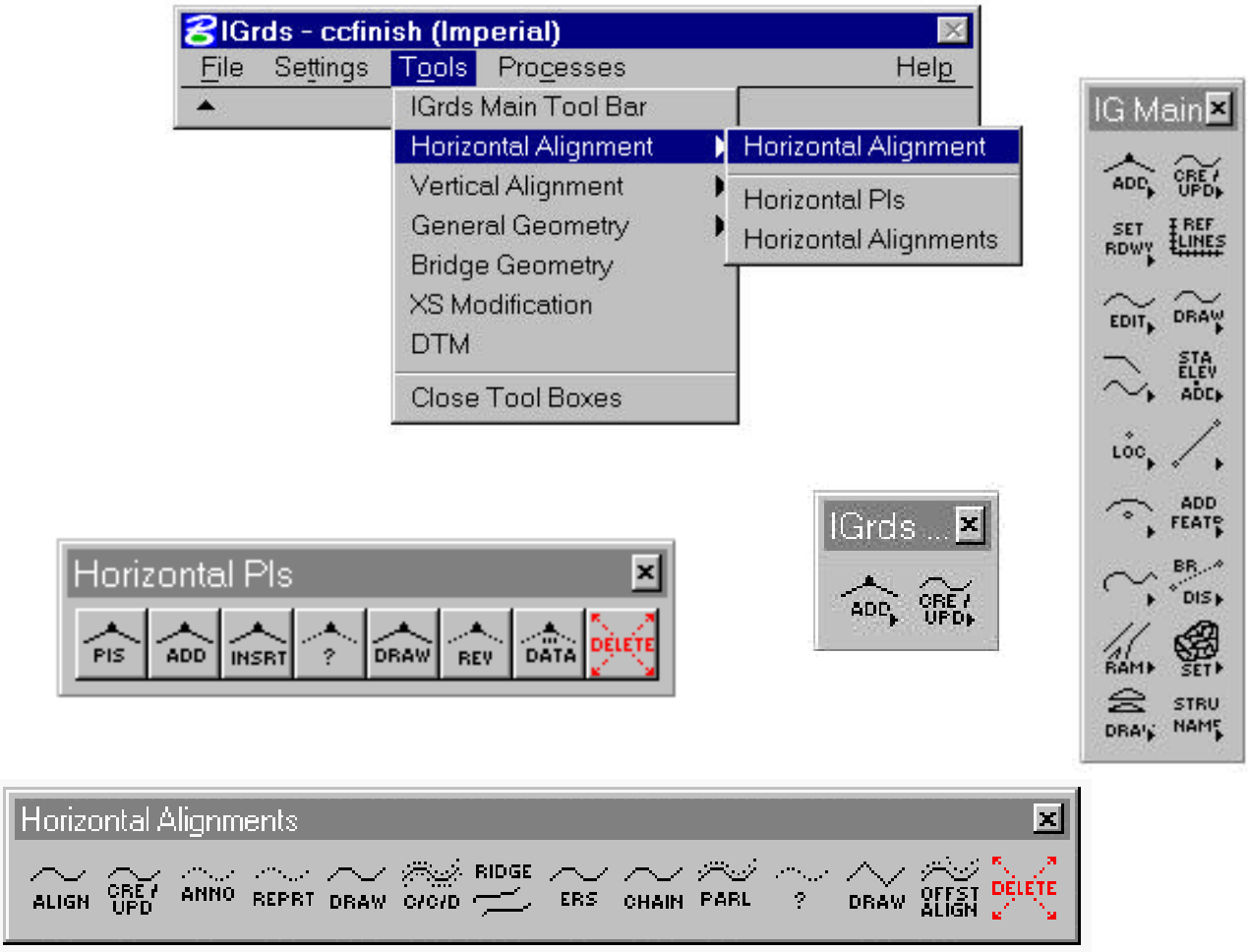
CHAPTER 3

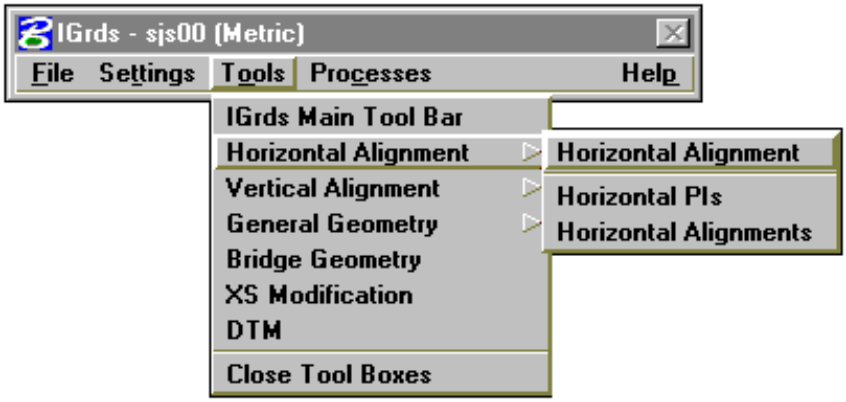
HORIZONTAL ALIGNMENT COMMANDS



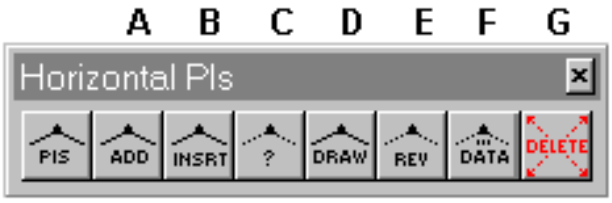
The IGrds Main Palette Provides an alternate path to subpalettes. Selecting a lower level icon initiates an IGrds command.

Figure 3-1.
Selecting and Displaying Horizontal Alignment Tools

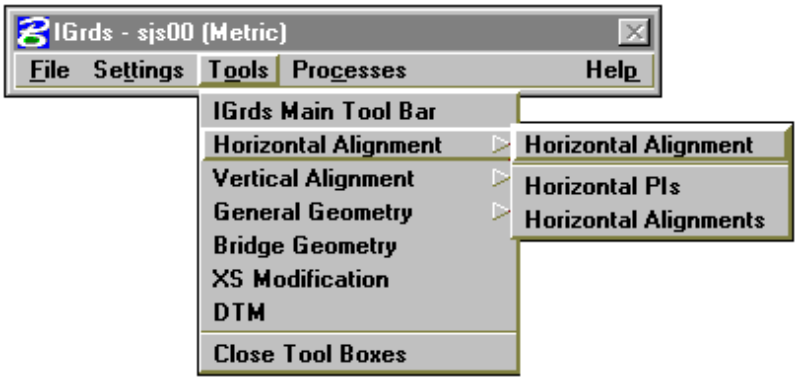
HORIZONTAL ALIGNMENT (HA)



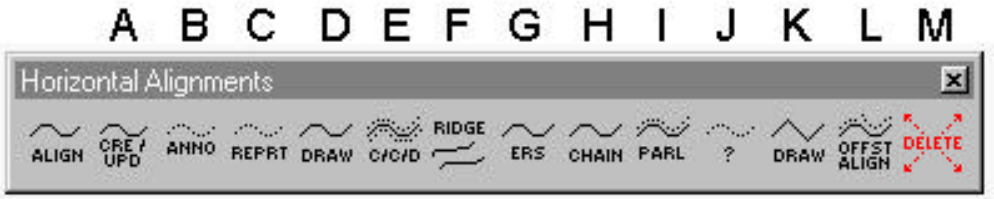
Horizontal Alignment Palette (Parent Menu)



KEY	COMMAND NUMBER	DESCRIPTION NAME	MANUAL PAGE
A	3	ADD HA PI	3-10
		ROADWAY DESIGN PARAMETERS	3-15
