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Configuring Bentley Rebar

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Configuring Bentley Rebar

1.1 THE CONFIGURATION PROCESS

GEOPAK Rebar is a general-purpose reinforcement detailing system. As such, most aspects of the software are user-definable to cater for the many and varied drafting standards used throughout the industry. This Chapter describes the approach you must follow in configuring the software and details the numerous configuration commands and parameters.

The configuration process described in this Chapter is useful in establishing not only your own drafting standards, but also the standards of your Clients.

This chapter describes features within GEOPAK Rebar that can be tailored to suit your requirements. The configuration process centers upon several files within your Project directory. These files have the filename extension ".sys". Modifying parameters within the configuration files using a text editor configures GEOPAK Rebar.

The ".sys" files are read by GEOPAK Rebar during the Login procedure. The Login process may occasionally detect errors in your configuration files. When this occurs, the error messages are written to the **Log File** (refer Chapter 2).

The configuration parameters described within this chapter cover the following topics:

- Creating a nominal defaults file ("defaults.def") for use during the Login procedure
- Defining the visual appearance of reinforcement details ("display.sys")
- Defining bar diameters, bar grades and all bending parameters for various international design codes ("barcodes.sys")
- Setting bar mark designations for each of standard and non-standard bar shapes available within the GEOPAK Rebar shape library ("barmarks.sys")
- Defining your preferred bar labels ("presets.sys")
- Defining a preferred bar chart layout for use during the automatic bar chart creation routines ("barchart.sys").

Each topic is now discussed in detail.

1.2 BAR CODES CONFIGURATION ("BARCODES.SYS")

Design and detailing data for local and international codes is completely configurable. GEOPAK Rebar stores the data in the file "barcodes.sys" in your GEOPAK Rebar "support" directory (not your project directory!).

Parameters within "barcodes.sys" control fundamental aspects of the detailing process. They include:

- the available bar diameters and bar grades

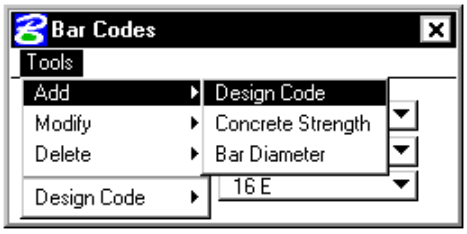
- internal bend radii for each bar diameter
- standard size of hooks and cogs
- schedule allowances for hooks and cogs
- stock lengths for standard steel sizes
- concrete strengths.

These parameters are input for as many design codes as required. You can create your own set of Bar Code parameters or use (or modify) the ones provided with your installation.

The Bar Codes dialog box is activated by selecting **Settings > Bar Codes**. The **Tools** pull down in the upper left corner of the dialog has several utility functions as depicted below.

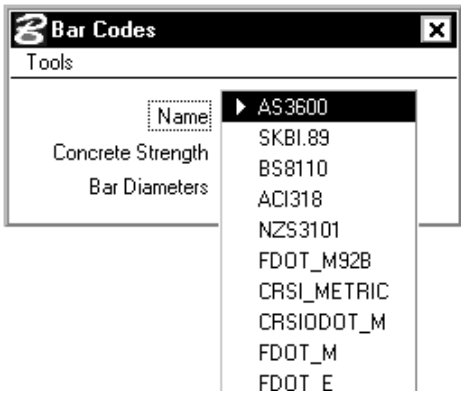
1.2.1 DESIGN CODES - ADD / MODIFY / DELETE

The **Add** and **Modify** buttons allow new design codes to be created or existing ones to be modified. When the **Add** pull down is selected, three options are supported as shown in the exploded view below.

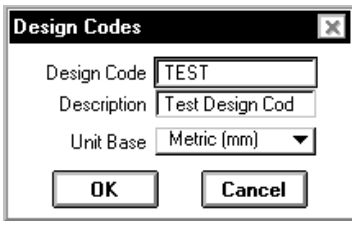


The lists of available bar diameters and concrete strengths dynamically update as different design codes are selected.

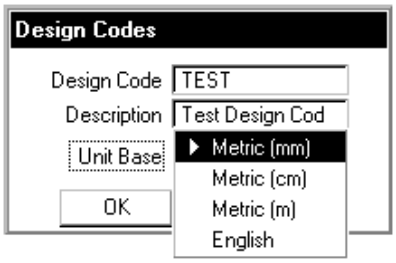
A list of available codes is found at the top of the dialog:



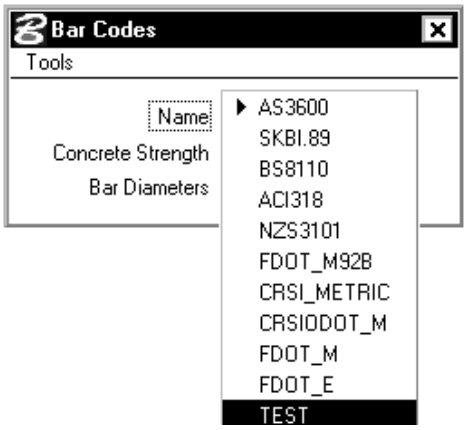
When **Add > Design Code** is selected, the dialog:



A new code is typed into the **Design Code** field and a **Description** (with a maximum of 15 characters) can be added as well. From the **Unit Base** options (as shown below) the desired English or Metric unit should be set.



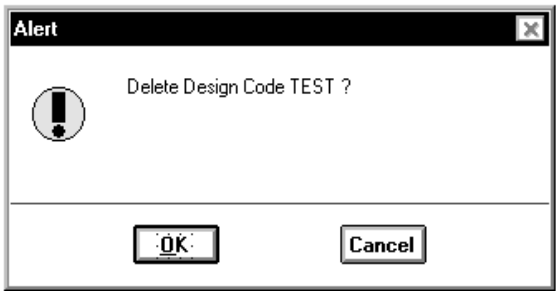
Select the **OK** button and the dialog closes, returning you to the main Design Codes dialog. A new entry is added to the **Name** list.



The **Modify > Design Code** tool operates functionally the same as the **Add** option. However, when the dialog appears, the current Design Code information is displayed.

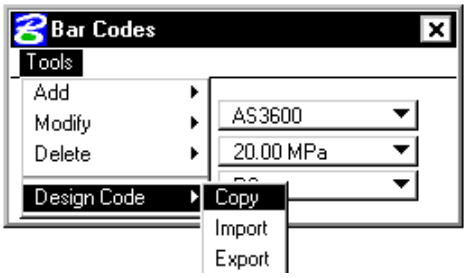
The **Tools** menu also contains a **Delete** option that removes a selected Design Code, bar diameter or concrete strength.

Care should be taken when using the **Delete** button. It not only removes the selected design code from the list, but also all other input data for that code (i.e. bar diameters, grades, concrete strengths, hook/cog details etc.). When selected, an Alert box is displayed as depicted below.



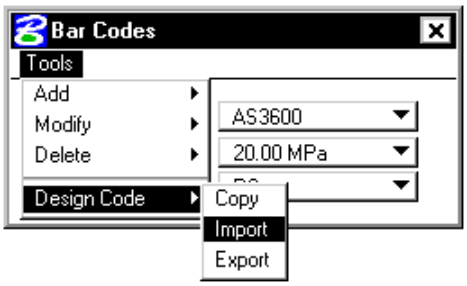
1.2.1 DESIGN CODE COPY / IMPORT / EXPORT

The **Tools** menu contains a **Design Code** menu providing three additional options for the management of your Bar Codes – Copy, Import and Export.



The **Copy** option duplicates an entire Design Code including all bar diameters and concrete strengths. The code you select in the **Name** pull-down menu is copied to a new Design Code when the Copy option is selected. A new Code name is assigned automatically. For example, if you select the AS3600 code (say) as shown in the dialog box above, then execute **Tools > Design Code > Copy**, a new code is added to the list with the name "Copy of AS3600". You can modify and rename the new "copy" like any other Deign Code using the **Tools > Modify > Design Code** option.

As stated previously, the data for all Design Codes is stored in a single file ("barcodes.sys") in your support directory. The **Import** and **Export** options allow you move a single design code into, and out of, your "barcodes.sys" file.

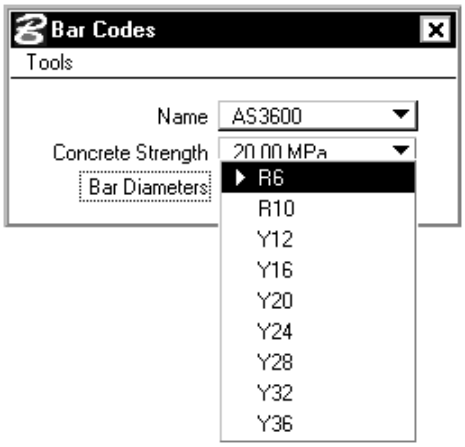


The **Import** option starts by prompting for the name of a ".sys" file containing the design code to be imported. If the ".sys" contains several design codes, all of those codes are imported – but only if the codes of the same name don't already exist in your current "barcodes.sys" file.

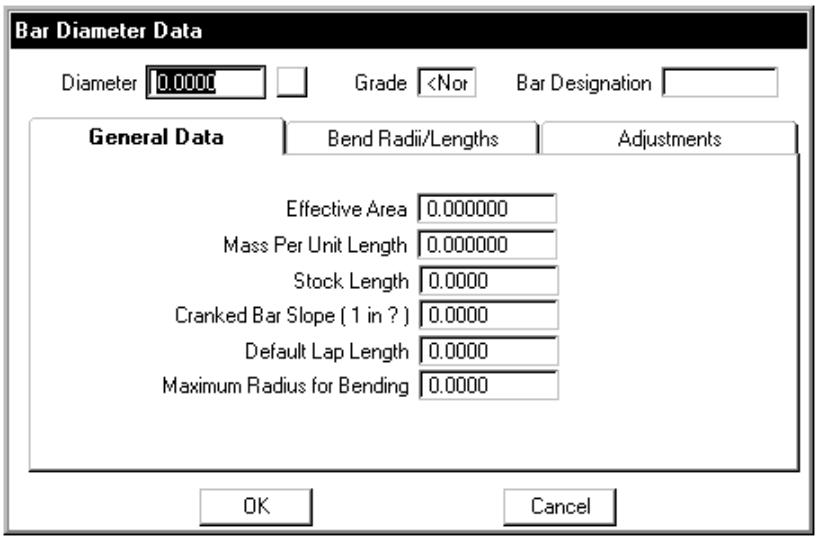
The file created by the **Export** option has the same format as "barcodes.sys". In effect, the exported file is a "barcodes.sys" file but it may contain just a single design code. The design code name displayed in the **Name** pull-down menu is output to a new file of your choice. If you select another ".sys" that was created previously, the exported Code is appended to Design Codes already in that file. The Export procedure is terminated if the a Code of the same name already exists in the file you are appending to.

1.2.2 BAR DIAMETERS

The size of reinforcing bars varies often from one country to the next – perhaps even from one State or Territory to the next. Standard bar diameter designations – the name used to identify a bar diameter - vary also. Therefore, for each design code, there exists a range of available bar sizes and grades. Available diameters appear in the pull-down menu as follows:



When **Add > Bar Diameter** is selected, the following dialog box appears:



Enter the data fundamental to each bar diameter in the fields across the top of the dialog box. The **Diameter** value represents the size of the bar diameter in Bar Codes units (i.e. mm, cm,

m or feet). This is the used to lay out bar geometry. It is also used in the calculation of bar mass (unless an alternative "Mass Per Unit Length" is supplied, see below).

Immediately to the right of the diameter input field is the **Bar Diameter Color**. Select the color from the color palette in the usual manner. Your bars are detailed in this color whenever the **Use Bar Codes Color** attribute is selected in the Main Bar Attributes dialog box of a bar (refer Chapter 3). This option therefore allows you to color-code each diameter.

The Grade letter is also used to alphabetically sort the bar diameter list e.g. all M bars are listed before all T bars.

The **Grade** field requires you input a single letter representing the grade of steel for the current diameter. Examples might be **M** for mild steel, **E** for epoxy-coated steel, **R** for round bar, etc.. Total bar masses are listed "per grade" during the production of charts. The grade letter can be output explicitly to a bar label or to your bar mark text using the Preset Text code **$bg** (refer later this Chapter).

The **Bar Designation** input field allows you to label the bar diameter. Enter any string of letters and numbers, e.g. "Y12", "T20", "#5", "R12M" etc.. The text you enter here is included in the bar diameter list throughout every dialog box where bar diameter is selected. This bar designation is output whenever you include the Preset Text code $d in a bar label or bar mark.

You can place round brackets "(...)" around any letter(s) in the bar designation to force the omission of that text (within brackets) from the diameter name in your bar labels and bar charts. For example, assume you must add another 20mm diameter bar to your Design Code because a non-standard bend radius of 150mm is required. This is to be the second 20mm bar in the Code. The original 20mm diameter (with a standard bend radius) has a bar designation of "M20". Most importantly, you want the second non-standard bend radius to be called by the same name as the first - "M20". So, to avoid the confusion caused by duplicate "M20" entries in your bar diameter list, you include the text "M20(R150)" into the bar designation. In the bar diameter list, GEOPAK Rebar knows to ignore the brackets "(..)" and the entry appears as "M20 R150". Furthermore, on the drawing and in the bar charts, the text within brackets is removed completely and the diameter appears as "M20". Only in the summary of total masses for each bar diameter does the "M20 R150" name appear again.

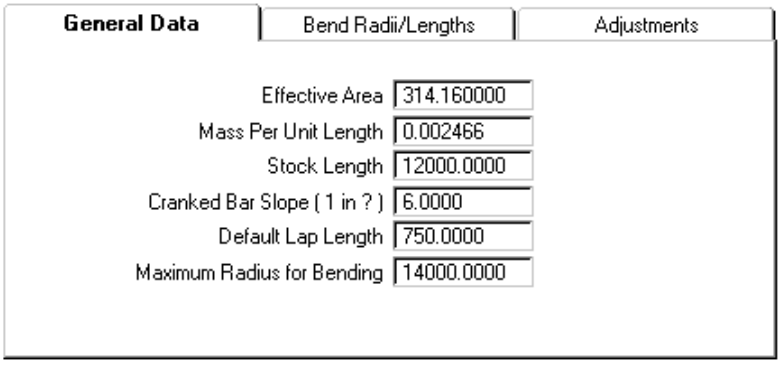
Furthermore, you can also specify an alternate diameter designation for your Bar Charts ONLY, by including square brackets in the Bar Designation. Assume that a bar diameter in your bar labels should be see as "20" but the designation shown in your bar charts for the same diameter needs to be "D20". You should include a bar diameter designation of "20[D20]". Anything inside the square brackets is ignored while placing and detailing bars with this diameter. However, when it comes to creating a bar chart, only those letters between the square brackets are recognized.

Apart from the **OK** and **Cancel** pushbuttons (which confirm and abort the data supplied to this dialog), the remainder of the Bar Diameter Data dialog box is divided into three Tabs – General Data, Bend Radii/Lengths and Adjustments.

The items in each of these Tabs are now described.

1.2.2.1 GENERAL DATA TAB

The input fields displayed on this Tab apply to the current bar diameter only, just as the items in the other two Tabs do as well. The General Data input is described as follows:



Placement of bars in longitudinal bar groups and bar ranges can be specified using a "total steel area" criteria where the total bars required is adjusted until the minimum specified steel area is exceeded. Often, the theoretical cross-sectional area of a bar is different to the "nominal" area used in design. GEOPAK Rebar uses the **Effective Area** value in its total steel area calculation. You should supply the value normally used in design calculations.

By default, the density of steel is assumed 7850 kg per cubic meter (or the imperial equivalent). This density along with the bar diameter size you specify in this dialog box is used in the calculation of bar mass. These assumptions would be invalid if you use a different density and/or where the diameter you use to calculate steel volume is different as well. In these situations, you should supply a preferred **Mass Per Unit Length** for each diameter. This value is used in favor of the "default" calculation method if it is not zero. It should be entered as kg/mm, kg/cm, kg/m, or pounds per foot, depending on your Design Code Units.

When straight bars are scheduled, GEOPAK Rebar determines whether their scheduled length is greater than the stock length provided in the **Stock Length** input field. If the scheduled length is greater than the specified stock length, GEOPAK Rebar pauses to ask if laps should automatically be added to the total length. (For further details, see chapter 5.)

If this facility is required, enter the appropriate stock length in the field provided. If the facility is not required, set the **Stock Length** to zero or a very large number (e.g. 1000 meters).

If the crank option in the Bar End Details dialog box is activated, the default slope (used when the crank detail is first created) is taken from **Cranked Bar Slope** value. The value is entered as the ratio of the extended length of the crank divided by the crank offset.

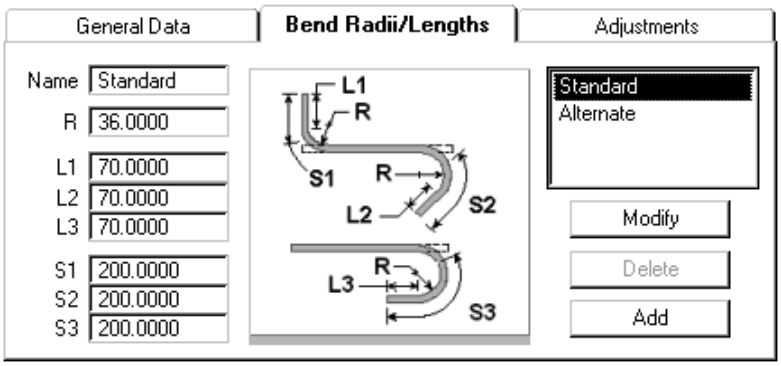
During bar placement and modification, you can indicate the end of another bar to activate the "lapped bar" method. As this occurs, the **Default Lap Length** you have specified for the current bar diameter is used as the initial lap length. You can override the default lap

during bar placement if necessary. If you retain the default lap length, its value is updated as the bar diameter is changed.

During the placement of circular bars, you may find it necessary to detail very large radius bars. In these circumstances, the radius of the bar might become so large that it no longer needs to be bent by the bar manufacturer. The bend radius might be so large it can be bent by hand on site. The **Maximum Radius For Bending** parameter sets the bend radius at which circular bars are no longer considered to be bent, but rather are considered straight bars to be bent on site. If the value is zero, this process is ignored and all circular bars regardless of the size of the radius are scheduled as bent bars. If the value is non-zero, any bends exceeding the specified maximum are considered non-existent for scheduling and manufacturing purposes. A warning is attached to the bar in these instances and the bar shape (type) and bar dimensions are adjusted accordingly.

1.2.2.2 BEND RADII / LENGTHS TAB

The geometry of all reinforcement is detailed and scheduled in accordance with the bend radii data you specify in this Tab.



All bar diameters have a **Standard** and **Alternate** bend radius category as listed on the right-hand side of the Tab (above). Many concrete design codes dictate that stirrups (also referred to as closed ties, ligatures and links etc.) must be bent with a radius smaller than the standard internal bend radius (used for all other reinforcement). The **Alternate** bend radius is included with every bar diameter for this reason. If your design standards do no insist on a reduced bend radius for stirrups, you can ignore the **Alternate** category.

Each bend category has the same list of bend data input fields comprising:

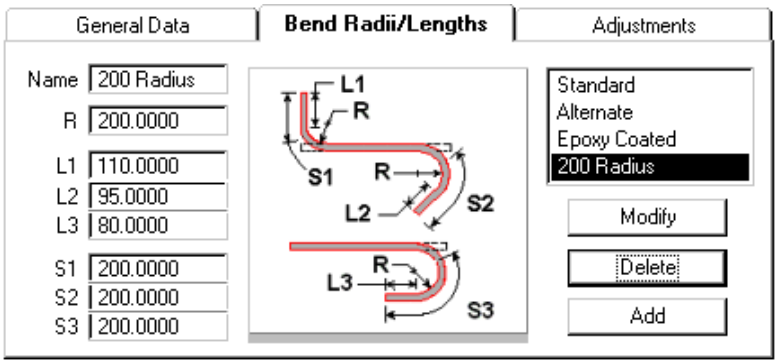
- The bend category **Name**, e.g. “Standard”
- The actual bend radius “**R**”- it refers to the size of the 'pin' around which all hooks, cogs and internal bends are bent.

The internal bend radius "**R**" in this dialog box is the default value used during bar placement. It can be overridden at runtime in the bar placement process by selecting a special or non-standard internal bend radius within the Main Bar Attributes dialog box (refer Chapter 4).

- Straight extensions for standard 90 degree, 135 degree and 180 degree bends – labeled **L1**, **L2** and **L3** (respectively) in the dialog box and in the diagram. These values are used only for the purpose of displaying the standard bends on the drawing. They have no effect on schedule length calculations. When your drawing scale becomes large, the L1, L2 and L3 values may be ignored in favor of a length determined by the "display.sys" parameter "**HLEN**" (refer later this chapter).
- Input fields **S1**, **S2** and **S3** correspond to the schedule bend "allowance" for standard 90 degree, 135 degree and 180 degree bends (respectively). As shown in the diagram, the allowance is added on to the end of the projected straight end of the bar. These values directly effect the schedule lengths calculated for any bars that include standard bends.

The data for any of these input fields can be modified at any time. Just type the new value then select the **Modify** button.

You are permitted to create as extra bend radius categories for any or all bars diameters in your Design Code. First input the new bend radius data, i.e. the **R**, **L1-L3**, and **S1-S3** values. Input the **Name** given to the new bend category, then select the **Add** button. The new entry now appears in the list, e.g.:



Note the **Delete** button is activated whenever one of your additional bend categories is selected. The **Standard** and **Alternate** categories can never be deleted.

