Introduction

This manual provides information on the Structures CADD Setup used for structures plans production for the Department of Transportation. This manual is to be used along with the Plans Preparation Manual, Structures Design Guidelines, Structures Detailing Manual and appropriate MicroStation Manual(s). It is recommended that all CADD Operators involved in Structures Plans Production have a working knowledge of MicroStation and be familiar with the contents of this manual. It is also suggested that District CADD Managers follow this guide in support of structures plans production.

Information shown within this manual is based upon Structures CADD Setup on the Windows 95/NT platform only. All programs are available on the FDOT STRUCTURES WEB page (www.dot .state.fl.us/business/structur/index.htm)

The Structures CADD Development section welcomes your comments concerning improvements, additions, and changes. The Florida Department of Transportation makes no warranty, expressed or implied, as to the documentation, function or performance of the programs described within this document.

The information described in this document is subject to change without notice.

For additional information and support contact:

FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURES DESIGN OFFICE / CADD DEVELOPMENT
605 Suwannee Street, MS 33
Tallahassee, Florida 32399-0450
Ph. 850-414-4255 SC 994-4255

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Introduction

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System Software

The CADD Software Product used by the Structures Design Office is Bentley MicroStation with an in-house software interface. CADD Production is supported on Microsoft WindowsNT/Windows95 operating systems only. 16 bit applications are no longer supported except where 32 bit versions are not yet available.

All references to MicroStation pertain to Bentley MicroStation version 95 and later.

Since Department policy now requires the use of Metric units, English tools are no longer supported.

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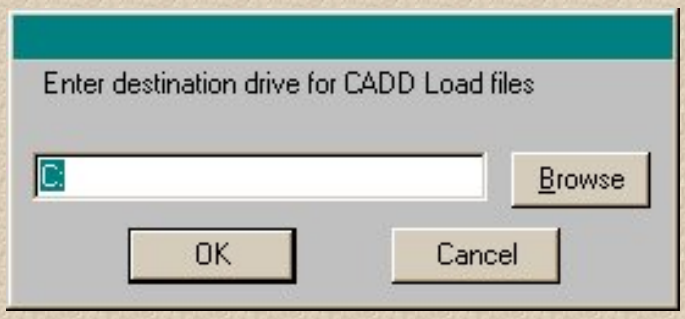
Structures CADD Setup

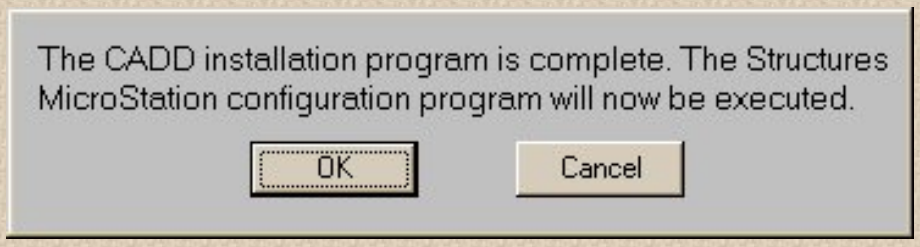
The Structures CADD setup is available as one executable file downloadable from our website. This installation can be used for configuring MicroStation on the Microsoft Windows 95/NT platforms.

The installation process is started by executing the CADDINST.EXE downloaded our website.

Upon starting the installation program, you will first be asked for the destination drive for the Structures CADD files. The load will build its own directory structure starting with FDOT_STRS and will not put any files outside of this directory except into the MicroStation/config/project directory.



After pressing the OK button, file copying will proceed. When the installation is finished copying files, the following information box will appear



The installation program is now complete. Press OK to start the second part of the installation that will configure MicroStation to use the Structures resources. In this part of the installation you will be asked for pertinent information on MicroStation's installation directory, what version of MicroStation you are using, what operation system you are using, and if you use license pooling.

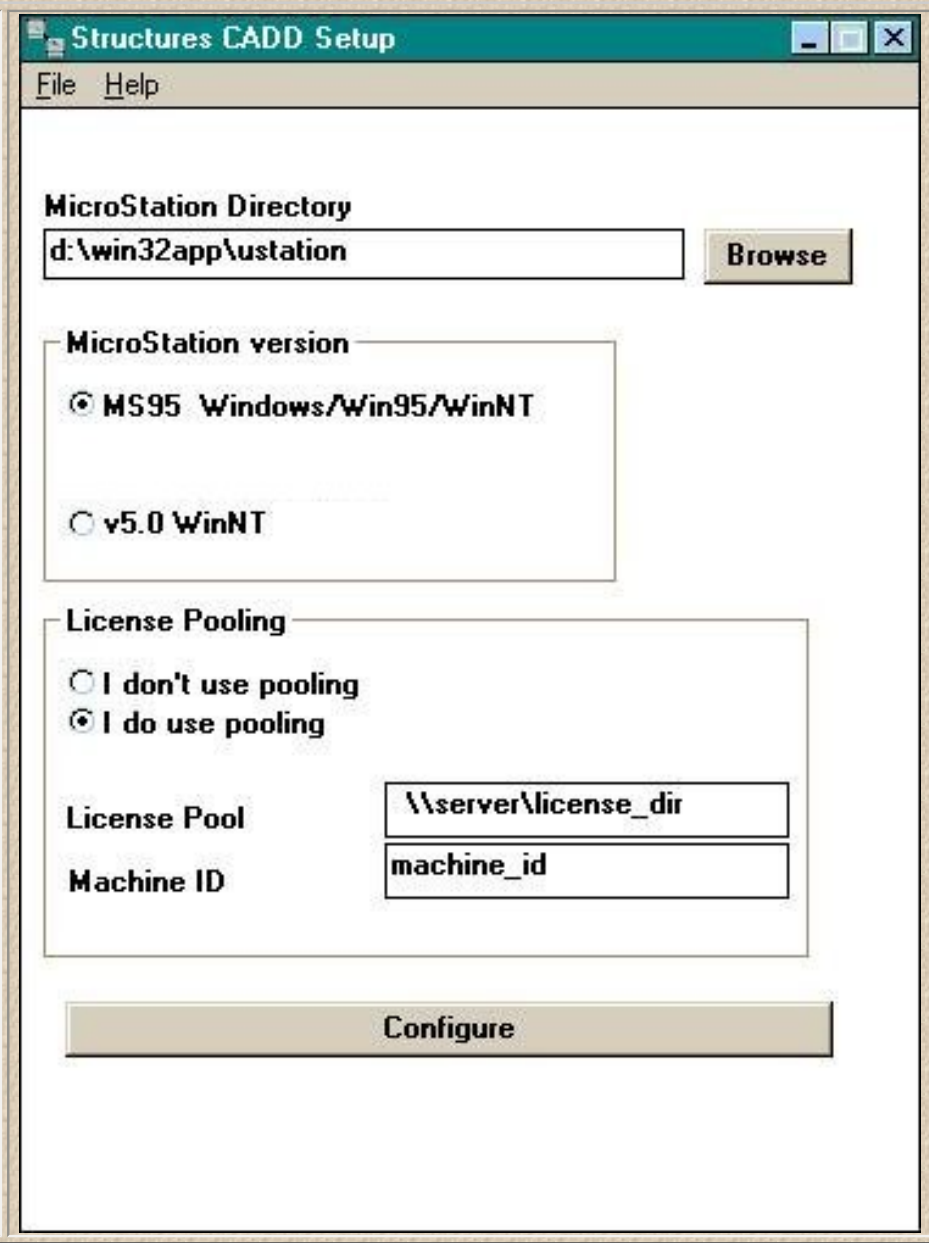
MicroStation Directory: enter or browse for the installation directory of MicroStation.

MicroStation version: pick the version of MicroStation that is installed on this machine.

License pooling: choose which option is appropriate for your work site.

For the license pool entry you may use either mapped drive letters or UNC naming.

The Machine ID field is the name you want the License log to use to identify the client machine. This is usually the client machines node name



When all entry fields are completed, press the Configure button and the appropriate MicroStation configurations will take place. Note: this load in no way edits or configures any of MicroStation's or any other third party configuration files, this load will only edit files created by the Structures CADD load program. If you want to customize our project configuration files (stmet.pcf and steng.pcf in the ustation/config/project directory), it is recommended that you copy and rename these files before making changes because our installation program will overwrite these files if the installation is performed again.

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General Production

This is a description of Structures CADD approach to producing drawings on the CADD System.

1. The following files are automatically attached when you run the **Structures CADD Load**, and choose the stmet Workspace in MicroStation Manager.

- **Cell Library:** strsmet.cel
- **Color Table:** bar.tbl

Proj2d.cel -this cell library is intended to be a "users" library available on each platform. Users can save "job specific" cells here. This "project" library, along with the "master", should be archived with the design files at the close of the job. Any "proj2d" cells that may be of use to others should be brought to the attention of the CADD Development Section so that it may be included in the master cell library.

2. Level Symbology - All established Level Symbologies can be selected from the Structures .barmenu.

These Symbology choices are required to be used.

3. Scales, Text/Dimensions and Borders:

a. All elements should be drawn at "Full Size" and completed before placing text or dimensions.

b. After all elements are drawn, then determine the "Overall" Border scale required.

c. Any details that may need to be scaled up or down should be done at this time.

d. Select the Border scale from the barmenu and place the Border Cell at this scale.

(You may want to use the Scale Tables provided in this manual)

e. Select the Text Level from the barmenu, select the appropriate size, then place text and Dimensions.

f. It is helpful to show the Scale of your Drawing and related details inside the Display area of your file but outside the Border area. This will be helpful to you and others who work on this file.

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Design File Naming Convention

This procedure is provided to standardize ALL design file names to be compatible with the new Plans Processing system. Use the following format for selecting a name for a particular design file:

SSSSXXXX.DGN

You may use the entire eight (8) characters to describe the sheet, but the first four (4) **MUST** be the same for all sheets of this kind in this project as well as all future jobs as well. The first four characters will be essential to retrieving sheets in the future.

S = Sheet Title - 4 characters to describe sheet title

X = Sequence - 4 digits to indicate additional title or sheet sequence.

NOTE: If a sequence number is not needed, do not include them in the sheet title.

All standard drawings shall be named by the individual index number. (ex. index 700 = 700.dgn)

Below is a partial listing of file names for sheet titles. We will be constantly adding to this list as new sheets are created. This list is only a starting place. Please try to use one of the existing names. Additions or suggestions of file names should be sent to Structures Design Office in Tallahassee.

DESIGN FILE NAME	SHEET DESCRIPTION
APSB	Approach Slab (Other than the Standard)
BRHY	Bridge Hydraulic Recommendation Sheet
BRDT	Bearing Details
BRPD	Neoprene Bearing Pads (Other than the Standard)
COVR	Cover sheet
CNNT	Construction Notes
CNDT	Construction Details
CNSQ	Construction Sequence
CODT	Conduit Details
CRWL	Crash Wall
CUDT	Culvert Details
DIDT	Diaphragm Details

DSDT	Drilled Shaft Details
EBNT1	End Bent No. 1
EBDT	End Bent Details
FGEL	Finish Grade Elevations
FDLO	Foundation Layout
FRPL	Framing Plan
FNDR	Fender System
FNDT	Fender Details
GNNT	General Notes
GRDT	Steel Girder Details
GIRD	Steel Girder
HNRL	Concrete Handrail **(Other than the Standard)**
INDX	Index of sheets
IBNT234	Intermediate Bent Nos. 2, 3, & 4
IBDT	Intermediate Bent Details
JADT	Jacking Details
JTDT	Expansion Joint Details
KEYS	Bridge Rehab. Key sheet
LDDT	Ladder Details
MSDT	Miscellaneous Details
PIDT	Pile Details
PIER689	Pier Nos. 6, 8, & 9
PRPE	Preliminary Plan and Elevation
PLEL	Plan and Elevation
PRSL	Prestressed Slab Units **(Other than the Standard)**
REBR	Reinforcing Bar List
RTWL25	25' Retaining Wall
RTWLSHT	Sheet Pile Retaining Wall
SPST3SPN	3 Span Superstructure
SPST110	110' Span Superstructure
SPST45	45' Span Superstructure
STDT	Superstructure Details

Mechanical and Electrical Sections will use the above names as well as the following:

DESIGN FILENAME	SHEET DESCRIPTION
COND	Conduit Riser
CMLO	Communications Layout
DESK	Control Desk
GRND	Grounding and Lighting Protection
LKPL	Lock Plan
LKDT	Lock Details
LTLO	Lighting; House and Pier Layout
NVLT	Navigation Lighting System
MEPL	Mechanical Plan
MEDT	Mechanical Details
PCIO	Input/Output Points; PLC
PCLL	Ladder Logic; PLC
PNBD	Panel Board Schedule
SYMB	Symbol Legend
SLDG	Single Line Diagram
SITE	Site Plan for Rest Area
SUB	Submarine Cable Details
WKID	Work Identification Sheet

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Seed Files

The following are the active parameters set in the DGN seed files.

STRMET.DGN (2D File)

Views On = 1, 2
Levels Displayed = 1-63
Locks On = Snap (Keypoint)
Active Level (LV) = 40
Color (CO) = 2
Weight (WT) = 3
Angle (AA) = 0
Scale (AS) = 1 : 1
Line Code (LC) = 0
Grid Units (GU) = 0.008,12
Global Origin (GO) = 0,0
Font (FT) = 68
Text Size (TX) = 0.003
Line Spacing (LS) = 0.0026
Line Length (LL) = 255
Cell Library = STRSMET.CEL (in drive:fdot_str\cadd\cell)
UCM Index = STRUCM.NDX (in drive:fdot_str\cadd\data)
Color Table = BAR.TBL (in drive:fdot_str\cadd\data)

STRMETZ.DGN (3D File)

Views On = 1 (Top), 5 (Iso), 6 (Top), 7 (Front), 8 (Right)
Levels Displayed = 1-63
Locks On = Snap (Keypoint)
Active Level (LV) = 40
Color (CO) = 2
Weight (WT) = 3
Angle (AA) = 0
Scale (AS) = 1
Line Code (LC) = 0
Active Point: XY = 0,0,0
Display Depth (DP) = -500,500
Window Center (WO) = 0,0,0
Grid Units (GU) =0.008,12

Global Origin (GO) = 0,0
Font (FT) = 68
Text Size (TX) = 0.0035
Line Spacing (LS) = 0.0026
Line Length (LL) = 255
Cell Library = STRSMET.CEL (in drive:fdot_str\cadd\cell)
UCM Index = STRUCM.NDX (in drive:fdot_str\cadd\data)
Color Table = BAR.TBL (in drive:fdot_str\cadd\data)

Additional Parameters: (Design Options)

Working Units (MU:SU:PU) = 1m:1000mm:200 or 21474 meters sq.
Angle - Format = Degrees, Minutes, Seconds (DDD^MM'SS.SS")
Angle - Mode = Conventional
Data Readout - Format = Master Units
Data Readout - Accuracy = 0.1234
Angle Round-Off = 0^00'00.00"
Dimensioning - English, AEC
Dimensioning - Substitute Symbol (Arrowhead) = ALT (Cell)
Dimensioning - Linear Accuracy = 1mm
Dimensioning - Degree Accuracy = 0.001

MicroStation Specific Settings: (Required for Strmet.dgn & Strmetz.dgn)

See Design File Settings page and Preference Settings page for MicroStation dialog box settings.

