used by the detailer if the tabulation option is activated in the Tabulation Settings Dialog. The column mark could be used to define a column type or grid location on the general arrangement drawing. Refer to chapter 3.6 Tabulation for more information;
- Level - This option is only used by the detailer if the tabulation option is switched on in the Tabulation Settings Dialog. The level option is used to define the floor level of the column. Refer to chapter 3.6 Tabulation for more information;
- Column Type - Defines the column section type as Rectangular or Circular;
- Column Above - Choose whether a column is drawn above or not by selecting Yes or No;
- Floor to Floor - Enter the floor to floor distance;
- Top Slab Thickness - Enter the thickness of the slab above the column;
- Bottom Slab Thickness - Enter the thickness of the slab below the column;
- Column Diameter - If column type is set to circular the column diameter is entered here;
- Column Dim. (A) - If the column type is set to rectangular, the column dim (A) is entered here;
- Column Dim. (B) - It the column type is set to rectangular, the column dim (B) is entered here;
- Cover to Ties - Enter the required cover value to the column links;

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- Draw Outline - When set to Yes, the detail produced will include the column outline, set to No the detail produced will only contain the reinforcement elements which can be placed into an existing outline drawing.

3.6 Defining the Bar Arrangements

The Column Detailer requires two bar arrangement areas to be defined namely Column Main Bars and Column Ties (Links). In each area the general arrangement is defined with the column detailer calculating actual bar dimensions based upon the column dimensions and covers.

3.6.1 Column Main Bar Arrangements

Selecting the Reinforcement Input button displays the Reinforcement Input dialog where the required bar arrangements can be defined.

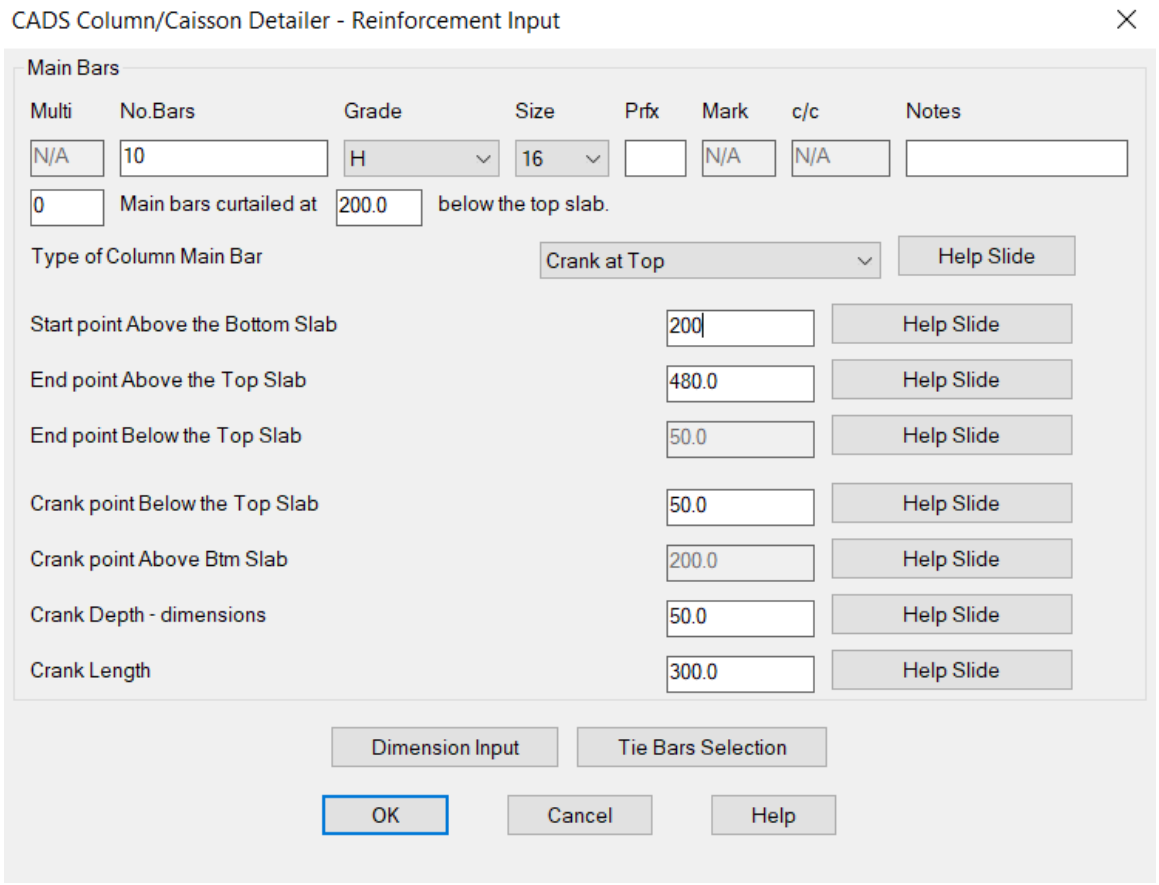

Figure 3.6:1 Reinforcement Input Dialog

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The following Column Main Bar inputs are available:

- No. Bars - Enter the total number of main bars required in the column.
- Grade - Select the required bar grade for the column main bars.
- Size - Select the bar size for the bar set.
- Prfx. - Enter any bar mark prefix required.
- Notes - Enter any note you want to include in the bar label for the column main bars set.

Curtailed Main Bars

The Number of Bars field described above defines the total number of column main bars required. If some of these bars are to be curtailed then you may enter the number of bars to be curtailed at a given distance below the top slab level. Curtailed column main bars will always be detailed as straight bars.

The program does not know which bars are to be curtailed so it draws the indicator bar in elevation ready for repositioning as required.

Additional Column Main Bar Inputs

- Type of Column Main Bar - If set to Bent, column main bars which project into the column above will be detailed as cranked bars. If set to Straight, column main bars which project into the column above will be detailed as straight bars;
- Start point Above the Bottom Slab - Enter a distance above the bottom slab level at which the column main bars will start. If the bars are to be detailed starting from the bottom slab then a distance of zero may be entered;
- End point Above the Top Slab - Only required if Column Above is set to Yes. Enter the distance above the top slab at which the column main bars will be terminated;
- End point Below the Top Slab - Only required if Column Above is set to No. Enter the distance below the top slab level at which the column main bars will detailed terminated;
- Crank point Below the Top Slab - Only required if Column Above is set to Yes. Enter the distance below the top slab level at which the column main bar upper crank point is to placed;
- Crank Depth / 'Out to Out' Dimension - Only required if Column Above is set to Yes. Enter the overall crank distance required on the column main bars;
- Crank Length - The slope length of the crank.

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3.6.2 Column Tie Bar Arrangements

Rectangular Column Types

The following Column Tie (Link) Bar inputs are available:

- No. Bars - Enter the total number of column link bars required;
- Grade - Select the required bar grade for the column link bars;
- Size - Select the bar size for the bar set;
- Prfx. - Enter any bar mark prefix required;
- C/C - Enter the required column link pitch;
- Notes - Enter any note you want to include in the bar label for the column link bars set.

If extra links are required then the number, pitch and any specific label notes required for the bar label of the extra links can be entered in the extra link inputs.

'The actual column link bar arrangement is defined by picking the Tie Arrangements button that accesses the Tie Arrangements Dialog.

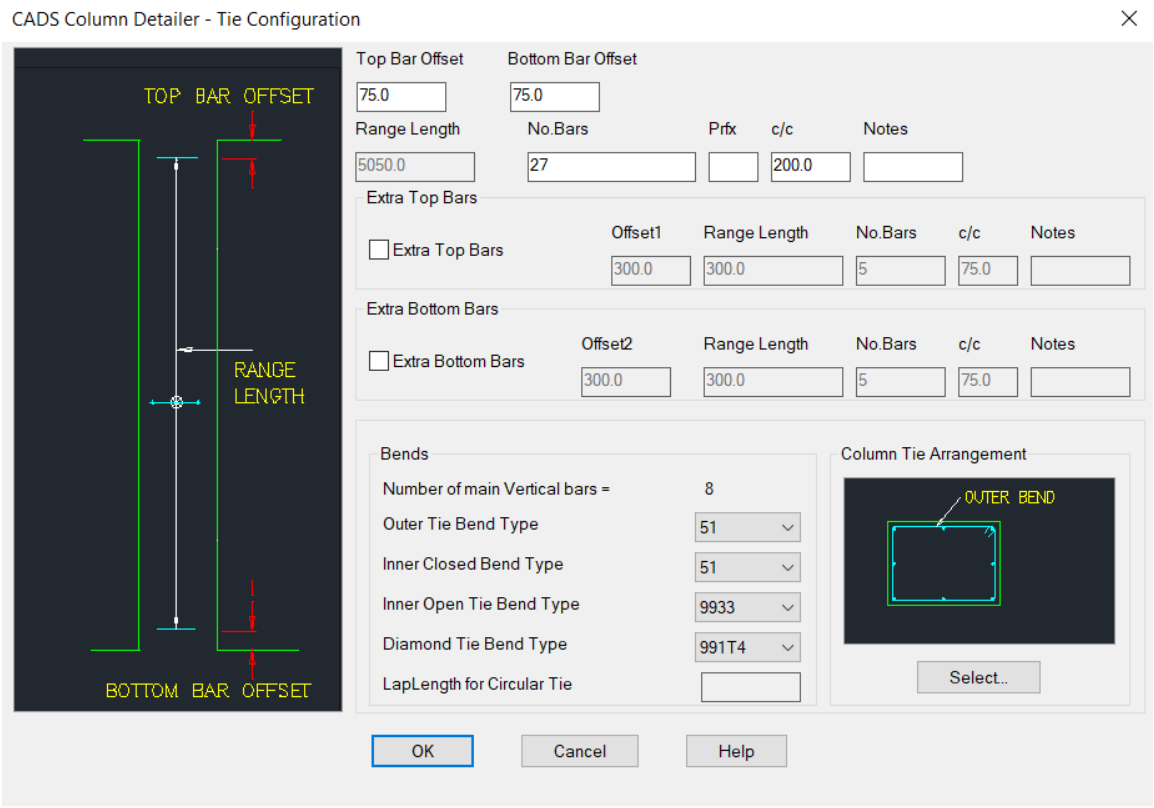

Figure 3.6.2:1 Tie Arrangements dialog

For imported details the CADS RC Column Designer determines the tie arrangement and only limited amendments can be made. The program will not draw arrangements with an odd

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number of bars and if more than sixteen bars are entered the program draws half in the opposite face with an enclosing link ready for the detail to be amended on the drawing as necessary.

Default column link arrangements are available for selection by picking the Select button that displays the column tie arrangements options for the number of main vertical bars in use.

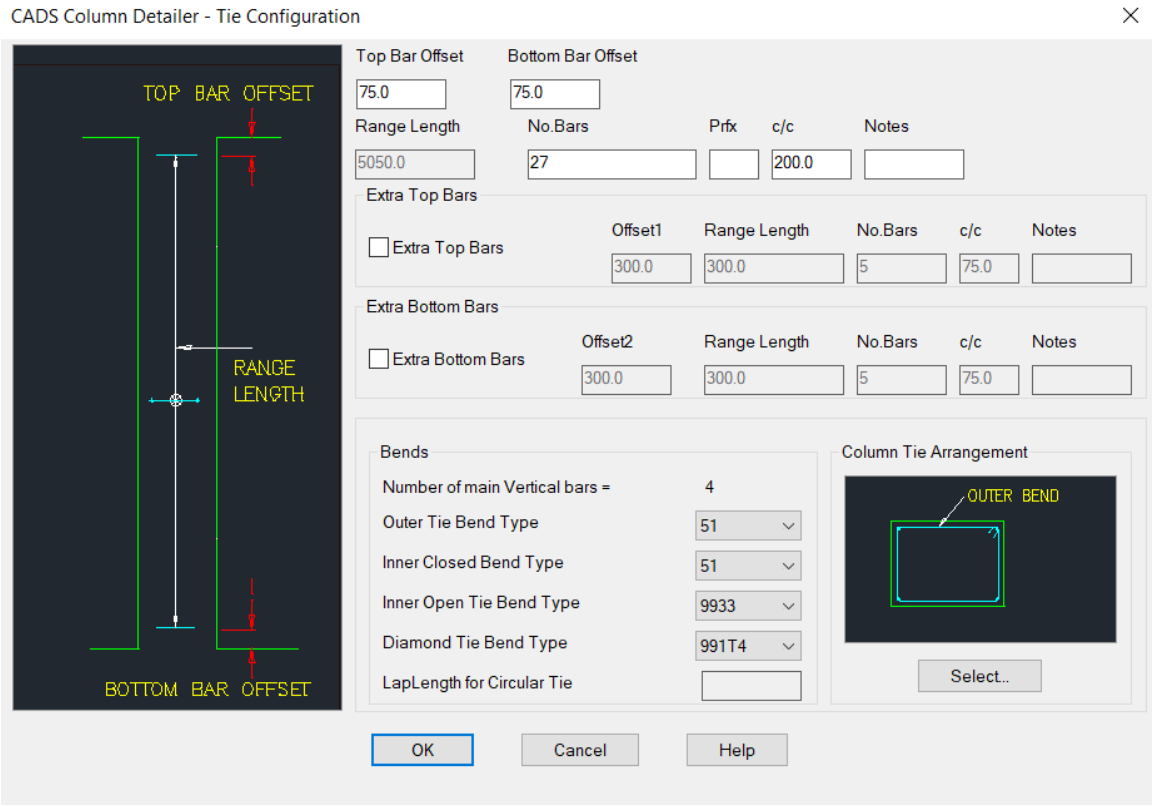

Figure 3.6.2:2 4 main vertical bar tie arrangements

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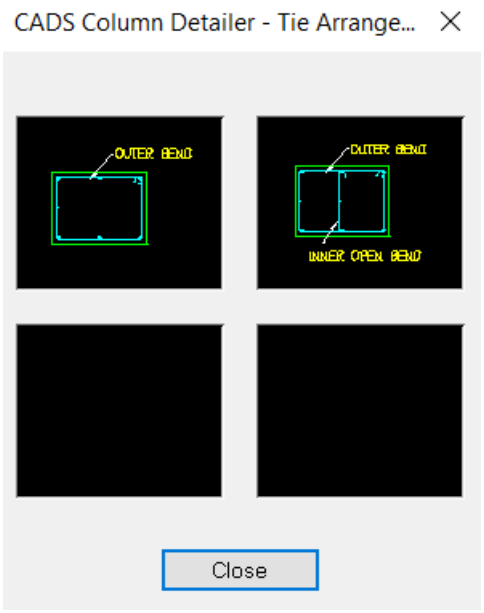

Figure 3.6.2:3 6 main vertical bar tie arrangements

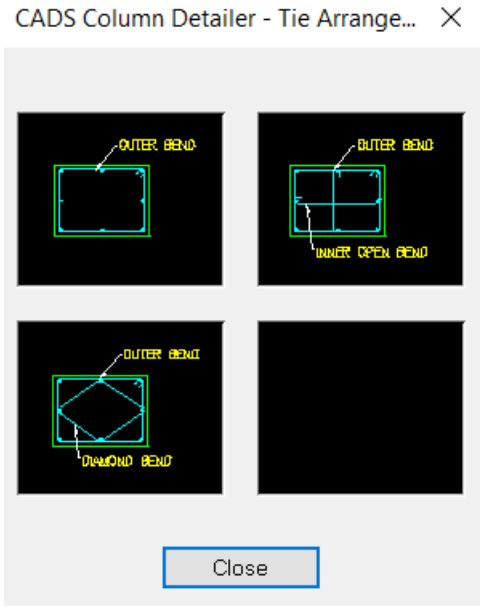

Figure 3.6.2:3 8 main vertical bar tie arrangements

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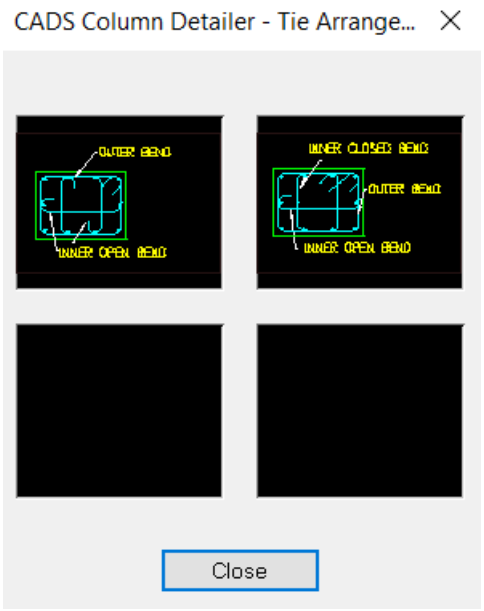

Figure 3.6.2:4 10 main vertical bar tie arrangements

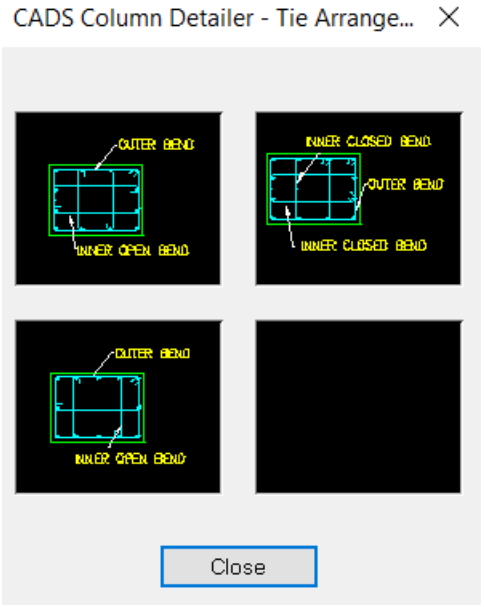

Figure 3.6.2:5 12 main vertical bar tie arrangements

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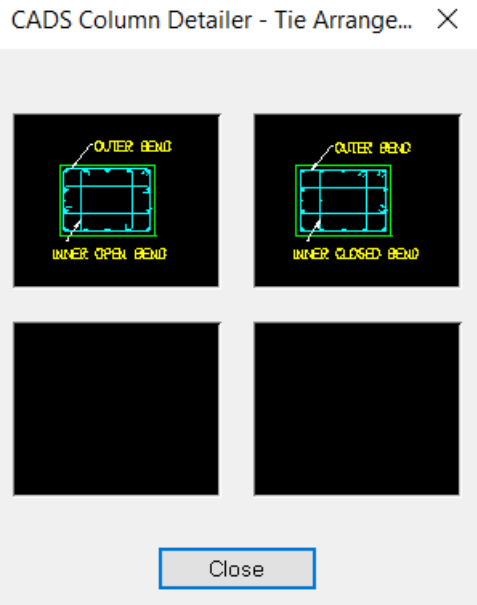

Figure 3.6.2:6 14 main vertical bar tie arrangements

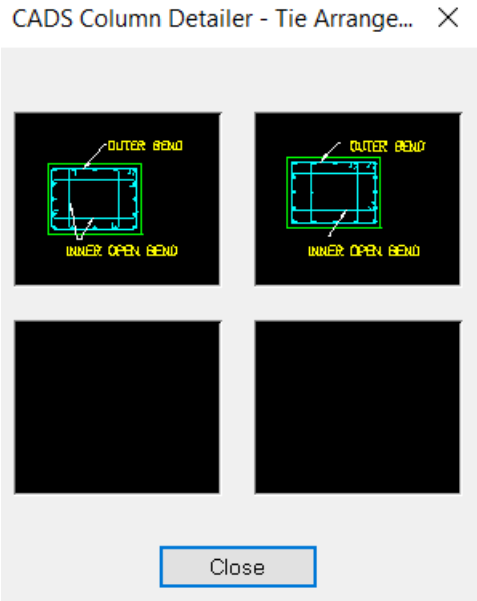

Figure 3.6.2:7 16 main vertical bar tie arrangements

When the required tie arrangement has been selected the actual bend types to be used can be defined.

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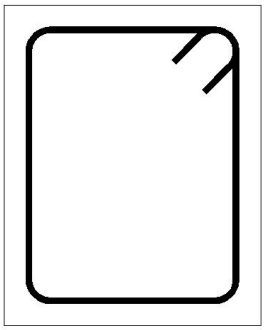

Figure 3.6.2:8 Outer Tie

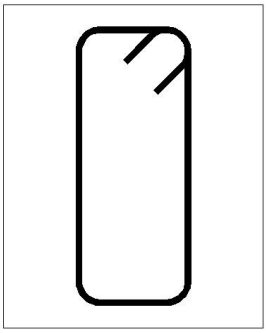

Figure 3.6.2:9 Inner Closed Tie

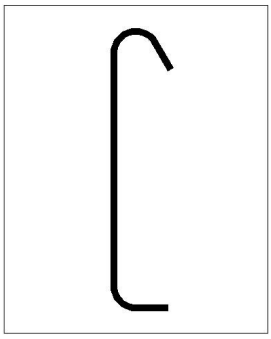

Figure 3.6.2:9 Inner Open Tie

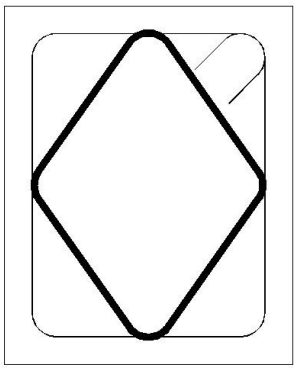

Figure 3.6.2:10 Diamond Tie

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Circular Column Types

Circular column types can be detailed with either loose ties (links) or spiral bars.

Loose Ties (Links)

If loose ties are required the following Column Tie (Link) Bar inputs are available:

- No. Bars - Enter the total number of column link bars required 2. Grade - Select the required bar grade for the column tie bars;
- Size - Select the bar size for the bar set;
- Prfx. - Enter any bar mark prefix required;
- C/C - Enter the required column tie pitch;
- Notes - Enter any note you want to include in the bar label for the column link bar set.

If extra links are required then the number, c/c and any specific label notes required for the bar label of the extra links can be entered in the extra tie input dialog.

The actual column link bar arrangement is defined by picking the Tie Arrangements button that accesses the Tie Arrangements Dialog.

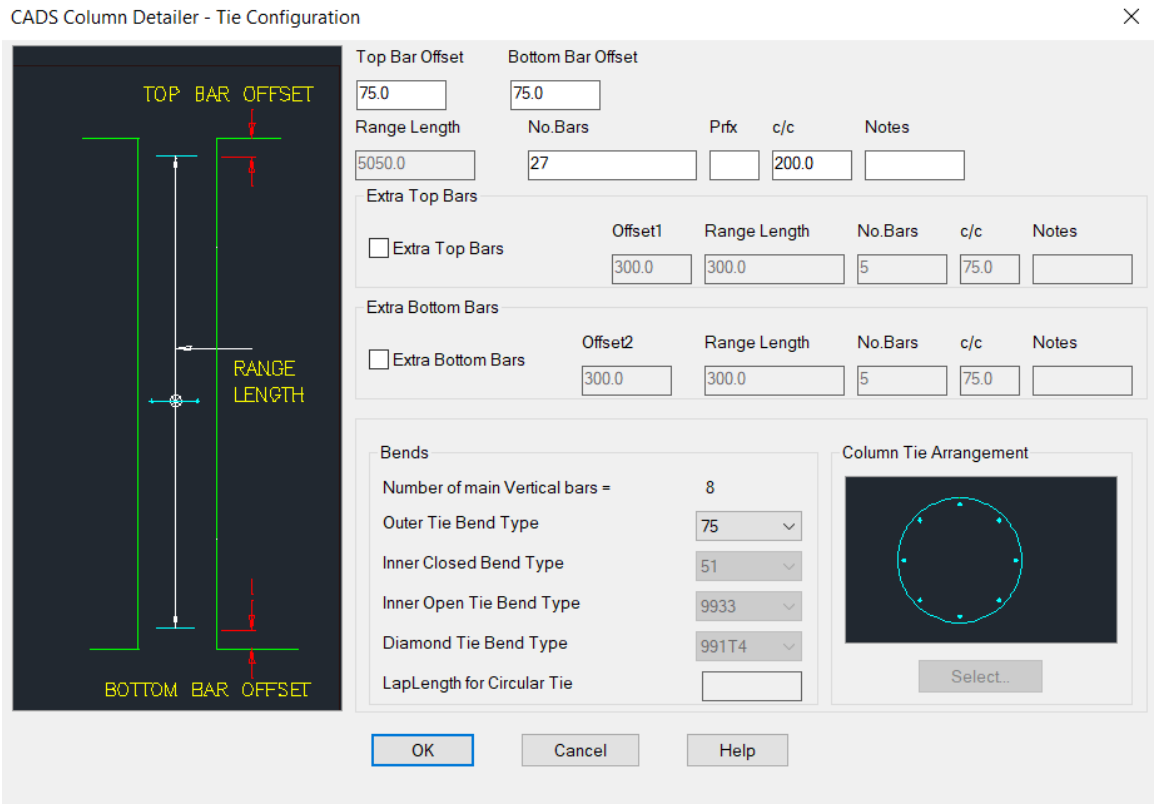

Figure 3.6.2:11 Tie Arrangements dialog

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Spiral Bars

If spiral bars are required the spiral check box can be activated in the Reinforcement Input Dialog, see Figure 3.6.2:12, which enables the Spirals Button on the Tie Arrangements Dialog. Picking the Spirals button displays the Spirals dialog.

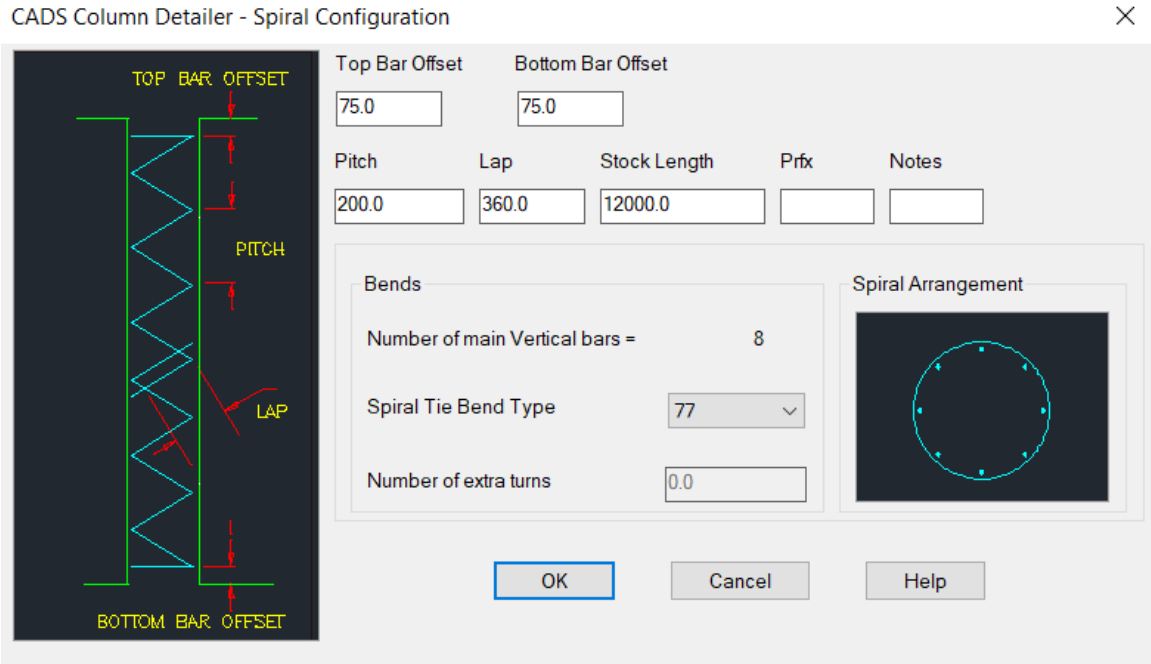

Figure 3.6.2:12 Spirals dialog

The spirals dialog allows the following spiral information to be entered:

- Bend Type - Enter the required spiral bend type;
- Spiral Tie Pitch - Enter the required spiral pitch (dimension F);
- Start Point above Btm Slab - Enter the distance above the bottom slab at which the spiral is to start;
- End Point below Top Slab – Enter the distance below the upper face of the top slab at which the spiral is to bend.

Note:

CADS Column Detailer will warn if the spiral bar is over the maximum stock length that is defined within CADS RC. It will, however, continue to draw the bar even though it may be over the stock length.

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3.7 Importing a Column Detail from CADS Column Designer

The Import Button on the Column Detailer Main Input Menu Dialog allows data prepared by the CADS Column Designer program to be used directly by the detailer. The link arrangements are determined in the designer and cannot be adjusted. Otherwise the all other imported data can be edited with the column detailer dialogs.

3.7.1 Locating and Selecting the File to Import

Once the Import Option has been selected the Column Import Dialog is displayed. This dialog shows the directories / folders in the left hand panel and the files in the right. It is set to display the Column Designer *.RCD files.

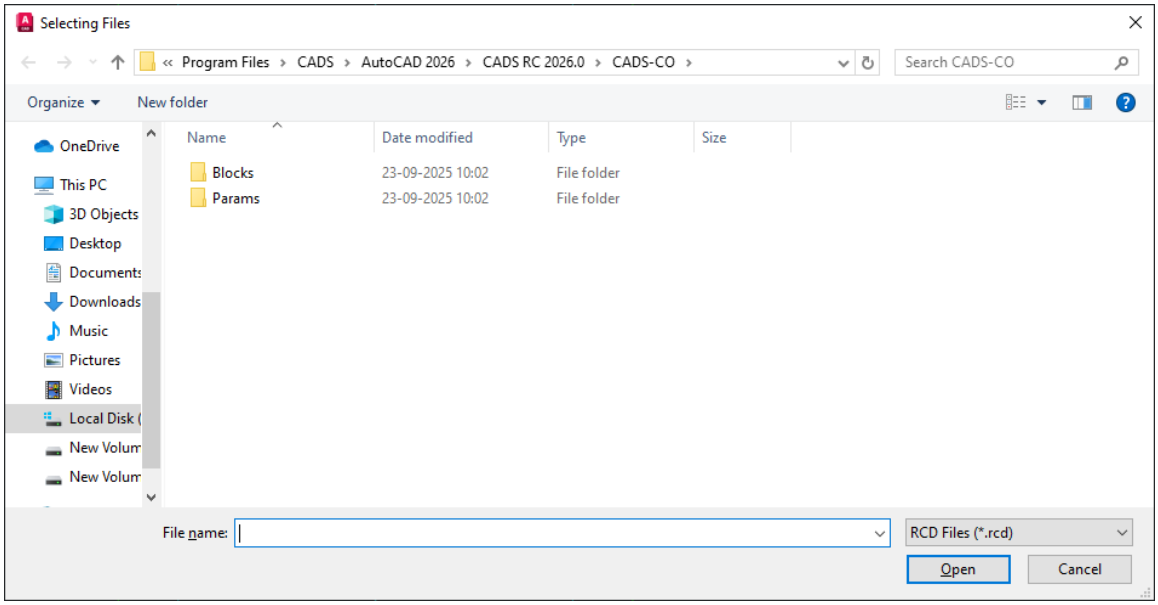

Figure 3.7.1:1 CADS Column Detailer Import Dialog

If you are not in the directory / folder you require then select the appropriate directory/folder or drive in the left panel until the correct path is shown.

Select the *.rcd file to import and then pick the OK button.

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3.8 Drawing the Column Detail

When the required column data has been entered the column can be drawn by selecting the Draw button from the Column Detailer dialog which can be displayed by picking the OK button from the Geometry or Reinforcement dialogs.

The Detailer draws the column elevation first and then prompts for its insertion point.

The section is then drawn and its placement requested. Both elevation and section can be relocated after their initial insertion.

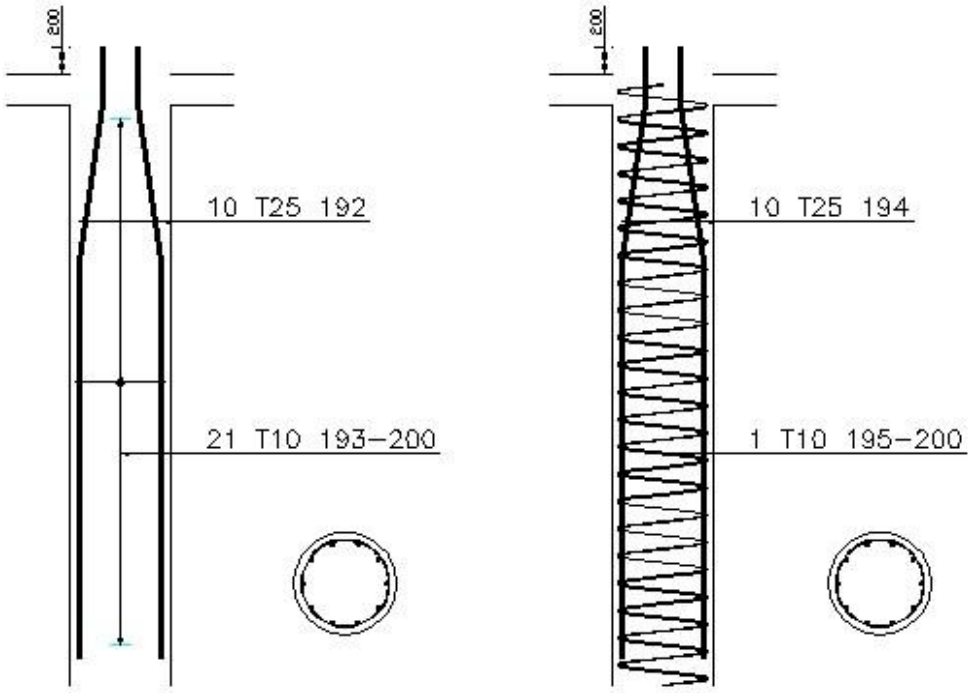

Figure 3.8:1 Typical Circular Column Elevations and Sections

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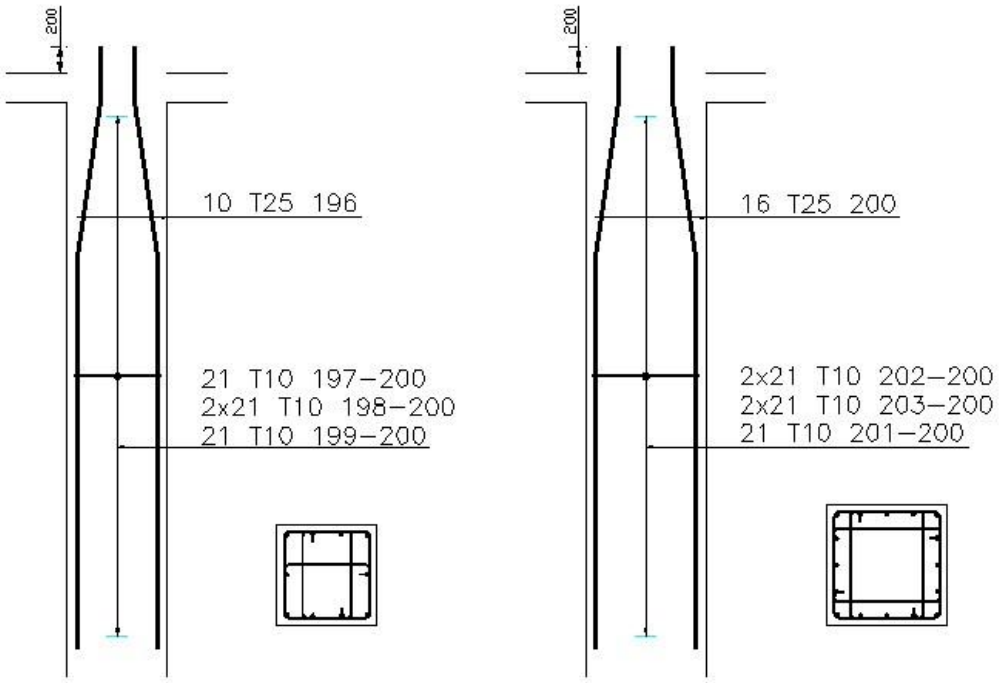

Figure 3.8:2 Typical Rectangular Column Elevations and Sections

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3.9 CADS Column Detailer Global Configuration Centre

Setting		Value	Explanation
[GeometryInputData]	ColumnAbove	No	
	ColumnSection	Rectangular	Column section type, rectangular or circular
	FloorToFloor		5500.0
	TopSlabThickness	500.0	Top structural slab thickness
	BtmSlabThickness	500.0	Bottom structural slab thickness
	ColumnDiam		750.0
	ColumnDimA		750.0
	ColumnDimB		750.0
	CoverToTies		75.0
	DrawOutline Yes		Draw outline switch Yes / No

Setting		Value	Explanation
[GeometryInputData]	DrawDimension	Yes	Draw dimensions switch Yes / No
	LinkRangeInset	HALF_CC_SPACING	

Setting		Value	Explanation
[RebarInput Data]	ColumnNumBars	10	Number of column main bars
	NumXbarsImported	0	
	NumYbarsImported	0	
	NumXlegsImported	0	
	NumYlegsImported	0	
	ColumnGrade	T	Column main bars - Grade
	ColumnSize	16	Column main bars - Diameter
	ColumnPrefix		Column main bars - Bar mark prefix
	ColumnNotes		Additional column main bar label note
	StartAboveBtm	200.0	Start distance of main column bars above bottom slab
	EndAboveTop	200.0	End distance of main column bars above top slab
	EndBelowTop	200.0	End distance of main column bars below top slab
	CrankBelowTop	200.0	Crank distance of main column bar below top slab

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CrankAboveBtm	200.0	Crank distance of main column bars above bottom slab
CrankDepth		Width of main column bar crank from outer face to outer face
CrankLength		Length of main column bar crank
TieNumBars		Number of link bars
TieGrade		Link bar - Grade
TieSize	8	Link bar - Diameter
TiePrefix		Link bars – Bar Mark prefix
Tiecc	200.0	Link bars - pitch
TieNotes		Link bars - additional bar label note
TieNumExtra	0	Number of extra links
TieccExtra	200.00	Extra Links - Pitch
TieNotesExtra	Extra Ties	Extra Links – additional bar label note
TieArrangement 1		Tie Arrangement option selected
NumCurtailedMainBars	0	Number of main column bars curtailed
StopDistanceForCurtail	200.0	
SpiralsActivated	0	Spiral link switch, 0 = Off, 1 = On
SpiralPitch	200.0	Vertical distance between spiral revolutions
SpiralStartPointAboveBtmSlab	0.0	Spiral link - start point above
SpiralEndPointBelowTopSlab	75.0	Spiral link – end point below top slab
ColumnAboveMainBendType	Bent	
ColumnNotAboveMainBendType	Straight	
PositionOfBend	At Top	
ColumnMainBarArrange	Straight	

	Setting	Value	Explanation
[Miscellaneous]	DCLFile	col_us.dcl	CADS Column Detailer dialogue control file

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	Setting	Value	Explanation
[BarInfo]	DCLFile	col_us.dcl	CADS Column Detailer dialogue control file
	StraightBar	20	Straight shape code
	StraightBarDim	A	Straight shape code leg letter
	Lbar	34	L bar shape code
	LbarDim	A	L bar shape code leg letter
	CrankBar	41	Crank bar shape code
	CrankDim1	A	Crank bar dim 1 letter
	CrankDim2	B	Crank bar dim 2 letter
	CrankDim3	C	Crank bar dim 3 letter
	CrankDim4	D	Crank bar dim 4 letter
	CrankHanding	L	
	CrankAngle	180.0	
	CrankIp	1	
	HookDim1		
	HookDim2		
	TieOuterShape	61	
	TieOuterShapeCircular 9904		Outer circular link bar shape code
	TieInnerClosedShape	61	
	TieInnerOpenShape	85	
	TieInnerOpenDim1	A	
	TieInnerOpenDim2	B	
	TieInnerOpenDim3	C	
	TieInnerOpenDim4	D	
	TieInnerOpenRotation	No	
	OuterLinkDim1	B	
	OuterLinkDim1Circular	A	
	OuterLinkDim1CircularDivision	1.0	
	OuterLinkDim2	A	
	OuterLinkDim3	B	
	OuterLinkDim4	A	
	OpenTieHanding	R	
	OpenTieRotation	Yes	
	OpenTieAddRotation	0.0	
	DiamondBar	99T4	Diamond link shape code
	DiamondHookDim2		
	DiamondXDim	H	
	DiamondYDim	I	
	PolarTieRad	Yes	
	SpiralShape	87	Spiral link shape code
	SpiralOverallDim	C	Spiral link overall dimension letter
	SpiralPitchDim	B	Spiral link pitch dimension letter
	SpiralDimeterDim	A	Spiral link diameter dimension letter

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	Setting	Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Bar Label offset distance from elevation in plotted mm
	ColumnLeaderPosDivision	0.8	
	TieLeaderPosDivision	0.6	
	TieRangeBarPosDivision	0.5	

	Setting	Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Bar Label offset distance from elevation in plotted mm
	ColumnLeaderPosDivision	0.8	
	TieLeaderPosDivision	0.6	
	TieRangeBarPosDivision	0.5	

	Setting	Value	Explanation
[Tabulation]	Tabulation	Off	Tabulation option On / Off
	TabulationMode	Table Header & Data Line	Current tabulation mode options: - Table Header & Data Line; Sketch Detail, Table Header & Data Line; Data Line only.
	MainBarsText	Continuous Main Bars	Default text for main column bars on sketch diagram
	CurtailedBarsText	Curtailed Main Bars	Default text for curtailed bars on sketch diagram
	TiesBarsText	Column Tie Bars	Default text for column links on sketch diagram
	TableLayer	bar-lbl	Tabulation table layer
	TableHeaderBlock name	tabhead	Tabulation table header wblock
	TableLineBlock	tabline	Tabulation table body wblock name
	TableThreeLineDist	20.9619	
	TableColMarkDist	41.6950	
	TableLevelDist	28.8223	
	TableContinuousDist	69.6447	
	TableCurtailedDist	69.6447	
	TableColumnTiesDist	69.6447	
	TableColumnXTiesDist	69.6447	

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Setting		Value	Explanation
[ColumnDesigner]	DataPath	\cads\rccd\data	Path to column designer job files

Setting		Value	Explanation
[SupportedGrades]	GradeT	T	
Grade Conversion	GradeR	R	
	GradeS		
	GradeU		
	GradeX		
	GradeY		
	GradeM		

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4 CADS Spread Footing Detailer

Chapter Objectives

CADS Spread Footing Detailer provides an automated method of producing reinforcement drawings for rectangular reinforced concrete spread footings. It features Top and Bottom or Bottom Bar only arrangements with the option to include column starter bars. Bar dimensions are automatically calculated from the entered footing data.

4.1 Program Operating Environment

CADS Spread Footing Detailer works in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Beam Detailer can be used.