The list of bend radii included for each diameter is displayed in the Main Bar Attributes box and the MicroStation Tool Settings dialog box during bar placement and modification. You can create as many new bend radius categories as you like for any diameter you choose. There is no limit to the number of categories allowed and not every diameter must have the same number of bend categories. If the number of categories vary from one diameter to next,

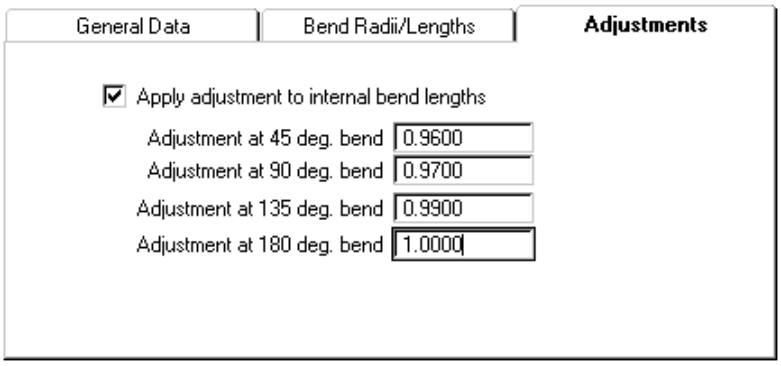
the list of bend radii presented during bar placement/modification changes as the diameter of the current bar changes.

1.2.2.3 ADJUSTMENTS TAB

When your Schedule is open, GEOPAK Rebar calculates of the total length of a bar using three methods (as discussed in Chapter 5). One method uses the calculated centerline length of the bar and adjusts it to account for the stretch at each bend that occurs during the manufacturing process. As a bar is bent, the centerline of the bar increases by a small amount often referred to as "bending gain".

The gain in the length of bar varies with bar diameter and the angle of the bend. The larger the bar diameter and the larger the angle, the larger the gain or stretch in the bar.

The four input fields in the Adjustments tab allow you to input a range of reduction factors for bend angles of 45, 90, 135 and 180 degrees. Toggle the **Apply adjustments to internal bend lengths** button ON if adjustments for the current diameter are required. Then enter the adjustments as a fraction between zero and one. These values are normally supplied by your bar manufacturer.



If adjustments are activated, the value is extracted for the angle of each bend on the bar. If the bend angle is not 45, 90, 135 and 180 degrees, the adjustment value is linearly interpolated or extrapolated. The centerline length of each bend in the bar is multiplied by the calculated adjustment and then incorporated in the total bar length.

At the time the User Manual was published, the adjustments specified in the Adjustments Tabs were not yet incorporated into the schedule dimension calculations. Please contact GEOPAK Corp. for more information about when this feature will become available.

When all key-in fields in the Bar Diameter dialogs are filled, press the **OK** button. The dialog will automatically close and return to the main Design Code dialog, adding the **Bar Diameter** to the displayed **Design Code**. Pressing the **Cancel** button closes the dialog, returns the user to the main dialog with no new **Bar Diameters** added.

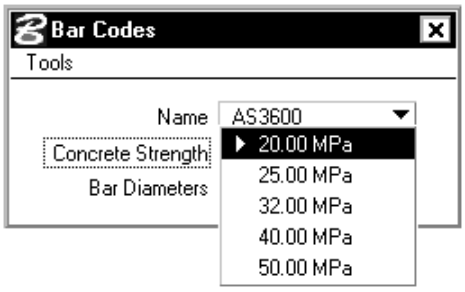
The **Modify > Bar Diameters** tool operates functionally the same as the **Add** option. However, when the dialog appears, the current Bar Diameter information is displayed.

Care should be taken when using the **Delete** button. It not only removes the selected bar diameter from the list, but also all bending and scheduling data for the selected diameter. When selected, an Alert box is displayed.

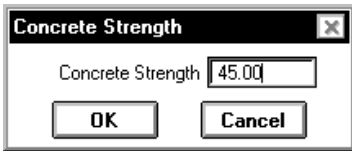
1.2.3 CONCRETE STRENGTHS

A list of concrete strengths for use by GEOPAK Rebar is displayed with each design code. Concrete strengths can be added, modified or deleted using the appropriate buttons. A concrete strength is selected from the list of available strengths within the Structural Detail Defaults dialog box as depicted in the sample graphic below (refer Chapter 3).

In future versions of the software, concrete strength will be used in the calculation of tensile development lengths (lap lengths). Concrete strength options (within the detailing procedures) are not yet implemented.



When **Add > Concrete Strength** is selected, the dialog depicted below appears.



Key in the new **Concrete Strength** value, then press the **OK** button. The dialog automatically closes and execution returns to the main Bar Codes dialog, adding the **Concrete Strength** to the displayed **Design Code**. Pressing the **Cancel** button closes the dialog, returns you to the main dialog with no new **Concrete Strengths** added.

The **Modify > Concrete Strength** tool operates functionally the same as the **Add** option. However, when the dialog appears, the current Concrete Strength is displayed.

1.3 PROJECT DIRECTORIES

When you Login to GEOPAK Rebar, a list of available project names is displayed. For new installations, initially just two projects are displayed ("DEFAULT" and "INSTALL").

The "DEFAULT" project refers to a directory of the same name beneath the "/rebar/projects" directory. The files within this project directory are normally configured to your existing office standards. You may rename the directory to some other Project name if you desire.

The "INSTALL" project is supplied with new installations and upgrades. If you are upgrading from a previous version of GEOPAK Rebar, it will contain a copy of the new configuration files. For new installations, it is nothing more than a safe copy of the "DEFAULT" project directory. In either case, the "INSTALL" directory can be deleted once you've finished the configuration process described in this Chapter.

1.3.1 WHY SHOULD PROJECTS BE USED ?

Most engineering organizations have established drafting office standards in place. Commonly, however, reinforcement details must be drawn to a style and standard specified by a Client or some other external organization. GEOPAK Rebar configuration files can be established to match these criteria. You can keep separate copies of each configuration file can be kept in Project directories for as many clients as necessary. As each new configuration is required, a new project directory is established.

For example, assume your Client ("XYZ Corporation") requires reinforcement details to be presented in a style they have specified. In addition, all reinforcement must be scheduled using the Clients standard bar mark designations (which differs perhaps from your normal scheduling standards). Also, the scheduled quantities must be listed in a predefined bar chart format.

1.3.2 HOW ARE NEW PROJECTS CREATED ?

The first step is to create a new project directory beneath the GEOPAK Rebar software directory. For simplicity, create the directory (folder) in the name of your Client, e.g.:

mkdir \rebar\projects\xyz

Copy the GEOPAK Rebar configuration files from an existing Project directory to the new project directory:

copy \rebar\projects\install*.* \rebar\projects\xyz

When the files are copied, you are now ready to establish the configuration for Company "XYZ". Using the procedures described in this Chapter, the display parameters are altered

within "display.sys". New bar designations are configured in "barmarks.sys" and a new bar chart is established.

A new GEOPAK Rebar detailing session can now be initiated with the "XYZ" standards. Select the "XYZ" from the Project list as you Login.

All new reinforcement details now take on the characteristics of your Clients standards. Bars are scheduled using their standard bars shapes and shape codes. Bar Charts are created in accordance with their requested style. All GEOPAK Rebar Objects you retrieve from your libraries are automatically drawn to the new standard.

The following sections describe the configuration process for each of the files within your project directories.

1.4 NOMINAL DEFAULTS FILE ("DEFAULT.DEF")

The Nominal Defaults File is located in every Project directory. It is simply a copy of a normal defaults file containing a list of your General, Level, Structural Detail, Main Bar, Longitudinal Bar and Text defaults. Whenever a detailing session begins, GEOPAK Rebar looks for an existing database file of the same name as the drawing. All of these Bar Defaults are read from the existing Database and installed for the current session. If an existing database is not found (as in the case of a brand new drawing), GEOPAK Rebar looks to your Nominal Defaults File in the current Project directory to install an initial set of Bar Defaults.

The Nominal Defaults Files enables your most commonly-used defaults to be installed automatically at the start of every new session. If the defaults within the file are established correctly, only minor changes to Bar Defaults should then be required prior to commencement of detailing.

The process required to establish the nominal defaults file is a simple one. First you need to run GEOPAK Rebar and set all defaults to the nominal values you require at Login (for a new session). As described in Chapter 3, these defaults are established from the Bar Defaults palette:

When all your preferred starting defaults are set, select the Save Project Defaults icon (the last icon in the palette). A message appears to confirm a Nominal Defaults File has been created.

Note that "defaults.def" is a binary file and cannot be edited using a normal Text Editor. The file is only created using the interactive procedure above.

1.5 DISPLAY PARAMETERS ("DISPLAY.SYS")

The appearance of most elements of reinforcement details are controlled via parameters within "display.sys" in your project directories. This file is a text file and should be edited with your normal Text Editor.

Each display parameter appears as a four letter name with the format:

NAME = Value

Two or three lines of comments accompany each parameter, briefly describing their use. Comments are identified by two slashes "//" at the start of a line. You can add extra comments to the file, if necessary.

Many elements of GEOPAK Rebar's details are drawn to appear on the final drawing at the same paper size regardless of drawing scale. Therefore, some display parameters, which control the size of reinforcement features, are specified in paper-size units. GEOPAK Rebar establishes the size of its paper-sized entities in the `real world' coordinate system by multiplying the current scale factor by the value of the display parameters provided in "display.sys". Paper-size parameters are identified in the description below where units are specified as "(mm, paper size)".

Use of display parameters is now described. Parameters are presented in alphabetical order and divided into the following categories:

1.5.1 GENERAL REINFORCEMENT

BEDS =
BEDR =
BEDW =

The "BED..." series of parameters controls the automatic Bar End Detection functionality. The **BEDS** parameter applies only to the placement of Section bar reinforcement. It sets the distance from the nominal bar end within which the search for a suitable concrete face or bar (for lapping) is conducted. If a concrete face or bar is found, the bar end is automatically adjusted to that element. The **BEDR** applies to bar end detection for bar range placement. **BEDW** sets the width of the zone within which the search is conducted. If **BEDS**, **BEDR** is set to zero, the auto-bar-end-detection is disabled for Section bar placement and Bar Range placement respectively. If **BEDW** is set to zero, the functionality is disabled for both placement categories.

BUPD =

In situations involving complex reinforcement arrangements where the majority of bars are interrelated to each other via bar associations and laps etc., the number of bars redrawn by the system after any bar modification (or Redraw Bar option) can be very high. This chain reaction of bar updates can be triggered is performed by the system in an attempt to ensure that all schedule information such as bar lengths, quantities and bar marks are correctly maintained. The **BUPD** parameter sets the threshold at which bars are no longer automatically

redrawn but rather kept in a Redraw Queue until such time as you choose to request the bars be processed. If **BUPD** is zero, the Redraw Queue is never established. If **BUPD** is set to 50 (say), an "Update Bars" icon palette appears as soon as the number of queued bars is equal to or greater than 50. You can then choose to execute or cancel the bar queue whenever you wish.

CPRS = Many of Geopak Rebar's detailing procedures involve the updating of bar details. The process of updating bars involves first deleting all bar elements and then redrawing them again in accordance with the RDB database information. When this process is repeated over and over, the DGN file size can expand rapidly, thereby necessitating frequent compressing of the DGN file. If you would like Rebar to automatically compress the DGN each time you execute Rebar->File->Save, set **CPRS** to 1. In additionally require a DGN compress whenever an Auto-Save is executed, set **CPRS** to 2. Other set **CPRS** to zero to disable the DGN Compress functionality.

EDF1 =
EDF2 = During bar placement, the ends of a bar normally appear with "free" ends (i.e. no hooks/cogs etc.) when the bar ends are first located. Controls within the Bar End Details dialog box are then used to modify the end conditions. The **EDF1** and **EDF2** parameters control the state of the initial end conditions. They specify conditions that should be applied to the ends of a bar automatically each time the bar ends are located. **EDF1** and **EDF2** therefore override the "free" end condition for the first and second end of a bar respectively. These parameters currently accept the following values:

Value = 0: Default condition - free end, no changes/additions.

Value = 1: A tick is automatically applied.

ENDX = Is used when indicating the ends of a bar. If **ENDX** is 1, control automatically switches from the first end to the second end after the first is indicated successfully (but only once). If **ENDX** is 2, the switch takes place after every successful indication (i.e. from end 1 to end 2 to end 1…). Set **ENDX** to 0 to disable this feature. In this case, the "Next End" button must always be selected to switch ends.

FBLS = If standard 90, 135 or 180 degree bends are added to the end of a bar, the bend can be detailed as a "field bend" (to be bent on site). The actual extended straight portion of the bar is drawn using a linestyle specified by the **FBLS** parameter.

FLSH = Bars are sometimes highlighted by flashing on and off as error or warning messages are displayed. The **FLSH** parameter controls the speed of the flashing sequence. The higher the number the slower the flashes occur. If **FLSH** is less than or equal to zero, the flashing is deactivated. As a

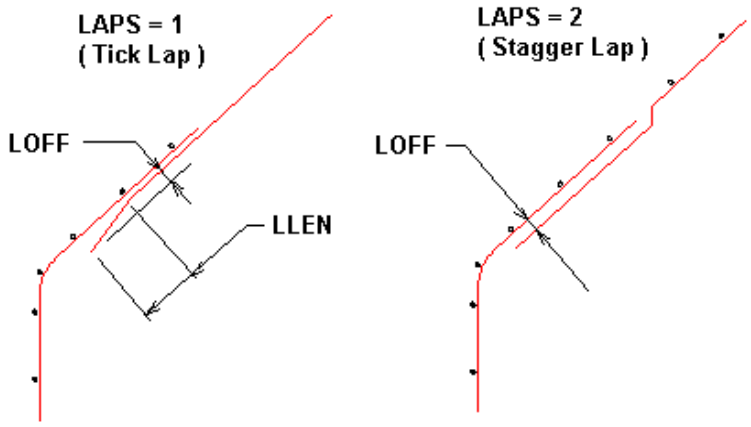
guide, the parameter should be set somewhere between 1 and 20 but this is dependent on your processor speed.

FSZE = If the **FSZE** parameter equals 1 and bar details are drawn in true detail (i.e. Full-Size attribute is ON), the bar dimensions are drawn to the accurate schedule dimensions if some have been specified. Schedule dimensions are entered in the Special Data Entry boxes and override the nominal drawing values. If **FSZE** = 0, full-size details are drawn using the drawing values always.

HDIA = When placing "Dots" on the end of a bar to represent bends, a circle is drawn with a diameter equal to **HDIA** (paper size). NOTE this parameter is not applied in full-size details.

IUPD = If some bars and dimensions have been queued for automatic updating (e.g. after the modification of concrete faces), there may be occasions where the detailing session is exited (or shutdown) before the updates are performed. If **IUPD** is set to 1, any updates that are still pending (from the previous session) are automatically performed during the next Login. If **IUPD** is set to 0, they are performed whenever the next bar (or set of bars) is redrawn.

LAPS = The type of lap detail used by GEOPAK Rebar when lapping main bars (also used for lapping Plan reinforcement). As shown in the diagram, a lap is detailed in the "tick" style if **LAPS** = 1. A "stagger" lap is drawn if **LAPS** = 2. If **LAPS** is set to zero, no laps detail are drawn. Parameters **LLEN** and **LOFF** are used in conjunction with **LAPS** and **LAPT**.



LAPT = Indicates the preferred lap detail that is added automatically when the length of a straight bar exceeds its stock length. If **LAPT** is 0, all stock lengths are offset alternately from each other. If **LAPT** is 1, all bars are drawn with a staggered lap. Set **LAPT** to 2 if you require ticked laps.

LDAT = If any existing database file (rdb) was last modified before **LDAT** a warning message is displayed before you can proceed to open the file.

The date format (**LDAT**) is mmddyyyy where:

mm is a number indicating the month (1 to 12). (Note do not start with a digit 0 (for Jan it is 1 not 01), otherwise the format will be invalid)

dd is TWO digit number indicating the day of the month (01 to 31)

yyyy is the year.

For example, the 5th of February 1998 **LDAT** is 2051998, or for Nov/12/2000, **LDAT** = 11122000. If **LDAT** is 0 or invalid no warning will be given.

LAYR = The number of layers of bars can be selected from a pop-up list within the Longitudinal Bar Placement (and Range Bar) dialog boxes. The numbers shown within the layers list are established according to the **LAYR** variables. Note this list also applies to "The "Number of Bars Per Bundle" when corner bars are placed.

LGLS = The default spacing method for longitudinal bars is controlled by the **LGLS** parameter. Choose 1 = Nominal-Spacing, 2 = Minimum-Spacing, 3 = Maximum-Spacing, 4 = Inter-Bar-Spacing, 5 = Number-Of-Bars and 6 = Total-Bar-Area.

NOTE that **LGLS** is also used to determine preferred spacing method for Bar Range details.

LGLX = Is similar in use to the **ENDX** parameter, but applies to the placement of longitudinal bar groups. If **LGLX** = 1, control automatically moves to the next leg of the bar after "SAVE" has been selected (to save a bar group). This only occurs while the next leg remains free of any longitudinal bars. If **LGLX** is 2, the switch takes place after every "SAVE" (always). Set **LGLX** to 0 to disable this feature.

LLEG = When placing single-legged bars, the initial bar is drawn at a nominal size of **LLEG** (master units).

LMIN = If **FLGL** is set to 1, small longitudinal bar diameters may be difficult to see when the drawing is plotted (occurs more commonly when larger scale factors are used). Set the **LMIN** parameter to 1 if you prefer that a minimum diameter is maintained in these situations. If **LMIN** = 1, the longitudinal bar diameter is guaranteed never to be smaller than the diameter specified by NDIA below. Otherwise, set **LMIN** to 0.

PLTA = If **PLTA** is 1, the angle of text placed in a bar or face label is always orthogonal, (0, 90, 180, or 270 degrees). Otherwise, if **PLTA** = 0, the

angle is determined by the angle of the adjacent leader line.

SBED = After selecting the initial faces for a new Section bar, or after indicating reference face for a new Bar Range detail, the next procedure to be undertaken is almost always the indication/confirmation of the Bar End Details. If the **SBED** parameter is set to 1, the Bar End Details dialog box is displayed automatically as soon as the initial faces are indicated. If **SBED** equals 0, no dialog is displayed automatically - i.e. the Bar End Details option then needs to be selected manually from the Bar Placement icon palette.

SPCG = Default spacings are offered in a pop-up list within several dialogue boxes. The range of spacings offered is determined by the **SPCG** variables contained below. Add more of these variables as required.

SPRL = When a circular bar is associated with a spiral bar, this variable indicates the initial splice type to be installed automatically when the association is created. The available options are:

Value = 0: No splice, a full circular bar is created

Value = 1: 135 degree bend splice

Value = 2: 90 degree bend splice

Value = 3: Mechanical splice

Value = 4: Cogged splice

Value = 5: Hooked splice with a lap

Value = 6: Cogged splice with a lap

STGR = Represents the offset used for a staggered end detail. It is the distance in mm (paper size) that the lapped portion of the bar is staggered out and away from an adjacent bar.

THRD = If bar ends are threaded, **THRD** controls the display of the thread detail when shown at full size. Set **THRD** = 1 to show the threaded region as a solid element, **THRD** = 2 for full threaded detail, and **THRD** = 0 for simple centerline only.

TICF = If ticks are also required when bars are drawn in full size, the **TICF** parameter should be set to 1. Otherwise set it to 0.

TICK = Ticks placed at the end of a bar or a bend are drawn as either a straight line or an arc. Set **TICK** to 0 if a line is required, or to 1 if an arc is required.

TLEN = The **TLEN** display variable sets the length of the turned up portion of a tick (value is paper size)

TOFF = Similar to **TLEN**, the **TOFF** variable determines the offset length of a "ticked" bar end detail from the projected centerline of the bar to the end of the tick (value is paper size).

UBOX = Occasionally, a large number of bars may need to be redrawn in a single update, perhaps during "Redraw Detail" or the resizing of dynamic dimensions. The **UBOX** parameter sets the threshold for when a "Completion Box" is displayed during the update process to provide feedback on the number of bars still to be redrawn. The threshold value is measured in terms of the number of bars required to be redrawn. For example, if **UBOX** = 100, the completion box is only displayed when 100 or more bars are about to be redrawn. If **UBOX** = 0, the completion box is never displayed.

1.5.2 SECTION REINFORCEMENT

CFIL = Specifies that all longitudinal bar circles should be created as filled elements when its value is 1. If set to zero, the circles are not filled.

FBLS = If standard 90, 135 or 180 degree bends are added to the end of a bar, the bend can be detailed as a "field bend" (to be bent on site). The actual extended straight portion of the bar is drawn using a linestyle specified by the **FBLS** parameter.

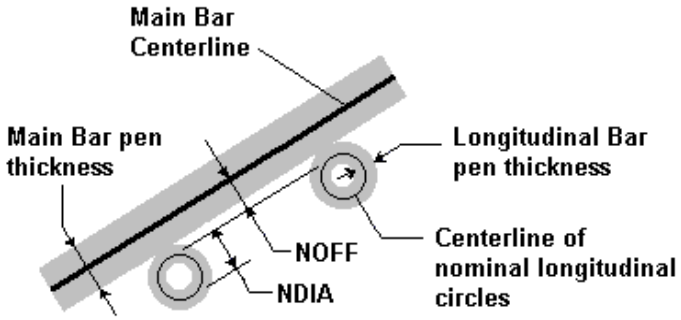
FLDB = When the Field Bend toggle button is selected during bar placement, the extended straight portion of the bend is immediately drawn using the linestyle defined by **FBLS** (above). When the **FLDB** parameter is set to zero, the straight extension of the bar is also drawn when the bar is saved to the DGN. If **FLDB** = 1, the straight extension is only shown during bar placement, then removed when the final detail is saved to the DGN.

FLGL = Longitudinal bars circles are normally sized in accordance with the **NOFF** and **NDIA** parameters when drawn as nominal sized circles. When a detail is redrawn at full-size, these longitudinal bars are drawn at their true physical diameters. The **FLGL** parameter controls whether these longitudinal bars are drawn in true diameter at all times (even for nominal centerline details). Set **FLGL** to 1 if full size bars are always required. Otherwise, set **FLGL** to 0 (zero).