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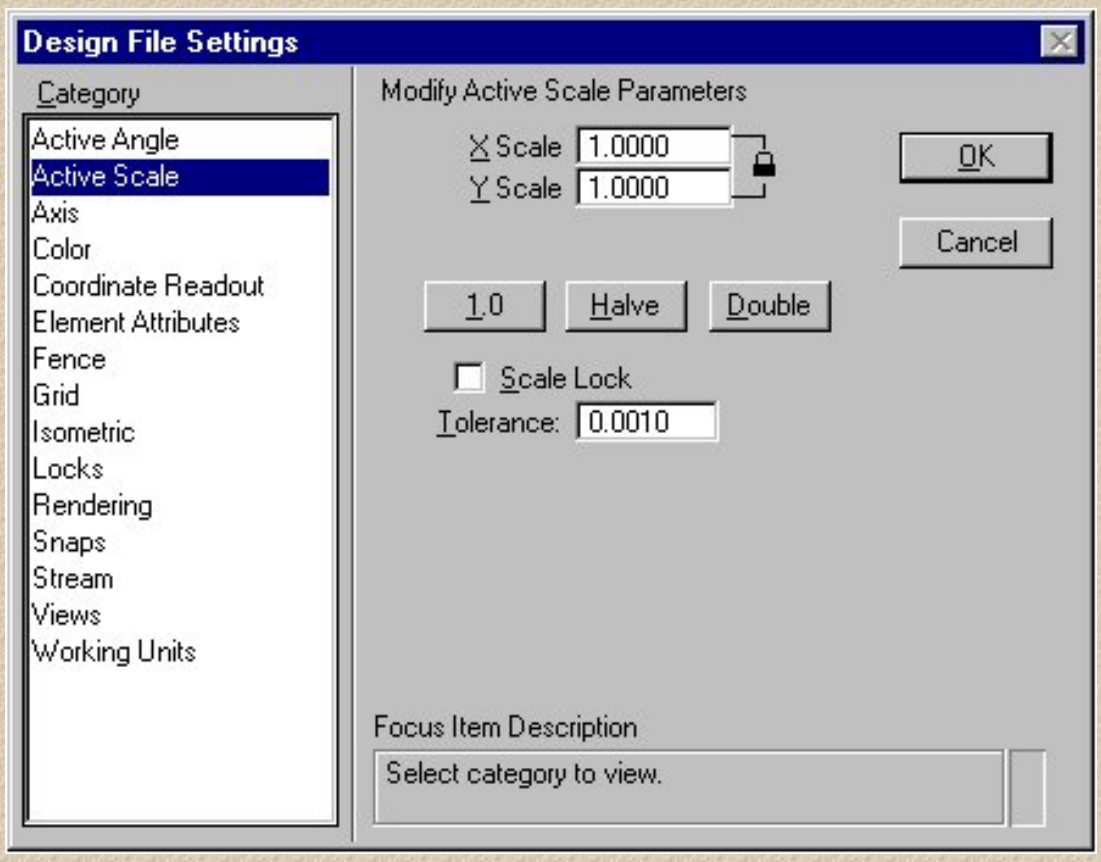
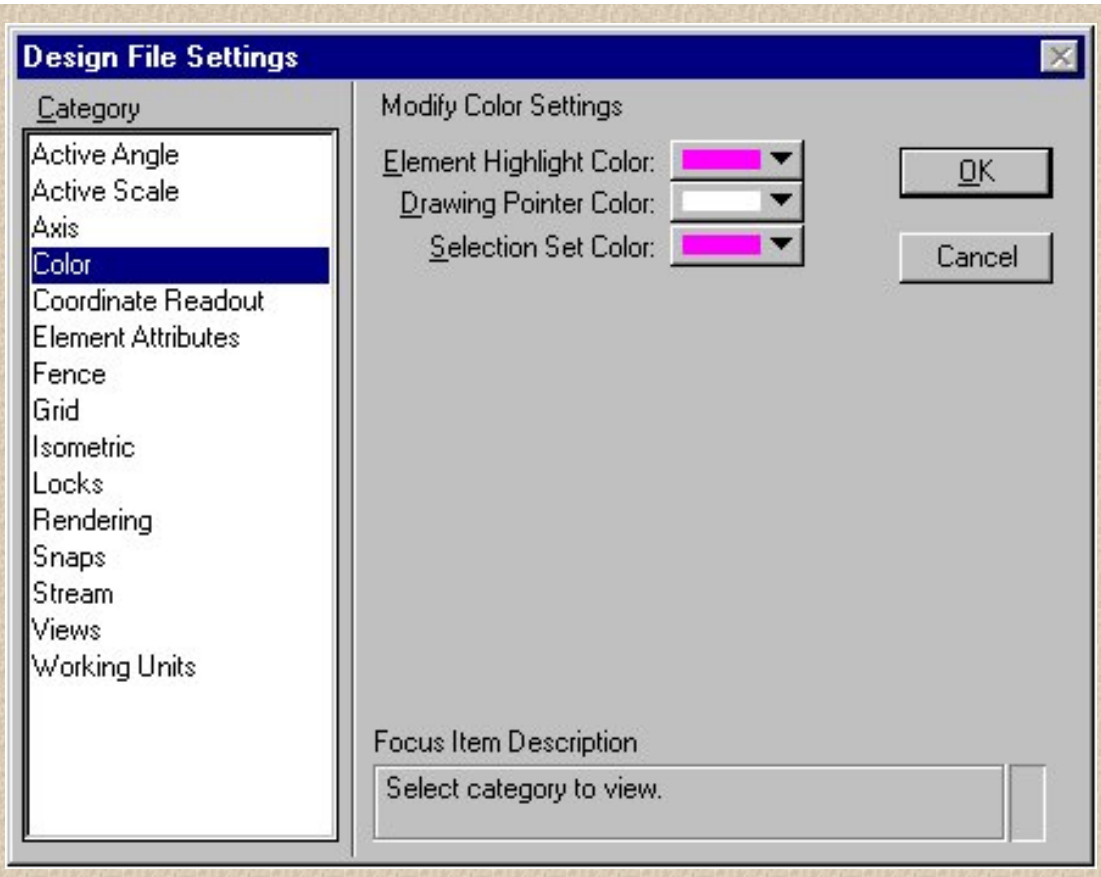
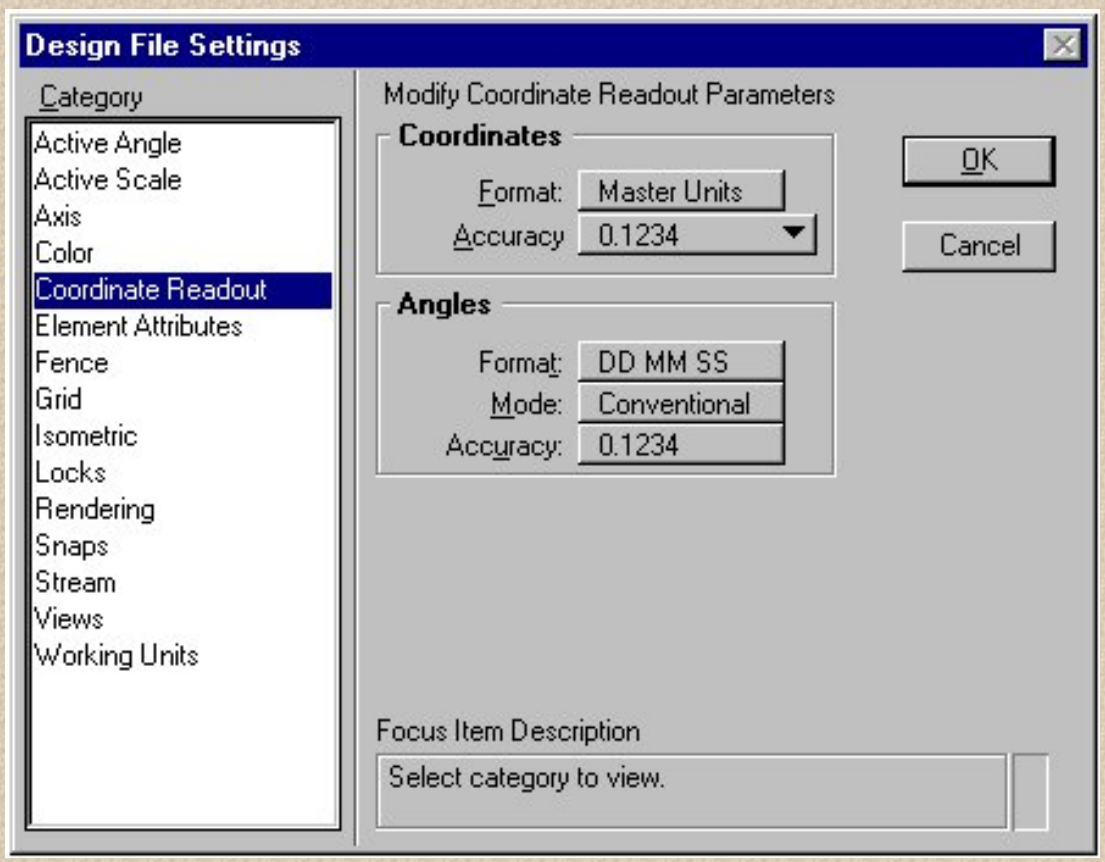
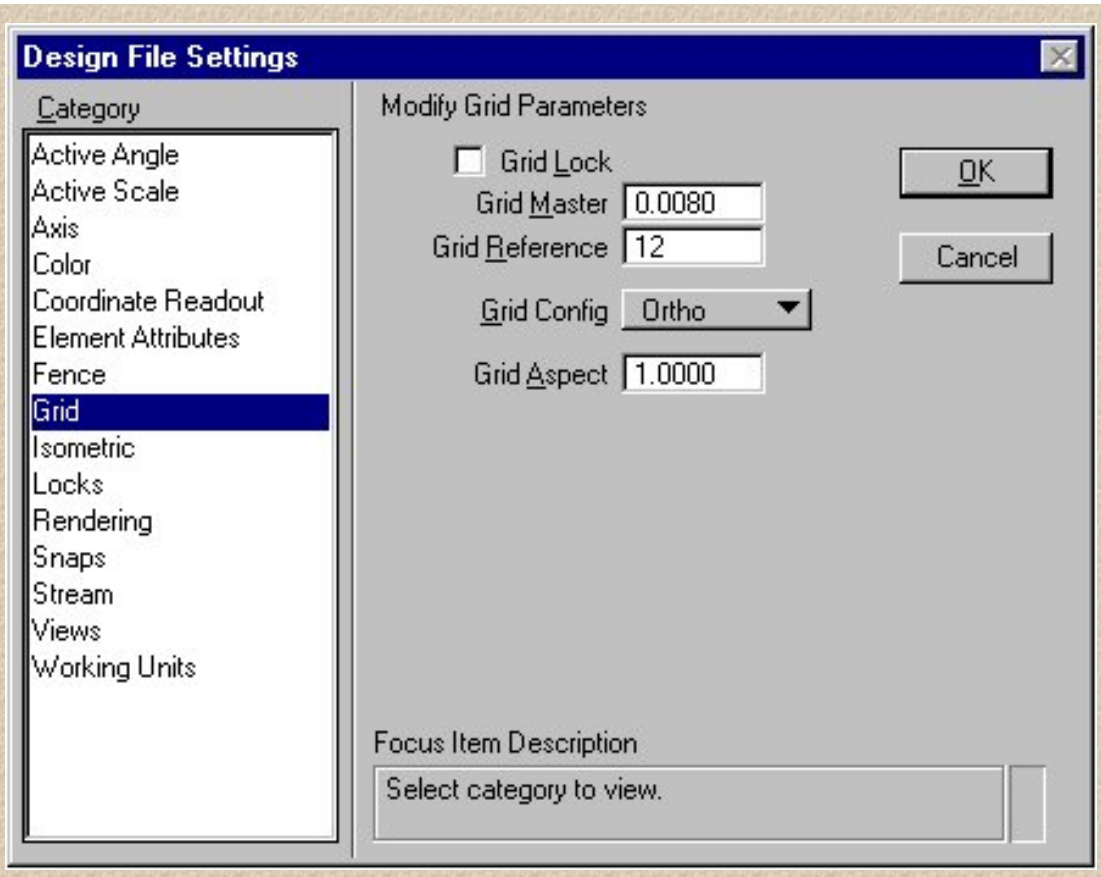
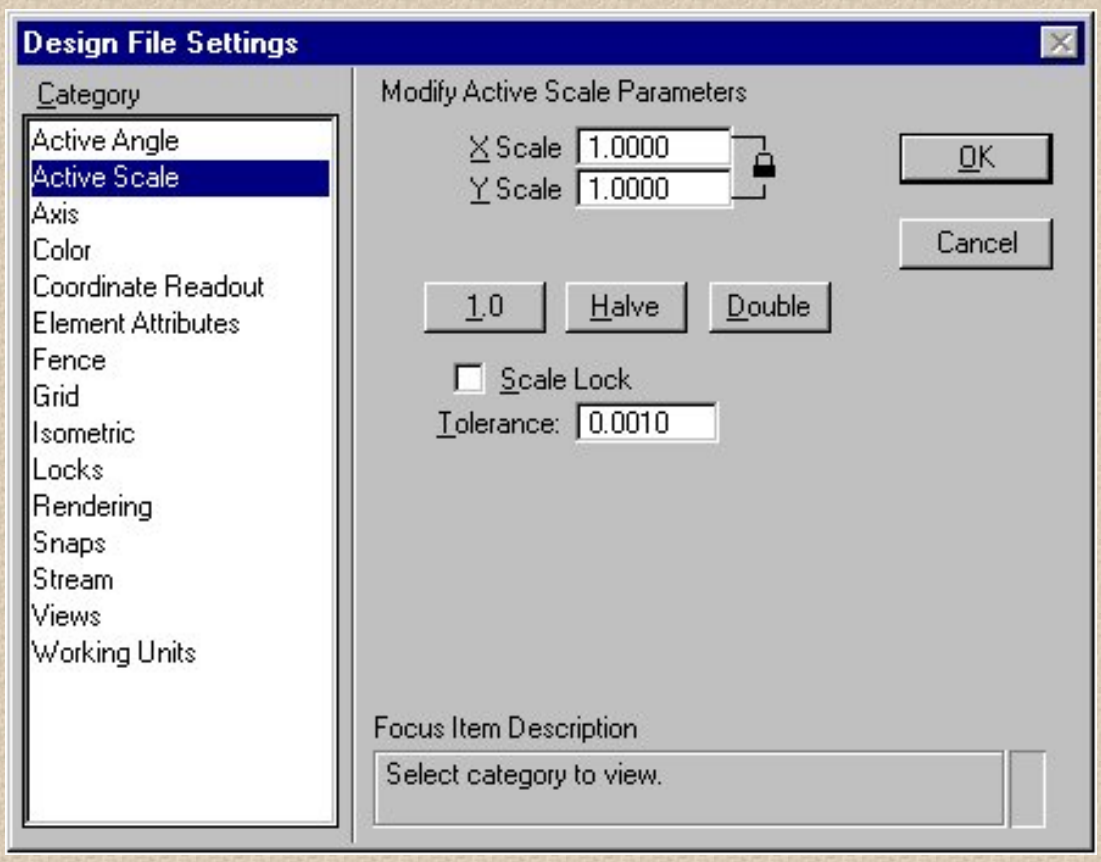
Design File Settings

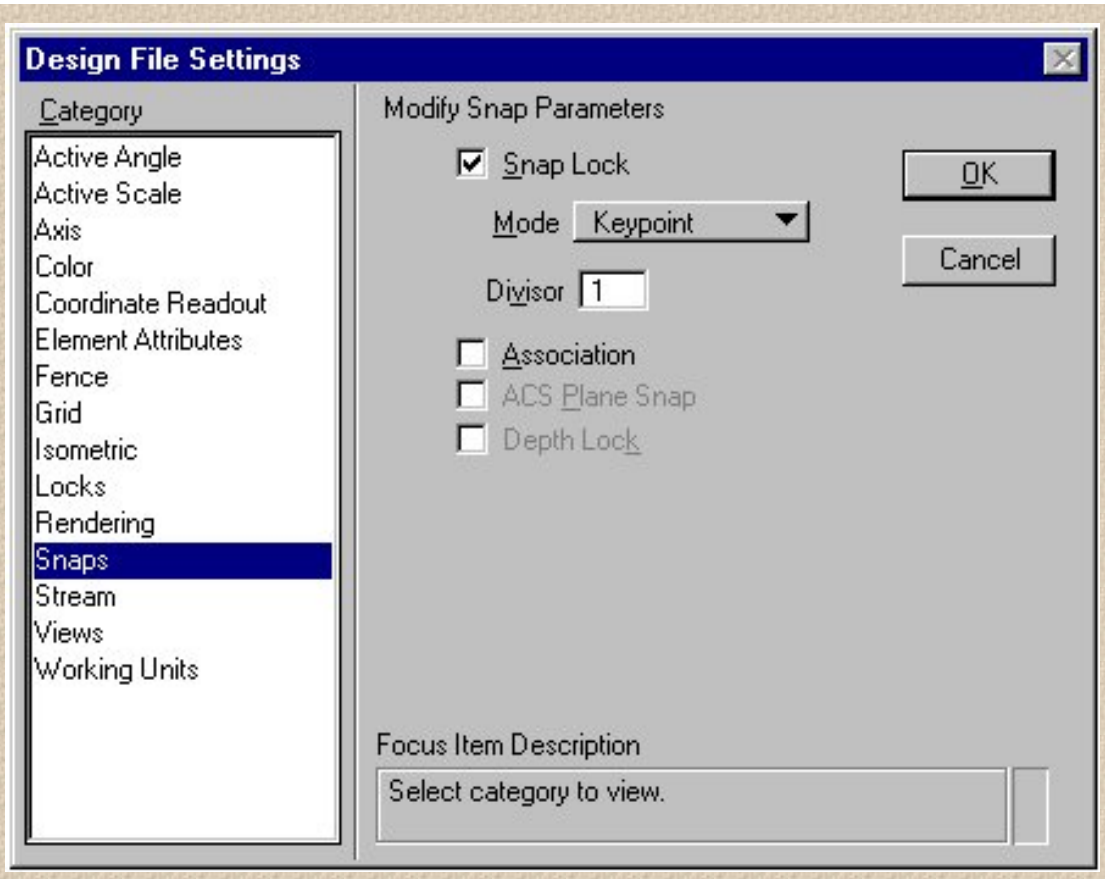


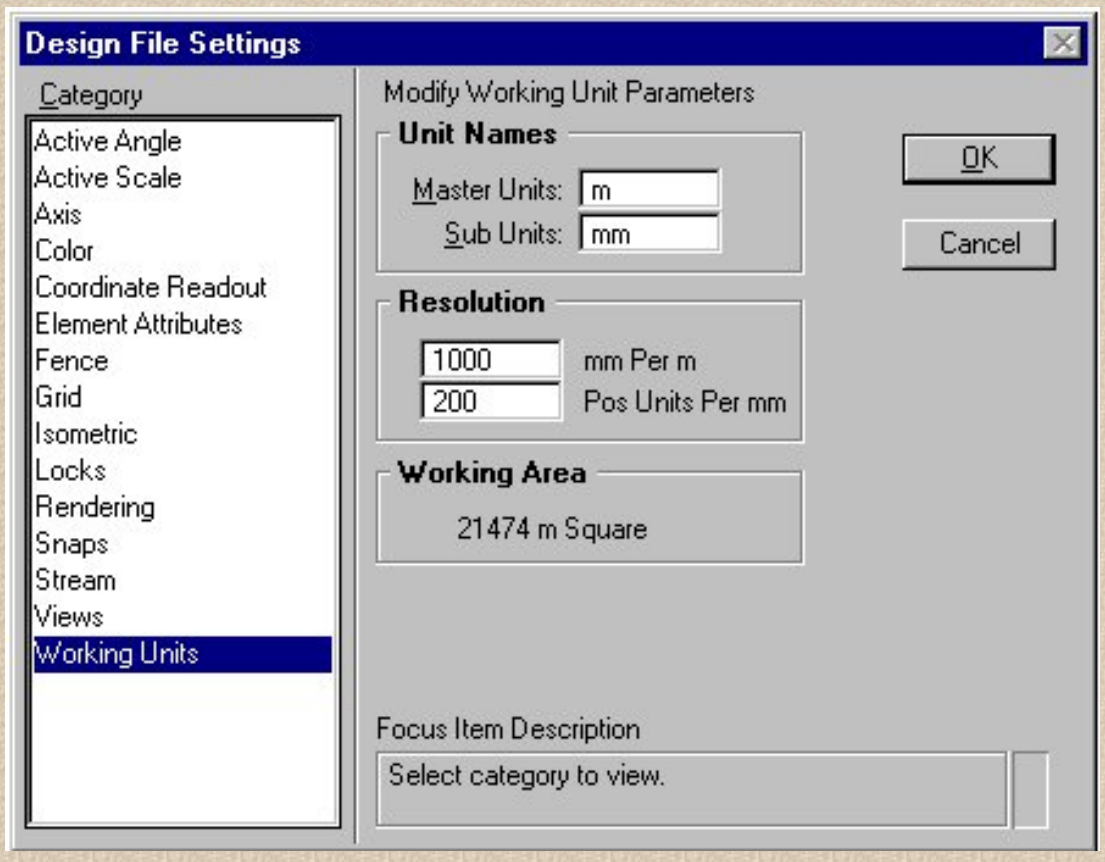

Design File Settings
Category
Active Angle
Active Scale
Axis
Color
Coordinate Readout
Element Attributes
Fence
Grid
Isometric
Locks
Rendering
Snaps
Stream
Views
Working Units
Modify Color Settings
Element Highlight Color:
Drawing Pointer Color:
Selection Set Color:
OK
Cancel
Focus Item Description
Select category to view.


Design File Settings
Category
Active Angle
Active Scale
Axis
Color
Coordinate Readout
Element Attributes
Fence
Grid
Isometric
Locks
Rendering
Snaps
Stream
Views
Working Units
Modify Coordinate Readout Parameters
Coordinates
Format: Master Units
Accuracy 0.1234
Angles
Format: DD MM SS
Mode: Conventional
Accuracy: 0.1234
OK
Cancel
Focus Item Description
Select category to view.


Design File Settings
Category
Active Angle
Active Scale
Axis
Color
Coordinate Readout
Element Attributes
Fence
Grid
Isometric
Locks
Rendering
Snaps
Stream
Views
Working Units
Modify Grid Parameters
Grid Lock
Grid Master 0.0080
Grid Reference 12
Grid Config Ortho
Grid Aspect 1.0000
OK
Cancel
Focus Item Description
Select category to view.


Design File Settings
Category
Active Angle
Active Scale
Axis
Color
Coordinate Readout
Element Attributes
Fence
Grid
Isometric
Locks
Rendering
Snaps
Stream
Views
Working Units
Modify Active Scale Parameters
X Scale 1.0000
Y Scale 1.0000
OK
Cancel
1.0
Halve
Double
Scale Lock
Tolerance: 0.0010
Focus Item Description
Select category to view.


Design File Settings
Category
Active Angle
Active Scale
Axis
Color
Coordinate Readout
Element Attributes
Fence
Grid
Isometric
Locks
Rendering
Snaps
Stream
Views
Working Units
Modify Snap Parameters
Snap Lock
Mode
Keypoint
Divisor
1
Association
ACS Plane Snap
Depth Lock
OK
Cancel
Focus Item Description
Select category to view.


Design File Settings
Category
Active Angle
Active Scale
Axis
Color
Coordinate Readout
Element Attributes
Fence
Grid
Isometric
Locks
Rendering
Snaps
Stream
Views
Working Units
Modify Working Unit Parameters
Unit Names
Master Units:
m
Sub Units:
mm
Resolution
1000
mm Per m
200
Pos Units Per mm
Working Area
21474 m Square
OK
Cancel
Focus Item Description
Select category to view.

