THE CADD MANUAL

FLORIDA DEPARTMENT OF TRANSPORTATION

STRUCTURES DESIGN

CADD Manual

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General

This manual provides information about the Structures Design Office (SDO) CADD Setup and is to be used with the Plans Preparation Manual, Structures Design Guidelines, Structures Detailing Manual and appropriate MicroStation Manual(s) for production of structures plans for the Florida Department of Transportation. All CADD Operators involved in structures plans production should be familiar with MicroStation. District CADD Managers should follow this guide in support of structures plans production.

Information shown in this manual is based upon the SDO CADD Setup on the Windows 95/NT platform only. All programs are available on the FDOT STRUCTURES WEB page =http://www.dot.state.fl.us/structures/ or our FDOT Intranet site at http://designweb/structures/ *Structures CADD Manual Online*.

The SDO 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:

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Software Requirements

The Structures Design Office (SDO) uses Bentley Microstation. CADD Production is supported on Microsoft Windows 95/98 /NT operating systems. All references to Microstation pertain to Bentley Version 95 and later. As a drawing aid, the SDO provides a software interface;.

System Requirements

For best results, the software should be loaded on a Pentium machine with minimum 128K memory, and a video card.

The CADD Load

The SDO CADD setup is available as one executable file downloadable from our Internet site at http://www.dot.state.fl.us/structures/ or FDOT Intranet site at http://designweb/structures/

This setup can be used for configuring Bentley MicroStation SE/95/J or Bentley Powerdraft on the Microsoft Windows 32bit Platform.

The following instructions will describe how to configure a standalone workstation, load needed resource files onto a file server, and how to configure a workstation to access shared server resources.

Standalone Workstation Install and Server Resource File Installation

The installation process is started by clicking on the CADDinst.exe.



An Introduction screen will explain what this program will perform.



Choose Next>, You will be presented with a dialog box asking for a directory location in which to store the Structures CADD resource files. This location can be a local hard drive or mapped drive letter. The load program will create it's own directory structure starting with FDOT_STR and will only copy files into this and no other locations. A mapped drive must be used for a network installation location, but clients can access this location via UNC path name after installation is complete.

Floy/ada	The software will install onto your system in a directory. Please accept the suggested directory location and name or type in one of your own. Make certain to provide both a drive letter and the directory name or a server path to a shared directory on which you have write privileges.
	Folder c:\ <back cancel<="" finish="" td=""></back>

When satisfied with the destination directory, press the **Finish** button.

The resource file copy portion of the CADD load is now complete and the MicroStation configuration portion of the CADD load will start after the next step

Configuring the MicroStation environment on the

Workstation Standalone or Server Client

If you are installing the resource files on a file server, press Cancel to exit the MicroStation configuration program when it starts.

This portion of the CADD load will configure MicroStation to use the Structures CADD resources. This portion of the program will automatically run following the copying of resource files to the Standalone Workstation or may be executed separately to configure a Client Workstation accessing server resources, or may also be used to reconfigure a Standalone Workstation. This file is named CADDLOAD.EXE and is located in the FDOT_STR/CADD directory and may be run from either a server or locally.

Structures Resource Directory Location -		
Location of Structures Resources (local I	harddrive or on server)	
FDOT_STR Directory Location	\\FDOT_STR	
Microstation Version and Location		55192 ₀ -
C MicroStation SE/95 or Powerdraft		
MicroStation/J or PowerDraft/J		
Bentley Directory Location	c:\bentley	
License Information		
C Do not configure License		
Use Select Server/License Pooling		
Select Server Name	SelectServerName	
MicroStation J Help Setup		
C Help Installed Locally		
Ose DynaWeb Help Server	DynaWeb Help Server Name	DynaWebServerName
User Preferences Location		
Directory to Store User Preference File	C:\Documents and Settings	

Structures Resource Directory Location: The location of FDOT_STR directory may be a local drive, a mapped network drive, or a UNC pathname.

MicroStation Version and Location:

Choose the version of MicroStation you are using and enter the location of the MicroStation or Powerdraft installation directory (not the executable itself). Normal installation paths are as follows:

MicroStation SE/95:	drive:\win32app\ustation
MicroStation J:	drive:\Bentley
PowerDraft:	drive:\win32app\draft
PowerDraft J:	drive:\Bentley

License Information:

Determine if you are using a standalone license located in the local MicroStation directory structure or if you are using select server or a pooled license on a server (SE/95).

If using a pooled license, enter the path to the license pool directory (not the license file itself). This path may use a mapped server drive or a UNC pathname. If using select server, enter the servername (not the UNC name.)

Microstation J Help Setup

If using DynaWeb Help Server, enter the server name (not the UNC name.)

User Preference Location:

Enter the directory location for storage of the user preference file steng.upf or stmet.upf. This may be either a local or network location.

When the required input is entered, press the Configure button to complete the configuration of MicroStation to use the Structures Design Office CADD Resources. At this time four (4) files are created with the MicroStation directory structure as follows:

MicroStation SE/95:

ustation\config\project\steng.pcf ustation\config\project\stmet.pcf ustation\config\user\steng.ucf ustation\config\user\stmet.ucf (English project configuration file) (Metric project configuration file) (English user configuration file) (Metric user configuration file)

MicroStation J:

bentley/workspace/projects/steng/steng.pcf(Eng. project configuration file)bentley/workspace/projects/stmet/stmet.pcf(Metric project configuration file)bentley/workspace/users/steng.ucf(English user configuration file)bentley/workspace/users/stmet.ucf(Metric user configuration file)

If these files already exist they will be renamed to stengpcf.old, stmetpcf.old, stengucf.old, & stmetucf.old. If the *.old files already exist. They will be deleted.

These are the only files written into the MicroStation directory structure.

Entering a Structures Workspace for the first time:

Start MicroStation. If this is the first time you have run MicroStation, you may be asked for License information. Choose the 15 minute tryout button which will take you to the MicroStation Manager window.

Fijes: 2014eng.dgn	Directories. e:\dgn\	<u> </u>
2014erg.dgn 2014s.dgn bascelev.dgn bdr.dgn cell.dgn cell.dgn coloilines.dgn dade_1 dgn dade_2 dgn	▲ Èrr e:\	Cance
List Files of <u>Type</u> <u>MicroStation De</u> Open Design	sign Files ['.dgn] ▼ [e Fles <u>R</u> ead-Only	•
8	Wukspace, Istany99 Project: Istang99 Istaface: Idefault	

From the Workspace pull down, choose either **steng99** to use the Structures English Workspace or **stmet** to use Structures Metric Workspace. Select an existing file or create a new file and press the **OK** to continue. Resources such as the menubar, cells, seed files, settings, applications, etc. will be available to you.

General Production

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

Cell Library: StEng.cel

Color Table: color.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.

Level Symbology - Use of established symbologies is required and can be selected from the SDO Menubar.

Scales, Text/Dimensions and Borders

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

After all elements are drawn, then determine the "Overall" Border scale required. Any details that may need to be scaled up or down should be done at this time. Select the Border scale from the Menubar and place the Border Cell at this scale.

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

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

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 the file.

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 9.72" x 15.37" drawing area on the border.

Drawing Scale	Active Scale (AS)	Height (FT.)	Width (FT.)
1/16" = 1'	192	155.52	245.92
3/32" = 1'	128	103.68	163.95
1/8" = 1'	96	77.76	122.96
3/16" = 1'	64	51.84	81.97
1/4'' = 1'	48	38.88	61.48
3/8" = 1'	32	25.92	40.99
$\frac{1}{2}'' = 1'$	24	19.44	30.74
3/4'' = 1'	16	12.96	20.49
1'' = 1'	12	9.72	15.37
$1 \frac{1}{2} = 1$	8	6.48	10.25
3'' = 1'	4	3.24	5.12
6'' = 1'	2	1.62	2.56
1' = 1'	1	.810	1.28

FORMULAS:

AS = 12 / Drawing Scale,

Ex. 1/4" = .25 in., then 12 / .25 = 48, Therefore AS = 48. W = Sheet Width (in.) / Drawing Scale

Ex. 1/4" = .25 in., then 32 / .25 = 128, Therefore W = 128. H = Sheet Height (in.) / Drawing Scale

Ex. 1/4'' = .25 in., then 19.5 / .25 = 78, Therefore H = 78.

Symbology

The following element symbologies are required for Structures Design production.