HLEN = If standard bends (hooks, cogs etc.) are added to the end of a bar, the actual straight extension of the bend may appear very small at large scales. **HLEN** specifies the minimum paper-size length of the straight extension of standard bends. If the true physical length of a bend (as specified in Bar Codes) is less than **HLEN** multiplied by the current

scale factor, the bend is drawn at a minimum length of **HLEN**, instead of the true length. This only applies to nominal centerline details - not at full-size. Set **HLEN** to zero to deactivate this functionality. In the case of standard 180-degree bends, **HLEN** also automatically ensures the diameter of the hook is not less one-half of **HLEN**.

NDIA = The nominal diameter in mm (paper size) of the longitudinal bar circles (only applicable when Full-Size is OFF). As shown in the diagram, you should set **NDIA** and **NOFF** in accordance with your pen thicknesses for main bar centerlines and longitudinal circles. If you require longitudinal circles completely colored in, set **NDIA** to the same size as the pen thickness used for longitudinal circles.



NOFF = Is the offset distance (paper size) from the centreline of a main bar to the edge of longitudinal bar circles (only applicable for nominal size detailing ie. Fullsize is OFF).

SPLC = Welded and mechanical splices can be drawn with a "ticked" lap or a staggered lap. **SPLC** should be set to 1 if ticks are required or 2 if the staggered details are required.

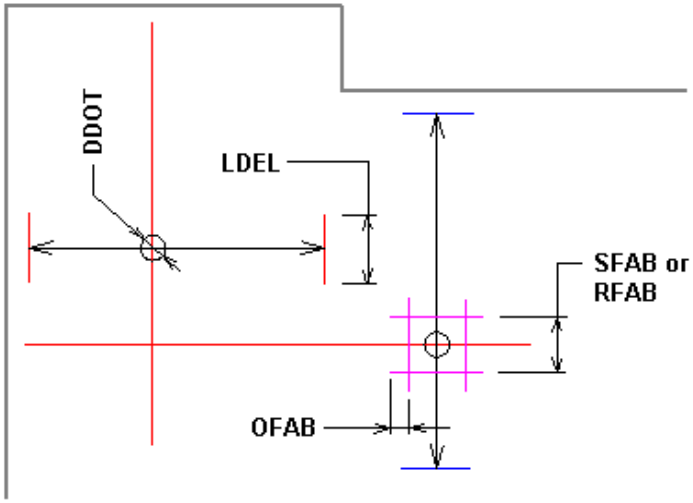
WELD = Welded laps can be drawn at a constant length (irrespective of bar diameter. This length is specified by the **WELD** parameter. If the **WELD** parameter is supplied, all values for weld length in the Bar Codes data are ignored. Comment this parameter out if the Bar Codes values should be used.

WKNG = Whenever the Working Units option is specified when making adjustments to bars in a bar group or bar range, the preferred distance in Working Units through which the bar is moved (at each modification) is specified by the parameter **WKNG**.

WKUN = Adjustments to the position of longitudinal bars can be made to any individual bar in a longitudinal bar group or in a bar range. Each time an adjustment is made, the bar is moved a distance equal to the nudge distance specified by **NUDG**, or the bar can be moved through a

specified distance in working units. If the Working Units option is the preferred method, set **WKUN** to 1, otherwise if the paper-units **NUDG** value is preferred, set **WKUN** to 0. NOTE that this method can be altered at run-time as modifications are performed.

1.5.3 BAR RANGE REINFORCEMENT



ACOG = In addition to the **PCOG** parameter, **ACOG** specifies whether or not a dot (or 45deg line) should be added automatically whenever a 90deg bend is added to the end of a bar range. If **ACOG** = 1, the "**Use Dot At Bend**" option is activated automatically every time a 90deg bend is selected.

DDOT = The diameter of the center circle in Plan reinforcement details (mm, paper size) (refer to the diagram above).

DWID = The width of the circle used at the center of Plan reinforcement details (mm, paper size). Set **DWID** to same positive value when you require the center circle to be completely colored in (i.e., all yellow for example). Otherwise, set **DWID** to zero. The **DDOT** and **DWID** parameters are inter-related. You should set **DWID** to half the size of **DDOT** if the center circle is to be filled in.

EDOT = If a "Dot" placed at the end of a bar (to indicate a 3D leg or standard bend) should be drawn as a filled circle, set the **EDOT** parameter to 1. Otherwise set the value to 0 for a circle that is not filled.

FDOT = If the center circle in bar range details should be drawn as a filled circle, set the **FDOT** parameter to 1. Otherwise, set the value to 0 for a circle that is not filled.

IBAD = By default (**IBAD = 1**), circles are placed at the intersection between main bars in a bar range and the delimiter line(s) drawn through the range. The **IBAD** parameter allows you specify elements other than circles at these intersection points (in a bar range detail). Add together each of the options that you require and set the **IBAD** parameter to that total.

Value = 1: Use circles with diameter **CDIA**

Value = 2: Use circles with diameter **LDIA** (see above)

Value = 4: Use strokes at each intersection

Value = 8: Use arrows

IDST = **IDST** controls the linestyle of internal delimiter lines drawn between adjacent bar ranges i.e. the connecting lines. If **IDST** is -1, the connecting lines are drawn with the same style as the normal delimiter lines. If **IDST** is zero or greater, that value represents the linestyle number for connecting delimiter lines. See also **IDEL** for the alternate color and weight of the internal delimiter lines.

LDEL = The size of the small delimiter bars used in Plan reinforcement details (mm, paper size). Refer to Diagram.

PCOG = When detailing bar ranges, 90 degree bends (cogs) that are heading into the page (in the 3rd dimension) are often symbolized by a 45deg line, instead of a solid dot. **PCOG** specifies the length of the symbolic 45deg line (paper size). If **PCOG** is zero, a dot is used at the end of the bar instead (the default case).

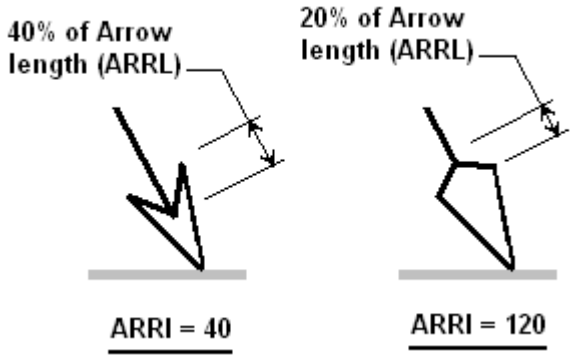
1.5.4 REINFORCEMENT LABELING

ALBL = Similar to the **ILBL** parameter, the **ALBL** parameter controls the angle through which a slant on the labels is incremented or decremented. The angle is given in degrees.

ARRA = The angle of all arrowheads placed by GEOPAK Rebar (as an angle in degrees between the two arrowhead lines).

ARRI = **ARRI** specifies the amount by which the recess at the back of the arrow (which must use **ARRT** Value = 16) extends towards the arrowhead. **ARRI** is expressed as a percentage of total arrowhead length (given by

ARRL) e.g. a value of 30 equals 0.3 times the length of the arrow.



NOTE: If you specify a length greater than 100, there is no recess, the back of the arrow extends in the opposite direction away from the arrowhead.

ARRL = The length of all arrowheads (mm, paper size).

ARRT = Arrows are constructed using either straight lines (unfilled) or a filled arrow (solid element). **ARRT** sets both the arrow shape and the filled or unfilled mode. Add together each of the options you require and set the **ARRT** parameter to that total. For example, if you want to create an arrow with a curved recessed end and with Fill, you need to select Value = 2 (fill) plus Value = 16 (circular recess), making a total **ARRT** = 18.

ARRT options are as follows:

Value 0: - Standard (simple) arrowhead

Value 1: - Not filled, create using line elements

Value 2: - Filled, create using solid elements

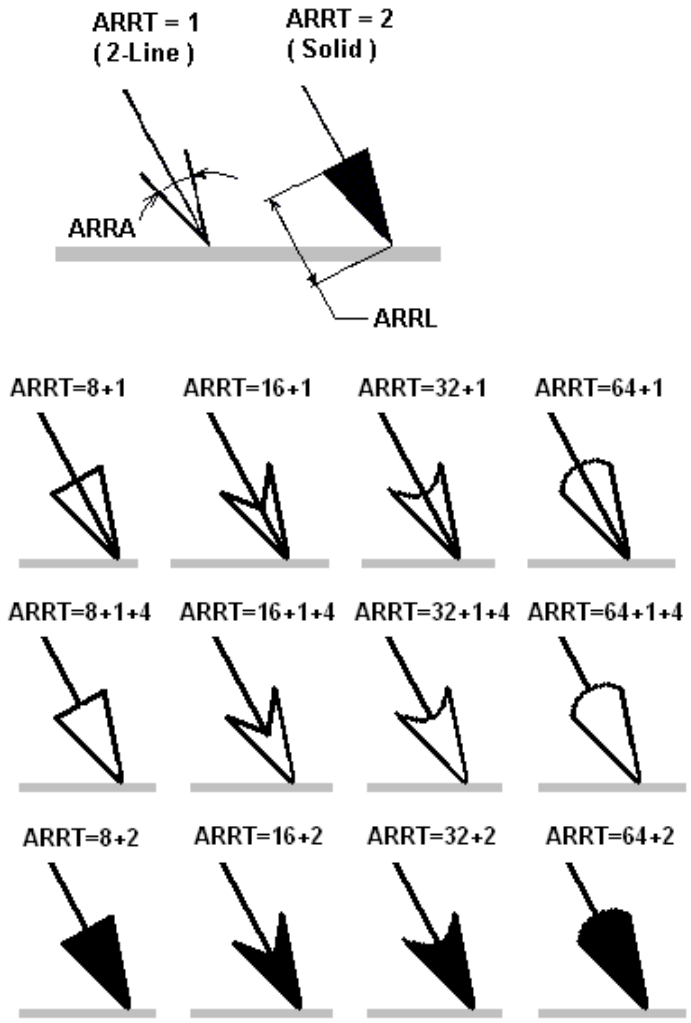
Value 4: - Stop leader line at back of arrow (default: extends to head of arrow)

Value 8: - Add a straight line across back of arrow

Value 16 - Add smaller arrow shape recess at back of arrow

Value 32: - Add circular shape recess to back of arrow

Value 64: - Add an external circular shape to back of arrow



ATAG = If tags should be automatically added every time a tick is added, set the **ATAG** parameter to 1. Otherwise, set it to 0 if tags are to be manually selected.

BDES = Normally the bar diameter designation set within the Bar Codes Diameter dialog box is output (unchanged) in the pop-up list of bar diameters. This designation is user-defined and in most cases made up of the bar grade (e.g. "T" "Y" etc) followed by the diameter size (20, 25, 32). The resultant designation (e.g. "Y20") is then output in the bar label using the $d preset text code. Some drafting standards call for the display of just the diameter size in the bar labels e.g. "20" (instead of "Y20"). In these cases, "20" must be entered as the bar designation.

Unfortunately, the pop-up list of bar diameters (as in the Bar Attributes dialog box) shows a list of just diameter sizes as well. The actual grade of the bar is not seen. So, if you require the Bar Grade to be prefixed to the bar designation to make the grade visible in the dialog box lists, set **BDES** to 1. If you require the Bar Grade to be postfixed to the diameter designation, set **BDES** to 2. Otherwise, when **BDES** = 0, the bar diameter designation is displayed unchanged in the dialog box lists.

BDIM = When bar shape diagrams are included in a bar label using the preset code "**$!!**" (double exclamation marks) instead of "**$!**" (a single exclamation mark), the bar dimension letters "A", "B" etc. are automatically replaced by the actual calculated bar dimension. If your preference is to include the calculated dimensions always whenever "**$!**" (single exclamation) is used, set **BDIM** to 1. Otherwise, set it to zero, then use "**$!**" or "**$!!**" as required.

Add 2 to this value if you want the calculated dimension text to be always center-bottom justified. Alternatively, the justification mode is inherited from the justification of the dimension letters “A”, “B” etc. found within the Cell.

See also **FDIM**, **GDIM**, **HDIM**, **PDIM** and **SCOL**.

BMNT = When each bar in a longitudinal bar is labeled with its Bar Mark Number, the height of the text placed adjacent to each bar is sized in accordance with the **BMNT** parameter (paper size).

CDIA =
LDIA = The diameter of the circles placed at the end of label lines is set by the value of the **CDIA** and **LDIA** display variable (paper size). **CDIA** represents the smaller circle diameter. **LDIA** is the larger circle diameter.

CDIM =
RDIM = **RDIM** and **CDIM** (paper size) control the distance from the end of dimension extension lines to the reinforcing bar or concrete face being dimensioned respectively. If either of these parameters is set to zero the default MicroStation settings are used.

DDIA = The diameter of "dots" placed at the end of label lines is set by the value of the **DDIA** display variable (paper size)

DDRO = When you choose to "stack" one dynamic dimension upon another dynamic dimension, an initial relative offset equal to **DDRO** is used (paper size offset).

DIMA = The text on a dynamic dimension and on all types of bar labels can be adjusted left or right (inside or outside the dimension lines). When the "Adjust Left" and "Adjust Right" buttons are selected when moving text, the **DIMA** parameter controls the distance through which the text is adjusted. Specifying a negative distance e.g. **DIMA** in paper-size units =

-2.5 would move the text by 2.5 paper units on the final drawing. If **DIMA** is a positive number, it is regarded as a real-world distance.

DIMH = The size of text placed adjacent to dynamic dimensions is controlled by the **DIMH** parameter, (paper size). If **DIMH** is not specified the default text height for reinforcing bar labels is used.

DIMT = When dimensions are attached to the ends of bars, text is added to the dimension in accordance with a selected preset text entry. **DIMT** specifies the preset index to be used by default whenever a new bar end dimension is created. **DIMT** applies to the [Bar End Location] presets within "presets.sys".

DLMA = When internal delimiter lines are adjusted back and forth between the ends of the bar (in a range), the amount by which the delimiters are adjusted is specified by the **DLMA** parameter. Each time the adjustment button is pushed, the delimiter lines move by **DLMA**, specified as a percentage distance down the main bar. **DLMA** must be greater than 0 and less than 100. A value of 10 would equate to an adjustment of 10% of the length of the bar. NOTE: The **ILBL** parameter determines the adjusted distance for "external" delimiters.

DLMC = The distance between the "offset" (or "cut") face and the end of the leader line (placed on external delimiter lines) is determined by the **DLMC** parameter (mm, paper size).

DLME = The extension of the leader lines extending from the bar range beyond the external delimiter lines is determined by the **DLME** parameter (mm, paper size). This is an absolute distance, not a multiple of text height as with the MicroStation dimension "extension".

DLMG = The distance between the end of a bar (in a bar range) and the leader line extending out to external delimiters is determined by the **DLMG** parameter (mm, paper size).

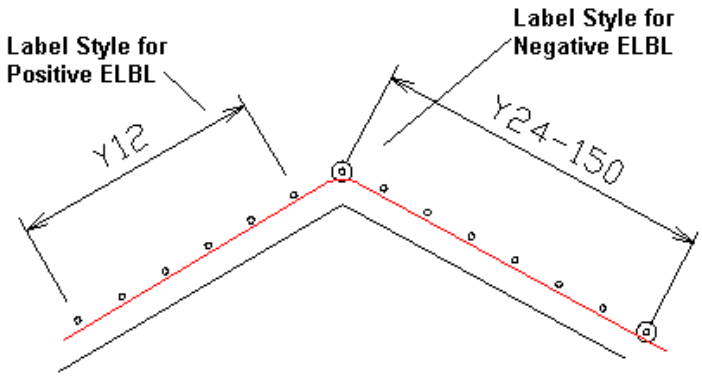
DLMI =
DLMO = The default position for delimiter lines placed inside or outside range bar details is controlled by the **DLMI** and **DLMO** parameters. **DLMI** refers to a percentage distance down the main bar at which INTERNAL delimiters are placed. **DLMI** must be greater than 0 and less than 100. For example, 55 = 55% down the length of the bar. **DLMO** refers to a distance (paper size) outside of the selected cut-off face, at which the external delimiters are drawn. **DLMI** and **DLMO** are both default values. The actual locations can be changed interactively during placement (refer to the **ILBL** and **DLMA** for the adjustment parameters).

DLMS = The delimiter style options represented by the 2nd, 3rd and 4th icons in the Delimiter Type icon palette. Assume, by default, that a circle is required at the intersection of the delimiter line and the main bar, along

with an arrow at the opposite end of the delimiter line. If arrows are preferred at both ends of all delimiters set **DLMS** to 1.

DTXH = Bar label text placed parallel to delimiter lines is sometimes drawn smaller and at a different color to the normal bar label text. The **DTXH** sets the alternative text height for the delimiter label text. This value should be set to zero if your normal text attribute height should be maintained... Refer also to the **DTXC** parameter that sets the alternative text weight and color for this text.

ELBL = The gap left between the edge of longitudinal circles and the delimiter lines used in Bar End Labels (see following diagram). If set to zero, delimiters are extended to touch the longitudinal bars. As an additional feature, when **ELBL** is set to a negative number, a circle of diameter "-**ELBL**" (mm, paper size) is drawn around the indicated longitudinal bars. Delimiter lines are then extended to touch the circle.



FDIM = When **BDIM** is non-zero or $!! is used (see above) and a varying-dimension bar is being created, Rebar uses the format set by **FDIM** to insert the varying dimensions similar to what occurs with Cell Diagrams in barchart.sys. For example, if **FDIM** is set to **~From $qlb~to $qle~step: $qlv~**, the dimension letter in the Cell diagram might be replaced with "**From 2400**", followed by "**to 3300**" on the next line and "**step: 35**" on the third line. Only **$qlb**, **$qle** and **$qlv** Preset codes can be used with **FDIM**.

The tilde "~" character must appear at the start and end of each variable-format line. See also **GDIM**, **HDIM**, **PDIM** and **SCOL**.

GDIM If more than line of text is specified in the varying-dimension format define **FDIM** (above), **GDIM** specifies the gap between each line of text. If **GDIM** is zero, the text spacing defaults to one-half of the text height. GDIM is a paper-size value.

GLBL = When you create longitudinal bar group labels, the dialog box appears with a Toggle option to "Add Bar Mark Number to all bars". This

toggle is activated normally when bar mark numbers must be placed adjacent to the longitudinal bar circles. If you require this toggle to be activated by default whenever the dialog box appears, set **GLBL** to 1. Otherwise, set **GLBL** to zero and the bar groups are labeled (by default) using the dimension style label.

HDIM = The height of the text elements used within bar shape Cells when bar shape letters “A”, “B” etc. are replaced by the actual scheduled bar dimensions (the process controlled by **BDIM)**. The height specified by **HDIM** is a paper-sized variable. It is multiplied by the scale of current bar before being applied to the text. It is independent of the scale of the Cell. If **HDIM** is zero, the height of the pre-existing dimension letters ("A", "B" etc.) is used. See also **GDIM**.

ILBL = The position of labels or dimensions can be adjusted dynamically after they are initially positioned. The offset to the label or dimension is incremented or decremented by **ILBL** (paper size).

IRDM = Similar to **ILBL,** the position of relative dimensions can be adjusted dynamically after they are initially positioned relatively to another dimension. The relative offset to the relative dimension is incremented or decremented by **IRDM** (paper size).

JUSD = The justification of text placed along delimiter lines is automatically adjusted as the text location moves back and forth along the delimiter line. When the text is placed in the center region of the delimiter, the text justification is set to "center". When text is located toward the end of delimiter line arrows, text justification is automatically switched to either "Left" or "Right" depending on the direction of the delimiter line arrow. The **JUSD** parameter specifies the length of this zone toward each end of the delimiter line in which the justification changes from "center" to "left" (or "right"). **JUSD** is a percentage of the overall length of the delimiter line and must be entered as a number between 0. and 1.. **JUSD** is not an absolute distance.

LDIA =
CDIA = The diameter of the circles placed at the end of label lines is set by the value of the **LDIA** and **CDIA** display variable (paper size). **CDIA** represents the smaller circle diameter. **LDIA** is the larger circle diameter.

LFRQ = The frequency with which bar marks are placed adjacent to longitudinal bars is set using the **LFRQ** parameter. Set **LFRQ** to 0 then, by default, you require all longitudinal bars to be labeled with a bar mark. Set **LFRQ** to 1 for just the end points only or **LFRQ** to 2 for mid points, and so on. This setting can of course be changed interactively in the Label dialog box once the labels are placed.

MGNP = When a line of text is placed in a bar label, the gap (or margin) between

MGNH = the label line and the adjacent text is controlled by either of two parameters - **MGNP** or **MGNH**. If you wish to specify the margin in terms of a multiple of text height, you should use **MGNH** parameter (for example **MGNH = 1** sets the gap to one times the text height). If you wish to specify an absolute distance (irrespective of text height), use the **MGNP** parameter (a paper-sized distance).

Whichever parameter you use, you must set the other one to zero.

OLBL = When automatic labeling of longitudinal bars is selected during the placement of section reinforcement, GEOPAK Rebar places the initial label lines at an offset equal to **OLBL** (mm, paper size). You are able to override this offset interactively as the label is placed.

PDIM = The font number used for text elements created within bar shape Cells when bar shape letters “A”, “B” etc. are replaced by the actual scheduled bar dimensions (the process controlled by **BDIM).** A negative value (-1) causes the font from the original dimension letter ("A", "B" etc. found within the Cell) to be inherited. See also **HDIM** and **SCOL**.

PLBS =
PLBL =
PLBP =
PLBB =
PLBC =

The following parameters control the default settings for the "Place Label" dialog box. Each is used for the following situations:

PLBS - Normal section reinforcement

PLBL - for labels attached to closed ligature bars

PLBP - for range bar (or delimitered) reinforcement

PLBB - for labels attached to longitudinal bars.

PLBC - Labels attached to concrete faces.