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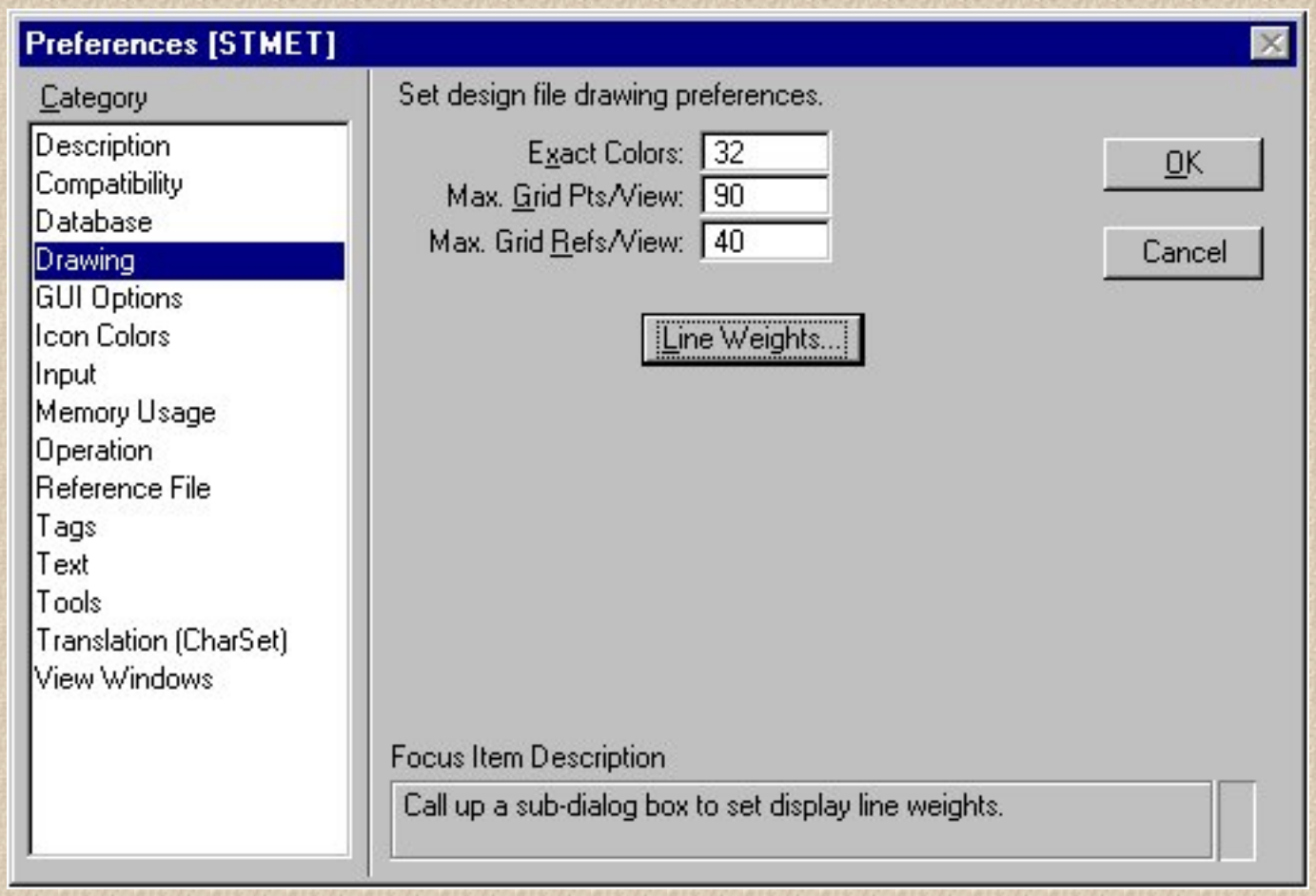
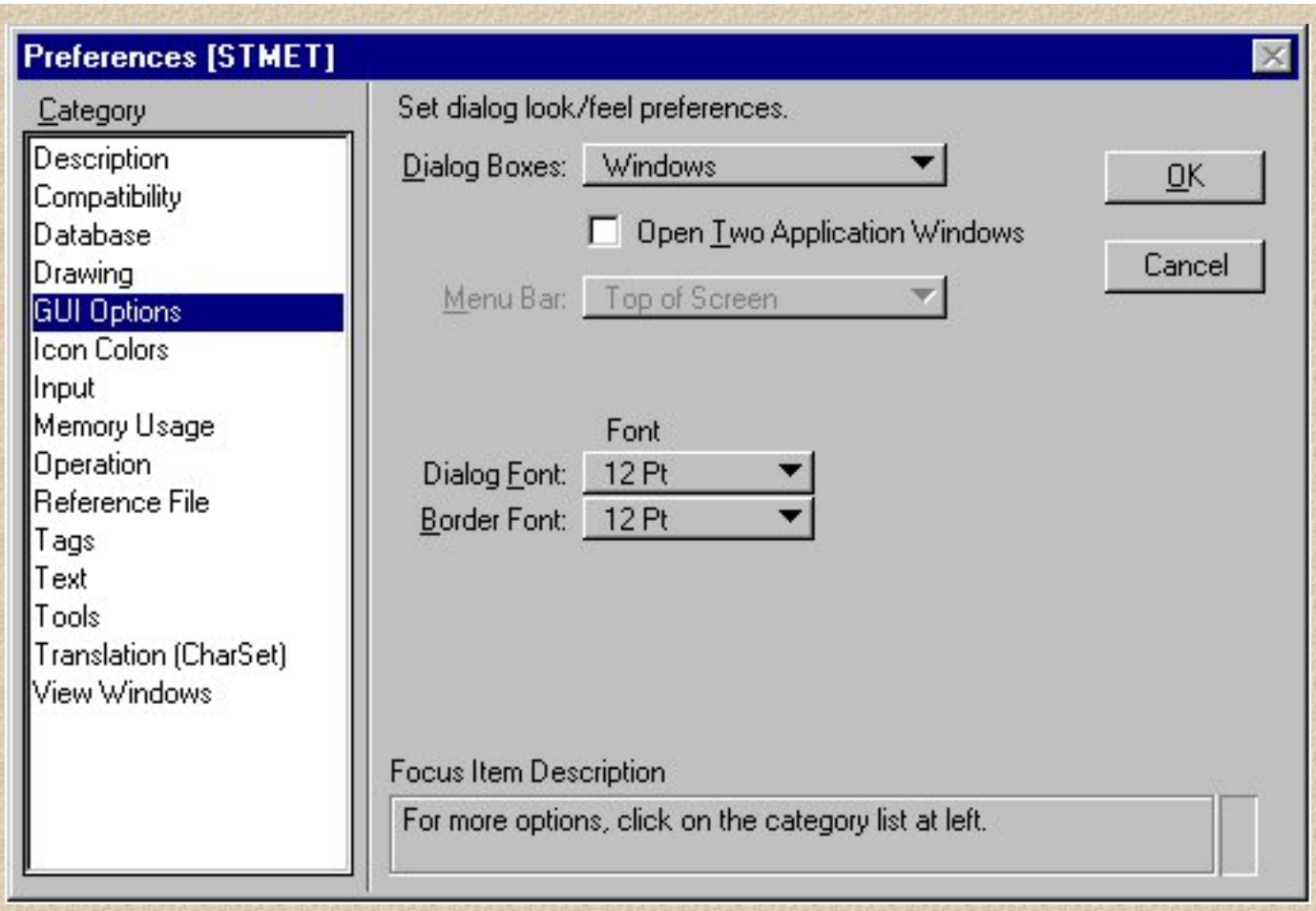
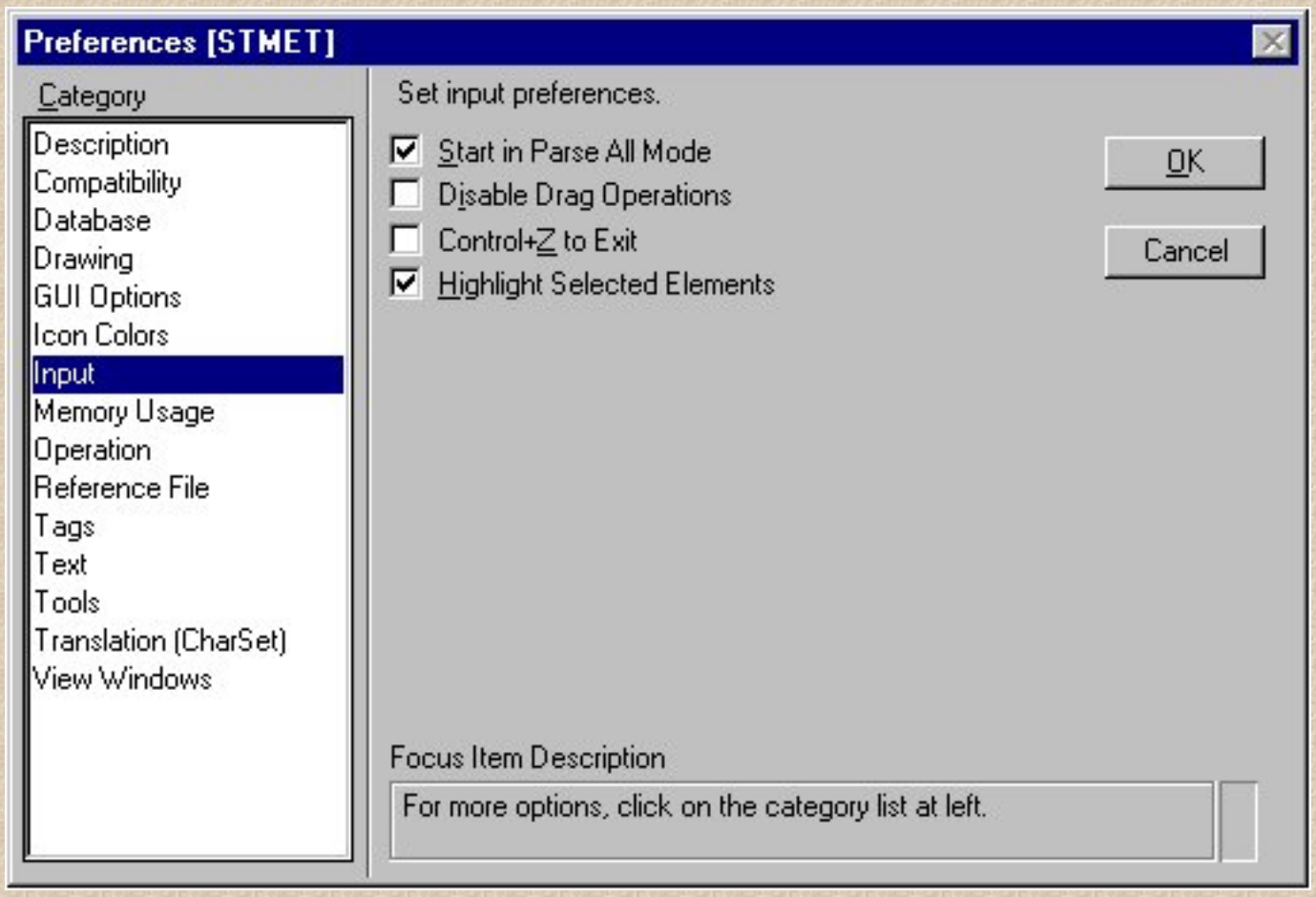
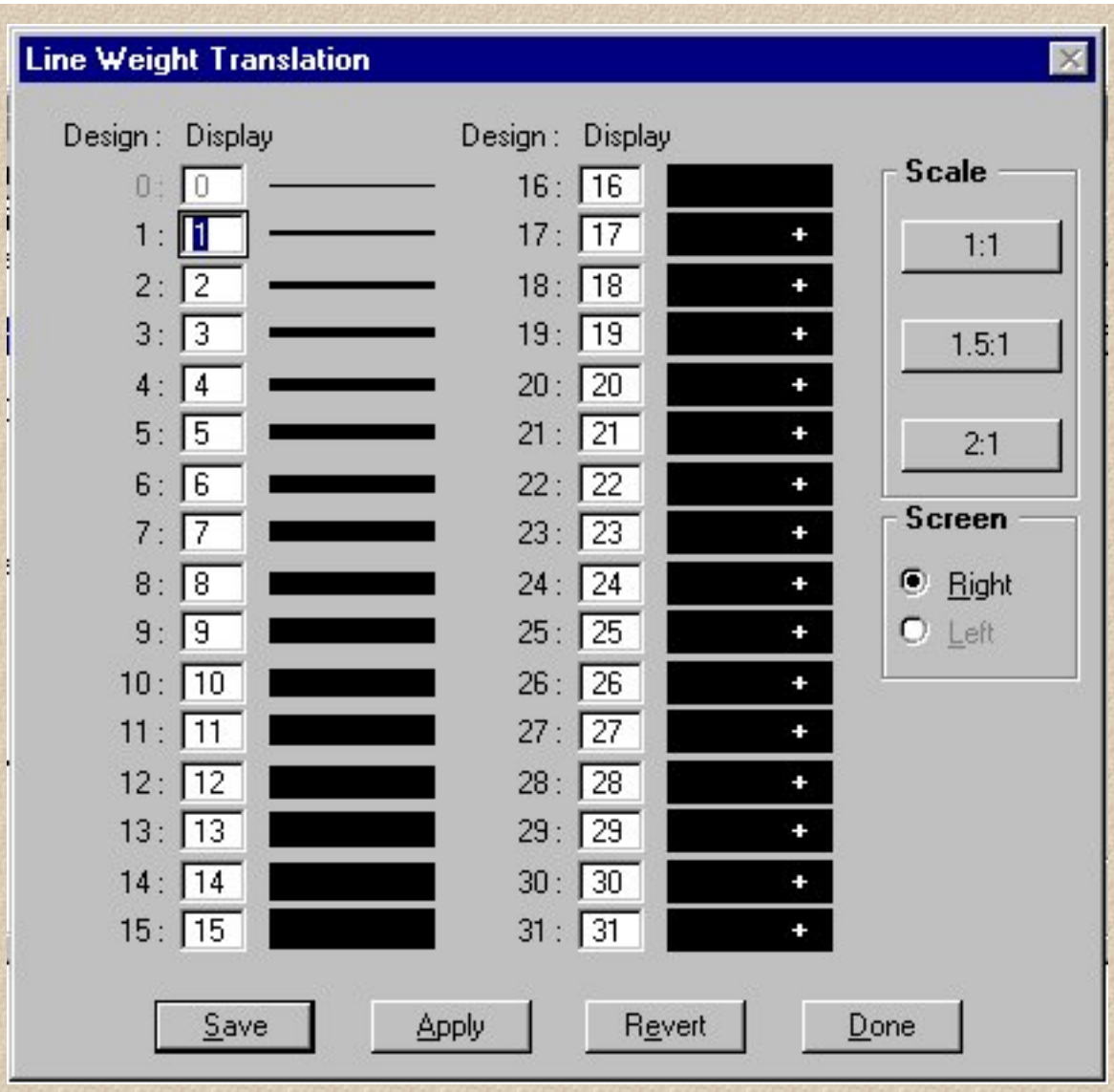
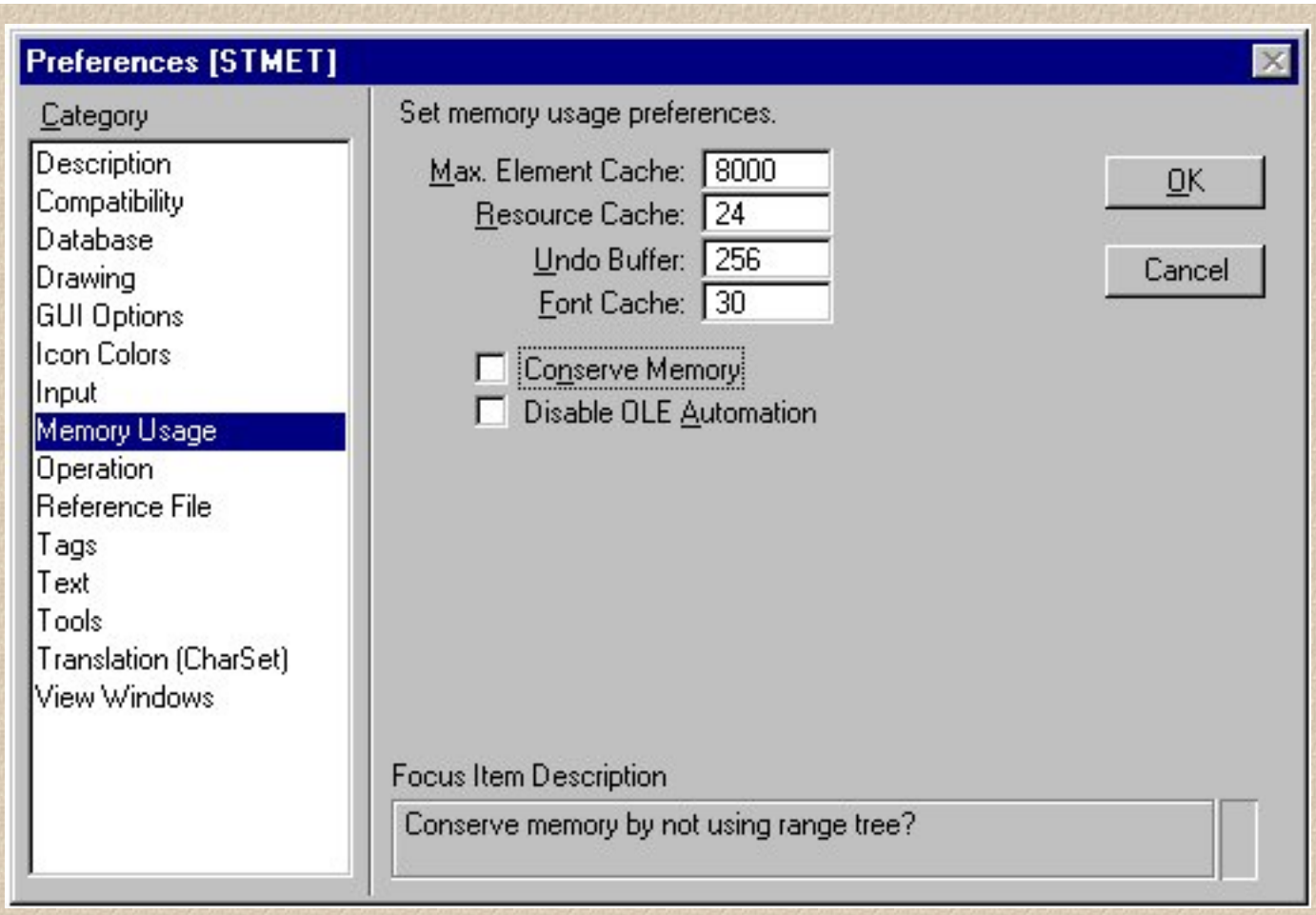
Preference Settings

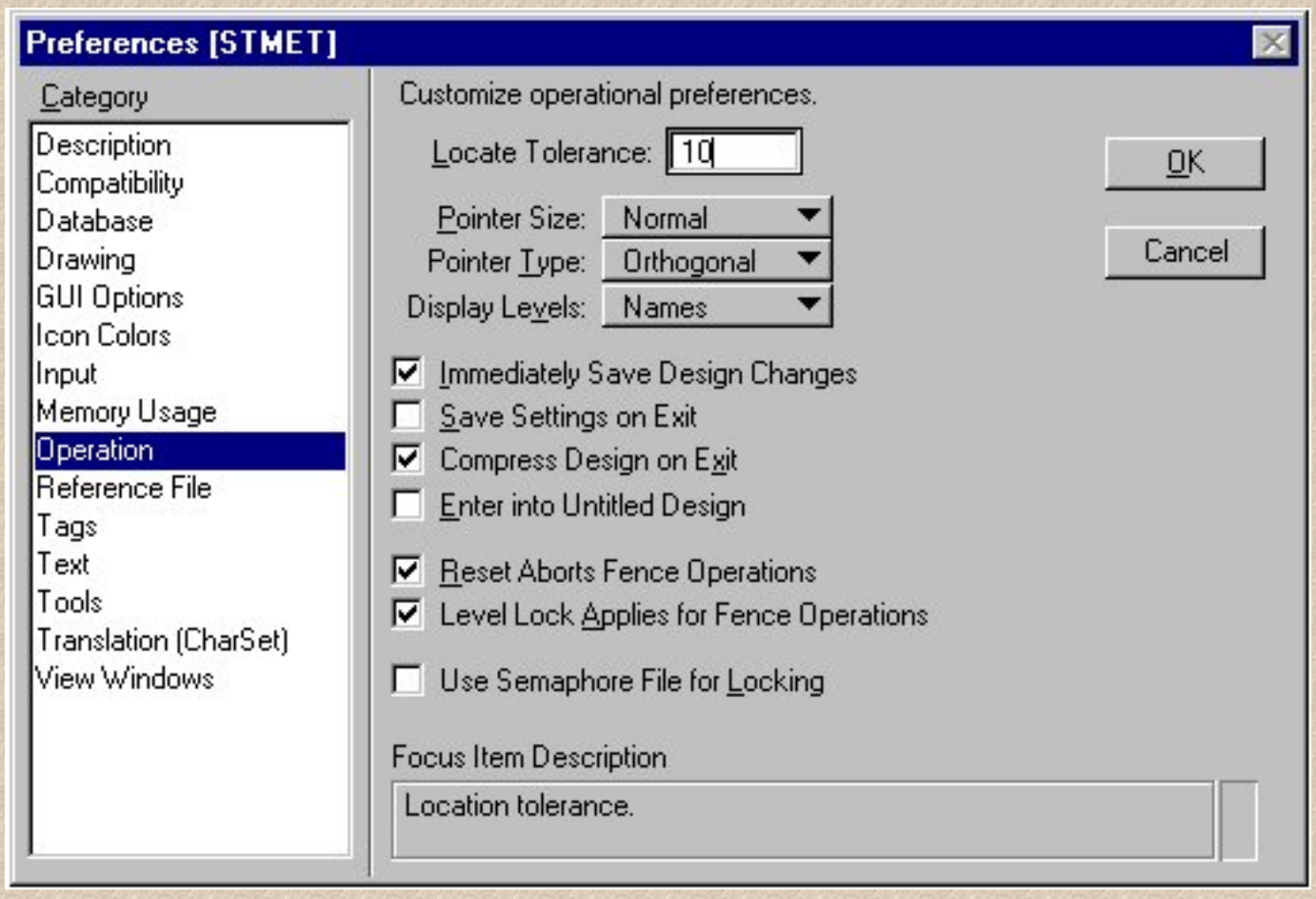


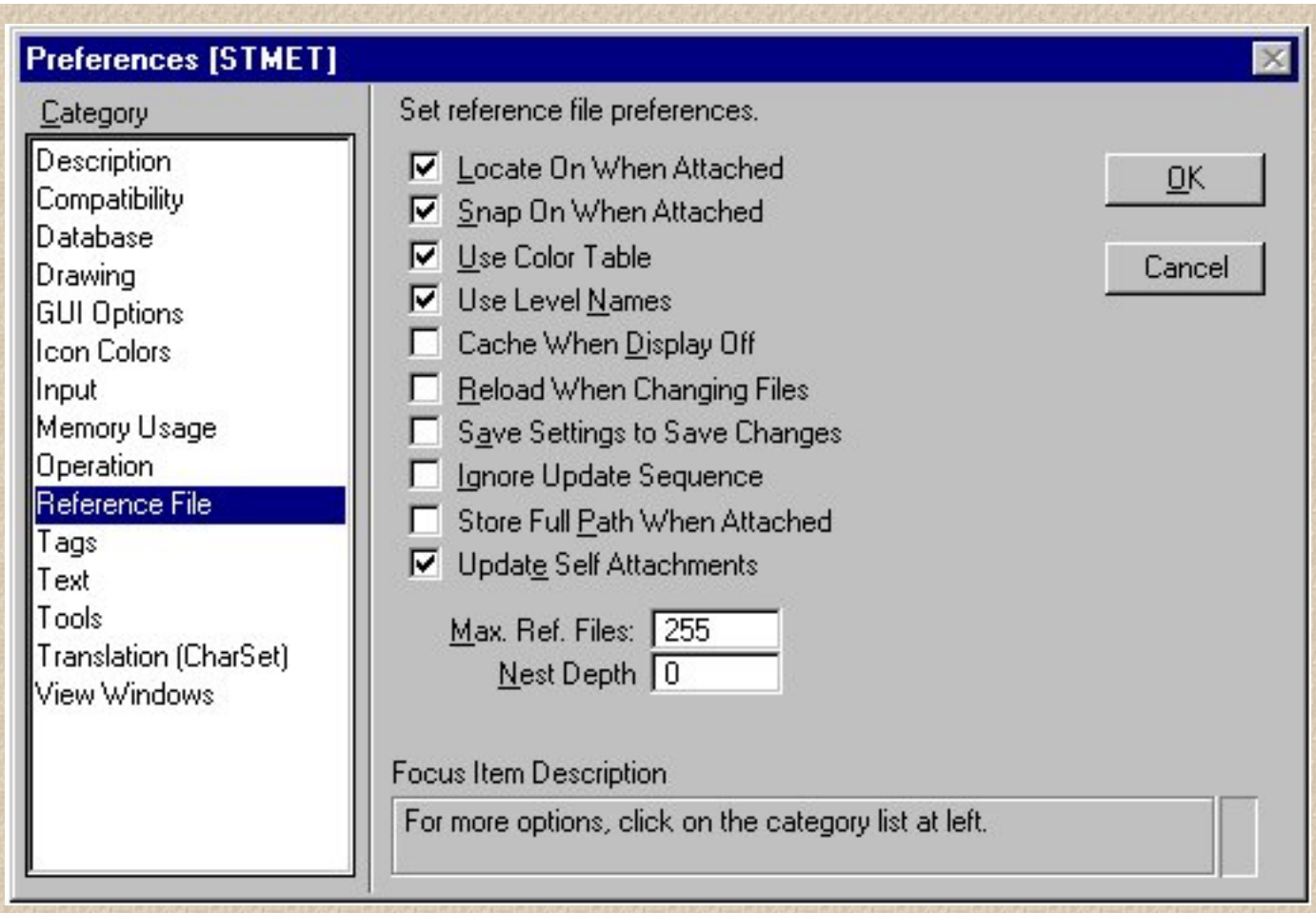

Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Set dialog look/feel preferences.
Dialog Boxes: Windows
OK
Open Two Application Windows
Cancel
Menu Bar: Top of Screen
Font
Dialog Font: 12 Pt
Border Font: 12 Pt
Focus Item Description
For more options, click on the category list at left.