CADS Spread Footing Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

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4.2 Loading the Spread Footing Detailer

The Spread Footing Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

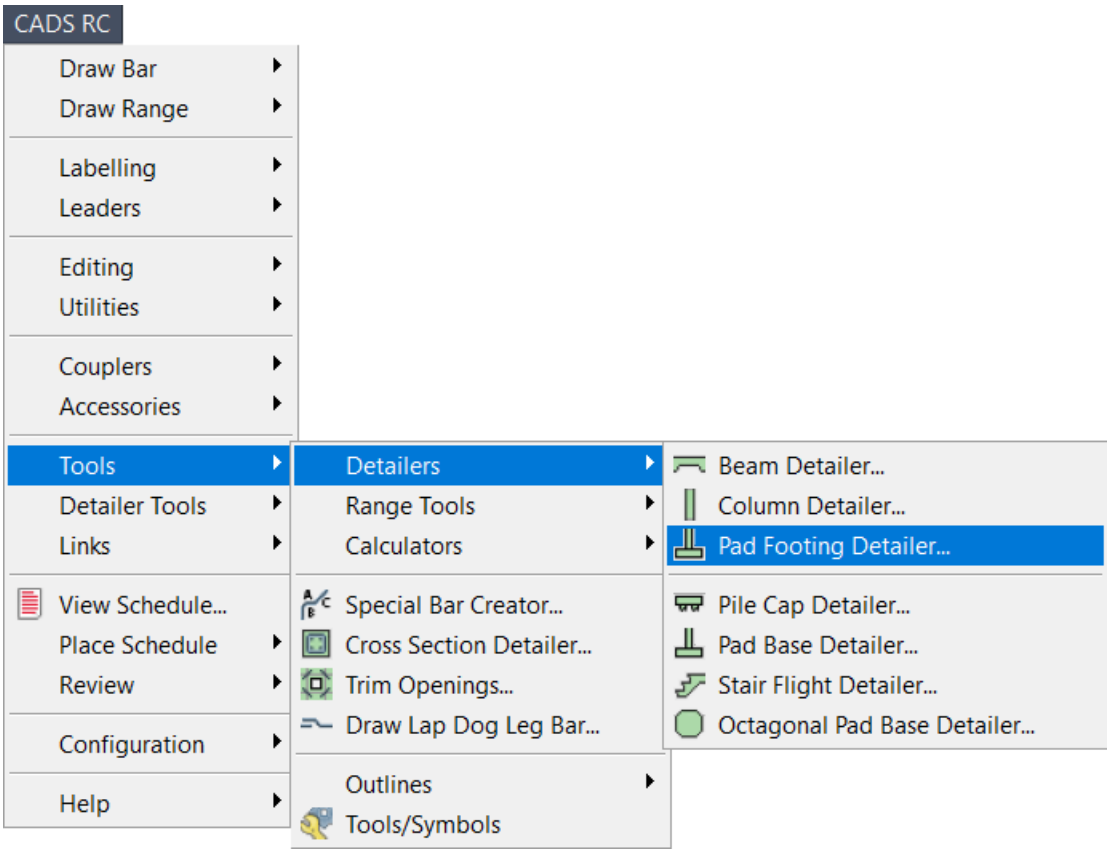

Figure 4.2:1 CADS RC Detailers Selection Menu

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The CADS RC Detailer Selection Menu Dialog, as shown in Figure 4.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

To load the Spread Footing Detailer, highlight the line 'CADS Spread Footing Detailer' and then pick the Load button. This will load the Spread Footing detailer ready for use.

4.3 Allocating the Spread Footing Member Title

When the CADS Spread Footing Detailer has been selected the Set Member Title Dialog is displayed, as shown in Figure 4.3:1. At this point you can select an existing member title or create a new member title. The spread footing reinforcement bars will be assigned to the selected member title. You can now continue by picking the OK button. For further information on member Titles refer to the CADS RC User Guide.

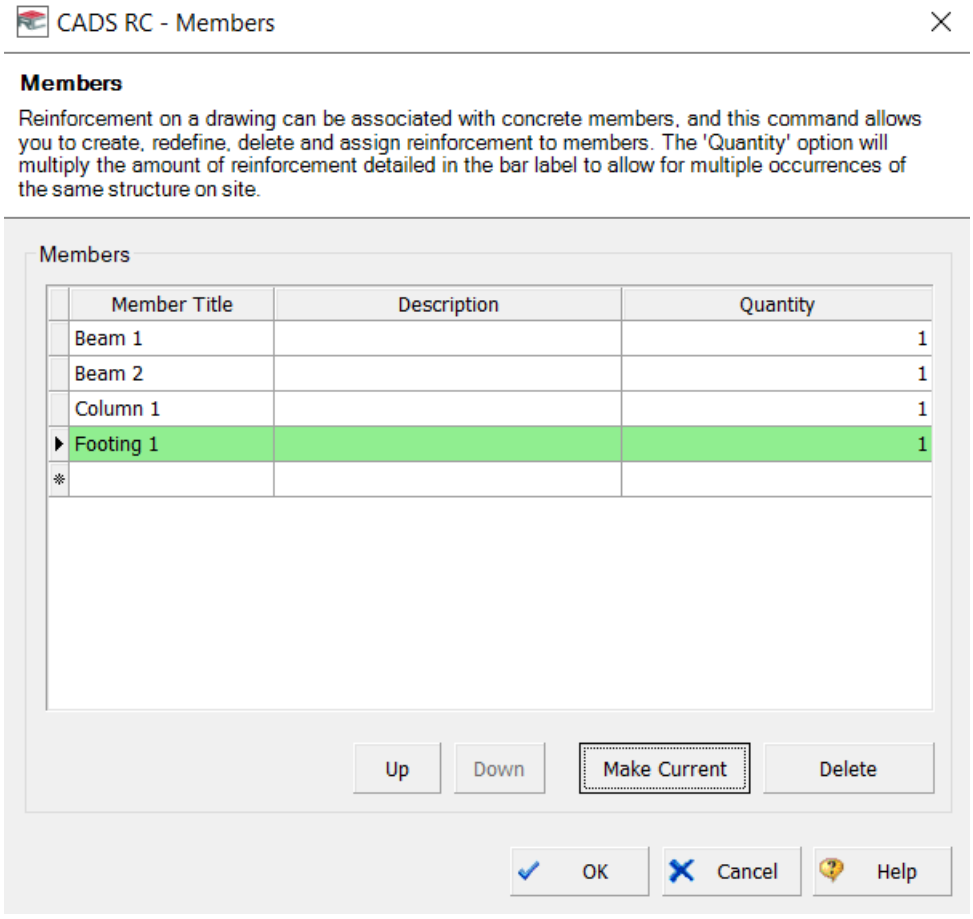

Figure 4.3:1 Member Title Selection Dialog

When the required member title has been defined the Spread Footing Detailer Input Menu dialog is displayed.

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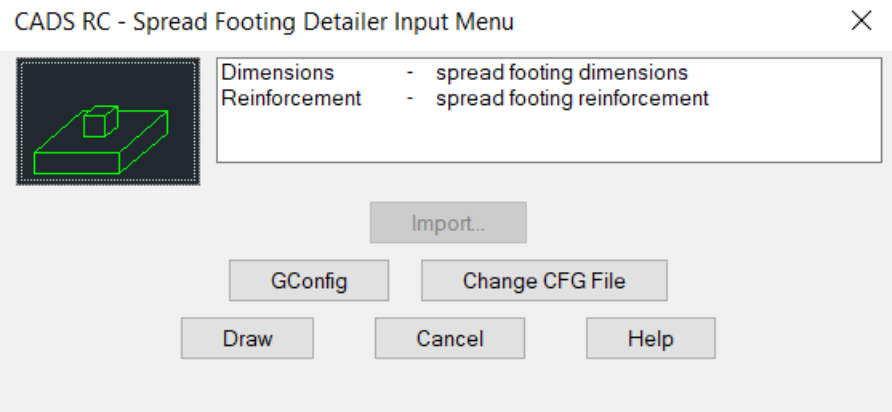

Figure 4.3:2 Spread Footing Detailer Dialog

4.4 Defining Spread Footings for Detailing

The Spread Footing Detailer requires three main data areas to be defined in order that the desired footing arrangement is produced. They consist of:

- Spread Footing Dimensions;
- Column Dimensions (optional);
- Reinforcement requirement.

4.4.1 Configuration File Selection

The Spread Footing Detailer Dialog, see Figure 4.3:2, contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 4.4:1.

Currently the UK version of this software offers two default files CADS-PFD.DEF and PFD_UK.DEF. The CADS-PFD.DEF is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The PFD_UK.DEF is identical to the CADS-PFD.DEF file.

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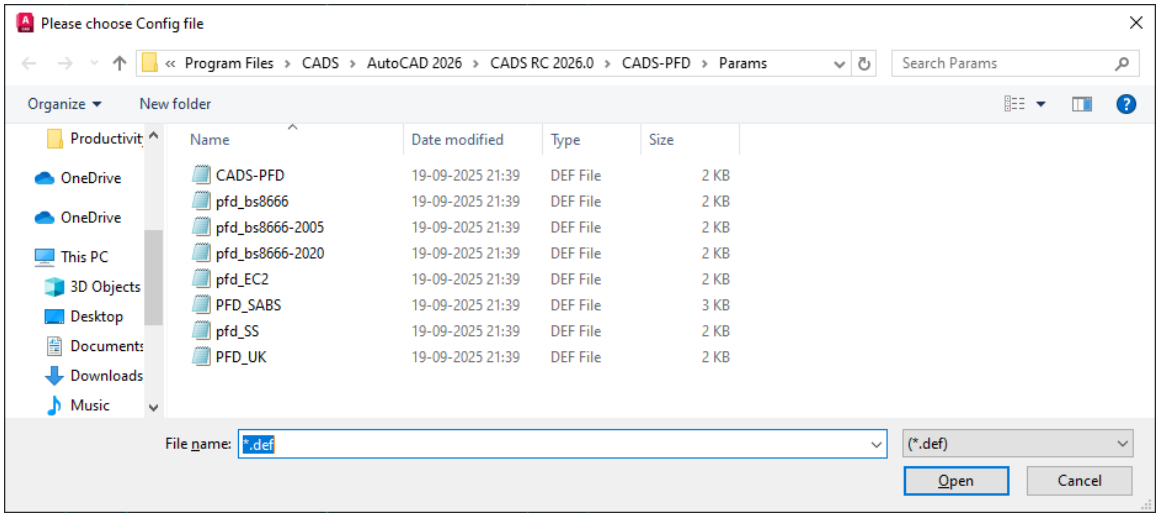

Figure 4.4:1 Default Spread Footing Configuration File Options

Should other configuration options be required, then please contact the CADS Support Department who will be pleased to advise accordingly.

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4.5 Defining the Spread Footing Dimensions

Selecting the Dimensions option from the Spread Footing Detailer Input Menu dialog displays the Dimensions Input dialog where the footing and column dimensions are input.

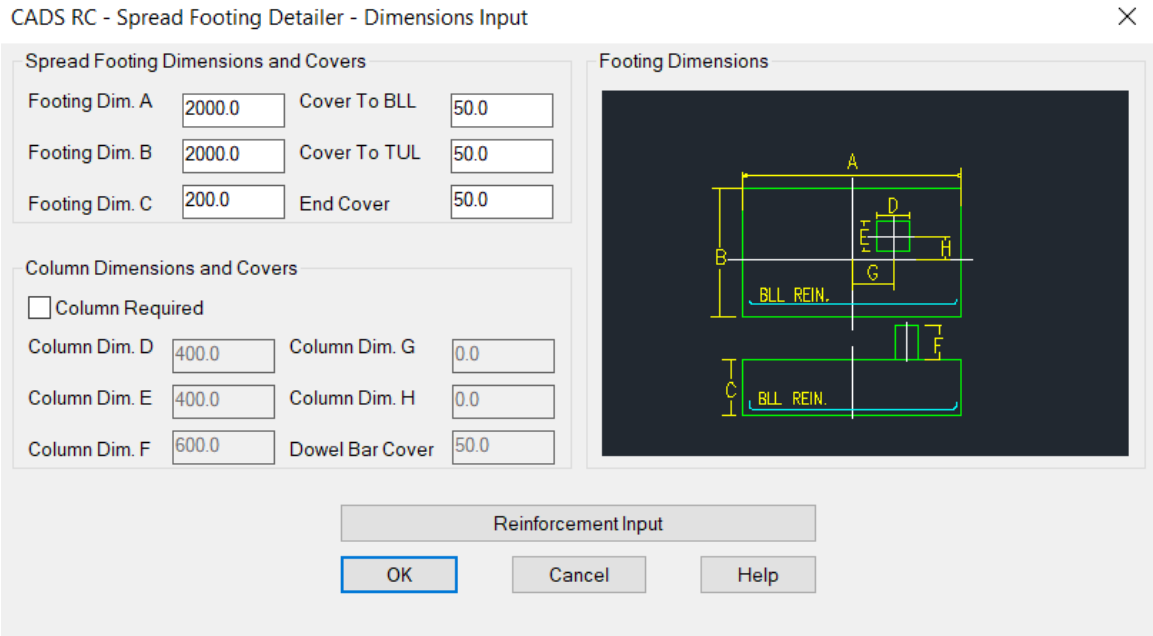

Figure 4.5:1 Dimensions Input dialog

Spread Footing Dimension and Cover input data is as follows:

- Footing Dim. A - Overall footing dimension parallel with the bottom lower layer of reinforcement (BLL);
- Footing Dim. B - Overall footing dimension parallel with the bottom upper layer of reinforcement (BUL);
- Footing Dim. C - Overall footing depth;
- Cover to BLL - Enter the concrete cover to the BLL reinforcement;
- Cover to TUL - Enter the concrete cover to the TUL reinforcement;
- End Cover - Enter the concrete cover to the end of the reinforcement at the edge of the spread footing.

If a column is required the Column Required check box needs to be activated which enables the column data to be input.

Column Dimensions and Covers input data is as follows:

- Column Dim. D - Overall column dimension parallel with the bottom lower layer of reinforcement (BLL);

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- Column Dim. E - Overall column dimension parallel with the bottom upper layer of reinforcement (BUL);
- Column Dim. F - Enter the column height;
- Column Dim. G - Enter the column offset from the centre of the footing parallel with the bottom lower layer of reinforcement (BLL);
- Column Dim. H - Enter the column offset from the centre of the footing parallel with the bottom upper layer of reinforcement (BUL);
- Dowel Bar Cover - Enter the concrete cover to the column dowel bars.

4.6 Defining the Bar Arrangements

The Column Detailer requires two bar arrangement areas to be defined namely the Footing and Column Dowels. In each area the general arrangement is defined with the spread footing detailer calculating actual bar dimensions based upon the footing and column dimensions and covers.

Selecting the Reinforcement Input option displays the Reinforcement Input dialog where the required bar arrangements can be defined.

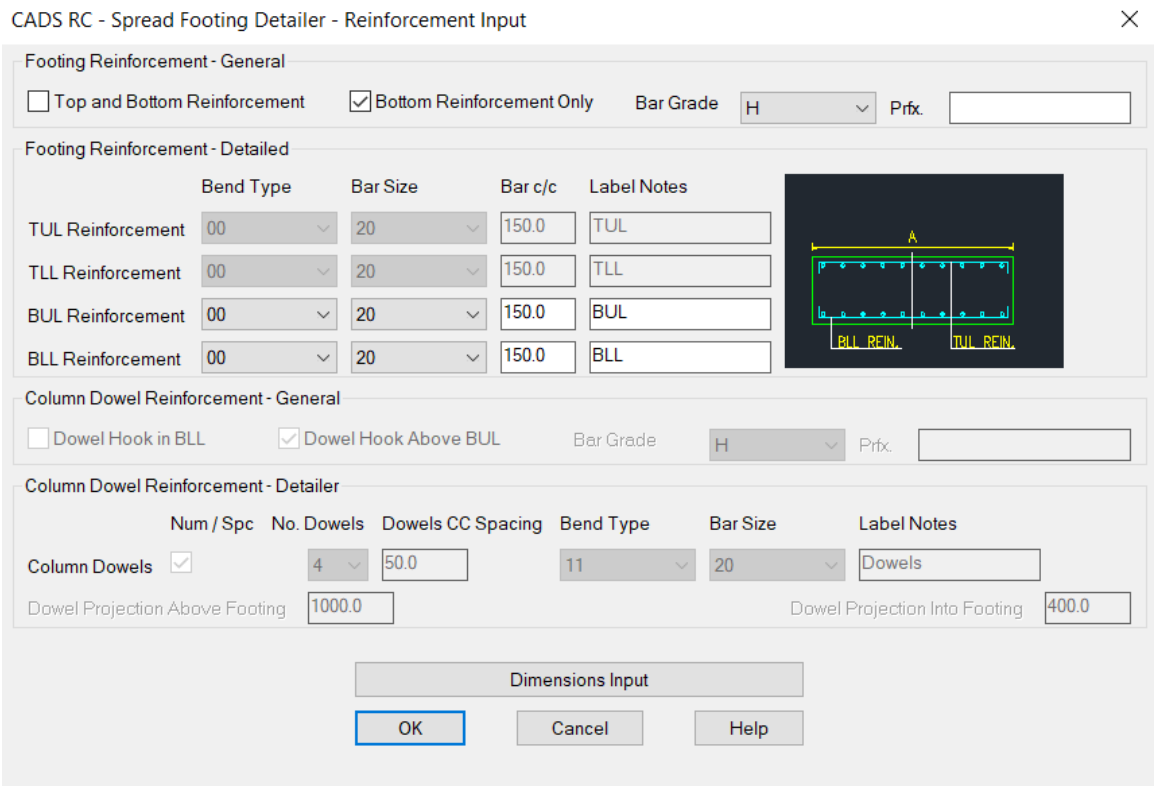

Figure 4.6:1 Reinforcement Input Dialog

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Footing Reinforcement

The following Spread Footing Reinforcement General inputs are available:

- Top and Bottom Reinforcement - Activate this check box to detail top and bottom reinforcement in the footing;
- Bottom Reinforcement Only - Activate this check box to detail bottom reinforcement only in the footing;
- Bar Grade - Select the bar grade to be used for the footing reinforcement;
- Prfx. - Enter any bar mark prefix required for the footing reinforcement, if any.

The following Spread Footing Reinforcement Detailed inputs are available for each layer of footing reinforcement:

- Bend Type - Select a suitable shape code to be used for the bar set;
- Bar Size - Select the required bar size;
- Bar c/c - Enter the required bar pitch;
- Label Notes - Enter any bar label notes required for the bar set label.

Column Dowel Reinforcement

The column dowel (starter bars) options are only available if a column option is activated in the Dimensions input.

The following Column Dowel Reinforcement General inputs are available:

- Dowel Hook in BLL - Only available if the Column Shape Code is set to a bent shape code such as a 37. If activated the column starter bar is detailed with leg or the hook A placed in the lower layer of the bottom reinforcement;

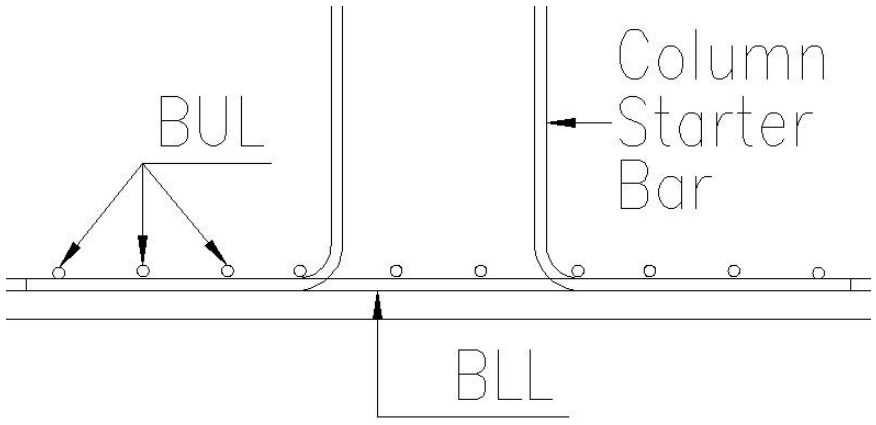

Figure 4.6:2 Column Dowel Hook detailed in BLL

- Dowel Hook Above BUL - Only available if the Column Shape Code is set to a bent shape code such as a 37. If activated the column starter bar is detailed with leg or the hook A placed in the upper layer of the bottom reinforcement;

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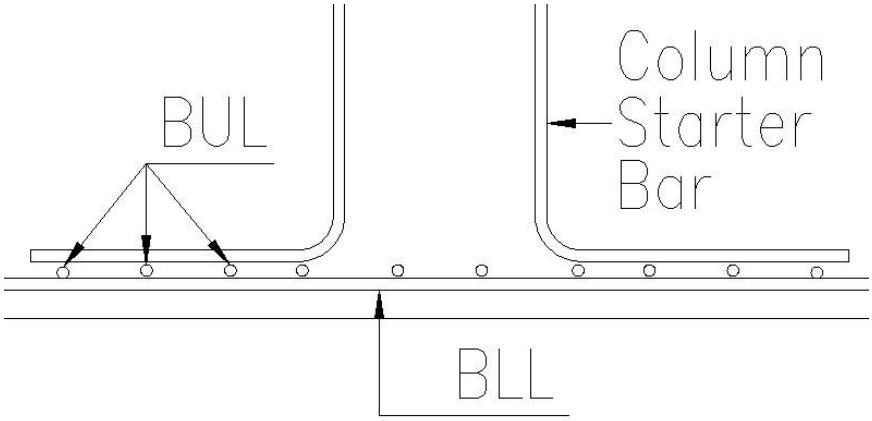

Figure 4.6:3 Column Dowel Hook detailed above BUL

- Bar Grade - Select the bar grade to be used for the column dowel reinforcement;
- Prfx. - Enter any bar mark prefix required for the column dowel reinforcement.

The following Column Dowel (Starter Bar) Reinforcement Detailed inputs are available:

- No. Dowels - Available if the Num/Spc check box is activated. Enter the required number of column starter bars;
- Bend Type - Select the bend type to be used for the column starter bars;
- Bar Size - Select the required bar size;
- Bar c/c - Enter the required starter bars pitch to automatically calculate the No. Bars required;
- Label Notes - Enter any bar label notes required for the column starter bar set label;
- Dowel Projection Above Footing - Enter the projection required for the column starter bars above the footing top;
- Dowel Projection into Footing - Only available if the column dowel bend type is set to a straight shape code (shape code 20). Enter the projection required into the footing from the footing top for the starter bars.

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4.7 Drawing the Spread Footing Detail

When the required footing data has been entered the footing can be drawn by selecting the Draw button from the Spread Footing Detailer Input Menu dialog which can be displayed by picking the OK button from the Dimensions or Reinforcement dialog.

The footing is drawn and you are prompted for its location.

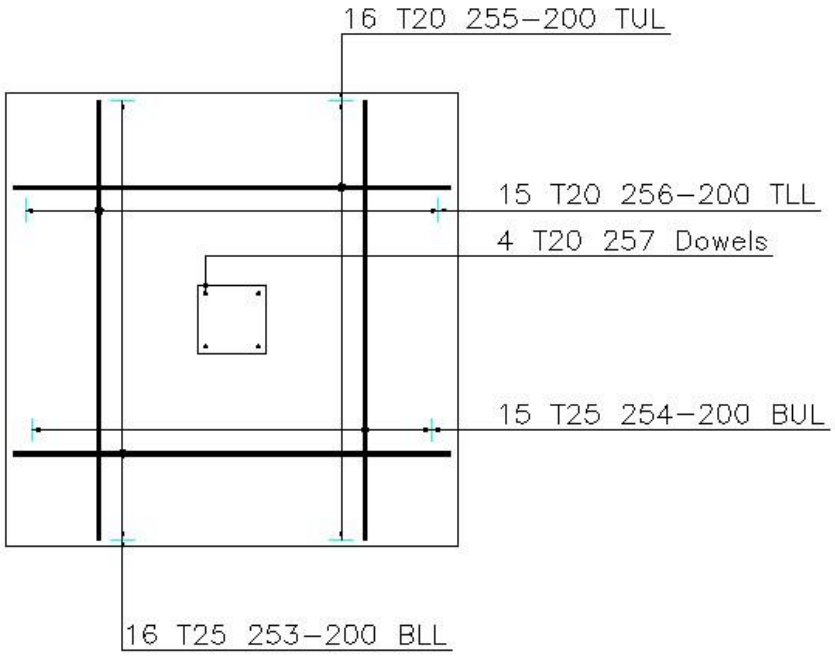

Figure 4.7:1 Typical Spread Footing Detail

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4.8 CADS Spread Footing Detailer Global Configuration Centre

Setting		Value	Explanation
[DimensionInputData]	DimA	2000.0	Footing length dimension
	DimB	2000.0	Footing width dimension
	DimC	200.0	Footing depth dimension
	CoverToBLL	50.0	Cover to lower bottom layer of reinforcement
	CoverToTUL	50.0	Cover to top upper layer of reinforcement
	EndCover	50.0	Cover to ends of reinforcement
	ColumnRequired	0	Column required 0 = No, 1 = Yes
	DimD	400.0	Column length dimension
	DimE	400.0	Column width dimension
	DimF	600.0	Column kicker height dimension
	DimG	0.0	Offset column parallel to length from centre of footing
	DimH	0.0	Offset column parallel to width from centre of footing
	DowelBarCover	50.0	Cover to column main bars

Setting		Value	Explanation
[RebarInputData]	Grade	T	Grade of reinforcement
	TULType	20	Top upper layer shape code
	TULSize	20	Top upper layer bar diameter
	TULNotes	TUL	Top upper layer bar label notes
	TULSpacing	15.0	Top upper layer pitch
	TLLType	20	Top lower layer shape code
	TLLSize	20	Top lower layer bar diameter
	TLLNotes	TLL	Top lower layer bar label notes
	TLLSpacing	150	Top lower layer pitch
	BULType	20	Bottom upper layer shape code
	BULSize	20	Bottom upper layer bar diameter
	BULNotes	BUL	Bottom upper layer bar label notes
	BULSpacing	150.0	Bottom upper layer pitch
	BLLType	20	Bottom lower layer shape code
	BLLSize	20	Bottom lower layer bar diameter
	BLLNotes	BLL	Bottom lower layer notes
	BLLSpacing	150.0	Bottom lower layer pitch

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	TopBtmReinfReq	0	Top and Bottom Reinforcement required switch 0 = Off, 1 = On
	BtmReinfOnlyReq	1	Bottom only reinforcement required switch 0 = Off, 1 = On
	FootPrefix		Main footing reinforcement bar mark prefix text
	BowelHookInBLL	0	Column main cage bar hook in bottom lower layer switch 0 = Off, 1 = On
	BowelHookAbvBUL	1	Column main cage bar hook in bottom upper layer switch 0 = Off, 1 = On
	ColumnPrefix		Column main cage bar mark prefix
	ColumnGrade	T	Column main cage bar grade
	ColumnNumber	4	Number of column main cage bars
	NumOfDowels	4	Number of starter bars
	DowelCCSpacing	50.0	Starter bar pitch
	ColumnSpacing	0.0	Column spacing
	NumSpcToggle	1	
	ColumnType	37	Starter bar shape code
	ColumnSize	20	Starter bar diameter
	ColumnNotes	Dowels	Starter bar label note
	DowelProjAbovFoot	1000.0	Starter bar projection above footing
	DowelProjIntoFoot	400.0	Starter bar projection into footing

Setting		Value	Explanation
[Miscellaneous]	DCLFile	cads-pfd.dcl	CADS Spread Footing Detailer dialog control file

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	Setting	Value	Explanation
[BarInfo]	StraightBar	20	Straight bar shape code
	HookBar	32	Hook bar shape code
	LegBar	34	Leg bar shape code
	StarterBar	37	Starter bar shape code
	StraightBarDim	A	Straight bar dimension letter
	HookBarDim	A	Hook bar dimension letter
	LegBarDim	A	Leg bar dimension letter
	StarterBarDim	B	Starter bar dimension letter
	StraightBarView	Plan	Straight bar, view to be drawn
	HookBarView	Plan	Hook bar, view to be drawn
	LegBarView	Plan	Leg bar, view to be drawn
	T1PlanDim	D	

	Setting	Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Bar Label offset distance from outline in plotted mm

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5 CADS Circular Bar Arrangement Detailer

Chapter Objectives

CADS Circular Bar Arrangement Detailer provides an automated method of detailing circular bar arrangements like those found in circular tank slabs using lapped stock length bars. Single or multiple rings can be detailed for flat or sloping slabs.

5.1 Program Operating Environment

CADS Circular Bar Arrangement Detailer works in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Circular Bar Arrangement Detailer can be used.

CADS Circular Bar Arrangement uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

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5.2 Loading the Circular Bar Arrangement Detailer

The CADS Circular Bar Arrangement Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 5.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

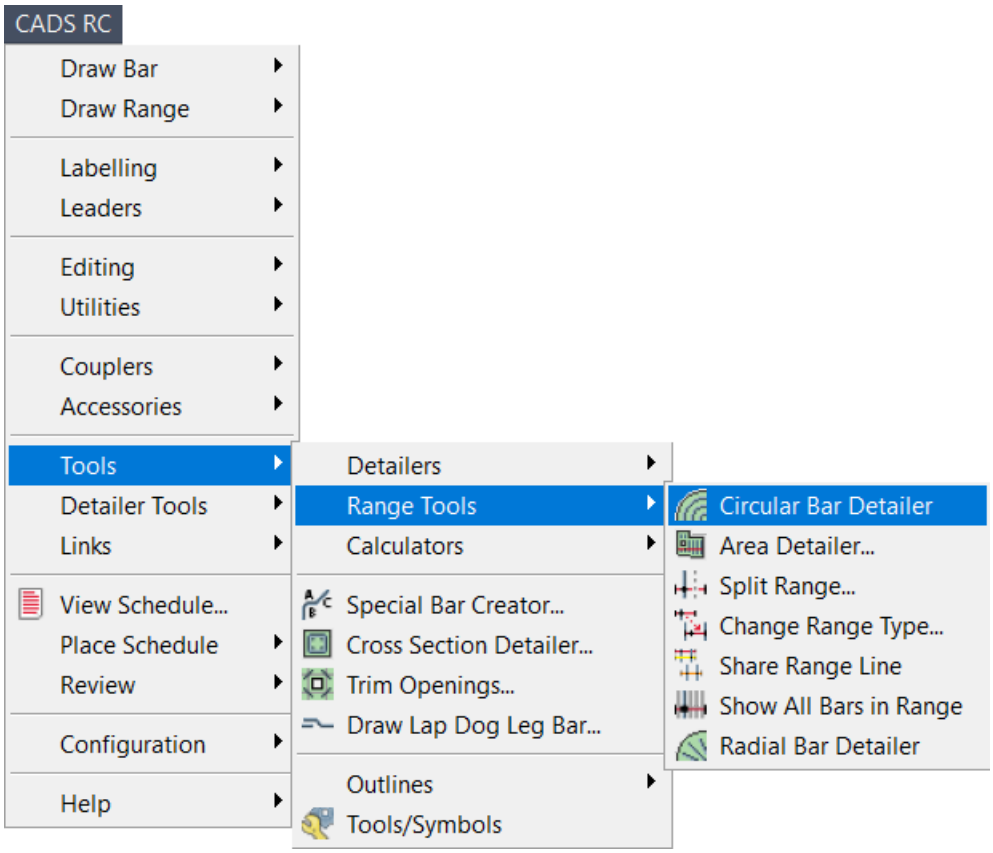

Figure 5.2:1 Detailer Selection Menu dialog

To load the Circular Bar Arrangement Detailer, highlight the line 'CADS Circular Bar Arrangement Detailer' and then pick the Load button. This will load the CADS Circular Bar Arrangement Detailer ready for use.

5.3 Defining Circular Bar Arrangements for Detailing

The Circular Bar Arrangement Detailer requires two main areas of data to be defined in order that the desired bar arrangement is produced. They consist of:

- Circular Bar Arrangement Size;
- Bar Information.

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5.3.1 Allocating the CADS Circular Bar Arrangement Detailer Member Title

When the Circular Bar Arrangement Detailer has been selected, the Circular Bar Arrangement Input dialog is displayed, as shown in Figure 5.3.3:1.

To allocate the CADS Circular Bar Arrangement to a Member Title select the Set Release Code button. This in turn displays the Member Title Selection Dialog. At this point you can select an existing member title or create a new member title. The Circular Bar Arrangement reinforcement will be assigned to the selected member title.

You can now continue by picking the OK button. For further information on Member Titles refer to the CADS RC User Guide.

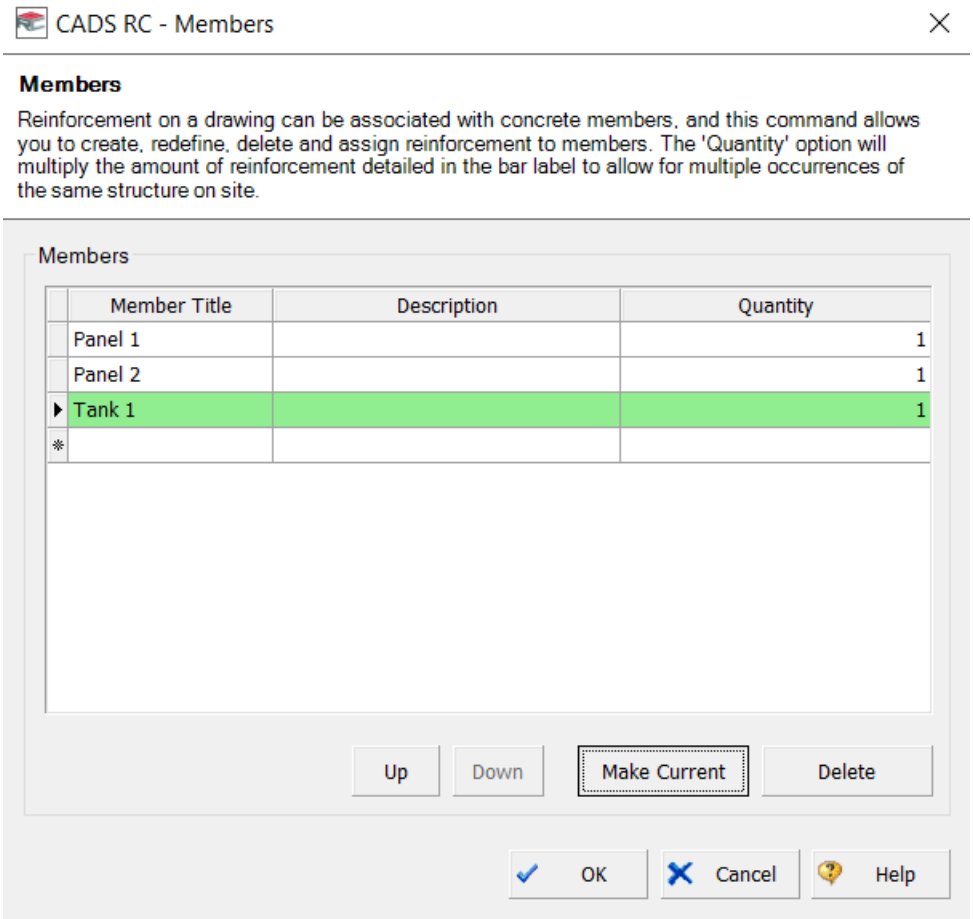

Figure 5.3.1:1 Member Title Selection Menu Dialog

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5.3.2 CADS Circular Bar Arrangemet Configuration File Selection

When the Circular Bar Arrangement Detailer is loaded the Circular Bar Arrangement Detailer Input dialog is displayed, as shown in Figure 5.3.3:1. This dialog contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 5.3.2:1.

Currently the UK version of this software offers two default files CADSCBA.DEF and CBAUK.DEF. The CADS-CBA.DEF is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The CBAUK.DEF is identical to the CADS-CBA.DEF file.

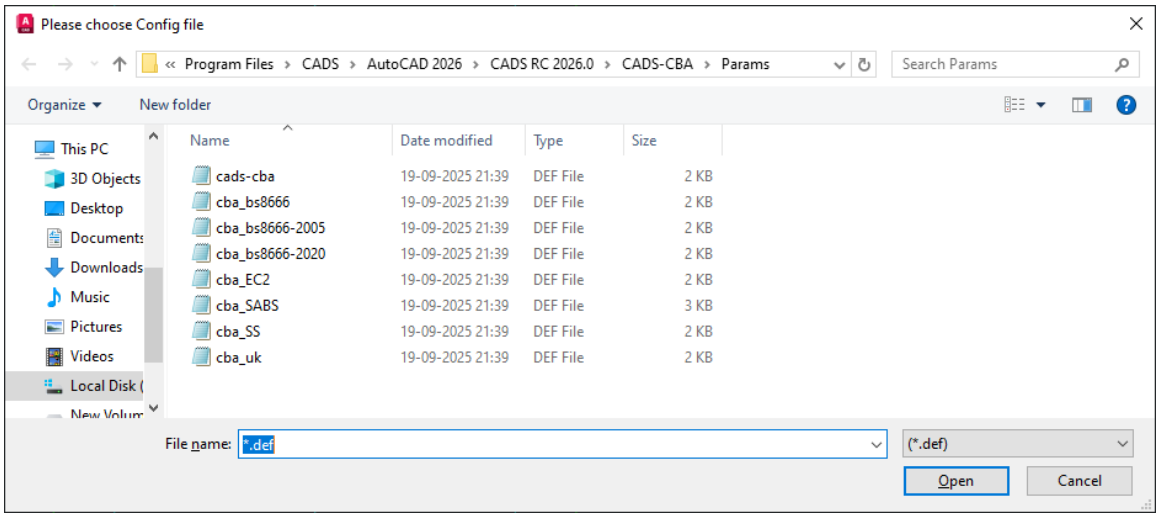

Figure 5.3.2:1 Default Circular Bar Arrangement Config File Options

Should other configuration options be required, then please contact the CADS Support department who will be pleased to advise accordingly.

5.3.3 Defining the Circular Bar Arrangement Geometry

The Circular Bar Arrangement Detailer Input dialog contains input options for defining the Circular Bar Arrangement geometry required for detailing.

The Circular Bar Arrangement Size is defined using the following geometry options:

- Outer Cover Radius - Enter the radius to the outer concrete cover line. Selecting the pick option allows the outer cover radius to be defined by picking points on the AutoCAD drawing;
- Inner Cover Radius - Enter the radius to the inner concrete cover line. Selecting the pick option allows the inner cover radius to be defined by picking points on the AutoCAD drawing;
- C/C - Enter the bar pitch required, if set to zero then a single ring of reinforcement will be detailed to the Outer Cover Radius value;

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- Slope - Enter the slope angle if the slab slopes towards the centre so the correct number of rings of reinforcement can be calculated;

- Total Rotation - Enter the included angle that is to be detailed. Selecting the pick option allows the total rotation to be defined by picking an angle on the AutoCAD drawing;
- Start Extra Lap – Enter any additional lap required, in mm, at the start of the radius bars;
- End Extra Lap – Enter any additional lap required, in mm, at the end of the radius bars.

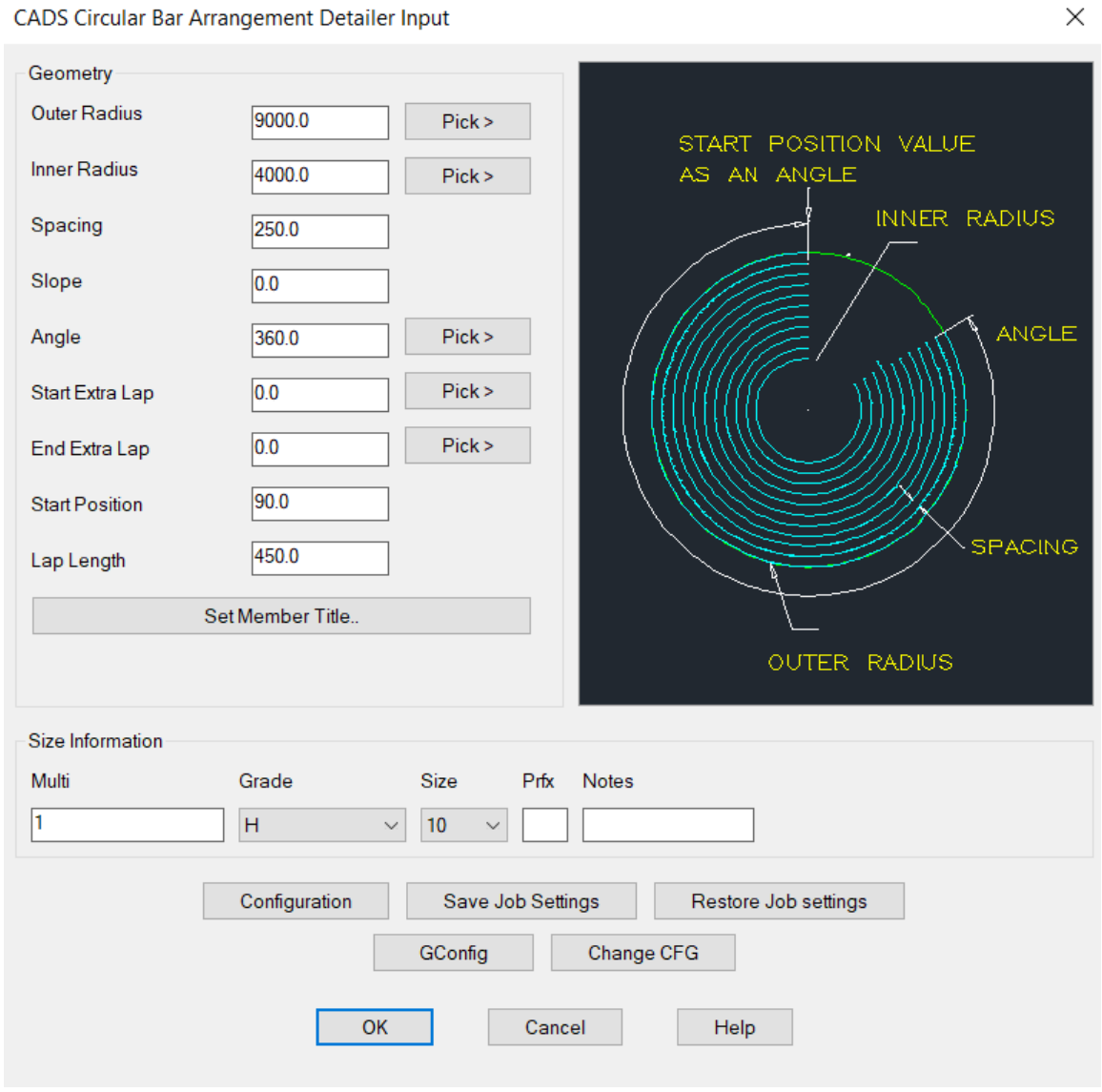

Figure 5.3.3:1 Circular Bar Arrangement Detailer Input dialog

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5.3.4 Defining the Circular Bar Arrangements

The Bar Information inputs which define the bar arrangements are as follows:

- Multi - Enter the required label multiplier to be applied to each bar set;
- Grade - Select the required bar grade;
- Size - Select the bar diameter;
- Prfx. - Enter any bar mark prefixing required;
- Notes - Enter any note you want to include in the bar labels;
- Bend Type - Select the bend type to be used for stock length radial bars. The Circular Bar Arrangement detailer supports bend type 65;
- Chord Dimension - Select the bend dimension representing the chord length of the bend type. Not supported on the UK version of this software;
- Radius Dimension - Select the bend dimension letter representing the radius of the bend type;
- Circumference Dimension - Select the bend dimension letter representing the circumference of the bend type;
- Lap Length Required - Enter the lap length to be used for bars that require lapping;
- Offset Bars - Enter in plotted mm the distance which lapping bars will offset to show the lap when plotted.