B	4	INSERT HA PI	3-21
C	9	IDENTIFY HA PI	3-23
D	2	DRAW HA PIs	3-24
E	7	REVISE HA PI	3-20
F	19	PLACE HA PI DATA	3-22
G	5	DELETE HA PI	3-25



Horizontal Alignment Palette (Parent Menu)



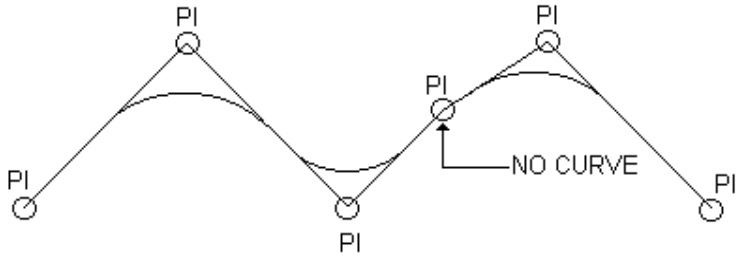
KEY	COMMAND NUMBER	DESCRIPTION NAME	MANUAL PAGE
A	10	CREATE/UPDATE HA	3-26
B	15	ANNOTATE HA	3-31
C	11	CREATE HA REPORT	3-35
D	12	DRAW HA	3-38
E	30	DRAW CROWN, CATCH OR DITCH LINES (C/C/D)	3-41
F	31	DRAW HA RIDGE LINES	3-43
G	29	ERASE HA	3-45
H	28	CREATE HA FROM CHAIN	3-29
I	25	CREATE PARALLEL HA	3-33
J	14	IDENTIFY HA	3-37
K	13	DRAW HA TANGENTS	3-40
L		OFFSET ALIGNMENTS	3-47
M	27	DELETE HA	3-46