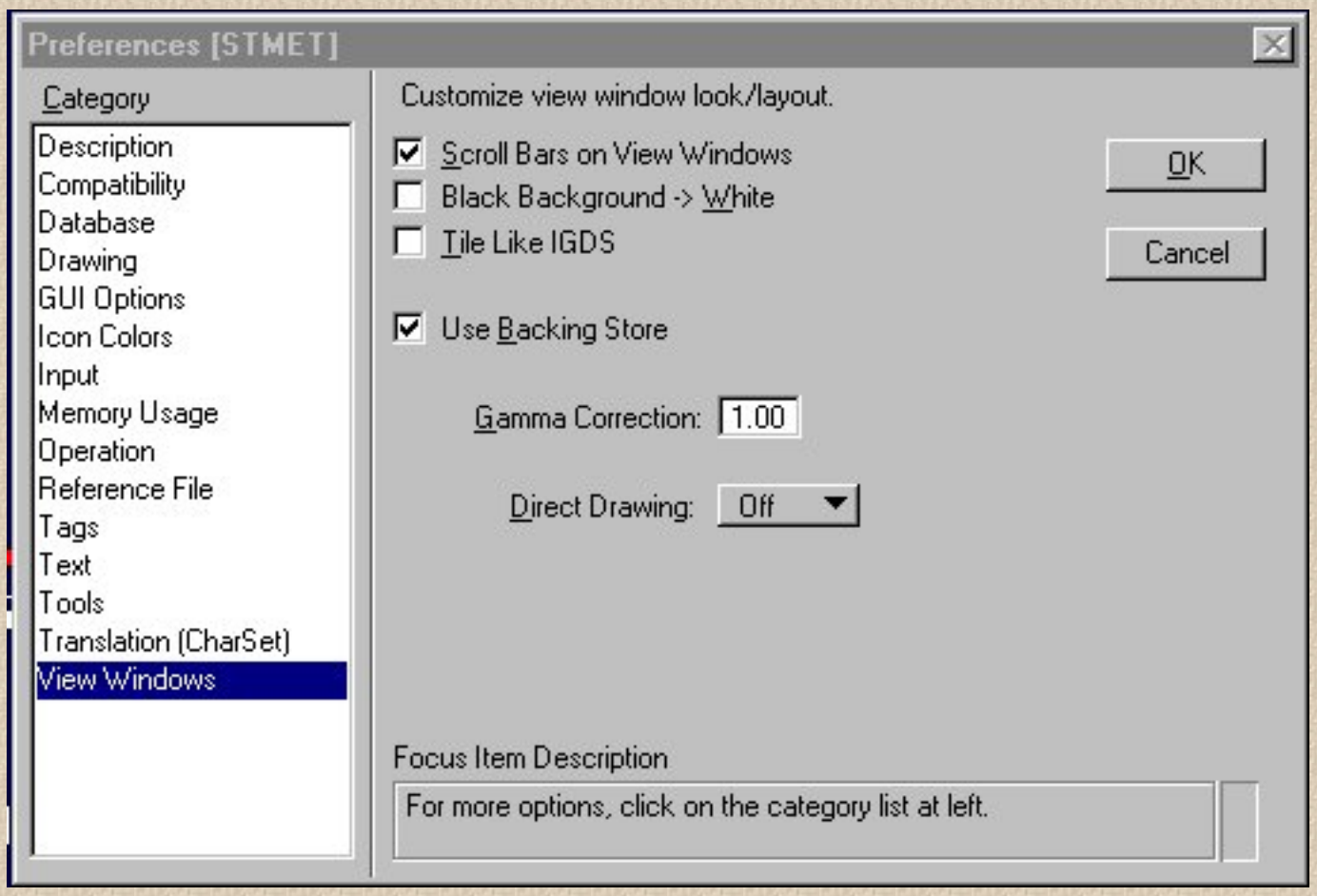

Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Set input preferences.
Start in Parse All Mode
Disable Drag Operations
Control+Z to Exit
Highlight Selected Elements
OK
Cancel
Focus Item Description
For more options, click on the category list at left.

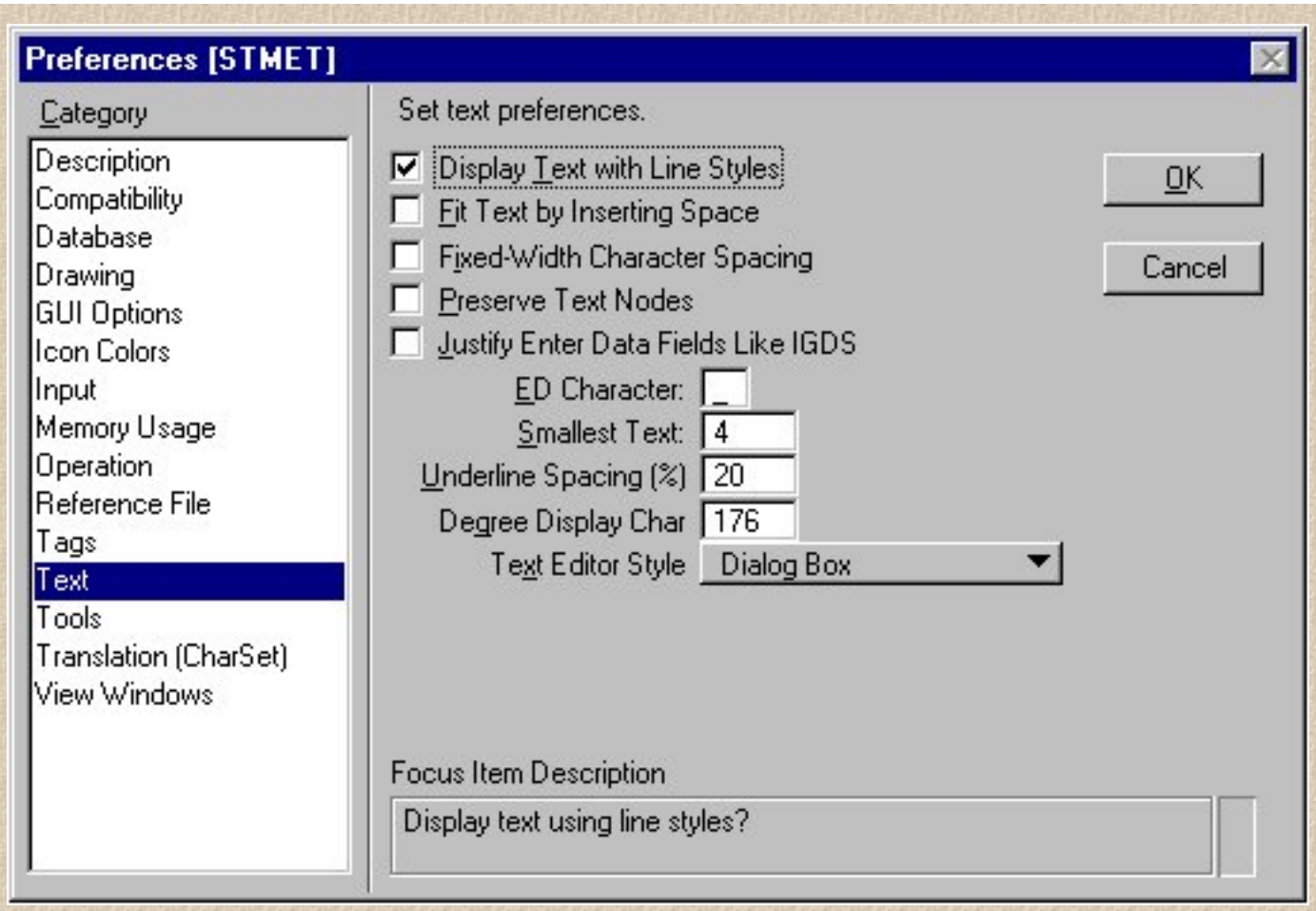

Line Weight Translation
Design : Display
Design : Display
0 : 0
1 : 1
2 : 2
3 : 3
4 : 4
5 : 5
6 : 6
7 : 7
8 : 8
9 : 9
10 : 10
11 : 11
12 : 12
13 : 13
14 : 14
15 : 15
16 : 16
17 : 17
18 : 18
19 : 19
20 : 20
21 : 21
22 : 22
23 : 23
24 : 24
25 : 25
26 : 26
27 : 27
28 : 28
29 : 29
30 : 30
31 : 31
Scale
1:1
1.5:1
2:1
Screen
Right
Left
Save
Apply
Revert
Done

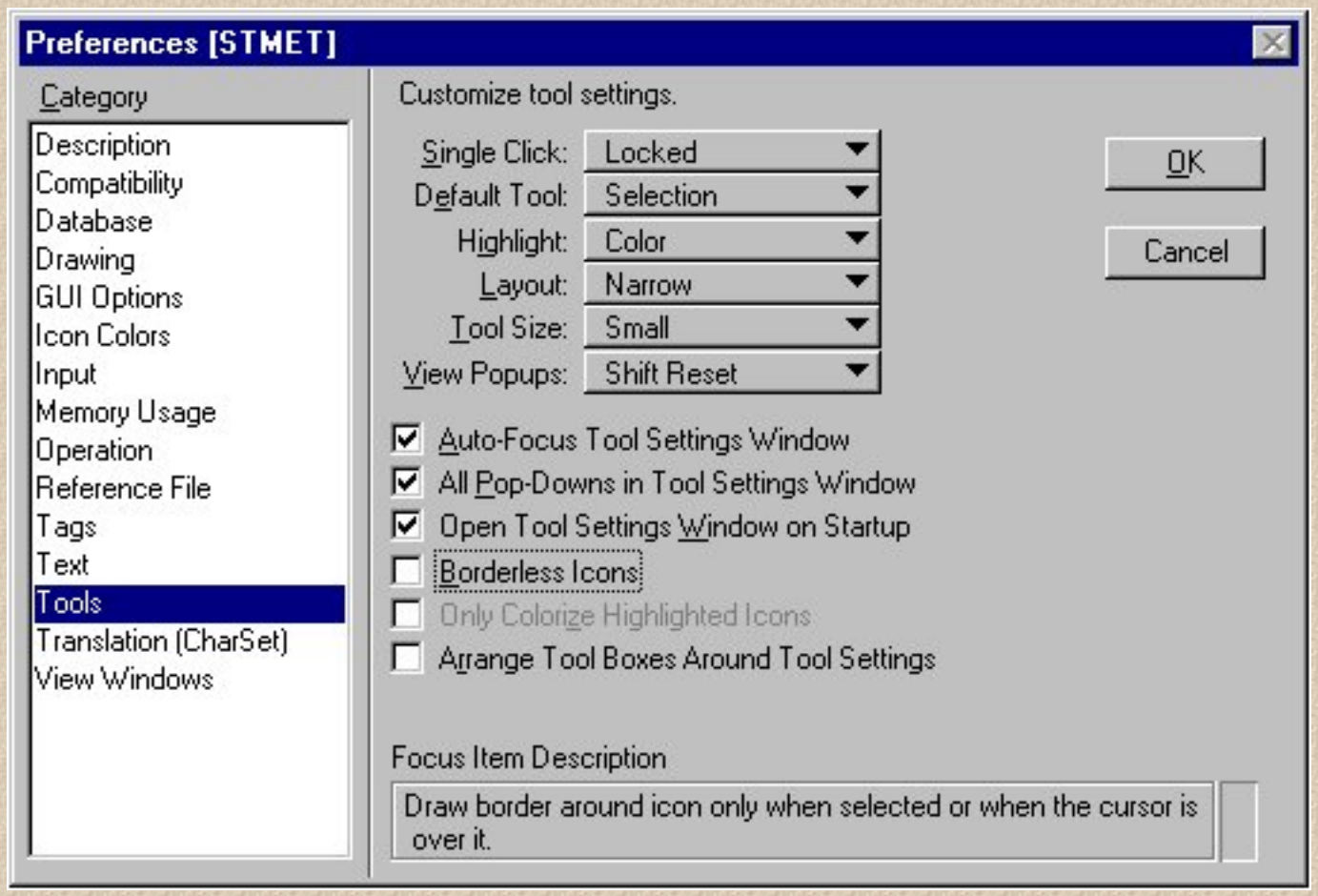

Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Set memory usage preferences.
Max. Element Cache: 8000
Resource Cache: 24
Undo Buffer: 256
Font Cache: 30
OK
Cancel
Conserve Memory
Disable OLE Automation
Focus Item Description
Conserve memory by not using range tree?


Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Customize operational preferences.
Locate Tolerance: 10
OK
Cancel
Pointer Size: Normal
Pointer Type: Orthogonal
Display Levels: Names
Immediately Save Design Changes
Save Settings on Exit
Compress Design on Exit
Enter into Untitled Design
Reset Aborts Fence Operations
Level Lock Applies for Fence Operations
Use Semaphore File for Locking
Focus Item Description
Location tolerance.


Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Set reference file preferences.
Locate On When Attached
Snap On When Attached
Use Color Table
Use Level Names
Cache When Display Off
Reload When Changing Files
Save Settings to Save Changes
Ignore Update Sequence
Store Full Path When Attached
Update Self Attachments
Max. Ref. Files: 255
Nest Depth 0
OK
Cancel
Focus Item Description
For more options, click on the category list at left.


Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Customize view window look/layout.
Scroll Bars on View Windows
Black Background -> White
Tile Like IGDS
Use Backing Store
Gamma Correction: 1.00
Direct Drawing: Off
OK
Cancel
Focus Item Description
For more options, click on the category list at left.


Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Set text preferences.
Display Text with Line Styles
Fit Text by Inserting Space
Fixed-Width Character Spacing
Preserve Text Nodes
Justify Enter Data Fields Like IGDS
ED Character: _
Smallest Text: 4
Underline Spacing (%) 20
Degree Display Char 176
Text Editor Style Dialog Box
OK
Cancel
Focus Item Description
Display text using line styles?


Preferences [STMET]
Category
Description
Compatibility
Database
Drawing
GUI Options
Icon Colors
Input
Memory Usage
Operation
Reference File
Tags
Text
Tools
Translation (CharSet)
View Windows
Customize tool settings.
Single Click: Locked
Default Tool: Selection
Highlight: Color
Layout: Narrow
Tool Size: Small
View Popups: Shift Reset
Auto-Focus Tool Settings Window
All Pop-Downs in Tool Settings Window
Open Tool Settings Window on Startup
Borderless Icons
Only Colorize Highlighted Icons
Arrange Tool Boxes Around Tool Settings
OK
Cancel
Focus Item Description
Draw border around icon only when selected or when the cursor is over it.