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
Timber	30	142 Dk. Bn.	2	0
Timber (Hidden)	30	142 Dk.	1	3
Navigation Lights & Access	15	7 Cyan	1	0
Navigation Lights & Access (Hidden)	15	7Cyan	0	3
Conduit, Junction Boxes, Pull Boxes & Access.	14	7 Cyan	1	0
Conduit, Junction Boxes, Pull Boxes & Access. (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
Electric Lines	10	3 Green	1	3

Element	Level	Color	Weight	Style
Fence	43	6 Orange	1	0
Site Gas Lines	10	0 white	1	3
R/W Line	37	0 White	2	0
Site Sewer Lines	10	3 Green	1	3
Site Telephone Lines	10	6 Orange	1	3
Site Water Lines	10	7 Cyan	1	3

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

Text Size: Annotation = $0.0063 \times ($ Active Scale). The SDO CADD Menubar provides all needed text sizes. The absolute minimum text size after plotting shall be .0063'. This is the smallest text size you should use on plans due to "half-sizing."

Text Sizes and Weights

All standard text sizes may be selected from the Menubar. The SDO uses special, custom fonts in its drawings and programs, specifically, Fonts 68 and 69. So that text displays properly, a font library is included in the purchase of a set of Standard Drawing files.

TITLE	WEIGHT	SIZE (Ft)
Special Small/Revisions	0	.0050
Annotation	1	.0063
View/Sheet/Sect Titles	2	.0073
Large	3	.0084
Extra Large	3	.0100
NOTE: Sizes shown are a 1:1 ratio	Э.	

Special Symbols

The SDO also uses special symbols that are part of the SDO font library. For example, in Font 68, if you key in a question mark, the result will be a Roman numeral one on the screen. The symbols are listed below:

!	Roman Numeral 5	1/3	Baseline
?	Roman Numeral 1	1/64	plate
\backslash	diameter mark	3/64	plus/minus sign
^	Degree symbol	5/64	squared ²
	Centerline	7/64	cubed ³

Design File Naming

In order to facilitate the indexing, archival and retrieval of design files, FDOT has developed a naming convention. All standard drawings shall be named using the individual index number. (Ex. index 700 = 700.dgn) Use the following format for selecting a name for a particular design file:

Structural Plans

Design File Name	Sheet Description
AccessOpen	Access Opening
ApproachSlab	Approach Slab
BaileyBridge	Bailey Bridge Details
BeamLay	Beam Layout
BeamLayBulbT	Bulb-T Beam Layout
BeamLayInvT	Inverted T Beam Layout
BeamLayT	T Beam Layout
BearingDet	Bearing Details
BearingPads	Neoprene Bearing Pads
BearingPlates	Beveled Bearing Plates
Borings	Foundation Investigation (Borings)
BridgeHydro	Bridge Hydraulic Recommendation Sheet
	Section through bridge showing the superstructure. Use
BrigeSection	this filename for the BDR or 30% plans.
Bulkhead	Bulkhead
BulkheadDet	Bulkhead Details
Camber	Camber Diagrams
ClosureJoint	Closure Joint Details
ContinuityTend	Continuity Tendon
CoverSheet	Cover Sheet
ConstNotes	Construction Notes
ConstDet	Construction Details
ConstSeq	Construction Sequence
ConduitDet	Utility Conduit Details
CPTSound	CPT Soundings
CrashWall	Crash Wall
CrossFrameDet	Cross Frame Details
CulvertDet	Culvert Details
DiaphragmDet	Diaphragm Details
DrainDet	Drain Details
DrillShaft10	Drilled Shaft Pier No. 10
DrillShaftDet	Drilled Shaft Details
EndBent	End Bent
EndBent1	End Bent No.1
EndBentDet	End Bent Details
ErectSeq	Erection Sequence

Design File Name ErectProced **ExpJointDet** ExistingPlans FinishGrEL FoundLav Footing3 FootingDet FramingPlan FenderSystem FenderDet FieldSplice FieldSpliceDet FloorBeam **FuturePTLay** GeneralNotes Handrail Index IntBent IntBent5 IntBentDet JackingDet JunctionBox **KeySheet** LadderDet LongPT10 MiscDet MaintLight MaintLightDet **MSEwall** MSEwall25 PileData PileDet Pier2 PierDet PierPTDet PotBearing Preliminary PlanElevP PrestSlab **PTDet** PTQuantities RebarList ReinfSegABC ReinfPierSeg ReinfAbutSeg **RemoveExist**

Structural Plans

Sheet Description Erection Procedure for Launching Girder **Expansion Joint Details Existing Bridge Plans Finish Grade Elevations** Foundation Layout Footing No.3 **Footing Details** Framing Plan Fender System Fender Details **Bolted Field Splice Bolted Field Splice Details** Floor Beams Future Post-Tensioning Layout General Notes Handrail Index of Sheets **Intermediate Bent Intermediate Bent No.5 Intermediate Bent Details** Jacking Details Junction Box Bridge Rehab Key Sheet Ladder Details Longitudinal Post-Tensioning Span 10 Miscellaneous details Maintenance lighting plan Maintenance lighting details Mechanically stabilized earth wall 25' MSE Wall Pile data table used in the foundation layout **Pile Details** Pier No.2 **Pier Details** Precast Box Pier Post-Tensioning Details **Pot Bearing Details** Preliminary Plan and Elevation Plan and Elevation Prestressed Slab Units **Post-Tensioning Details Post-Tensioning Quantities Reinforcing Bar List** Reinforcing Segements A,B and C **Reinforcing in Pier Segments Reinforcing in Abutment Segments Removal of Existing Structures**

Design File Name RetainingWall25 RiprapRubble RiprapSand SegLayout SegDimAbut **SegDimBox** SegDimCap SegDimPier SheetPileWall SheetPileWallST SheetPileWallConc SheetPileWall20 SheetPileWallAnch SheetPileWallCant SidewalkDet SlidingPlate Superst Superst100 Superst45 **SuperstDet** SteelGirder SteelDet Stiffener SurfaceFinish TendonCurveDet TransPTPier **TransPTAbut** TransTendonDet TypicalSection VertCurveSuperEL

Structural Plans

Sheet Description 25' Retaining Wall Rubble Riprap Sand Cement Riprap Segment Layout **Abutment Segment Dimensions Precast Box Segment Dimensions Pier Cap Segment Dimensions** Pier Segment Dimensions Sheet Pile Retaining Wall Steel Sheet Pile Retaining Wall Concrete Sheet Pile Retaining Wall 20' Sheet Pile Retaining Wall Anchored Sheet Pile Wall **Cantilever Sheet Pile Wall** Sidewalk Details Sliding Plate Assembly Superstructure 100' Span Superstructure 45' Span Superstructure Superstructure Details Steel Girder Steel Girder Details Stiffener Details Surface Finish Details **Tendon Curvature Details** Pier Transverse Post-Tensioning Abutment Transverse Post-Tensioning Transverse Tendon Details Typical section through bride deck Vertical Curve and Superelevation Transition

Mechanical and Electrical Bridge Plans **Design File Name** Sheet Description **BasculePier Bascule Pier** BasculeSpan **Bascule Span** CatwalkDet Catwalk Details ConduitRiser **Conduit Riser** CommLayout **Communications Layout** ControlDesk Control Desk ControlTower **Control Tower** CounterWt **Counter Weight** DriveAssem Drive Assembly GridDeckDet Grid Deck Details Grounding and Lighting Protection Grounding

HouseLayout **IOpoints** LadderLogic Legend LockPlan LockDet MechPlan MechDet NaviLightDet PanelBoardSch **PinionDet** Plumbing RestPier SingleLine SitePlan SubCableDet TrunAssem TrunBrace TrunDet WorkID

House, Lighting and Pier Layout Input Output Points, PLC Ladder Logic, PLC Symbol Legend Lock Plan Lock Details Mechanical Plan Mechanical Details Navigation Lighting System Details Panel Board Schedule **Pinion Details** Plumbing **Rest Pier** Single Line Diagram Site Plan for Rest Area Submarine Cable Details **Trunnion Assembly Trunnion Bracing** Trunnion Details Work Identification Sheet

Additional Scour Protection Plan File Names

Design File Name BotContourMap ScourPlan Protection ScourProf ScourDetail Sheet Description Bottom Contour Map Plan View of Scour Protection Profile of Scour Protection Scour Protection Details

Additional Load Test Plan File Names

Design File Name CompTestSetup DrillShaftLT123 InstruDet LTSumPile LTSumDrillShaft LTFrame LTBraceDet LTGirderDet OsterbergCell3000 PlatformDet StatnamicLT Sheet Description Compression Test Setup Drilled Shaft Load Test Sites 1,2 & 3 Instrumentation Details Pile Load Test Program Summary Drilled Shaft Load Test Program Summary Load Test Frame Configuration Load Test Reaction Girder Bracing Details Load Test Reaction Girder Details Osterberg Cell 3000 ton Load Testing Device Service Platform Deck and Frame Details Statnamic Load Test Details LateralLT