INTRODUCTION

The Horizontal Alignment (HA) Subsystem of IGrds provides commands to establish alignments simultaneously in design and graphics files. You interactively create new alignments, or review/revise existing alignments.

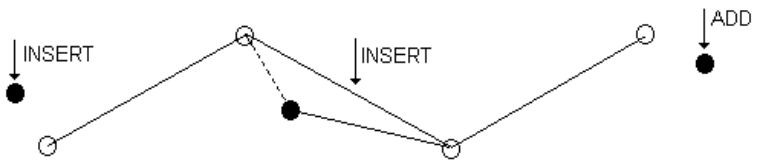
General Geometry commands may be used to calculate points for use in establishing alignments. Geometry calculations may use stored alignments.

A Horizontal Alignment is a series of straight intersecting tangents. The Horizontal Alignment commands place curves between adjacent tangents at interior points of intersection (PIs) as shown here:



The input for alignments is the beginning station and the PI points with associated curve data. PIs may also be located by projections from the previous PI. IGrds computes all other stations except where you introduce station equations.

The ADD HA PI (3) command establishes the first and subsequent PIs.



The INSERT HA PI (4) command establishes PIs between or prior to existing PIs.

The REVISE HA PI (7) and DELETE HA PI (5) commands modify alignments.

PI numbers are handled automatically.

IMPORTANT! Execute the CREATE/UPDATE HA (10) command after establishing all of the PIs for an alignment. This includes defining curve properties and any station equations. The CREATE/UPDATE HA command computes all of the properties of the alignment so that you can display it or use it in other computations. Execute this command after any change to an existing alignment. If you insert a PI before the first PI or add a PI after the last PI, you must delete the previous first PI or last PI and insert or add a PI to replace that PI and make it a No radius (P-Line), PI, or a PI with a curve(s) and/or spirals.

Roadway Designation

You can define up to 100 alignments, each designated by a roadway designation.

The SET ACTIVE ROADWAY (205) command establishes or changes the active roadway.

The active roadway remains in effect until changed, and all data entries relate to that roadway.

Stationing and Equations

Enter stations in feet or meters (e.g., 12321.5 for 123+21.5). If you do not use equations, the only station you must enter for an alignment is the beginning PI or POT station.

Enter the actual station when you introduce equations. (The ADD HA PI (3) command gives instructions for several equation location options.)

Overlap equations (ahead station has a smaller number than the back station) are adjusted automatically. For imperial unit projects, 1,000,000 feet is added for each overlap equation. See Figure 3-2. For metric unit projects 100,000 meters is added. Include this station numbering scheme in all subsequent references to stationing. Do not put station equations at the beginning or ending PI.

General Specifications

The following general AN Option Horizontal Alignment specifications apply:

- A baseline roadway must be used for terrain data (multiple baselines can be used).
- IGrds performs horizontal position calculations for each design roadway. (Required for original ground profiles through IGrds.)
- You can specify up to 100 PIs for each design roadway.
- Alignments transferred from AN are in the form of fixed single PI curves.