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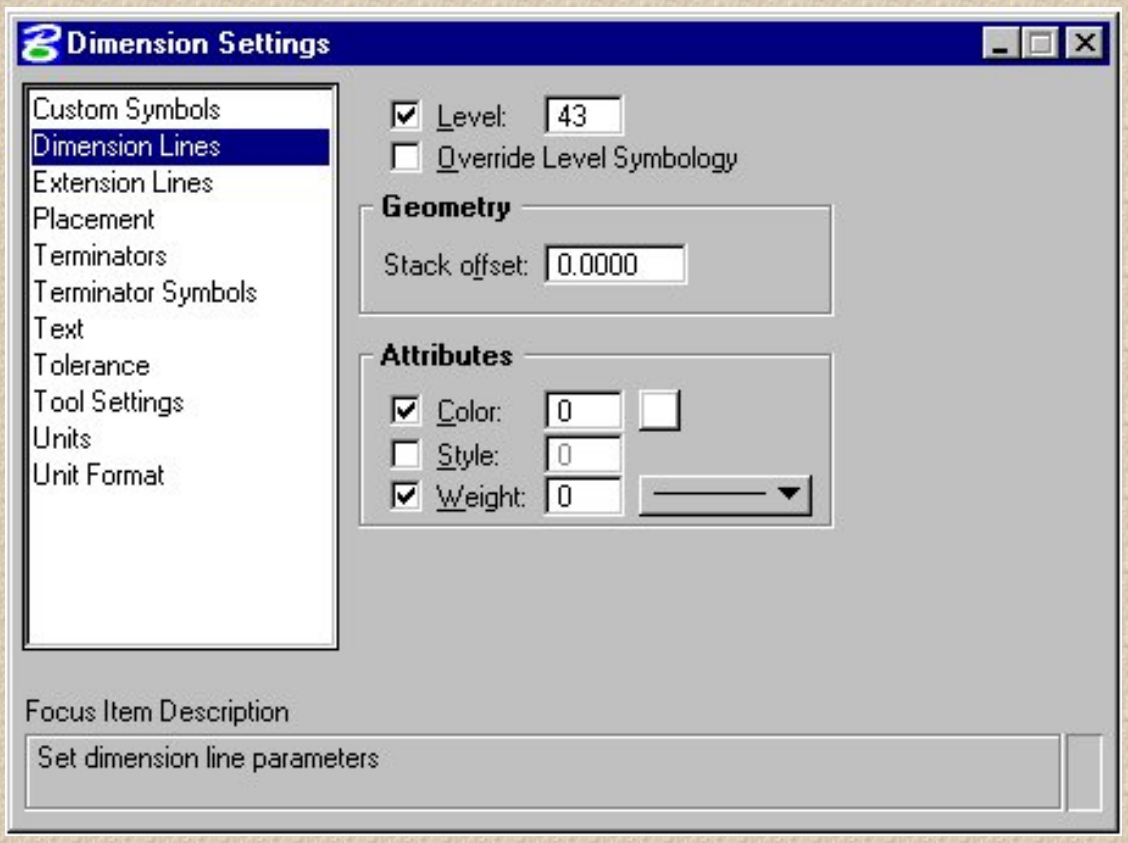
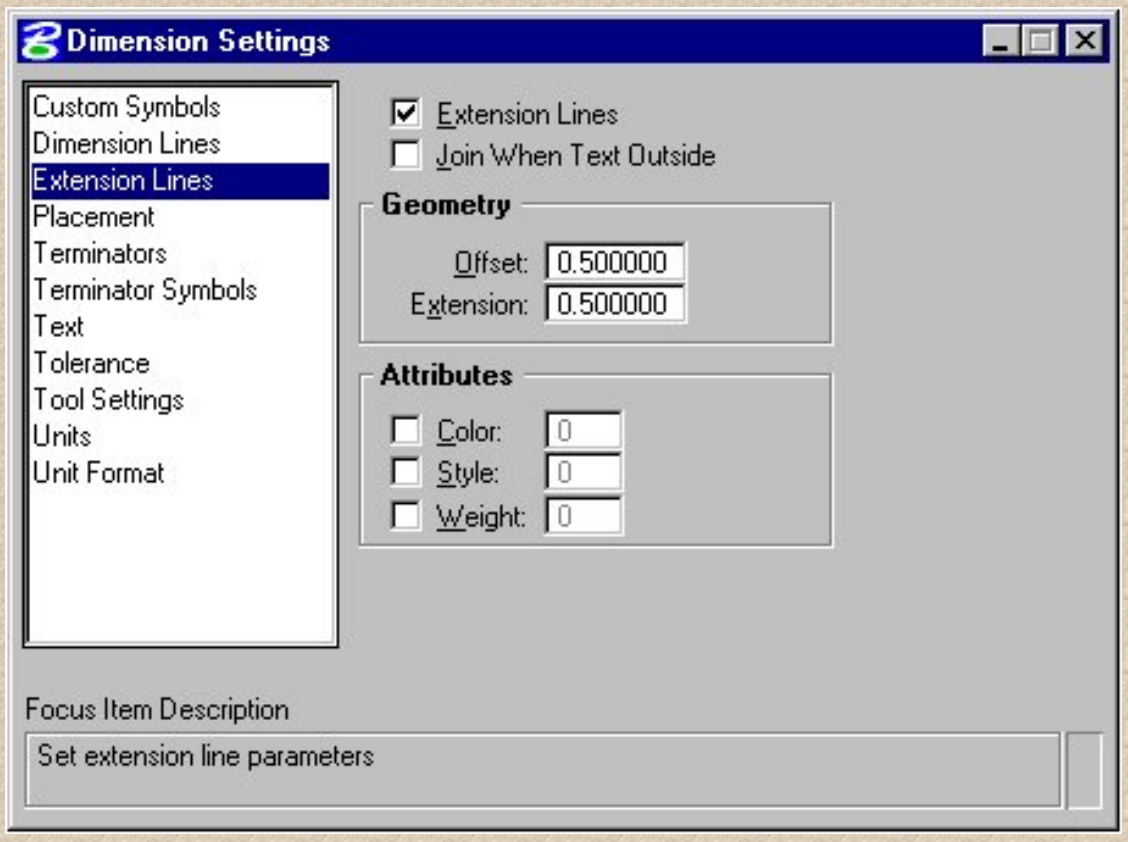
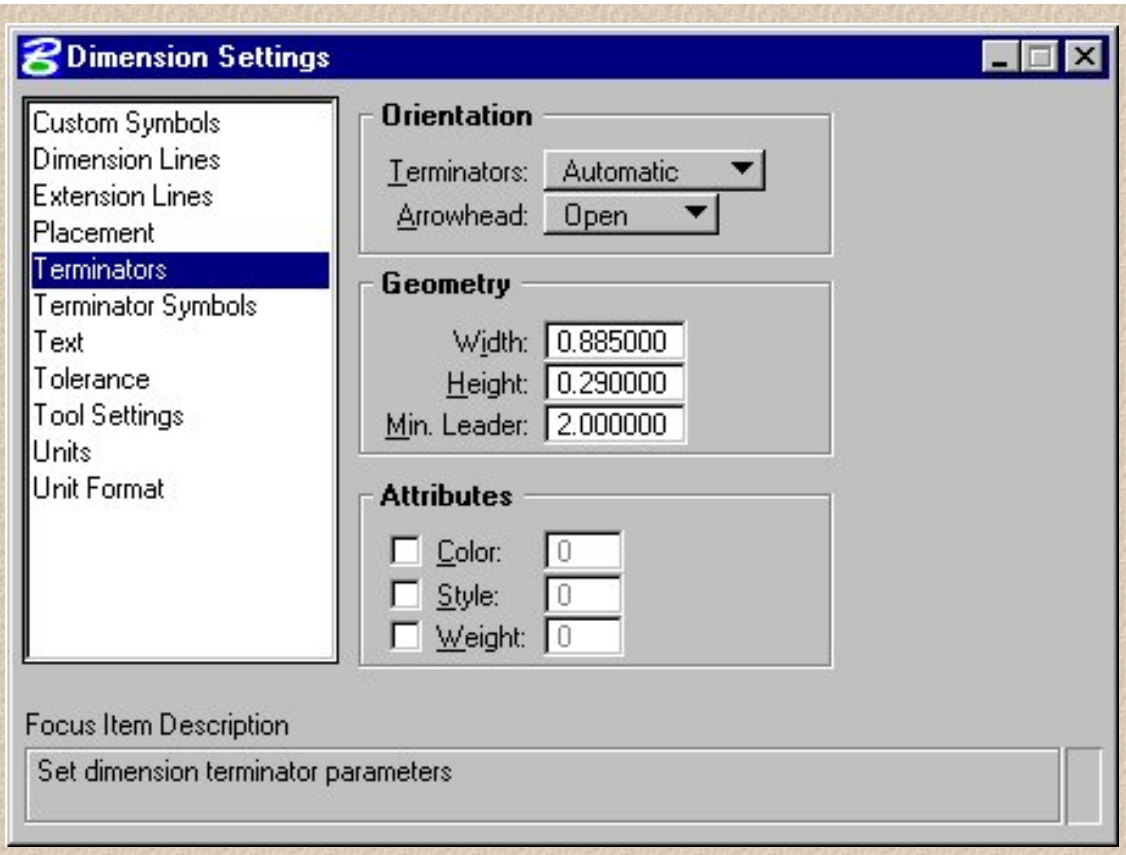
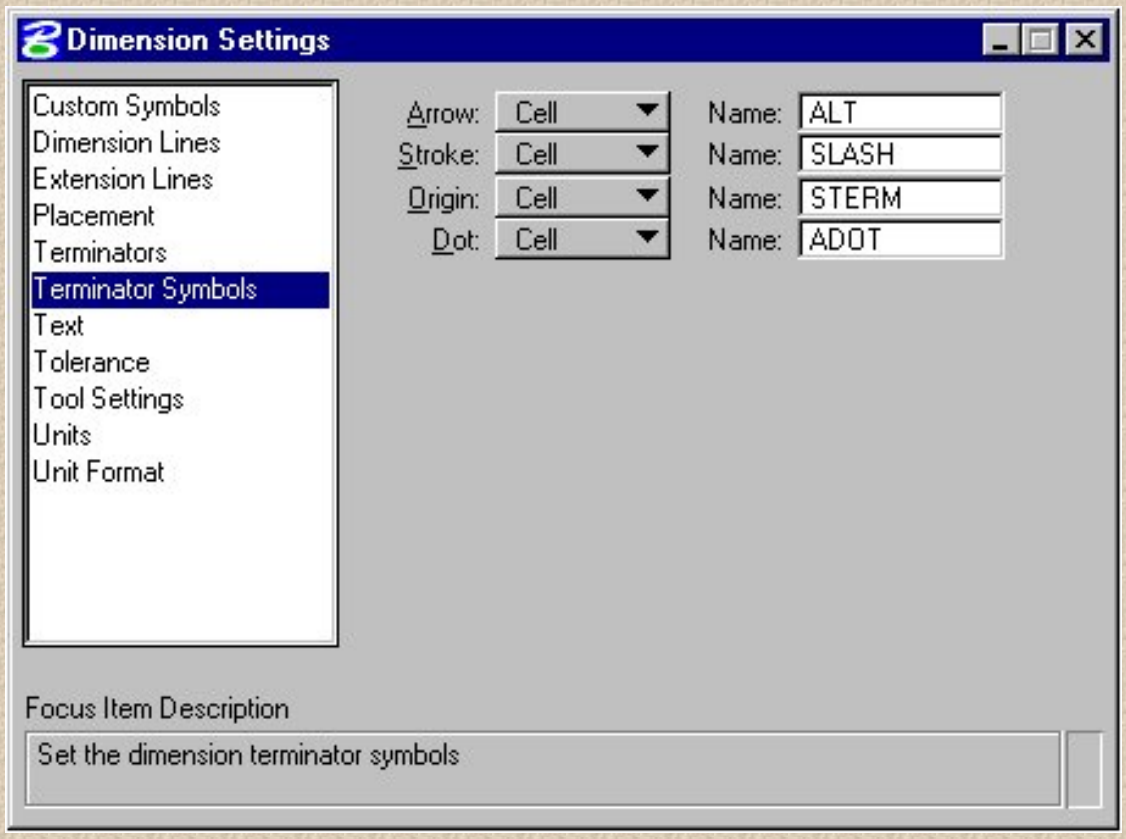
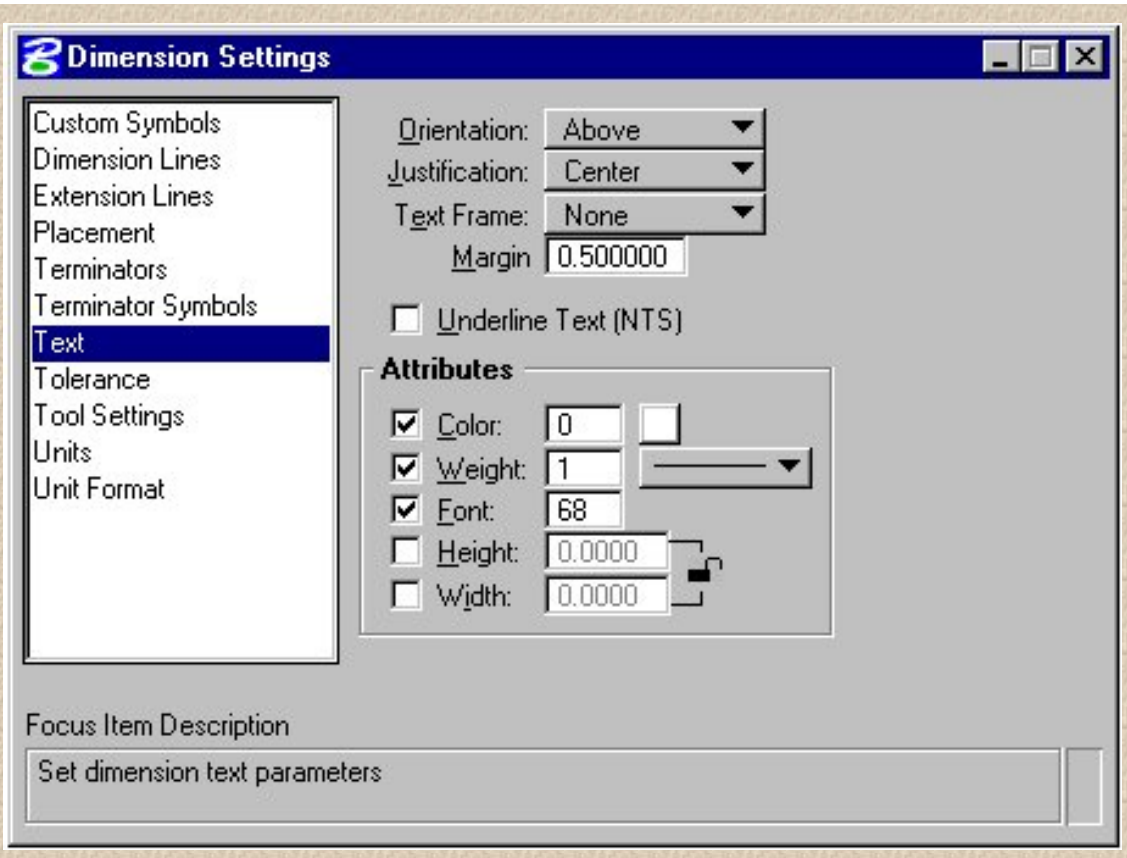
Dimension Settings

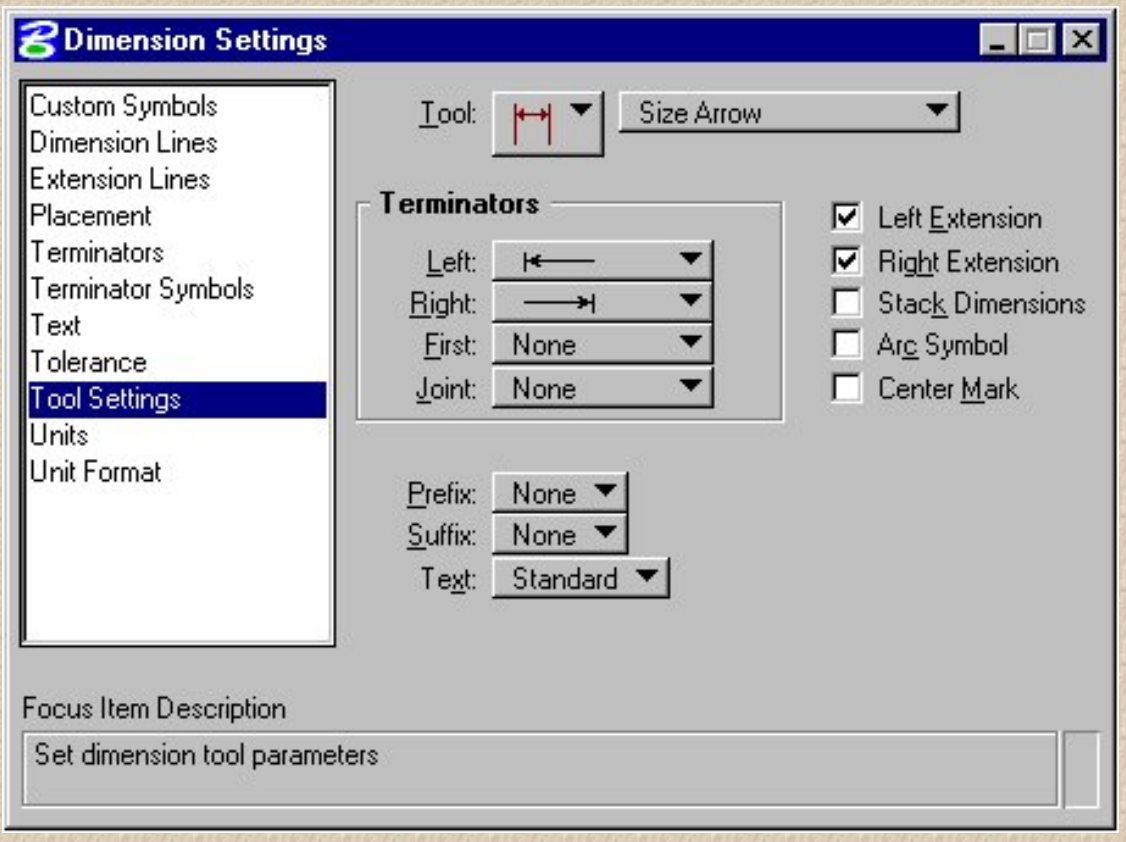


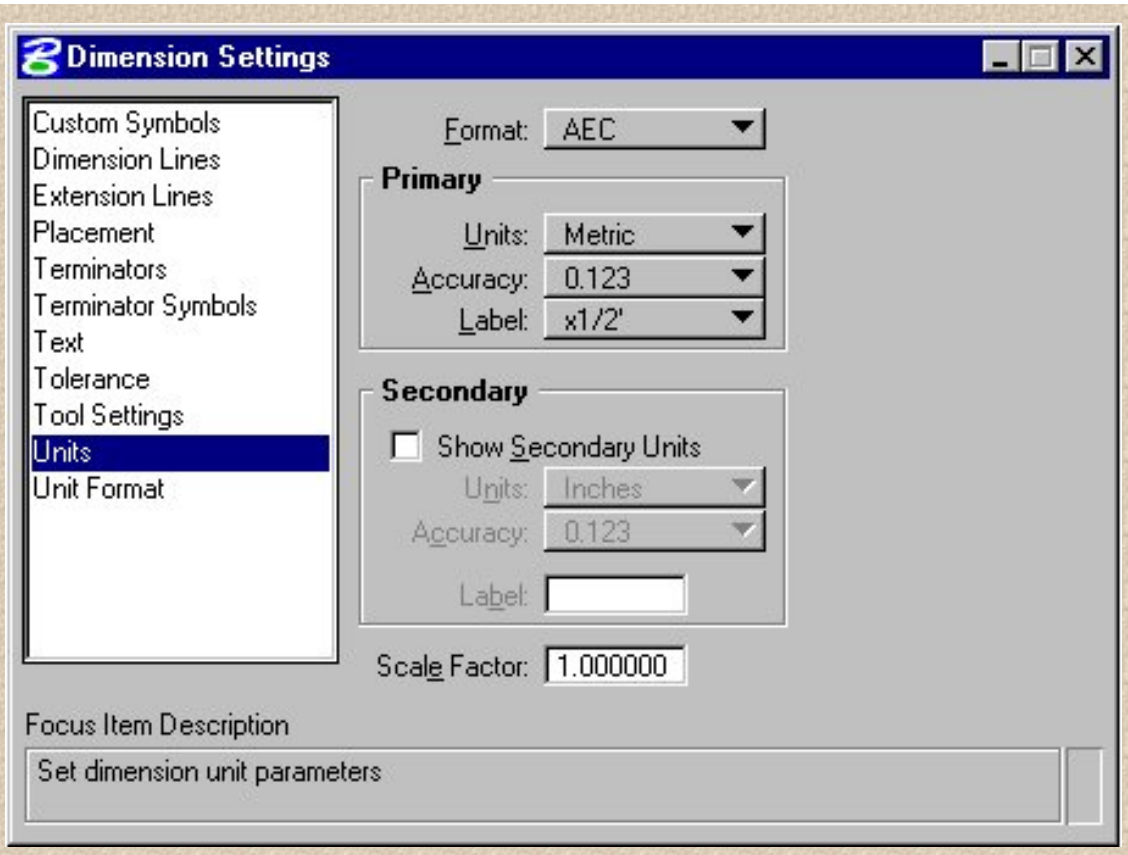


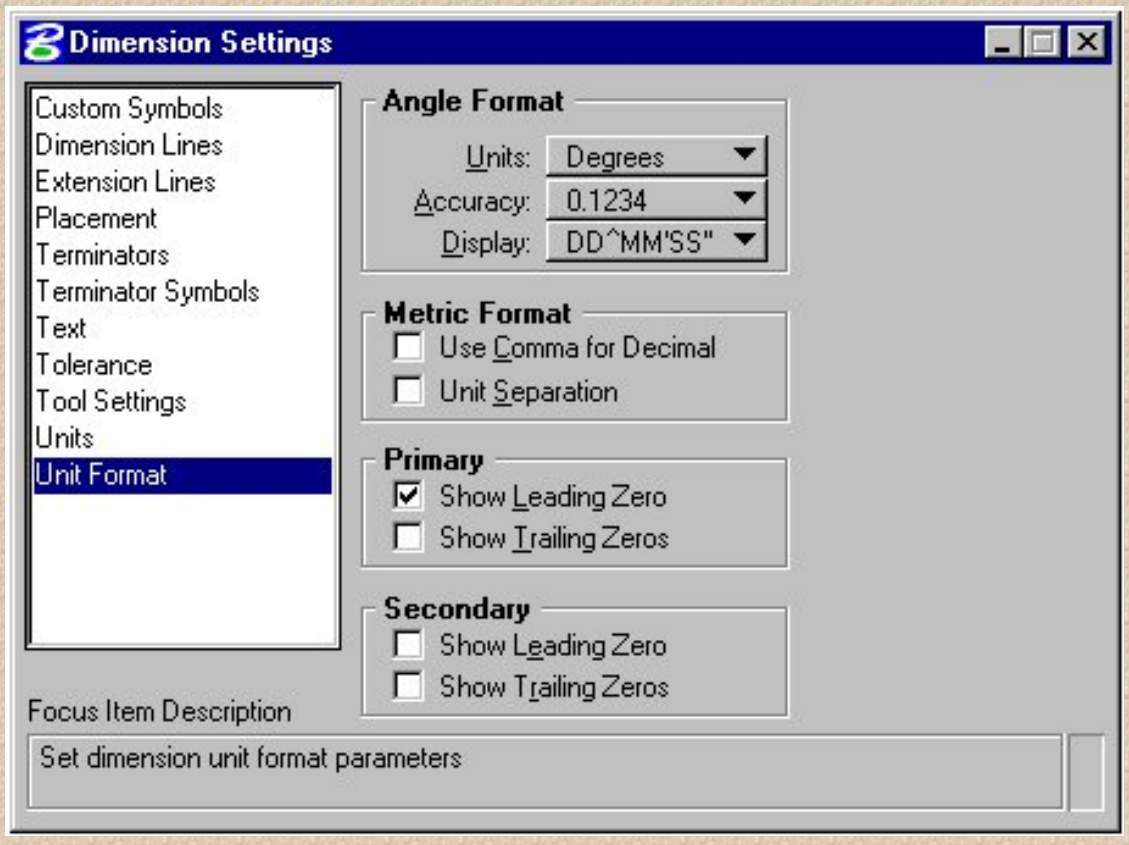

Dimension Settings
Custom Symbols
Dimension Lines
Extension Lines
Placement
Terminators
Terminator Symbols
Text
Tolerance
Tool Settings
Units
Unit Format
Orientation
Terminators: Automatic
Arrowhead: Open
Geometry
Width: 0.885000
Height: 0.290000
Min. Leader: 2.000000
Attributes
Color: 0
Style: 0
Weight: 0
Focus Item Description
Set dimension terminator parameters