Lateral Load Test Details

Geotechnical (Architectural Plans)

Design File Name	Sheet Description
B-FP	Floor plan
B-SP	Site plan
B-DP	Demolition plan
B-QP	Equipment plan
B-XP	Éxisting plan
B-EL	Elevation
B-SC	Section
B-DT	Detail
B-SH	Schedules
B-3D	Isometric/3D
B-DG	Diagrams

Civil (Architectural Plans)

Design File Name	Sheet Description
C-FP	Floor plan
C-SP	Site plan
C-D	Demolition plan
C-EP	Environmental
C-GP	Grading
C-RP	Roads/Topographic
C-SV	Survey
C-UP	Utilities
C-QP	Equipment plan
C-XP	Existing plan
C-EL	Elevation
C-SC	Section
C-DT	Detail
C-SH	Schedules
C-3D	Isometric/3D
C-DG	Diagrams

Process (Architectural Plans)
Design File Name
D-FP
D-SP
D-DP
Site plan
Demolition plan

D-QP

Demolition plan Equipment plan

D-XP	Existing plan
D-EL	Elevation
D-SC D-DT	Section Detail
D-SH	Schedules
D-3D	Isometric/3D
D-DG	Diagrams

	Electrical (Architectural Plans)
E-FP	Floor plan
E-SP	Site plan
E-CP	Communication
E-GP	Grounding
E-LP	Lighting
E-PP	Power
E-DP	Demolition plan
E-QP	Equipment plan
E-XP	Existing plan
E-EL	Elevation
E-SC	Section
E-DT	Detail
E-SH	Schedules
E-3D	Isometric/3D
E-DG	Diagrams

Fire Protection	(Architectural Plans)

Design File Name	e Sheet Description
F-FP	Floor plan
F-SP	Site plan
F-DP	Demolition plan
F-QP	Equipment plan
F-XP	Existing plan
F-EL	Elevation
F-VP	Evacuation plan
F-KP	Sprinkler plan
F-SC	Section
F-DT	Detail
F-SH	Schedules
F-3D	Isometric/3D
F-DG	Diagrams
1	

Interiors (Architectural Plans)

Fire Protection	(Architectural Plans)
Design File Name	Sheet Description
I-FP	Floor plan
I-SP	Site plan
I-DP	Demolition plan
I-QP	Equipment plan
I-XP	Existing plan
I-CP	Ceiling plan
I-EP	Enlarged plan
I-RP	Furniture plan
I-NP	Finish plan
I-EL	Elevation
I-SC	Section
I-DT	Detail
I-SH	Schedules
I-3D	Isometric/3D
I-DG	Diagrams

Mechanical	(Architectural Plans)
Design File Name	Sheet Description
M-FP	Floor plan
M-SP	Site plan
M-DP	Demolition plan
M-QP	Equipment plan
M-XP	Existing plan
M-CP	Control plan
M-HP	HVAC ductwork plan
M-EL	Elevation
M-SC	Section
M-DT	Detail
M-SH	Schedules
M-3D	Isometric/3D
M-DG	Diagrams

Plumbing (Architectural Plans)

Design File Name	Sheet Description
P-FP	Floor plan
P-SP	Site Plan
P-DP	Demolition plan
P-QP	Equipment plan

Plumbing Plans Existing plan Elevation
Section Detail
Schedules Isometric/3D Diagrams

Structural (Architectural Plans)

S-FP	Framing plan
S-NP	Foundation plan
S-SP	Site Plan
S-DP	Demolition plan
S-QP	Equipment plan
S-XP	Existing plan
S-EL	Elevation
S-SC	Section
S-DT	Detail
S-SH	Schedules
S-3D	Isometric/3D
S-DG	Diagrams

Telecommunications (Architectural Plans) Design File Name Sheet Description

Design i ne Marne	Sheet Description
T-FP	Floor plan
T-SP	Site Plan
T-DP	Demolition plan
T-QP	Equipment plan
T-DP	Data
T-TP	Telephone
T-XP	Existing plan
T-EL	Elevation
T-SC	Section
T-DT	Detail
T-SH	Schedules
T-3D	Isometric/3D
T-DG	Diagrams

Formats for Sheet File Names

	General (Architectural Plans)
G-001	General
G-101	Plans
G-201	Elevations
G-301	Sections
G-401	Large Scale Views
G-501	Details
G-601	Schedules and Diagrams
G-701	User Defined
G-801	User Defined
G-901	3D Representation

Hazardous Material (Architectural Plans)

Design File Name	Sheet Description
H-001	General
H-101	Plans
H-201	Elevations
H-301	Sections
H-401	Large Scale Views
H-501	Details
H-601	Schedules and Diagrams
Civil (Ar	chitectural Plans)
C-001	General
C-101	Plans
C-201	Elevations
C-301	Sections
C-401	Large Scale Views
C-501	Details
C-601	Schedules and Diagrams
C-701	User Defined
C-801	User Defined
C-901	3D Representation

	Landscape (Architectural Plans)
L-001	General
L-101	Plans
L-201	Elevations
L-301	Sections
L-401	Large Scale Views

L-501	Details
L-601	Schedules and Diagrams
L-701	User Defined
L-801	User Defined
L-901	3D Representation

Structural (Architectural Plans)

Design File Name	Sheet Description
S-001	General
S-101	Plans
S-201	Elevations
S-301	Sections
S-401	Large Scale Views
S-501	Details
S-601	Schedules and Diagrams
S-701	User Defined
S-801	User Defined
S-901	3D Representation

Architectural (Architectural Plans)

A-001	General
A-101	Plans
A-201	Elevations
A-301	Sections
A-401	Large Scale Views
A-501	Details
A-601	Schedules and Diagrams
A-701	User Defined
A-801	User Defined
A-901	3D Representation

Interiors (Architectural Plans)

I-001	General
I-101	Plans
I-201	Elevations
I-301	Sections
I-401	Large Scale Views
I-501	Details
I-601	Schedules and Diagrams

	Interiors (Architectural Plans)
I-701	User Defined
I-801	User Defined
I-901	3D Representation

Equipment (Architectural Plans)

Design File	Name	Sheet Description
Q-001		General
Q-101		Plans
Q-201		Elevations
Q-301		Sections
Q-401		Large Scale Views
Q-501		Details
Q-601		Schedules and Diagrams
Q-701		User Defined
Q-801		User Defined
Q-901	.	
Fire	e Protect	ion (Architectural Plans)
F-001		General
F-101		Plans
F-201		Elevations
F-301		Sections
F-401		Large Scale Views
F-501		Details
F-601		Schedules and Diagrams
F-701		User Defined
F-801		User Defined
F-901		3D Representation
	Arc	hitectural Plans
P-001		General
P-101		Plans
P-201		Elevations
P-301		Sections
P-401		Large Scale Views
P-501		Details
P-601		Schedules and Diagrams
P-701		User Defined
P-801		User Defined
P-901		3D Representation
N	lechanica	al (Architectural Plans)
Design File	Name	Sheet Description

M-001	General
M-101	Plans
M-201	Elevations
M-301	Sections
M-401	Large Scale Views
M-501	Details
M-601	Schedules and Diagrams
M-701	User Defined
M-801	User Defined
M-901	3D Representation
	Electrical (Architectural Plans)
E-001	General
E-101	Plans
E-201	Elevations
E-301	Sections
E-401	Large Scale Views
E-501	Details
E-601	Schedules and Diagrams
E-701	User Defined
E-801	User Defined
E-901	3D Representation
Teleo	communication (Architectural Plans)
T-001	General
T-101	Plans
T-201	Elevations
T-301	Sections
Т-401	Large Scale Views
I-501 T 601	Details Schedules and Disgrams
1-001 T 701	Schedules and Diagrams
T-801	User Defined
T-901	3D Representation
1 001	Resource (Architectural Plans)
Design File	Name Sheet Description
R-FP	Floor plan
R-SP	Site plan
R-DP	Demolition plan
R-QP	Equipment plan
R-XP	Existing plan
R-EL	Elevation
R-SC	Section
R-DT	Detail

R-SH	Schedules					
R-3D	Isometric/3D					
R-DG	Diagrams					
Other	Disciplines (Architectural Plans)					
X-001	General					
X-101	Plans					
X-201	Elevations					
X-301	Sections					
X-401	Large Scale Views					
X-501	Details					
X-601	Schedules and Diagrams					
X-701	User Defined					
X-801	User Defined					
X-901	3D Representation					
Contractor	/Shop Drawings (Architectural Plans)					
Z-001	General					
Z-101	Plans					
Z-201	Elevations					
Z-301	Sections					
Z-401	Large Scale Views					
Z-501	Details					
Z-601	Schedules and Diagrams					
Z-701	User Defined					
Z-801	User Defined					
Z-901	3D Representation					

Seed Files

The Structures Design Office CADD Load is delivered with the following active parameters set in the DGN seed files.