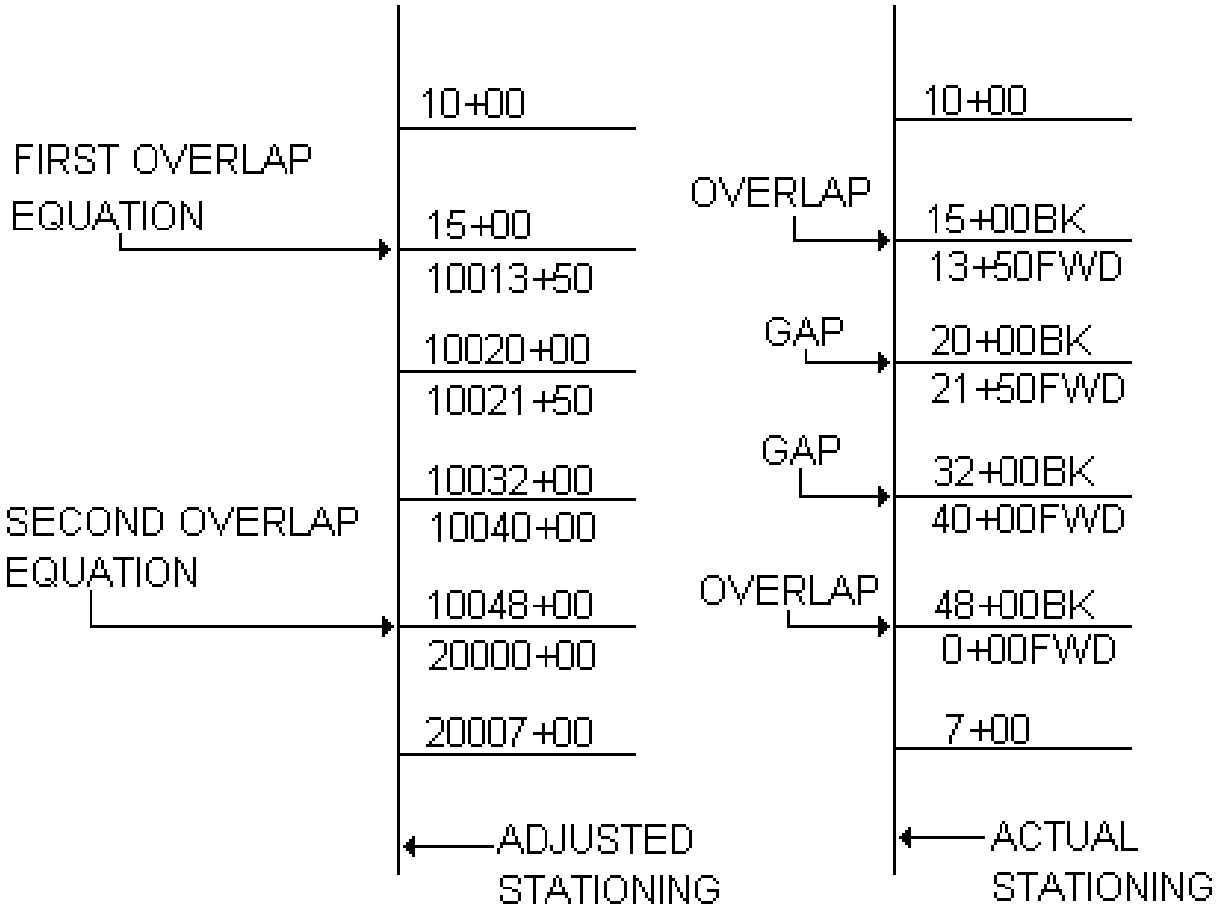


Figure 3-2
Equation Scheme

Alignment Features

- Fixed PI locations of:
  - tangent bearings
  - lengths (PT to PC)
  - curve lengths
- Define compound curves between tangents at a single PI with optional compound spiral connections.
- Enter PIs with no curve (P-Line).
- Enter POTs.
- Enter equations at PC or TS; PT or ST; or POTs.

  A PI with no curve must be a P-Line point, except for first and last PIs, which are POTs.

Transfer of Alignments to and from the AN Option

Transfer Limitations

You can transfer alignments developed in the AN Option to the IG Option and use them, with certain limitations.

The AN storage methods use special input data such as "Rounding", "Connect", and "Hold", but do not retain them. Compound PI data entered through FALO reduces to two adjacent simple PIs.

In such cases, IGrds draws and annotates transferred alignments and uses them for computation, but may not properly execute other horizontal alignment commands such as DRAW HA PIs (2), DRAW HA TANGENTS. In some cases, you must re-enter FALO-type alignments directly into IG.

Transfer of Station Equation on last PI (HALO).

IG alignments transferred to AN can only have single ASCII character identifiers.

Invalid AN Transfers

Alignments defined in AN with chord definition curves are not valid for transfer to IG.

Current HA Limitations

In addition to some AN/IG transfer limitations, the following alignment definition limitations are noted:

- The PLACE HA PI DATA (19) command does not handle compound spiral data.