Each parameter controls a different toggle, pop-up list item or method contained within the "Place Label" dialog box. They appear as follows:

PLBS = (type), (terminator), (position), (oblique), (angle lock), (preset index) where

(Type) = 1 for Arrow Label, = 2 for Line Label, = 3 for delimiter label.

(Terminator) = 0 for none, = 1 for arrow, = 2 for small circle, =3 for large circle, = 4 for dot, = 5 for stroke.

(Position) = 0 for Adjacent, = 1 for Between, = 2 for Above, = 3 for Below.

(Oblique) = 0 for Oblique First Line OFF, = 1 for ON.

(Angle lock) = 0 for Angle Lock OFF, = 1 for ON.

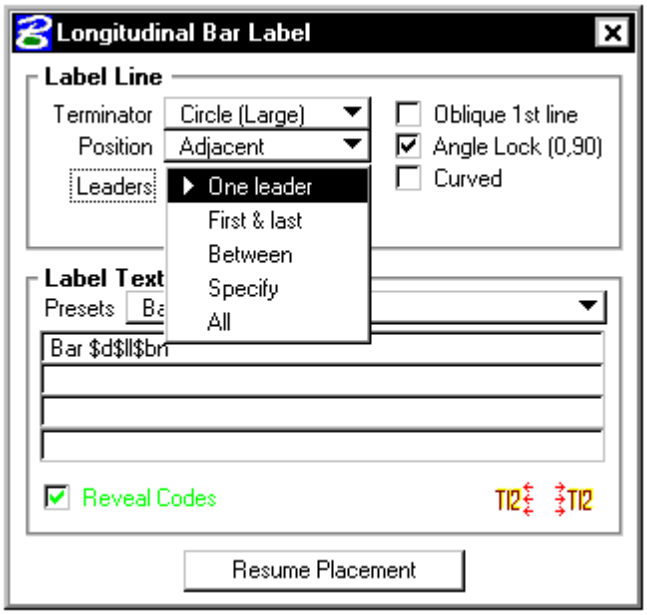
(Preset index) = 1, 2, 3.... Corresponding to the 1st, 2nd, 3rd... preset text entry in the relevant "presets.sys" list. NOTE: If the preset index is set to 0 (zero), the first line of preset text is automatically installed.

(Curved) = 0 for Curved OFF, = 1 for ON.

(Angle lock) = 0 for Angle Lock OFF, = 1 for ON.

Note:

The **PLBB** parameter uses two extra parameters that follow after those described above. These extra fields govern the multi-leader line options associated with the Leaders option shown in the dialog below:



The extra parameters are:

(Leader Type) = 0 for **One Leader**, = 1 for **First & Last**, = 2 for **Between**, = 3 for **Specify**, = 4 for **All**

(Specify Value) sets the preferred number of leaders required when the **Specify** option is selected.

PRNG =
SRNG =
ARNG =

The Preset Text Code **"$rt"** can be included in main bar labels in order to output an abbreviation (or code) that relates to the type of bar range being detailed. For example, the text "STG" might be output at the end of a bar label placed on a staggered bar range. The following parameters **PRNG**, **SRNG** and **ARNG** specify the code you wish to use for parallel, staggered and alternate bar ranges, respectively.

RVLC =

RVLC specifies whether the "Reveal Codes" toggle (in the "Place Label" dialog box) should be on or off by default. Set **RVLC** to 1 for ON.

SDIM =
TDIM =

When the "Test" option is selected during placement of dynamic dimensions, the parameters **TDIM** and **SDIM** control the magnitude and

speed of the test adjustments. **TDIM** represents the percentage of dimension size through which the dimension is increased and decreased. For example, **TDIM** = 15 causes the dimension to be tested through a range of sizes from +15% to -15% of the size of the dimension. **SDIM** controls the number of steps through which these adjustments should be made. **SDIM** = 10 would force 10 adjustments to the dimension as it increases (or decreases) in size. The apparent speed of the dimension test decreases as the number of steps (**SDIM**) increases.

SLBL = This variable is used in a similar manner to **ELBL**. It controls the type and size of the detail placed adjacent to longitudinal bar circles when creating a "Single Bar Label". If **SLBL**=1, GEOPAK Rebar places an arrow at the end of the label line (touching the circle). If set to zero, the label line is drawn touching the circle without an arrow. If set to a negative number, a circle of diameter **"-SLBL**" is placed around the longitudinal circle, extending from the label line.

SLSF = A bar shape can be presented as a Cell within a label using the preset text "$!". If $! is used in a bar label, the corresponding bar shape cell for the bar, e.g. "bar234" is retrieved. The scale factor used during the retrieval of these bar shape cells is evaluated by multiplying the **SLSF** factor by the current scale of the bar.

TAGA =
TAGL =
TAGH =
TAGI =
TAGO =
TAGW =

Tags can be placed adjacent to the end of bars. Several parameters control the sizing of these parameters. They are **TAGL** (length of the Tag), **TAGA** (length of the tag arrow), **TAGW** (width of the tag leader) and **TAGH** (height of the Tag text), **TAGO** (the initial offset at which the tag is placed) and **TAGI** (the incremental distance through which the tag is moved). All of these parameters are specified in paper size units.

TAGT = The size of text placed adjacent to dynamic dimensions is controlled by the **DIMH** parameter, (paper size). If **DIMH** is not specified the default text height for reinforcing bar labels is used.

TICL = By default, when **TICL** = 0, bar labels are created using simple elements – individual line and text elements. If you set **TICL** = 1, bar labels are created as a single complex element. The advantage of this approach is found when establishing Bar Associations. You can indicate bars or bar groups simply by indicating some part of the complex label that touches them.

TSPC = All lines of text are spaced according to the **TSPC** parameter. Its value represents lines spacing in terms of a percentage of the height of the text. I.e. **TSPC** = 50 is equivalent to a spacing of 0.5 times the text height.

VROT = When bar labels are placed, each line of text is normally aligned at an indicated angle with the current DGN coordinate system. If situations

arise where rotation must be applied to the current View(s), the alignment of text will ignore any view rotation when **VROT** = 0. If you require the text to be aligned in accordance with the current view rotation, set **VROT** to 1. *CAUTION!* When **VROT** = 1, the text alignment will be performed using the rotation of the view in which the bar is initially placed. If such bars are then displayed in other views, where the view rotation is different (or zero), the text will appear misarranged.

1.5.5 COLORS / WEIGHTS

When altering the colors and weights of any of the following display variables, you must specify one of the standard MicroStation color numbers (1-255) and standard weights.

ACOL = The color name or number used for all arrowheads and circles placed at the end of label lines.

BCOL = The color number and weight to be used for all "dots" placed at the end of label lines.

CCOL = The color number and weight for circles or "dots" placed at the end of bars to represent bends (not used in full-size details)

DCOL = The color name or number used for the small delimiter lines in plan reinforcement details. If not specified (i.e., commented out), the color of the small delimiters is set to the color of the main bar.

DTXC = Bar label text placed parallel to delimiter lines is sometimes drawn smaller and at a different color to the normal bar label text. The **DTXC** sets the color number and weight for the delimiter label text. These values should be set to -1 if your normal text attribute color and weight should be used... Refer also to the **DTXH** parameter, which sets the alternative text height for this text.

FCOL = The color name or number for square and rectangular fabric symbols used in the Plan Fabric details.

GCOL = The colors number and weight for text placed on all bar tags.

GIFC = When Objects are created, a GIF or PNG image of the detail is created. When the image appears in the dialog box, the color correction can be adjusted. You should set the **GIFC** parameter to your preferred color correction factor between 1 and 5 inclusive (whole numbers).

HCOL = The color name or number used for all hatching created by the dynamic hatching options.

HILI = **HILI** sets the color number and weight used to highlight all reinforcing bar elements when the placement process for a bar is temporarily suspended as a new bar is started.

IDEL = **IDEL** controls the color and weight of internal delimiter lines drawn between adjacent bar ranges i.e. the connecting lines. If the color or weight is –1 the connecting lines are drawn with the same color/weight as the normal delimiter lines. See also **IDST** for the linestyle number of these connecting lines.

INDI = During placement and modification of a bar, indicator lines, circles and arrows are drawn to temporarily highlight various aspects of the bar detail. The color and weight of these indicators are set according to the INDI parameter.

LBEC = Sets the color number and weight for text placed adjacent to longitudinal bar circles (in section) - used typically when labeling these circles with bar mark numbers.

LCOL = The color name or number used for all label lines and delimiter lines.

LFUL = **LFUL** sets the preferred color number and weight for all longitudinal reinforcement drawn in full size detail. If the **LFUL** color or weight is set equal -1, the setting is disregarded.

LHIL = **LHIL** sets the preferred color number and weight used when highlighting the current bar group during placement of longitudinal bars.

MFUL = **MFUL** sets the preferred color number and weight for all main bar reinforcement drawn in full size detail. If the **MFUL** color or weight is set equal -1, the setting is disregarded.

PCOL = The color name or number used for the center circle on all Plan reinforcement details.

SCOL = Sets the color number and weight of the scheduled dimensions included within bar shape Cell Diagrams when the Preset Code **$!!** is used. Set to –1, -1 to adopt the text color and weight of the original dimension text letters “A” “B” “C” etc. within the Cell.

TCOL = The color number & weight used for all "ticks" placed at the ends of bars (centerline details only).

THRC = Sets the color number and weight used for the threaded end of a bar when drawn at nominal centerline detail. Set to -1 if normal bar color and weight is required.

THRF = Sets the color number and weight for threaded ends drawn with full-size detail. Set color to -1 to adopt normal full size detail color.

XRFC = Bars are often linked through the Bar Associations option. Whenever a bar is modified, any bars that are linked to the selected bar are highlighted. **XRFC** sets the color number for all elements of these linked bars. NOTE that the weight value is ignored. Specify color of -1 to adopt normal system highlight color.

XCOL = Sets the color number and weight for the cross placed at the end of a bar to indicate the presence of a 3D bend going into or out of the page.

1.5.6 SCHEDULING PARAMETERS

ANGC = During the detection of bar shapes, comparisons are sometimes made between the angle of two or more legs of a bar. These angular comparisons are not designed to be exact. The angle of two legs might still be considered the same even when the two legs are (say) 1 degree different from each other in terms of their bearing. The **ANGC** parameter specifies the acceptable difference used in the comparison of angles during bar shape detection. If **ANGC** is set to 0.0, comparisons will always be exact, but this is NOT recommended. It is suggested that **ANGC** should be in the range 0.2 to 1.0 degrees.

ANGP = Some bar shapes require the calculation of angular dimensions instead of just normal bar lengths (distances). The **ANGP** parameter specifies the number of decimal places with which these angles should be displayed in the schedule listing.

ATOL = When individual shape dimensions A, B, C, etc. are compared during the process of checking bars of a similar length/shape, the **ATOL** parameter (with values usually between 0. and 1.) is used to reduce the **STOL** grouping tolerance or the alternate tolerance you enter in the Schedule Details dialog box. One can argue the comparison of individual lengths should work to a smaller tolerance than the comparison of the overall length L. If, for example, your normal grouping tolerance was set to 25mm and **ATOL** was set to 0.2, the total length dimensions would be compared to within 25mm of each other while each of the individual shape dimensions would compare to within 0.2 times 25 = 5mm of each other. If these dimensions should be exactly the same, set **ATOL** = 0.

AUDT = It is entirely possible that some bars which have been added to the schedule (and therefore output to bar charts) are included without a proper "bar association" being established and therefore do not have the correct total quantities. Perhaps bars, which have been scheduled, have not been labeled. The **AUDT** parameter controls a variety of rules, which make up the auditing procedure. Each of the rules listed below

can be selectively turned ON or OFF. If you require any of the rules to be included in the auditing procedure, simply add the "values" of each of the required rules together and set **AUDT** to the calculated total. Specify **AUDT** = 0 if no auditing is required...

Value 1 = check that each scheduled bar has a Bar Association, i.e. that it has 'quantities' associated with it.

Value 2 = check each scheduled bar or its 'associated' bar has been labeled.

Value 4 = ignore 'associated bars' when checking for labels, i.e. the actual bar being scheduled must always have a bar label.

Value 8 = provide a warning on all scheduled NON-STANDARD bars.

Value 16 = check for **$n** in the bar label or associated bar labels

Value 32 = check for **$tn** in the bar label or associated bar labels

Value 64 = check for **$bn** in the bar label or associated bar labels

Value 128 = check for **$bs** in the bar label or associated bar labels

BARX = The mass of each individual bar in the schedule can be output during the Bar Chart creation process. If you want the **MASX** parameter (above) to be applied to these individual bar masses (as they are for the summary of total masses) set the following **BARX** parameter to 1, otherwise set it to 0 if the individual bar masses are to be always displayed as the unfactored exact mass.

BCMT = The program checks the state of any external bar charts after a duration as set below for **BCMT** in minutes. If a modification is detected then you are prompted about updating the bar chart.

BDAT = During bar placement and modification, the "Bar Data" dialog box may appear with a continuously updated display of the bar mark number, the schedule dimensions and a diagram of the detected shape. The Bar Data dialog box contains a toggle button which either expands the dialog to full size to include all schedule dimensions and the bar shape diagram, or contracts the dialog to display just the bar mark number and the total length. The **BDAT** parameter confirms which of these states is required by default. Set **BDAT** = 0 if the small version of the dialog is displayed first, or set it to 1 if the expanded version is required by default.

BTOL = An allowance for bending tolerances is specified when indicating the end of a bar leg and when selecting cover to a bar. The number of **BTOL** parameters listed below determines the range of tolerances displayed for your selection. NOTE that if no **BTOL** parameters are supplied, the bending tolerance option will not appear during bar placement.

BTON = Just as **MTON** controls the conversion to tonnes/tons for the output of total masses, so too does the **BTON** variable for the mass of each bar (or bar mark) and the total mass per page displayed on each bar chart page. If conversion to tonnes/tons is required in these instances as well set **BTON** to 1.

CFMT = This is the default export format. It can be one of these variables

Value = 0: - No export to file is required.
Value = 1: - Just a generic ASCII file.
Value = 2: - A BHP file format.
Value = 3: - A CSF file format.

CSFL = Parameter **CSFL** specifies the number of bars output to each page of the CSF (comma separated datafile).

DIGI = Bar mark numbers can be displayed with leading zeros. The **DIGI** parameter specifies the number of digits permanently required in bar mark numbers. If a bar mark number occupies less numbers than **DIGI**, the number is prefixed by zeros until **DIGI** numbers are occupied.

DMBR = When bar charts are created, member names can be output to the chart using the **COL_MEMBER** option. If member names are displayed, each line in the bar chart will include the member name regardless of whether the same member name appears on the next line or not. This is the default behavior (**DMBR** = 0). If you require duplicated member names to be omitted, set the **DMBR** parameter according to the list of options below. If multiple options are required, set the **DMBR** parameter to the sum of the value of each required option...

Value 0: - Show member names on each bar chart entry

Value 1: - Show member name for the 1st line of a new member

Value 2: - Show member name for the last line of a new member

Value 4: - Show member name for the 1st line of a new page

DTOL = The default bending tolerance that is applied automatically to each leg and bar end of all new bars.

EXBC = Specify 2 colors using **EXBC** that will be used alternatively on imported bar charts items listed in the schedule listing dialog box. Color numbers should match the internal Microstation color settings. Setting **EXBC** = -1 is the default color, as used for all bars in the current active bar chart. Color numbers vary from 0 to 127. The color numbers to choose from are:

BLACK 7
BLUE 9
BROWN 11

CHOCOLATE 15
CYAN 19
DARK_GREEN 21
DEEP_SKY_BLUE 33
DIM_GREY 34
GOLD 40
GREEN 42
GREEN_YELLOW 43
GREY 44
HOT_PINK 46
INDIAN_RED 47
LIGHT_BLUE 54
LIGHT_GREY 59
MAGENTA 70
MAROON 71
NAVY_BLUE 86
ORANGE 88
PINK 98
PURPLE 101
RED 102
TAN 117
WHITE 124
YELLOW 126

FORM = The maximum number of lines per page used when formatting the schedule datafile. **FORM** should be set to 65 for most standard computer printouts.

IMBR = When using the "Per Drawing", "Per Diameter", "Per Shape" and "Per Layer" bar mark numbering methods, the **IMBR** parameter controls whether or not bars with the same bar mark number (i.e. those with same bar dimensions and shape) should be grouped together as a single Bar Chart entry regardless of the Member in which they are located. For example, if four bars are all given the same bar mark number (because they have the same shape and lengths) but two of them are from Member A and the other two are from Member B. When the Bar Chart is created, all four bars could be grouped together as one entry in the chart with a combined total number of bars calculated by summing the totals of each. To enable this behavior, **IMBR** should be set to 1. If, on the other hand, you require 2 bar chart entries i.e. 1 combined entry for the 2 bars in Member A and another entry for the 2 bars in Member B, the quantities for each entry summarized across each set of 2 bars. Set **IMBR** = 0 for this method. This is normally the default setting.

LSTG = Controls the sorting of bar marks within the schedule listing is controlled by **LSTG**. You need only specify the additional sorting routines that do not already appear in the Bar Mark Numbering sequence (defined by

MSEQ). Select those sorting criteria from the list below and set **LSTG** equal to the sum of those values:

Value = 0 - Sort bars according to Bar Mark Numbering sequence

Value = 1 - for additional sort "PER MEMBER".

Value = 2 - for additional sort "PER LAYER".

Value = 4 - for additional sort "PER SHAPE".

Value = 8 - for additional sort "PER DIAMETER"

Value = 16 - for additional sort "PER GRADE"

LTXT = Longitudinal bars can be labeled individually with their corresponding bar mark number. The format of the bar mark label is usually **"$bn**" (the preset text code for bar mark number). However, you can format these longitudinal bar labels to any sequence of bar parameters and literal text just as in the case of the **MTXT** parameter.

MARK = ***This parameter has been superceded by MSEQ.***

When opening a schedule, 3 bar mark numbering conventions are offered. The 1st method "PER DRAWING", numbers all bars in the schedule irrespective of bar shape sequentially from number 1 (or some other user-defined starting number). The second method "PER SHAPE", numbers bars sequentially within each group of bars of the same shape (starting from bar number 1). The third method "PER DIAMETER" numbers each new bar within groups of bars of the same diameter, and so on. The method is confirmed as the schedule is opened. The method you most often use is offered by default, in accordance with the "**MARK**" parameter.

Select from:

MARK = 1 for "PER DRAWING"

MARK = 2 for "PER DIAMETER"

MARK = 3 for "PER SHAPE".

MARK = 4 for "PER MEMBER".

MARK = 5 for "PER LAYER".

MARK = 6 for "PER MEMBER & LAYER".

MASX = By default, the masses that appear in the Bar Masses dialog box are calculated by multiplying the overall length of the bar by the cross-sectional area (extracted from the Bar Codes data) times the density of steel of 7850 kg per cubic meter. The following parameter **MASX** is used to factor up (or down) the theoretical calculated masses. Set **MASX** to 1.0 if no factoring is required. Or, for example, set **MASX** to

1.10 if you would like masses to be increased by 10 percent (say for estimating purposes).

MRKS = By default, when **MRKS** = 0, bar mark assignment is carried out at every step in the detailing process when placing or modifying a bar. On large drawings, the detailing process might be slowed as a result. If **MRKS** = 1, the bar marking process is restricted to those times when a bar is finally saved and when the Schedule Details box is open.

MSEQ = This parameter supercedes the **MARK** parameter (which is no longer used). When opening a schedule, six bar mark numbering conventions are offered. The 1st method "PER DRAWING", numbers all bars in the schedule (irrespective of bar shape or size) sequentially from number 1 (or some other user-defined starting number) up to the maximum number of bars in the drawing.

Otherwise you can select any mix of the other five bar mark numbering criteria, e.g. Per Member Per Layer etc.. If you need several criteria, the order in which you choose them is critically important.

For example if you want the numbering first to be by diameter and then by layer, you specify **MSEQ** as “42” (4 for diameter and 2 for layer). If you required Per Member, then Per Shape followed by Per Diameter, you should specify **MSEQ** as “134”.

You confirm the bar mark numbering method as the schedule is opened. The method you most often use is offered by default, in accordance with the **MSEQ** parameter.

Select from:

Value = 0 for "PER DRAWING"

Value = 1 for "PER MEMBER".

Value = 2 for "PER LAYER".

Value = 3 for "PER SHAPE".

Value = 4 for "PER DIAMETER"

Value = 5 for "PER GRADE"

MTON = By default, when **MTON** = 0, total masses are output in kilograms under Metric units or in pounds under English (Imperial) units. If you require these totals to be output in Tonnes (Metric) or Tons (English), specify **MTON** = 1.

MTXT = When schedule data for the current bar is displayed in the run-time dialog box listing, the system looks to the **MTXT** variable to determine the composition of the bar mark text displayed at the top of the box. You can set the **MTXT** variable to any combination letters and main bar

Preset Text variables. For example, the BS4466 (UK Standard) **MTXT** might consist of the bar diameter followed by the bar mark number "T1203" (i.e. **MTXT = $d$bn**). AS1100 (Australia / New Zealand Standard) might use bar mark text like "LL03" (i.e. **MTXT = bsbn**).

NOML = You can configure the software to calculate a "nominal" total bar length in addition to the accurate "cut" length using the **NOML** parameter. The nominal length for any bar is defined as the sum of all out-to-out lengths of each leg of the bar. By definition, the nominal length takes no account of the bends in a bar and is usually greater than the calculated "cut" length.

There are several options related to the calculation and display of nominal lengths. Add together each of the options that you require and set the **NOML** parameter to that total. For example, if you want to include the nominal length in the schedule listing and use the nominal length for bar masses, you need to select Value = 1 plus Value = 2, making **NOML** = 3.

Select from:

Value 0 = Do not calculate or display nominal bar lengths

Value 1 = Include Nominal Length in Schedule Listing

Value 2 = Calculate Bar Masses from Nominal Length, not cut length

Value 4 = When standard 90, 135 or 180 degree bends are added to a bar, the nominal length will include the out-to-out lengths of the standard bend instead of using the S1, S2 or S3 values from your Bar Code.