STENG2D.DGN (2D File) Views on = 1, 2Levels Displayed = 1-63Locks on = Snap (Keypoint) Active Level (LV) = 40Color(CO) = 2Weight (WT) = 3Angle (AA) = 0Scale (AS) = 1:1Line Code (LC) = 0Grid Units (GU) = 0.008,12Global Origin (GO) = 0.0Font (FT) = 68Text Size (TX) = 0.0063Line Spacing (LS) = 0.0047 (75% of text size) Line Length (LL) = 255Cell Library = STENG.CEL (in drive:fdot_str\cadd\cell) Color Table = COLOR.TBL (Microstation color table) STENG3D.DGN (3D File) Views on = 1 (Top), 5 (Iso), 6 (Top), 7 (Front), 8 (Right) Levels Displayed = 1-63Locks on = Snap (Keypoint) Active Level (LV) = 40Color(CO) = 2Weight (WT) = 3Angle (AA) = 0Scale (AS) = 1Line Code (LC) = 0Active Point: XY = 0.0.0Display Depth (DP) = -500,500Window Center (WO) = 0.0.0Grid Units (GU) =0.008,12 Global Origin (GO) = 0.0Font (FT) = 68Text Size (TX) = 0.0063

Line Spacing (LS) = 0.0047 (75% of text size) Line Length (LL) = 255 THE CADD MANUAL

Cell Library = STENG3D.CEL (in drive:fdot_str\cadd\cell)

Color Table = COLOR.TBL (Microstation color table)

Additional Parameters: (Design Options) Working Units (MU:SU:PU) = 1:12:1600 or 223696 sq ft. Angle Format = Degrees, Minutes, Seconds (DDD^MM'SS.SS") Mode = Conventional Data Readout Format = Master Units Accuracy = 0.1234 Angle Round-Off = 0^00'00.00" Dimensioning English, AEC Substitute Symbol (Arrowhead) = ALT (Cell) Linear Accuracy = 0.0001 Degree Accuracy = 0.001

Design File Settings

The Structures Design Office (SDO) CADD load is delivered with the following pre-set designfile settings.

File Edit Element	Settings Tools Utilitie	s Wo	rkspace	Windov	v He	Ip FDOT	Γ	
Attach TxtSiz Levels	Manage	de	rs Tables	Cells	Term	Patterns	Ang/Slope	Locks
8 Wind	AccuDraw Color Table Database	•						
	Design File							
Main 🗙	Level	•						
	Locks	•						
A	Camera	P.						
+, 😪	Rendering							
	Snaps	•						
	View Attributes Ctrl+	1						
, O, *								
₿0; A,								
₹ <u>₹</u> *,								
++ ++								

Design File Settings	
<u>C</u> ategory	Modify Active Scale Parameters
Active Angle Active Scale Axis Color Coordinate Readout Element Attributes Fence Grid Isometric Locks Rendering Snaps Stream Views Working Units	X Scale 1.0000 Y Scale 1.0000 Cancel 1.0 <u>Halve Double</u> Scale Lock <u>I</u> olerance: 0.0010
	Focus Item Description
	Set the active scale factor along the view y-axis (vertical).

Design File Settings	
<u>C</u> ategory	Modify Color Settings
Active Angle Active Scale Axis Color Coordinate Readout Element Attributes Fence Grid Isometric Locks Rendering Snaps Stream Views Working Units	Element Highlight Color:
	Focus Item Description
	Select category to view.

Color 1

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

Coordinate Readout 1

Design File Settings		
<u>Category</u>	Modify Grid Parameters	
Active Angle Active Scale Axis Color Coordinate Readout Element Attributes Fence Grid Isometric Locks Rendering Snaps Stream Views Working Units	☐ Grid Lock Grid <u>M</u> aster 0.0833 Grid <u>R</u> eference 12 <u>G</u> rid Config <u>Ortho</u> ▼ Grid <u>A</u> spect 1.0000	<u>D</u> K Cancel
	Focus Item Description Select category to view.	

Grid 1

Design File Settings		
<u>C</u> ategory	Modify Snap Parameters	
Active Angle Active Scale Axis Color Coordinate Readout Element Attributes Fence Grid Isometric Locks Rendering Stream Views Working Units	✓ Snap Lock Mode Keypoint ▼ Divisor 1 ▼ Oivisor 1 ▼ ∴ Association ↓ ∴ ACS Plane Snap ↓ ∴ Depth Lock ↓	<u>D</u> K Cancel
	Focus Item Description	
	Select category to view.	

Snaps 1

Design File Settings	
<u>C</u> ategory	Modify Working Unit Parameters
<u>Category</u> 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: Sub Units: Sub Units: 12 12 1600 Pos Units Per " Working Area 223696 ' Square
	Focus Item Description
	Select category to view.

Working Units 1

Workspace Preferences

The Structures Design Office CADD load is delivered with the following preference settings.



Line Weights 1

Preferences [steng]				
<u>C</u> ategory	Set design	n file drawing preferences.		
Description	Max. J	Grid Pts/View: 90	0	< 1
Compatibility	Max. G	rid <u>R</u> efs/View: 40		
Dimensions			Can	cel
Drawing		Line Weights	1	
GUI Options			-	
Icon Lolors	L	ine Weight Translation		
Memory Usage		Design: Display	Design : Display	
Uperation Reference File		0: 0	16: 16	Scale
Tags		1: 1	17: 17	+ 1.1
Text		2: 2	18: 18	+
Translation (CharSet)		3: 3	19: 19	+ 151
View Windows		4: 4	20: 20	+
	Focus It	5: 5	21 : 21	+ 2:1
	Call up	6: 6	22: 22	+
		7: 7	23: 23	+ Screen
		8: 8	24: 24	+ 💿 <u>Rig</u> ht
		9: 9	25: 25	+ O Left
		10: 10	26: 26	+
		11: 11	27: 27	+
		12: 12	28: 28	+
		13: 13	29: 29	+
		14: 14	30: 30	+
		15: 15	31 : 31	+
		<u>S</u> ave	Apply <u>Revert</u>	

Preferences [steng]	
<u>C</u> ategory	Set dialog look/feel preferences.
Description Compatibility Database Dimensions Drawing GUI Options	Dialog Boxes: Windows
Icon Colors Input Memory Usage Operation Reference File Tags Text Tools Translation (CharSet)	Font Dialog <u>F</u> ont: <u>12 Pt ▼</u> Border Font: <u>12 Pt ▼</u>
	Focus Item Description For more options, click on the category list at left.

Preferences [steng]	
<u>C</u> ategory	Set memory usage preferences.
Description Compatibility Database Dimensions Drawing GUI Options Icon Colors Input Memory Usage Operation Reference File Tags Text Tools Translation (CharSet)	Max. Element Cache: 10240 <u>R</u> esource Cache: 1024 <u>Undo Buffer:</u> 2048 <u>Font Cache:</u> 256 Conserve Memory Cancel Disable OLE Automation Disable OLE Automation
View Windows	Focus Item Description
	Maximum size (K) of the font cache.

Preferences [steng]	
Category	Customize operational preferences.
Description Compatibility Database Dimensions Drawing GUI Options Icon Colors Input Memory Usage Operation Reference File Tags Text Tools Translation (CharSet) View Windows	Locate Tolerance: 10 □K Pointer Size: Normal Cancel Pointer Type: Orthogonal Cancel Display Levels: Names Cancel ✓ Immediately Save Design Changes Save Settings on Exit Compress Design on Exit ✓ Compress Design on Exit Enter into Untitled Design Enter into Untitled Design ✓ Reset Aborts Fence Operations ✓ Level Lock Applies for Fence Operations ✓ Use Optimized Fence Clipping Use Semaphore File for Locking Focus Item Description Select either normal or full screen pointer size.