Last Bar Options

This is applied to the closer bar in the Circular Bar Arrangement detail and has the following options:

- If set to Run-out the closer bar will be detailed to the dimensions required to close the arrangement by lapping onto the last preferred/stock length bar making the bar shorter than the preferred/stock length;
- If set to Over Length the last preferred/stock length bar will be extended to close the Circular Bar Arrangement detail making the bar longer then the preferred/stock length.

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5.3.5 Miscellaneous Inputs

The miscellaneous inputs available are as follows:

- Draw Outline - If set to Yes, the Circular Bar Arrangement detail includes an outline drawn to the Outer Cover Radius;
- Label Bars - If set to Yes, each bar set is automatically labelled as it is drawn;
- Draw New Views - If set to Yes then all stock length bars in each ring of reinforcement are drawn, if set to No only the first and run-out bar are drawn for each ring of reinforcement;
- Start Position - Indicates the start angle for the reinforcement placement, 90 means that the start position is vertically at the top of the bar arrangement.

5.3.6 Preferred Stock Lengths

Selecting this button accesses the Transport / Stock Length dialog. The options available in this dialog are as follows:

- First Selected Stock Length - Enter you longest choice stock of bar length;
- Second Selected Stock Bar Length - Enter your second longest choice of stock bar length;
- Third Selected Stock Bar Length - Enter you third longest choice of stock bar length;
- Fourth Selected Stock Bar Length - Enter you fourth longest choice of stock bar length. The circular bar arrangement detailer will use the longest stock bar length until the E dimension becomes greater than the value defined for the Maximum Transport width at which point it will begin to use the next longest stock bar length and so on;
- Maximum Transport Width - Enter the maximum transport dimension value for the bent bars;
- Use 9904 below 1200mm Radius - Enter the bend type you wish to detail when the radius is below the entered value. By default, bend type 9904 is used.

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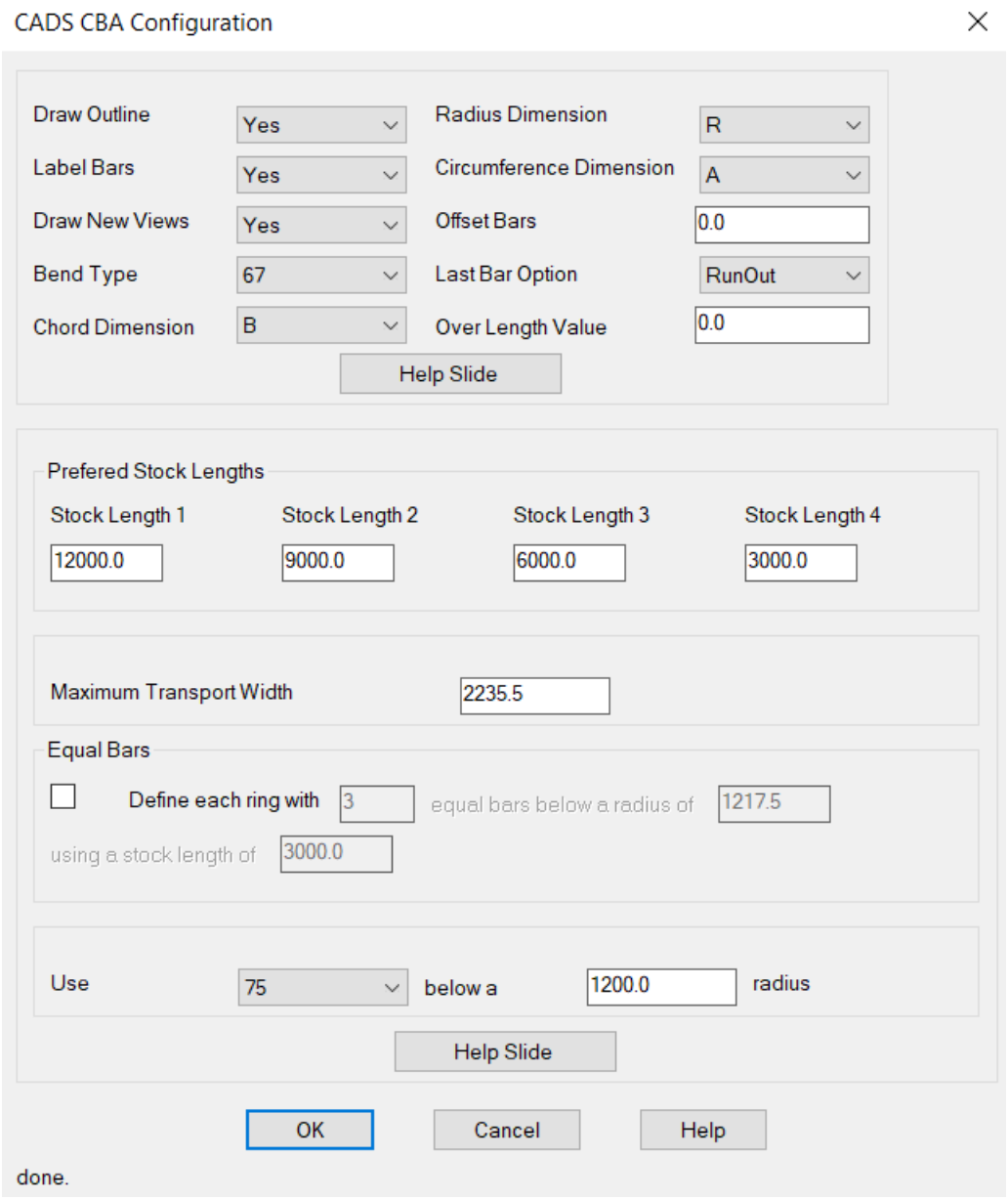

Figure 5.3.6:1 Stock Bar and Transport Data Dialog

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5.4 Drawing the Circular Bar Arrangement Detail

When the required Circular Bar Arrangement data has been entered the Circular Bar Arrangement can be drawn by selecting the OK button from the Circular Bar Arrangement Detailer Input dialog.

The Circular Bar Arrangement is drawn and its placement requested.

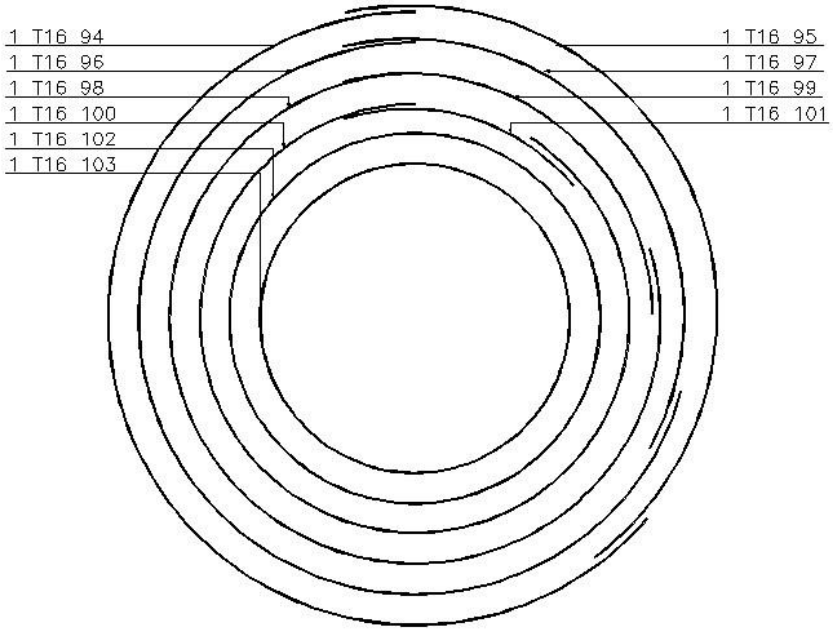

Figure 5.4:1 Typical Circular Bar Arrangement Detailer output

Three label groups are used when labelling is on:

- Top Left Labels - Labels for the stock bars in each reinforcement ring listed outer ring at the top and innermost ring at the bottom;
- Top Right Labels - Labels for the run-out bars in each reinforcement ring listed outer ring at the top and innermost ring at the bottom.

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5.5 CADS Circular Bar Arrangement Global Configuration Centre

	Setting	Value	Explanation
[InputData]	Radius	9000.0	Outer cover radius
	InnerRadius	4000.0	Inner cover radius
	Cc	250.0	Bar pitch
	Slope	0.0	Slope of circular bar arrangement
	Angle	360.0	Angle of circle to be reinforced
	Multi	1	Bar multiplier
	Grade	T	Reinforcement grade
	Size	10	Bar diameter
	StockLength	12000.0	Longest bar length
	StockLength2	9000.0	Second longest bar length
	StockLength3	6000.0	Third longest bar length
	StockLength4	3000.0	Fourth longest bar length
	LapLength	450.0	Default lap distance
	OffsetBars	0.0	Distance to offset lapped bars
	LastBarOption	RunOut	Last bar options; runout or overlength
	Prefix		Bar mark prefix
	LabelNotes		Bar Label default notes

	Setting	Value	Explanation
[InputData]	DrawOutline	Yes	Draw circular outline, Yes / No option
	LabelBars	Yes	Label bars Yes / No option
	MinRadiusForCircularShape	1200.0	Minimum
	DrawNewViews	Yes	Start extra bar lap distance
	StartExtraLap	0.0	End extra bar lap
	EndExtraLap	0.0	Reinforcement start angle
	StartPosition	90.0	Draw circular outline, Yes / No option

	Setting	Value	Explanation
[Miscellaneous]	DCLFile	cba_us.dcl	CADS Circular Bar Arrangement dialog control file

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	Setting	Value	Explanation
[BarInfo]	ArcBendType	65	Radius bar shape code
	ChordDim		Chord dimension letter, not UK
	RadiusDim	E	Radius dimension letter
	CircumferenceDim	A	Circumference dimension letter
	RdimtoWhatFace	Inner	Radius to which face of bar
	CircularHookDim1		
	CircularHookDim2		
	CircularLapDim		
	CircularShape	9904	Circular bar shape code
	CircularShapeDim	A	Circular bar dimension letter
	CircularShapeDimFact	2.0	
	PolarCircRad	No	

	Setting	Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Distance of bar labels from outline

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6 CADS Pile Cap Detailer

Chapter Objectives

CADS Pile Cap Detailer provides an automated method of detailing pile cap bar arrangements. A wide variety of arrangements are available and even for the more unusual details you will probably find a suitable one which can be modified using the CADS RC bar editing facilities. The Pile Cap detailer also allows you to specify starter bars to incorporate with the base. The program also has an import facility to read data from CADS Pile Cap Designer.

6.1 Program Operating Environment

CADS Pile Cap Detailer works in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Pile Cap Detailer can be used.

CADS Pile Cap Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

6.2 Loading the Pile Cap Detailer

The CADS Pile Cap Detailer Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 6.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

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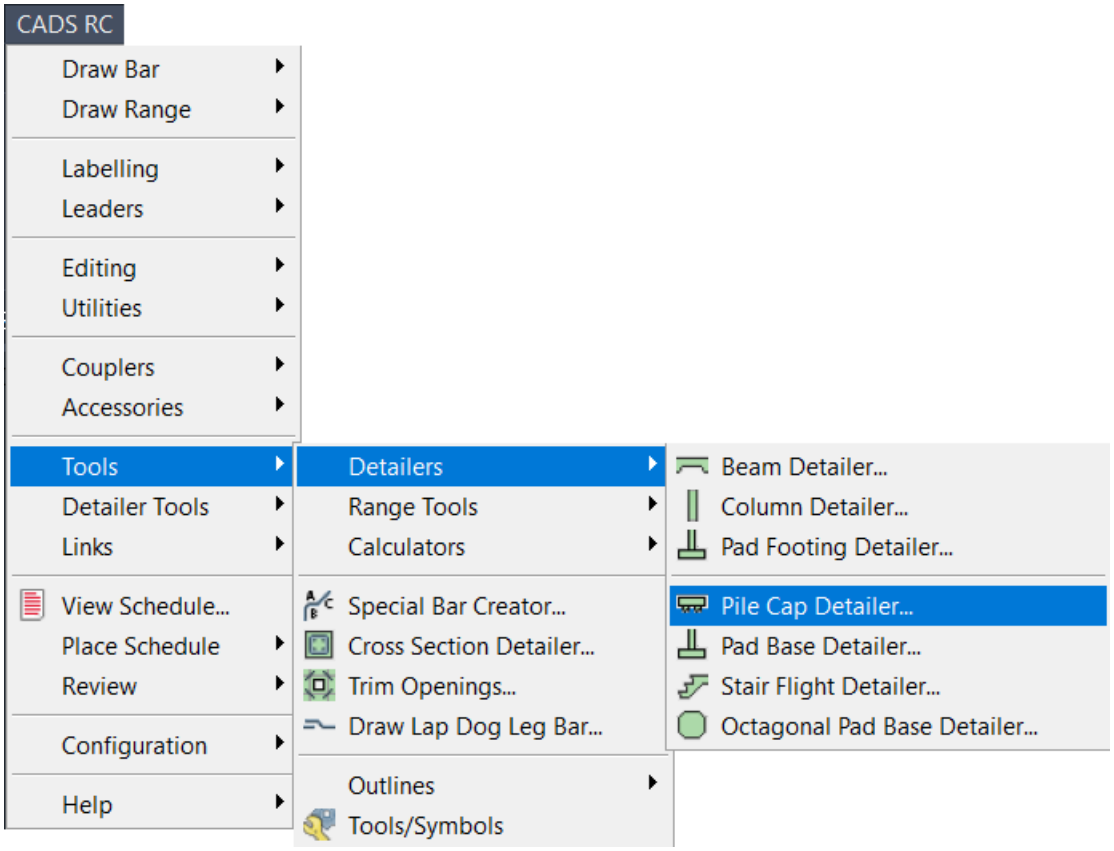

Figure 6.2:1 CADS RC Detailers Selection Menu

To load the Pile Cap Detailer, highlight the line 'CADS Pile Cap Detailer' and then pick the Load button. This will load the CADS Pile Cap Detailer ready for use.

6.3 Allocating the Pile Cap Member Title

When the Pile Cap Detailer (CADS PCD) has been selected the Set Member Title Dialog is displayed, as shown in Figure 6.3:1. At this point you can select an existing member title or create a new member title. The pile cap reinforcement will be assigned to the selected member title.

You can now continue by picking the OK button. For further information on Member Titles refer to the CADS RC User Guide.

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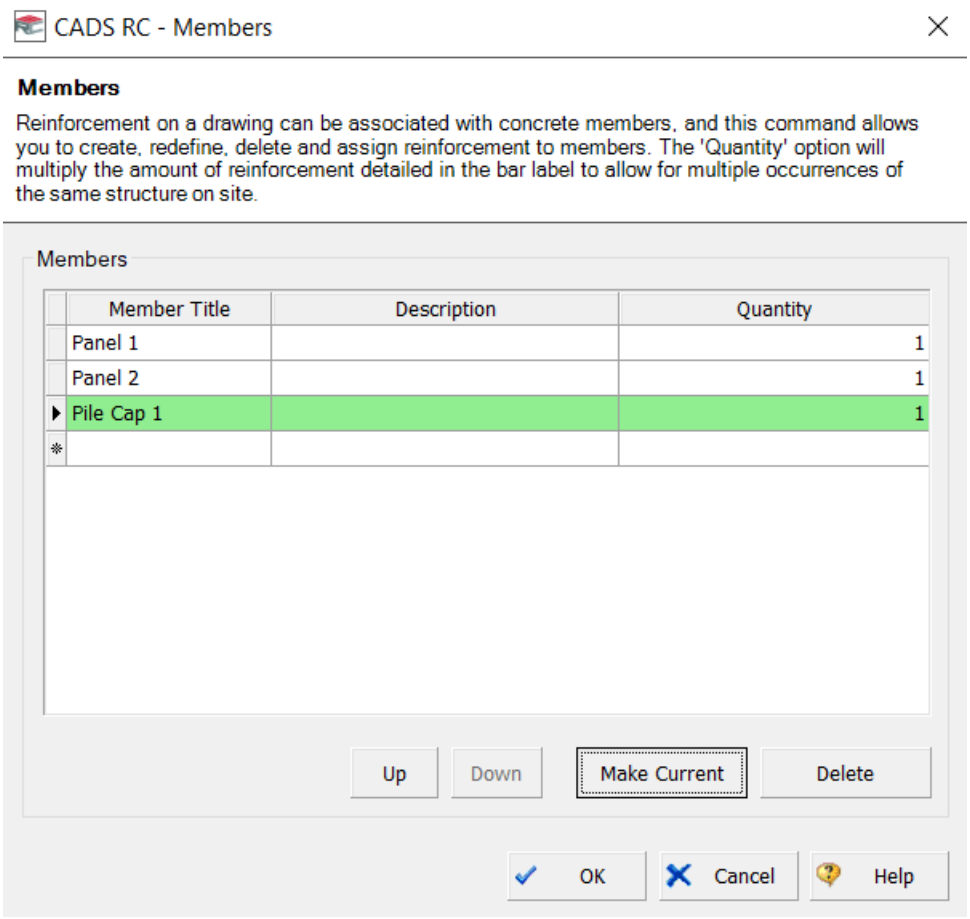

Figure 6.3:1 Member Title Selection Dialog

When the required member title has been defined the Pile Cap Detailer Input Menu dialog is displayed, as shown in Figure 6.3:3

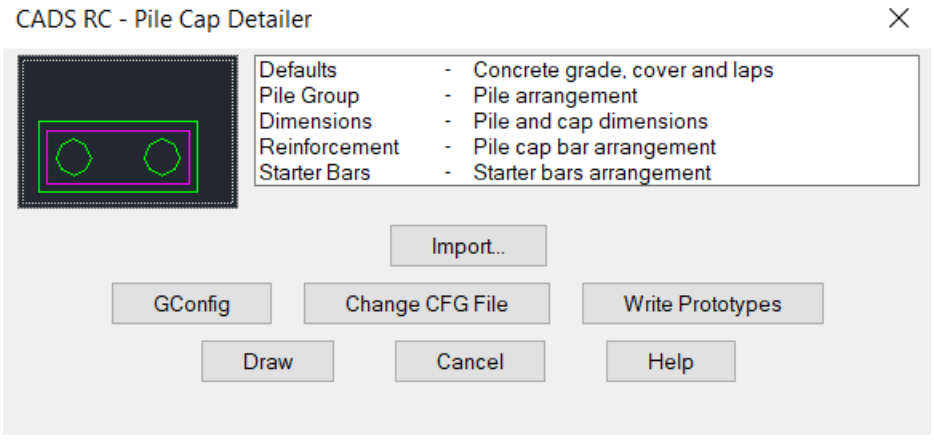

Figure 6.3:3 Pile Cap Selection Dialog

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6.4 Defining the Pile Cap for Detailing

The program supports a range of typical cap details based on the number of piles with reinforcement in an appropriate double (top and bottom) mat arrangement.

The program is divided into the following topics, each of which has its own input dialog:

- Defaults - consists of basic materials and lap data;
- Pile Group - specify the number of pile and cap type to be drawn;
- Dimensions - specify the geometry of the pile cap;
- Reinforcement - where the bar arrangements are defined;
- Starters - define the starter bars where required.

6.4.1 Pile Cap Configuration File Selection

When the Reinforcement Panel Detailer is loaded the Panel Detailer Input dialog is displayed, see Figure 6.3:3. This dialog contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 6.4.1:1.

Currently the UK version of this software offers two default files CADS-PCD.DEF and PCD_UK.DEF. The CADS-PCD.DEF is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The PCD_UK.DEF is identical to the CADS-PCD.DEF file.

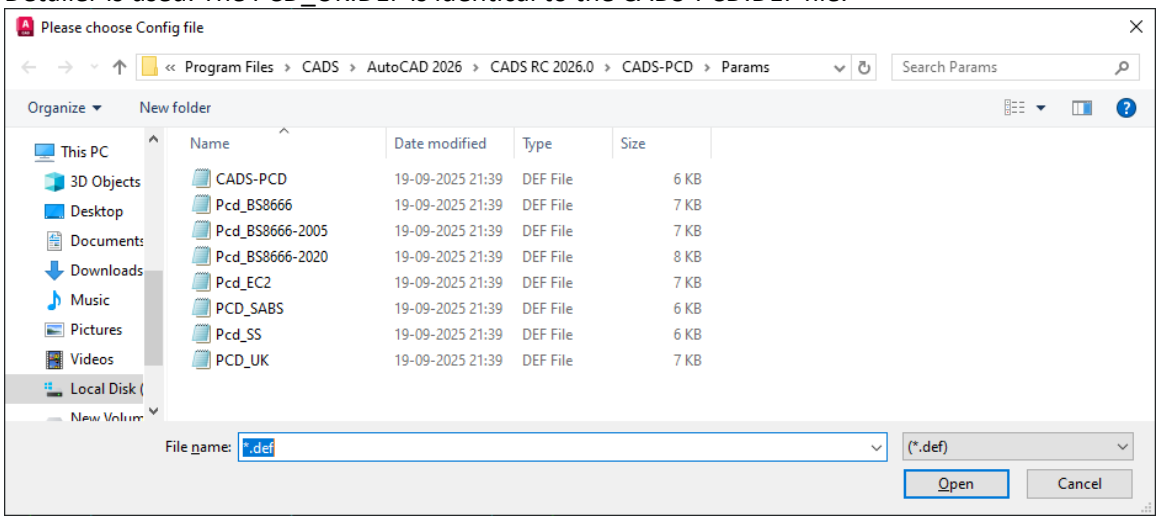

Figure 6.4.1:1 Default Pile Cap Configuration File Options

Should other configuration options be required, then please contact the CADS Support department who will be pleased to advise accordingly.

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6.5 Defining the Pile Cap Defaults

The defaults are primarily concerned with the materials and covers, but also allows the lap parameters to be set.

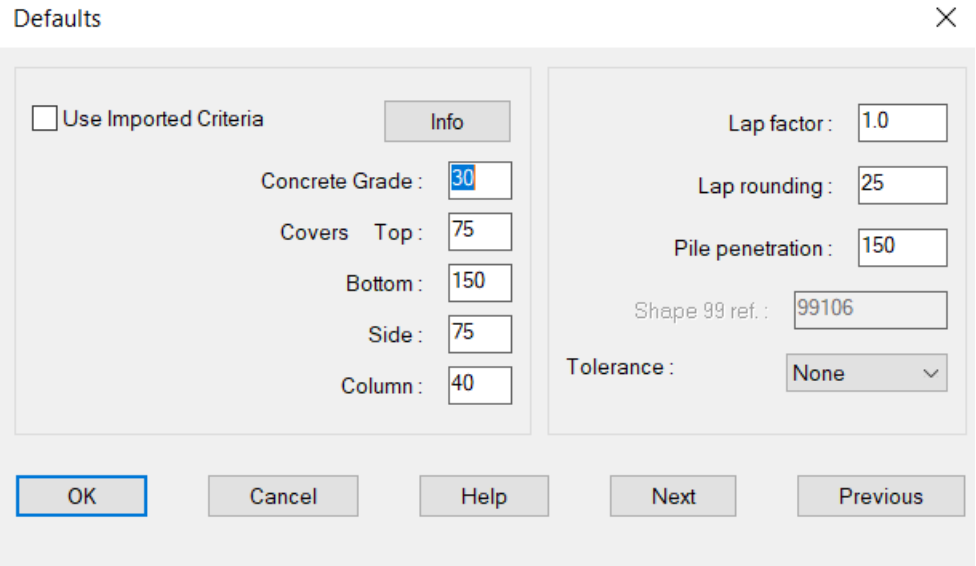

Figure 6.5:1 Pile Cap Concrete Grade, Covers and Detailing Options Dialog

The Pile Cap Defaults Dialog has the following input options:

- Concrete Grade - The concrete grade is used to determine the basic lap length for the type of bar. The length is based on the multiplier values given in Table 3.29 of BS8110: Part 1:1985;
- Covers - You can specify the bottom, top and side covers to the cap, plus the cover to the column bars. In all cases the cover is set to the outer most bars, i.e. the B1 and T1 main bars, the side bars (where present), and the column links. The side covers are assumed to be the same all round, but if they are not then the car sets can be moved and stretched, if necessary, on the drawing using CADS RC;
- Lap Factor - The lap length is determined by the concrete grade and may need to be modified by a factor if the bar size is greater than half the cover. The program does not do this automatically but allows you to specify an appropriate value if you wish;
- Lap Rounding - The lap rounding value simply rounds up the calculated lap length to the next specified increment (e.g. a calculated lap of 444 becomes 450 when a rounding value of 25 is used);
- Pile Penetration - The side / sectional view of the cap shows the pile penetration within the cap. This filed allows you to specify the value. It is used solely for drawing the pile cap outline and does not affect the positioning of the reinforcement. The piles can therefore be shown penetrating inside the reinforcement if required, as shown in Figure 6.5:2;
- Shape 99 Ref. - The main reinforcing bars are shape code 38 by default, however sometimes the bend radius needs to be larger than the standard shape codes requiring

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shape code 99 'Ubars' to be provided. This field allows you to specify any library shape code you want to use for this shape. For instance, the CADS standard library shape code 9906 is used by default.

- Tolerance - This option allows you to choose whether the BS8110 Table 3.26 tolerances will be applied to bars, which extend between the covers;
- Otherwise no tolerance will be applied.

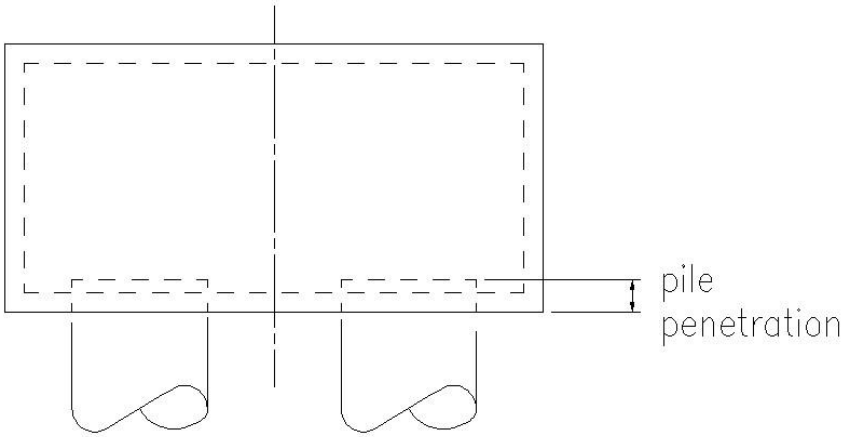

Figure 6.5:2 Pile Penetration into the Pile Cap

6.6 Selecting the Type of Pile Grouping

The Pile Group dialog, see Figure 6.6:1, allows you to specify the number of piles required and illustrates the cap type that will be used.

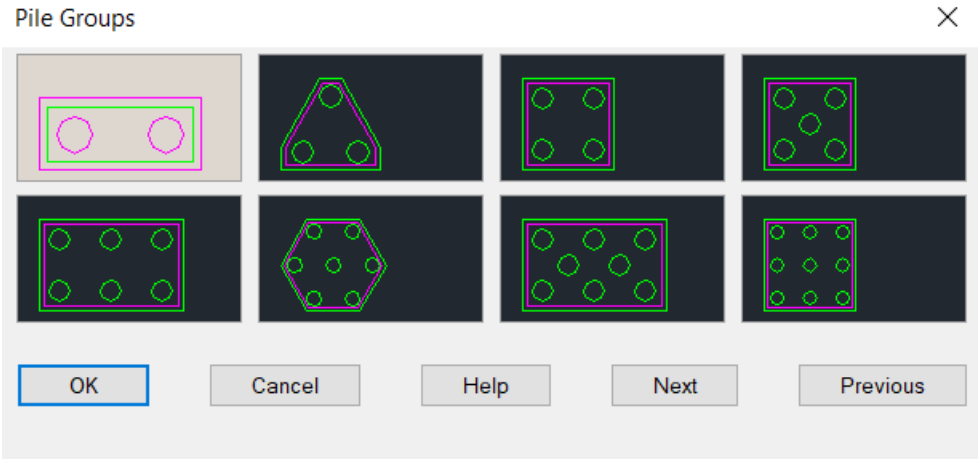

Figure 6.6:1 Pile Group Selection Dialog

The Pile Group Dialog illustrates the layout of the piles for the number required. Select the group / number you want by clicking on the slide.

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The reinforcement arrangement provided depends on the group chosen and is not variable except that bar sets can be omitted. Chapter 8.9 Pile Cap Reinforcement describes the arrangements in detail.

6.7 Defining the Pile Cap Dimensions

The dimensions are determined by the pile size, spacing and overhang, or edge clearance. From these dimensions the overall length and width of the pile cap is calculated and displayed. For three and seven pile caps you also supply the dimensions for the side and end faces as appropriate. There is also a diagram accompanying the input that references the dimensions. All dimensions are in mm.

Figure 6.7:1 shows all the input fields but in practice only those required for the particular pile group chosen will be active, the remainder being 'greyed out'.

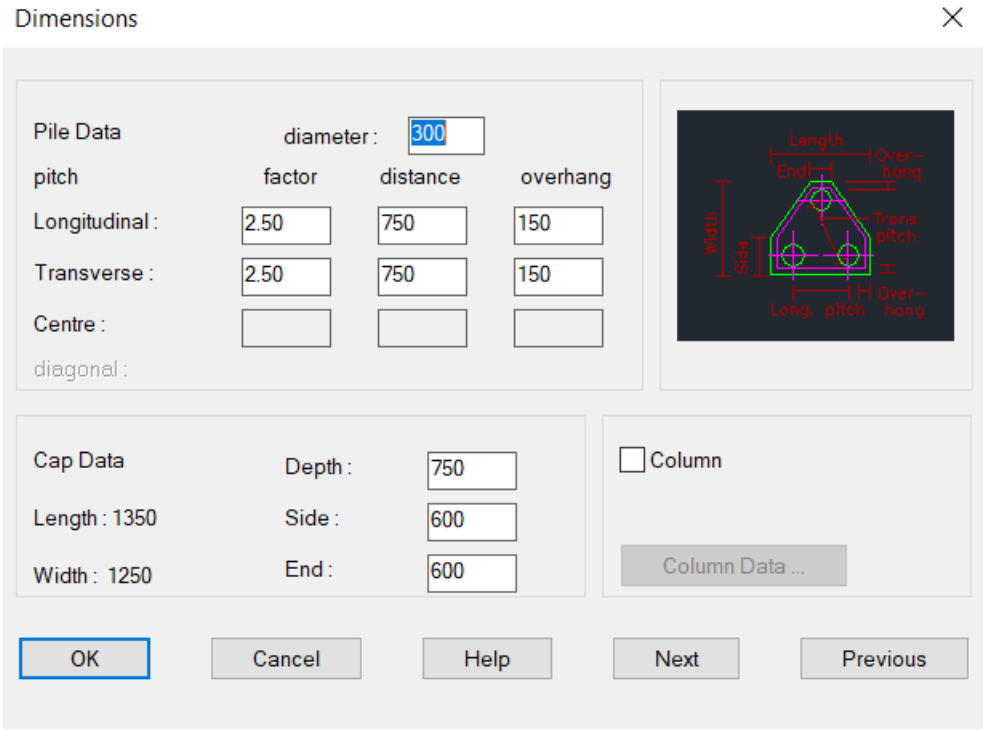

Figure 6.7:1 Typical Pile Cap Dimension Input Dialog

The Pile Cap Dimensions dialog is divided into to the following input areas:

Pile Data

This part of the dialog gathers data about the pile size, spacing and cap overhang. From this the overall size of the cap is calculated. Each of the values interacts with the others so as you change one input area those fields dependent on it will also change. How they relate is described under the individual entries below. For convenience the terms longitudinal and transverse are used to describe the horizontal and vertical dimensions of the cap as shown.

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- Diameter - This is the diameter of the piles. The pitch distance (or pile spacing) is calculated from the diameter and the pitch factor. This then gives the overall size of the pile cap. Changing the pile diameter changes the pitch distance as the pitch factor is given precedence;
- Pitch Factor - The pitch factor determines the spacing of the piles and normally depends on the kind of pile being used. Changing this value alters the pitch distance;
- Pitch Distance - This is the distance between the centre of the piles. Changing this value will alter the corresponding pitch factor;
- Overhang - This is the distance from the face of the pile to the edge of the cap. Altering this value only changes the overall size of the cap.

The above pitch values can be specified for the longitudinal direction for all pile groups. All but the seven pile group has transverse values. The seven pile group uses the same pitch factor for all the pile spacings.

The five and eight pile groups have a further set of centre values for the internal piles. These are always symmetrically placed in the cap. The diagonal values are shown as a check against the pitch factor or distance becoming unacceptably small. The program does not automatically protect against this as changing either the longitudinal or transverse pitches can relieve any problem.

Cap Data

This data relates to the overall geometry of the cap. All groups require a cap depth and some also require further side or end dimensions to fully define their shape. The overall widths and length are also shown. The accompanying diagrams will clarify the various terms used.

- Depth - This specifies the thickness or depth of the cap.
- Side - The three-pile group requires a dimension for its sides, which are the vertical edges of the pile cap. The seven pile group displays the length of its sides based on the pile data;
- End - The three-pile cap also requires the length of the horizontal face truncating the ‘triangular’ faces;
- Length - The longitudinal length is shown as calculated from the pile data. In the case of the seven pile group it is the greatest dimension across the cap;
- Width - The transverse length is shown as calculate from the pile cap data. In the case of the three pile cap it is the distance over the parallel long and short faces. For the seven pile cap it is the distance over the parallel faces.

Cap dimensions

The following Figures illustrate how the dimensions relate to the dialog fields.

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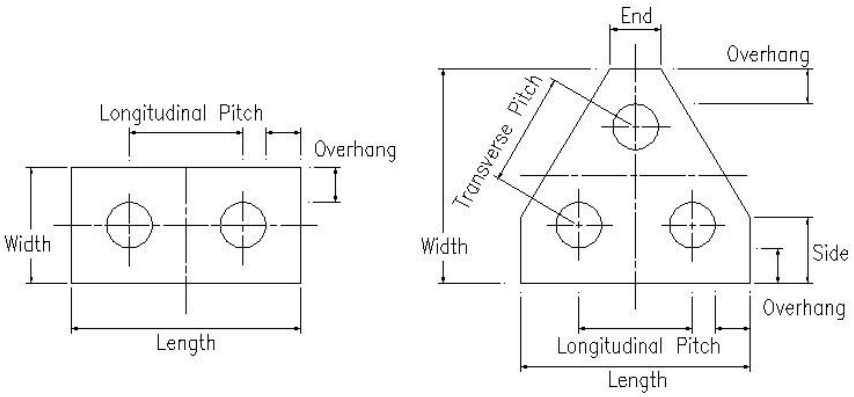

Figure 6.7:2 Two and Three Pile Groups

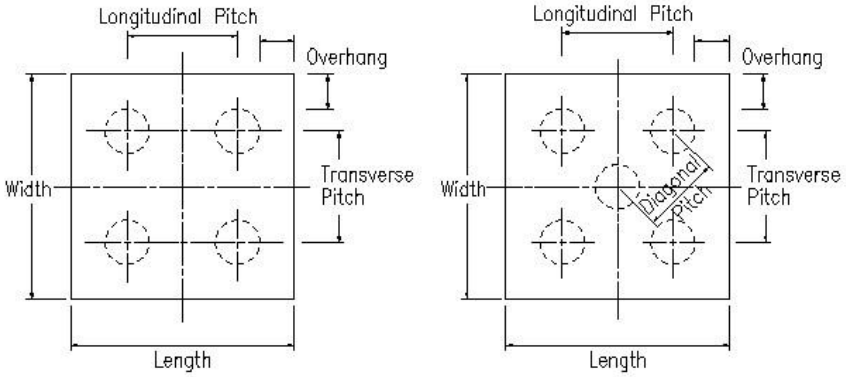

Figure 6.7:3 Four and Five Pile Groups

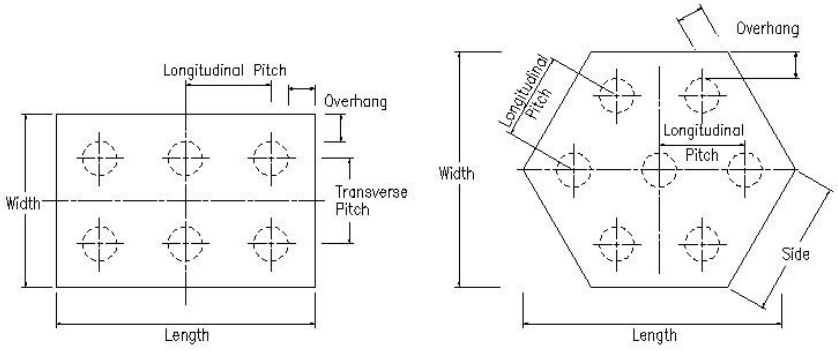

Figure 6.7:4 Six and Seven Pile Groups

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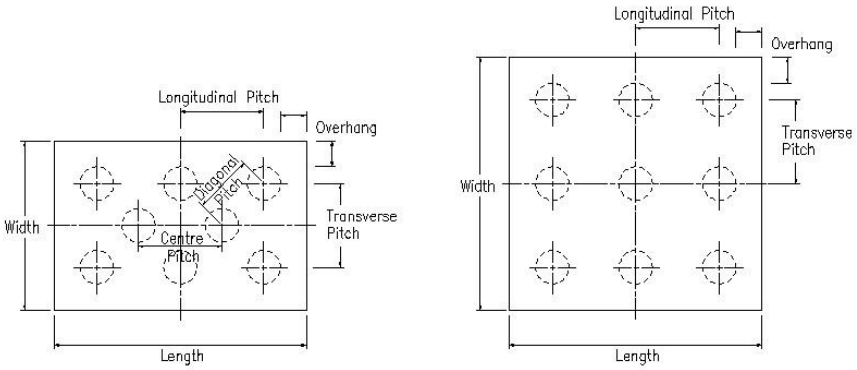

Figure 6.7:5 Eight and Nine Pile group

6.7.1 Defining the Column Dimensions

Although it may not be that usual to have a column springing directly from a pile cap the program does allow you to add one if required. The column must be rectangular and positioned within the cap. Even if you are not detailing a column directly from the cap it may be useful to specify one in order to include starter bars into a beam or other similar detail. The column outline could then be subsequently erased.

To select a column, check the Column Option in the Pile Cap Dimension Dialog, see Figure 6.7.1:1, and then select the Column Data Button.

The Column Dimension dialog is divided into the following input fields:

- Length - This applies to the side of the column parallel to the length of the cap;
- Width - This is the dimension parallel to the cap width;
- Longitudinal Offset - By default the column is centred over the geometric centre of the pile group with a zero offset. Positive values move the centre of the column to the right, and negative to the left;
- Transverse Offset - This determines the vertical position of the column relative to the geometric centre of the pile group. Positive values move the column up and negative values down relative to the plan view;
- Kicker Height - This specifies the height of the kicker to be drawn on the section.

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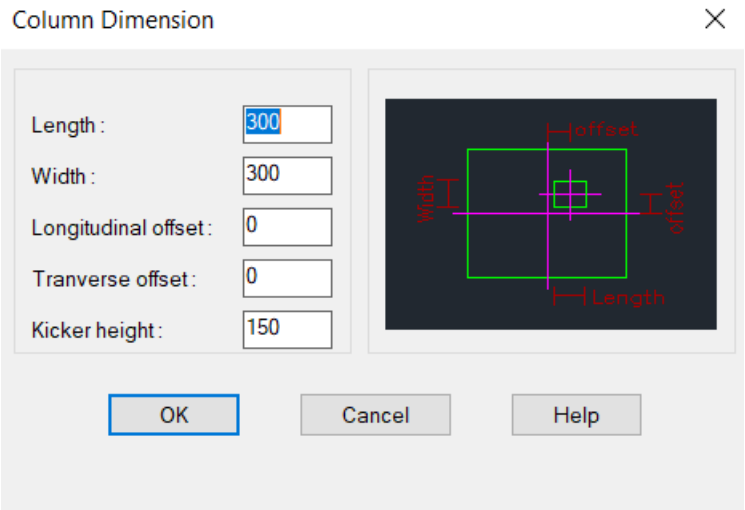

Figure 6.7.1:1 Column Dimensions Input Dialog

6.8 Defining the Pile Cap Bar Arrangement

The Pile Cap Reinforcement dialog allows you to define each of the bar sets in terms of its number, type, size and pitch. This information is described more fully below.

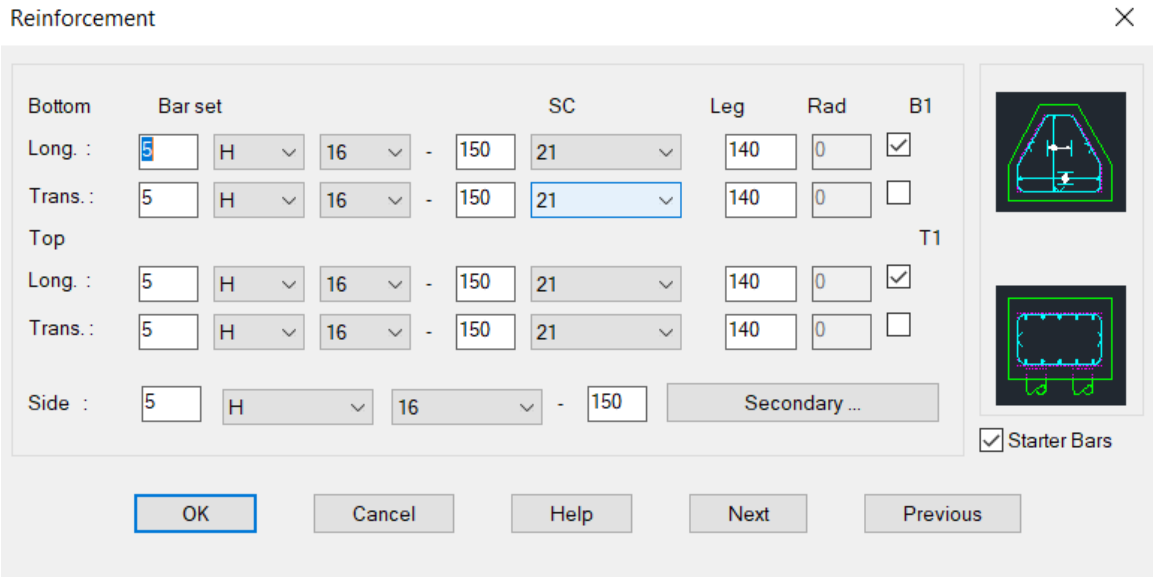

Figure 6.8:1 Typical Pile Cap Reinforcement Input Dialogue

All pile caps contain main reinforcement that is specified using the Pile Cap Reinforcement dialog. The three and seven pile types also have secondary bars that are specified using a sub-dialog that is described later.

The Bar Sets appropriate to the chosen arrangement are listed together with an accompanying diagram that indicates the current bar arrangement. Each bar set requires some basic data,

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namely the number of bars in the range, bar type, bar size and pitch. If you change the number of bars then the pitch will be recalculated. If you change the pitch then the number of bars is recalculated although for small changes in pitch there may no change in the number.

The cover and bend radius of the perpendicular bars determines the length of the ranges so that the ranges fit within their shoulders.