Value 8 = Output the nominal length instead of the cut length in the Text File Output for the schedule.

Value 16 = The nominal length of bars that contain acute angle bends can be shorter than the accurate cut length of the bar. Select this value to use the cut length whenever the cut length exceeds the nominal length.

Value 32 = Output the nominal length instead of the cut length ever the **$ql** Preset Text parameter is used.

RCFF = When exporting a "Rebar Chart File" from an existing Bar Chart, the RCF file can is created with Microsoft Access format. The data in that file can be output using either a flat database structure or a series of three tables. Set **RCFF** to 1 if you require the flat file format, otherwise set it to zero.

RCFV = Rebar Chart Files (RCF) are created using Microsoft Access database format. **RCFV** controls the Access format version number. Set **RCFV**

to 0 for Version 3.51 or set it to 1 for Version 4.00. Note that Version 4.00 is the default database revision for the Windows 2000 operating system.

REVL = When your Schedule is date stamped, the revision for the schedule is incremented. As bars are modified after date stamping, they are also tagged with a revision. The current revision in either situation is displayed as either a letter or a number. If you require revision letters starting with "A" for the first revision, set **REVL = A**. If you require the first revision to be "a", set **REVL** = a. If you want revision numbers, set **REVL** = 1.

RNDO =
RNDI = Just as **RNDN** provides control over the rounding up functionality of **RNDL**, the **RNDO** and **RNDI** parameters controls the same functionality for the respective **RNDA** and **RNDV** parameters.

RNGV = If a bar range is associated with a scheduled dimension for a bar (e.g. when attaching a varying length to a dimension), the associated bar range must have the same or similar spacing to the bar range or longitudinal bar group chosen during the Bar Associations process. You can specify the amount by which these spacings can vary (a minor variation is probably OK) using the **RNGV** parameter. If set to zero, the spacings must be the same. Remember, the quantity of bars in these ranges must always be the same and is not user-definable.

ROUT = Some detailing standards require 1 or more bar dimensions to be calculated but not actually shown on the final bar chart. These dimensions are sometimes referred to as "run-out" dimensions. They are those superfluous dimensions which are not actually required in the production of a bar shape. Run-out dimensions are configured in "barchart.sys" using lower-case dimension letters. If the parameter **ROUT** is set to zero, all "run-out" dimensions specified in "barmarks.sys" will be ignored (i.e. all dimensions for a bar shape will be displayed in the bar chart. If **ROUT** is set to 1, run-out dimensions are displayed in the Schedule Listing dialog box with brackets around them, e.g. (2350), but these dimensions are omitted from the final bar chart. If **ROUT** = 2, the run-out dimensions are bracketed in the Schedule Listing dialog box and displayed in the bar chart as well (including the brackets).

SCHX = Whenever the schedule listing dialog box or schedule masses dialog box are displayed, the listings will be updated dynamically if bars (that been scheduled) are created or modified. If **SCHX** is set to 0, these dynamic updates will occur at the end of every major redraw and whenever bars are modified individually. If **SCHX** is 1, the listings will be updated the instant any bar is modified regardless of whether a detail is being drawn or not. For example, if 50 bars are redrawn using the Redraw Detail

option and **SCHX**=1, the schedule boxes will be instantly updated 50 times. (NOTE this setting will cause the speed of Redraw Detail and general reinforcement updates to reduce significantly, especially when a drawing contains many bars.

STOL = When lengths for a bar are calculated, a scan is made for all other bars in the schedule of similar length. If one is found, its bar mark can be automatically assigned to the current bar (since the two bars are essentially the same). **STOL** sets the DEFAULT tolerance to define bars of a similar length. This default appears in the Schedule Data dialog box for every bar and can be changed at any time like any normal bar attribute. NOTE that individual bar dimensions are compared as well as overall lengths. **STOL** is applied to all comparisons. If **STOL** is zero, this feature is disabled.

TMDP =
BMDP = The number of decimal places used in the display of total bar masses is controlled by parameter **TMDP**. The number of decimal places used in the display of the mass of an individual bar is set using **BMDP**.

UNAM = Although you may specify unit names for the display of lengths or dimensions (e.g. "mm", "m" or ' and " for English units), it is sometimes necessary to omit them for (say) the display of lengths in bar charts. The **UNAM** parameter allows you omit unit names in three situations - for bar charts, for dimensions and for the display of Preset Text lengths in bar labels such as spacings.

Choose the following values to omit the unit names in each situation. Add together each of the options that you require and set the **UNAM** parameter to that total.

The **UNAM** parameter settings are:

Value = 0: - (Default) Do not omit unit names

Value = 1: - Omit names for lengths within bar charts

Value = 2: - Omit names for lengths displayed on dimensions

Value = 4: - Omit names for Preset Text lengths (in bar labels)

Value = 8: - Omit the dash between master and sub units within bar charts.

Value = 16: - Omit the dash between master and sub units in dimensions.

Value = 32: - Omit the dash between master and sub units in Preset Text.

VACC = Dimensions with **RNDV** rounding might need to be displayed in barcharts and in bar labels with a smaller accuracy than the value for accuracy in the MicroStation dialog item (remember, the dimension

variations are usually much smaller than the actual bar dimensions). The dimension accuracy used by default for ALL scheduled bar dimensions is found in the dialog menu:

Microsation -> Element -> Dimensions -> Units -> Primary -> Accuracy

Set the **VACC** variable to 0 if your current MicroStation dimension accuracy is valid for your **RNDV**-rounded dimensions. Otherwise, choose a value corresponding to the accuracy in the Microstation pull-down menu. For example, if you are working with "English" dimension units, the accuracy options are:

VACC Value	Dimension Accuracy (English)
1	-> 0
2	-> 0.1
3	-> 0.12
4	-> 0.123
5	-> 0.1234
6	-> 0.12345
7	-> 0.123456
8	-> 0.1234567
9	-> 0.12345678
10	-> 1/2
11	-> 1/4
12	-> 1/8
13	-> 1/16
14	-> 1/32
15	-> 1/64

For metric values, the **VACC** values can be calculated from the corresponding entries in the Microstation Dimension Settings for "Metric" units. For example, **VACC** = 4 under Metric units corresponds to the accuracy "0.123".

NOTE: The **VACC** parameter only changes the way the **RNDV** values are displayed. It does not effect the calculation of the variation in dimensions.

VLRS = When a variable length bar range is scheduled, the bar mark numbers for each bar in the range are numbered alphabetically 26a, 26b, 26c etc. or numerically 26-1, 26-2, 26-3 etc... Set **VLRS** to either 'a' for alphabetical, or '1' for numerical.

XMBR = If you bar mark your bars using the "Per Member" or "Per Member & Layer" bar mark numbering methods, then bars of exactly the same size appearing in different members will automatically be given a unique bar

mark number. For the other methods, however, ("Per Drawing", "Per Diameter", "Per Layer" and "Per Shape"), the parameter **XMBR** determines whether or not bars of the same size attract the same or unique bar marks across different members. Set **XMBR** = 0 if bars in different members should be given unique bar mark numbers. Set **XMBR** = 1 if bars of the same size should be given the same bar mark number across members. NOTE: The **STOL** parameter (above) can be varied interactively (at run-time) to override the **XMBR** = 0 functionality. e.g. **STOL** = 0 for a bar would prevent a bar from being given the same bar mark number as another bar in a different member.

1.5.7 MISCELLANEOUS

ACTZ = Reinforcement detailing is conducted on a 2D plane (defined by a constant Z value). Detailing can take place in a 2D DGN file in which case all details are placed at Z=0. Details can also be created in a 3D DGN file. The Z-level at which details are to be created in a 3D file is defined by **ACTZ**.

BEEP = When the system automatically detects that updates to reinforcement are required, a dialog box is displayed pending the update. If you prefer that a beep be sounded whenever this occurs set **BEEP** to a value other than zero.

BSTY = While a bar is being placed, it's main bar element can be drawn in a line style set by the **BSTY** parameter. **BSTY** should be set to one of the available line style numbers. Use a dashed or dotted style to ensure the bar being currently placed is easily seen amongst other existing bars. **BSTY** = 0 adopts a continuous line.

CRAT = Several bar shapes with the "BHP Reinforcing Products" range (i.e. the bar7xx series shapes) incorporate cranked legs. The detection criteria for these cranked bar shapes includes a check for the slope of the cranks. By default, the slope should not exceed 1 in 6. However, if your bar standards call for different slope, the **CRAT** parameter may be modified accordingly. **CRAT** represents the number of units of extension for every unit of offset, i.e. slope = 1:**CRAT**

CSTY = By default, when **CSTY** is zero, all lines used to detail the edges of a bar using full-size detailing mode, are created using the continuous linestyle (linestyle 0). In this mode, the active linestyle used when drawing the centerline of a bar is ignored in favour of the continuous linestyle. If you prefer to use the normal centerline linestyle for full-size details as well set the **CSTY** parameter to -1. Otherwise, if you would prefer that

full-size details be always drawn in some alternate style, set **CSTY** to that linestyle number.

DELW = When you select a reinforcing bar to be deleted, the default behavior (**DELW**=0) is for the selected bar to be highlighted awaiting confirmation of the deletion using a tentative snap (the standard MicroStation confirmation). For further control of this confirmation process, set **DELW** to 1 if you want a confirmation box to appear with OK/Cancel options. Confirmation is also provided when deleting the Last Bar, or Deleting Detail. Set **DELW** to 2 if you want the selected bar (for deletion) to be magnified and displayed within View 8, as the OK/Cancel box is displayed.

FSTY If main bar reinforcing for range bar details is designated "far face" or "btm layer" steel, it will be drawn on a different Level to normal "near face" bars. Furthermore, these bars can also be drawn using a line style specified by the parameter "**FSTY**". Select style 0 for a continuous line.

HTCH = When placing line or area hatches adjacent to concrete faces, a list of user-defined hatch patterns appears within the "PLACE HATCH" dialog box. The following **HTCH** parameters must be specified for each hatch pattern required in the Hatch Attributes dialog box. There is no limit on the number of Hatches you may define. Simply select the cell required and all of the other default pattern settings as listed below.

NOTE: The following patterns are found in the AREAPT.CEL library provided in the default MicroStation cell directory. You should attach this Cell Library or include the Library name in the MS_CELLLIST configuration parameter.

ALSO NOTE: The scale factor below is automatically multiplied by the number of units of resolution per Master Unit before input to the hatch placement routine. The scale factor is also multiplied by the active reinforcing scale factor. Therefore, in order to calculate a scale factor, place the specified hatch pattern manually using MicroStation to arrive at the correct pattern scaling, then divide the value by the precision of your design file and then the scale factor at which the pattern is shown.

MAPD = During the Login process and also as an Object is retrieved, the bar diameters used during your last detailing session (or when the Object was created) are compared to the diameters saved in the current active Bar Code. Those diameters that don't exist anymore or those that have changed since the previous session are mapped to the nearest available diameter. This eliminates the problems associated with changing from one Bar Code to another, or with adding or deleting bar diameters. During this "diameter mapping" process, the software searches for previous diameters of the same Bar Designation (i.e. the bar name), e.g. "Y20". If it can't find a "Y20"bar in the current Bar Code, it looks for

the diameter with the same Bar Grade and the closest diameter size. This is the default behavior when **MAPD** is set to 0. Some organizations, however, choose not to include a "Bar Grade" letter(s) in their Bar Designations - their designations include just the diameter, e.g. "20". In these situations, there could be several bars with the same bar designation "20" that actually have different bar grades. This can then lead to incorrect diameter mappings. Under these conditions, **MAPD** should be set to 1. The search for bar diameters is then carried out using the physical bar diameter and the bar grade letter as the basis for the comparison.

MAXL = If the maximum allowable length of a bar specified by **MAXL** is exceeded, a warning is placed on the bar until the bar length is corrected. Occasionally incorrect alignment or disruption of faces can distort bar geometry. The **MAXL** parameter should be set to a value like 200 meters. It prevents bars from accidentally being drawn beyond design file limits.

MAXN = Specifies the maximum allowable number of bars in a single bar range or longitudinal bar group.

MAXR = Specifies the maximum allowable length for a bar range or longitudinal bar group.

MINI = The minimum internal leg length between adjacent bends is specified using the **MINI** parameter. If Warnings are activated, all internal legs less than **MINI** in length will be identified. Note the **WDIA** option determines whether **MINI** is specified in multiples of the current bar diameter, or an absolute distance.

MINL = The minimum length of any free bar leg is controlled by the **MINL** parameter. If Warnings are activated, any bar with a free leg length less than **MINL** is automatically identified for your information.

MINO = When the bends on a bar (either 180, 135, 90 degree bends or internal bends) are move to a point where they overlap, the location is marked with a label to warn of a bad geometric arrangement. In view of bending tolerances and other approximations, overlapping bends are only identified when they actually overlap by more than the permitted overlap tolerance specified by **MINO**. In other words, a small nominal overlap equal to **MINO** is permitted. When the actual overlap exceeds **MINO** the warning is displayed.

MSPC = When bars are placed parallel to each other in a staggered or alternate pattern, the parameter **MSPC** sets the minimum distance (paper size) between each adjacent bar. This parameter ensures that bars are always drawn at a minimum clear distance on drawings where bar ranges are drawn at large scales. If the physical bar spacing is greater than a value =

MSPC * SCALE, the **MSPC** value is ignored in favor of the true spacing. **MSPC** is also ignored when all bars in a range are detailed.

NUDG = Specifies the distance (mm, paper size) that values within the Special Data Entry box are modified each time one of the "Nudge" buttons are activated. The **NUDG** parameter also specifies the distance through which a bar is moved when its location is nudged during Bar Modifications. Set **NUDG** to 0 to deactivate these options. REMEMBER... **NUDG** is a paper-size variable. The actual nudge distance used during bar placement is equal to **NUDG** * scale factor.

SCAL = *This parameter has now been suprceded by SCLF (see below).*

Many components of the reinforcing details will be drawn in accordance with a specified drawing scale (eg. text, label arrows). The active scale is set within the System Defaults dialog box. The **SCAL** variable is used to define the scales commonly used by your organisation.

SCLF = Many components of the reinforcing details will be drawn in accordance with a specified drawing scale (eg. text, label arrows). The active scale is set within the System Defaults dialog box. The **SCLF** variable is used to define the scales commonly used by your organisation. It accepts two parameters using the format:

SCLF = scale_factor scale_name

The scale name is the text shown in the pulldown menus wherever a scale factor is selected. If the scale name must include spaces, it should be enclosed in double quotation marks. The scale factor is the decimal number using in the scaling calculations.

UNDO = During the bar placement process, bars that have been modified or deleted are recorded in an Undo buffer. The Undo Bar option can then be used to cycle back through any modifications, or restore bars that have been deleted. All bars modified during a Redraw Detail or Dynamic Dimension Update process are also added to the Undo buffer. If many bars are edited during a detailing session, the buffer will grow larger and larger, consuming increasingly more memory. Considering it is possible to modify perhaps 20 or more bars in a single Redraw Detail or Dimension Update procedure, it would be inefficient to use Undo Bar to cycle back through all those changes. It is always better to enter the previous dimension value for example. Therefore, in view of the fact that Undo Bar is normally only useful for the last few detailing procedures, it is advisable to limit the number of bars stored in the Undo Buffer using the **UNDO** parameter, thereby minimizing memory usage.

UNIT = The **UNIT** parameter indicates whether length variables within this file are METRIC or ENGLISH. If measurements are ENGLISH, values MUST still be represented as real values, not 1/8", but 0.125.

VLYR = Your concrete, reinforcement and text levels can be switched on and off automatically during bar placement. Multiple layer selections can be configured using the "**VLYR**" parameter, all of which are displayed in a pop-up list during your detailing sessions. Using the format shown below, you may select, which levels are to be turned on, and which are to be turned off. Labels for each of the level selections are also specified, each of which is displayed in the pop-up selection list.

Specify - 0 if the level is turned OFF, 1 to turn the level ON. 2 to turn the level ON and make it the ACTIVE view.

WARN = As each bar is created, checks are made on bar geometry to ensure the integrity of bar bends and minimum leg lengths. If you require warnings to be displayed on your drawing, sets **WARN** to 1, otherwise set **WARN** to 0.

WDIA = Both **MINL** and **MINI** define the minimum lengths of free and internal legs of a bar respectively. If **WDIA** is set to 1, **MINL** and **MINI** are assumed to be measured in terms of a number of bar diameters for the current bar. If **WDIA** is set to 0, both **MINL** and **MINI** are assumed absolute distances.

1.6 PRESET TEXT MENUS ("PRESETS.SYS")

The **Preset Text** feature - unique to GEOPAK Rebar - provides a fast and intelligent method of annotating reinforcement details. Any one of an unlimited number of commonly used bar labels is selected using a single datapoint selection. Typing is not usually required if the Preset Text entries are configured properly. A range of special keywords inserted within the label text allows reinforcement parameters for the current bar to be included dynamically into a label. No longer is it necessary to manually update your bar labels with new bar diameters, spacings, covers, or perhaps scheduled data. If a reinforcement parameter changes, GEOPAK Rebar makes a search of all occurrences of the associated keyword, then updates the labels accordingly.

All labels appearing in the Preset Text lists are user-definable within "presets.sys" in your Project Directories. Your label lists can vary from one Project to the next if necessary.

"Presets.sys" is a text file that should be edited with your normal Text Editor.

The configuration file is divided into six categories. Each category represents and defines the Preset Text entries displayed with each of four bar label dialog boxes.

The file format is shown below. The entries enclosed in square brackets […] are the major Preset Label category names. Any lines not beginning with either a square bracket or double inverted quotes are regarded as a comment (or remark).

// Start of File

[Main Bar]

…..

….. (Unlimited number of preset text entries for Main Bar labeling)

…..

[Longitudinal Bar]

…..

….. (Preset text entries for Longitudinal Bar labeling)

…..

[Bar End Location]

…..

….. (Preset text entries for Bar End labeling)

…..

[Face Labels]

…..

….. (Preset text entries for Face Labeling)

…..

[Dynamic Dimensions]

…..

….. (Preset text entries for Dynamic Dimensions)

…..

[Schedule Remarks]

…..

….. (Preset text entries for Schedule Remarks)

…..

// End if File

For each of these categories, you can include your own lists of Preset Text entries. GEOPAK Rebar reads each line of Preset Text for each category and adds them to the Preset Text pull-down menu, within the bar labeling dialog boxes. You are then free to choose any one of these predefined labels at run-time, when the label is placed.

Preset Text is designed to eliminate the need for typing when placing bar labels. For each entry in the "presets.sys" file you must specify two pieces of information - the label shown in the dialog box list and, secondly, the actual text to be output to the drawing when this entry is selected. The format of each entry in the file is therefore:

" Dialog Box Label " Actual text output to drawing

Note the dialog box label is placed between double inverted quotes.

Even though only one entry in the Preset Text list is selected at any one time, the entry can be designed to output up to 4 lines of text for any single selection. The "|" character is used to request a carriage return. Place it anywhere in the actual text to be output. The text is split into separate lines when the entry is selected if these special characters are found.

Another important feature of Preset Text is the ability to include live reinforcement variables into any part of a bar label. A large number of Preset Text Codes are provided for each category (above). Each of these codes are described in the following respective Sections:

1.6.1 MAIN BAR LABELS

Available Main Bar preset text Codes are:

$d	Main bar diameter (length)
$ad	Actual main bar diameter (designation)
$n	Main bar quantity (cross-referenced variable)
$rn	A sequential list of the number of bars across all ranges within the same bar range detail (e.g. "12+5+17")
$tn	Total main bar quantity for all bar ranges associated with the current bar (cross-referenced variable)
$ln	Number of layers for the main bar (cross-referenced variable)
$ll	Label text (code) specified for the current bar layer
$s	Actual main bar spacing (cross-referenced variable)
$ns	Nominal main bar spacing (normal, minimum, maximum or inter-bar, cross-referenced variable)
$xs	Number of spaces occupied by the bar range or group (i.e. $n - 1)
$td	Length of threaded bar end (NOTE: label arrow must touch threaded end)
$bg	Bar Grade
$bs	Scheduled bar shape code
$bn	Bar mark number including range variation e.g., 26(a-g)
$bnb	Bar mark number for first bar in varying bar range e.g., 26a
$bne	Bar mark number for last bar in a varying bar range e.g., 26g
$bnx	Bar mark number excluding range variation e.g., 26

$bm	Same as **$bnx** - bar mark number excluding range variation e.g., 26
$br	Bar mark range
$qm	Scheduled member name
$qb	Scheduled member name – Abbreviation
$qr	Scheduled Revision name
$qt	Scheduled member quantity
$ql	Scheduled total bar length
$qlb	Scheduled total length of first bar in a varying bar range
$qle	Scheduled total length of first bar in a varying bar range
$qlv	Variation in scheduled total length between each bar in a varying bar range
$qlt	The sum of the schedule length of all bars in a bar range
$qs	Scheduled number of sets of the current bar
$c	Default cover (main bar Structural Detail Attribute)
$tl	Calculated tension lap
$cl	Calculated compression lap
$sl	Lap length specified between stock lengths
$rt	User-supplied code for the current bar range type (e.g. "STG" "ALT")
$ps	Spiral pitch – standard
$ps	Spiral pitch – alternate
$!	Automatically includes the bar shape Cell diagram for the current bar shape within the bar label. Additionally, you can use: **$(! * *scale_factor* + *vertical_offset* / *rotation_angle*)** for additional adjustments to the Cell placement. This parameter also works in conjunction with the display.sys parameter **SLSF**
$!!	Performs exactly the same functionality as "**$!**" but, in addition, causes the bar dimension letters "A", "B", "C" etc. to be replaced by the actual calculated dimension (refer to "display.sys" parameters **BDIM, FDIM, GDIM, HDIM, PDIM** and **SCOL.**)..
$(cell)	Automatically includes the Cell specified by "cell" within the bar label.