Dimension Settings
Custom Symbols
Dimension Lines
Extension Lines
Placement
Terminators
Terminator Symbols
Text
Tolerance
Tool Settings
Units
Unit Format
Arrow: Cell Name: ALT
Stroke: Cell Name: SLASH
Origin: Cell Name: STERM
Dot: Cell Name: ADOT
Focus Item Description
Set the dimension terminator symbols


Dimension Settings
Custom Symbols
Dimension Lines
Extension Lines
Placement
Terminators
Terminator Symbols
Text
Tolerance
Tool Settings
Units
Unit Format
Orientation: Above
Justification: Center
Text Frame: None
Margin 0.500000
Underline Text (NTS)
Attributes
Color: 0
Weight: 1
Font: 68
Height: 0.0000
Width: 0.0000
Focus Item Description
Set dimension text parameters


Dimension Settings
Custom Symbols
Dimension Lines
Extension Lines
Placement
Terminators
Terminator Symbols
Text
Tolerance
Tool Settings
Units
Unit Format
Tool:
Size Arrow
Terminators
Left:
Right:
First: None
Joint: None
Left Extension
Right Extension
Stack Dimensions
Arc Symbol
Center Mark
Prefix: None
Suffix: None
Text: Standard
Focus Item Description
Set dimension tool parameters





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Level Symbology

ELEMENT	LEVEL	COLOR	WEIGHT	STYLE
Reinforcing Steel	46	4 Yellow	1	0
Concrete(Solid)	40	2 Green	3	0
Concrete (Hidden)	40	2 Green	2	2
Centerline	39	3 Red	0	7
Existing Structure (Solid)	41	3 Red	0	3
Existing Structure (Hidden)	41	3 Red	0	2
Structural Steel (Solid)	42	6 Orange	1	0
Structural Steel (Hidden)	42	6 Orange	0	2
2D Text, Dimensions	43	0 White	Varies	0
3D Text, Dimensions	Top 54 Front 53 Rt,Lt 55	0 White	Varies	0
Prestressing Steel	44	4 Yellow	1	0
Post-Tensioning Steel	45	4 Yellow	1	0
Miscellaneous (Solid)	50	3 Red	0	0
Miscellaneous (Hidden)	50	3 Red	0	2
Border	51	0 White	Varies	0
MISCELLANEOUS ITEMS				
Timber	30	10 Brn	2	0
Timber (Hidden)	30	10 Brn	1	3
Navigation Lights & Acces.	15	7 Cyan	1	0
Navigation Lights & Acces. (Hidden)	15	7Cyan	0	3
Conduit, Junction Boxes, Pull Boxes & Acces.	14	7 Cyan	1	0
Conduit, Junction Boxes, Pull Boxes & Acces. (Hidden)	14	7 Cyan	1	3
Riprap, Sand-Cement, & Rubble	50	3 Red	1	0
Riprap, Sand-Cement, & Rubble (Hidden)	50	3 Red	0	3
Slope Pavement	40	3 Green	3	0
Slope Pavement (Hidden)	40	3 Green	2	3
SITE ITEMS				

Electric Lines	10	3 Green	1	3
Fence	43	6 Orange	1	0
Gas Lines	10	0 white	1	3
R/W Line	37	0 White	2	0
Sewer Lines	10	3 Green	1	3
Telephone Lines	10	6 Orange	1	3
Water Lines	10	7 Cyan	1	3
Electric Lines	10	3 Green	1	3

Colors: colors are dependent upon your design file color table. "Bar.tbl" has the above colors, therefore it is important that "bar.tbl" is loaded.

Text Size: Annotation = 0.0035 m x (Active Scale). The Structures CADD barmenu contains all needed text sizes. The absolute minimum text size after plotting shall be 3.5mm (Fullsize Plans). This is the smallest text size you should use on plans due to "half-sizing"

NEW TEXT SIZES AND WEIGHTS

TITLE	LEROY SIZE	WEIGHT	METRIC SIZE
Special Small	120	0	.0030 m
Annotation	140	1	.0035 m
View/Sheet/Sect Titles	175	2	.0044 m
Large	200	3	.0050 m
Extra Large	250	3	.0060 m

NOTE: Sizes shown are a 1:1 ratio.

All standard text sizes may be selected from the barmenu. FDOT uses special, custom fonts in its drawings and programs, specifically, Fonts 68 and 69. When a Consultant purchases a set of Standard Drawing files, a font library is included so text will display correctly. We also use special symbols that are part of the Structures font library. For example, in Font 68, if you key in a question mark, the result will be a Roman numeral 1 on the screen. The symbols are listed below:

!	Roman Numeral 5
?	Roman Numeral 1

\	diameter mark
^	degree mark
|	centerline
1/32	baseline
1/64	plate
3/64	plus/minus sign
5/64	meters squared
7/64	meters cubed

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Metric Scales

The following Chart is intended to aid the User in determining the appropriate scale for placing the Border and Text on a Drawing based on the Actual size of the Drawing. Calculations are based on a 0.495 m x 0.813 m Drawing Area on the Border.

HEIGHT m	WIDTH m	ACTIVE SCALE AS	DRAWING SCALE	PLOT SCALE PS
0.495	0.813	1	1 : 1	0.001
0.366	0.99	2	1 : 2	0.002
2.475	4.065	5	1 : 5	0.005
4.950	8.13	10	1 : 10	0.01
7.425	12.195	15	1 : 15	0.015
9.900	16.26	20	1 : 20	0.02
12.375	20.325	25	1 : 25	0.025
14.850	24.39	30	1 : 30	0.03
19.800	32.52	40	1 : 40	0.04
24.750	40.650	50	1 : 50	0.05
29.700	48.78	60	1 : 60	0.06
34.650	56.91	70	1 : 70	0.07
37.125	60.975	75	1 : 75	0.075
39.600	65.04	80	1 : 80	0.08
49.500	81.3	100	1 : 100	0.1
74.250	121.95	150	1 : 150	0.15
99.000	162.6	200	1 : 200	0.2
123.750	203.25	250	1 : 250	0.25
148.500	243.9	300	1 : 300	0.3
198.000	325.2	400	1 : 400	0.4

247.500	406.5	500	1 : 500	0.5
340.000	650.4	800	1 : 800	0.8

FORMULAS :
AS = 1 x Drawing Scale
ex. 1 : 10, then 1 x 10 = 10, Therefore AS = 10.

PS = Drawing Scale / 1000
ex. 1: 10, then 10 / 1000 = .010, Therefore PS = .010.

W = Sheet Width (m) x Drawing Scale
ex. 1 : 10, then 0.813 m x 10 = 8.130 m, Therefore W = 8.130 m.

H = Sheet Height (m) x Drawing Scale
ex. 1 : 10, then 0.495 m x 10 = 4.950 m, Therefore H = 4.950 m.

METRIC:
Metric plans production an appropriate method in laying out drawings. Scales are slightly larger than in English, so less will be shown on each sheet. This will mean a set of plans will probably have 20-30 percent more sheets. Details previously shown on the main member sheet, are now shown on an additional sheet. The table below depicts the relationship of metric scales English scales for individual sheets.

SUGGESTED METRIC DRAWING SCALES

SHEET TYPES	METRIC SCALES	REMARKS
PILE BENTS PIERS SUBSTR. DETAILS	1:25 1:30 1:10	Close to 1/2" Close to 3/8" Between 1" & 1 1/2"
SUPERSTRUCTURES SUPERSTR. DETAILS	1:50 1:75 1:25 or 1:10	Close to 1/4" Close to 3/16"
PLAN AND ELEVATION, FOUNDATION LAYOUT, FINISH GRADES, FRAMING PLANS, GIRDER DETAILS	1:200 1:250 1:300 1:500	Close to 1/16" Close to 20 scale Between 20 & 30 Close to 40 scale

The scales listed above are only suggestions. Each individual sheet will have to be prepared based on its size and details to be shown.

WORKING UNITS:
The working units for our FDOT CADD files will be meters (Master Units) and millimeters (Sub Units).
Master Units = meters
Sub Units = 1000 (millimeters)
Positional Units = 200

HALFSIZE PLANS:
Halfsize plans dictate that we deliver a concise and readable product. To give us a more readable sheet when plotted at halfsize, annotation text size and weight have been increased.

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Structures Menu Bar

(BARMENU)

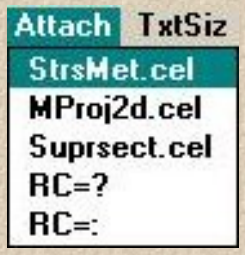
When you load the Structures CADD Setup you will receive the FDOT custom "MDL" application, barmenu.ma. The following text explains the general use of the Structures menubar.

DESCRIPTION OF MENU BAR SPECIFICS:

Upon loading the Structures CADD software, the Structures Barmenu is loaded.

Menubar items are shown as twelve separate pull-down menus, "Attach" through "Locks". The following pages are a description of each feature included in the menus. These pull-downs are hierarchal in nature and cannot be "torn" away.

ATTACH Menu Item



StrsMet.cel - attaches the Structures metric cell library

MProj2d.cel - attaches the users metric 2d project cell library

Suprsect.cel - attaches the Supersection cell library

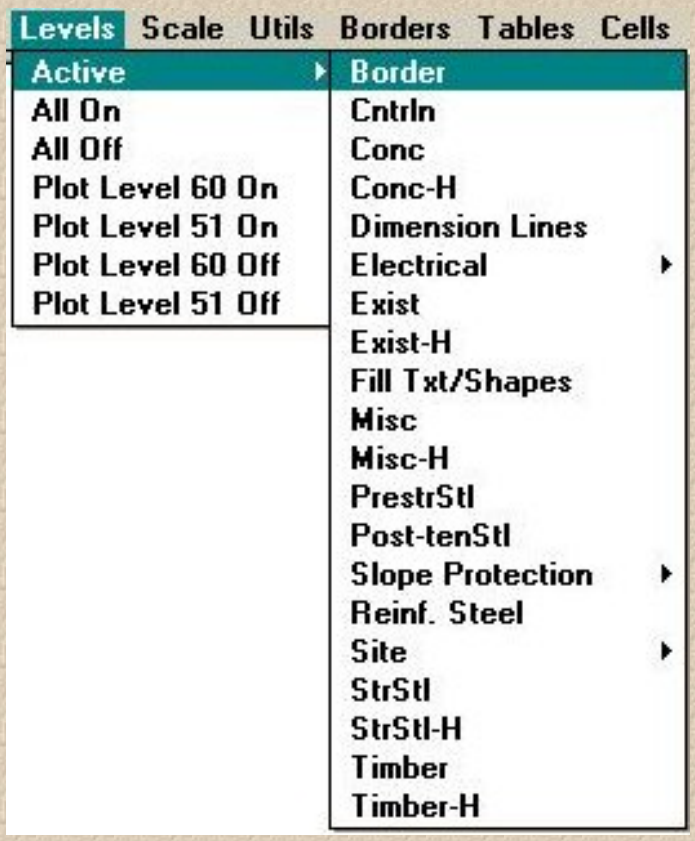
RC=? - returns the currently attached cell library

RC=# - brings up Dialog Box to attach any cell library

TXTSIZ Menu Item

Using the TXTSIZ pull-down keeps the drawing text within standards as set by the Structures office. Be sure to select the Border scale before selecting your text size ! (See "Scale" Menu Item).

LEVELS Menu Item



This menu provides most of the level symbology needed to produce plans that comply with the Structures CADD Standards. These selections will set your color, level, style and weight for each type of classification. Also provided is a quick "all levels on" and "all levels off" selection as well as Plot Level 60 (shape) and Plot Level 51 (linestring) ON/OFF to keep from having to key in "on=" and/or open the "levels" dialog box.

SCALE Menu Item

These are the scales our users have requested to use. They include the obvious ones and some unusual ones (ie. 15, 120 and 150). A scale should be selected before setting text size, choosing a line terminator, before placing cell (other than ones intended to be placed at "AS=1"), and before placing the border.

UTILS Menu Item

The "Utils" pull-down is a collection of user commands and MDL applications.

Set Active Ang 2pts - sets the active angle to the angle between two user defined input data points.

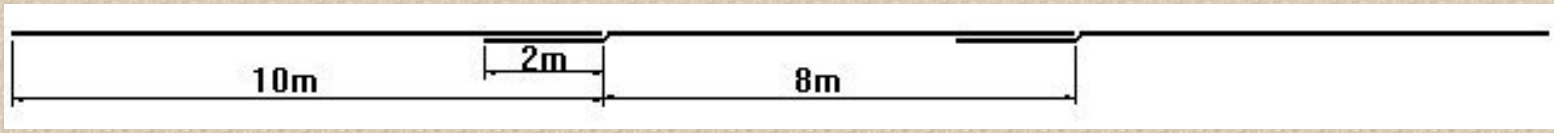
Set Active Ang 3pts - sets the active angle to the angle between three user defined input data points

Engineer of Record - Choose your active scale first, then choose the Engineer of Record cell for the district.

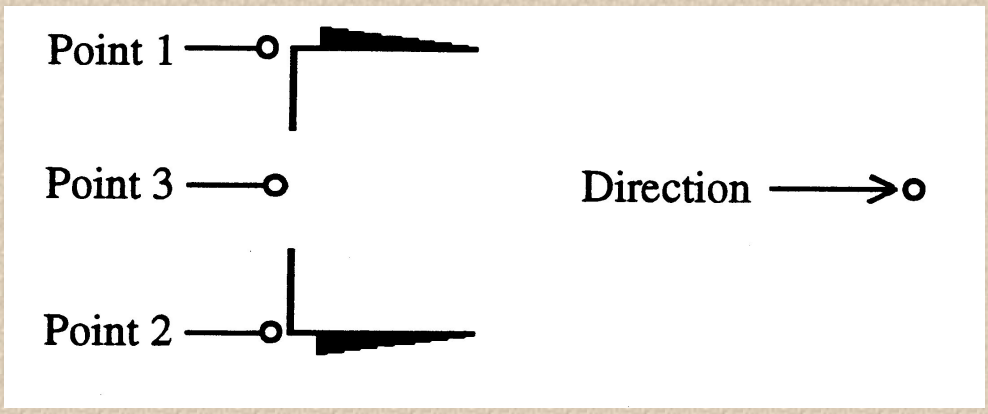
Ground - is a simple Station and elevation placement of a linestring to help draw the "groundline" underneath a bridge or along a cross section. Initiate the command and you will be prompted to select a starting point (this must be an element, not a point in space), accept/reject, key in begin Station, and elevation repeating this procedure to place your entire ground line. You have a choice to reset to start a new

line or quit. Watch your prompts!

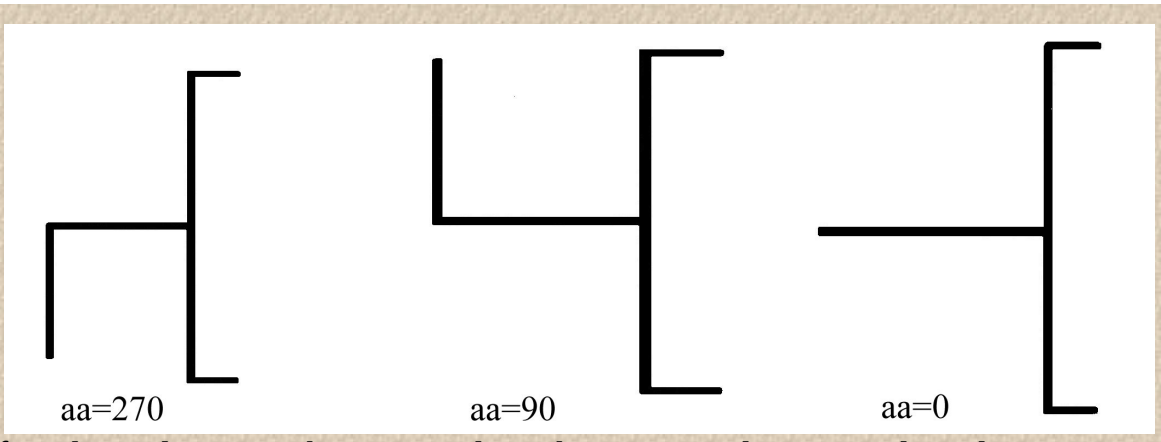
LapBar - is a tool for placing rebar with laps. The first prompt is to key in the angle to place the bars. Next, you make a choice of having a constant or variable lap. Then key in the lap length. Place a data point to start the first bar, key in bar length, then length of next bar. If you had chosen a variable lap you would have been prompted each bar to key in a lap length ! A little more explanation is in order in determining bar lengths. As an example, lets place 3 l0m. long bars with a constant 2m. lap length. Execute the utility and first, key in an angle to place bars, for example "0", and press return. Now, you are prompted for a constant or variable lap, key "1" for constant; press return. Key in lap length, "2"; press return. Place a data point to begin the first bar, then key in the bar length, "10"; press return. You are now prompted to key in the length of the next bar. This is where errors are sometimes made. You would assume the next bar length would be 10 ft. also. This is not true! 10m.. minus the 2m. lap is actually 8m. So, for the program to work properly key in "8"; press return, then "8" and return for the third and final bar. You should end up with a picture like below (dimensions are only for clarity - "LapBar" does not dimension).



SecArr - Section arrows. Places a set of section arrows in an arrangement determined by you. You must have set the correct active scale and attached the Structures Cell library before this will work properly. It works in the following way. Prompts will ask for 4 data points, points 1 and 2 are along the axis of the vertical component of the section arrow, point 3 is the center point between 1 and 2. The 4th point is simply the direction the arrows point.

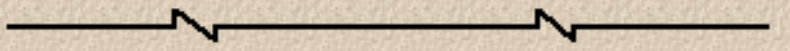


Brack - Bracket. Places a bracket with leader. As you can see from the example below, a bracket can be placed in different ways. You start by selecting the command from the pull-down menu. If you want the beginning leader to point down (left example) you should set aa=270 before executing command. The center example requires an aa=90, and the rightmost example requires an aa=O. The program prompts for the "horizontal" component next as a direction and data-point left or right. A bracket cell is then placed on the end of the horizontal line. This command requires a sensible scale and attachment of the master cell library.



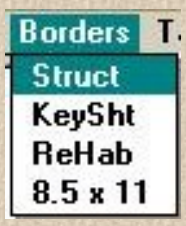
AutoNum - This utility number your piles on a foundation layout with sequenced numbers in a circle once scale and text size are selected. This command can be used for whatever purpose calls for circled numbers.

Breakline - Breakline is a Dimension or Drawing breakline.



Clrtxt - This utility clears extraneous elements away from text so the text is readable. It has two modes". You can tag a text element and lines across the text will be cut and cleared or place a shape around your text and select Clrtxt Shape; all elements within the shape will cut and clear. This does not work on a cell within the cut area. You have to drop status on the cell before it will "cut and clear".

BORDER Menu Item



After selecting the proper scale, you may select the border you wish to place. Typically we draw with the fullsize border and then use the plot system to "halfsize" to 11 x 17.

TABLES Menu Item

These tables should help you with common items such as quantity boxes and geometry data. The horizontal and vertical curve data diagrams have data entry fields in them, so you can fill them in very quickly. Select scale before choosing these. Also, the Structures cell library must be attached.

CELLS Menu Item

This menu item calls the most frequently used cells in the Structures cell library that are not called by some other routine. Some of these cells need to have an active scale set before use, some need to be placed at AS=1. For pile placement there are commands for setting batter angles (See first selection group). If you have any cells which may be useful to everyone as a group, please forward them to Structures CADD Development and Support Section for inclusion into the master..

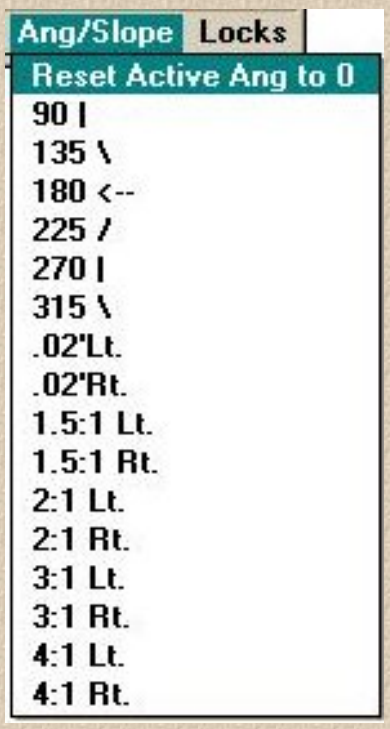
TERM Menu Item

These are line terminators. The appropriate scale must be set before use. Terminators can be used individually or with auto-dimensioning. Note: if you are using a scale other than one chosen form the Scales menu, the Terminator Scale (TS=) must be set manually.

PATTERNS Menu Item

Select the proper scale and attach the strs cell library before selecting a pattern command. These patterns are set up for typical use on a set of bridge plans. The pattern deltas and pattern scales present a suitable pattern at the commonly used active scales for detailed reinforcing drawings. If a particular pattern is too "thick" and/or thin, choose a different scale and re-pattern. Patterning should have a similar appearance throughout the set of plans.

SLOPES Menu Item



These are some of the common angles or slopes that occur on FDOT drawings. A command to reset the active angle to zero is included at the top of the menu.