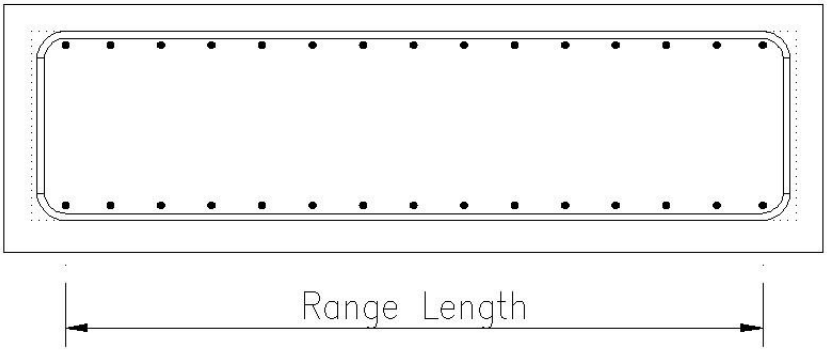

Figure 6.8:2 Range Length

6.8.1 Main Reinforcement

Longitudinal and Transverse Reinforcement

All the pile caps contain longitudinal and transverse main bars in the top and bottom of the cap. In addition to general bar data you also have a choice of shape code 38 or 99. Shape 99 is provided so that a non-standard bend radius can be specified for cases where bearing stress at the bend is critical.

For both shapes the bend length can be modified to suit your detail, and the program will warn you if too small a value is entered. For shape code 99 bars you can also specify the inside bend radius. By default, the standard radius is offered, but clearly this should be modified otherwise there is no point in using a shape 99.

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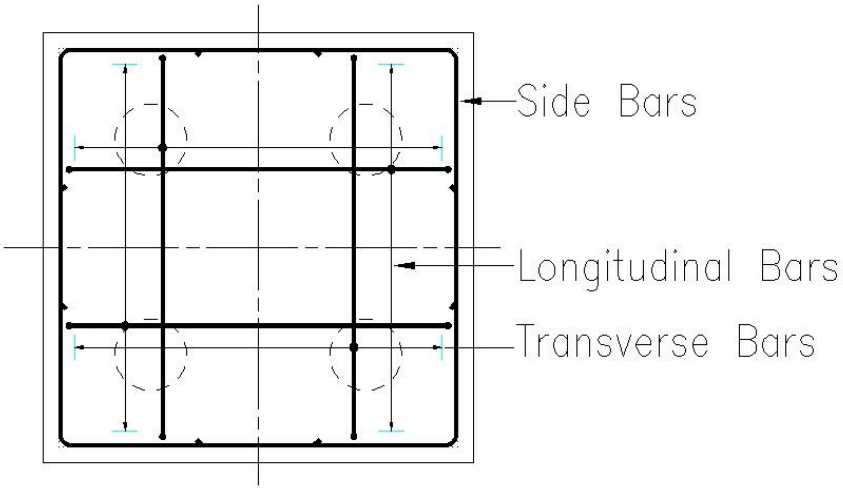

Figure 6.8:3 Typical Pile Cap Bar Sets

You can also indicate whether the longitudinal or transverse bars are to be placed in the outer layer by picking the appropriate radio button for top and bottom sets.

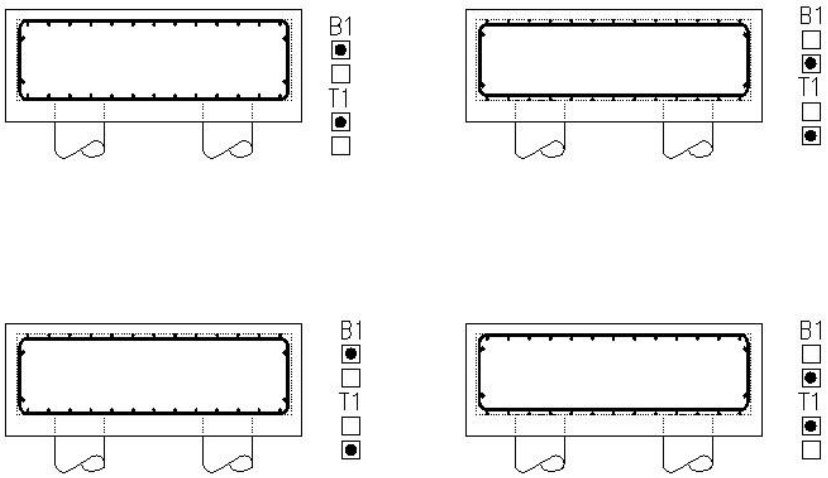

Figure 6.8:4 Bar Layering Options

The three and seven pile groups have their main reinforcement arranged in bands as shown in Figure 6.8:5

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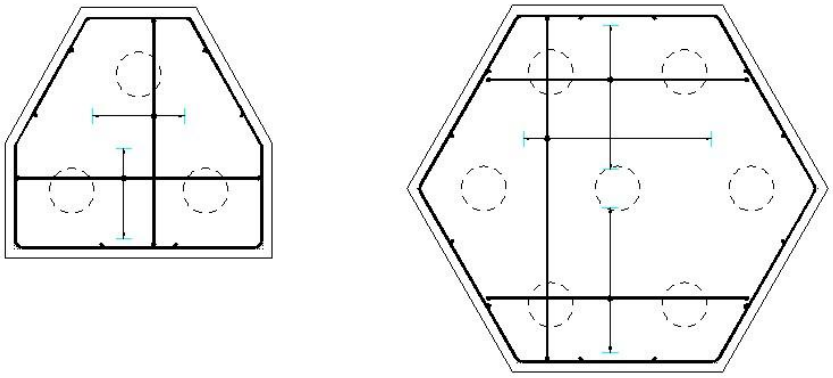

Figure 6.8:5 Main Reinforcement Bands

Side Bars

Deep Pile Caps may require side bars that can have their basic bar data defined. The pile group type and the lap criteria set-up in the Defaults Dialog determine the bar shape and dimensions.

6.8.2 Secondary Reinforcement

The three and seven Pile Caps also have secondary reinforcement to fill in areas beyond the main reinforcement bands.

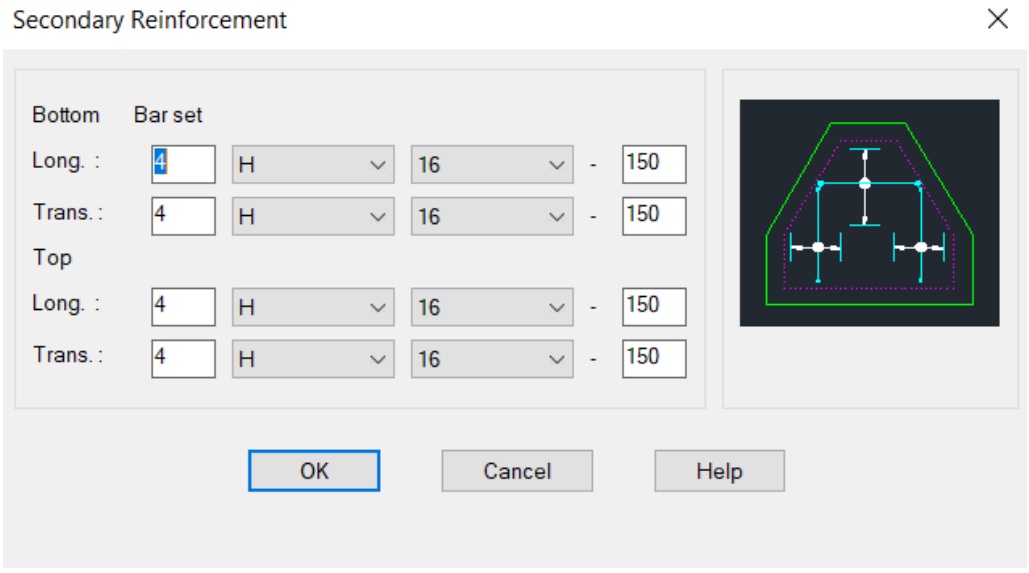

Figure 6.8.2:1 Typical Secondary Reinforcement Dialog

The three pile cap has three sets of secondary reinforcement top and bottom; two either side of the main transverse bars and one in the 'trapezoidal' part of the cap alongside the main longitudinal bars. The seven pile cap has two sets of secondary reinforcement they are top and bottom either side of the main transverse band.

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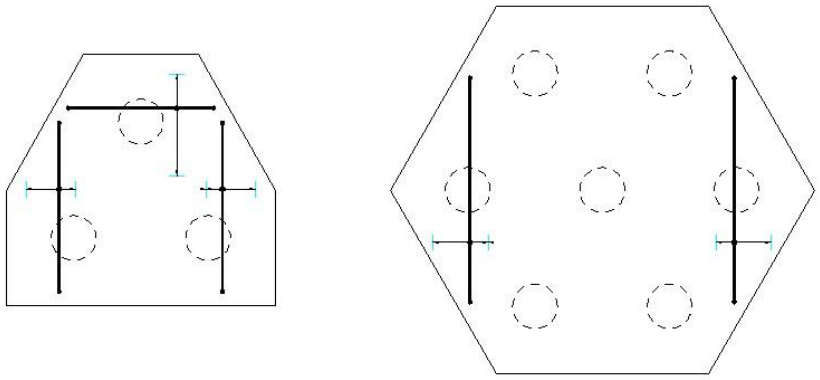

Figure 6.8.2:2 Three and Seven Pile, Secondary Reinforcement

Starter Bars

If you have specified a column then selecting this check box enables you to add starter bars to the pile cap. This dialog is accessed as the 'Next' option from the Reinforcement Dialog or from the Main Pile Cap Dialog.

6.9 Starter Bars

If you have selected the Starter Bars option in the Reinforcement Dialog then the Starter Bars Dialog allows you to define them.

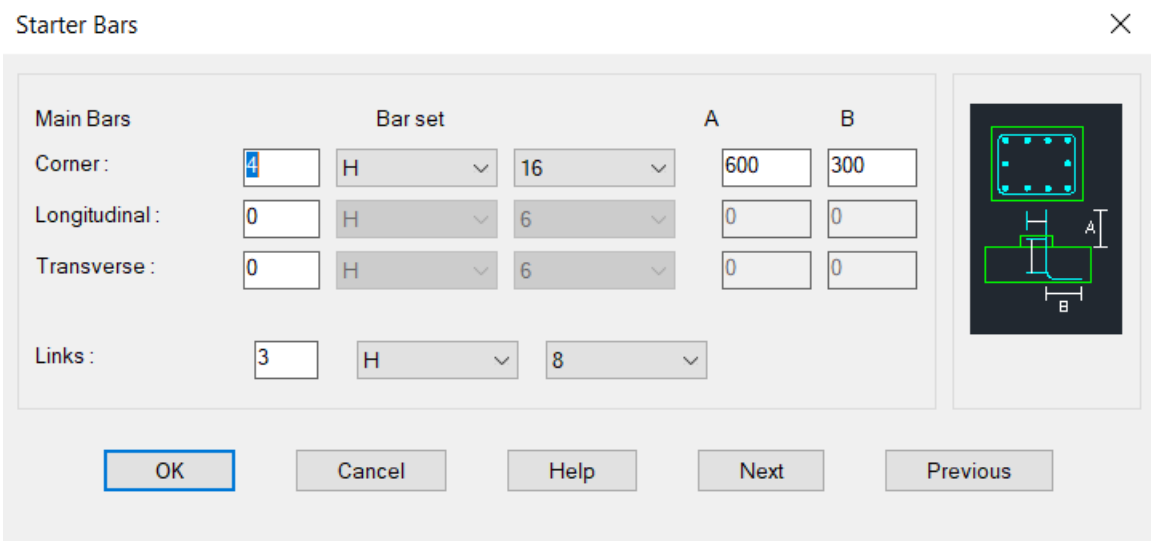

Figure 6.9:1 Starter Bars Dialog

There are always four corner bars. You can also add the longitudinal and transverse faces of the column. In both cases you enter the total number of bars which are shared equally between the opposite faces.

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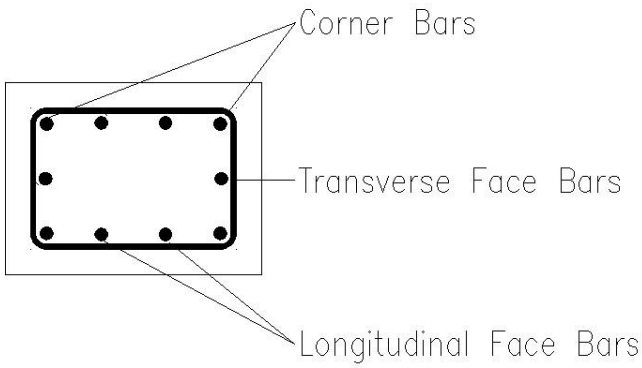

Figure 6.9:3 Pile Cap Column Bars

Once you have entered a number greater than zero into the number of bars field you can specify the bar type, diameter, starter length (A) and bob length (B). The starter length you give is the distance the bars project above the top of the cap. The program will calculate the required dimension so that the starters sit on the B2 layer.

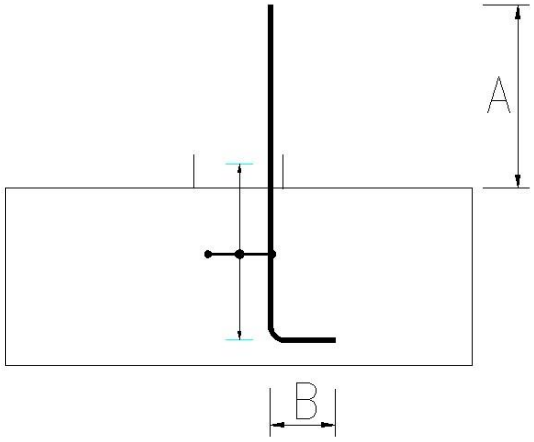

Figure 6.9:4 Starter Bar Dimensions

The links must be specified and are taken between the bottom bend of the starter bars and the kicker.

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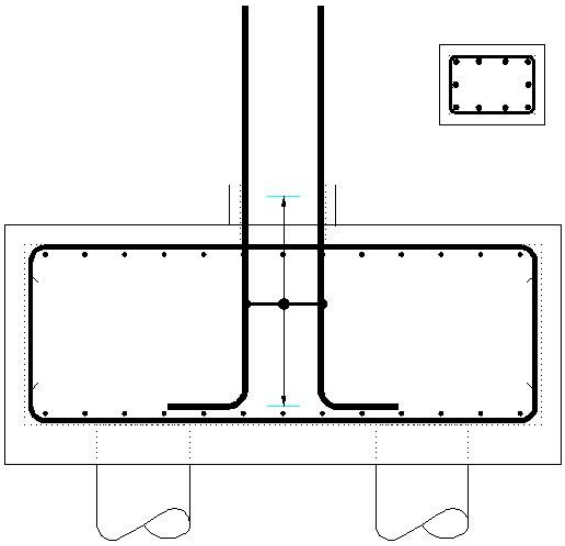

Figure 6.9:5 Typical Starter Detail

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6.10 Importing Data from Pile Cap Designer

The Import button on the Main Pile Cap Dialog allows data prepared by the CADS Pile Cap Designer to be used directly by this detailer. The design program creates job files with the extension *.PCD. The *.PCD files can be read by the Pile Cap Detailer. The Pile Cap Designer allows you to place the transfer file in any location you desire.

6.10.1 Locating and Selecting the File to Import

Once the Import Option is selected the Select Pile Cap Import File Dialog is displayed.

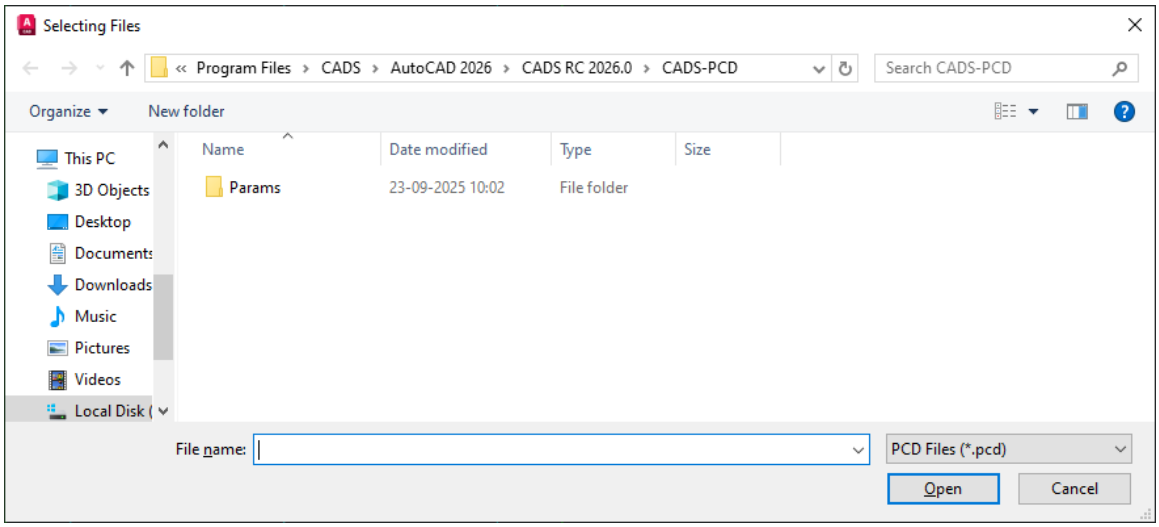

Figure 6.10:1 Typical Job / Directory List

If you are not in the directory you require then select the appropriate directory or drive in the left panel until the correct path is shown. The file type is fixed as *.PCD.

To make locating the files easier it is advisable for the creator of the designer file and the detailer to agree a standard location. This directory should have the appropriate read write permissions for both users. One suggestion is to write the files to the directory where the project drawing files are located.

6.10.2 Loading the Job File

Select the transfer file you require and the pile cap designer data is transferred to the Pile Cap Detailer as if you had manually input the data. You can then edit it as described in the earlier sections of this manual. The Pile Cap Detailer does not, however, make any checks on the suitability of the chosen arrangement.

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The CADS Pile Cap Designer uses the number of bars to determine the resistance of the cap to moments and shears, but allows you to specify the nominal centres as well. The bars entered in the Pile Cap Designer should be compatible with the detailer. However, as some of the detailer input options are not necessary at the design stage it may give rise to some minor discrepancies. The detailer will endeavour to preserve the number of bars and modify the centres as necessary.

6.11 Drawing the Pile Cap Detail

Once the Pile Cap Dimensions and Bar sets have been defined then the detail is ready to draw. Selecting the Draw Button from the Main Pile Cap Dialog doe this. The program will pause for a few moments while it assembles the drawing data and then returns to the AutoCAD drawing editor.

The plan is drawn first and can be moved to an appropriate position on the drawing. The elevation is then drawn and it can be also moved into position. Finally, the column section is drawn if requested.

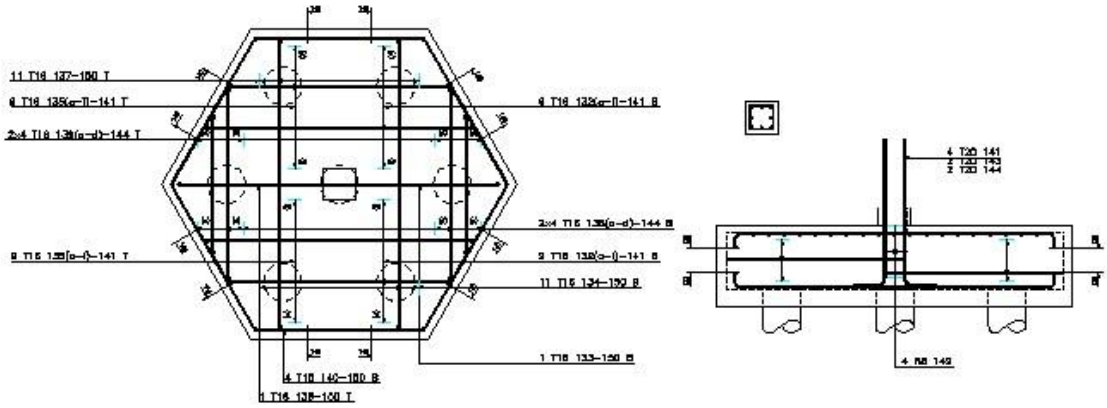

Figure 6.10:2 Typical Pile Cap Detail

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6.12 CADS Pile Cap Detailer Global Configuration Centre

	Setting	Value	Explanation
[defaults]	imported_criteria	0	
	concrete_grades	30	Default concrete grade
	covers_top	75	Cover to top of pile cap
	covers_btm	150	Cover to bottom of pile cap
	covers_side	75	Cover to side of pile cap
	covers_col	40	Cover to column
	lap_factor	1.0	Lap increment factor
	lap_rounding	25	Lap rounding dimension, rounds to nearest 25mm
	pile_penetration	150	Pile penetration into pile cap
	tolerance	0	Tolerance options None or BS8110
	link_range_inset	150	

	Setting	Value	Explanation
[pcdims]	group	0	Pile Cap Type selected, 0 = two pile cap
	diameter	300	Pile diameter
	pitch_factor1	2.5	determines longitudinal pile spacing
	pitch_distance1	400	determines longitudinal distance between piles
	pitch_overhang1	150	determines longitudinal distance from pile face to edge of pile cap
	pitch_factor2	2.5	determines transverse pile spacing
	pitch_distance2	400	determines transverse distance between piles
	pitch_overhang2	150	determines transverse distance from pile face to edge of pile cap
	pitch_factor3	2.5	determines centre pile spacing
	pitch_distance3	400	determines centre distance between piles
	pitch_factor4	2.5	determines diagonal pile spacing
	pitch_distance4	800	determines diagonal distance between piles
	cap_length	1000.0	Pile cap length dimension
	cap_width	1000.0	Pile cap width dimension
	cap_depth	750	Pile cap depth dimension
	cap_side	500	Pile cap vertical edge dimension
	cap_end	500	Pile cap horizontal edge dimension
	column_flag	0	Draw Column Yes / No option
	col_length	300	Column length
	col_width	300	Column width
	col_l_off	0	Column horizontal offset from pile cap centre
	col_t_off	0	Column vertical offset from pile cap centre
	col_kick_h	150	Kicker height

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	Setting	Value	Explanation
[reinf]	primary_reinf1type	T	Bottom longitudinal reinforcement grade
	primary_reinf1size	16	Bottom longitudinal reinforcement bar diameter
	primary_reinf1spacing	150	Bottom longitudinal reinforcement bar pitch
	primary_reinf1shape	38	Bottom longitudinal reinforcement shape code
	primary_reinf1bendlen	0	Bottom longitudinal reinforcement bend length
	primary_reinf1bendrad	0	Bottom longitudinal reinforcement bend radius
	primary_reinf1layer	1	Determines whether transverse or longitudinal bars are placed in the outer layer, 1 = on, 0 = off
	primary_reinf1entered_num_or_spc	0	Number of bottom longitudinal bars
	primary_reinf1number	10	Number of bottom longitudinal bars
	primary_reinf1Bw	0.0	
	primary_reinf2type	T	Bottom transverse reinforcement grade
	primary_reinf2size	16	Bottom transverse reinforcement bar diameter
	primary_reinf2spacing	150	Bottom transverse reinforcement bar pitch
	primary_reinf2shape	38	Bottom transverse reinforcement shape code
	primary_reinf2bendlen	0	Bottom transverse reinforcement bend length
	primary_reinf2bendrad	0	Bottom transverse reinforcement bend radius
	primary_reinf2layer	0	Determines whether transverse or longitudinal bars are placed in the outer layer, 1 = on, 0 = off
	primary_reinf2entered_num_or_spc	0	
	primary_reinf2number	10	Number of bottom transverse bars
	primary_reinf2Bw	0.0	
	primary_reinf3type	T	Top longitudinal reinforcement grade
	primary_reinf3size	16	Top longitudinal reinforcement bar diameter
	primary_reinf3spacing	150	Top longitudinal reinforcement bar pitch
	primary_reinf3shape	38	Top longitudinal reinforcement shape code
	primary_reinf3bendlen	0	Top longitudinal reinforcement bend length
	primary_reinf3bendrad	0	Top longitudinal reinforcement bend radius
	primary_reinf3layer	1	determines whether transverse or longitudinal bars are placed in the outer layer, 1 = on, 0 = off
	primary_reinf3number	10	Number of top longitudinal bars
	primary_reinf3Bw	0.0	

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primary_reinf4type	T	Top transverse reinforcement grade
primary_reinf4size	16	Top transverse reinforcement bar diameter
primary_reinf4spacing	150	Top transverse reinforcement bar pitch
primary_reinf4shape	38	Top transverse reinforcement shape code
primary_reinf4bendlen	0	Top transverse reinforcement bend length
primary_reinf4bendrad	0	Top transverse reinforcement bend radius
primary_reinf4entered_num_or_spc	0	
primary_reinf4number	10	Number of top transverse bars.
primary_reinf4Bw	0.0	
secondary_reinf1type	T	Bottom longitudinal tapered reinforcement grade
secondary_reinf1size	16	Bottom longitudinal tapered reinforcement bar diameter
secondary_reinf1spacing	150	Bottom longitudinal tapered reinforcement bar pitch
secondary_reinf1shape	38	Bottom longitudinal tapered reinforcement shape code
secondary_reinf1bendlen	0	Bottom longitudinal tapered reinforcement bend length
secondary_reinf1bendrad	0	Bottom longitudinal tapered reinforcement bend radius
secondary_reinf1layer	1	Determines whether tapered transverse or longitudinal bars are placed, 1 = on, 0 = off
secondary_reinf1entered_num_or_spc	0	
secondary_reinf1number	10	Number of bottom longitudinal tapered bars
secondary_reinf2type	T	Bottom transverse tapered reinforcement grade
secondary_reinf2size	16	Bottom transverse tapered reinforcement bar diameter
secondary_reinf2spacing	150	Bottom transverse tapered reinforcement bar pitch
secondary_reinf2shape	38	Bottom transverse tapered reinforcement shape code
secondary_reinf2bendlen	0	Bottom transverse tapered reinforcement bend length
secondary_reinf2bendrad	0	Bottom transverse tapered reinforcement bend radius
secondary_reinf2layer	1	Determines whether tapered transverse or longitudinal bars are placed, 1 = on, 0 = off
secondary_reinf2entered_num_or_spc	0	
secondary_reinf2number	10	Number of bottom transverse tapered bars
secondary_reinf3type	T	Top longitudinal tapered reinforcement grade
secondary_reinf3size	16	Top longitudinal tapered reinforcement bar diameter

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secondary_reinf3spacing	150	Top longitudinal tapered reinforcement bar pitch
secondary_reinf3shape	38	Top longitudinal tapered reinforcement shape code
secondary_reinf3bendlen	0	Top longitudinal tapered reinforcement bend length
secondary_reinf3bendrad	0	Top longitudinal tapered reinforcement bend radius
secondary_reinf3layer	1	Determines whether tapered transverse or longitudinal bars are placed, 1 = on, 0 = off
secondary_reinf3entered_num_or_spc	0	
secondary_reinf3number	10	Number of top longitudinal tapered bars
secondary_reinf4type	T	Top transverse tapered reinforcement grade
secondary_reinf4size	16	Top transverse tapered reinforcement bar diameter
secondary_reinf4spacing	150	Top transverse tapered reinforcement bar pitch
secondary_reinf4shape	38	Top transverse tapered reinforcement shape code
secondary_reinf4bendlen	0	Top transverse tapered reinforcement bend length
secondary_reinf4bendrad	0	Top transverse tapered reinforcement bend radius
secondary_reinf4layer	1	Determines whether tapered transverse or longitudinal bars are placed, 1 = on, 0 = off
secondary_reinf4entered_num_or_spc	0	
secondary_reinf4number	10	Number of top transverse tapered bars
side_bar_reinftype	T	Side reinforcement bar grade
side_bar_reinfsize	16	Side reinforcement bar diameter
side_bar_reinfspacing	150	Side reinforcement bar pitch
side_bar_reinfshape	38	Side reinforcement bar shape code
side_bar_reinfbendlen	0	Side reinforcement bar bend length
side_bar_reinfbendrad	0	Side reinforcement bar bend radius
side_bar_reinflayer	1	Determines whether the side bars are placed, 1 = on, 0 = off
side_bar_reinfentered_num_or_spc	0	
side_bar_reinfnumber	10	Number of side reinforcement bars
starter_bars	1	Determines whether the starter bars are placed, 1 = on, 0 = off
SideBarNominalInsetFlag	0	
SideBarNominalInsetValue	50.0	
starter_bars_reinf1type	T	Corner starter bar reinforcement grade
starter_bars_reinf1size	16	Corner starter bar reinforcement bar diameter
starter_bars_reinf1spacing	150	Corner starter bar reinforcement bar pitch

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starter_bars_reinf1shape	37	Corner starter bar reinforcement bar shape code
starter_bars_reinf1bob	300	Corner starter bar reinforcement bar bob length
starter_bars_reinf1length	0	
starter_bars_reinf1layer	1	Determines whether corner starter bars are placed, 1= on, 0 = off
starter_bars_reinf1entered_num_or_spc	0	
starter_bars_reinf1number	4	Number of corner starter reinforcement bars
starter_bars_reinf2type	T	Longitudinal starter bar reinforcement grade
starter_bars_reinf2size	16	Longitudinal starter bar diameter
starter_bars_reinf2spacing	150	Longitudinal starter bar pitch
starter_bars_reinf2shape	37	Longitudinal starter bar shape code
starter_bars_reinf2bob	300	Longitudinal starter bar bob length
starter_bars_reinf2length	0	
starter_bars_reinf2layer	1	Determines whether longitudinal starter bars are placed, 1= on, 0 = off
starter_bars_reinf2entered_num_or_spc	0	
starter_bars_reinf2number	0	Number of longitudinal starter bars
starter_bars_reinf3type	T	Transverse starter bar grade
starter_bars_reinf3size	16	Transverse starter bar diameter
starter_bars_reinf3spacing	150	Transverse starter bar pitch
starter_bars_reinf3shape	37	Transverse starter bar shape code
starter_bars_reinf3bob	300	Transverse starter bar bob length
starter_bars_reinf3length	0	
starter_bars_reinf3layer	1	Determines whether transverse starter bars are placed, 0 = off, 1 = on
starter_bars_reinf3entered_num_or_spc	0	
starter_bars_reinf3number	0	Number of transverse starter bars
starter_bars_reinf4type	R	Starter link bar grade
starter_bars_reinf4size	8	Starter link bar diameter
starter_bars_reinf4spacing	150	Starter link bar pitch
starter_bars_reinf4shape	61	Starter link shape code
starter_bars_reinf4bob	0	
starter_bars_reinf4length	0	
starter_bars_reinf4layer	1	Determines whether link bars are placed, 0 = off, 1 = on
starter_bars_reinf4entered_num_or_spc	0	
starter_bars_reinf4number	3	Number of starter links

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	Setting	Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Distance of bar label in plotted mm

	Setting	Value	Explanation
[BarInfo]	StraightBar	20	Straight bar shape code
	LegBar	35	Leg bar shape code
	FullBar	38	Full bar shape code
	Lbar	37	'L' bar shape code
	LinkBar	61	Link bar shape code
	PC3LRSideBars	45	
	PC3LRSideBarsDim1	A	
	PC3LRSideBarsDim2	B	
	PC3LRSideBarsDim3	C	
	PC3LRSideBarsDim4	D	
	PC3LRSideBarsRP	0	
	PC3TpSideBars	49	
	PC3TpSideBarsDim1	A	
	PC3TpSideBarsDim2	B	
	PC3TpSideBarsDim3	C	
	PC3TpSideBarsDim4	D	
	PC3TpSideBarsDim5	E	
	PC3TpSideBarsRP	0	
	PC7SideBars	62	
	PC7SideBarsDim1	A	
	PC7SideBarsDim2	B	
	PC7SideBarsDim3	C	
	PC7SideBarsRP	0	
	LinkBarDim1	A	Link bar leg 1 dimension letter
	LinkBarDim2	B	Link bar leg 2 dimension letter
	LBarDim1	A	'L' Bar leg 1 dimension letter
	LBarDim2	B	'L' Bar leg 2 dimension letter
	StraightBarDim	A	Straight bar dimension letter
	LegBarDim	A	Leg bar dimension letter
	FullDim1	A	Full bar leg 1 dimension letter
	FullDim2	B	Full bar leg 2 dimension letter
	FullDim3	C	Full bar leg 3 dimension letter
	StraightBarView Side		Straight bar, view to be drawn
	LegBarView	Side	Leg bar, view to be drawn
	FullBarView	Side	Full bar, view to be drawn
	RotateFullBars	0	Rotation angle for full bars
	RotateSideBars	0	Rotation angle for side bars
	LinkBarDim	Normal	
	AllowSCEntry	Yes	
	99Bar	99	
	100Bar	100	

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Setting		Value	Explanation
[PileCapDesigner]	DataPath	\cads\rcpcd\data	Path to CADS Pile Cap Designer

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7 CADS Octagonal Pile Cap Detailer

Chapter Objectives

CADS Octagonal Pile Cap Detailer provides an automated method of detailing octagonal pile cap bar arrangements.

7.1 Program Operating Environment

CADS Octagonal Pile Cap Detailer Octagonal Pile Cap Detailer works in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Pile Cap Detailer can be used.

CADS Octagonal Pile Cap Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

7.2 Loading the Octagonal Pile Cap Detailer

The CADS Octagonal Pile Cap Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 7.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

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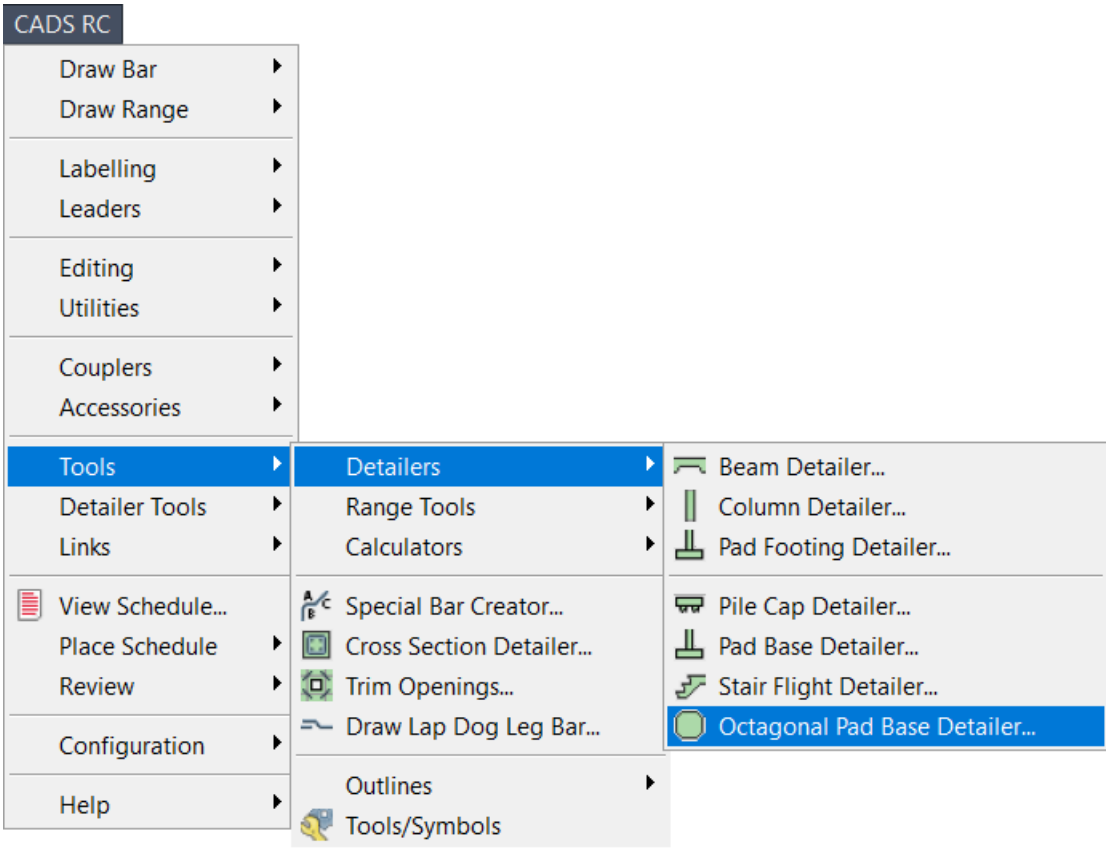

Figure 7.2:1 CADS RC Detailers Selection Menu

To load the Octagonal Pile Cap Detailer, highlight the line 'CADS Octagonal Pile Cap Detailer' and then pick the Load button. This will load the CADS Octagonal Pile Cap Detailer ready for use.

7.3 Allocating the Octagonal Pile Cap Member Title

When the Octagonal Pile Cap Detailer (CADS OPD) has been selected the

Set Member Title Dialog is displayed, as shown in Figure 7.3:1. At this point

you can select an existing member title or create a new member title. The pile cap reinforcement will be assigned to the selected member title.

You can now continue by picking the OK button. For further information on Member Titles refer to the CADS RC User Guide.

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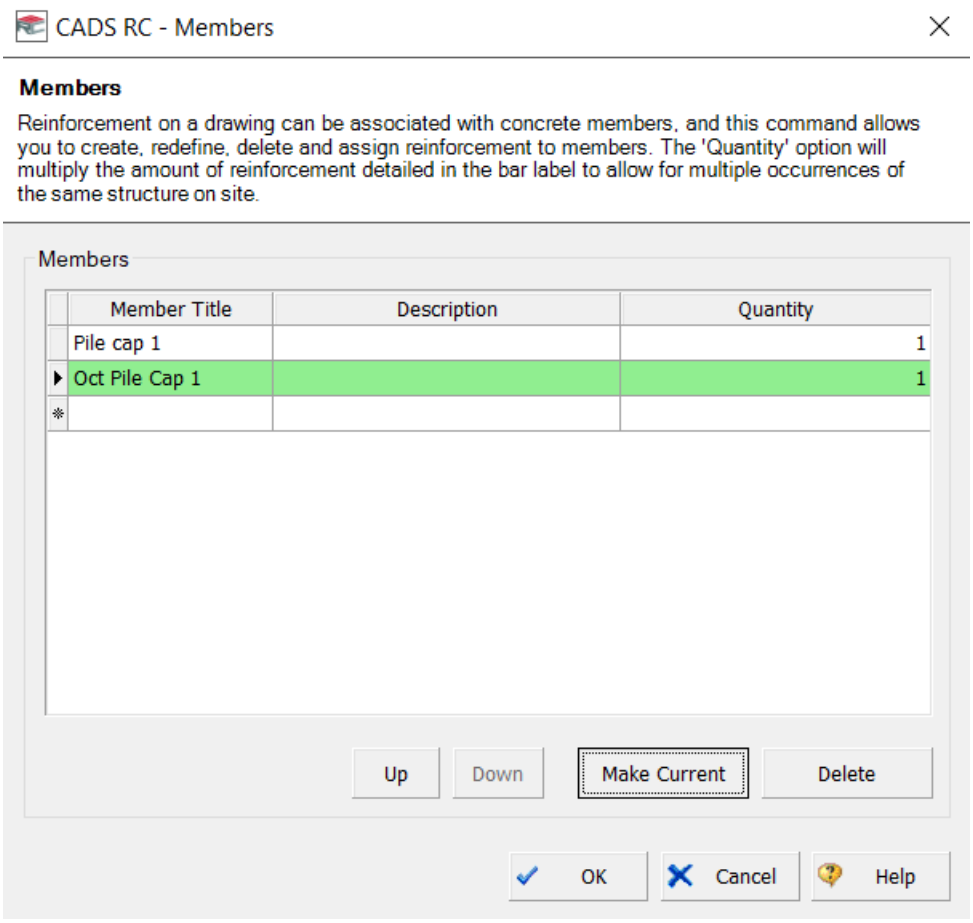

Figure 7.3:1 Member Title Selection Dialog

When the required member title has been defined the Octagonal Pile Cap Detailer Input Menu dialog is displayed, as shown in Figure 7.3:3.

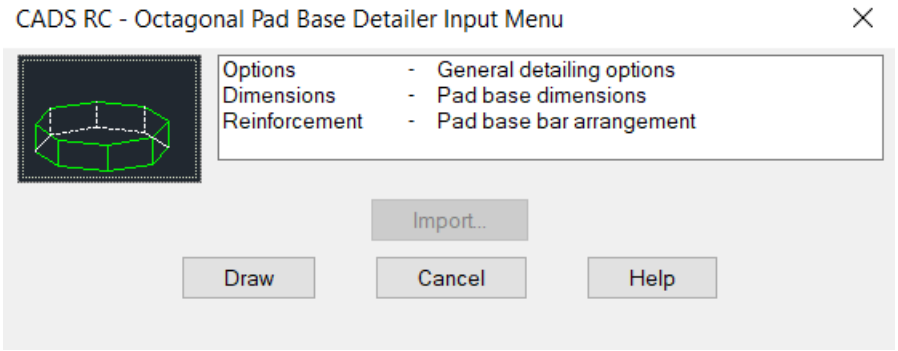

Figure 7.3:3 CADS Octagonal Pile Cap Detailer Input Menu Dialog

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7.4 Defining the Octagonal Pile Cap for Detailing

The program is divided into three main topics, each of which has its own input screens:

- Options – where the required bar arrangement is defined;
- Dimensions – where the base dimensions are defined;
- Reinforcement – where the bar sizes, pitch and controlling dimensions are specified.

The program should provide most of the types of detail you are likely to need. However, other variations can also be easily obtained by using one of the supplied types and modifying it using CADS RC. You can add, delete or edit the bars and so produce the arrangement you wish.

7.5 Defining the General Detailing Options

Picking Options from the Main CADS Octagonal Pile Cap Detailer Dialog displays the Options Dialog, shown in Figure 7.5:1, where the general reinforcing bar arrangement required is selected.

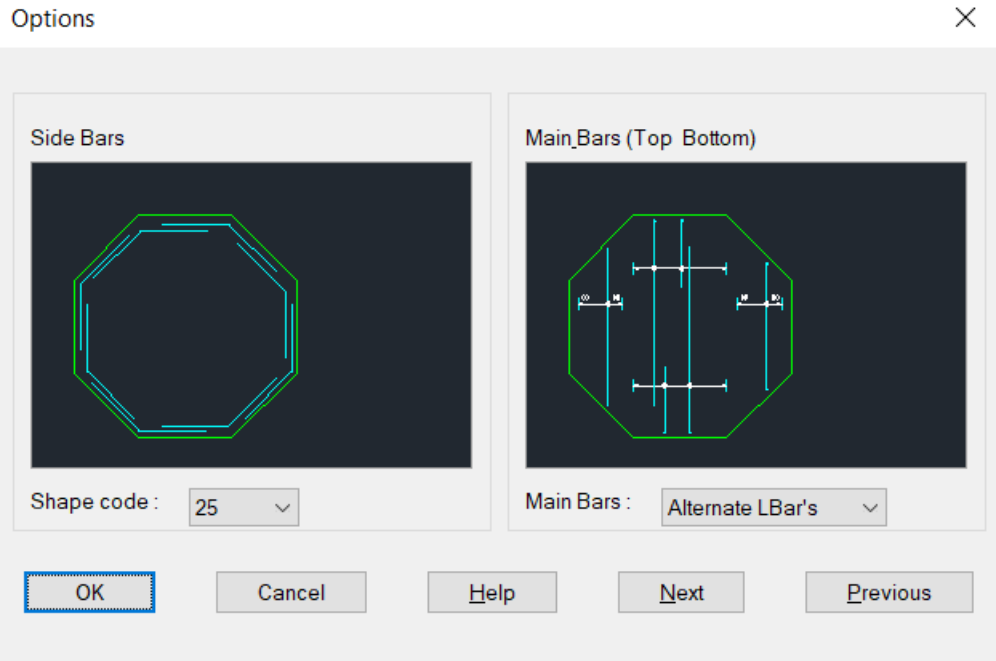

Figure 7.5:1 CADS Octagonal Pile Cap Detailer Reinforcement Options Dialog

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Side Bars

The required side bar arrangement can be selected from the pop down list below the side bar slide. There are two options available:

- Shape Code 49 - This option uses four identical shape code 49 bars lapped to produce a continuous side bar;
- Shape Code 62 - This option uses eight identical shape code 62 bars lapped to produce a continuous side bar.