Preferences [steng]	
<u>C</u> ategory	Set reference file preferences.
Description Compatibility Database Dimensions Drawing GUI Options Icon Colors Input Memory Usage Operation Reference File Tags Text Tools Translation (CharSet) View Windows	✓ Locate On When Attached ✓ Snap On When Attached ✓ Use Color Table Cancel ✓ Use Level Names Cancel ✓ Beload When Changing Files Save Settings to Save Changes Ignore Update Sequence Store Full Path When Attached Max. Ref. Files: 255 Nest Depth 0 0 ✓ Focus Item Description For more options, click on the category list at left.

Preferences [steng]	
Preferences [steng] Category Description Compatibility Database Dimensions Drawing GUI Options Icon Colors Input	Set text preferences. ✓ Display Text with Line Styles) <u>DK</u> Fit Text by Inserting Space
Operation Reference File Tags Text Tools Translation (CharSet) View Windows	Degree Display Char 176 Text Editor Style Dialog Box Focus Item Description Display text using line styles?

Preferences [steng]	
<u>Category</u>	Customize tool settings.
Description Compatibility Database Dimensions Drawing GUI Options Icon Colors Input Memory Usage Operation Reference File Tags Text Tools Translation (CharSet) View Windows	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
	Focus Item Description Draw border around icon only when selected or when the cursor is over it.

Preferences [steng]		
Category	Customize view window look/layout.	
Description Compatibility Database Dimensions Drawing GUI Options Icon Colors Input Memory Usage Operation Reference File Tags Text Tools Translation (CharSet) View Windows	 ✓ Scroll Bars on View Windows Black Background -> White ☐ Tile Like IGDS ✓ Enhanced Dither ✓ Use Backing Store Update Frequency (secs): 0.5 Gamma Correction: 1.00 	<u>O</u> K Cancel
	Focus Item Description Use enhanced MicroStation dithering or System default?	

Dimension Settings

The SDO CADD load is delivered with the following pre-set Dimension Settings.



Dimension Settings; Lines 1

S Dimension Settings		
Custom Symbols Dimension Lines Extension Lines Placement Terminators Terminator Symbols Text Tolerance Tool Settings Units Unit Format	✓ Extension Lines ✓ Join When Text Outside Geometry ①ffset: 0.500000 Extension: 0.500000 Attributes ○ Color: 0 ○ Style: 0 ○ Weight: 0	
Text Tolerance Tool Settings Units Unit Format Focus Item Description	Extension: 0.500000 Attributes Color: 0 Style: 0 Veight: 0	

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

Dimension Settings; Terminators 1

THE CADD MANUAL

Custom Symbols Dimension Lines Extension Lines Placement Terminators Terminator Symbols Text Tolerance Tool Settings Units Unit Format	<u>A</u> rrow: <u>S</u> troke: <u>D</u> rigin: <u>D</u> ot:	Cell Cell Cell	v v v	Name: Name: Name: Name:	ALT SLASH STERM ADOT	

名 Dimension Settings		
Custom Symbols Dimension Lines Extension Lines Placement Terminators Terminator Symbols Text Tolerance Tool Settings Units Units Unit Format	Orientation: Above ▼ Justification: Center ▼ Text Frame: None ▼ Margin 0.500000 ▼ Underline Text (NTS) Attributes ▼ ✓ Color: 0 ● ✓ Color: 0 ● ✓ Color: 0 ● ✓ Eont: 68 ● ● Height: 0.00000 ● ● Width: 0.00000 ●	
Focus Item Description		
Set dimension text param	ieters	

Dimension Settings; Text 1

2 Dimension Settings		
Custom Symbols Dimension Lines Extension Lines Placement Terminators Terminator Symbols Text Tolerance Tool Settings Units Units	Icool: ✓ Size Arrow Terminators Left: ► Hight: ► First: None Joint: None	 ✓ Left <u>Extension</u> ✓ Right Extension ✓ Stack Dimensions ✓ Arc Symbol
Focus Item Description	Prefix: None ▼ Suffix: None ▼ Te <u>x</u> t: Standard ▼	

Custom Symbols	<u> </u>	AEC	•	
Dimension Lines Extension Lines	Primary —			
Placement	Units:	English	▼	
Terminators	<u>A</u> ccuracy:	1/16	•	
Terminator Symbols	Label:	x'-x"	•	
Tolerance Tool Settings	Secondary -			
Units	Show Seco	ondary Units		
Unit Format	U <u>n</u> its:	Millimeters	<u> </u>	
	Accuracy:	0.12	T	
	La <u>b</u> el:			
	Scal <u>e</u> Factor:	.000000		
ocus Item Description				

Dimension Settings; Units 1

Custom Symbols	Angle Format					
Dimension Lines Extension Lines Placement Terminators Terminator Symbols Text Tolerance Tool Settings Units Units	Units: Degrees ▼ Accuracy: 0.1234 ▼ Display: DD^MM'SS" ▼ Metric Format Use Comma for Decimal					
	Primary ✓ Show Leading Zero ✓ Show Irailing Zeros					
ocus Item Description	Secondary Show L <u>e</u> ading Zero Show T <u>r</u> ailing Zeros					

Structures Menu Bar

The Structures Design Office (SDO) CADD setup includes a custom "MDL" application, "barmenu.ma" The menubar is 'dockable' under the task bar,

名 bda. dgn (2D) - Mia	rostatio	n/J								
File Edit	Element	Settings	Tools	Ut lities	Works	bace W	/indow	Help	FDOT		
Attach 1xtS	iiz Level:	Scale I	JUM Ap	plications	Boiders	l ables	Cells I	erm -	'atterns	Ang/Slope	Locks
								-			
5 Window 1	•										
r mav be	"torn	awav"									
i illay be		uwuy	•								
🚰 bda, dgn (j	2D) - Mier	astation.	1								
-ile Boit	tramelt	Settings	Icols	Uh ifies	Workstaa	æ win:	:04" He	slo H	601		
n 🛩 i		X De	B .	nal	5 2	2	3/5	6 7 8	31		
					<u> </u>		اد اد اد	in land a	-		
A WEIGHT T											
Pathananahaaraana				200212010200000000000000000000000000000				COLUMN DE LA COLUMN	CHURCH MILLION	point Michael Missission	and the second se
Shruch	ir es Barm	en. '99	(English) J_ne	.922						×
Alton	TxIS z Lo	wols Ecc	le LCM	Application	na Boida	3 Table:	s Cols	- zm	Pattern	 Ang/Slope 	E Looks

Menu bar item's are shown as thirteen 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

Structu	ires Bar	menu i	(Englis	sh) :	September	2000						×
Attach	TxtSiz I	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
Structu	ires Englis	h Cell L	ib									
Proj2d.	cel (Proje	ct Spec	ific)									
RC=?												
RC=:												

Structures English Cell Lib- Attaches the SDO English cell library (StEng.cel). **Proj2d.cel (Project Specific)**- Attaches the user's 2d project cell library.

RC=? - Returns the currently attached cell library.

RC=: - Brings up **Attach Cell Library** dialog box to browse for a cell library.

TxtSiz.

Using the **TxtSiz** pull-down keeps the drawing text within SDO standards. Select the border scale before selecting your text size (See '"Scale" Menu Item).

Structu	ires Bo	Irmenu	(Englis	sh) :	September	2000						×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
_	Revisi	ons	-			_						
	Annot	ate										
	Views											
	Sheet	Titles										
	Sectio	n Arrow										
	Initials											
	Sheet	#										
	Proj. #	ŧ										
	Large											
	Larger	f										

To determine size of placed text multiply the active scale by the test size shown.

Revisions -	.0050'.	Views-	.0080'
Annotate -	.0063'	Sheet Titles -	.0073'
Section Arro	w 0080'	Sheet # -	.0058'
Initials -	.0058'	Proj. # -	.0058'
Large -	.0084'	Larger -	.0100'

Levels

This menu provides most of the level symbology needed to produce plans that comply with the SDO CADD Standards. These selections will set your color, level, style and weight for each type of classification. Also provided are All On and All Off for all levels and specific levels such as Plot Level 60 (shape) and Plot Level 51 (linestring). These shortcuts do away with keying in "on=" and opening the "levels" dialog box

Structures Bo	rmenu (English) S	ieptember.	2000						×
Attach TxtSiz	Levels Scale UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
	All On								
	All Off								
	Plot Level 60 On								
	Plot Level 51 Un								
	Plot Level 60 Ulf								
	FIDELEVELOT OIL								
	Choose Active Level B	elow							
	Border								
	Centerline								
	Concrete								
	Loncrete-Hidden								
	Dimension Lines	2							
	Electrical								
	Exist-Hidden								
	Fill Txt/Shapes								
	Miscellaneous								
	Miscellaneous-Hidden								
	Prestress Steel								
	Post-tension Steel								
	Slope Protection	•							
	Reinforced Steel								
	Site	•							
	Structural Steel								
	Structural Steel-Hidder								
	Timber								
	Timber-Hidden								

Scale

Scale selections are provided for Engineering units as well as Architectural Units. Select a scale before setting text size, choosing a line terminator, placing cells and before placing the border .