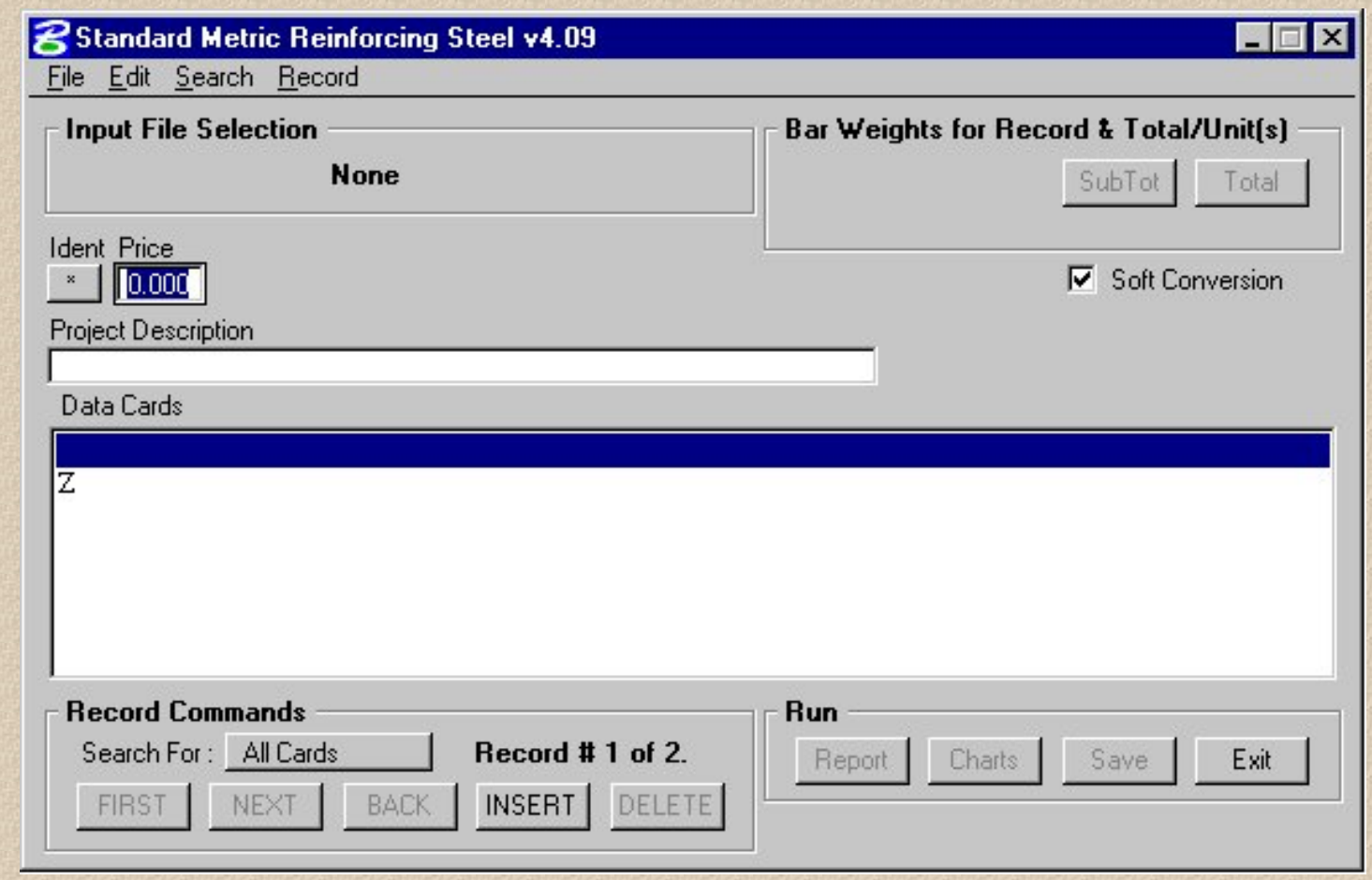
LOCKS Menu Item

The Locks menu item is a convenient way to access the most used Locks and Fence modes.

Metric Reinforcing Steel Quantity Program

(MREBAR)

MREBAR is a MDL application for use with MicroStation 5.x/95. The program will calculate individual bar lengths and total up individual units (end bents, superstructures and etc). Reports can be generated and printed for use in final computation book. All bar bends are based on the Structures Design Office Standard Index 1300. The Strsmet.cel must be attached to the current design file.



Program Operation:
After starting MicroStation start Mrebar by selecting the program from the Structures Menu bar or you can key-in "mdl load mrebar". Once started, open an existing file by selecting the file open option. This allows you to open an existing input file. A sample input file is delivered with program.

Pull-down Menus:

File:	Files may be opened, saved, edited or the program may be exited.
Edit:	Allows for full screen edit sessions of input files.
Search:	Allows the user to search for a particular type of code.

Record: Allows the user to go to a particular record in the input file.

Soft Conversion: Allows the user to choose between soft converted metric bars and true metric bars. Enable this box to use "soft" bar sizes.

Price: Allows the user to insert a price per kg in the Unit Code. The program

Input Codes:

D - Data Code Data codes are the reinforcing bars.

V - Vary Code A vary code is used to indicate a range of bars that vary in length.

*** - Identification Code** This code is used to give job number, county or whatever

U - Unit Code Used to define the type of unit being coded.(ie. End Bent, wall etc.)

K - Skip Code This code is used to show a blank line in the input.

C - Comment Code Use this code for any comment you might want to show.

Z - Z Code Indicates End of Data.

RECORDS COMMANDS:

Search Allows the user to search for a particular record or type of record.

First: Move to first record in input file.

Next: Move to next record in input file.

Back: Move to previous record in input file

Insert: Allows the user to Insert a new record.

Delete: Deletes the current record.

RUN:

Report: Executes the MREBAR program and creates a report (RPT) file for Reinforcing details. A report (RPT) file must be created before the Chart command can be used. (see Chart command below)

Charts: Creates the Charts from the current report (RPT) file. (See Report command above)

Save: Save any changes you may have made to the input file.

Exit: Exits the MREBAR program.

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Geometric Solution of Highway Bridges

(Georgia Skew)

Using the Georgia Skew Program to create drawings is a two step process. First, input is entered into the Georgia Skew program that generates a report. Second the Georgia Skew MDL application is run using this report to produce a drawing.

Georgia Skew Program Operation:

A new windows program is available to help build input files for the Georgia Skew program, the file name for this program is GSKBLD.EXE and comes with the Georgia Skew package when downloaded from the Intranet or Internet. This program does not have to be used, input files can be build using a standard text editor to input column specific data, the file builder program just makes it easier to enter column specific data. The Georgia Skew program manual is still needed to understand how to code bridge input and in what order the input is expected.

Using the Georgia Skew File Builder Program:

Run the file GSKBLD.EXE to start the file builder program, then you will be presented with a standard windows program interface that lets you open and/or save program data. (Fig. 1).

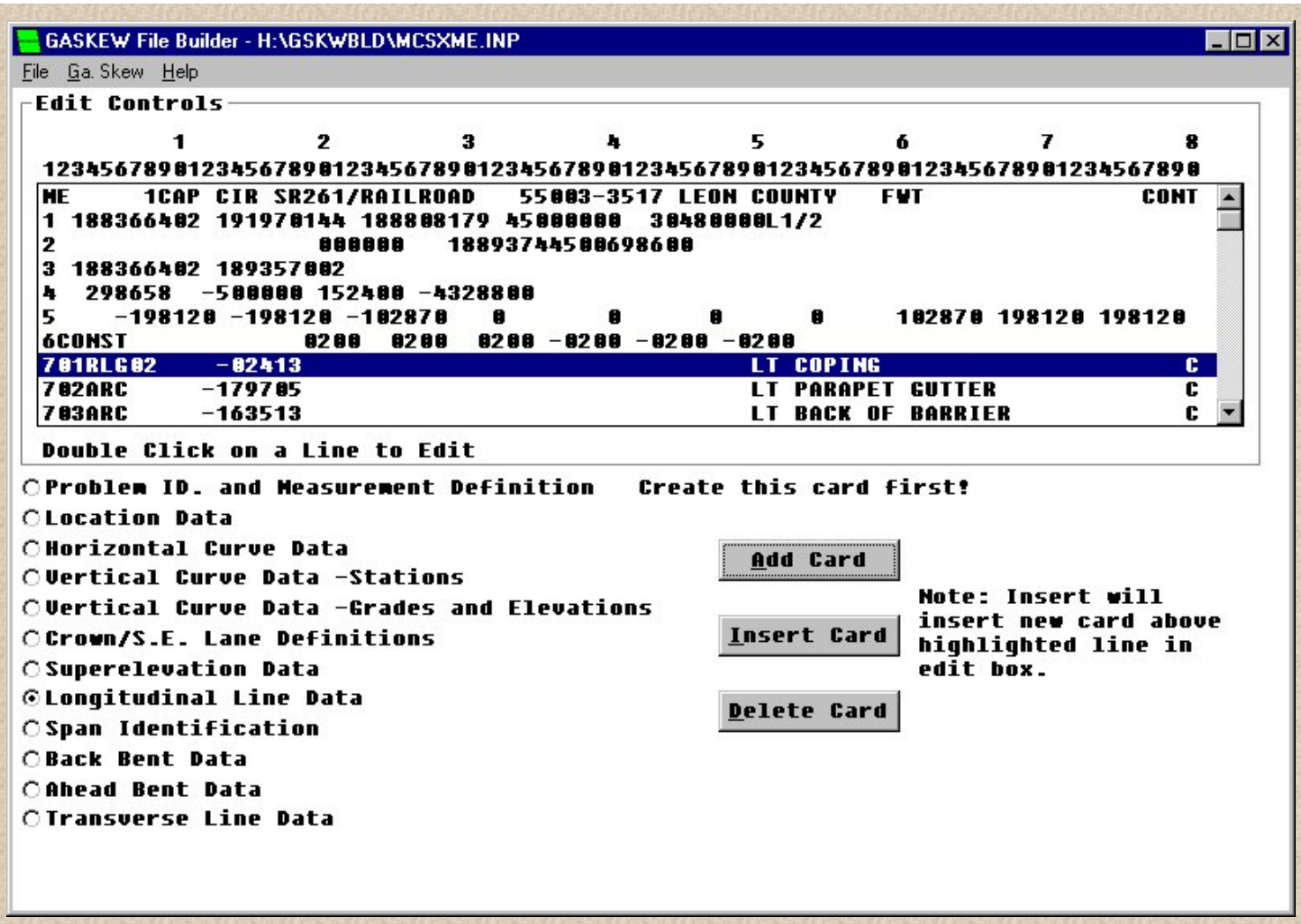


Figure 1 shows an input file loaded into the program. Along the top of the edit box you will see the corresponding card column each piece of data is placed in. Each line in the box corresponds to one input card image.

To create a new card, choose the type of card to create from the list on the bottom left of the program screen and then press the Add Card button. A dialog box will appear asking for the pertinent card data. When finished entering data, press the OK button to keep the data or Cancel to discard the data. If OK is pressed, the card will be added to the end of the card list.

To insert a card into the card list, first highlight in the card list box the card which you would like the new card to be inserted above. Next, choose the type of card you would like to insert from the list on the bottom left of the program screen and then press the Insert Card button. A dialog box will appear asking for the pertinent card data. When finished entering data press the OK button to keep the data or Cancel to discard the data.

To edit an existing card just double click on the card in the card list and a dialog box will appear with the current data loaded. Change the data you need and then press OK to commit your changes or Cancel to disregard changes.

To delete a card just highlight the card in the card list you would like to delete and press the Delete Card button. You will need to acknowledge that you want the card deleted.

Once input is completed, save your file and then from the Georgia Skew menu, choose Make Report to create an output report. This report is the file the Georgia Skew MDL uses to create MicroStation drawings. Once the report

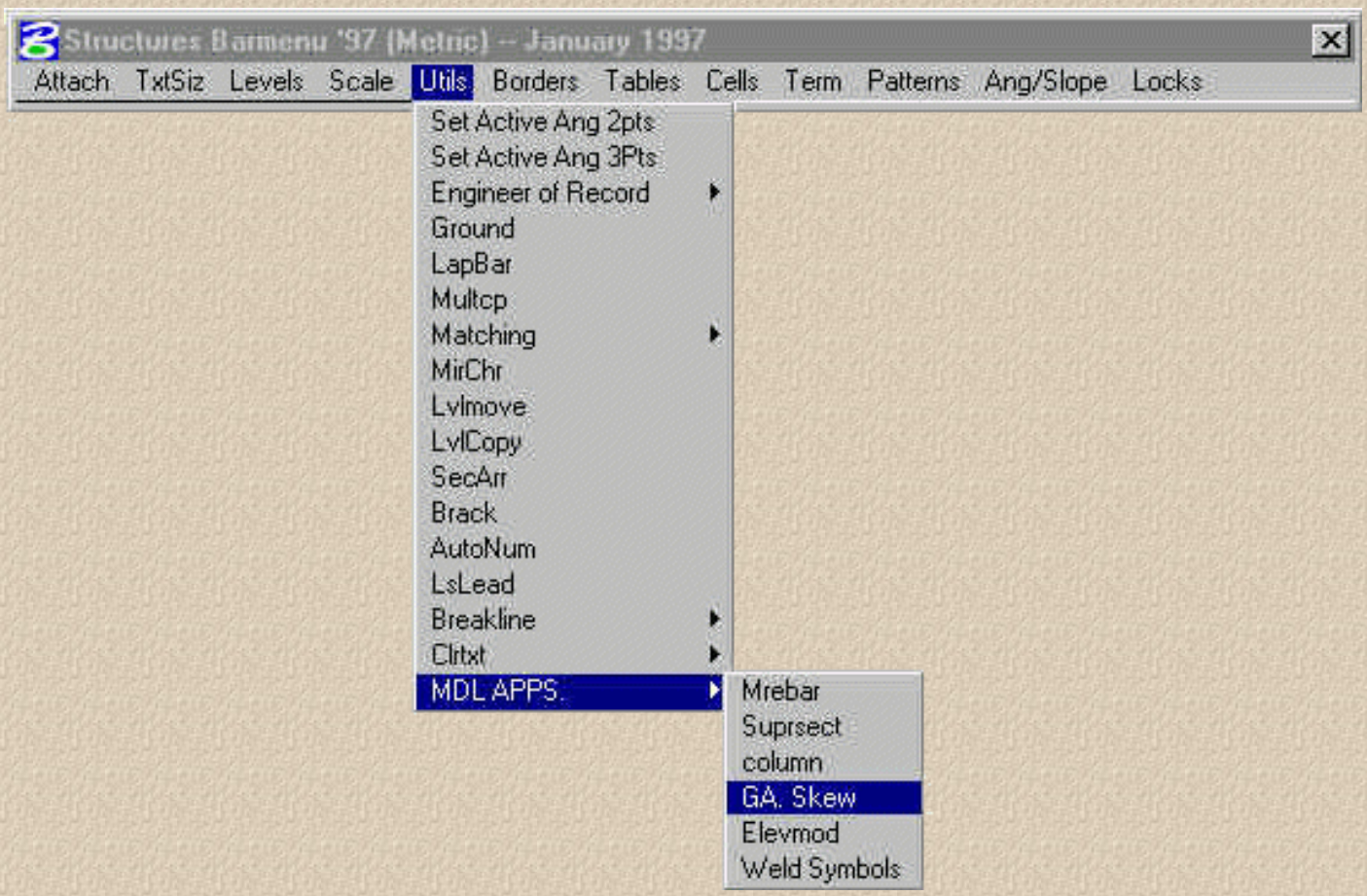
is created, choose View Report from the Georgia Skew menu to check for any input errors. If there are no errors, you are ready to create your MicroStation drawing. Note: the report file will be created in same directory and with the same file name as the Input file except with a .rpt extension.

Note: At this time Coordinate input is not handled by the file builder, therefore, it must be entered using a text editor.

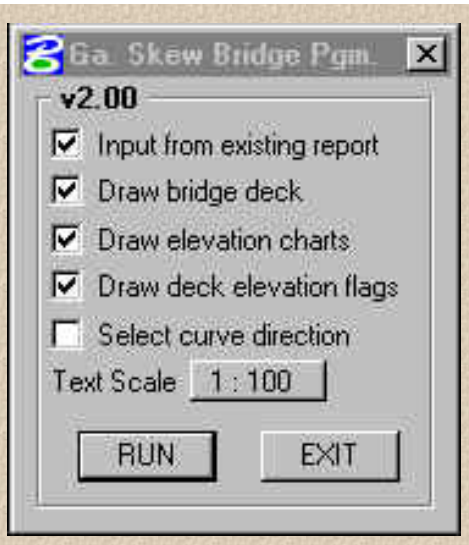
Using the Georgia Skew MDL:

Open or create the .dgn file you want to create your Georgia Skew drawing in. Make sure you are using a file with the correct working units, if your Georgia Skew report contains metric output you should be using metric working units or vica-versa for english.

From the Structures Menubar choose Utils->MDL APPS.->GA. Skew (Fig 2) or use the MicroStation key-in "mdl load bdeck".



The Georgia Skew MDL dialog box appears asking for certain information. (Fig 3)



The "Input from existing report" option **must** be enabled if using Metric units for input or ouput.
Enable the other Drawing options that you need.
The Text Scale does not need to be set if you are using a existing report.
Press Run to start your drawing.
If you are using an existing report, you will be presented with a standard file location dialog asking for the location of your report file.
After choosing the report location, MicroStation will start your drawing and notify you when the drawing is complete.

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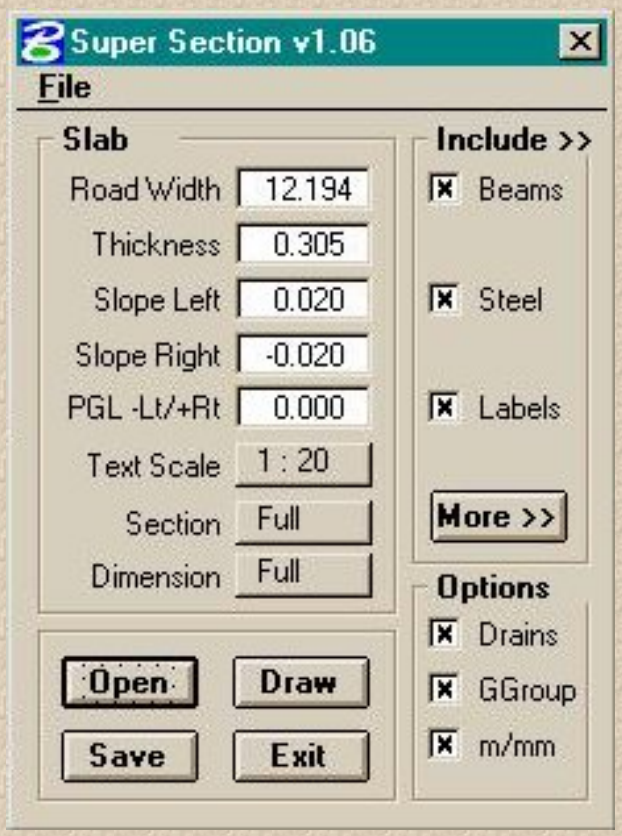
Superstructure Cross Section Program

(SUPRSECT)

SUPRSECT is an MDL application used with MicroStation that will generate a cross section of the superstructure. The Suprsect.cel is automatically attached to the current design file when the application is started. You must manually reattach the previous cell library.

Program Operation:
After starting MicroStation, start Suprsect by selecting the program from the Structures Menu bar or key-in "mdl load suprsect". Once you have started the program, you can create a new file by filling in the data entry boxes and using the File->Save menu item, or open an existing file by using the File->Open menu item . A sample input file is delivered with the program.



Slab

Road Width	Roadway width Gutter to Gutter
Thickness	Slab Thickness
Slope Left	Cross slope left of centerline
Slope Right	Cross slope right of centerline
PGL -Lt/Rt	Distance from Rt. Gutter to PGL
Text Scale	Scale of section. Click for options
Section	Draw Full or Half at a time. Click for options.
Dimension	Dimension Full, Top, or Bottom. Click for Options.

Options

Drains	Automatically draws deck drains.
Ggroup	Makes entire section a graphic group
m/mm	Shows meters or millimeters

OPEN: Allows a user to open an existing input file.