Note:

The side bars are detailed as being placed inside the main cage bars.

Main Bars

The required main bar arrangement for layers B1, B2, T1 and T2 used between parallel faces can be selected from the pop-down list below the Main Bar Slide. There are two options available:

- Standard 38's - This option details the reinforcement between parallel faces as shape code 38 bars with leg B spanning between the parallel faces;
- Alternate 37's - This option details the reinforcement between parallel faces as alternately placed lapped shape code 37 bars.

In both the above cases the area between the non-parallel faces is detailed using the tapering shape code 38 bars with leg B spanning between the nonparallel faces.

Note:

Main Bars are detailed to the side cover specified. If you wish to allow tolerances, you are advised to increase the side cover to a value that will produce the tolerance required.

Each layer of main bars (B1, B2, T1 and T2) are detailed with different bar marks to allow different bar types and diameters to be specified for each layer. CADS RC can be used to rationalise bar marks if required.

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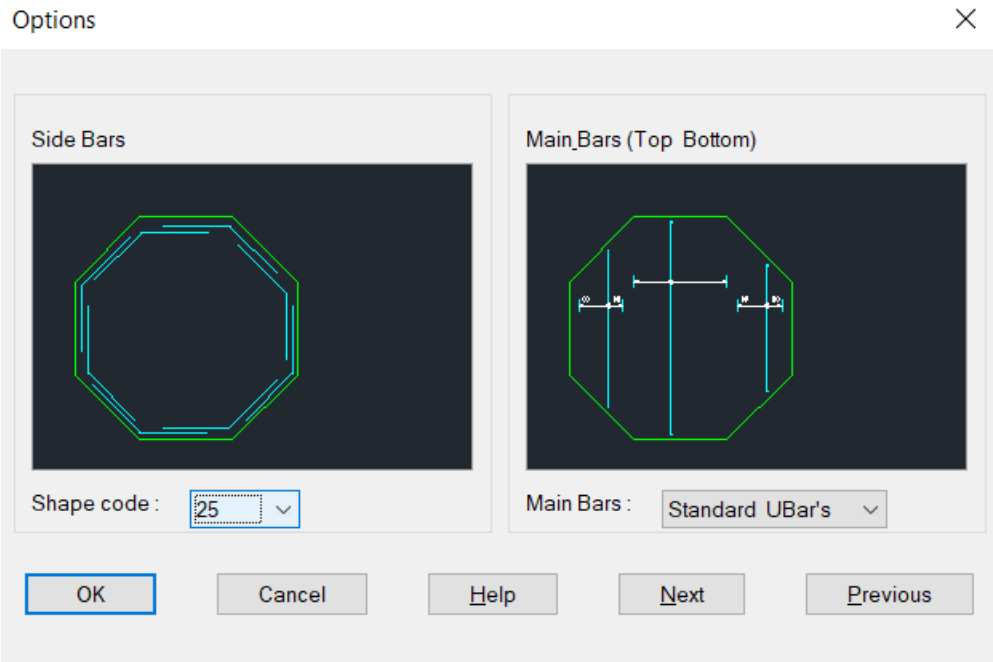

Figure 7.5:2 Reinforcement Options Dialog showing alternative selections

7.6 Defining the Dimensions

The required base dimensions and covers are entered in the Dimensions dialog, see Figure 7.6:1. All dimensions and covers are in mm.

The dimensions dialog has the following input fields:

- Distance Between Faces (A) - The required distance between parallel faces can be entered. The distance between corners and face length will be recalculated to suit;
- Distance Between Corners (B) - The required distance between corners can be entered. The distance between faces and face length will be automatically recalculated to suit;
- Face Length (C) - The required face length can be entered. The distance between faces and corners will be recalculated to suit;
- Base Thickness (D) - The required base depth can be entered. This value, along with the top and bottom cover values, control the maximum leg length of the return legs of the top and bottom bars that is entered in the Reinforcement Dialog;
- Top Cover (C1) - The cover to the top bars can be entered;
- Bottom Cover (C2) - The cover to the bottom bars can be entered;
- Side Cover (C3) - The cover to the return legs of the top and bottom bars on the side faces of the base can be entered.

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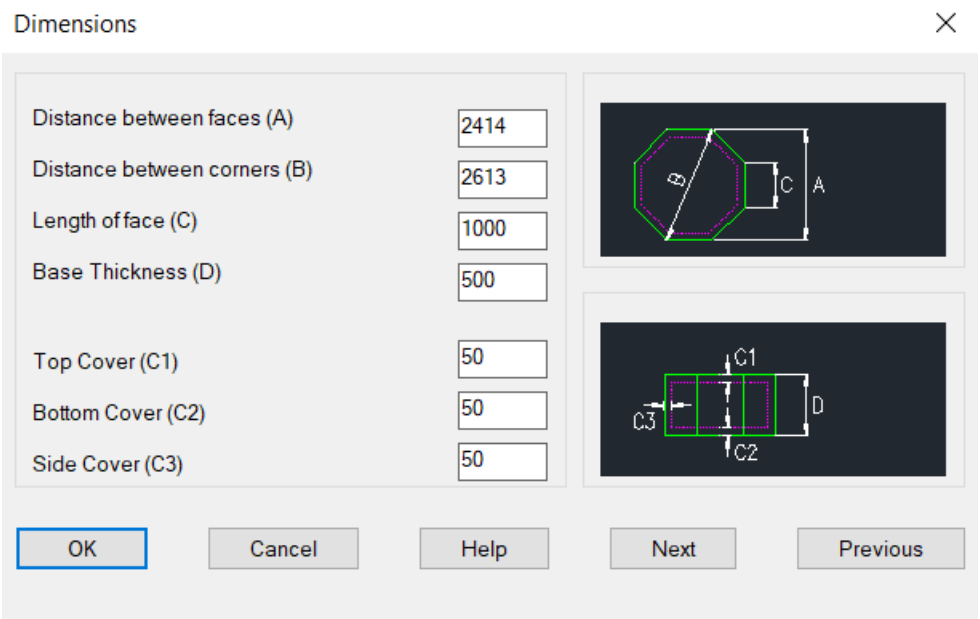

Figure 7.6:1 Dimensions Input Dialog

7.7 Defining the Bar Arrangement

Bar Type, size, pitch, lap lengths and controlling dimensions are entered in the Reinforcement Dialog, see Figure 7.7.1:1. All values are in mm.

The reinforcement produced by CADS Octagonala Pile Cap Detailer has been divided into three main areas:

- Top Bars (Layer T1 and T2);
- Bottom Bars (Layer B1 and B2);
- Side Bars.

7.7.1 Top and Bottom Bar Options for Layers T1, T2, B1 and B2

- Bar Type - The required bar type can be selected from the pop down list. The bar diameter is entered in the field alongside. The bar type and diameter will be applied to all bars in the layer;
- C/C - This is the bar pitch value that will be applied to all bar ranges in that layer;
- Alternate 37's Leg A - This length is that of the short alternate bar on plan (Leg A);
- Alternate 37's Leg B - This length is that of the return leg (Leg B) of all the alternate bars in this layer. This leg dimension cannot be greater than the base depth - (C1 + C2);
- Alternate 37's Lap - This is the lap length of the long alternate bar to the short alternate bar;

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- S.C. 38's Leg A & C - This length is that of the return leg (Leg B) of all the shape code 38 bars in this layer. This leg dimension cannot be greater than the base depth - (C1 + C2).

Note:

The Alternate 37 options are only available if the main bar option is set to Alternate 37's in the Options Dialog.

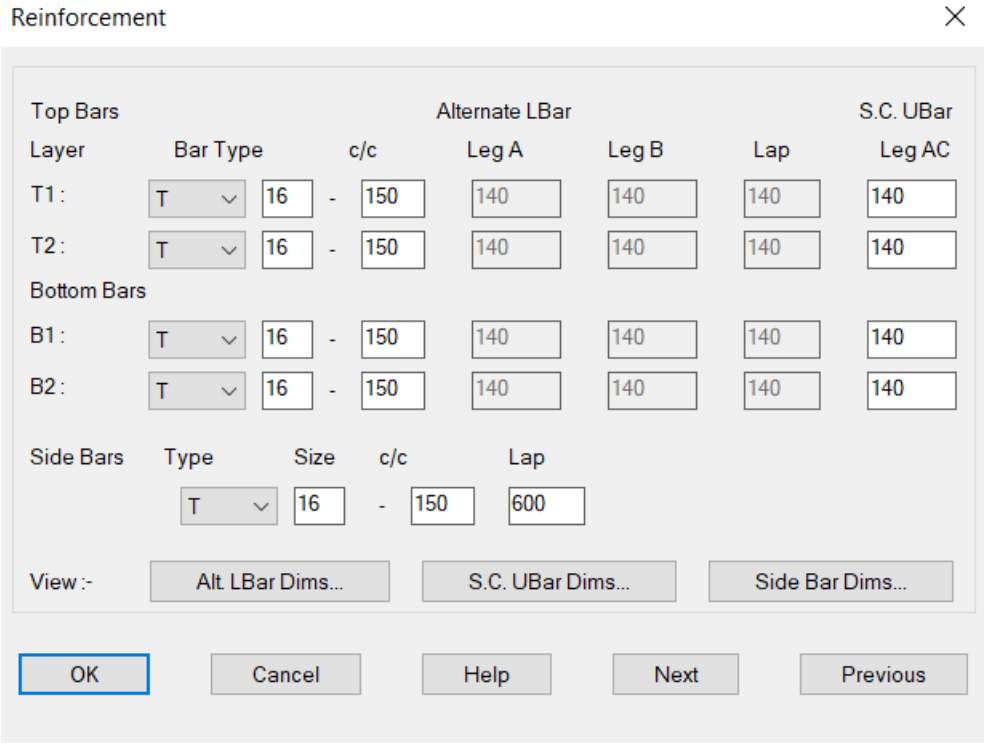

Figure 7.7.1:1 Detailer Reinforcement Input Dialog

7.7.2 Side Bar Options

- Bar Type - The required bar type can be selected from the pop down list.;
- The bar diameter is entered in the field alongside;
- Size – Enter the required bar diameter;
- C/C - This is the bar pitch value that will be applied to the side bars;
- Lap – Enter the required lap distance.

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7.7.3 View Options

- Alternate 37's Dims Button - Displays a slide indicating the dimension options for the alternate 37's;
- S.C. 38 Dims Button - Displays a slide indicating the dimension options for the shape code 38 bars;
- Side Bars Dims Button - Displays a slide indicating the lap length applied to the side bars.

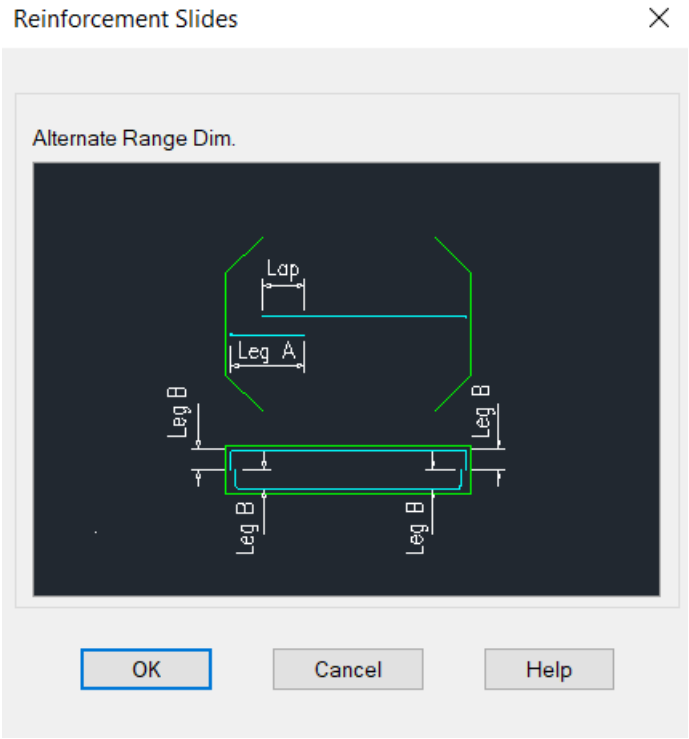

Figure 7.7.3:1 Alternate 37's Dimensions Slide

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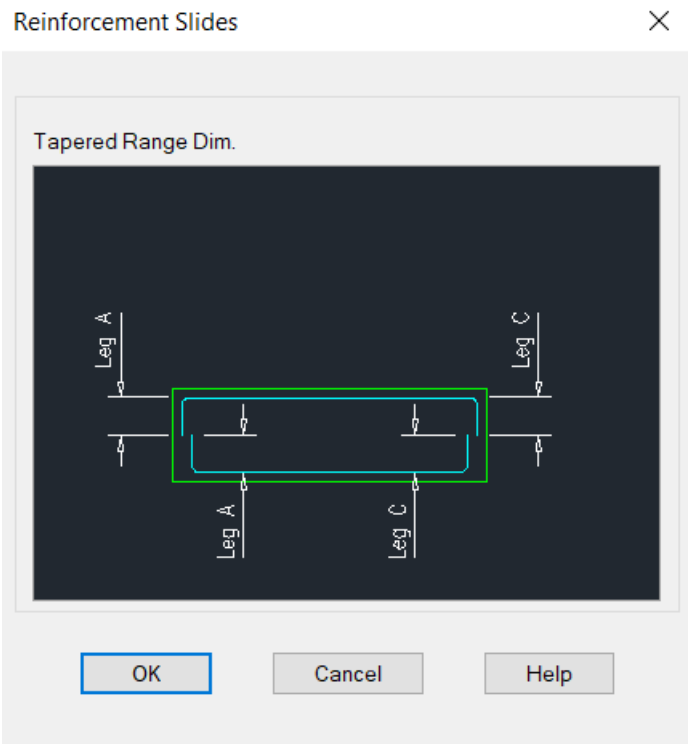

Figure 7.7.3:2 Shape Code 38 Dims Slide

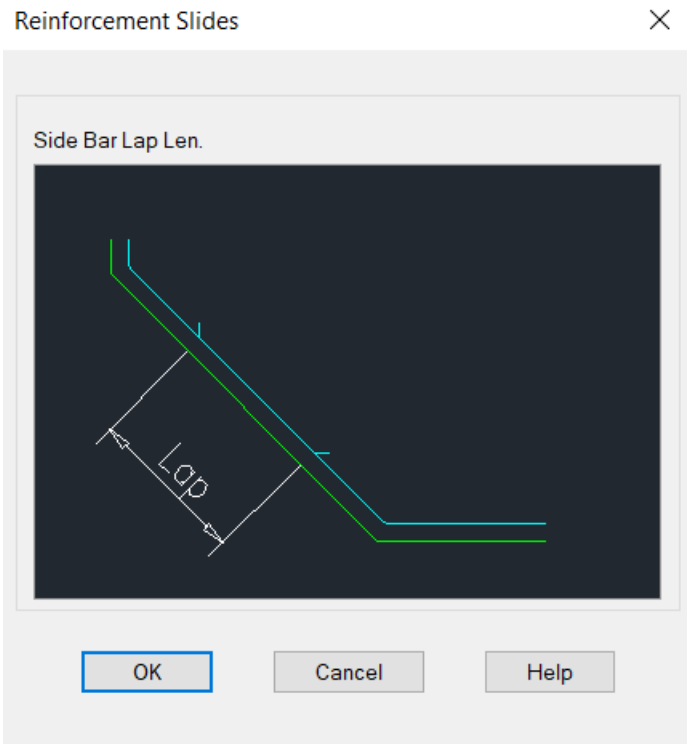

Figure 7.7.3:3 Side Bars Dimensions Slide

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7.8 Drawing the Octagonal Pad Base Detail

Once all the dimensions and bar data have been defined the detail is ready to be drawn. Selecting the Draw Button from the Main CADS OPD Dialog invokes the detail drawing process. The program will pause for a moment while it assembles the data and then it returns to the AutoCAD drawing editor.

The plan is drawn first and you are prompted to select an insertion point for it on the drawing. The program then draws the section and you are again prompted for an insertion point for it on the drawing. Once this has been selected, the drawing is complete and you are returned to the AutoCAD command prompt.

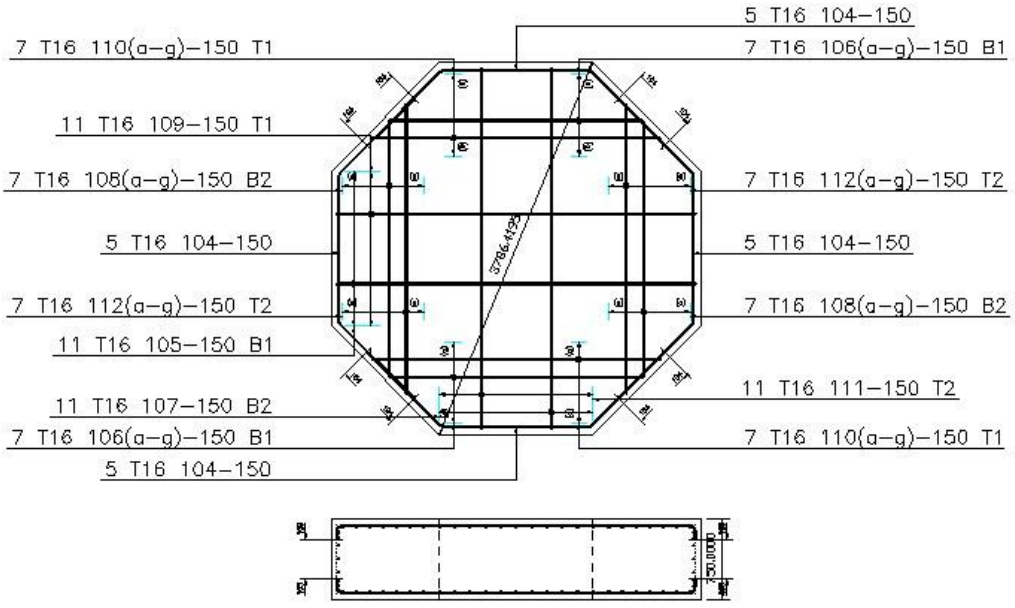

Figure 7.8:1 Typical Octagonal Pile Cap Reinforcement Drawing

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8 CADS Pad Base Detailer

Chapter Objectives

This chapter of the manual describes how to use the Pad Base Detailer. It is assumed that the user is familiar with normal pad base details.

The CADS Pad Base Detailer supports a range of typical base details with reinforcement in a single bottom mat, or double (top and bottom) mats. There are a number of bar shapes and arrangements for both cases.

8.1 Program Operating Environment

The CADS Pad Base Detailer is designed to make the drawing of pad bases a quick and easy process. The program is used in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Pad Base Detailer can be used. The details produced are fully compatible with CADS RC, which means that they can be readily merged into an existing drawing and modified to suit the particular conditions.

CADS Pad Base Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

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8.2 Loading the Pad Base Detailer

The Pad Base Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

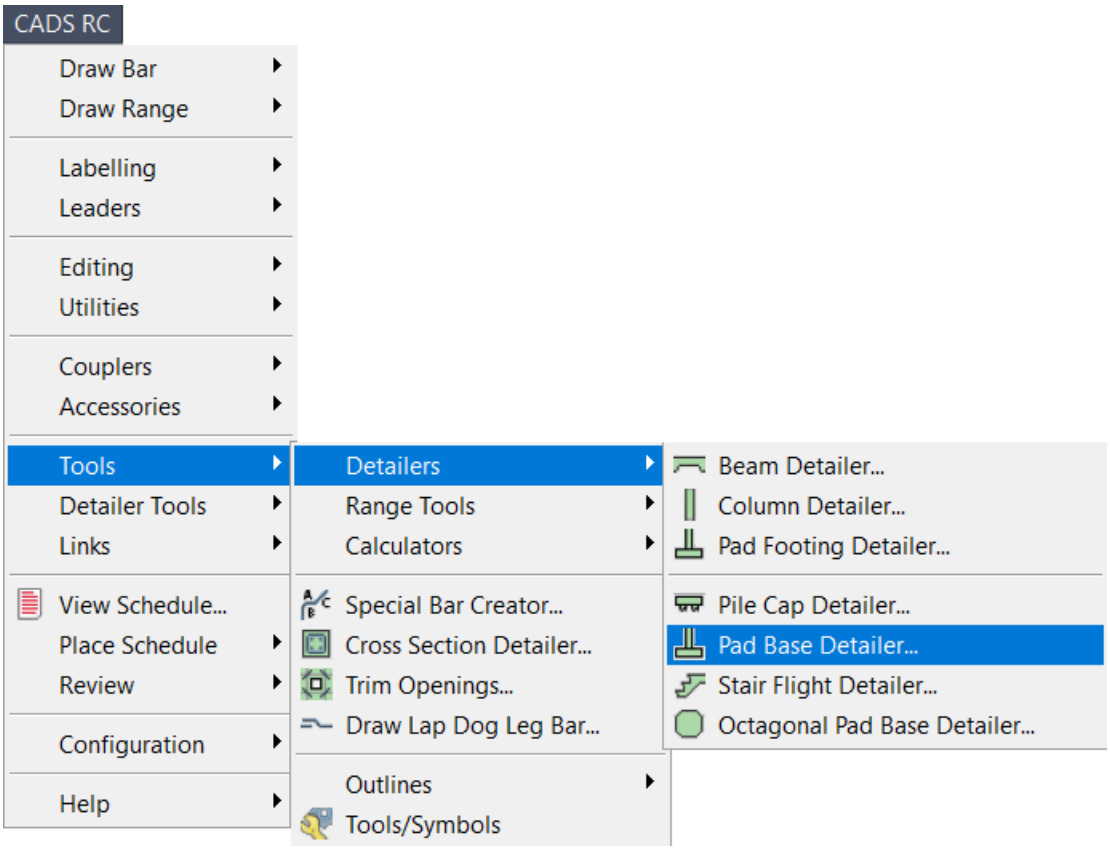

Figure 8.2:1 CADS RC Detailers Selection Menu

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 8.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

To load the Pad Base Detailer, highlight the line 'CADS Pad Base Detailer' and then pick the Load button.

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8.3 Allocating the Pad Base Member Title

When the Pad base Detailer (CADS PBD) has been selected the Set Member Title Dialog is displayed, as shown in Figure 8.3:1. At this point you can select an existing member title or create a new member title. The pile cap reinforcement will be assigned to the selected member title.

You can now continue by picking the OK button. For further information on Member Titles refer to the CADS RC User Guide.

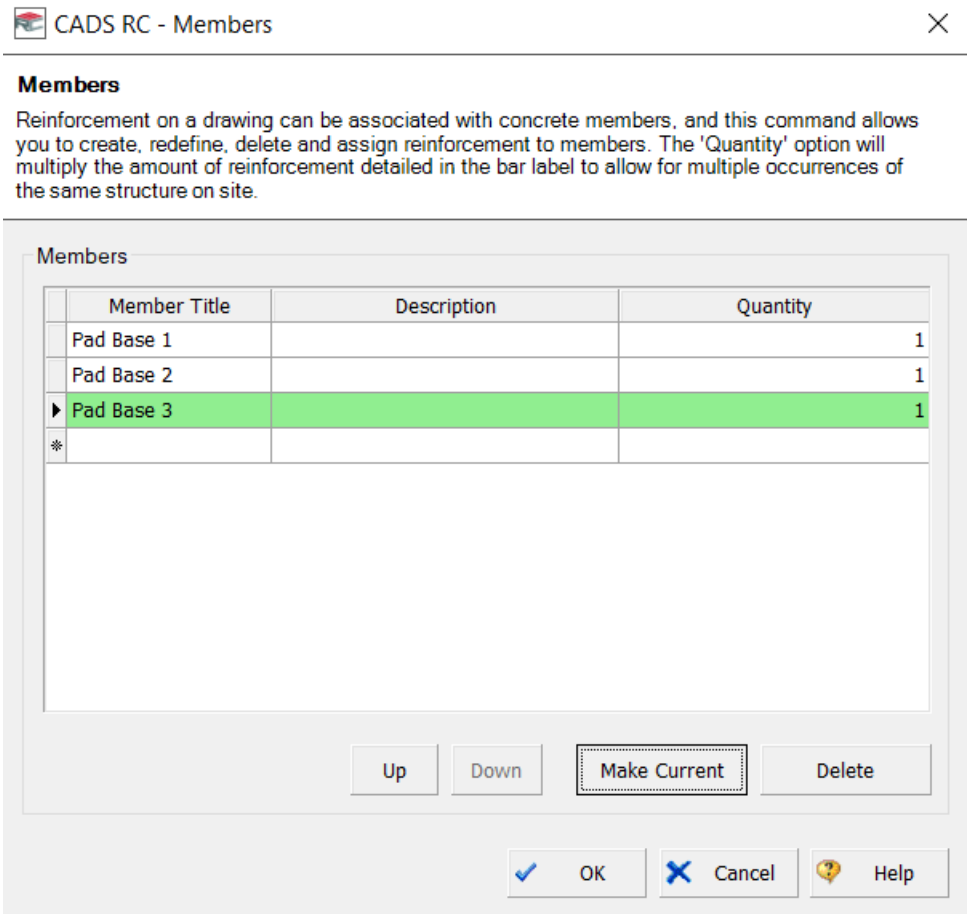

Figure 8.3:1 Member Title Selection Dialog

When the required member title has been defined the Octagonal Pile Cap Detailer Input Menu dialog is displayed, as shown in Figure 8.3:1

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8.4 Defining the Pad Base for Detailing

The program is divided into the following topics, each of which has its own input dialog.

- Defaults which consists of basic materials and lap data;
- Layout to define the bar arrangement to be drawn;
- Dimensions that specify the geometry of the pad base;
- Bars where the number, type, size and pitch of the bars are defined;
- Starters to define the starter bars when required.

The program also has an import facility to read data from CADS Base 2 and CADS Pad Base Designer both of which are Pad Base Design Programs.

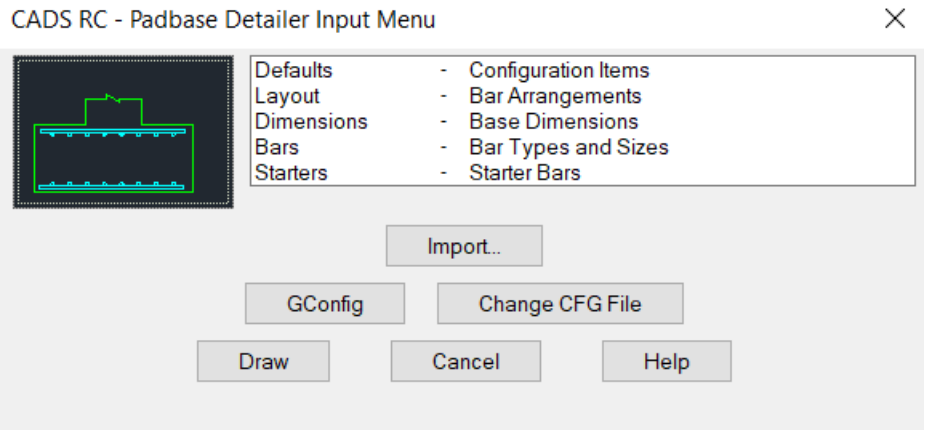

Figure 8.4:1 Padbase Detailer Input Main Input Menu

8.4.1 Padbase Detailer Configuration File Selection

When the Padbase Detailer is loaded the Padbase Detailer Input dialog is displayed, see Figure 8.4:1. This dialog contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 8.4.1:1.

Currently the UK version of this software offers two default files CADS-PBD.DEF and PBD_UK.DEF. The CADS-PBD.DEF is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The PBD_UK.DEF is identical to the CADS-PBD.DEF file.

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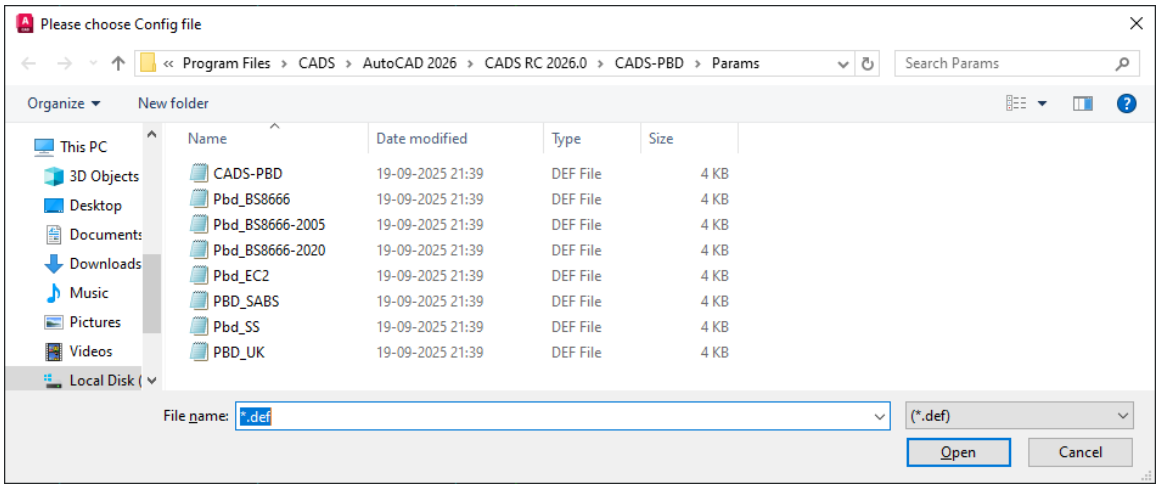

Figure 8.4.1:1 Default Padbase Configuration File Options

Should other configuration options be required, then please contact the CADS Support department who will be pleased to advise accordingly.

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8.5 Setting the Pad Base Detailer Defaults

The defaults are primarily concerned with the materials and covers, but also allow the lap parameters to be set.

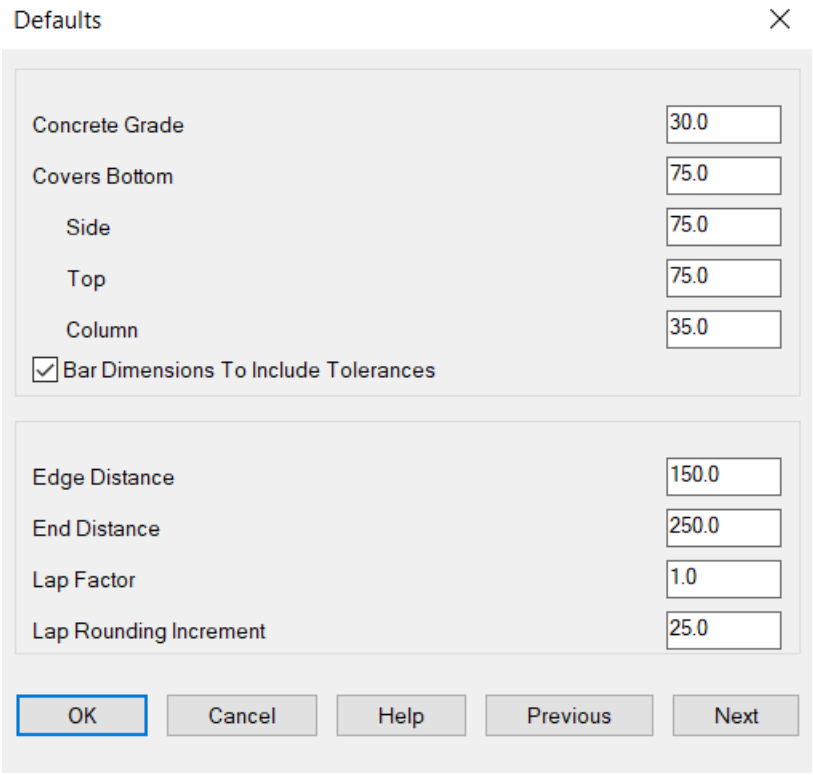

Figure 8.5:1 Defaults Dialog

The defaults dialog is divided into the following input fields;

- Concrete Grade - The concrete grade is used to determine the basic lap length for the type of reinforcement bar. The length is based on the multiple values in Table 3.29 of BS8110:Part1:1985.
- Covers - You can specify the bottom, top and side cover distances to the base, plus the cover to the column bars. In all case the covers are to the outer most bars, i.e. the B1 and T1 main bars, the side bars (where present), and the column links. The side covers are assumed to be the same all round, but if they are not then the bar sets can be moved and stretched, if necessary, on the drawing.
- Bar Tolerances - If this option is set to YES then the BS8110 Table 3.26 tolerances will be applied to the bars that extend between the covers.
- Edge and End Distances - The Edge Distance value can be used to set how close to the sides of the base the bar ranges will extend. This allows you to insert them so the outermost bars of the range are not at the very ends of the bars in the opposite direction, for instance. Regardless of this setting the range bars will always be inside the covers and where appropriate inside any bar radius at the ends of the ranges. The End Distance is

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used to determine where lapping bars start relative to the side of the base. The program will ensure that the ends of the bars do not extend beyond the cover, see Figure 8.5:2.

- Lap Factor and Rounding - The lap length is determined by the concrete grade and may need to be modified by a factor if the bar size is greater than half the cover. The program does not do this automatically but allows you to specify an appropriate value if you wish. The lap rounding value simply rounds up the calculated lap length to the next specified increment (e.g. a calculated lap length of 444 becomes 450 when a rounding value of 25 is used), see Figure 8.5:3.

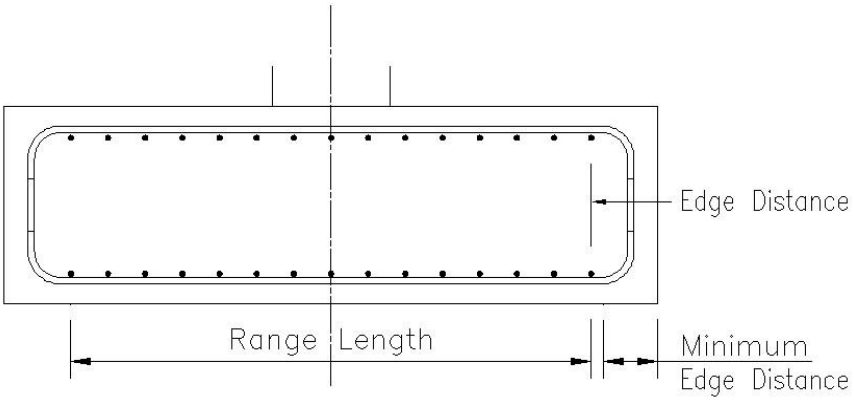

Figure 8.5:2 Edge Distance Information

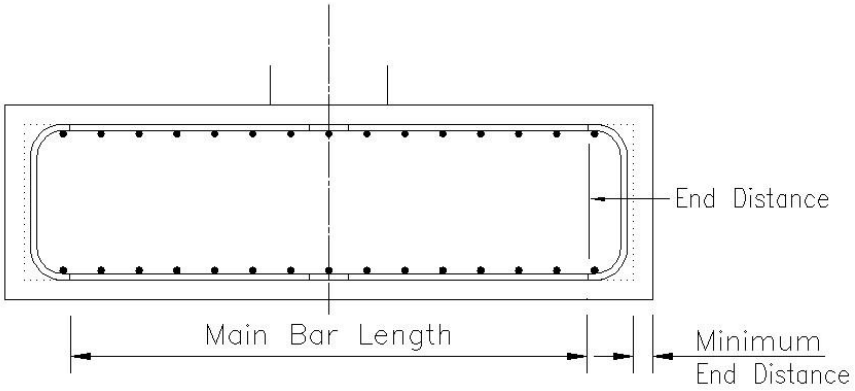

Figure 8.5:3 End Distance Information

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8.6 Choosing the Bar Arrangement Layout

Figure 8.6:1 shows the Bar Arrangement Layout dialog, which allows you to specify the type of base detail, required.

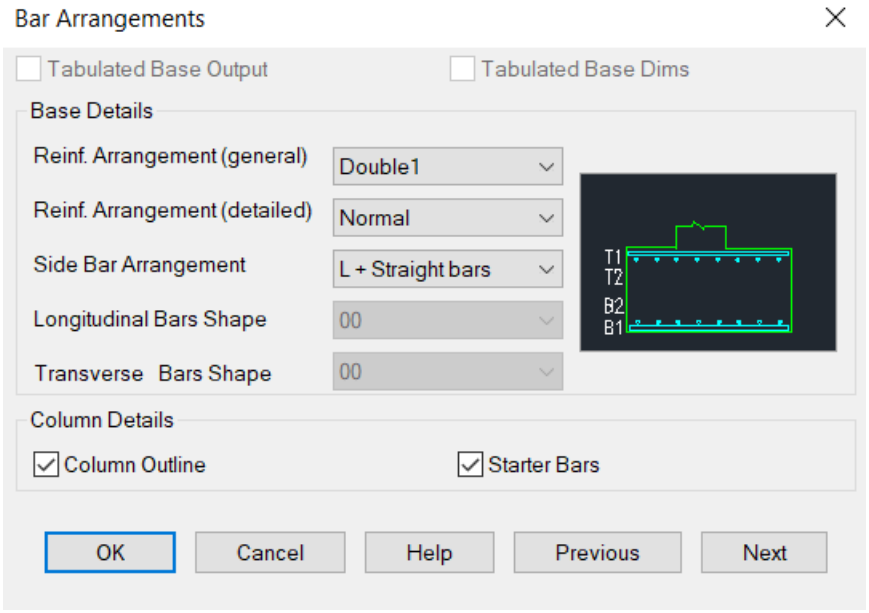

Figure 8.6:1 Bar Arrangements Dialog

8.6.1 Tabulated Base Output and Dimensions

Presently only individual bases can be detailed, therefore the following options are greyed out. It is intended to extend the program to include tabulated details.

Tabulated Base Output will produce details in tabular form when the box is ticked.

Tabulate Base Dimensions will include the base dimensions in the tabulated output.

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8.7 Reinforcement Arrangements

The following five items enable you to select a particular bar arrangement. Used in conjunction with each other wide ranges of combinations are available. To avoid confusion over the direction of the bars the following terms are used to describe the bars. Longitudinal Bars run parallel to the length of the base. Transverse Bars are perpendicular to the longitudinal bar and run parallel to the width.

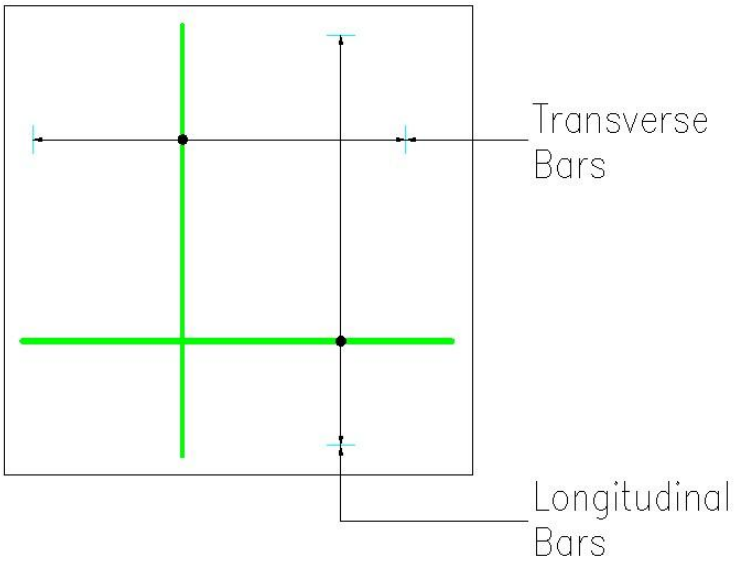

Figure 8.7:1 Bar Directions

8.7.1 General Bar Arrangement

This option selects the basic bar layout. You can choose an un-reinforced, singly reinforced or doubly reinforced base. Both the reinforced options include various layer arrangements as described below. These options can be selected using the pop down menu to the right of each option.

- Un-Reinforced - This setting will simply produce a base without reinforcement;
- Single 1 - This detail is a single mat of reinforcement in the bottom of the base with the longitudinal bars in the B1 Layer, parallel to the base length;
- Single 2 - This arrangement also has a bottom mat, but with the transverse bars in the B1 Layer, parallel to the base width.

Both the Single Arrangements can have the bar shapes to be used specified under the longitudinal and transverse bar shape fields.

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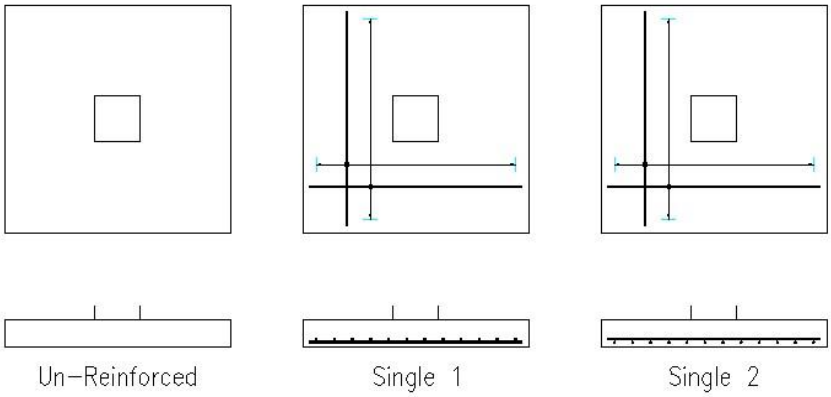

Figure 8.7.1:1 Typical Un-reinforced and Single Bar Arrangements

- Double 1 - This bar arrangement provides a reinforcement mat in the top and bottom of the base. The longitudinal bars are placed in the B1 and T1 Layers;
- Double 2 - This is similar to the Double 1 Arrangement, but with the transverse bars in the B1 and T1 Layers;
- Double 3 - In this arrangement the top longitudinal bars are placed in layer T1, and the bottom transverse bars in Layer B1;
- Double 4 - This is the converse of the Double 3 arrangement with the top transverse bars in Layer T1 and bottom longitudinal bars in Layer B1.