Structures Barmenu i			Septe	ember							×
Attach TxtSiz Levels	Scale	UCM	Appli	cations	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
	Engine	eering	•	10						1000100100	
	Archite	ecture	•	15							
				20							
				30							
				40							
				50							
				60							
				100							
				200							
				400							
				500							

UCM (User Commands)

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

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

Structu	ures Bo	irmenu	(Englis	:h) :	September	2000						×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
		2441		Set A	ctive Ang 2pt:	s				and a second		
				Set A	active Ang 3Pt	s						

MDLApps

The Structure's Menubar includes applications which have been developed specifically for use in detailing structures plans. See the Table of Contents for an explanation of each application

Structures Barmenu (English) 3	September 2000				×
Attach TxtSiz Levels Scale UCM	Applications Borders Tables Cells	Term	Patterns	Ang/Slope	Locks
	Boring Log Generator				
	Bridge Drawing Automation (BDA)	+			
	Design File Cleanup				
	Elevation Flag Modifier				
	Georgia Skew				
	Rebar				
	Revision Cloud				
	Steel Shapes				
	Super Section				
	Weld Symbols				





Borders

After selecting the proper scale, you may select the border you wish to place. The Structures Border is a "true half-size" border for plotting to 11 x 17 paper. The actual drawing area is 9.72" x 15.36". See "Scales."

Structu	ires Bo	irmenu	(Engli	sh)	September	2000			194			×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
					andt.	Structur	es 🗕				2004 - 100 - 1	
						KeyShe	et					
						ReHab	and a second					
						8.5 x 11						

Tables

These tables assist in creation of commonly used items such as quantity boxes and geometry data. The horizontal and vertical curve data diagrams have data entry fields, and can be completed very quickly. Attach the Structures cell library and select the active scale before placing tables.

Structu	ires Bo	irmenu	(Englis	:h)	September	2000						×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
					505974 (111		SuperS	itructur	e Qty			
							SubStr	ucture	Qty			
							Horizor	ntal Cu	rve			
							Vertica	l Curve	,			

Cells

This menu item calls the most frequently used cells in the SDO cell library that are not called by another routine. Some of these cells must have an active scale set before use. Some are meant to be placed at AS=1. Preset battered pile angles are available for pile placement.

If you have any cells which may be useful to everyone as a group, please forward them to SDO CADD Development and Support Section for inclusion into the master cell library.

Structu	ires Bo	irmenu	(Englis	sh) 3	September	2000							×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/	Slope	Locks
			\$\$\$2777777					Piles	(Concr	ete)			
								Piles	(Batter	ed)	•		
								Piles	(Steel)		•		
								Bean	ns (Pres	stressed)	•		
								Barrie	ers		+		
								Rails			+		
								Symb	ools		+		
								Deta	ils		+		
								Misc			+		
								Engi	neer of	Record	+		
								100000	222252255		22.22.22.2		

Term

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 from the Scales menu, the Terminator Scale (TS=) must be set manually.



Patterns

Select the proper scale and attach the "Steng" 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.

Structi	ures Bo	irmenu	(Englis	sh) :	September	2000						×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
_										Concrete		
										Hatch		
										Earth		
										Sand		
				Rock								
										Wood		
										Light Sh	ade	
										Dark Sh	ade	
										Steel		
										Solid		
										Binran		
										Backfill		

Slopes

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

Structu	ires Bo	irmenu	(Englis	sh)	September	2000					14	×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Locks
											Reset Activ	ve Ang to 0
											45 /	
											90	
											135 \	
											180 <	
											225 /	
											2701	
											315 \	
											.02'Lt.	
											.02'Rt	
											1.5:1 Lt.	
											1.5:1 Rt	
											2:1 Lt.	
											2:1 Rt	
											3:1 Lt.	
											3:1 Rt.	
											4:1 Lt.	
											4:1 Rt.	

Locks

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

5tructu	ires Bo	irmenu	(Englis	sh)	September	2000			-	100 D		×
Attach	TxtSiz	Levels	Scale	UCM	Applications	Borders	Tables	Cells	Term	Patterns	Ang/Slope	Lock
												Inside
												Overlap
												Clip
												Outside Void
												Overlap Void
												Clip Void
												Keypoint Snap
												Nearest Snap
												Graphic Group
												Intersection
												Axis
												Isometric
												Association

Boring Log Generator

The Boring Log Generator a JMDL application that creates boring sheets using the boring data created from within the SPT97 application available on the Structures Internet Site. This application only runs from within MicroStation/J & PowerDraft/J. The application can be invoked either from the Structures Barmenu from the applications pulldown or using the keyin "java fdotsdo.jBorelog.jBorelog".



Once invoked, enter the filename and location of the SPT97 data files that are to be used for the boring sheet generation. You may enter up to 4 input files that must all be of the same unit system (all English or all metric).

😤 Boring Log Applicat	tion v1.0		
Location of Boring Log data	a files		
#1	I		
#2			
#3			
#4			
Cell Scale Auto 💌	Text Scale	Auto 🔽	·

When at least one input file is chosen, the outline of the drawing will be attached to the cursor and you may place the sheet by pressing the accept button on the mouse.

The program will scale text & patterning to the correct size. If you wish to override the default scales you may change the Cell & Text scales independently using the drop down lists.

Reinforcing Steel Quantity Program

(Rebar)

REBAR is an MDL application for use with MicroStation. 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 a final computation book. All bar bends are based on the Structures Design Office Standard Index 1300. The Steng.cel must be attached to the current design file.

d: \Alp	e Selectior ha Data\C	AD Apps\	Rebar\ken.inp		- Bar Weights Record:	for Record a 0.000	& Total/Unit(SubTot	[s] Total
ata Type	Size De	es Leng)th Bars /	4 G		Er	nglish	d.
B	C	D	E F		H J	к	N O	WT/Unit
0.000	0.000	0.000	0.000 0.0	00 0	.000 0.000	0.000		4.303
Data Cards		a - 110		0.50	1.000		10 (PA)	
10								
J 7	VERTICA	T SLEET	FOR WALL					
-								
54	80	20 1						
	160	1						
5B	120	1						
5B 5C								
5B 5C Becord (ommands				Bun			

Program Operation:

Start Rebar by selecting the program from the Structures Menubar or key-in "MDL load rebar". A sample input file is delivered with the program.

Pull-down Menus:

File	Files may be opened, saved, edited or the program may be exited.
Edit	Full screen edit sessions of input files.
Search	Search for a particular type of code.
Record	Go to a particular record in the input file

Price Price per pound in the Unit Code. Program will use this number to calculate the total cost of reinforcing steel for an individual bar or the

Input Codes:

D-Data	The reinforcing bars.
V-Vary	Indicates a range of bars that vary in length.
*Identi.	The job number, county or another identifier.
U-Unit	Defines the type of unit (i.e. End Bent, Wall, etc.)
K-Skip	This code is used to show a blank line in the input.
Comment	Use this code for any comment you might want to show
T-Total	Total weight of rebar will be computed to beginning of job or to
	a preceding Total Column.
Z-Z	Indicates End of Data

RECORDS COMMANDS:

- **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 REBAR 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)
a	

- **Save** Save any changes you may have made to the input file.
- **Exit** Exits the REBAR program.

Georgia Skew

The Georgia Skew Program is a two step process. Data is entered into the Georgia Skew program and a report is generated. The Georgia Skew MDL application is run using this report to produce a drawing.

Georgia Skew Program Operation:

A program (GSKBLD.EXE) is included to help build input files for the Georgia Skew program. This program does not have to be used, input files can be built 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, you will be presented with a standard windows program interface that lets you open and/or save program data

cure concrois				
1 2 3 4 12345678981234567898123456789812345678981	5 23456789812345678	6 7 9812345678981	8 234567898	
EE82 17875-3483 SOUTHBOUND S.R. 681 () EE DOUBLE BOX STEEL DSH-ST98681.JOE 11648888888166688888881647753188 45888888 2 8888888 816421389881658638988	RAMP "L") DVER I- .Data(SR681EL) CO 50000000R1/8	75 Ded by JLF 6-4	CONT 90	•
4 318400 30000001600000 -3046000 5 -300000 -220000 00000 60000 1000	888			
6CONST 2400 2400 2400	IEET PADT	ue.	•	
782CRD 68888	LEFT GUTT	FR	c	-
Double Click on a Line to Edit				2000
Location Data Horizontal Curve Data Vertical Curve Data -Stations Vertical Curve Data -Crades and Elevation Crown/S.E. Lane Definitions Superelevation Data Longitudinal Line Data Span Identification Back Bent Data Ahead Bent Data	<u>A</u> dd Card Insert Card <u>D</u> elete Card	Hote: Inser insort now highlighted odit box.	t will card abou line in	e

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, in the card list box, highlight the card which you would like the new card to be inserted above. Next, from the list on the bottom left of the program screen, choose the type of card you would like to insert and 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.