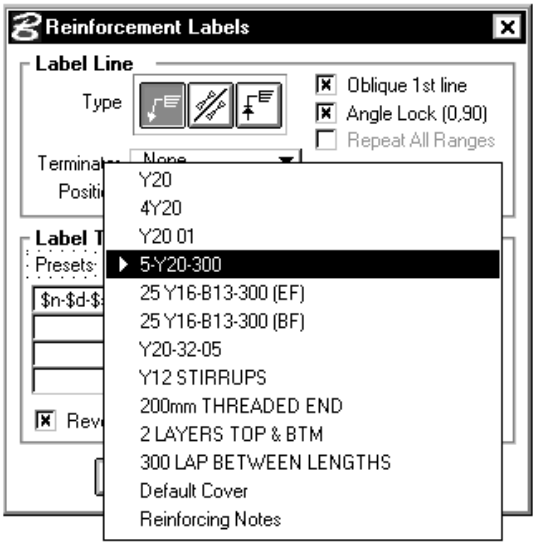
Additionally, you can use:

$(cellName * *scale_factor* + *vertical_offset* / *rotation_angle*)

for additional adjustments to the Cell placement.

$? Displays the contents of this file during label placement (HELP)

All entries provided in the Main Bar category are listed in the Reinforcement Labels dialog box during placement of Plan and Section bar details, like the one shown below:



Examples of main bar Preset Text entries are:

"Y20"	**$d**
"4Y20"	**nd**
"Y20 01	**$d $bn**
"(12-150)"	**($d-$ns)|(Both Faces)**
"5-Y20-300"	**$n-$d-$s**
"12 23(a-e) T1/B1"	**$n $bn T1/B1**
"25 Y16-B13-300 (EF)"	**$n $d-$qb$bn-$ns (EF)**
"25 Y16-B13-300 (BF)"	**$n $d-$qb$bn-$ns (BF)**

Using the Bar Association features described in Chapter 4, you can link multiple bars in Section (e.g. a one, two, three-legged bar etc.) to a single bar range. This situation occurs when several bars detailed in a cross-section view are all represented by the same bar range in elevation or plan. In other words, all bars shown in section are at the same nominal spacing and location. The problems that arise are related to the labels attached to the bar range detail. The bar label now needs to describe the diameter, bar mark number, member abbreviation etc.. for not just one bar but for all the bars in the Section that are 'associated' with it. Each of the **$d**, **$bn**, **$bs**, **$ql**, **$qb**, **$ll, $!** and **$!!** preset text codes can include a number after the "**$**" to indicate the 2nd, 3rd, 4th.. etc associated bars. For example, the **$2d** preset text code outputs the diameter of the second associated bar. **$4qb** outputs the member abbreviation of the forth associated bar, and so on.

1.6.2 LONGITUDINAL BAR LABELS

Available Main Bar preset text Codes are:

$d	Longitudinal bar diameter (designation)
$ad	Actual longitudinal bar diameter (length)
$n	Number of longitudinal bars
$ln	Number of layers of longitudinal bars
$s	Actual longitudinal bar spacing
$ns	Nominal longitudinal bar spacing (normal, minimum, maximum or inter-bar)
$xs	Number of spaces occupied by the bar range or group (i.e. $n - 1)
$bs	Scheduled bar shape (cross-referenced variable)
$bn	Bar mark number (cross-referenced variable)
$br	Bar mark range (cross-referenced variable)
$qm	Scheduled member name (cross-referenced variable)
$qb	Scheduled member name – Abbreviation (cross-referenced variable)
$qt	Scheduled member quantity
$ql	Scheduled total bar length
$gl	Actual length of total longitudinal bar group (c/c)
$!	Automatically includes the bar shape Cell diagram for the current bar shape within the bar label. Additionally, you can use:

$(! * *scale_factor* + *vertical_offset* / *rotation_angle*)

for additional adjustments to the Cell placement.

This parameter also works in conjunction with the “display.sys” parameter **SLSF**

$!!** Performs exactly the same functionality as “**$!” but, in addition, causes the bar dimension letters “A”, “B”, “C” etc. to be replaced by the actual calculated dimension (refer to “display.sys” parameters **BDIM, FDIM, GDIM, HDIM, PDIM** and **SCOL.**).

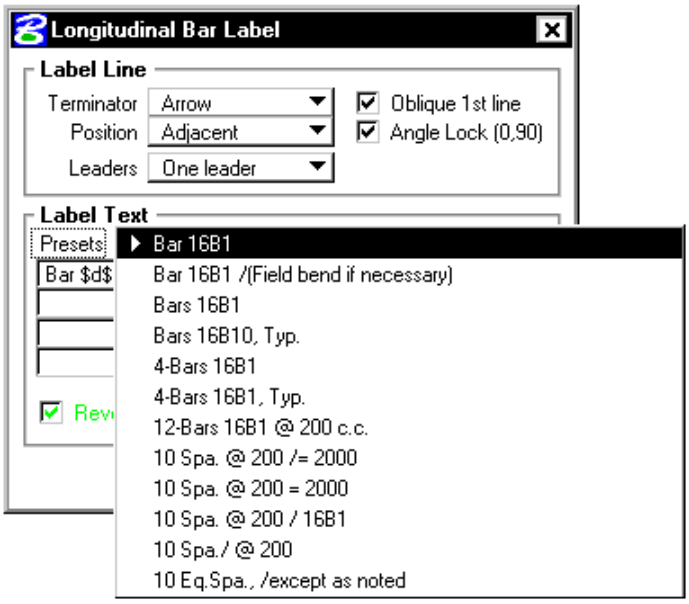
$(cell) Automatically includes the Cell specified by “cell” within the bar label. Additionally, you can use:

$(cellName * *scale_factor* + *vertical_offset* / *rotation_angle*)

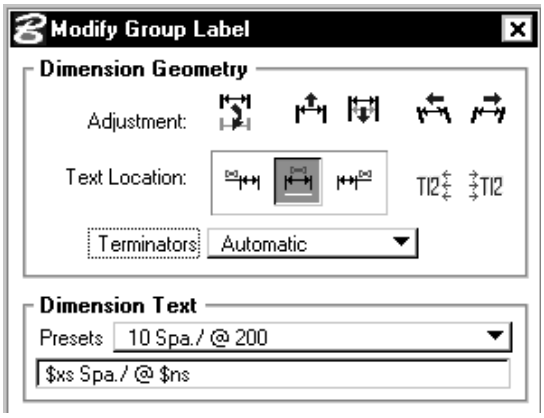
for additional adjustments to the Cell placement.

$? Displays the contents of this file during label placement (HELP)

All entries provided in the Longitudinal Bar category are listed in the Longitudinal Bar Label and Modify Group Label dialog boxes during placement of longitudinal bars in Section bar details:



and the Group Label dialog box:



Examples of longitudinal bar Preset Text entries are:

"Y20"	**$d**
"5-Y15"	**$n-$d**
"5-Y20 (2 LAYERS)"	**$n-$d ($ln LAYERS)**
"Y15-150"	**$d-$s**
"Y15-125 c/c"	**$d-$ns c/c**
"10 Spa./ @ 200"	**$xs Spa./ @ $ns**
"Y15-125 c/c / (Nom = 300)"	**$d-$ns c/c|(Nom=$ns)**
"CLEAR..."	**|||**
"HELP!!"	**$?**

Using the Bar Association features described in Chapter 4, you can link multiple bars in Section (e.g. a one, two, three-legged bar etc.) to a single longitudinal bar group. This situation occurs when several bars detailed in a cross-section view are all represented by the same longitudinal bar group in elevation or section. In other words, all bars shown in section are at the same nominal spacing and location. The problems that arise are related to the labels attached to the longitudinal bar group. The bar label now needs to describe the diameter, bar mark number, member abbreviation etc. for not just one bar but for all the bars in the Section that are 'associated' with it. Each of the **$d**, **$bn**, **$bs**, **$ql**, **$qb**, **$ll, $!** and **$!!** preset text codes can include a number after the "**$**" to indicate the 2nd, 3rd, 4th.. etc associated bars. For example, the **$2d** preset text code outputs the diameter of the second associated bar. **$4qb** outputs the member abbreviation of the forth associated bar, and so on.

1.6.3 BAR END LABELS

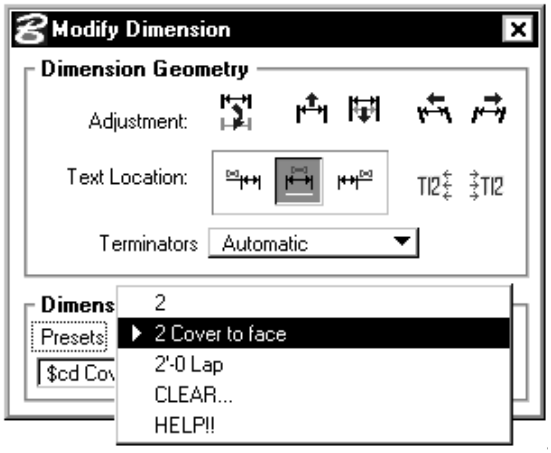
Available Bar End preset text Codes are:

$cd Cover, length or lap distance specified for bar end

$3d Three dimensional length specified in Bar End Details

$? Displays the contents of this file during label placement (HELP)

All entries provided in the Bar End category are listed in the Modify Dimension dialog box which appears when a dimension added to the end of a bar is modified (from Bar End Details box):



Examples of Bar End Preset Text entries are:

"300"	**$cd**
"300 Cover to face"	**$cd Cover to face**
"480 Lap"	**$cd Lap**
"CLEAR..."	**||||**
"HELP!!"	**$?**

1.6.4 FACE LABELS

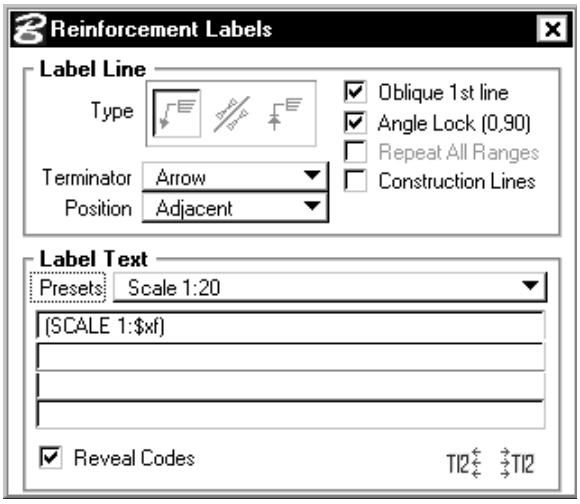
Preset Text codes available for use in the Face Label category are:

$xf Scale factor (extracted from Structural Detail Attributes)

$c Default cover (extracted from Structural Detail Attributes)

$fc	Concrete strength (extracted from Structural Detail Attributes)
$qm	Scheduled member name (cross-referenced variable)
$qb	Scheduled member name - Abbreviation (cross-referenced variable)
$qt	Scheduled member quantity
$as	Angle of skew (extracted from Structural Detail Attributes)
$(cell)	Automatically includes the Cell specified by "cell" into the Face Label. Additionally, you can use $(cellname*scale +/- Vertical Offset) for additional adjustments to the Cell placement. See below for a detail description.
$?	Displays the contents of this file during label placement (HELP)

Preset Text entries added in the Face Label category appear in the following dialog box, during the placement of Face Labels:



Some examples of Face Label preset text entries are:

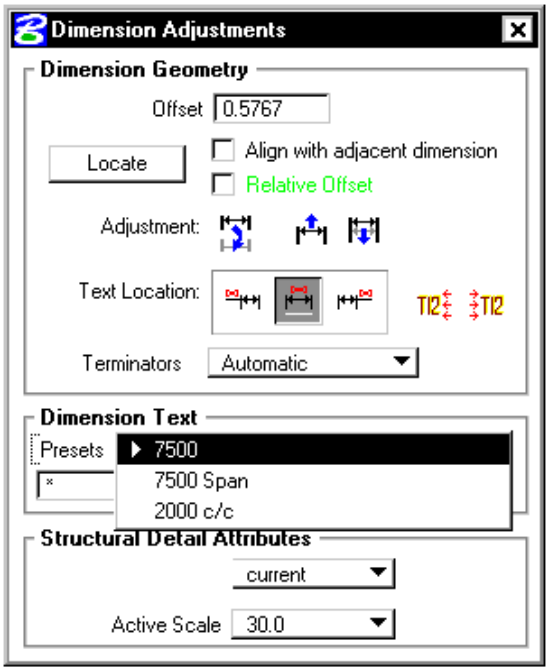
"Scale 1:20"	**(SCALE 1:$xf)**
"PLAN ON FLOOR SLAB"	**PLAN ON FLOOR SLAB**
"(2 No. THUS)"	**($mt No. THUS)**
"CLEAR..."	**||||**

1.6.5 DYNAMIC DIMENSIONS

Some examples of Face Label preset text entries are:

"7500"	*****
"7500 Span"	*** Span**
"2000 c/c"	*** c/c**

Preset Dynamic Dimension entries added in the Dynamic Dimension category appear in the following dialog box, during the placement of Dynamic Dimensions:

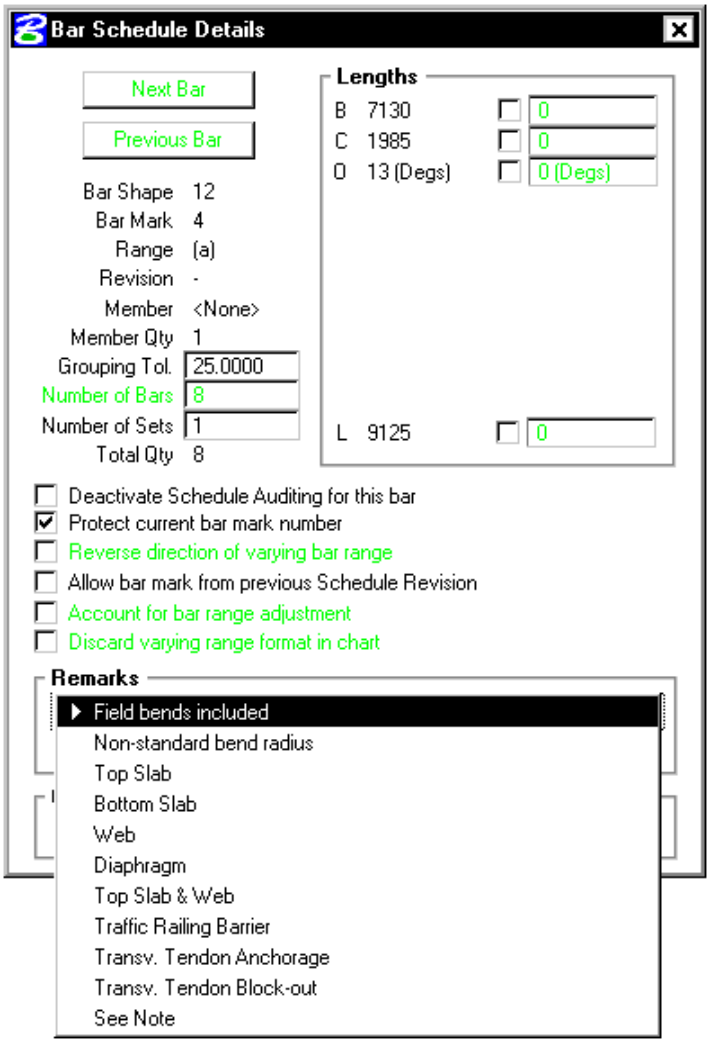


1.6.6 SCHEDULE REMARKS

Some examples of Face Label preset text entries are:

"Field bend included"	**Field bends included.**
"Non-standard bend radius"	**Non-standard bend radius.**

Preset Schedule Remark entries added in the Schedule Remark category appear in the following dialog box, during the placement of Reinforcement.



1.6.7 CELL RETRIEVAL USING PRESET TEXT CODES

When adding labels to a bar or during placement of a face label, you can include a Cell anywhere within the label text. As listed in the categories above, the required preset text code has the format:

$(*cellname*)

This is the most basic form of the command. In this case, the named cell (given by "cellname") is retrieved. If you don't have the appropriate Cell Library attached, an error message is inserted where the Cell would otherwise appear.

Other preset text codes can be placed before and/or after this Cell code. If you do this, the Cell is centered horizontally within that text with its origin located vertically at the justification point for the text.

The scaling applied to each Cell is designed to automatically adjust the Cell size as changes to the scale of a bar (or the Face Label) are made. By default (using the basic format above), the Cell size is multiplied by the scale factor for the bar. Then, as the scale of the bar changes, so too does the size of the Cell – matching the changes in size of the bar label text.

You may need to change the size and position of a Cell. Instead of using a MicroStation command to move (or scale) the Cell manually, you can include either or both of two optional parameters in the Cell preset text code. The parameters for "scale" and "vertical adjustment" are used in the following manner:

$(*cellname [* scale] [+/- vertical adjustment] [/ rotation angle]*)

The optional "scale" factor is a relative scale. For example, if you entered the following preset text:

$(hook1 * 2.5)

the Cell named "hook1" is retrieved at 2.5 times the size it would otherwise have appeared (without the additional parameter). In this case, therefore, the size of the original Cell (within the Cell Library) is multiplied by firstly the scale factor of the bar (or Face Label) and then by the additional factor of 2.5.

In this example, the "hook1" Cell has grown 2.5 times larger. If you assume – as a result of the change in size - the Cell now encroaches on the line of text in the bar label below the Cell, you can move the insertion point of the Cell upwards by adding a second parameter:

$(hook1 * 2.5 + 6.5)

Here, the insertion point is adjusted upwards by 6.5 paper-size units. This value of 6.5 is multiplied by the current scale factor of the bar (not the Cell) before being applied. An English unit measurement is also allowed.

A negative value would move the insertion point downwards.

Finally, you could also rotate the Cell using the option "/" qualifier:

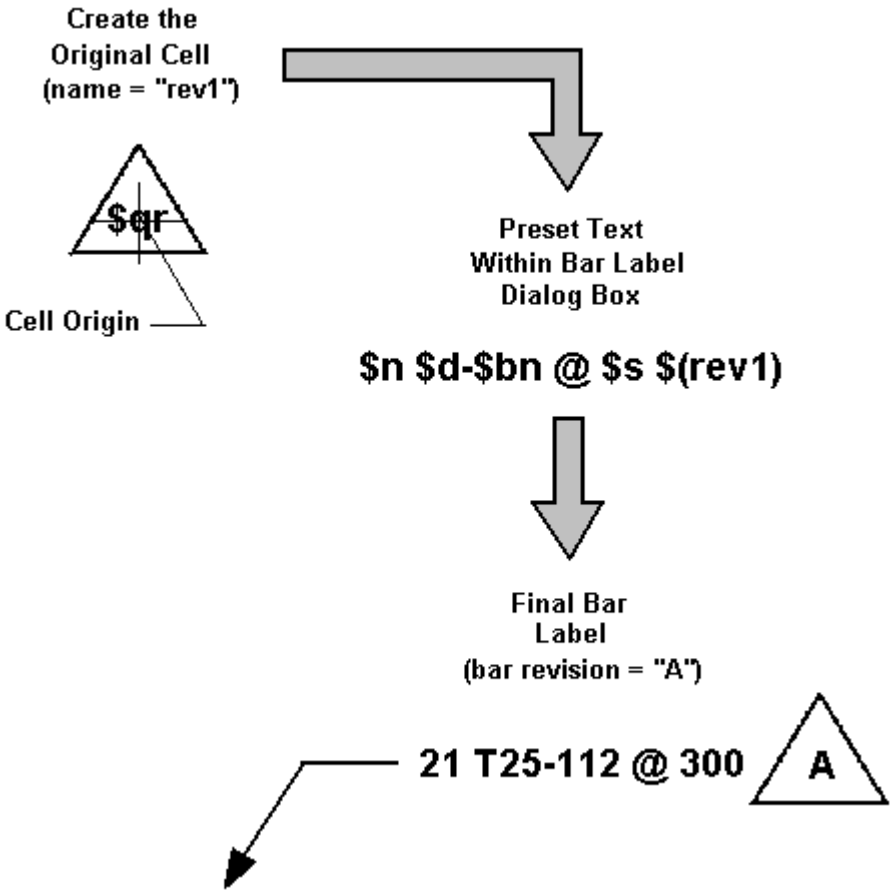
$(hook1 * 2.5 + 6.5 / 35)

where in this example, the Cell is rotate by an angle of 35 degrees.

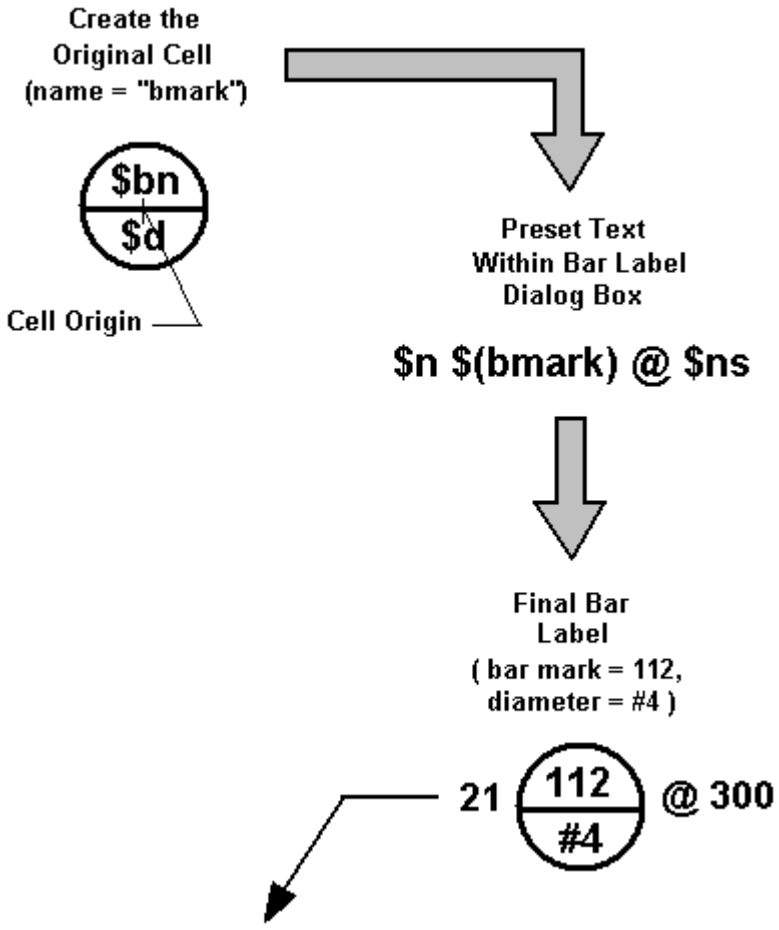
1.6.7.1 INCLUDING PRESET TEXT CODES WITHIN CELLS

Whenever you add Cells to a bar label, GEOPAK Rebar scans those Cells during the retrieval process. If Preset Text codes are found within text elements in the Cells, those text elements are replaced with the corresponding Preset Text variable as it applies to the current bar. For example, if "$d" is found within a text element within a Cell, it is replaced by the actual bar diameter. This facility is useful whenever special symbols are required within bar labels.