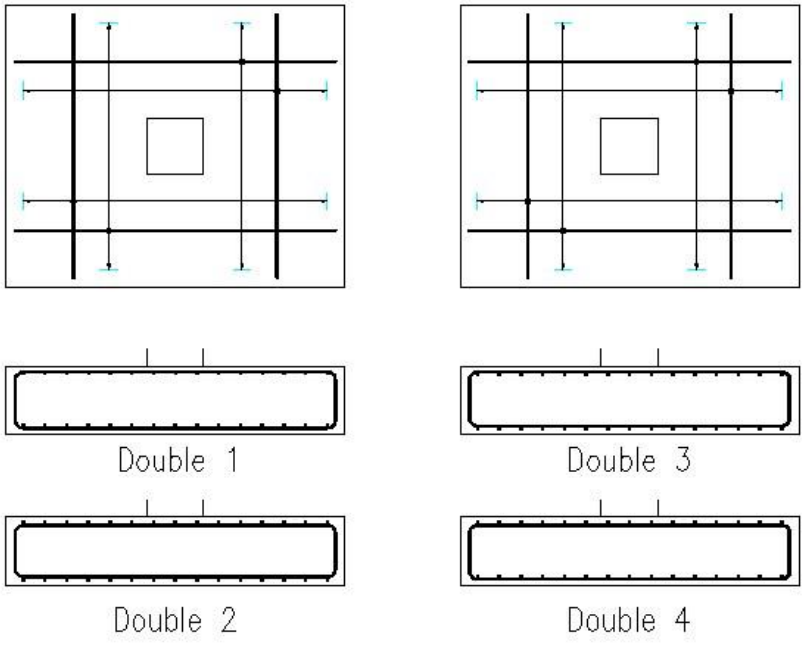

Figure 8.7.1:2 Typical Double Bar Arrangements

The Double Arrangements described above can be set out in three ways as described below. They can also have side bars associated with them, refer to chapter 8.7.3.

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8.7.2 Detailed Bar Arrangement

Each of the double General Arrangements can have three further arrangements as follows;

- Normal - The main bars in each reinforcement mat are shape code 20 and lap in the same layer with shape 38 U bars extending between the top and bottom layers. The ends of the main bars are determined by the end distance specified in the default screen, but will not extend beyond the side cover. The U Bars lap with these main bars by a lap length determined by the smaller bar as modified by the lap factor and rounding;

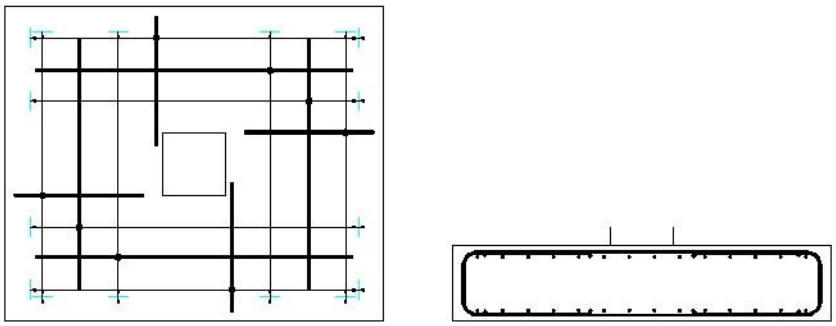

Figure 8.7.2:1 Typical Normal Bar Arrangement

- Trombone - In this arrangement the main bars form interlacing shape code 38 U bars with the bottom bars extending from the end distance in the bottom of the base to lap with the top bars. These similarly extend from the end distance in the top to lap with the bottom bars;

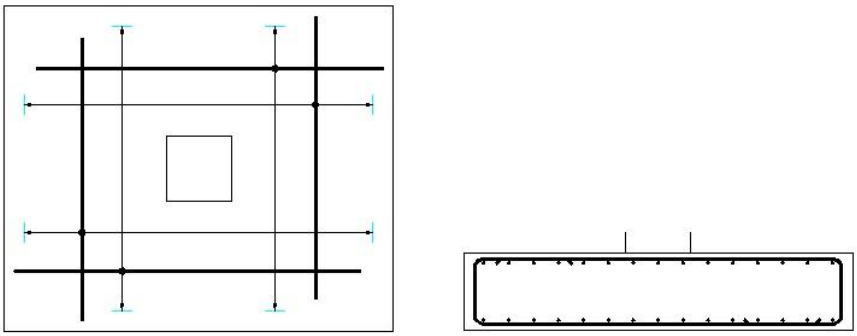

Figure 8.7.2:2 Typical Trombone Bar Arrangement

- Simple - This arrangement consists of the shape 38 bars in both mats lapping in the sides of the base. A full side lap is attempted unless the bar bend length is limited by the top and bottom covers.

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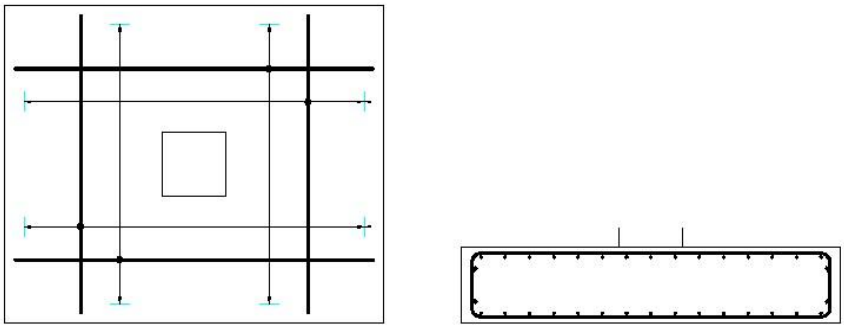

Figure 8.7.2:3 Typical Simple Bar Arrangement

8.7.3 Side Bar Arrangement

The Double General Arrangements can also have side bars enclosing them as shown in Figure 8.7.3:1 below.

- No Bars - No side bars are provided;
- 37 & 20 - This arrangement has shape code 20 bars in the sides lapping with shape 37 corner bars. The end distance is also applied to straight bars;
- 37 only - In this case the shape code 37 corner bars extend along the sides of the base to lap in the middle;

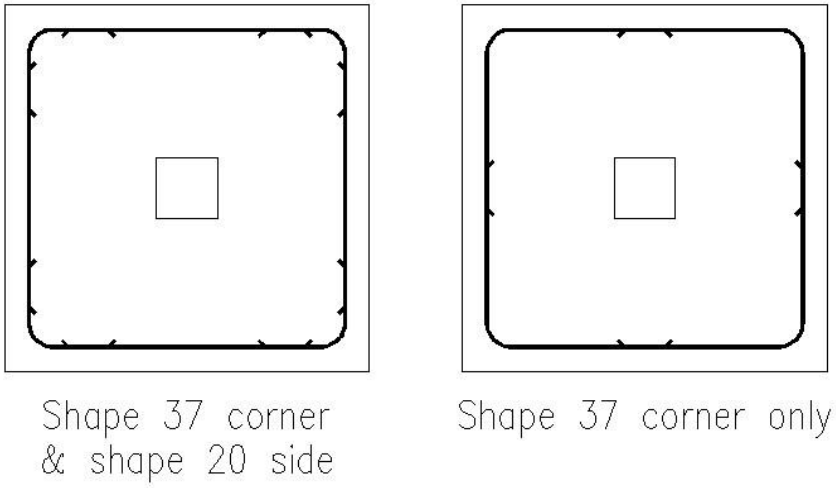

Figure 8.7.3:1 Side Bar Arrangements

8.7.4 Longitudinal Bar Shape

The longitudinal bar shape is required when a single general arrangement is selected. You can choose from shapes 20, 35 and 38.

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8.7.5 Transverse Bar Shape

This is similar to the longitudinal bar shape in a single arrangement.

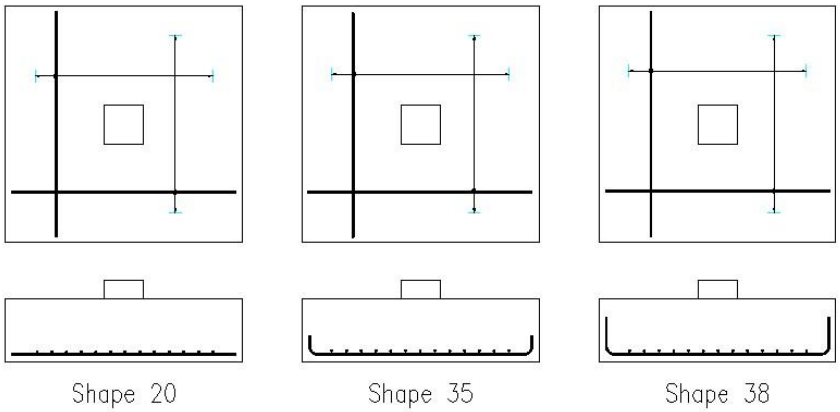

Figure 8.7.5:1 Single Longitudinal and Transverse Bar Shapes

8.7.6 Column Detail Arrangements

The Pad Base Detailer allows you to include separate column section outline and starter bars if required.

- Column Outline - Checking the Column Outline box will make CADS Pad Base Detailer draw a column section in addition to the pad base plan and section;
- Starter Bars - The Starter Bars box will only become available if the column outline box is checked, you can then go on to choose to have starter bars included. Chapter 10.10 details how to specify the starter bars.

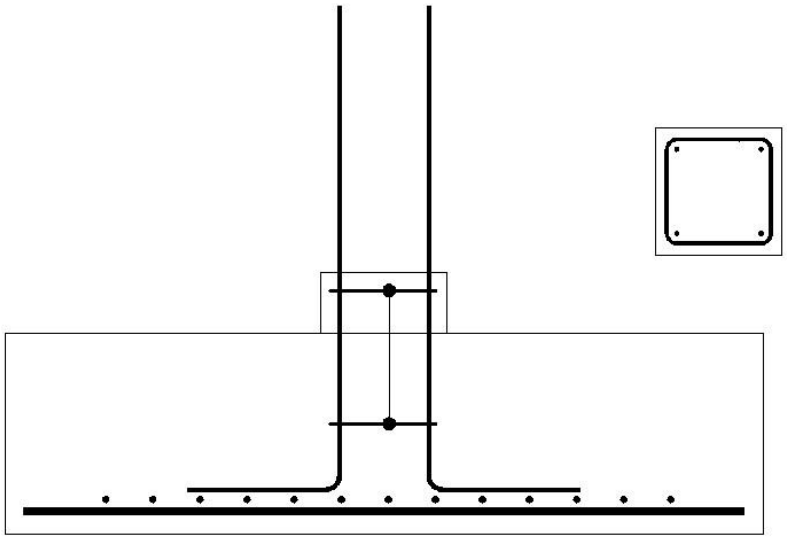

Figure 8.7.6:1 Typical Starter Bar Detail

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8.8 Pad Base Dimensions

The dimensions of the pad base are entered in this dialog. There is also a diagram accompanying the input that references the dimensions. All dimensions are in mm.

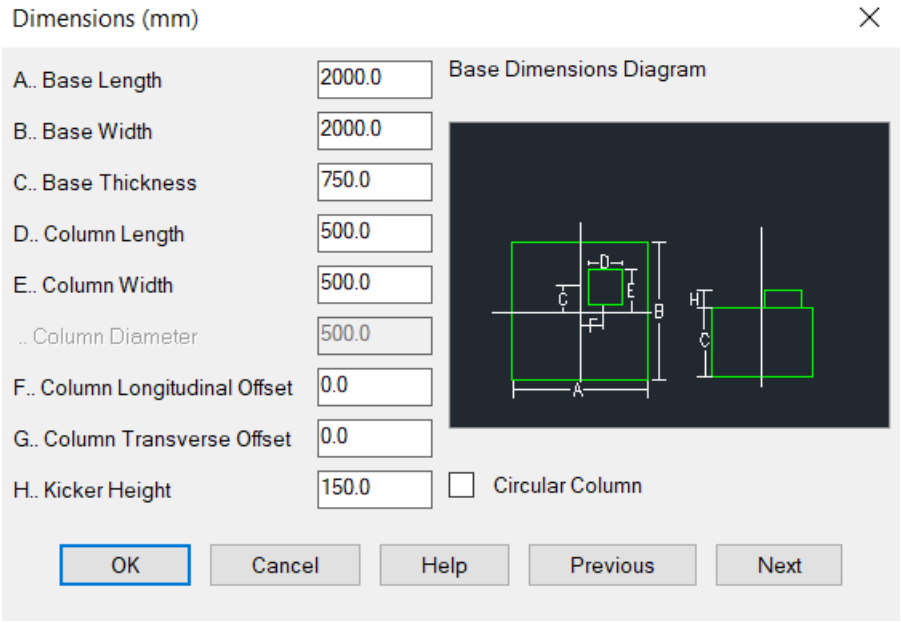

Figure 8.8:1 Pad Base Dimension Input Dialog

The OK button returns you to the Pad Base Detailer Input Main Input Menu Dialog, Previous to the Bar Arrangements, and Next to the Pad Base Reinforcement Dialogs.

The dimension dialog has the following input fields;

- Base Length - This would normally be to the longer side of the base, but it does not have to be. The Pad Base Detailer aligns this side horizontally on the drawing, and the longitudinal bars are placed parallel to this direction;
- Base Width - It follows that this is the perpendicular dimension of the base, but it does not have to be. The Pad Base Detailer aligns this side horizontally on the drawing, and longitudinal bars are placed parallel to this direction;
- Base Thickness - This is the thickness or depth of the base;
- Column Length - This applies to the side of the column parallel to the length of the base;
- Column Width - This is the dimension parallel to the base width;
- Column Longitudinal Offset - By default the column is centred over the centre of the base with a zero offset. Positive values move the centre of the column to the right, negative to the left;
- Column Transverse Offset - This determines the vertical position of the centre of the column relative to the centre of the base. Positive values move the column up, and negative down;
- Kicker Height - This specifies the height of the kicker to be drawn on the section;

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- Circular Column - If this option is selected a circular column is drawn. The column width and length options are greyed out and the column diameter option is available for input.

8.9 Pad Base Reinforcement

In this dialog you can define each of the bar sets in terms of the number of bars, type, size and pitch. These settings are described in detail below.

The OK button returns you to the Pad Base Detailer Input Main Input Menu Dialog. The Next button takes you to the Starter bars Dialog, if they have been requested, otherwise it returns you to the main Input Menu. The Previous button goes to the Dimensions Dialog.

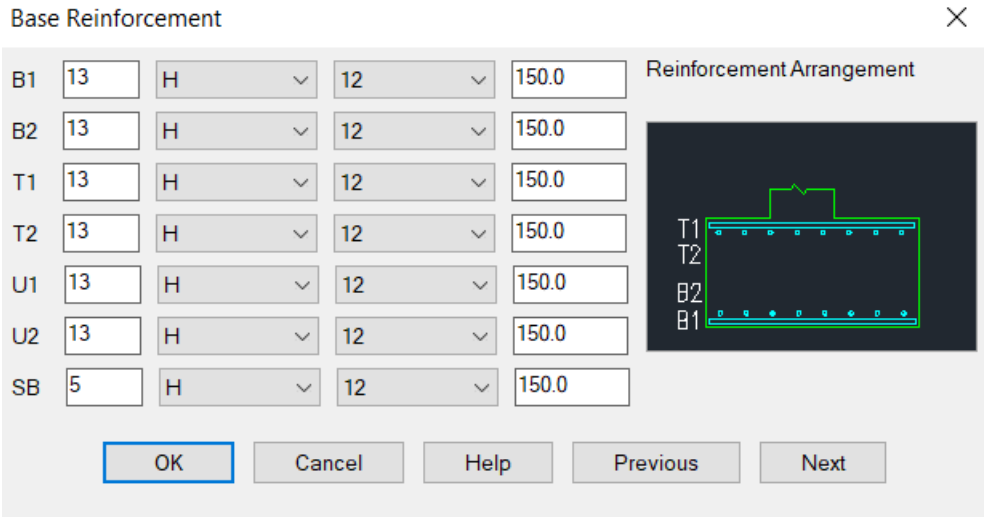

Figure 8.9:1 Typical Base Reinforcement Dialog

The Bar Sets appropriate to the chosen arrangement are listed together with an accompanying diagram which indicates the current bar arrangement. Each Bar Set requires the same data, namely the number of bars in the range, bar type, bar size and pitch. If you change the number of bars then the pitch will automatically update. If you change the pitch then the number of bars will be automatically recalculated, although for small changes of pitch there may be no change in number.

The length of the ranges is determined by the edge distance, specified in the Defaults Dialog, from the sides of the pad base. The ranges are in any case limited to the cover or the 'shoulder' of the U bars.

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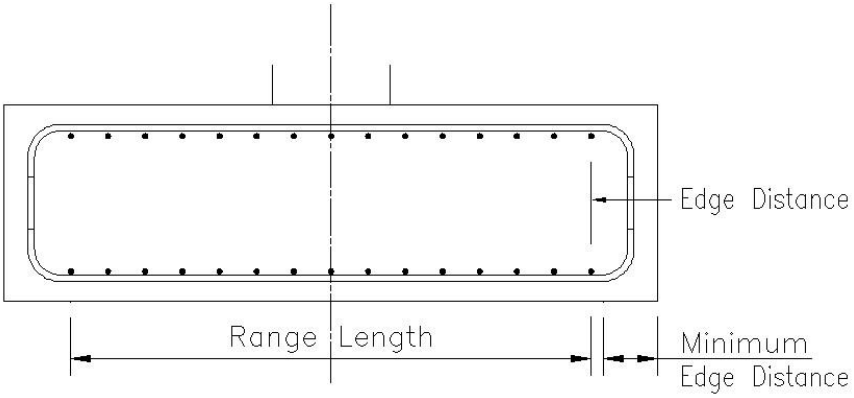

Figure 8.9:2 Edge Distance and Range Length

The main bar sets are defined by layer and so may be either longitudinal or transverse bars depending on the arrangement chosen, The U Bars, however are defined by direction, i.e. U1 is always longitudinal and U2 transverse.

For clarity the U Bars are illustrated within the main reinforcement mats but they will be drawn lapping alongside the main bars in the appropriate direction. Where chosen the side bars are taken to be the same number, type, size and pitch for all their sets.

8.10 Starter Bars

8.10.1 Rectangular Column

If you have chosen to include starter bars then this dialog allows you to define them.

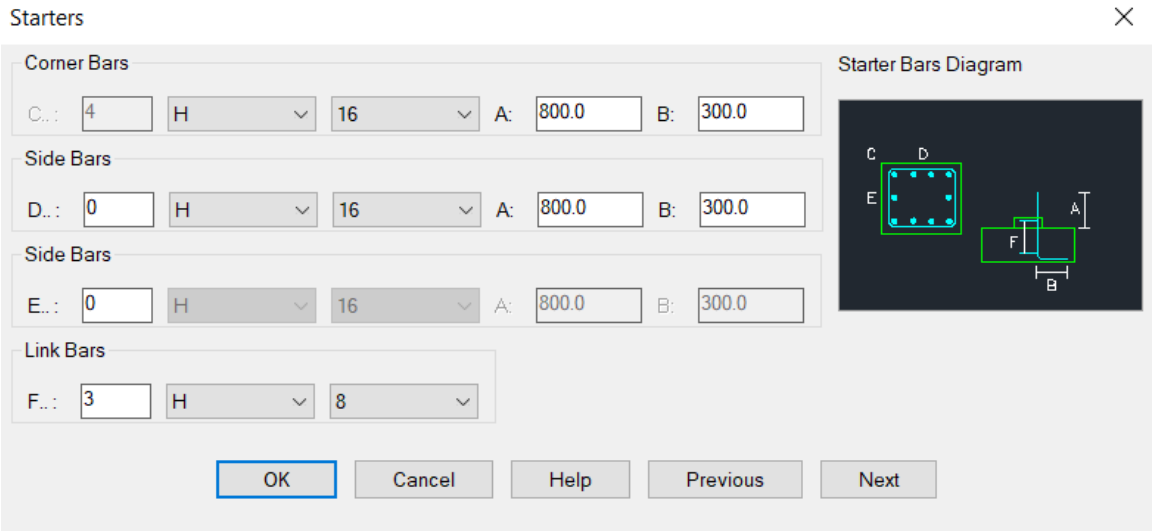

Figure 8.10:1 Starter Bars Dialog Rectangular Column

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The Bar Sets are referred to as C, D, E and F. The Bar Set C is always the four corner bars. You can also add bars along the longitudinal face of the column, Bar Set D, and the transverse face, Bar Set E. In both cases you enter the total number of bars that are shared equally between the opposite faces.

Starter Bars

Once you have entered a number greater than zero you can then specify the bar type, diameter, starter length (Leg A) and the bob length (Leg B). The Starter length you give is the distance the bars project above the top of the base. The program will calculate the required dimension so that the starters sit on the B2 Layer.

Link Bars

The links, Bar Set F, must also be specified and are taken to range between the bottom bend of the starter bars and the kicker.

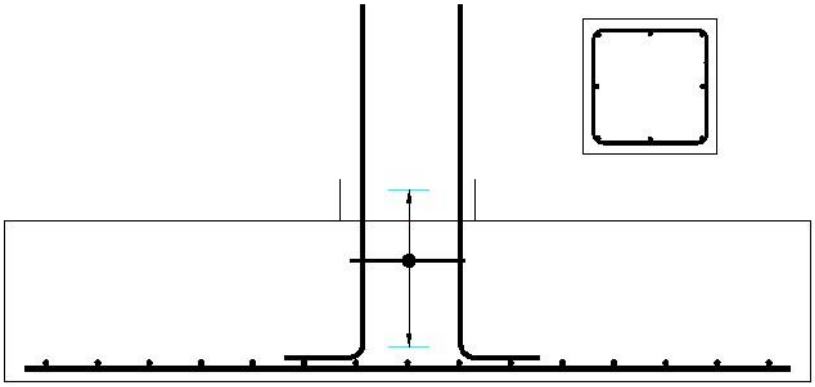

Figure 8.10:2 Typical Rectangular Column Starter Bar Detail

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8.10.2 Circular Column

If you have chosen to include starter bars and ticked the circular column option then this dialog allows you to define them.

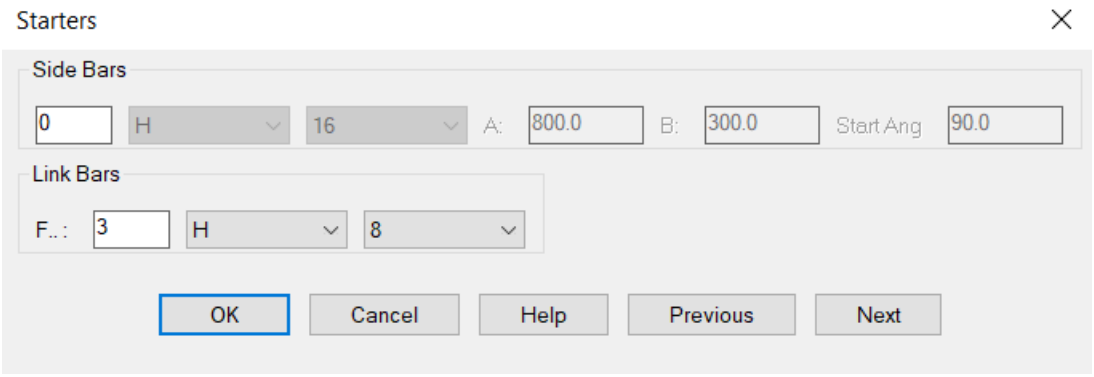

Figure 8.10.2:1 Pad Base Starter Bars Dialog Circular Column

Side Bars

Once you have entered a number greater than zero you can then specify the bar type, diameter, starter length (Leg A) and the bob length (Leg B). The Starter length you give is the distance the bars project above the top of the base. The program will calculate the required dimension so that the starters sit on the B2 Layer.

Link Bars

The links, Bar Set F, must also be specified and are taken to range between the bottom bend of the starter bars and the kicker. The link in this case is a shape code 9904, circular link, taken from CADS RC pre-programmed library of 99's.

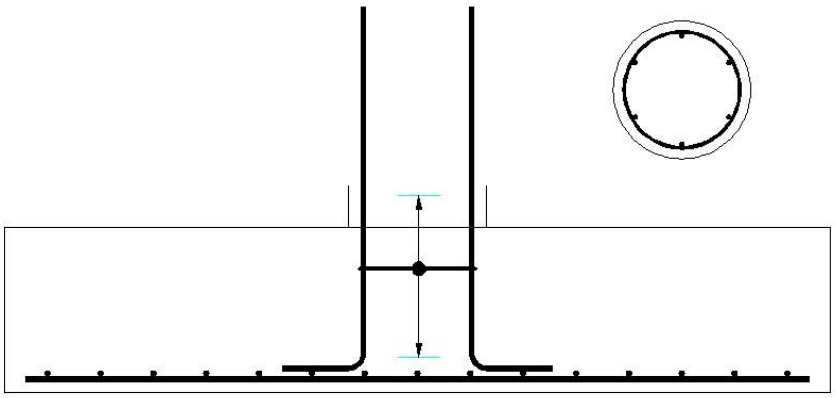

Figure 8.10.2:2 Typical Circular Column Starter Bar Detail

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8.11 Importing Design Data

The Import Button on the Padbase Detailer Main Input Menu Dialog allows data prepared by the CADS Pad Base Designer program to be used directly by the detailer. It also allows data written to a transfer file prepared by the CADS Base 2 program to be used directly by the pad Base Detailer. The Pad Base Detailer can read the data file produced by the design program.

8.11.1 Locating and Selecting the File to Import

Once the Import Option has been selected the Pad Base Import Dialog is displayed. This dialog shows the directories / folders in the left hand panel and the files in the right. It is set to display the Pad Base Designer *.RCB files and CADS Base 2 *.CCF transfer files.

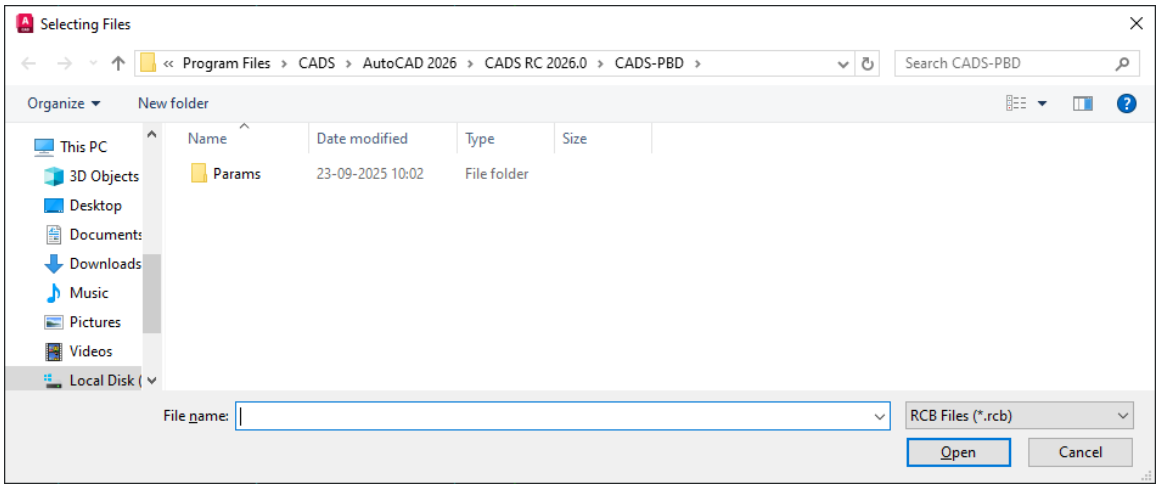

Figure 8.11:1 Pad Base Detailer Import File Selection Dialog

If you are not in the directory / folder you require then select the appropriate directory/folder or drive in the left panel until the correct path is shown.

In order to make locating the CADS Base 2 transfer files easier it is advisable for the creator of the transfer file and the detailer to agree a standard location. This location should have read / write permissions for both users. One suggestion is to write the files into the directory in which the drawing is kept, or if write permissions are not available set-up a common directory for use by both programs.

Loading a Transfer File from CADS Base 2

8.11.2 Loading a Transfer File from CADS Base 2

Select the transfer (*.CCF) file you require and a list of the bases it contains will be displayed. You can either detail bases individually, which enables you to modify the data, or mark any number of bases for the program to produce the detail directly as a batch process.

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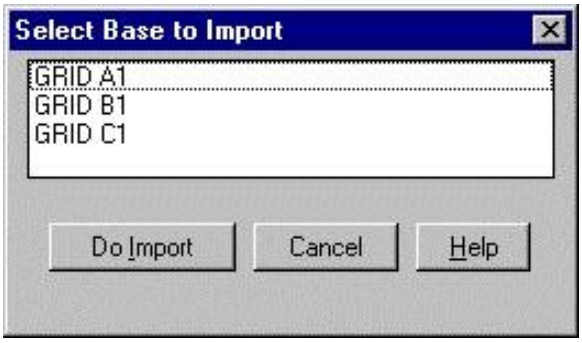

Figure 8.11.2:1 Typical List of CADS Base 2 Pad Bases

To pick an individual base select the appropriate item from the list and the base will be loaded into Pad Base Detailer as if you had entered it by hand.

You can then edit it as described in earlier sections of this manual. The Pad Base Detailer does not, however, make any checks on suitability of the chosen arrangement.

8.11.3 Loading a Job File from CADS Pad Base Designer

The Pad Base Designer will only design one pad base per job file. Select the

Pad Base Designer job file you require and the base will be loaded into Pad Base Detailer with the data set-up as if you had entered it by hand. You can then edit it as described in earlier sections of this manual. The Pad Base Detailer does not, however, make any checks on suitability of the chosen arrangement.

8.11.4 Common Information on Importing Data

Both the CADS Base 2 and the CADS Pad Base Designer programs uses the number of bars to determine the resistance of the base to moments and shears, but allows you to specify the nominal centres as well. However, it has only limited means of specifying the limits of the ranges and types of detail. The Pad Base Detailer allows more control over range limits and also checks for fitting within the 'shoulders' of the bars in the transverse direction.

As a consequence, the range lengths used by the detailer may not be the same as that assumed by the Design programs. In order to preserve the number of bars the centres will be adjusted to suit. Go to the bar Reinforcement Dialog to edit these if necessary.

8.11.5 Batch Drawing using Transfer Files from CADS Base 2

Alternatively, you can select the number of bases to process as a batch. Selecting the ALL button will mark them all. Next select the Do Import button and then the Draw Button from the Main

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Pad Base Detailer Dialog. The program will prepare each base detail in turn for placing on the drawing. You are advised to have any grids or setting out aids already on the drawing.

The batch process does not permit individual modification of transfer data, so the program will use the data directly from the transfer file. The transfer file does not carry any information about bar arrangements required, only the quantities of reinforcement in each layer and the specified bar shapes. The Pad Base Detailer will supply this missing information using its current settings as described below. You should set-up these options in the Pad Base Detailer prior to importing the base data.

As the bar centres cannot be individually updated you are asked to confirm that you want bar centres automatically calculated to 25mm increments. If you respond NO then the actual centres will be used.

For bases with just bottom reinforcement the Single 1 and Single 2 arrangements will be used according to which layer the outer bars are specified in. The transfer data will specify the bar shape.

For doubly reinforced bases the program tries to use the most appropriate detail for the bar shapes specified in CADS Base 2. If the four sets of bars are all shape code 20 then the Normal bar arrangement will be used, if they are all shape 38 then the Simple Arrangement is used. If the shapes are mixed the program will use currently set Double arrangement, and failing that the Normal Arrangement.

If the batch includes a mixture of singly and doubly reinforced pad bases then you should set-up the Pad base detailer for the required Doubly reinforced arrangement as the Single details will be dealt with automatically.

Side bars will be added to the detail, according to the arrangement chosen, using the type, size and pitch currently specified in the Reinforcement Input Dialog.

The lap factors and rounding as set in the defaults dialog will be applied where the arrangement requires lapped bars.

All the bases will be allocated to one member but they can be easily reassigned with CADS RC using the Change Member command on the Editing menu.

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8.12 Drawing the Padbase Detail

Once the dimensions and bar sets have been defined then the detail is ready to draw. Selecting the Draw button from the Main Dialog does this. The program will pause for a few moments while it assembles the drawing data and then returns to the AutoCAD drawing editor.

The Plan is drawn first and can be moved to an appropriate position on the drawing. The elevation is then drawn and it can also be moved into position. Finally, the column is drawn if requested.

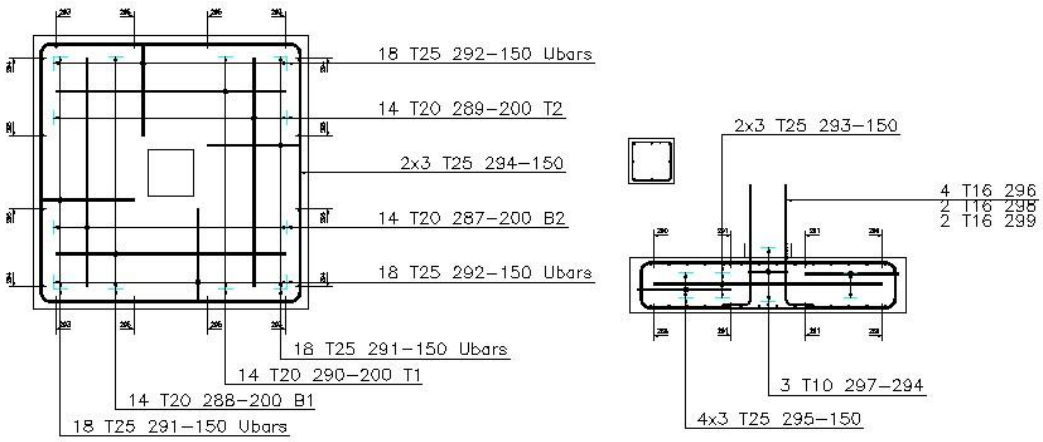

Figure 8.13:1 Typical Pad Base Reinforcement Detail

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8.13 CADS Pad Base Detaler Global Configuration Centre

	Setting	Value	Explanation
[base_cfg]	o_method	0	
	o_outline	0	
	o_level	1	
	o_reinf	3	
	o_topbars	1	
	o_sidebars	1	
	o_sidecover	2	
	o_column	2	
	o_tolerance	1	
	concrete_grade	30.0	Concrete grade
	c_bottom	75.0	Cover to bottom of padbase
	c_top	75.0	Cover to top of padbase
	c_sides	75.0	Cover to side of padbase
	c_column	35.0	Cover to column
	sideoffset	150.0	distance from end of range to side of padbase
	endoffset	250.0	distance from end of bar to side of padbase, maintains minimum cover
	lapfactor	1.0	Lap increment factor
	lapincrement	25.0	Lap rounding dimension, rounds to nearest 25mm

	Setting	Value	Explanation
[base_info]	base_level	0.0	
	base_length	2000.0	Padbase length dimension
	base_width	2000.0	Padbase width dimension
	base_thickness	750.0	Padbase thickness dimension
	blinding	150.0	Thickness of blinding to underside
	kicker_height	150.0	Padbase kicker height dimension
	column_length	500.0	Rectangular column length dimension
	column_width	500.0	Rectangular column width dimension
	column_diam	500.0	Circular column diameter
	x_offset	0.0	Column horizontal offset from padbase centre
	y_offset	0.0	Column vertical offset from padbase centre
	number_a_bars	0	
	number_b_bars	0	
	number_a_bars	0	
	number_b_bars	0	
	side_bar_size	16	Side reinforcement bar diameter
	side_bar_type	T	Side reinforcement bar grade
	side_bar_spacing	150.0	Side reinforcement bar pitch
	side_calc_mode	0	

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number_bars_up_side	3	Number of side reinforcement bars
a_bob_length	300.0	
b_bob_length	300.0	
c_bob_length	300.0	
a_starter_length	800.0	
b_starter_length	800.0	
c_starter_length	800.0	
link_bar_size	8	Link reinforcement bar diameter
link_bar_type	R	Link reinforcement bar grade
number_links	3	Number of links in column stub
reinf1base_bar_size	16	Bottom longitudinal reinforcement bar diameter
reinf1base_bar_type	T	Bottom longitudinal reinforcement bar grade
reinf1shape_code	20	Bottom longitudinal reinforcement shape code
reinf1bar_spacing	150.0	Bottom longitudinal reinforcement bar pitch
reinf1number_bars	10	Number of bottom longitudinal reinforcement bars
reinf1calc_mode	0	
reinf2base_bar_size	16	Bottom transverse reinforcement bar diameter
reinf2base_bar_type	T	Bottom transverse reinforcement bar grade
reinf2shape_code	20	Bottom transverse reinforcement shape code
reinf2bar_spacing	150.0	Bottom transverse reinforcement bar pitch
reinf2number_bars	10	Number of bottom transverse reinforcement bars
reinf2calc_mode	0	
reinf3base_bar_size	16	Top longitudinal reinforcement bar diameter
reinf3base_bar_type	T	Top longitudinal reinforcement bar grade
reinf3shape_code	20	Top longitudinal reinforcement bar shape code
reinf3bar_spacing	150.0	Top longitudinal reinforcement bar pitch
reinf3number_bars	10	Number of top longitudinal bars
reinf3calc_mode	0	
reinf3number_bars	10	Number of top longitudinal bars
reinf3calc_mode	0	
reinf4base_bar_size	16	Top transverse reinforcement bar diameter
reinf4base_bar_type	T	Top transverse reinforcement bar grade
reinf4shape_code	20	Top transverse reinforcement bar shape code
reinf4bar_spacing	150.0	Top transverse reinforcement bar pitch
reinf4number_bars	10	Number of top transverse bars

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reinf4calc_mode	0	
reinf4calc_mode	0	
reinf5base_bar_size	16	
reinf5base_bar_type	T	
reinf5Shape_code	38	
reinf5bar_spacing	150.0	
reinf5number_bars	10	
reinf5calc_mode	0	
reinf6base_bar_size	16	
reinf6base_bar_type	T	
reinf6shape_code	38	
reinf6bar_spacing	150.0	
reinf6number_bars	10	
reinf6calc_mode	0	
col_bar_size1	16	Corner column reinforcement bar diameter
col_bar_type1	T	Corner column reinforcement bar grade
col_bar_size2	16	Longitudinal column reinforcement bar diameter
col_bar_type2	T	Longitudinal column reinforcement bar grade
col_bar_size3	16	Transverse column reinforcement bar diameter
col_bar_type3	T	Transverse column reinforcement bar grade
circstrang	90.0	

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	Setting	Value	Explanation
[BarInfo]	StraightBar	20	Straight bar shape code
	LegBar	35	Leg bar shape code
	FullBar	38	Full bar shape code
	Lbar	37	'L' bar shape code
	LinkBar	61	Link bar shape code
	CircLinkBar		Circular Link shape code
	LinkBarDim1		Link bar leg 1 dimension letter
	LinkBarDim2	B	Link bar leg 2 dimension letter
	LBarDim1	A	'L' bar leg 1 dimension letter
	LBarDim2	B	'L' bar leg 2 dimension letter
	StraightBarDim	A	Straight bar dimension letter
	LegBarDim	A	Leg Bar dimension letter
	FullDim1	A	Full bar leg 1 dimension letter
	FullDim2	B	Full bar leg 2 dimension letter
	FullDim3	C	Full bar leg 3 dimension letter
	StraightBarView Side		Straight bar, view to be drawn
	LegBarView	Side	Leg bar, view to be drawn
	FullBarView	Side	Full bar, view to be drawn
	RotateFullBars	0	
	RotateSideBars	0	
	LinkBarDim	Normal	
	CircLinkBarDim	A	Circular link dimension letter

	Setting	Value	Explanation
[PadBaseDesigner]	DataPath	\cads\rcbased\data	Path to CADS Pad Base Designer

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9 CADS Stair Flight Detailer

Chapter Objectives

CADS Stair Flight Detailer provides an automated method of detailing the reinforcement arrangements for a single flight staircase. The basic detail the program draws is of the form recommended in the "Standard method of Detailing Structural Concrete" published by the Institution of Structural engineers and the Concrete Society.

9.1 Program Operating Environment

The CADS Stair Flight Detailer is designed to make the drawing of stair flights a quick and easy process. The program is used in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Stair Flight Detailer can be used. The details produced are fully compatible with CADS RC, which means that they can be readily merged into an existing drawing and modified to suit the particular conditions.

CADS Stair Flight Detailer uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

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9.2 Loading the Stair Flight Detailer

The CADS Stair Flight Detailer is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 9.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

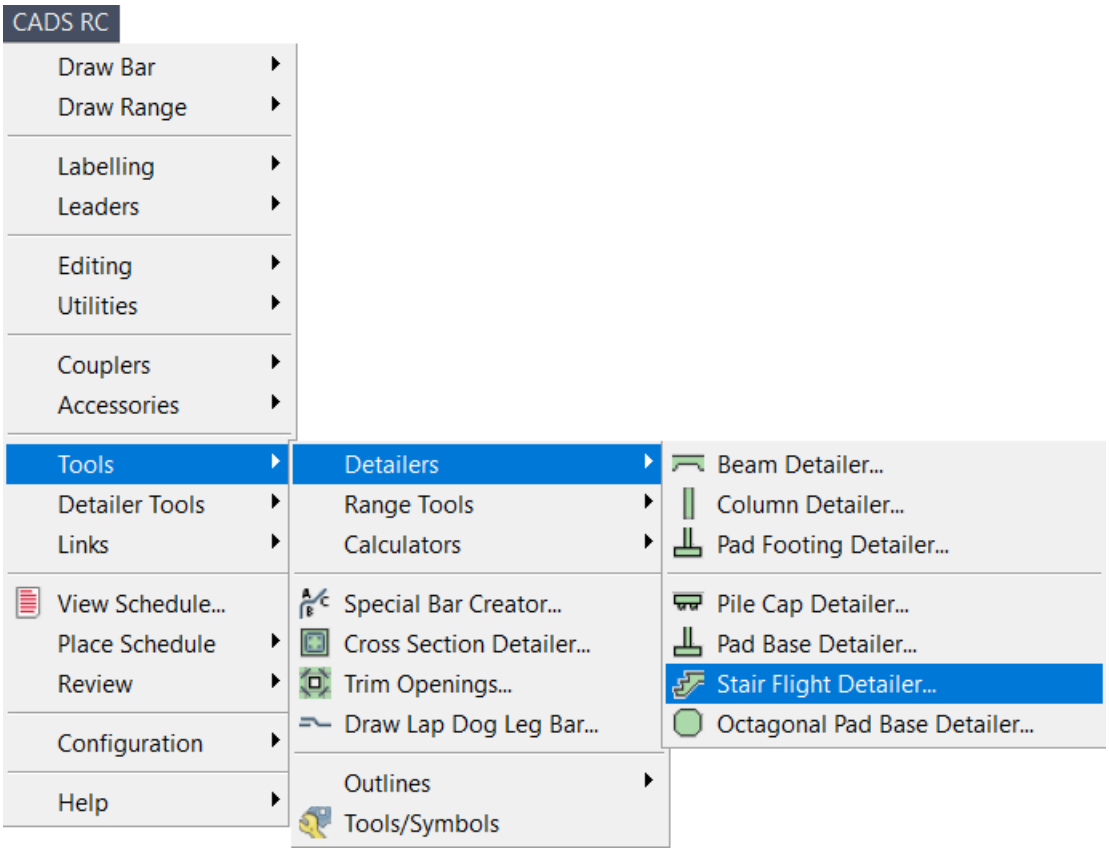

Figure 9.2:1 CADS RC Detailers Selection Menu

To load the Stair Flight Cap Detailer, highlight the line 'CADS Stair Flight Detailer' and then pick the Load button. This will load the CADS Stair Flight Detailer ready for use.