When input is completed, save your file. 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. When 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

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 visa-versa for English.

From the Structures Menubar choose MDL APPS.->GA. Skew or use the MicroStation key-in "MDL load bdeck".



The Georgia Skew MDL dialog box appears asking for certain information.

🔁 Ga. Skew Bridge Pgm. 🛛 🛛 🗙	l
v2.00	
Input from existing report	
🔽 Draw bridge deck	
☑ Draw elevation charts	
☑ Draw deck elevation flags	
Select curve direction	
Text Scale 3/8 = 32	
RUN EXIT	

It is suggested that this program be run from an existing report. This will minimize undetected errors in the report file. The **Input from existing report** option must be enabled if using units for input or output. Enable the other Drawing options that you need. The **Text Scale** does not need to be set if you are using an 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.

Superstructure Cross Section Program

(SuperSect)

Supersect 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	43.307	🔽 Beams
Thickness [0.689	
Slope Left 🛛	0.020	Steel
Slope Right	-0.020	Traditional
PGL-Lt/+Rt	0.000	-
Text Scale	1:32	
Section	Full	More >>
Dimension	Full	Options -
		Drains
Open	Draw	GGroup
Sava	E vit 1	

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

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 program

More>>

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 Spacir	ng:Used for variable beam spacing.
Beam Spacing:	Up to 13 beams. Use spacing #1 if spacing is constant.

DRAW DIAPHRAGM

Concrete:Draw concrete diaphragmSteel: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 (in). Transverse Steel (Top & Bottom)
Distribution:	Spacing for Distribution Steel (in). (Bottom of Slab)
Continuity:	Spacing for Continuity Steel over piers. (Future Option)
Temperature:	Spacing for Temperature Steel (in). (Top of Slab)

STEEL SIZE

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

Тор:	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 Labels data entry fields. Labels may be edited for use with the program.

ilab ———	Include >>	Labels
Road Width 43.307	🔽 Beams	#1 Profile Grade Line
Thickness 0.689		#2 Contruction
Slope Left 0.020	🔽 Steel	#3 1/2 in V-Groove (Typ.)
Slope Right -0.020	Traditional	#4 SECTION THRU SUPERSTRUCTURE
PGL -Lt/+Rt 0.000		#5 HALF END ELEVATION
Text Scale 1:32		#6 HALFSECTION THRU BRIDGE
Section Full	More >>	#7 🛛 %i~ Bars 16C1 @ %s = %s (Top & Bottom of S
Dimension Full	- Options -	#8 🕺 ~ Bars 16C3 @ %s = %s (Top of Slab over I
10 Jan 10	🔽 Drains	
Open Draw	GGroup	Next

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 Steng.cel or Stmet.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.

This example shows a ¹/₄" full penetration weld on the arrow side.

Weld Leader Placement	×
▼2.02 Top 1/4" Type Full Bottom 1/4" Specification Both Sides	
BEGIN] //4

This example shows a 1/8" fillet weld on the arrow side and a 1/4" fillet weld on the otherwise. 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

Weld Leader Placement X -v2.02 Top 1/47 Type Filet If AllAnound Batton 1/87 If Specification If Both Sides	\sim	1/a N	/ Place
BEGIN	$(\rightarrow - $	\rightarrow	— Text
Specification Text	\mathcal{Y}	1/0 /	11050
Place	1	18 1	\ Here
LieM	1		
Here	0		

full. One side or both sides of the leader may be selected.

Stand London Francescol v2.82 Top 1/4* Type File: ₽ AllAnsand Bottern 1/4* ₽ Specification ₽ Both Sides		
8EGIN	$\bigcirc \frac{1/4}{1/4} \rightarrow 1$	Text Here
Test Hore	/ 14 V	

The above example shows a 1/4" 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.

This example shows 1/4 Bevel weld on the far side with an all around symbol and a specification.

V2.12 Top 1/4* Type Benel IP All-Around Bottom 1/4* IP Specification IP Both/Sides	\frown	1/4	/	-
BEGIN	$() \rightarrow$			l ext Here
Specification Text	Y			
Text Here	1		1	
	1			
	1			
	1			

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.

Elevation Flag Modifier (Elmod)

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 <u>Text Scale</u> and <u>Line Spacing</u> (spacing of text above the flag leader) is required as input. A line string "flag" of the proper size is required to be hand-built before using the application 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 flags at one time.