In the first example below, a Cell call "rev1" is created with a text element containing $qr. It is added to the end of a typical bar label to call up the bar revision:



In the next example, a Cell is created with $bn (bar mark) and $d (diameter) included in two separate text strings. It demonstrates how a "balloon" symbol is included with the Bar Label to highlight the bar mark (and bar diameter):



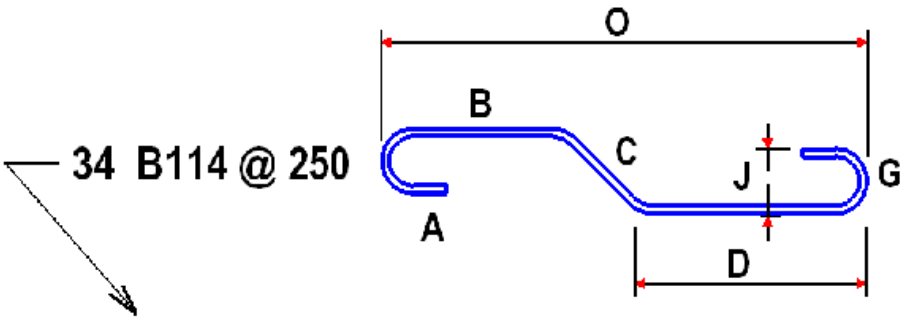
When creating these Cells, note the text size, color, font and justification method for each of the Preset Text fields in the final bar label are inherited directly from the corresponding text elements in the original Cell. In the example above, if the "$bn" Preset Text code in the original Cell is 10 units in height, color 5, font number 3, with center justification, the final evaluated bar mark number "112" is created with these properties also.

1.6.7.2 Retrieval of Bar Shape Diagrams Using Preset Text Codes

As described in the Section above, you can include a Cell anywhere within a bar label. Using that procedure, it is possible for you to retrieve a Cell diagram containing the actual shape of the bar. A Cell Library is supplied with your GEOPAK Rebar software containing each one of the bar shapes that are currently detected by the software. You could attach the bar shape Cell Library, then enter bar label text something like the following:

$n qbbn @ $ns $(bar205)

which might produce:



Notice the name of the bar shape Cell, "bar205", is specified within the last Preset Text command. Although in theory this procedure for retrieving a bar shape diagram works well, it is rather cumbersome in practice. You need to first determine the shape of the bar and the corresponding Cell name before entering the Preset Text code. Furthermore, you need to remember to repeat this procedure whenever the bar shape changes.

You should use the special "**$!**" Preset Code to overcome these limitations. Whenever **$!** is used, Rebar first determines the shape of the bar, then automatically retrieves the corresponding bar shape Cell. In the example above, the same bar label is produced using:

$n qbbn @ $ns $!

Notice that **$(bar205)** is replaced by the much simpler Code **$!**. More importantly, if this bar shape is modified to become bar020 (say), the same Preset Text code, **$!**, automatically retrieves the new Cell diagram.

As with Preset Code for standard Cells, the special bar shape Cell Code also accepts the commands to apply a scale factor, vertical adjustment and/or a rotation. The command can take the form:

$(! + *vertical_adjustment* * *scale_factor* / *rotation_angle*)

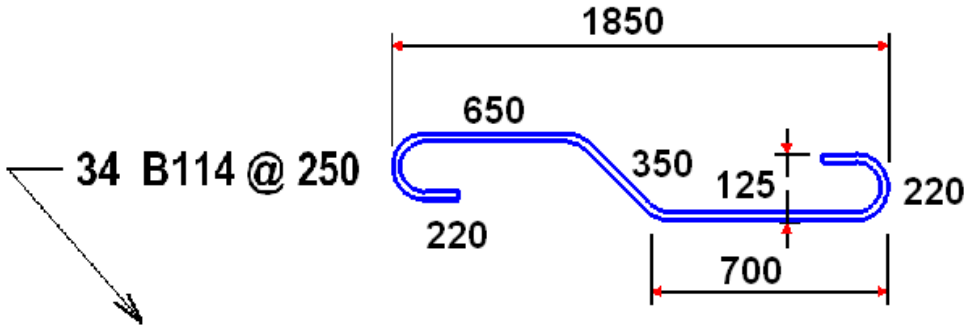
1.6.7.3 RETRIEVAL OF BAR SHAPE DIAGRAMS INCLUDING BAR DIMENSIONS

As a further option in the retrieval of Cells, you can command GEOPAK Rebar to include calculated schedule dimensions within your bar shape diagrams. The Preset Text code is

"**$!!**" (double exclamation). Whenever this Code is included in a bar label, not only will the appropriate bar shape Cell be retrieved, but the dimension letters "A", "B", "C" etc. are replaced by the corresponding dimensions calculated for the current bar. Extending the above example, the bar label text such as:

$n qbbn @ $ns $!!

might produce the following label:



Each of the bar dimensions now appear. They are updated within the Cell as changes to the bar are made. The size, format and properties of the dimension text are variables controlled by several configuration parameters. Refer to **BDIM**, **FDIM**, **GDIM**, **HDIM**, **PDIM** and **SCOL** earlier in "display.sys", Chapter 1.

When you include actual bar dimensions in your Cell diagrams using "**$!!**", you may encounter problems with the positioning of the bar dimension text. The bar dimension text elements are usually longer than the dimension letters "A", "B" etc. which they replace. The dimensions may appear across the top of other dimensions or perhaps the bar diagram itself. Depending on your setting for the **BDIM** "display.sys" parameter, the new bar dimension text elements are either created with justification "center-bottom" at the locating point of the dimension letters "A", "B", or created with the "same" justification as the dimension letters. The bar shape Cells provided in your bar shape Library are not designed with these situations in mind. There is no gaurantee the bar dimension text will be located correctly within the Cells provided with the software. If you are unhappy with the look of the Cells, you should experiment with changes to the text height used for bar dimensions (refer to "display.sys" parameter **HDIM**) or simply recreate your own Cells thereby incorporating your own specific preferences.

If you make your own bar diagram Cells, remember to create them in a new Cell Library – not the Cell Library provided by GEOPAK. You should then add this new Cell Library to MicroStation's "Cell Library List" making sure it is placed in the list above the GEOPAK Rebar Cell Library. This ensures your version of a bar shape Cell is found before the one provided by GEOPAK. You will also eliminate the possibility of overwriting your modified Cells when you next update your GEOPAK Rebar installation.

As with the "**$!**" Preset Text code, the "**$!!**" code also accepts the option qualifiers for vertical adjustment, scale factor and rotation.

1.7 BAR SHAPE LIBRARY ("BARMARKS.SYS")

When GEOPAK Rebar schedules reinforcement, it attempts to match the shape of the current bar with all active bar shapes in the Library. Upon finding a match it calculates the individual bar dimensions required for that shape and assigns a bar mark number to the bar.

While most international detailing codes incorporate a similar set of `standard' bar shapes, there are several variations from one code to the next. The GEOPAK Rebar Shape Library (listed in Chapter 11) includes shapes that cater for most international codes, as well as the standard shapes from other major organizations using the software.

Extra shapes can be added to the GEOPAK Rebar Shape Library upon request. You should refer to Chapter 11 for details of shapes provided with your current installation.

The "barmarks.sys" file in your Project directories is a text file containing the list of all bar shapes currently available in the GEOPAK Rebar Library. You can edit the "barmarks.sys" file with your normal Text Editor.

The decision as to which shapes you include is yours entirely. For most of the time, the detailing Code you work with shall stipulate the necessary Standard Shapes. If your work involves other States or countries, it may be necessary to configure the system for your Client's, or another organization's, bar shape standards.

If so, it is recommended you establish a new "barmarks.sys" file in a separate Project directory to the one you normally use. Determine which bar shapes are required, then activate them using the procedure below. All remaining shapes, except for any 'non-standard' bars you require, should be deactivated.

In general, the purpose of the "barmarks.sys" file is to tailor the GEOPAK Rebar bar shape library to your own standards (or those of your Clients). In particular, it is used to:

- override nominal bar shape (type) designations provided by GEOPAK Rebar with those required by your detailing code
- activate/deactivate the detection of GEOPAK Rebar bar shapes.
- override nominal bar dimension letters (A, B, C, etc) with those required by your detailing code
- override the bend radius criteria adopted by GEOPAK Rebar for each of the shapes in the Bar Shape Library.

There are five columns of data for each entry in "barmarks.sys". The two right-most columns are optional.

BAR001 ***(Shape Designation)*** **(ON/OFF) (ABCD…) (Bend Criteria)**

The first column is reserved for the internal name of the bar shape e.g., "**BAR001**". This is the name GEOPAK Rebar uses internally to identify the bar. It should never be modified in the barmarks.sys file.

All other columns in the file are discussed separately as follows:

1.7.1 Bar Shape (Type) Designation

The bar mark designation – otherwise know as the "name", "type" or "shape code" of the bar - is offered in accordance with the detected shape, and cannot be changed at runtime. When the bar shape is detected, the shape designation is extracted from the corresponding entry in "barmarks.sys.

The second column in the file contains the shape designation, for example:

BAR001 23 On

Instead of the internal designation of "BAR001" this bar shape is now called "23". Any combination of letters, numbers or other non-alphabetical characters is allowed in the shape designation. The designation cannot include spaces or tab characters.

A change in a bar mark designation within "barmarks.sys" has no effect on the criteria used by GEOPAK Rebar to detect the bar shape.

1.7.2 Including/Excluding Bar Shapes

The third column of the "barmarks.sys" provides a facility to turn a bar shape on and off in your Shape Library:

BAR001 23 On
BAR002 26 Off

In the example above the "23" shape is activated. The "26" shape is turned off and is not included in the shape detection process.

The GEOPAK Rebar library has more than 300 shapes in it and is growing with each new version. By default, each new shape added to the library is Off.

1.7.3 Renaming Bar Shape Dimensions

Occasionally, you might find the dimension letters used for a particular shape are not to your liking. This is more likely to occur when you activate bar shapes from international standards other than your own.

For example, you might activate a shape from the library that calculates dimensions **A**, **B**, **C**, **F** and **G**. In view of your existing practices, you decide it would be better if dimension **A** was shown as **D** and dimensions **F** and **G** were called up as dimensions **E** and **H** (respectively). The renaming procedure is a simple one.

You simply edit the "barmarks.sys" file for the required bar entry and add a forth column of data to the entry as follows:

BAR002 26 On D . . . . EH

A string of letters including the new dimension letters is added. The letter **D** is inserted as the first character in the string i.e. position one in the alphabet where the letter **A** would normally sit. You move out to the sixth character (letter **F** in the alphabet) and include the new letter **E**. The seventh character (letter **G**) is replaced with **H**.

Upper case letters MUST be used in the renaming sequence.

All other characters in the string used to pad the space between the letters **D** and **E** (in the example above) can be any non-alphabetic character except a minus sign "**-**" (the minus sign is reserved for deleted dimension letters as discussed in the next section). You could have typed "**D****EH**" or "**D####EH**" etc..

Dimensions **B** and **C** rename unchanged in the example above because the character inserted in the second and third character positions is non-alphabetic.

1.7.4 DELETING BAR SHAPE DIMENSIONS

It is quite possible that some shapes in the Rebar Library are supplied with more calculated dimensions than you actually require. Using the same example from above where the original bar shape contains dimensions **A**, **B**, **C**, **F** and **G,** you could remove dimension **F** from the shape by using the following "barchart.sys" entry:

BAR002 26 On . . . . . -

The minus sign character is placed at character position six (dimension **F** in the alphabet) while all other previous positions are filled with a period "**.**".

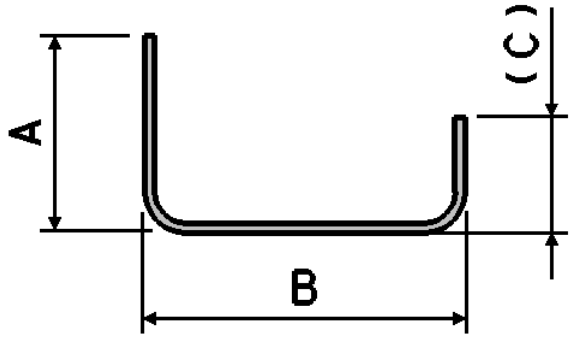
If you wanted to rename the **A** and **G** dimensions and delete the **F** dimension at the same time, the entry would be modified to:

BAR002 26 On D . . . . -H

The entry is the same as in the renaming example (above) but for the inclusion of the minus sign at position six.

1.7.5 SPECIFYING "RUN-OUT" DIMENSIONS

The British and South African bar shape Standards specify the use and calculation of "run-out" dimensions. The term "run-out" refers to that bar dimension that is considered superfluous and unnecessary for manufacturing purposes. As an example, consider the British Standard (BS4466) bar shape "**38**" (**BAR107**). This bar is a regular 3-legged bar with the following dimensions:



The calculated dimensions for the shape are listed as **A**, **B** and **C**. Dimension "**C**" however, is enclosed by brackets "( )" indicating it is a "run-out" dimension. Dimension "**C**" is deemed a run-out dimension (and superfluous) because the other two dimensions **A** and **B** along with the total length of the bar – dimension **L** – are all that are necessary to manufacture the bar. A leg length equal to Dimension "**C**" is automatically what remains after the leg lengths **A** and **B** are bent (assuming of course the total length **L** is always accurate).

GEOPAK Rebar displays run-out dimensions in the schedule listing as a length enclosed by brackets e.g. (1500). Run-out dimensions may, or may not, be included in your bar charts. It is up to you to decide. The "display.sys" parameter **ROUT** specifies your preference. British Standard practice is for run-out dimensions to be ***omitted*** from bar charts.

Run-out dimensions are configured in "barmarks.sys" by including a lower-case dimension letter in place of an upper-case letter. In a bar shape like the one above (which specifies calculated dimensions **A**, **B** and **C**), dimension **C** is configured as a "run-out" dimension using the following "barmarks.sys" entry:

```
BAR107      38      On              . . c
```

In this example, a lower-case "**c**" is inserted at the third character position. The first two characters are filled with non-alphabetic characters. Dimension letters A and B are not therefore effected.

You can rename, delete and convert to "run-out" any or all dimension letters for a bar shape. Any mix of the above configurations is permitted.

1.7.6 OVERRIDING BEND RADIUS CRITERIA

Every bar in the bar shape Library is internally coded with a default bend radius criteria. In most cases (not all), stirrup bar shapes can only be detected when a bar is detailed with an **Alternate** bend radius. This is because the Bar Standard for which the shape is established specifies the use of a smaller internal bend radius (i.e. the Alternate radius). Internally, when checking for stirrup shapes, GEOPAK Rebar has been told to reject all bars which don't have the Alternate bend radius.

Just as you might sometimes rename the dimension letters for a bar shape, it might also be necessary to modify the default bend radius criteria. To do so, you should add any one of the following keywords to the end of the "barmarks.sys" entries:

- **Standard**
- **Alternate**
- **Standard+Alternate**
- **Non-Standard**
- **Any**

The "**38**" bar shape from the above example has a default bend radius criteria of "Standard". If you decided this shape should only be detected when the bar has an alternate bend radius, you should configure the barmarks.sys entry as:

BAR107 38 On Alternate

If either the Standard or Alternate bend radius is acceptable, it should be changed to:

BAR107 38 On Standard+Alternate

and so on for the other keyword options.

1.8 BAR CHART LAYOUTS ("BARCHART.SYS")

Creating a bar chart within GEOPAK Rebar involves the retrieval of an MicroStation CELL representing your standard bar chart format. Using the methods described in Chapter 5,

lengths and dimensions contained within a schedule are output to the chart line-by-line for each bar mark in the schedule.

The bar chart creation process is controlled using commands within a file named "barchart.sys" in your current Project directory. The commands within these files are free-format and simple to use.

When GEOPAK Rebar retrieves the bar chart CELL specified within "barchart.sys", you are asked to indicate the locating point for the chart. This point is the insertion point of the CELL (the Cell origin) you selected when the Cell was first created.

When GEOPAK Rebar formats your schedule data in a Bar Chart, all columns of data are placed in the chart in accordance with commands in "barchart.sys". GEOPAK Rebar interprets all X and Y locations specified in the layout file as locations relative to the CELL origin.

Before configuring "barchart.sys", you must first create the CELL resembling your standard bar chart layout. Commands within your layout file(s) can then easily be determined.

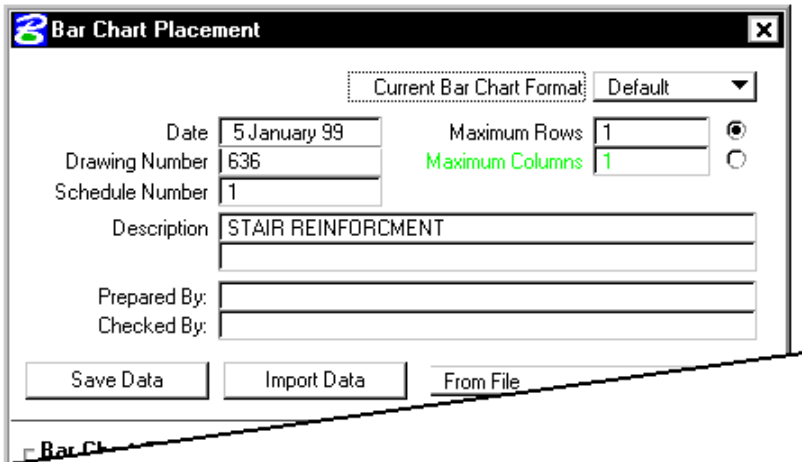
You should refer to the example bar chart layouts provided with your installation. Retrieve a bar chart using each of the example formats. Note the corresponding bar chart Cells are located in the Cell Library "barchart.cel" within each Project directory. You must add these Cell Libraries to MicroStation's MS_CELLLIST configuration variable before retrieving a Bar Chart.

The command set for "barchart.sys" is described below (in the order they normally appear in the file).

1.8.1 MULTIPLE BAR CHART FORMATS

You might need to retrieve several different styles of bar charts to your reinforcement drawings. You might have one type of bar chart for beam reinforcement, another for slab reinforcement etc.. In these situations, you can configure several bar charts within a single Project directory. Then, as you create a bar chart during your detailing session, you can choose from a list of available bar chart formats.

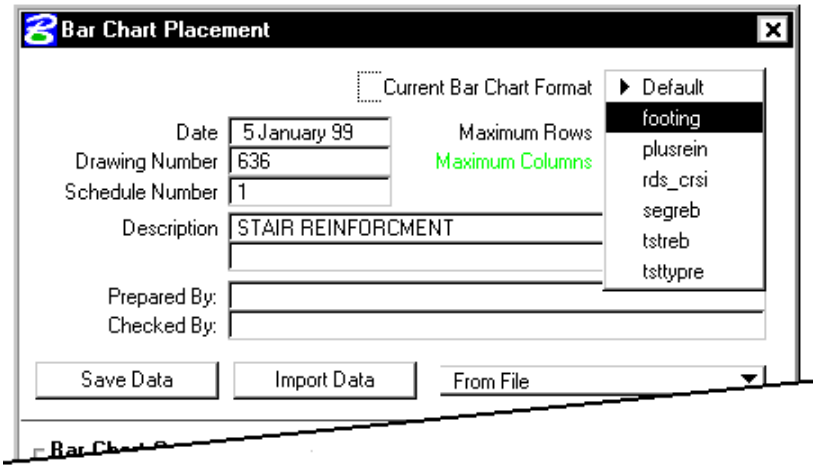
The “barchart.sys” file in your current Project directory always corresponds to your default bar chart format. When you create a bar chart for the first time, the “default” bar chart format is automatically installed:



If you need one or more alternate bar chart formats, you must create a sub-directory with the name "charts" beneath your Project directory. Then, a new barchart.sys file must be configured for each alternate format. Although the alternate barchart.sys files use exactly the same bar chart commands, each file must be renamed using the following naming convention:

[*barchart format name*].sys

These alternate files must then be moved into your "charts" directory. For example, you could configure a new barchart.sys file for the output of footing reinforcement. The file is renamed to "footing.sys" and moved to your "charts" directory. Then, when your next bar chart for footing reinforcement is created, you could select the "footing" bar chart format from your list of alternate formats:



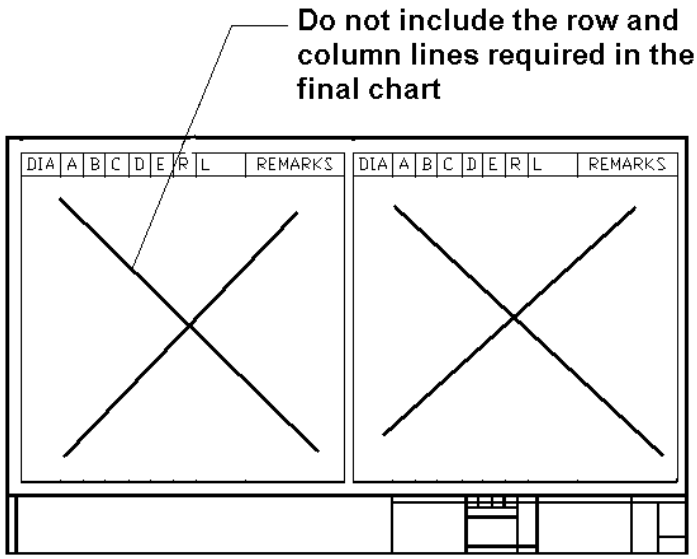
The selected format is saved in the GEOPAK Rebar database with each bar chart you create. When you modify an existing bar chart, the bar chart format you originally used is always reinstalled.