When the Stair Flight Detailer has been selected the Set Member Title Dialog is displayed, as shown in Figure 9.2:2. At this point you can select an existing member title or create a new member title. The stair flight reinforcement will be assigned to the selected member title.

You can now continue by picking the OK button. For further information on Member Titles refer to the CADS RC User Guide.

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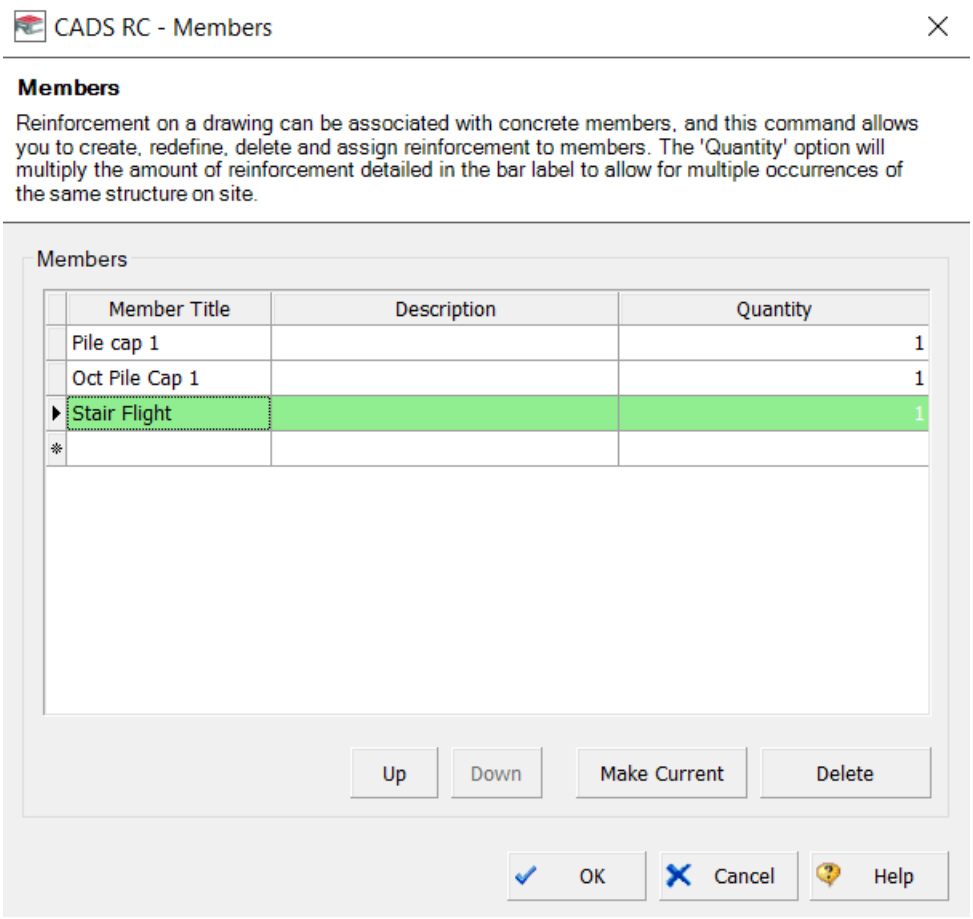

Figure 9.2:2 Member Title Selection Dialog

When the required member title has been defined the Stair Flight Detailer Input Menu dialog is displayed, as shown in Figure 9.3:1

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9.3 Defining the Stair Flight for Detailing

The program is divided into the following topics, each of which has its own input dialog:

- Defaults - which consists of the basic materials and lap data;
- Options - to define the bar arrangement to be drawn;
- Dimensions - which specify the geometry of the stair;
- Reinforcement - where the number, type, size and pitch of the bars are defined.

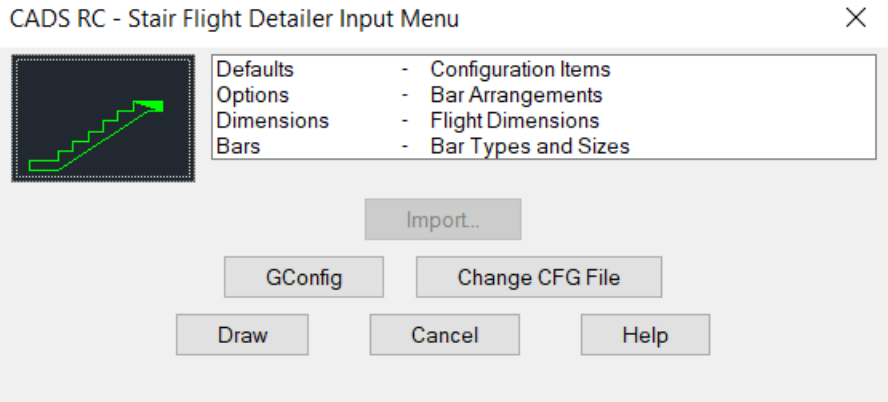

Figure 9.3:1 Stair Flight Detailer Selection Menu

9.3.1 Stair Flight Detailer Configuration File Selection

When the Stair Flight Detailer is loaded the Stair Flight Detailer Input dialog is displayed, see Figure 9.3:1. This dialog contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 9.3.1:1.

Currently the UK version of this software offers two default files CADS-SFD.DEF and SFD_UK.DEF. The CADS-SFD.DEF is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The SFD_UK.DEF is identical to the CADS-SFD.DEF file.

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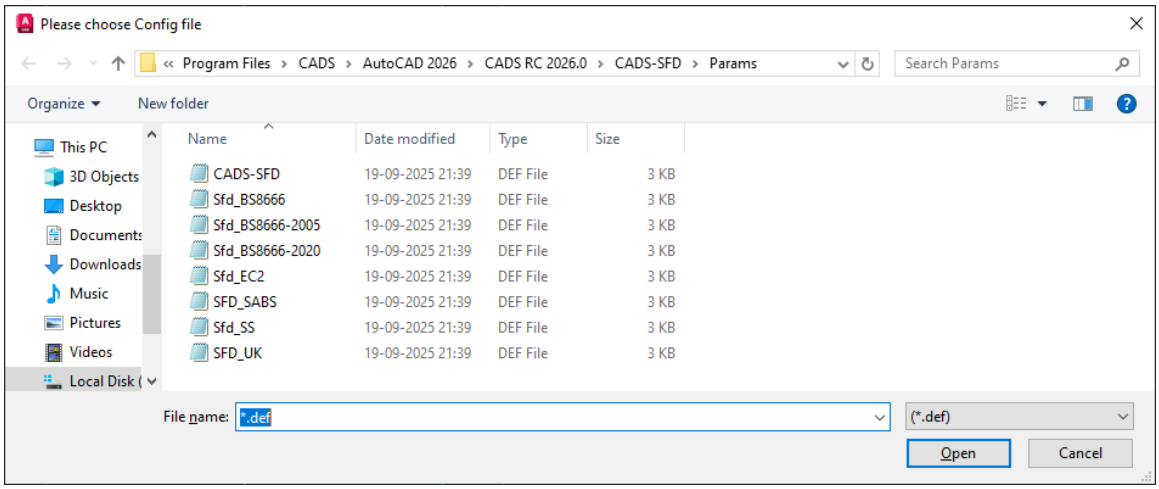

Figure 9.3.1:1 Default Stair Flight Configuration File Options

Should other configuration options be required, then please contact the CADS Support department who will be pleased to advise accordingly.

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9.4 Setting the Stair Flight Defaults

The input options in the Defaults dialog are primarily concerned with the materials, but also the lap parameters to be set.

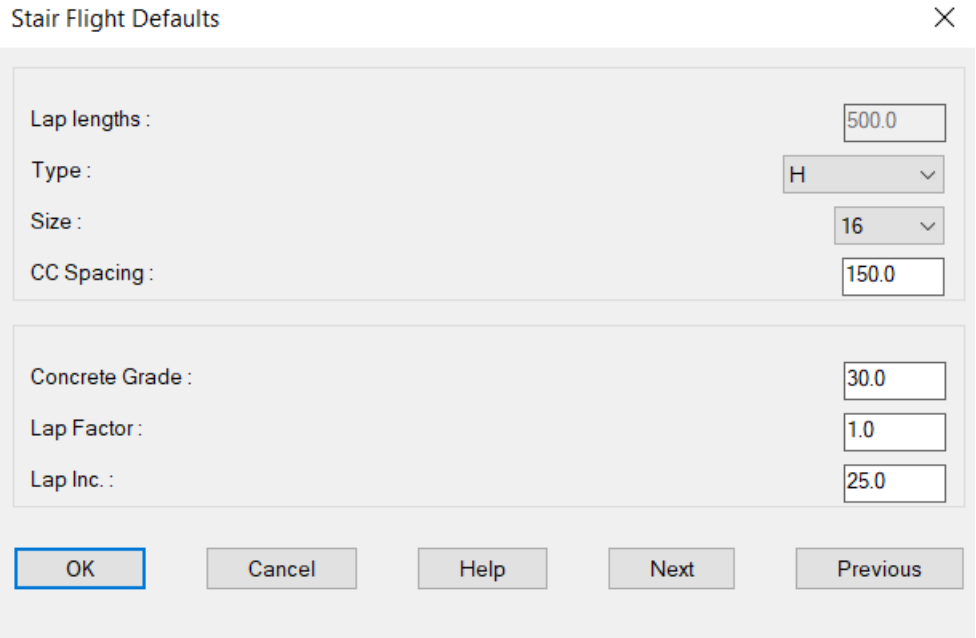

Figure 9.4:1 Defaults Dialog

The defaults dialog is divided it to the following input fields:

- Concrete Grade - The concrete grade is used to determine the basic lap length for the type of bar. The length is based on the multiplier values given in Table 3.29 of BS8110:Part1:1985;
- Bar Type, Size and Pitch - Staircases frequently have a number of bar sets that use the same type, size and pitch (c/c) of bars. In order to make the reinforcement data easier to define you can specify defaults that the program will use to set-up the bar data. These defaults can also be used to reset all the bar data you wish;
- Lap Factor - The lap length determined by the concrete grade might need to be modified by a factor if the bar size is greater than half the cover. In order to provide control, the program does not do this automatically, but allows you to specify an appropriate value if you wish;
- Lap Rounding - The lap rounding value simply rounds up the calculated lap length to the next specified increment (e.g. a calculated lap length of 444 becomes 450 when a rounding value of 25 is used).

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9.5 Selecting the Stair Flight Options

The Options Dialog is divided into three groups. These determine how the stair is to be drawn and the bar setting. This information is described in the following sections.

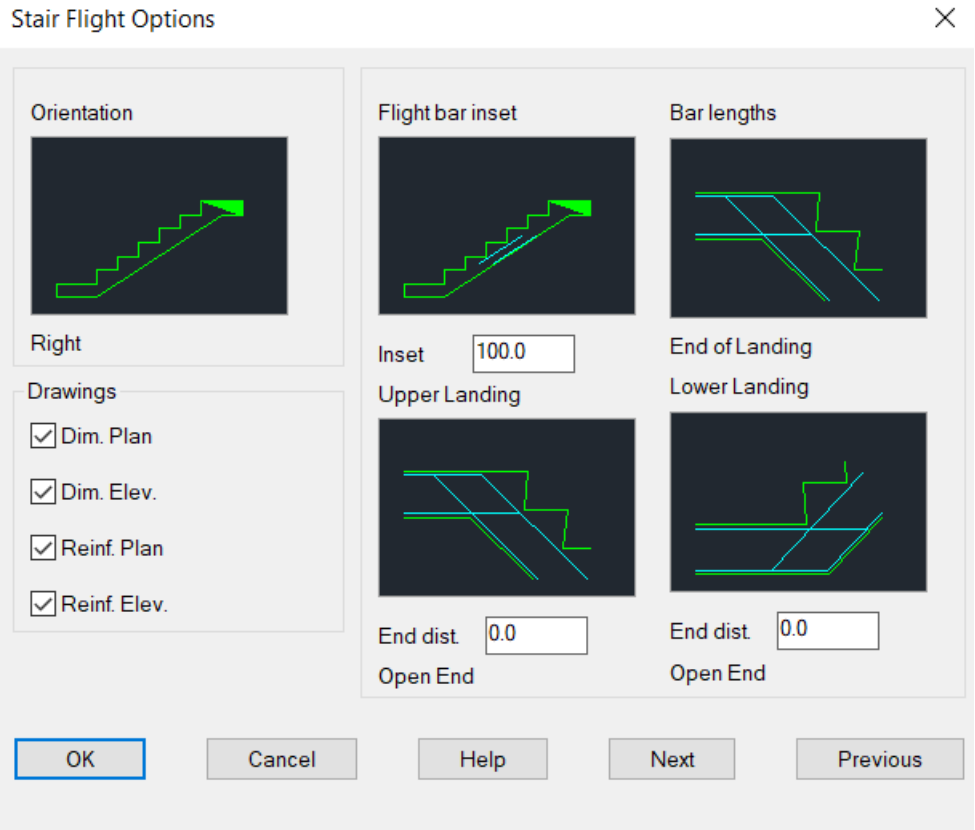

Figure 9.5:1 Typical Options Dialog

Orientation

This option simply determines which way round the flight will be drawn, i.e. up towards the right or up towards the left. Clicking on the slide of the stair flight will toggle between these options.

Drawings

The four options allow you to choose whether to have the elevation and / or plan of the stair reinforced and dimensioned. Select the appropriate check boxes to set-up the combination of your choice.

Should you wish the detailer could be used to produce just an outline of the stair, if the reinforcement options are switched off. You may find this easier and quicker to use than the two stair outlines in CADS RC.

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End Options

The remaining four options in this group allow you to indicate where the main bars are to be placed and the end conditions of the landing outline.

- Flight Bar Inset - The flight bars are assumed to run between the line of the structural top face of the lower landing and the structural soffit of the upper landing as shown in Figure 9.5:2 below;

Figure 9.5:2 Flight Bars between Landings

Clicking on the flight bar inset slide allows you to toggle between this and specifying a distance by which the bars will be inset.

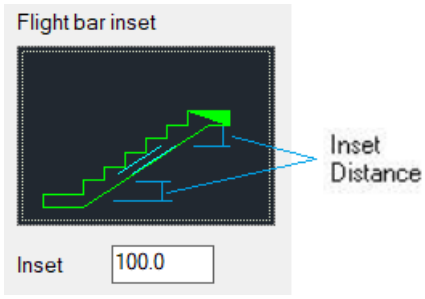

Figure 9.5:3 Flight Bars Inset from Landings

- Bar Lengths - Clicking on the Bar Lengths Slide allows you to indicate whether the bars in the landing extend tot he end of the landing or are based on the bar anchorage length. If the End of Landing option is chosen then the bars will be continued to the end of the landing or to an inset distance from the end as specified for the Top and Bottom Landings in the next two options;

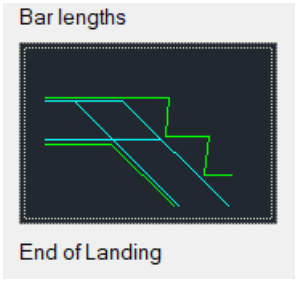

Figure 9.5:4 End of Landing Option

The alternative choice is Anchorage Length in which case the bar is terminated an anchorage length from the flight. This length is measured from the same notional line as used for the flight bars as described in the section above.

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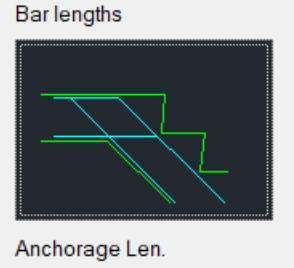

Figure 9.5:5 Anchorage Length

- Upper and Lower Landing Ends - The last two options on this dialog enable you to specify the type of end closure used for the outline and an end distance if the Bar Length is specified to the end of the landing;

There are three end conditions (Open, Cut and Closed), as shown in Figures 9.5:6, 9.5:7 and 9.5:8 below, which can be selected by clicking on the Upper or Lower Landing Slides.

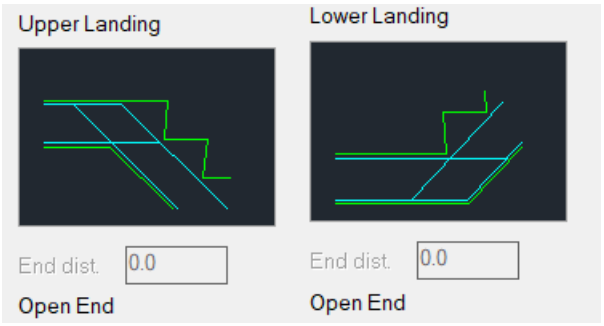

Figure 9.5:6 Open End Landing Condition

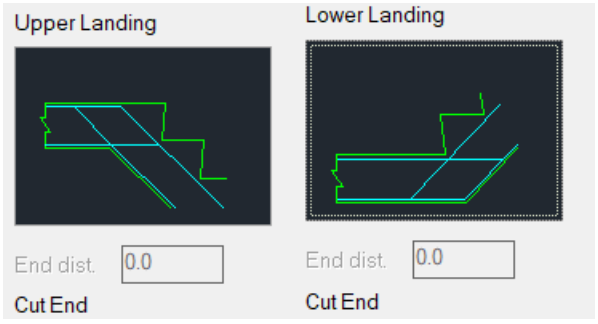

Figure 9.5:7 Cut End Landing Condition

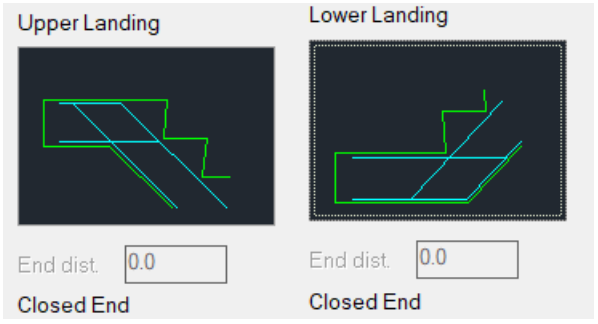

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Figure 9.5:8 Closed End Landing Condition

- End Distance – This allows you to specify how far from the end of the landing you want the bars to start. A value of zero will place them at the end and a negative value will cause the bars to project beyond the end of the outline. You can use this distance to specify an end cover to the bars.

The length of the landing itself is defined in the Dimensions Dialog that is detailed in the next section.

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9.6 Defining the Stair Flight Dimensions

The Dimensions Dialog is where the actual geometry of the stair is defined. It is very similar to the CADS RC stair outline in the data it requires. The input fields are displayed with a letter corresponding to a dimension on the accompanying diagram.

The overall dimensions are to the finishes but if you wish to specify to the structural concrete them make the finishes (F1, F2, A1 and A2) zero.

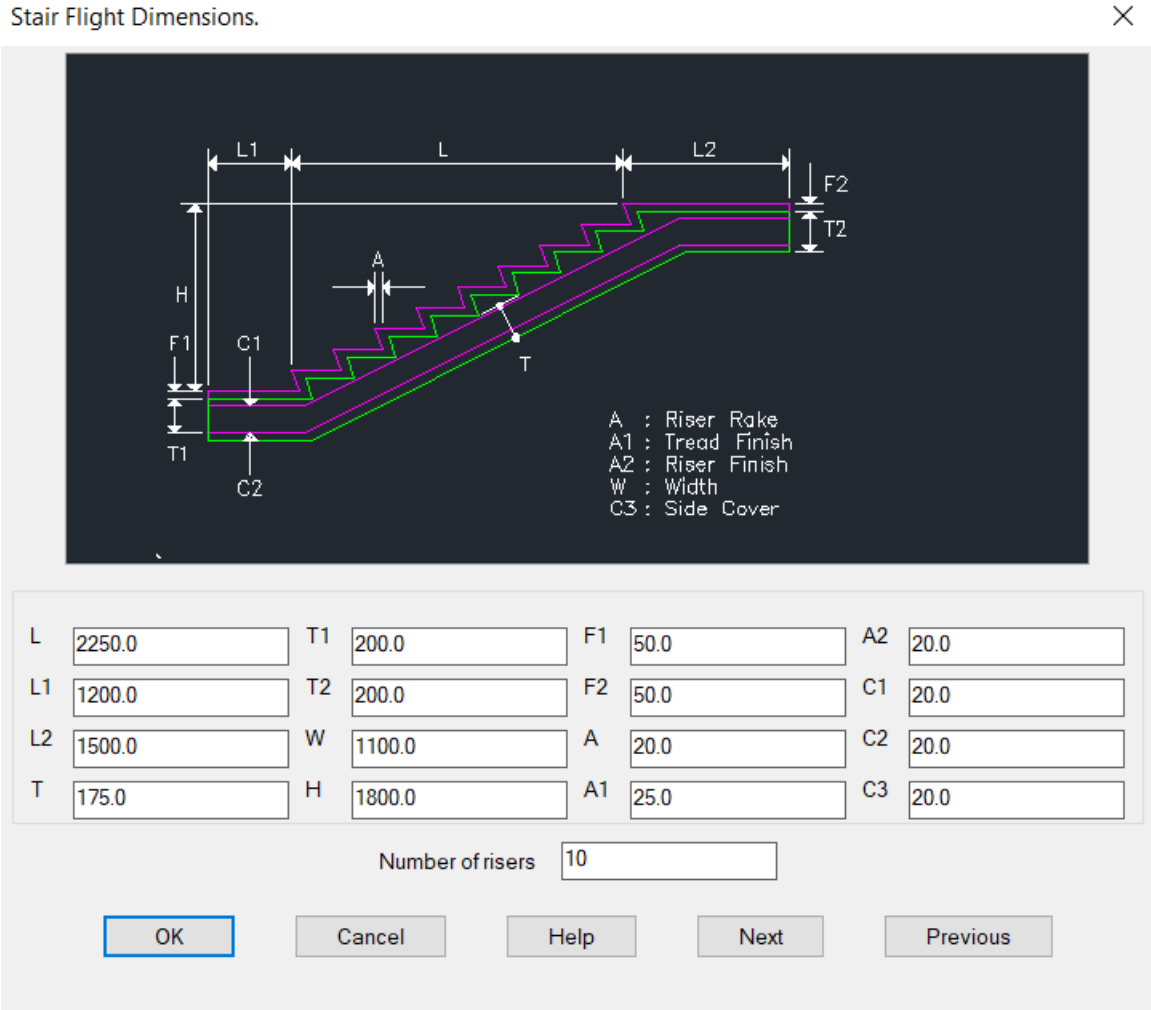

Figure 9.6:1 Typical Dimensions Dialog

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Each dimension for the Dimension Dialog is explained in more detail below:

- Flight Length L - This is the length of the flight measured between the finished nosings of the first tread and the top landing;
- Lower Landing Length L1 - The length of the lower landing is measured from the finished nosing of the first tread tot he end of the landing outline as it is to be drawn. This value will depend on how you want the landing to merge with any other details you may have on your drawing, and need not correspond with the physical end of the landing;
- Upper Landing Length L2 - The upper landing length is measured from the nosing of upper landing to its end, as you want it drawn. Like the lower landing the actual value will depend on the detail required;
- Waist Thickness T - The waist thickness is the structural thickness of the stair from the root of a typical step to the soffit of the flight. Where necessary a fillet will be provided between the lower landing and the first riser to preserve the waist thickness;
- Lower Landing Thickness T1 - This is the structural thickness of the lower landing;
- Upper Landing Thickness T2 - This is the structural thickness of the upper landing;
- Flight Width W - This is the width of the stair flight. For the purposes of creating the detail it is taken to include the landings as well. Where the landings differ in width from the flight there are such a wide variation in details that it might be considered to be much more useful, and flexible to edit the bar arrangement when the stair has been placed on the drawing using CADS RC;
- Flight Height H - The overall height of the flight is measured between the top of the finish on the upper and lower landings. The relationship between the flight length L and its height H govern the steepness of the stair, but the program does not make checks for compliance with any regulations;
- Lower Landing Finish F1 - This is the thickness of the lower landing finishes;
- Upper Landing Finish F2 - This is the thickness of the upper landing finishes;
- Riser Rake A - This is the rake of the riser measured to the finish;
- Tread Finish A1 - This is the thickness of the finish on a typical tread;
- Riser Finish A2 - This is the thickness of the finish to a typical riser;
- Top Cover C1 - The top cover value applies to both landings and the flight. The flight cover is measured from the structural root of a typical step;
- Bottom Cover C2 - The bottom cover value applies to both landings and the flight soffit;

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- Side Cover C3 - This is the cover to the side of the stair as viewed in plan. There is no specific end cover value, but the End Distance in the Options Dialog can be used for this purpose;
- Number of Risers N - The program will divide the flight height into this number of equal risers measured over their finish. Consequently, any variations in finish thickness will be taken out on the top and bottom structural risers.

Note:

The stair flight detailer dimensions dialog does not check that the data entered into the above fields against the Building Regulations.

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9.7 Defining the Stair Flight Bar Arrangement

The Reinforcement Dialog allows you to define each of the bar sets in terms of its number, type, size and pitch. This information is described more fully below:

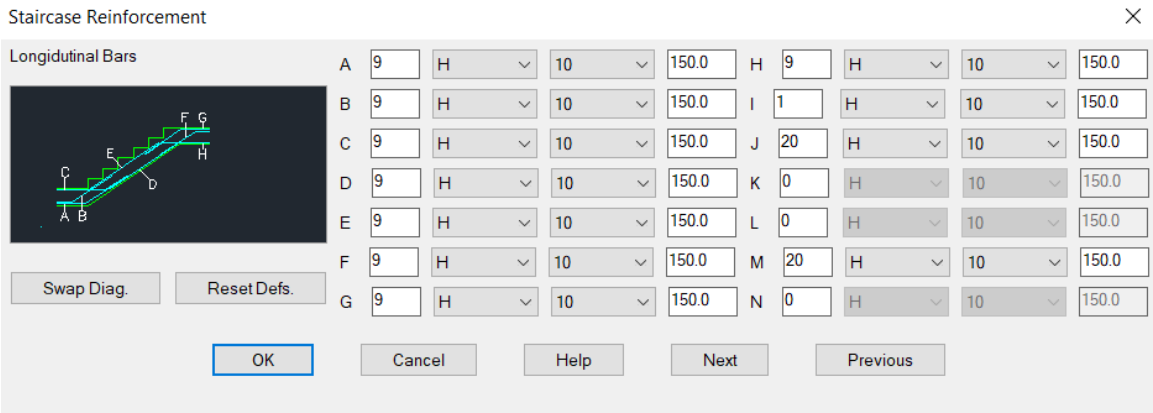

Figure 9.7:1 Typical Reinforcement Dialog

Swap Diagram Button

This button toggles between the diagram of the annotated illustrations of the longitudinal bars and the transverse bars to assist with identifying the bar sets that you can define in the Reinforcement Dialog

Figure 9.7:2 Transverse Bar Diagram

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9.7.1 Defining a Typical Bar Set

All the bar sets are defined in the same way. They have been laid out like a typical bar label so that entering the data follows a natural flow. Usually you should start at the number field and work across each set until you have entered the pitch.

The program automatically determines the number of bars or the pitch depending on the range length of the bar set. How these range lengths are determined is described for each particular bar set in the next section.

- Number of Bars - If you change the number of bars then the pitch will be simultaneously recalculated. The calculated pitch will be the average pitch of the bars and may not be a rounded number you would normally use. This can be amended when you reach the pitch input field. This program does not allow a range with less than two bars;
- A special case is when you enter zero for the number of bars. This tells the program not to draw that bar set and the other input fields for that set are 'greyed out';
- Type of Bar - The program will accept T, R, U, X and S type of reinforcement, although U, X and S are not fully supported by CADS RC. You can use the pop down list to select the required option;
- Size of Bar - You can select the diameter of bar from the pop down list;
- Bar Pitch - This is calculated according to the number of bars whenever that is amended. Otherwise when you change the value of the pitch the number of the bars will be recalculated. In many cases small changes in the pitch will not change the number of bars.

9.7.2 The Stair Flight Bar Sets Explained

This section describes each of the bar sets detailed by the program. The anchorage and lap lengths mentioned include the lap factor and any specified rounding. The lap is based on the lesser value for the two bar types and diameter.

The main and secondary longitudinal bars all have the same range extending between the side covers of the flight. The transverse bars are all shape code 20 bars extending between the covers, but with a 40mm end tolerance deduction.

- Lower Landing Main Bottom Bars 'A' - These are shape code 62 bars which extend either from the inset value at the end of the landing, or an anchorage length from the flight, to lap with the bottom flight bars;

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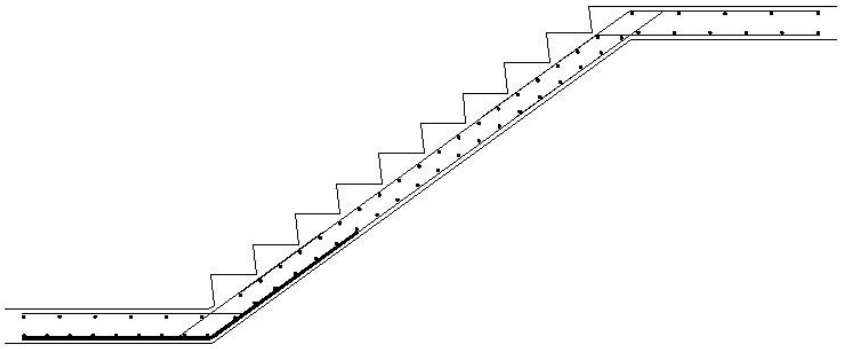

Figure 9.7.2:1 Bar Set 'A'

- Lower Landing Secondary Bars 'B' - These are shape code 62 bars that run in a similar manner to the bottom landing main bars but lap with the top flight bars. If the top flight bars omitted then they extend into the flight by an anchorage length. You may wish to alter this position, using CADSRC, if it does not correspond with the simplified bar curtailments shown in the I Struct E Detailing Manual. In most cases such a change will not be required;

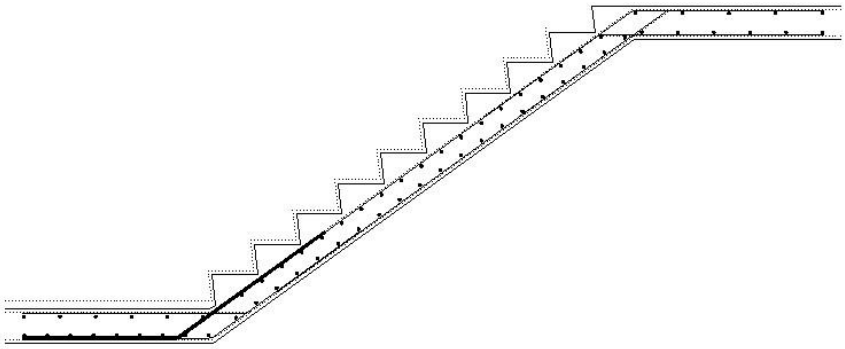

Figure 9.7.2:2 Bar Set 'B'

- Lower Landing Main Top Bars 'C' - These shape code 62 bars extend from the end inset, or anchorage length from the flight, to lap with the bottom flight bars;

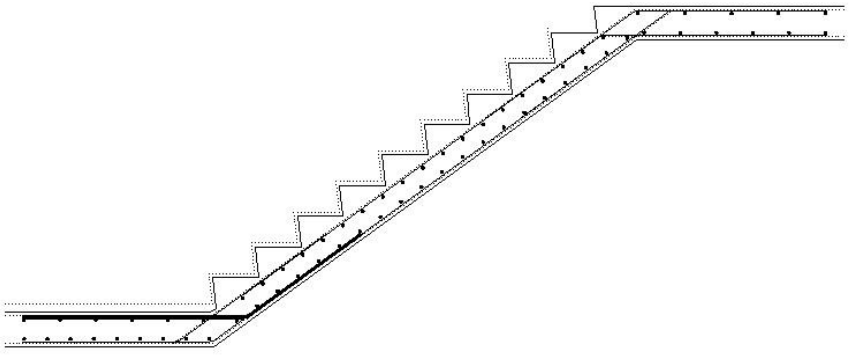

Figure 9.7.2:3 Bar Set 'C'

- Flight Main Bottom Bars 'D' - These are shape code 20 bars running between the flight inset values. They have a full lap with the main top and bottom bars from both landings;

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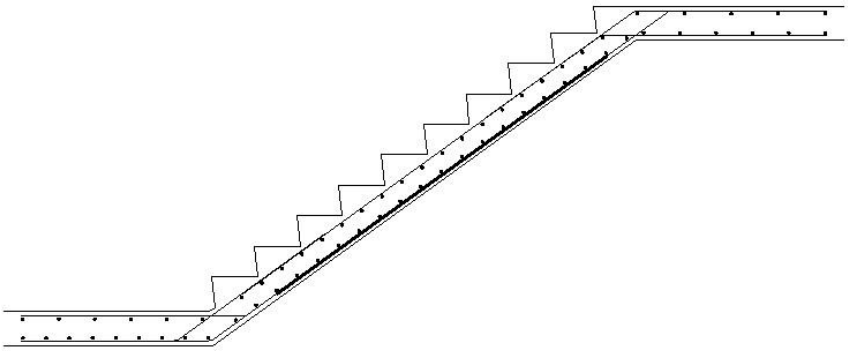

Figure 9.7.2:4 Bar Set 'D'

Flight Main Top Bars 'E' - These are shape code 20 bars that extend over the same distance as the flight main bottom bars. They are quite often omitted from a stair detail.

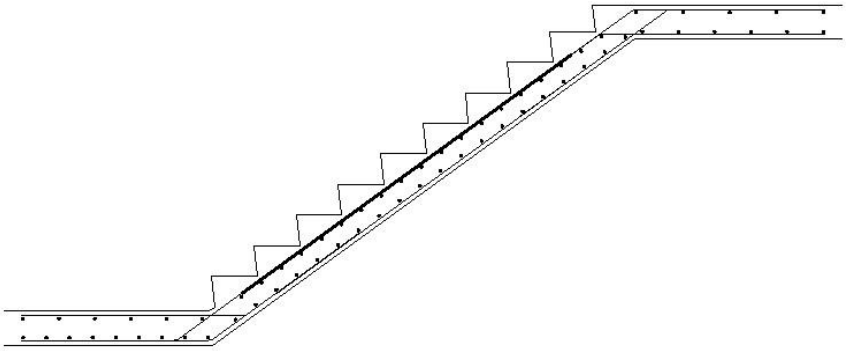

Figure 9.7.2:5 Bar Set 'E'

- Upper Landing Secondary Bars 'F' - These extend from the end inset, or anchorage distance from the flight, to lap with the bottom flight bars.

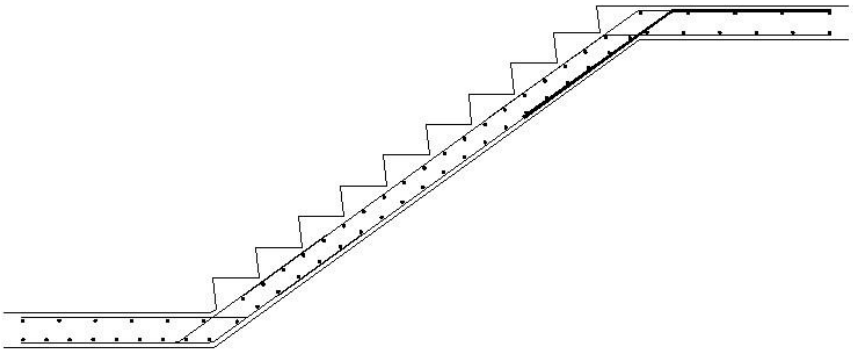

Figure 9.7.2:6 Bar Set 'F'

Upper Landing Main Top Bars 'G' - These extend from the same position as the main top bars but lap with the top flight bars if they are present. Otherwise they extend an anchorage length into the flight. You may wish to alter this position for the reasons outlined under the Lower Landing Secondary Bars above.

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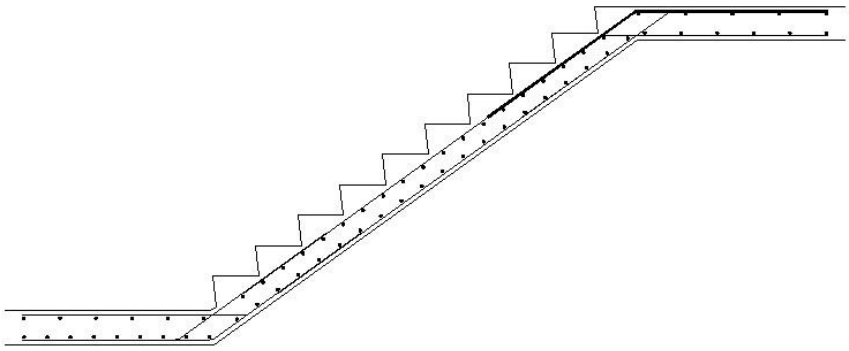

Figure 9.7.2:7 Bar Set 'G'

- Upper Landing Main Bottom Bars 'H' - These extend as the other landing bars to lap with the top flight bars, or anchorage length into the flight;

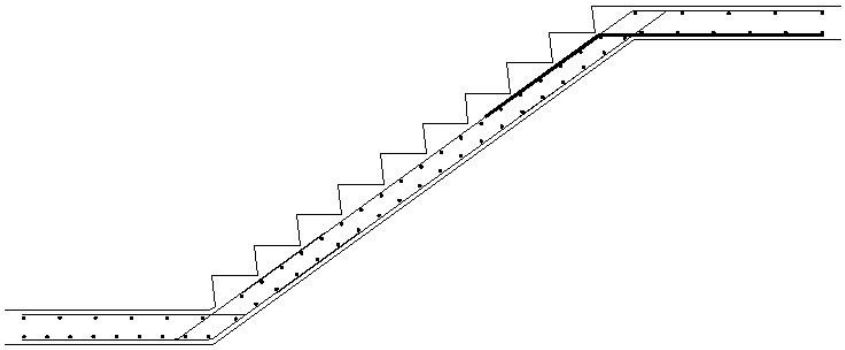

Figure 9.7.2:8 Bar Set 'H'

- Lower Landing Transverse Bottom Bars 'I' - These extend along the whole length of the landing bottom bars;

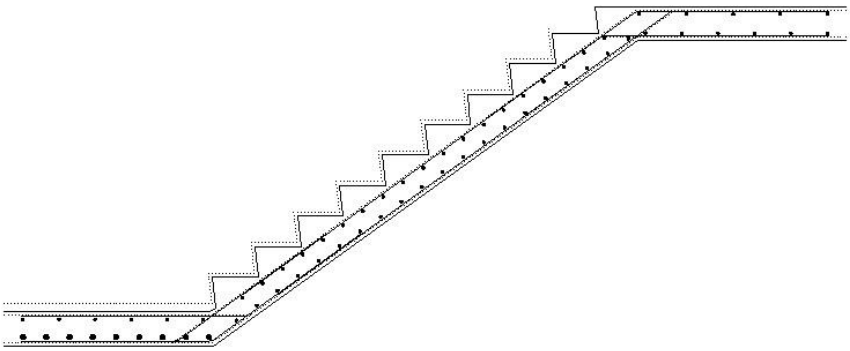

Figure 9.7.2:9 Bar Set 'I'

- Flight Transverse Bottom Bars 'J' - These extend from a pitch above the lower landing bottom transverse bars to a pitch below the upper landing bottom transverse bars;

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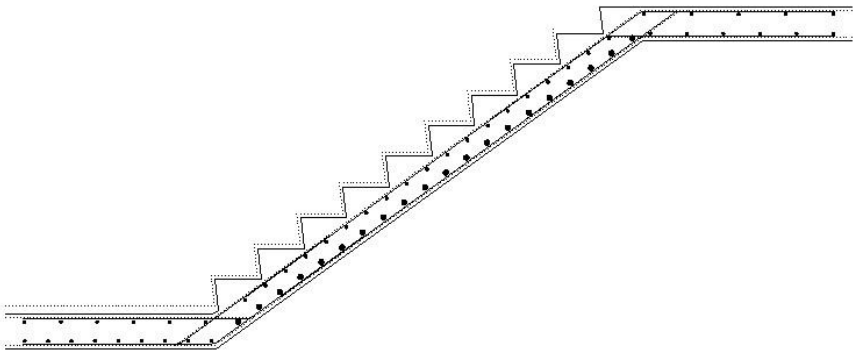

Figure 9.7.2:10 Bar Set 'J'

- Upper Landing Transverse Bottom Bars 'K' - These extend from the end of the bottom main bars to the intersection with the secondary bars;

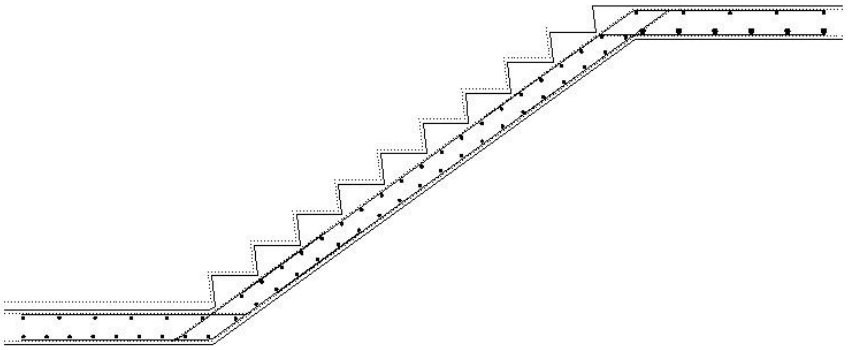

Figure 9.7.2:11 Bar Set 'K'

- Lower Landing Transverse Top Bars 'L' - These extend from the end of the top bars to their intersection with the secondary bars;

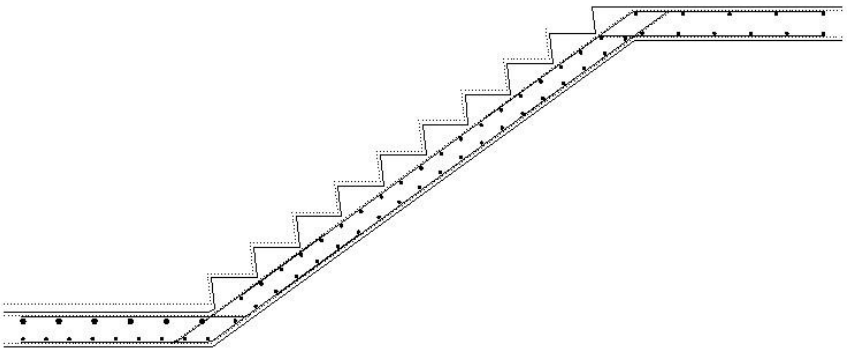

Figure 9.7.2:12 Bar Set 'L'

- Flight Transverse Top Bars 'M' - These run between the top transverse bars in the upper and lower landing with each end offset by the pitch value. If the top main flight is omitted and the bars from the landing do not lap then these transverse bars will be split into two sets extending the length of the top bars;

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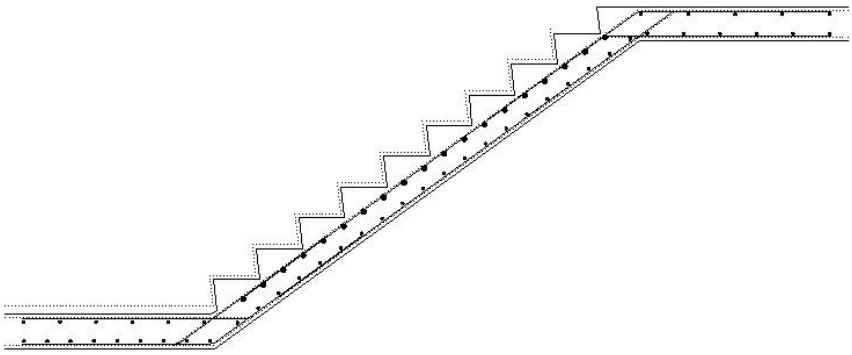

Figure 9.7.2:13 Bar Set 'M' Continuous

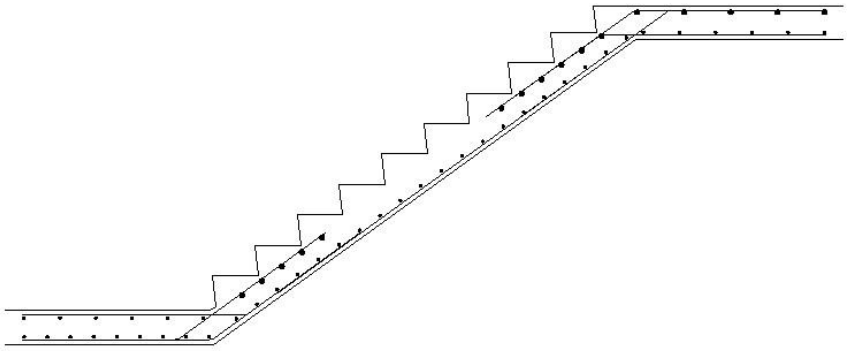

Figure 9.7.2:14 Bar Set 'M' Split

- Upper Landing Transverse Top Bars 'N' - These run along the length of the top bars;

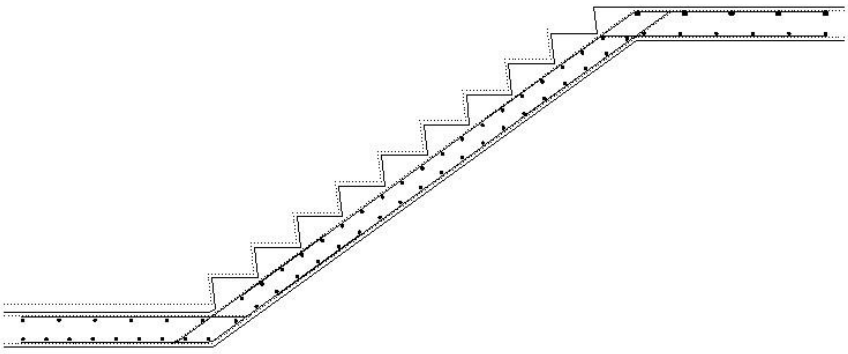

Figure 9.7.2:15 Bar Set 'N'

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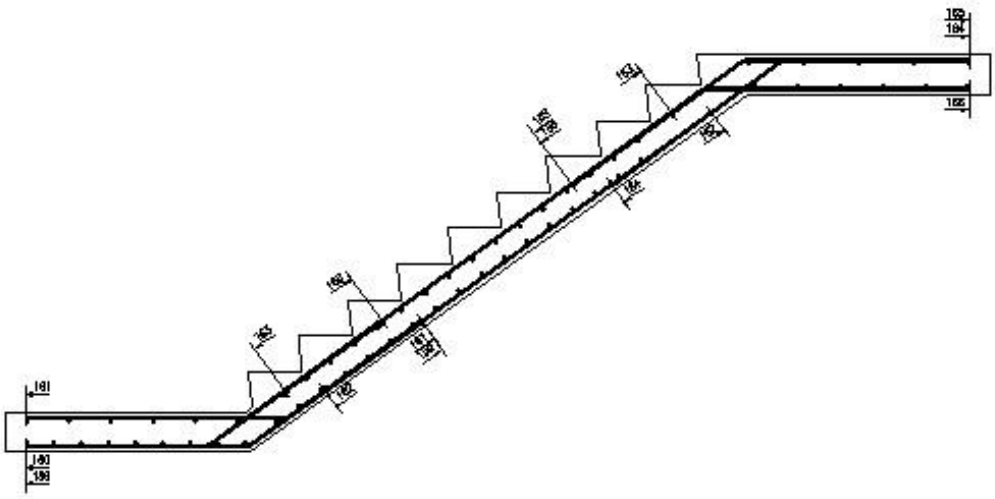
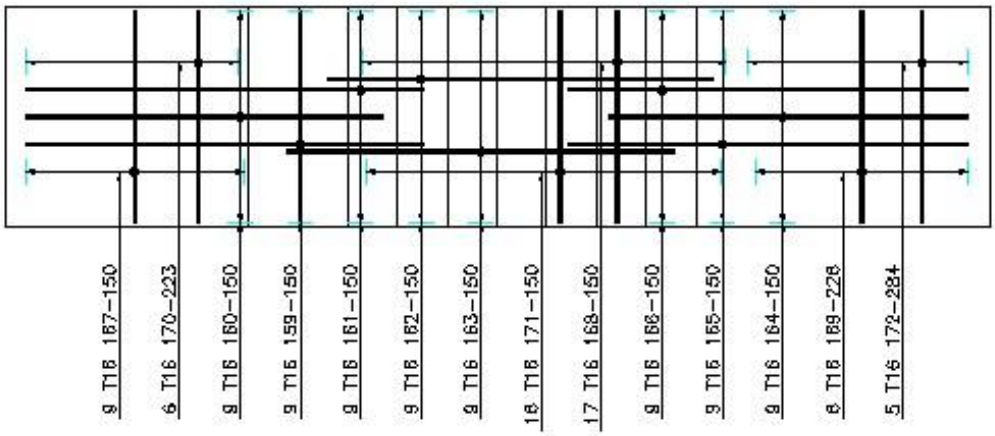
9.8 Drawing the Stair Flight Detail

Once the dimensions and the bar sets have been defined then the detail is ready to draw. Selecting the Draw Button from the Main Stair Flight Dialog does this. The program will pause for a few moments while it assembles the drawing data and then return to the AutoCAD drawing editor. You will be prompted to indicate whether you want the labels to be placed on the Plan View, Both Elevation and Plan or Neither (i.e. not labelled). If you choose 'Both', the longitudinal bars are labelled in the elevation and the transverse bars in plan. Finally, you are asked whether the plan labels should appear above or below the plan. This is of most use when you are detailing both flights of a half landing stair.