📔 Use Fe	nce
Line Space	1/2
Text Scale	3/16 = 64
M	DDIFY

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0"	0.0000	1"	0.0833	2"	0.1667	3"	0.2500	4"	0.3333	5"	0.4167
1/16"	0.0052	1/16"	0.0885	1/16"	0.1719	1/16"	0.2552	1/16"	0.3385	1/16"	0.4219
1/8"	0.0104	1 1/8"	0.0937	1/8"	0.1771	1/8"	0.2604	1/8"	0.3437	1/8"	0.4271
3/16"	0.0156	1 3/16"	0.0990	3/16"	0.1823	3/16"	0.2656	3/16"	0.3490	3/16"	0.4323
1/4"	0.0208	1 1/4"	0.1042	1/4"	0.1875	1/4"	0.2708	1/4"	0.3542	1/4"	0.4375
5/16"	0.0260	1 5/16"	0.1094	5/16"	0.1927	5/16"	0.2760	5/16"	0.3594	5/16"	0.4427
3/8"	0.0312	13/8"	0.1146	3/8"	0.1979	3/8"	0.2812	3/8"	0.3646	3/8"	0.4479
7/16"	0.0365	1 7/16"	0.1198	7/16"	0.2031	7/16"	0.2865	7/16"	0.3698	7/16"	0.4531
1/2"	0.0417	1 1/2"	0.1250	1/2"	0.2083	1/2"	0.2917	1/2"	0.3750	1/2"	0.4583
9/16"	0.0469	1 9/16"	0.1302	9/16"	0.2135	9/16"	0.2969	9/16"	0.3802	9/16"	0.4635
5/8"	0.0521	5/8"	0.1354	5/8"	0.2187	5/8"	0.3021	5/8"	0.3854	5/8"	0.4687
11/16"	0.0573	11/16"	0.1406	11/16"	0.2240	11/16"	0.3073	11/16"	0.3906	11/16"	0.4740
3/4"	0.0625	3/4"	0.1458	3/4"	0.2292	3/4"	0.3125	3/4"	0.3958	3/4"	0.4792
13/16"	0.0677	13/16"	0.1510	13/16"	0.2344	13/16"	0.3177	13/16"	0.4010	13/16"	0.4844
7/8"	0.0729	7/8"	0.1562	7/8"	0.2396	7/8"	0.3229	7/8"	0.4062	7/8"	0.4896
15/16"	0.0781	15/16"	0.1615	15/16"	0.2448	15/16"	0.3281	15/16"	0.4115	15/16"	0.4948
6"	0.5000	7"	0.5833	8"	0.6667	9"	0.7500	10"	0.8333	11"	0.9167
6" 1/16"	0.5000	7" 1/16"	0.5833 0.5885	8" 1/16"	0.6667 0.6719	9" 1/16"	0.7500 0.7552	10" 1/16"	0.8385	11" 1/16"	0.9167 0.9219
6" 1/16" 1/8"	0.5000 0.5052 0.5104	7" 1/16" 1/8"	0.5833 0.5885 0.5937	8" 1/16" 1/8"	0.6667 0.6719 0.6771	9" 1/16" 1/8"	0.7500 0.7552 0.7604	10" 1/16" 1/8"	0.8333 0.8385 0.8437	11" 1/16" 1/8"	0.9167 0.9219 0.9271
6" 1/16" 1/8" 3/16"	0.5000 0.5052 0.5104 0.5156	7" 1/16" 1/8" 3/16"	0.5833 0.5885 0.5937 0.5990	8" 1/16" 1/8" 3/16"	0.6667 0.6719 0.6771 0.6823	9" 1/16" 1/8" 3/16"	0.7500 0.7552 0.7604 0.7656	10" 1/16" 1/8" 3/16"	0.8333 0.8385 0.8437 0.8490	11" 1/16" 1/8" 3/16"	0.9167 0.9219 0.9271 0.9323
6" 1/16" 1/8" 3/16" 1/4"	0.5000 0.5052 0.5104 0.5156 0.5208	7" 1/16" 1/8" 3/16" 1/4"	0.5833 0.5885 0.5937 0.5990 0.6042	8" 1/16" 1/8" 3/16" 1/4"	0.6667 0.6719 0.6771 0.6823 0.6875	9" 1/16" 1/8" 3/16" 1/4"	0.7500 0.7552 0.7604 0.7656 0.7708	10" 1/16" 1/8" 3/16" 1/4"	0.8333 0.8385 0.8437 0.8490 0.8542	11" 1/16" 1/8" 3/16" 1/4"	0.9167 0.9219 0.9271 0.9323 0.9375
6" 1/16" 1/8" 3/16" 1/4" 5/16"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260	7" 1/16" 1/8" 3/16" 1/4" 5/16"	0.5833 0.5885 0.5937 0.5990 0.6042 0.6094	8" 1/16" 1/8" 3/16" 1/4" 5/16"	0.6667 0.6719 0.6771 0.6823 0.6875 0.6927	9" 1/16" 1/8" 3/16" 1/4" 5/16"	0.7500 0.7552 0.7604 0.7656 0.7708 0.7760	10" 1/16" 1/8" 3/16" 1/4" 5/16"	0.8333 0.8385 0.8437 0.8490 0.8542 0.8594	11" 1/16" 1/8" 3/16" 1/4" 5/16"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8"	0.5833 0.5885 0.5937 0.5990 0.6042 0.6094 0.6146	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8"	0.6667 0.6719 0.6771 0.6823 0.6875 0.6927 0.6979	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8"	0.7552 0.7604 0.7656 0.7708 0.7760 0.7812	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8"	0.8383 0.8385 0.8437 0.8490 0.8542 0.8594 0.8594	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427 0.9479
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16"	0.5833 0.5885 0.5937 0.5990 0.6042 0.6094 0.6146 0.6198	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16"	0.6667 0.6719 0.6771 0.6823 0.6875 0.6977 0.6979 0.7031	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16"	0.7552 0.7604 0.7656 0.7708 0.7708 0.7760 0.7812 0.7865	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16"	0.8383 0.8385 0.8437 0.8490 0.8542 0.8594 0.8646 0.8698	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427 0.9429 0.9431
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	0.5833 0.5885 0.5937 0.6042 0.6094 0.6146 0.6198 0.6250	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	0.6667 0.6719 0.6771 0.6823 0.6875 0.6927 0.6927 0.6979 0.7031 0.7083	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	0.7552 0.7604 0.7656 0.7708 0.7708 0.7760 0.7812 0.7865 0.7917	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	0.8333 0.8385 0.8437 0.8490 0.8542 0.8594 0.8594 0.8646 0.8698 0.8750	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427 0.9479 0.9531 0.9583
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417 0.5469	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16"	0.5833 0.5885 0.5937 0.6042 0.6094 0.6146 0.6198 0.6250 0.6302	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16"	0.66667 0.6719 0.6823 0.6875 0.6927 0.6979 0.7031 0.7083 0.7135	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16"	0.7552 0.7604 0.7656 0.7708 0.7760 0.7812 0.7865 0.7917 0.7969	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16"	0.8333 0.8385 0.8437 0.8542 0.8594 0.8594 0.8698 0.8698 0.8750 0.8802	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427 0.9427 0.9479 0.9531 0.9583 0.9635
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417 0.5469 0.5521	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8"	0.5833 0.5885 0.5937 0.6042 0.6094 0.6146 0.6198 0.6250 0.6302 0.6354	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8"	0.6667 0.6719 0.6771 0.6823 0.6875 0.6977 0.6979 0.7031 0.7083 0.7135 0.7187	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8"	0.7552 0.7604 0.7656 0.7708 0.7708 0.7812 0.7865 0.7917 0.7969 0.8021	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8"	0.8383 0.8385 0.8437 0.8490 0.8542 0.8594 0.8698 0.8698 0.8750 0.8802 0.8854	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9479 0.9479 0.9531 0.9583 0.9635 0.9687
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417 0.5469 0.5521 0.5573	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16"	0.5833 0.5885 0.5937 0.6042 0.6094 0.6146 0.6198 0.6250 0.6302 0.6354 0.6406	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16"	0.6667 0.6719 0.6771 0.6823 0.6875 0.6927 0.6979 0.7031 0.7031 0.7083 0.7135 0.7187 0.7240	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16"	0.7552 0.7604 0.7656 0.7708 0.7708 0.7760 0.7812 0.7865 0.7917 0.7969 0.8021 0.8073	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16"	0.8383 0.8385 0.8437 0.8490 0.8542 0.8594 0.8646 0.8698 0.8750 0.8802 0.8802 0.8854 0.8906	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427 0.9479 0.9531 0.9583 0.9685 0.9687 0.9740
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417 0.5469 0.5521 0.5573 0.5573	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4"	0.5833 0.5937 0.5990 0.6042 0.6094 0.6146 0.6198 0.6250 0.6302 0.6354 0.6406 0.6458	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4"	0.66667 0.6719 0.6771 0.6823 0.6875 0.6927 0.6979 0.7031 0.7083 0.7135 0.7187 0.7240 0.7292	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4"	0.7550 0.7604 0.7656 0.7708 0.7708 0.7760 0.7812 0.7865 0.7917 0.7969 0.8021 0.8073 0.8125	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4"	0.8383 0.8385 0.8437 0.8542 0.8594 0.8594 0.8698 0.8698 0.8750 0.8802 0.8802 0.8804 0.8906 0.8958	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9427 0.9479 0.9531 0.9583 0.9685 0.9687 0.9740 0.9792
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417 0.5469 0.5521 0.5573 0.5573 0.5625 0.5677	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16"	0.5833 0.5937 0.5990 0.6042 0.6094 0.6146 0.6198 0.6250 0.6302 0.6354 0.6458 0.6458 0.6510	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16"	0.66667 0.6719 0.6823 0.6875 0.6927 0.6979 0.7031 0.7083 0.7135 0.7187 0.7240 0.7292 0.7344	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16"	0.7500 0.7552 0.7604 0.7656 0.7708 0.7708 0.7812 0.7865 0.7917 0.7969 0.8021 0.8021 0.8073 0.8125 0.8177	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16"	0.8383 0.8385 0.8437 0.8490 0.8542 0.8594 0.8698 0.8698 0.8750 0.8802 0.8802 0.8854 0.8906 0.8958 0.8958	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16"	0.9167 0.9219 0.9271 0.9323 0.9375 0.9479 0.9479 0.9531 0.9583 0.9687 0.9687 0.9740 0.9740 0.9744
6" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16" 7/8"	0.5000 0.5052 0.5104 0.5156 0.5208 0.5260 0.5312 0.5365 0.5417 0.5469 0.5521 0.5573 0.5573 0.5625 0.5677 0.5729	7" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16" 7/8"	0.5833 0.5937 0.5990 0.6042 0.6094 0.6146 0.6198 0.6250 0.6302 0.6354 0.6354 0.6406 0.6458 0.6510 0.6562	8" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16" 7/8"	0.66667 0.6719 0.6771 0.6823 0.6875 0.6927 0.6979 0.7031 0.7031 0.7135 0.7187 0.7187 0.7240 0.7292 0.7344 0.7396	9" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16" 7/8"	0.7500 0.7552 0.7604 0.7656 0.7708 0.7708 0.7812 0.7865 0.7917 0.7969 0.8021 0.8021 0.8073 0.8125 0.8177 0.8229	10" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16" 7/8"	0.8333 0.8385 0.8437 0.8490 0.8542 0.8594 0.8698 0.8698 0.8750 0.8802 0.8854 0.8854 0.8906 0.8958 0.9010 0.9010	11" 1/16" 1/8" 3/16" 1/4" 5/16" 3/8" 7/16" 1/2" 9/16" 5/8" 11/16" 3/4" 13/16" 7/8"	0.9167 0.9219 0.9271 0.9373 0.9375 0.9427 0.9479 0.9531 0.9533 0.9635 0.9687 0.9740 0.9740 0.9740 0.9844 0.9896

Fractions of Inch and Decimals of a Foot