1.8.2 CREATING A BAR CHART CELL

Create the CELL using your normal MicroStation techniques. The Cell origin can be placed at any location in the chart. Remember, however, most commands in "barchart.sys" specify X and Y location relative to this point. It is recommended the Cell Origin be placed at a key-point on the Bar Chart outline, preferably one of the corners.

As each entry in a Bar Chart is added, GEOPAK Rebar draws the lines across each row and between each column in the chart. These lines should not be included in your Bar Chart Cell. They are included automatically by the software.

Your Cell should include just the title block lines and text, like the following:



The commands included in the Schedule category below describe the positioning of row and column lines.

1.8.3 BAR CHART CONFIGURATION COMMANDS

The bar chart commands are divided into seven separate categories - General, Lines, Text, Schedule, Fields, Diagrams and Masses. Each set of commands is now described:

1.8.3.1 "GENERAL" COMMANDS

The General category applies to details about the Cell used for the Bar Chart.

[General] Marker for start of the General category

UNIT Set either to METRIC or ENGLISH depending on the units of measurement used to format the chart.

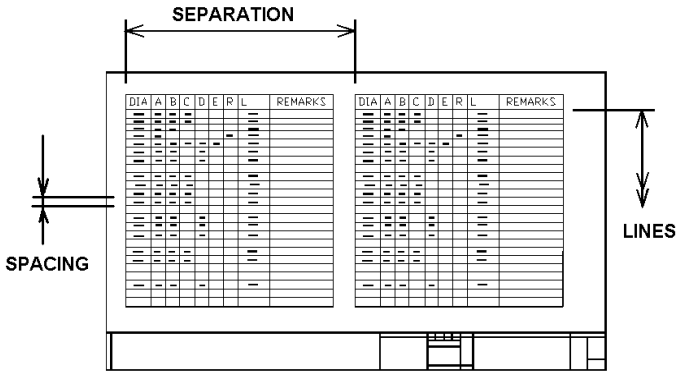
CELL The name of the Cell you wish to retrieve each time a Bar Chart is created. Remember to include the related Cell Library in the MS_CELLLIST directive.

CELL_X_SIZE Overall width of Cell

CELL_Y_SIZE Overall height of Cell

CELL_MARGIN Spacing between cells when more than one Cell is output. This occurs when the number of entries for the current set of Bar Charts exceeds the maximum number of lines allowed in the bar chart.

SUB_CELL The cell name of the intermediate header used as a heading before every bar list imported into the main chart. If no SUB_CELL is specified, no header will be used.



TABLES = 2

SEPARATION The horizontal distance between tables across the bar chart page (only required when **TABLES** is not equal to 1).

LINES The total number of lines per table within the bar chart filled with schedule data. When the GEOPAK Rebar fills the specified number of lines, it moves to the top of the next table or starts a new page (by retrieving a new Cell.

SPACING The distance down the page between one line of data and the next. When a full line of data for a bar is written to the chart, GEOPAK

Rebar decreases the Y location by the specified **SPACING**, before proceeding with the next line of data. Use one **SPACING** command only.

ALT_SPACING When bar dimensions vary and they are output to the bar chart using the special multi-line format, this command is used to change the spacing of that text. This command is optional. It is normally used in conjunction with **ALT_HEIGHT** (below).

BLANKS The number of blank lines inserted into the chart when there is a change in member / layer / diameter / shape etc.. Refer to "display.sys" parameter **LSTG**.

1.8.3.2 "LINES" COMMANDS

The Lines standard output of bar lengths, bar marks etc.

[LINES] Marker identifying the start of the LINES category

PEN_NUMBER Color number used for all row lines placed within the Bar Chart Cell. Number in the range 1-255

PEN_WEIGHT Line thickness used for all row lines placed within the Bar Chart Cell.

PEN_NUMBER_VERTICAL Color number used for all column lines placed within the Bar Chart Cell. Number in the range 1-255

PEN_WEIGHT_VERTICAL Line thickness used for all column lines placed within the Bar Chart Cell.

NO_CHART_LINES Specifies if bar chart lines should be drawn or not.(1 = No Bar Chart Lines). Your bar chart cell should be modified to permanently include the row and column lines if this variable is set to "1". Note however, you should always allow GEOPAK Rebar to create the lines if you have configured your chart to include bar shape Cell diagrams (refer [Diagrams] section below.

1.8.3.3 "TEXT" COMMANDS

These commands define the element attributes used when adding text into the Bar Charts. Note there are two groups - one for the normal schedule data text placed for each bar entry, another for the Field entries.

[TEXT]	Marker identifying the start of the TEXT category.
FONT	The MicroStation font number used for bar data text inserted line-by-line into the Bar Chart.
HEIGHT	Text height for each line of bar data. Should be less than **SPACING** defined above.
ALT_HEIGHT	Text height for each line of special varying-dimension output. Should be less than **ALT_SPACING** defined above.
PEN_NUMBER	Color number to be used for all bar data text.
PEN_WEIGHT	Text thickness for bar data.
FONT_FIELD	**FONT** as above but for Field entries.
HEIGHT_FIELD	**HEIGHT** as above but for Field entries.
PEN_NUMBER_FIELD	**PEN_NUMBER** as above but for Field entries.
PEN_WEIGHT_FIELD	**PEN_WEIGHT** as above but for Field entries.

1.8.3.4 "SCHEDULE" COMMANDS

These commands make up the bulk of all commands in "barchart.sys". Note that most commands are OPTIONAL (as noted below). In other words, if a particular column of data is not required in your Chart, comment the line out and it will not appear.

[SCHEDULE]	Marker identifying the start of the SCHEDULE category
START_LINE_X	X offset from the Cell Origin at which all lines in the bar chart shall START. This refers to those lines represent each row. These lines separate each individual bar entry. The X direction is from left to right across the width of the Cell.
START_TEXT_Y	Y distance from the Cell Origin at which first line of text is located. This distance is measure up (or down) the page.

The following "**COL**_" fields specify data required to be output for every line of bar data, except in the case of the optional **COL_J** fields etc. which have an optional line number.

For each of these columns, a column line is drawn (except where diagrams have been inserted). For each row of bar data, a row line must be drawn (except where diagrams are inserted).

If any of these "**COL_**" lines are not present in the file or have been commented out, the column will be omitted from the Bar Chart entirely.

The five arguments must follow the **COL_** command as follows:

COL_X a b c d e

Where …

a = the distance in the X-direction from the locating point of the Cell to where the text is to be located (justified)

b = the distance in the X-direction from the locating point of the Cell to where the column line on the right of the text is to be located (justified)

c = the text justification. Options "**Left**", "**Right**" or "**Center**"

d = an optional line number

e = the variable-dimension format specification (used only when dimensions vary) and consists of Preset Text codes and literal text enclosed by tilde "~" characters that designate the start and finish of each line to be output. For example, if:

e = **~$qlb to $qle~varies by~$qlv~**

then the variable bar dimension would be output like:

2300 to 4500
varies by
125

Please note that when the "**e**" argument is specified for **COL_L** (the total length), the same argument is then used as the "default" for all other **COL_A** to **COL_Z** commands unless you specify otherwise.

Please Note:

The "display.sys" parameter **UNAM** controls the formatting of unit names within the schedule dimensions located by the **COL_xxx** commands.

The "display.sys" parameters **RNDV** and **RNDI** control the rounding of the schedule dimension variations output by **$qlv** in the variable-bar formatting.

COL_INDEX Index number for all lines in the bar chart (i.e. a line count). The "**d**" argument specifies the interval for the display of the line number. For example, if **d = 10**, the line numbers would be output

	every 10th line.
COL_MEMBER	Member Name
COL_MARK_NUMBER	Bar mark number
COL_MARK	Bar Mark text generated by the **MTXT** display.sys parameter
COL_SHAPE_CODE	Bar Shape Designation (Shape Code)
COL_MEMBER_QTY	Number of members
COL_GRADE	Bar Grade
COL_DIA	Bar Diameter
COL_DIA_X	Diameter but with first letter of designation excluded.
COL_PIN_DIAMETER	Pin Diameter of Bends
COL_A	Scheduled A dimension
COL_B	Scheduled B dimension
COL_C	Scheduled C dimension
COL_D	Scheduled D dimension
COL_E	Scheduled E dimension
COL_L	Scheduled L dimension - Scheduled TOTAL BAR LENGTH
COL_LNOM	Scheduled “NOMINAL” TOTAL BAR LENGTH
COL_L_TOTAL	The sum of all total bar lengths (L) for the current bar mark.
COL_NUMBER	Number of bars
COL_TOTAL	Total number of bars
COL_SETS	Number of sets of bars
COL_REMARKS	Schedule remarks for current bar
COL_REV	Bar Revision
COL_SHAPE_CATEGORY	Bar shape category - "BENT" or "STR"
	OPTIONAL ENTRIES. If these entries below are specified GEOPAK Rebar will only allocate extra lines when the schedule value is a non-zero.
COL_F	Scheduled F dimension
COL_G	Scheduled G dimension

COL_H	Scheduled H dimension
COL_I	Scheduled I dimension
COL_J	Scheduled J dimension
COL_K	Scheduled K dimension
COL_M	Scheduled M dimension
COL_N	Scheduled N dimension
COL_O	Scheduled O dimension
COL_P	Scheduled P dimension
COL_R	Scheduled R dimension
COL_S	Scheduled S dimension
COL_T	Scheduled T dimension
COL_U	Scheduled U dimension
COL_V	Scheduled V dimension
COL_W	Scheduled W dimension
COL_X	Scheduled X dimension
COL_Y	Scheduled Y dimension
COL_Z	Scheduled Z dimension
COL_BAR_MASS	Mass of a single bar
COL_BAR_MARK_MASS	Mass of all bars of the same bar mark
COL_BAR_PAGE_MASS	Outputs the total mass of all bars on each page of a schedule at a specified X and Y location on each chart. This mass only appears once within each bar chart cell.

1.8.3.5 "FIELD" COMMANDS

Title block information that you might normally add into each Cell using MicroStation's Text commands is added automatically using the Field commands. This information might be User initials, Dates, Page numbers etc. A "Field" is defined as that information which appears on every Bar Chart sheet at the same location.

A number of Fields are automatically output by GEOPAK Rebar. As many as 10 User-defined fields can be output also. If some or all of these Fields are not required, comment them out with '//" characters (say).

Column lines are not drawn beside the following "Fields". The third column of data represents the absolute Y location relative to the locating point of the chart.

NOTE: do not place comments at the end of **FIELD**_ types. They will be interpreted as part of the field string.

Arguments for each of the Field commands are of the form:

COL_??? a b c d

Where …

a = the X value where the text is to be located (justified)

b = the Y value where the text is to be located (justified)

c = the justification. Can be Left, Right or Center

d = the name of this field that will appear in the Bar Charts dialog. It is not displayed in the bar chart. This field is only valid for the fields named **FIELD_USER?.** If the field is **FIELD_DRAWING_NUMBER** this value is 0 (off) or 1 (on). If on, then the drawing number will be post-fixed by the page number i.e. 34557 / 1, where the drawing number is entered as "34557".

[SCHEDULE]	Marker identifying the start of the SCHEDULE category
FIELD_SCHEDULE_ TITLE1	The 1st title line entered into the Bar Chart Creation dialog box.
FIELD_SCHEDULE_ TITLE2	The 2nd title line entered into the Bar Chart Creation dialog box.
FIELD_SCHEDULE_ NUMBER	The Schedule Number entered into the Bar Chart Creation dialog box.
FIELD_DRAWING_ NUMBER	The Drawing Number entered into the Bar Chart Creation dialog box.
FIELD_PAGE	The current page number for the Bar Chart Cell being formatted.
FIELD_PAGE_ TOTAL	The total number of Cells (pages) being output for the current Bar Chart set.
FIELD_DATE	The current date (or the date you enter) in the Bar Chart Creation dialog box.
FIELD_REVISION	The Schedule Revision number.
FIELD_USER0	Optional user-defined Field entry #1

FIELD_USER1	Optional user-defined Field entry #2
FIELD_USER2	Optional user-defined Field entry #3
FIELD_USER3	Optional user-defined Field entry #4
FIELD_USER4	Optional user-defined Field entry #5
FIELD_USER5	Optional user-defined Field entry #6
FIELD_USER6	Optional user-defined Field entry #7
FIELD_USER7	Optional user-defined Field entry #8
FIELD_USER8	Optional user-defined Field entry #9
FIELD_USER9	Optional user-defined Field entry #10

1.8.3.6 "DIAGRAMS" COMMANDS

The Diagrams category includes command allowing the output of bar diagrams with certain specified (or all) bar chart entries. Small Cells can be output at the first occurrence of each new bar shape in the Schedule. You must create these Cells separately for each bar shape, then set the commands below accordingly.

The number of entries in this section is unlimited. The Section begins with the following marker:

[DIAGRAMS]	Marker identifying the start of the DIAGRAMS category

The diagram entries use the format:

Barname a b c d e f g h i j l k m n p q r

Where the arguments are…

Barname = the internal GEOPAK Rebar Code name used in barmarks.sys for the bar shape you require a diagram for, e.g. **BAR001**, **BAR236** etc..

a = the locating X value for the diagram Cell Origin

b = is the locating Y value for the diagram Cell Origin relative to the text line for this schedule entry

c = the Cell name to be displayed

d = the number of lines to allow for the diagram

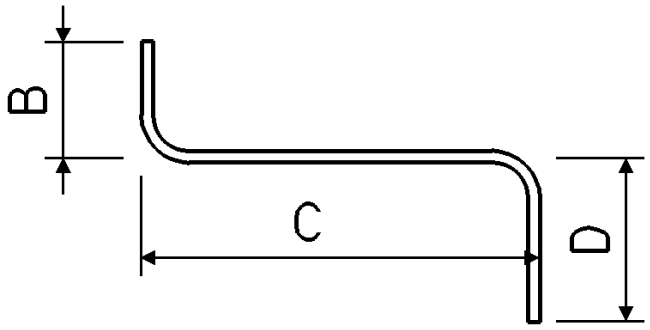
e & f = the leftmost and rightmost x extremities of where the diagram will be displayed. These values should not conflict with any of the **COL_???** values. If **e** & **f** are 0, then the diagram will be displayed on a separate line just below the **COL_???** entries in the bar chart.

g = indicates whether the diagram should be included at every bar mark or not. Set **g** = 2 if diagrams are displayed at every occurrence of the specified bar throughout the schedule/chart. If **g** = 1, diagrams are displayed at the first occurrence of each bar shape on each page (i.e. bars are displayed only once on each page). If **g** = 0, diagrams are only displayed once at the first occurrence of the bar across the entire schedule.

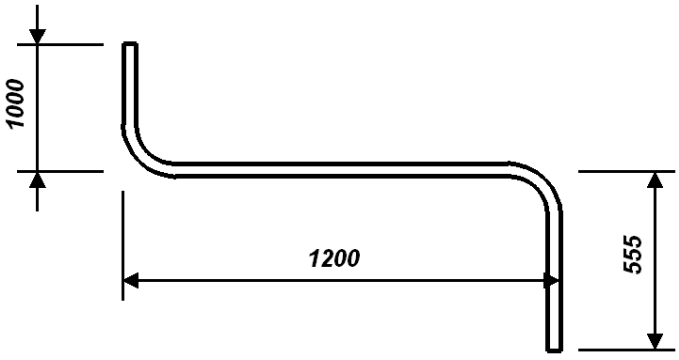
h & i = are respectively X and Y scale factors for the cell. If these scales are not specified or set to 0, cells are scaled according to the available space as determined by fields **d**, **e** & **f**.

The last eight arguments – **j**, **k**, **l**, **m**, **n**, **p**, **q** and **r** – control the automatic inclusion of live scheduled dimensions into the bar shape cell. As the cell diagram is loaded into the bar chart, a search is performed the bar shape dimension letters within the text in the Cell. If the dimension letter is found, the letter is deleted and replaced by the current dimension length. The dimension length text is always inserted using center justification.

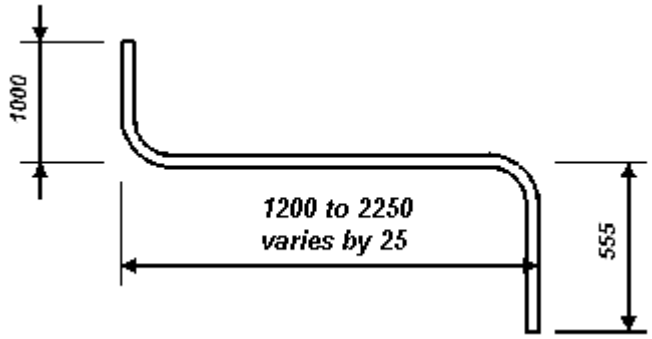
For example, after configuring these parameters, a normal Cell diagram which looks like:



is automatically transformed into…



or in situations where the scheduled bar dimensions vary, the Cell diagram might appear:



Notice that as well as the dimensions being inserted, the text font and height have changed. The color and weight of the text can also be controlled.

Additional bar parameters can also be inserted into the Cell diagrams. The total length of the bar (dimension "L") is inserted if the letter "L" is found within the Cell. The bar diameter is inserted if the text "DIA" is found and the current bend radius is inserted if the text "RAD" is located. Of course, these additional items are never supplied in the bar shape Cell Library provided by GEOPAK. You need to edit the Cells manually and insert this text at the appropriate location when required.

These optional arguments are now described…

j = The trigger to force live schedule dimensions and total length of a bar to be inserted directly into the cell in place of the "A" "B" "C"..."L" etc. dimension letters. Set **j** = 1 to activate this feature, otherwise **j** = 0.

k = Alternative height for dimension text in bar shape cells. zero for no change)

l = Font for dimension text (equals -1 (minus 1) for no change)

m = Color for dimension text (equals -1 (minus 1) for no change)

n = Weight for dimension text (equals -1 (minus 1) for no change)

p = Spacing between lines of text (if 0, spacing defaults to half the text height)

q = Parameter controlling the justification method for the text. If zero, the dimension text is created center justified, else if 1, the justification method is inherited from the original dimension letter "A", "B" etc. found in the Cell. For example, if the existing text justification (of the dimension letter) in the Cell is center-bottom and q = 1, the dimension text is moved upward if more than one line of text line is needed.

r = The string format for varying dimensions, similar to the last parameter required in **COL_L** style commands. Only **$qlb**, **$qle** and **$qlv** Preset codes can be used. For example,

~$qlb to $qle~varies by $qlv~ would generate the variable-dimension format shown in the Cell diagram above.

Parameter **"r"** does not need to be repeated for each line. Rebar considers the first format it reads as the default for all other Cells unless otherwise defined.

1.8.3.7 "MASSES" COMMANDS

The Masses section controls the output of a total masses summary within the Bar Chart. The summary is only output on the last page of each Bar Chart set.

The row and column lines must be contained in your Cell for Masses output. GEOPAK Rebar does not output them as is the case for the Bar Data lines.

Specify Start Line Y = 0 and Start Line X = 0 if masses are not required. Specify Start Line Y only if masses summary is to be listed in the vertical direction. Otherwise specify Start Line X (ONLY) if masses summary is to be listed horizontally across the page.

[MASSES] Marker identifying the start of the MASSES category

START_LINE_Y The location in the "Y" axis (up the page) of the first line of masses data relative to the Cell Origin

START_LINE_X The location in the "X" axis (across the page) of the first line of masses data relative to the Cell Origin

QTY_SPACING Spacing between quantities for each diameter.

The format for the following commands is:

COL_??? A B

Where

A = the X value where the text is to be located (justified)

B = the text justification. Can be "Left", "Right" or "Center"

COL_SIZE Bar Diameter for mass output.

DIAM_CELL Specifies the Cell name for the Header at the start of each summary listed by diameter. If no cell is specified then no header will be inserted. Note that the overall scale of the barchart will apply on this cell.

DIAM_SHIFT_CELL The shift given to the DIAM_CELL. It is assume to be to the left if

	the masses summary is vertically arranged or upward if horizontally arranged.
END_LINE	The end location where any consecutive summary will be inserted in a new line up.
END_GAP	The gap between two consecutive summaries.
COL_LENGTH	Total length of all bars of current diameter in Schedule.

Bar Grade Summary

GRADE_START_LINE_Y	Location of the column of quantities for the first bar grade.
GRADE_START_LINE_X	Location of the row of quantities for the first bar grade.
GRADE_QTY_SPACING	Spacing vertically between quantities for each bar grade.
GRADE_CELL	Specifies the Cell name for the Header at the start of each summary listed by diameter. If no cell is specified then no header will be inserted. Note that the overall scale of the barchart will apply on this cell.
GRADE_SHIFT_CELL	The shift given to the GRADE_CELL. It is assume to be to the left if the masses summary is vertically arranged or upward if horizontally arranged.
GRADE_END_LINE	The end location where any consecutive summary will be inserted in a new line up.
GRADE_END_GAP	The gap between two consecutive summaries.
GRADE_QTY_STEP	The distance between the start of two summaries.
COL_GRADE_QTY_TOTAL	Total mass of all bars for each grade.
COL_GRADE	Bar Grade Designations.
COL_GRADE_QTY_TOTAL	Total mass of all bars for each grade.