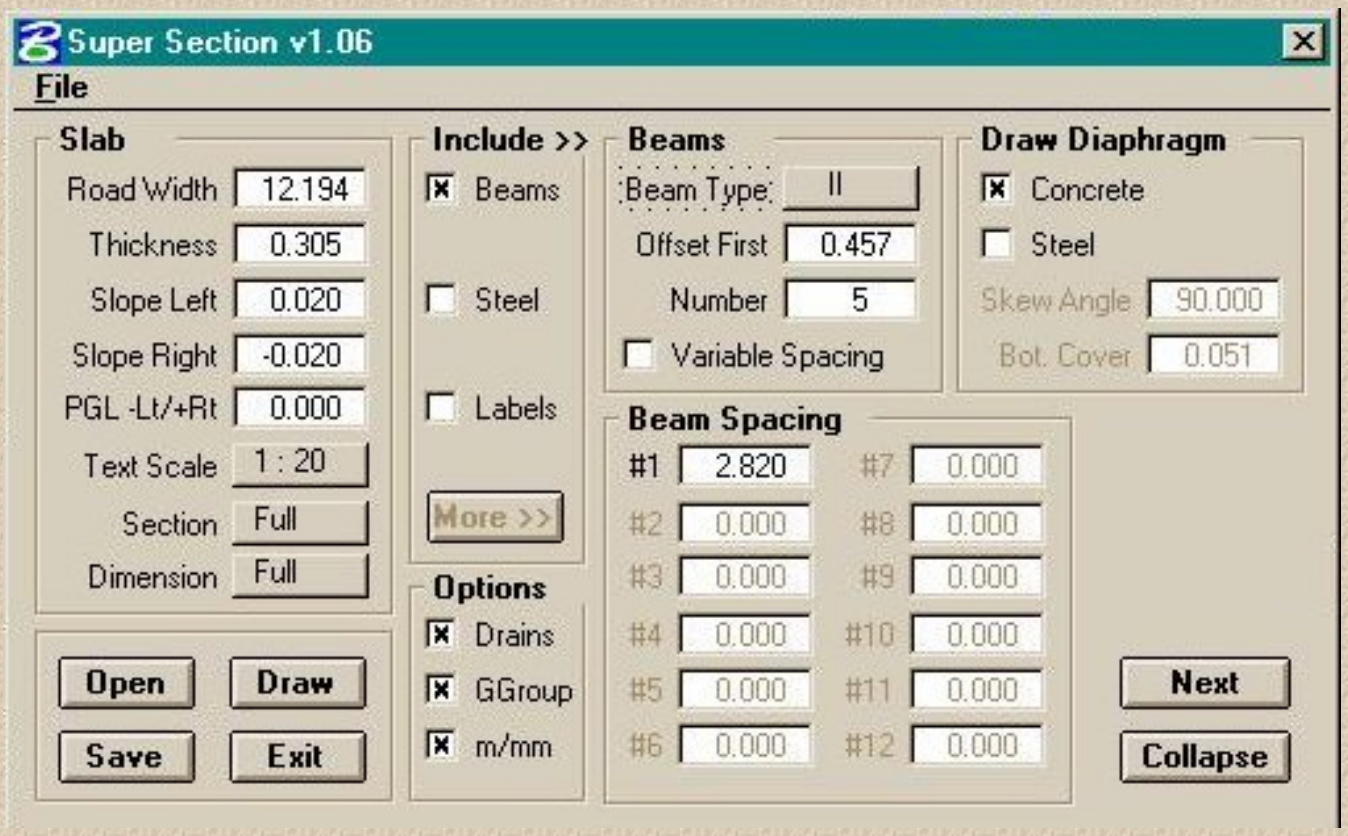
SAVE: Allows the user to save the existing input.

DRAW: Attaches section to cursor for user placement within the design file.

EXIT: Exits the progra

The More>> button

Beams:
Pressing the More>> button with Beams chosen in the Include box displays the following Beam input categories appear:



BEAMS:

Beam Type:	Choose Beam Type, click to see choices
Offset First:	Distance from Left Gutter to first beam.
Number:	Number of Beams
Variable Spacing:	Used for variable beam spacing.

BEAM SPACING: Possibility of 13 beams. Use spacing #1 if spacing is constant.

DRAW DIAPHRAGM:

Concrete:	Draw concrete diaphragm

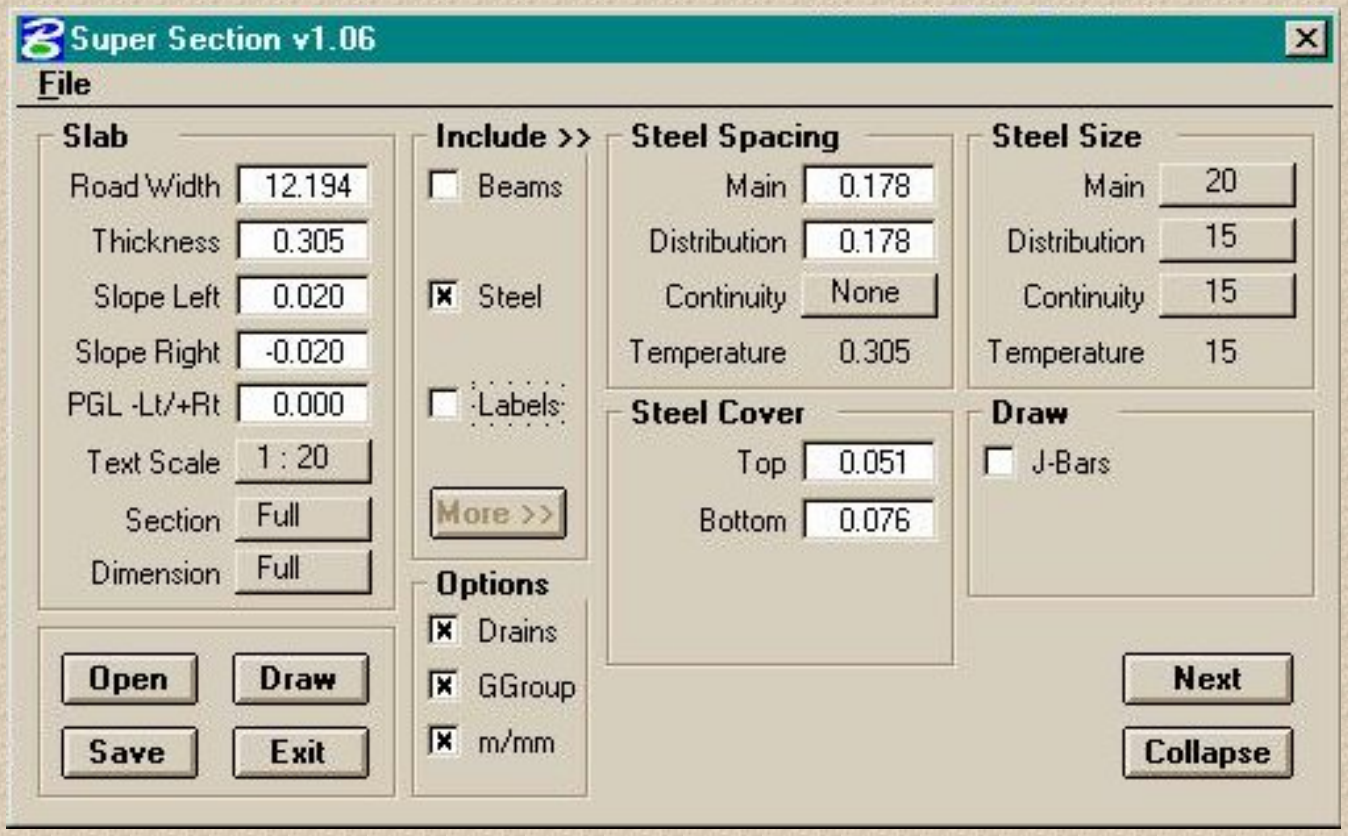
Steel: Draw reinforcing Steel in Diaphragm.

Skew Angle: Angle at bent (Used to calculate diaphragm reinforcing spacing)

Bottom Cover: Cover on stirrups in diaphragm.

STEEL:

Pressing the More>> button with the Steel check box chosen in the Include box displays the following Steel input categories appear:



STEEL SPACING:

Main: Spacing for Main Steel (mm). Transver Steel (Top & Bottom)

Distribution: Spacing for Distribution Steel (mm). (Bottom of Slab)

Continuity: Spacing for Continuity Steel over piers. (Future Option)

Temperature: Spacing for Temperature Steel (mm). (Top of Slab)

STEEL SIZE:

Main Size of Main Steel. (used for annotation)

Distribution: Size of Distribution Steel. (used for annotation)

Continuity: Size of Continuity Steel. (used for annotation)

Temperature: Size of Temperature Steel. (used for annotation)

DRAW:

J-Bars: Additional Bars at gutter. Formally known as J-bars. Now shown straight.

STEEL COVER

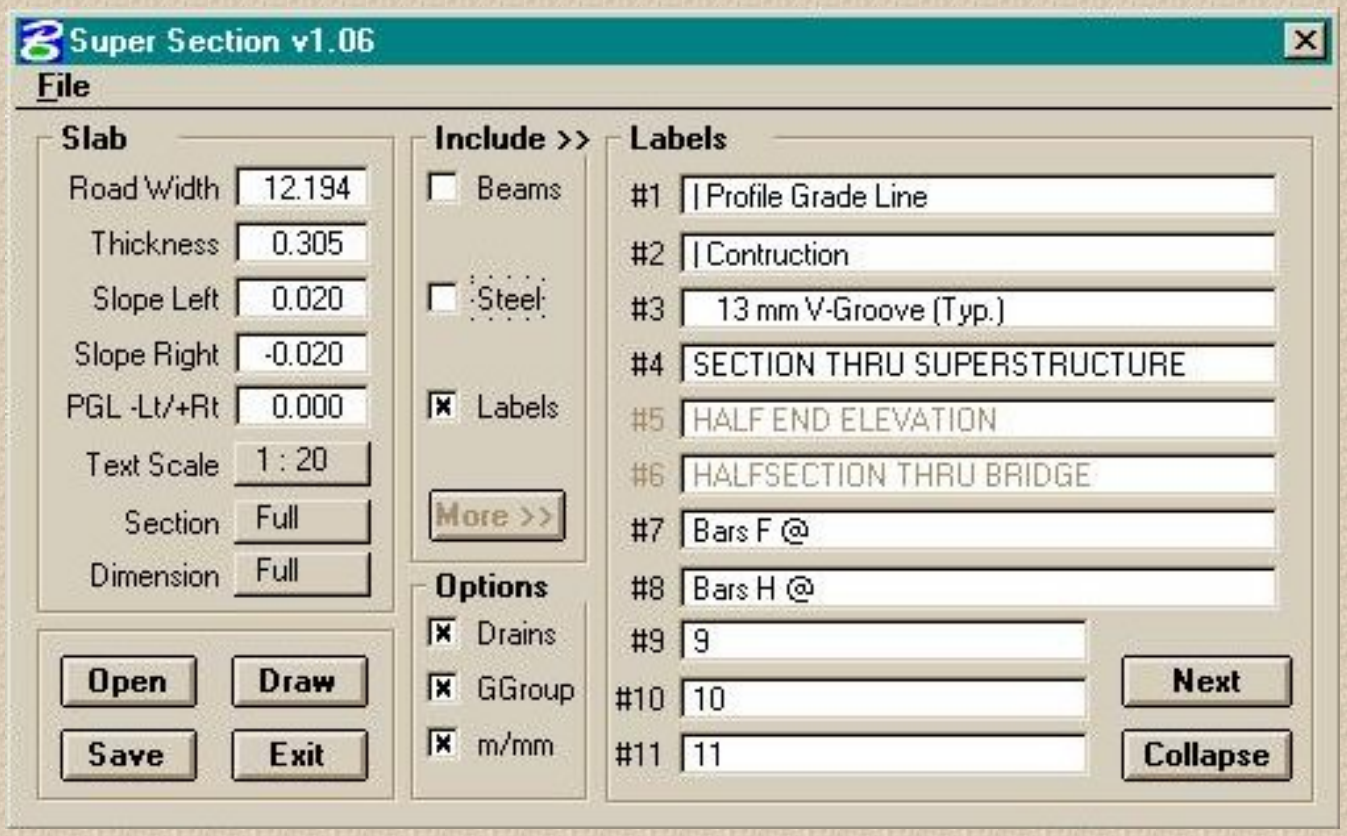
Top: Cover on Top reinforcing steel.

Bottom: Cover on Bottom reinforcing steel.

LABELS:

Pressing the More>> button with the Labels check box chosen in the Include box displays the following Labels data entry fields.

Labels may be edited for use with the program.



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Weld Symbol Builder Program

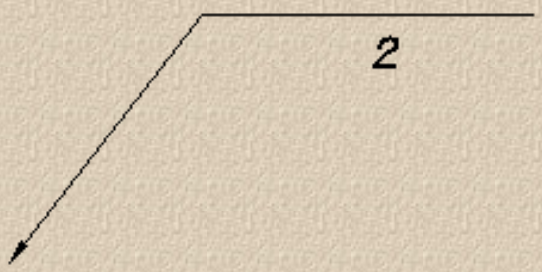
(WELD)

WELD is an MDL application for use with MicroStation. The program will draw weld symbols using metric or English annotation. The program reads the working units of the current design file before displaying the dialogue box. The Strs.cel or Strsmet.cel must be attached to the current design file.

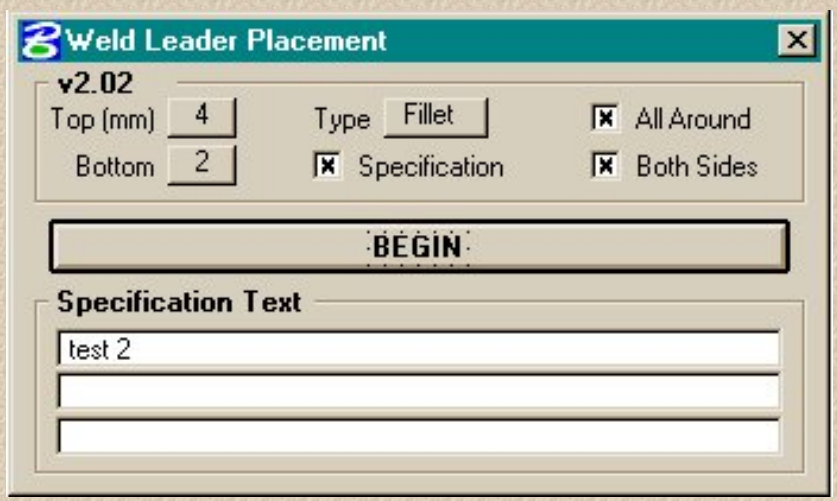
Program Operation:

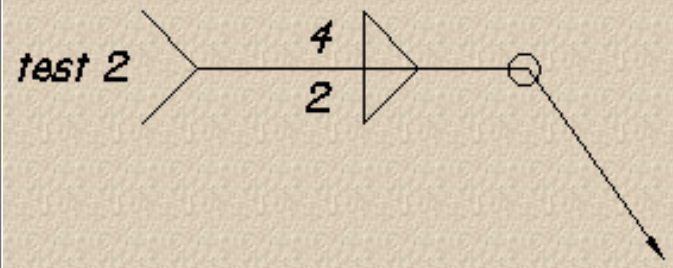
After starting MicroStation, start WELD by selecting the program from the Structures Menu bar or you can key-in "mdl load weld". Once you have started the program, select the weld size, type and a specification. Scale and text size must be selected before beginning to draw the symbol. To draw a symbol you simply "Click" on the BEGIN bar and place data points in the design file to create the leader symbol

The following are a few examples of the use of the weld symbol builder:

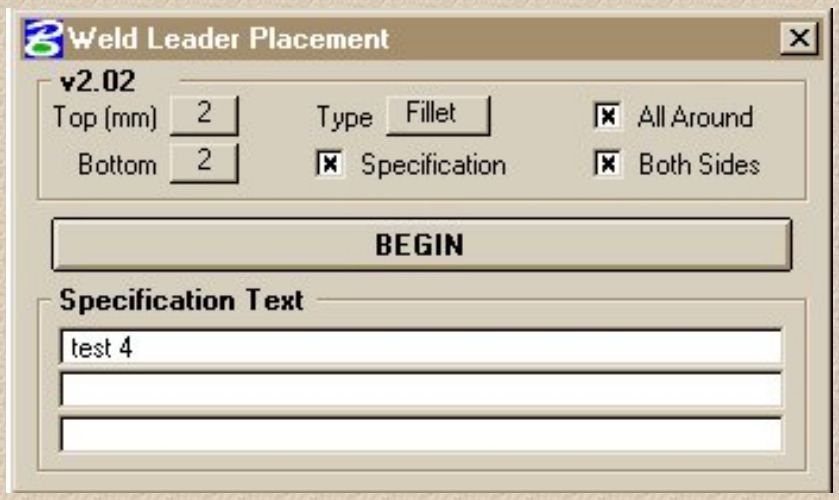


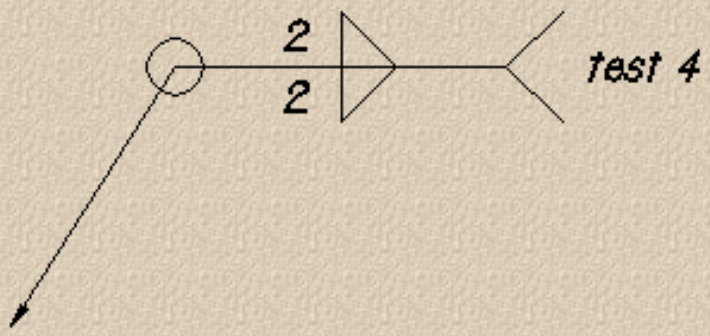
The above example above shows a 2 mm full penetration weld on the arrow side.



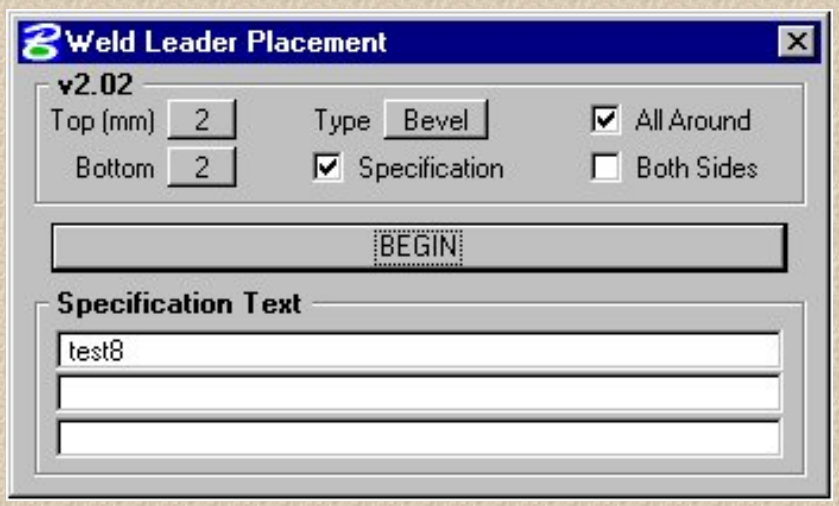


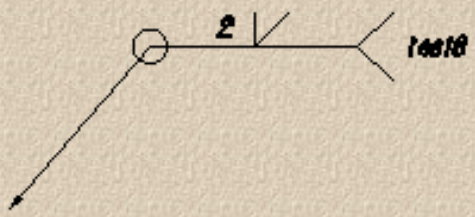
This above example shows a 2 mm fillet weld on the arrowside and a 4 mm fillet weld on the otherside. Clicking on the top or bottom boxes will reveal the range of weld sizes. This example also shows the weld on both sides with a specification. Specifications may be one to three lines in length. Various sizes of welds may be shown on the top or the bottom of the leader. There are three different types of welds, fillet , bevel and full. One side or both sides of the leader may be selected.





The above example shows a 2 mm fillet weld on the top and bottom of the leader with an all around symbol. It also shows the fillet symbol on both sides and a one line specification.





The above example above shows 2mm Bevel weld on the farside with an around symbol and a specification.

The weld symbol builder is very flexible, and almost any type of weld symbol can be created. Once a symbol is placed, the entire symbol and the annotation can be manipulated at once with the graphic group lock turned-on.

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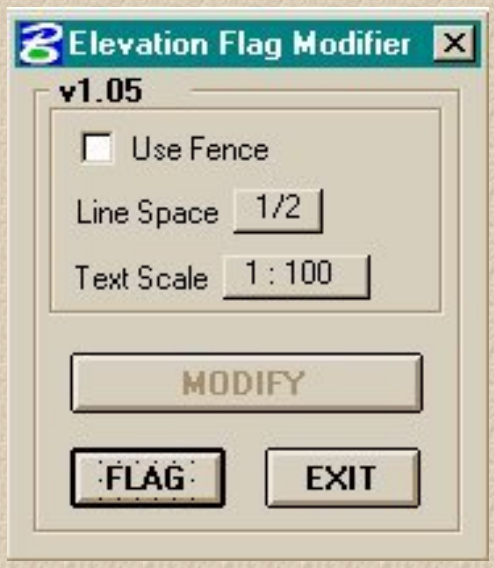
Elevation Flag Modifier

(ELEVMOD)

This mdl application is used with the "gaskew" application. Gaskew (Georgia Skew Geometry program) builds a design file after calculating all of the bridge deck elevations. The design file has all the elevations positioned on a flag in a plan view of the deck. Elevmod provides a quick and easy way to clean up any or all annotations the program could not fit well. The Text Scale and Line Spacing (spacing of text above the flag leader) is requied as input. A line string "flag" of the proper size is required to be hand-built before using the applicaton if you wish to change the size of the annotation flag. This application can be used to change one flag at a time or used with a fence to change multiple of flags at one time.



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