The elevation is drawn first and can be moved to an appropriate position on the drawing. The plan is then drawn and can also be moved into position.





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9.9 CADS Stair Flight Detailer Global Configuration Centre

	Setting	Value	Explanation
[stair_cfg]	lap_length	500.0	Default lap length
	concrete_grade	30.0	Concrete grade
	lapfactor	1.0	Lap increment factor
	lapincrement	25.0	Lap rounding dimension, rounds to nearest 25mm
	def_type	T	Default reinforcement bar grade
	def_size	16	Default reinforcement bar diameter
	def_spacing	150.0	Default reinforcement bar pitch

	Setting	Value	Explanation
[options]	orientation	0	
	landing_end0	0	
	landing_end1	0	
	bar_lengths	0	
	drawings_dim_plan	1	
	drawings_dim_elev	1	
	drawings_rein_plan	1	
	drawings_rein_elev	1	

	Setting	Value	Explanation
[stair_dims]	width	1100.0	Staircase width mm
	flight_len	2250.0	Staircase total going
	low_l_len	1200.0	Lower landing length
	upp_l_len	1500.0	Upper landing length
	overall_rise	1800.0	Staircase total rise
	nosing	20.0	Nosing projection
	low_l_fin_thick	50.0	Lower landing finish thickness
	upp_l_fin_thick	50.0	Upper landing finish thickness
	tread_fin_thick	25.0	Tread finish thickness
	riser_fin_thick	20.0	Riser finish thickness
	waist_thickness	175.0	Staircase waist thickness
	low_l_thickness	200.0	Lower landing thickness
	upp_l_thickness	200.0	Upper landing thickness
	side_cover	20.0	Staircase side cover
	top_cover	20.0	Staircase top cover
	bottom_cover	20.0	Staircase bottom cover
	number_rises	10	Number of risers
	z_dimension	100.0	

	Setting	Value	Explanation
[BarInfo]	BentBar	62	Bent bar shape code
	StraightBar	20	Straight bar shape code
	HookBar	32	Hook bar shape code

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LegBar	34	Leg bar shape code
StraightBarDim	A	Straight bar dimension letter
HookBarDim	A	Hook bar dimension letter
LegBarDim	A	Leg bar dimension letter
BentBarDim1	A	Bent bar, leg 1 dimension letter
BentBarDim2	B	Bent bar, leg 2 dimension letter
BentBarDim3	C	Bent bar, leg 3 dimension letter
StraightBarView Side		Straight bar, view to be drawn
HookBarView	Side	Hook bar, view to be drawn
LegBarView	Side	Leg bar, view to be drawn
BentBarView	Side	Bent bar, view to be drawn
PlanBarView	Plan	Plan bar, view to be drawn
BentBarHand	Same	Bent bar handing
BentBarSlope	Adjust	Bent bar slope setting
DoLapCalcs	1	

	Setting	Value	Explanation
[old_reinf]	numb1	99	Set 1 shape code
	type1	T	Set 1 reinforcement bar grade
	size1	16	Set 1 bar diameter
	spac1	150	Set 1 bar pitch
	calc1	0	
	numb2	99	Set 2 shape code
	type2	T	Set 2 reinforcement bar grade
	size2	16	Set 2 bar diameter
	spac2	150	Set 2 bar pitch
	calc2	0	
	numb3	99	Set 3 shape code
	type3	T	Set 3 reinforcement bar grade
	size3	16	Set 3 bar diameter
	spac3	150	Set 3 bar pitch
	calc3	0	
	numb4	99	Set 4 shape code
	type4	T	Set 4 reinforcement bar grade
	size4	16	Set 4 bar diameter
	spac4	150	Set 4 bar pitch
	calc4	0	
	numb5	99	Set 5 shape code
	type5	T	Set 5 reinforcement bar grade
	size5	16	Set 5 bar diameter
	spac5	150	Set 5 bar pitch
	calc5	0	
	calc5	0	
	numb6	99	Set 6 shape code
	type6	T	Set 6 reinforcement bar grade
	size6	16	Set 6 bar diameter
	spac6	150	Set 6 bar pitch

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calc6	0	
calc6	0	Set 7 shape code
numb7	99	Set 7 reinforcement bar grade
type7	T	Set 7 bar diameter
size7	16	Set 7 bar pitch
spac7	150	Set 7 shape code
calc7	0	
numb8	99	Set 8 shape code
type8	T	Set 8 reinforcement bar grade
size8	16	Set 8 bar diameter
spac8	150	Set 8 bar pitch
calc8	0	
numb9	99	Set 9 shape code
type9	T	Set 9 reinforcement bar grade
size9	16	Set 9 bar diameter
spac9	150	Set 9 bar pitch
calc9	0	
numb10	99	Set 10 shape code
type10	T	Set 10 reinforcement bar grade
size10	16	Set 10 bar diameter
spac10	150	Set 10 bar pitch
calc10	0	
calc10	0	
numb11	99	Set 11 shape code
type11	T	Set 11 reinforcement bar grade
size11	16	Set 11 bar diameter
spac11	150	Set 11 bar pitch
calc11	0	
numb12	99	Set 12 shape code
type12	T	Set 12 reinforcement bar grade
size12	16	Set 12 bar diameter
spac12	150	Set 12 bar pitch
calc12	0	
numb13	99	Set 13 shape code
type13	T	Set 13 reinforcement bar grade
size13	16	Set 13 bar diameter
spac13	150	Set 13 bar pitch
calc13	0	
numb14	99	Set 14 shape code
type14	T	Set 14 reinforcement bar grade
size14	16	Set 14 bar diameter
spac14	150	Set 14 bar pitch
calc14	0	

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	Setting	Value	Explanation
[Labelling]	LabelDistFactor	~mm~10.0	Label distance from outline in plotted mm
	TextSizeFactor	~mm~3.0	Text height in plotted mm
	DimOffsetFactor	~mm~30.0	Dimension offset from outline in plotted mm
	TickTagOffsetFactor	~mm~2.0	Tick and Tag Offset distance from bar in plotted mm
	DimUnit	2	

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10 CADS Beam Link

Chapter Objectives

CADS Beam Link provides an automated link between the CADS Beam Designer and CADS RC. The program will read the Beam Designer project and automatically produce a placement drawing, bar bending schedule and bar weightings, along with configuration to assist in achieving the required drawing layout with minimum user intervention.

10.1 Program Operating Environment

The CADS Beam Link is designed to make the importing of Beam Designer data into the drawing a quick and easy process. The program is used in conjunction with CADS RC and therefore requires AutoCAD and CADS RC to be loaded and ready for use before the Beam Link can be used. The details produced are fully compatible with CADS RC, which means that they can be readily merged into an existing drawing and modified to suit the particular conditions.

CADS Beam Link uses the Dimscale variable to size its text to suit the plotted scale of the drawing regardless of whether you are working with Tilemode set to 1 or 0. Ensure that Dimscale is set to match the plotted scale of the detail.

If you have access to either the CADS Drawing Environment or CADS Scale software, use the Drawing Set-up Function to load in a Title Block and set the appropriate scale and drawing environment. For more information on the Drawing Set-up Routines refer to either the CADS Drawing Environment or CADS Scale User Guides.

10.2 Loading Beam Link

The CADS Beam Link is loaded by selecting the Outlines option from the CADS RC pull down menu and then picking the Detailers option.

The CADS RC Detailer Selection Menu Dialog, as shown in Figure 10.2:1, is then displayed on the screen. This dialog displays a list of the Detailers and Productivity Tools that have been installed on your computer.

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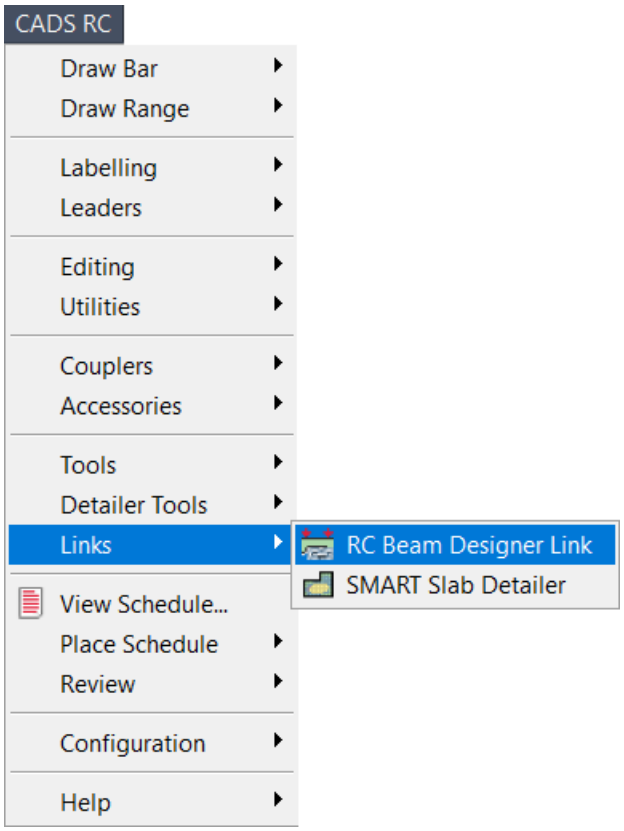

Figure 10.2:1 CADS RC Detailers Selection Menu

To load the Beam Link, highlight the line 'CADS Beam Link' and then pick the Load button. This will load the CADS Beam Link Detailer ready for use.

10.3 Importing CADS Beam Designer Files

There are five main processes in using the CADS RC Beam Link to detail reinforced concrete beams designed using CADS RC Beam Designer. These are as follows:

- Selecting the CADS RC Beam Designer job to be detailed;
- Selecting the beam spans to be detailed;
- Allocating the bars, a Member Title;
- Selecting the positions along the beam at which section details are required;
- Placing the arrangement on the drawing.
- Selecting the Beam to be Detailed.

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10.3.1 Selecting the Beam to be Detailed

When the CADS RC Beam Link is selected, the first task is to select the CADS RC Beam Designer job file that contains the beam spans to be detailed. The CADS RC Beam Designer job file is selected from the Select Import File dialog as shown in Figure 10.3.1:1.

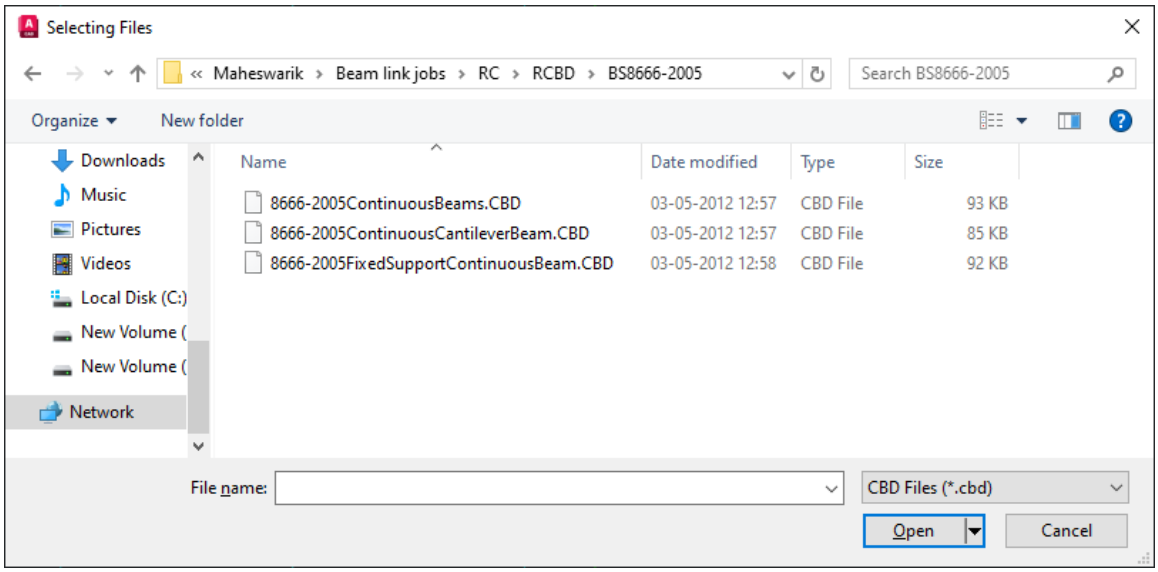

Figure 10.3.1:1 Select Import File Dialog

CADS RC Beam Designer job files are allocated *.CBD extensions, to assist in file selection the Select Import File dialog is pre-set to only display files of this type. CADS RC Beam Designer job files can be selected from any of the available drives and directories. To select a file for importing, either highlight the file and pick OK or double click on the file. The file will then be loaded for use by CADS RC Beam Link. Job files that contain serious design deficiencies will produce a warning and the beam cannot be drawn using CADS RC Beam Link.

Note:

If when selecting a file to import into CADS RC Beam Link a sharing violation error is reported, CADS RC Beam Designer is still using the file. The file can not be selected for import until the job file is closed in CADS RC Beam Designer.

10.3.2 Selecting the Beam Spans to be Detailed.

When a CADS RC Beam Designer job file has been imported into CADS RC Beam Link you must select the beams you want to be detailed. The spans to be detailed are selected from the Span Selection dialog as shown in Figure 10.3.2:1 below.

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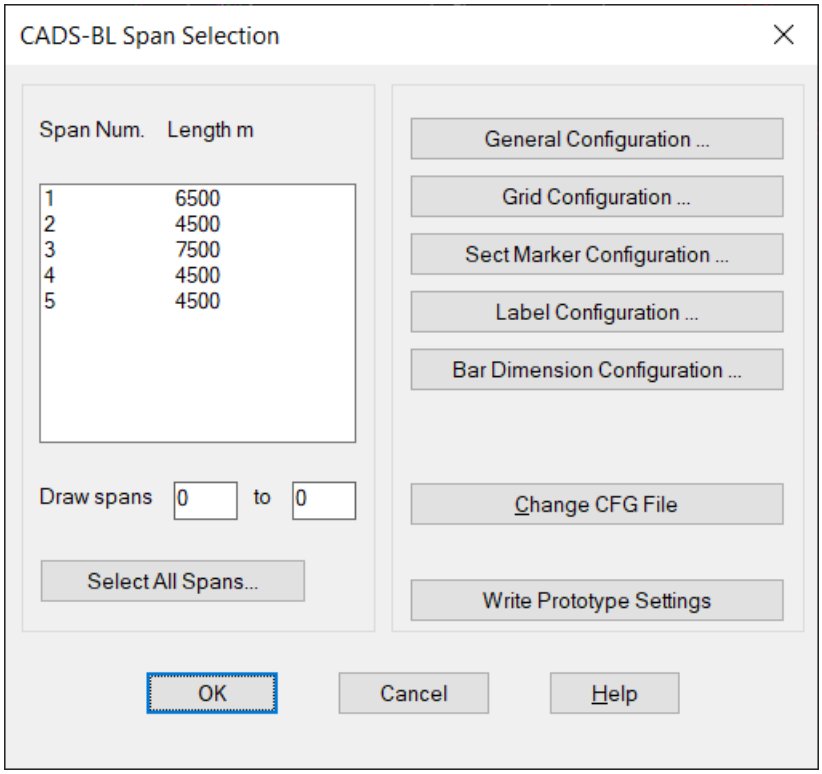

Figure 10.3.2:1 Span Selection Dialog

The dialog displays each span within the job along with the corresponding span length.

If all the spans are to be detailed on a continuous elevation, the Select All Spans button can be picked. This will automatically select all the spans for detailing.

When selected spans are to be detailed, they can be selected by entering the first and last spans in the Draw Spans Fields or by picking the first and last spans in the list. The selected spans for detailing will be highlighted in the Span List.

Picking OK will start the detailing process.

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10.3.3 Allocating the Beam Member Title

After the CADS RC Beam Link has produced the beam outline the CADS RC Member Title Selection Dialog is displayed as shown in Figure 10.3.3:1.

Before CADS RC Beam Link begins detailing the reinforcement, a member title must be selected which the beam reinforcement will be allocated to. For further information on Member Titles refer to the CADS RC User Guide manual. Picking OK will continue the detailing process.

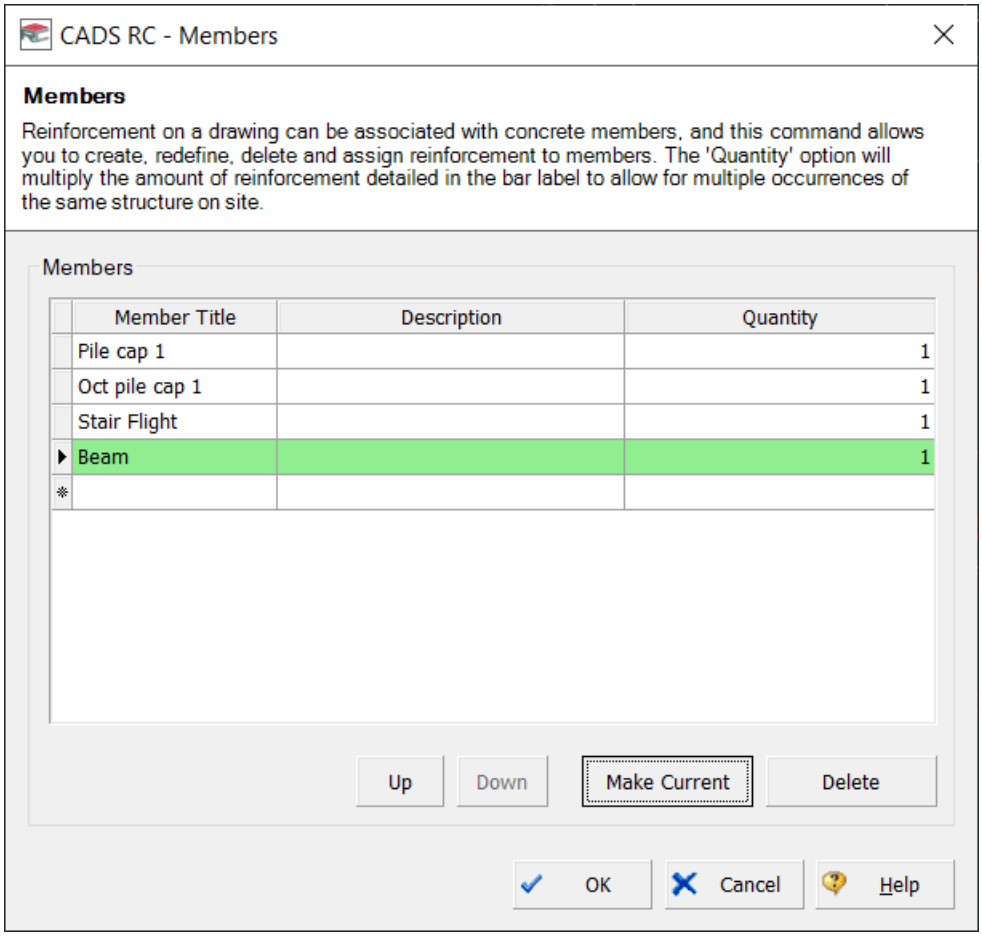

Figure 10.3.3:1 Member Title Selection Dialog

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10.3.4 Selecting the Section Detail Positions

The General Configuration described in the chapter 12.4.2 contains an option to allow section details to be chosen off the beam elevation. If the configuration is set to Pick All Section Points you will, on completion of the beam elevation drawing process, be asked to pick the required sections. This achieved by moving the pointer cross-hairs so the vertical aligns with the position on the beam elevation where a section is required and picking with the pointing device. A section will then be drawn at that location; other sections can be selected in the same manner as required. The elevation can be zoomed to assist the selection of the section point by entering 'Z' at the command line and windowing as required. When all the necessary section points have been defined entering 'E' at the command line will end the selection process.

10.3.5 Placing the Beam Detail on the drawing

When the detail elevation and sections are complete, the whole detail is ghosted and is available for final placement on the drawing. The detail can be moved to the required position and placed by picking with the pointing device.

Note:

All items making up the final detail can be moved using the standard AutoCAD commands to fine tune the layout.

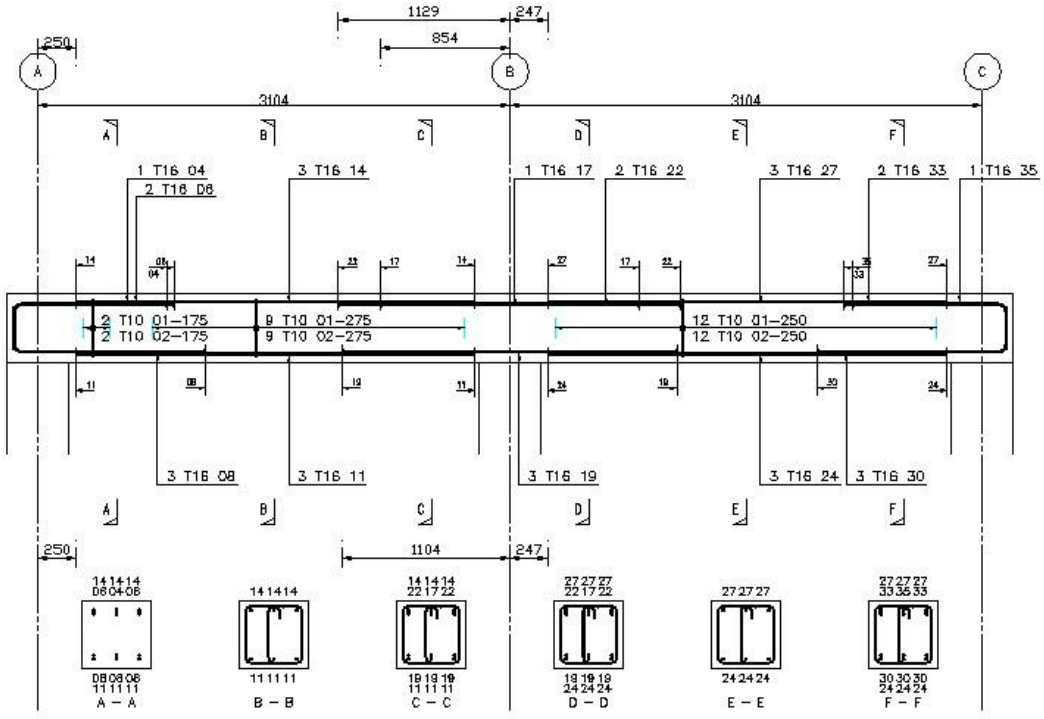

Figure 103.3:4 Typical Beam Detail

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10.4 Configuration Options

This section describes the configuration options available in the CADS RC Beam Link Program.

10.4.1 Beam Link Configuration File Selection

When the Beam Link is loaded the Beam Link Input dialog is displayed, see Figure 10.3.2:1. This dialog contains a Change CFG File option that allows the required configuration file (def file) to be selected in order that suitable default data is displayed, as shown in Figure 10.4.1:1.

Currently the UK version of this software offers two default files CADSBL.DEF and BL_UK.DEF. The CADS-BL.DEF is set-up for UK metric detailing and is automatically loaded when the Beam Detailer is used. The BL_UK.DEF is identical to the CADS_BL.DEF file.

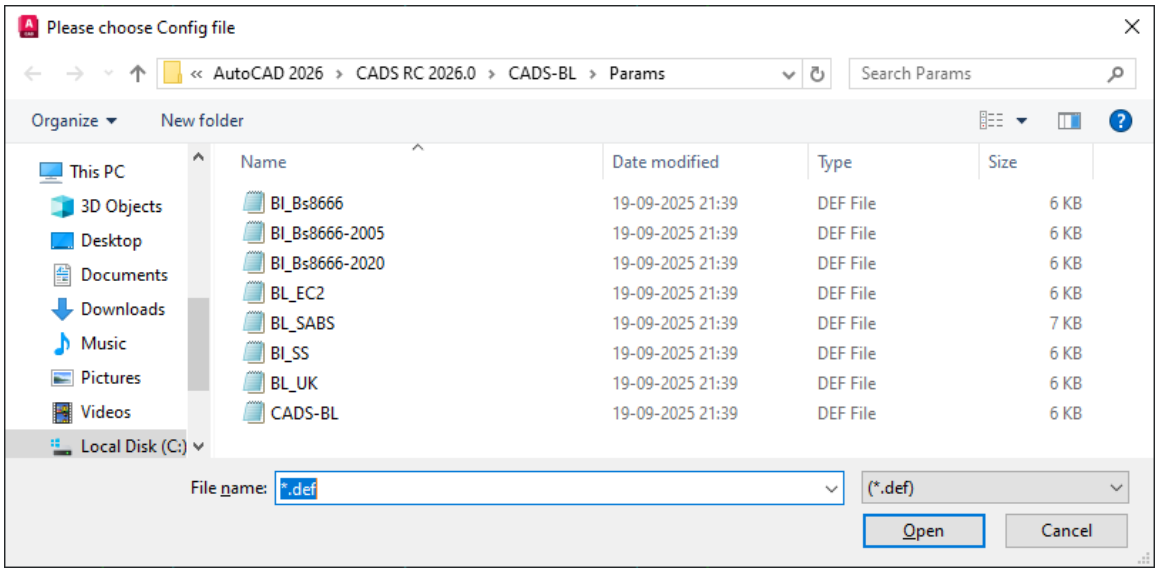

Figure 10.4.1:1 Beam Link Configuration File Options

Should other configuration options be required, then please contact the CADS Support department who will be pleased to advise accordingly.

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10.4.2 General Configuration

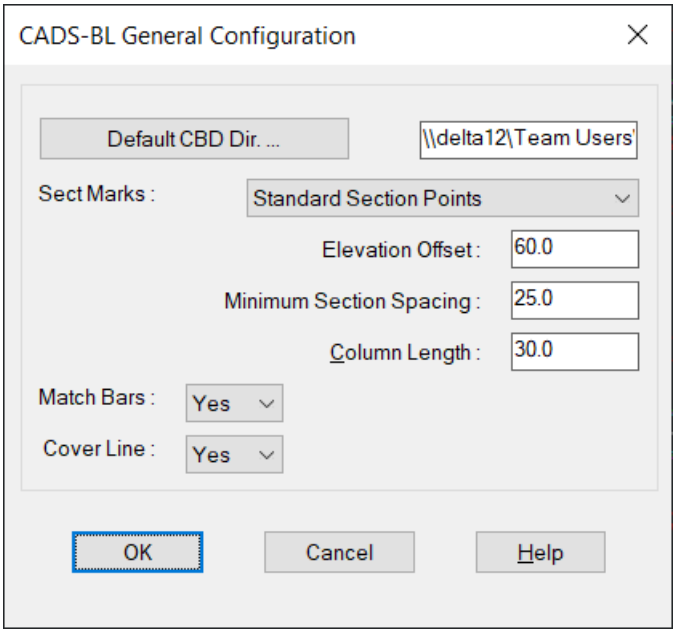

Figure 10.4.2:1 General Configuration Dialog

The General Configuration Dialog has the following input fields;

Default CBD Directory

Defines the default directory that Beam Link will display when selecting beams for import.

Section Marks

Controls the location of points along the beam elevation where the section details will be produced. The options are:

- Standard Section Points - Three sections will be produced for each span, one in the left support zone, one in the right support zone and one at midspan;
- Pick All Section Points - The location and number of section points is selected by the user on the beam elevation;
- No Section Points - Only the beam elevation is produced.

Elevation Offset

This is the distance in plotted mm between the top of the sections and the bottom of the beam elevation.

Minimum Section Spacing

If, on short span beams the Sections would be drawn overlapping each other this value is used to space the sections so no overlapping occurs.

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Column Length

This is the distance in plotted mm that the column profile is drawn above and below the beam on elevation.

Match Bars

If set to Yes, this option will search through the bar sets and give identical sets the sane bar mark number automatically thereby reducing the number of bar marks used on the drawing.

10.4.3 Grid Configuration

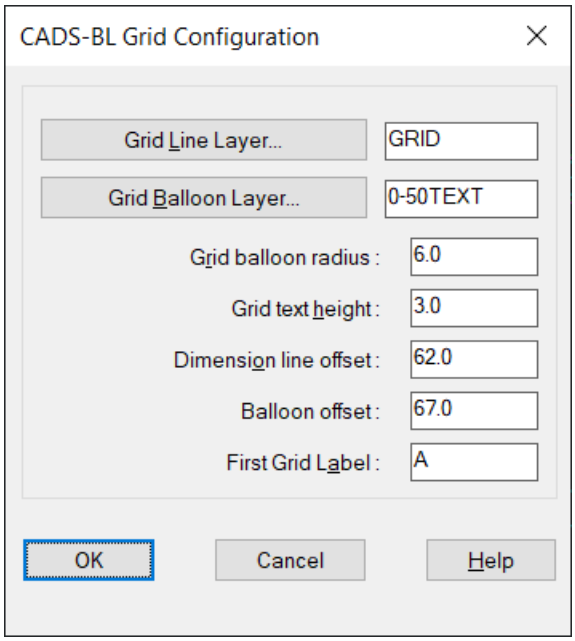

Figure 10.4.3:1 Grid Configuration Dialog

The Grid Configuration Dialog has the following input fields;

- Grid Line Layer - This is the layer on which the vertical grid lines are placed;
- Grid Balloon Layer - This is the layer on which the grid balloons at the top of the grid lines are placed;
- Grid Balloon Radius - This is the radius of the grid balloons in plotted mm;
- Grid Text Height - This is the text height in plotted mm of the grid labels;
- Dimension Line Offset - This is the distance in plotted mm that the span dimensions are placed above the beam elevation;
- Balloon Offset - This is the distance in plotted mm between the underside of the gird balloon and the top of the beam elevation;
- First Grid Label - This is the first grid label used on the left-hand grid of the first span. Entering 'A' would give A B C D etc.

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10.4.4 Section Marker Configuration

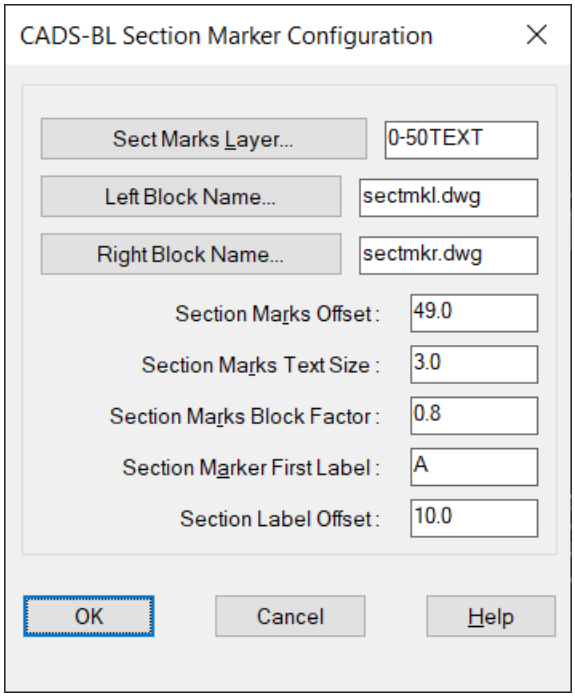

Figure 10.4.4:1 Section Marker Configuration Dialog

The Section Marker Configuration Dialog has the following input fields;

- Section Markers Layer - This is the layer on which the section markers on the beam elevation are placed;
- Left Block Name / Right Block Name - These are the blocks used for the section marker symbols;
- Section Markers Offset - This is the distance in plotted mm the section markers are placed above and below the beam elevation;
- Section Markers Text Size - This is the height of the section marker text in plotted mm;
- Section Markers Block Factor - This is the scaling factor to increase or decrease the overall size of the section markers;
- Section Markers First Label - This is the section label used for the first section point. Entered values work in a similar fashion to the First Grid Label option described earlier;
- Section Label Offset - This is the distance above and below the beam elevation the section markers will be drawn.

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10.4.5 Label Configuration

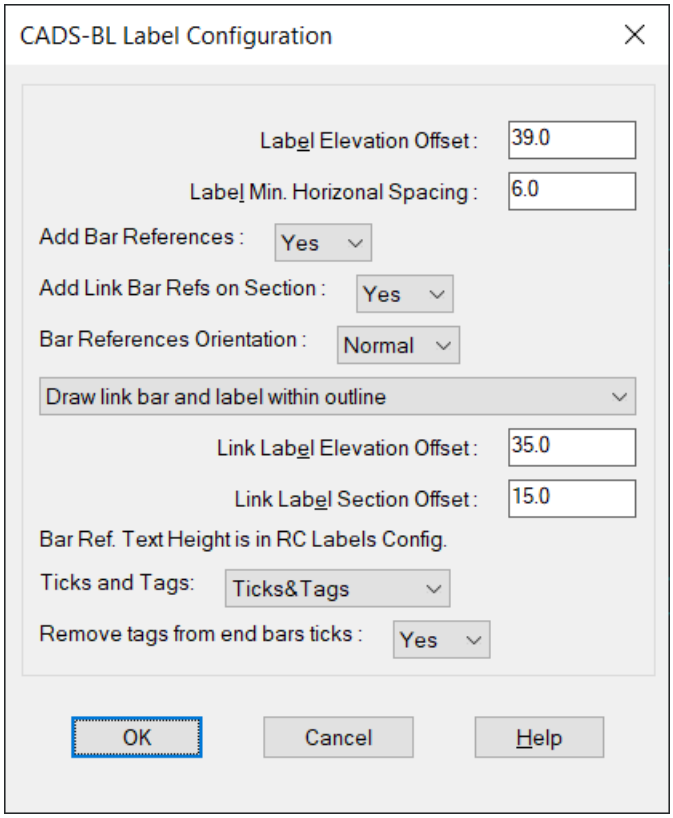

Figure 10.4.5:1 Label Configuration Dialog

The Label Configuration dialog contains the following input fields;

Label Elevation Offset

This is the distance in plotted mm the bar labels are placed above and below the beam elevation.

Label Minimum Horizontal Spacing

When the labels are repositioned to prevent overlapping, this is the distance in plotted mm they are spaced by.

Add Bar References

Setting this option to Yes will place the Bar Mark References on the beam sections
Bar Reference Orientation

Link Bar Label Placement

There are four options to choose from, these are listed below:

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- Draw link bar and label within outline – places the bar, range and label inside the beam span;
- Draw link bar and label outside outline – places the bar, range and label outside of the outline. The distance is determined by the value entered into the Link Label Elevation Offset;
- Just draw link range and label above outline - draws only the range and label above the outline. The distance is determined by the value entered into the Link Label Elevation Offset. This option does not draw a link bar inside the outline;
- Just draw link range and label below outline - draws only the range and label below the outline. The distance is determined by the value entered into the Link Label Elevation Offset. This option does not draw a link bar inside the outline.

Link Label Elevation Offset

This is the distance between the link label and the top of the beam if the Link Label Placement has been set to either just draw link range and label above outline or just draw link range and label below outline.

Remove Tags from End Bars Ticks

This option if set to Yes removes the tags and bar refs for the bars at the end of each span.

10.4.6 Bar Dimension Configuration

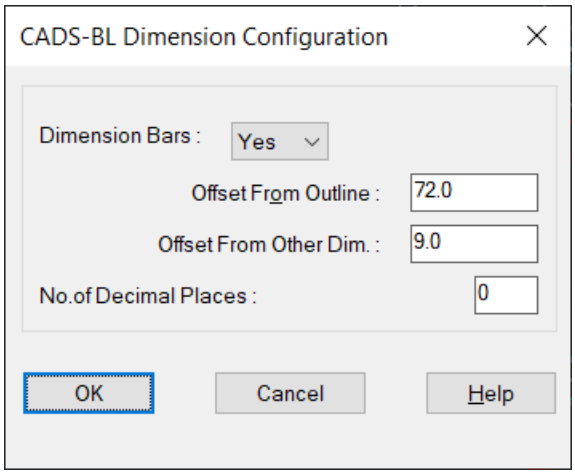

Figure 10.4.6:1 Bar Dimension Configuration Dialog

The Bar Dimension Dialog contains the following input fields;

- Dimension Bars - Setting to Yes will place dimensions on the drawing for the top and bottom bars locating the bar start point from the adjacent grid line;
- Offset from Outline - This is the distance above the beam elevation to the first bar dimension;
- Offset from other Dim - This is the vertical distance between bar dimensions.

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10.4.7 Write Prototype Settings

The Write Prototype Settings option is found on the CADS Beam Link Span Selection Dialog. This option allows alterations made to the configuration to be saved as the default for all subsequent details produced by the CADS Beam Link. Picking the Write Prototype Settings Button will cause CADS-BL to write a new configuration file to the hard disk.

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Customer Enquiry Fax Sheet

To: CADS Ltd.	**Fax: +44(0) 1202 690284**
Number of sheets ……	**(inclusive)**
From:	
Name:	**Company:**
Phone:	**Fax:**
CADS Application:	**Version:**
Processor type and speed:	**Memory size:**
Hard disk size:	**Operating system:**
Other applications running:	
Details of the enquiry:	

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CADS Address Details

If you would like to contact CADS, please do so on the following:

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