Other HA Commands

Establishing Alignments

The discussion above covers regular procedures for establishing alignments. There also are three special procedures for establishing alignments:

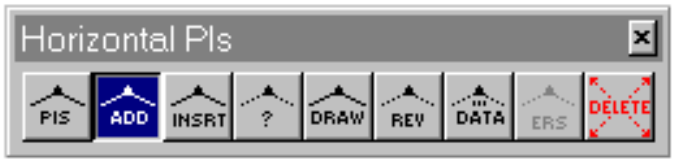
- CREATE PARALLEL HA (25)
- CREATE HA FROM CHAIN (28)
- OFFSET ALIGNMENTS

Working With Alignments

Once you have established an alignment with CREATE/UPDATE HA (10), IGrds can use it with the General Geometry commands to compute stations and offsets of points or to locate points by station and offset, and also with the following HA commands:

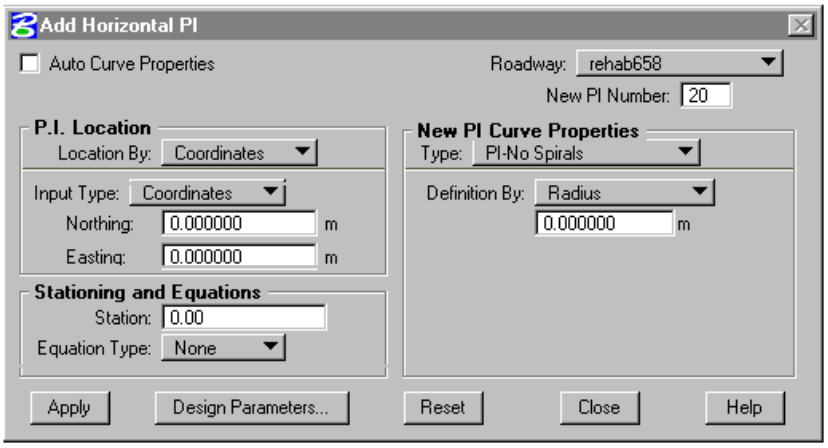
- IDENTIFY HA (14) from screen
- IDENTIFY HA PI (9) from screen
- CREATE HA REPORT (11)
- DRAW HA PIs (2)
- DRAW HA TANGENTS (13)
- DRAW HA (12)
- DRAW CROWN, CATCH OR DITCH LINES (30) (Design run must precede)
- ANNOTATE HA (15)
- PLACE HA PI DATA (19)
- DELETE HA (27)
- ERASE HA (29)

ADD HA PI



This command adds PIs

- First PI, or
- PIs beyond any existing PIs



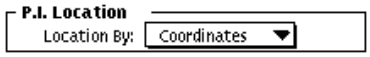
(Use Insert Horizontal PI for other cases). Numbers are handled automatically or can be entered by the user. Added PIs are stored in working files and displayed graphically. Note: When Auto Curve Properties is selected and PI with Spirals is also selected, then an additional toggle labeled Include Auto Widening appears. If Auto Curve Widening is to be considered for the curve, then this toggle should be selected so that any auto curve widening would be taken into account when calculating spiral lengths. Automatic computations are based on the Design Parameters set for the PI.

Auto Curve Properties	Push to request generation of Curve Properties based on Design Specifications and Design Parameters. Design Parameters are established using the Design Parameters Dialog Box which will be displayed if not established previously for the roadway. See Page 3-15
Roadway	Select the desired roadway. The current active roadway is shown.
New PI Number	Automatically set to the next available PI number. This can be edited to reflect a particular PI number. If the number entered is available, it will be used; otherwise the original number will be restored.

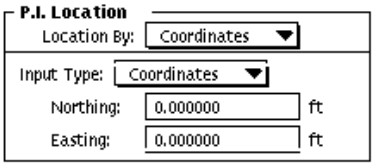
Complete PI Location and New Curve Property data as shown on the following pages before applying.

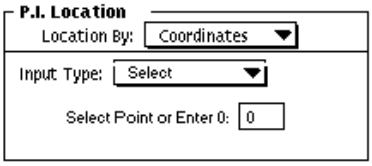
Stationing and Equations	Enter Station Value**.** Leave at 0.00 unless entering a different beginning station or a station equation. When entering a station equation, enter the forward station.

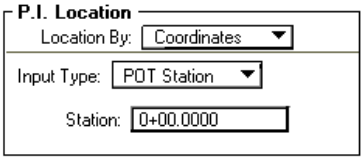
	Select Equation Type where the equation will be applied. • None • PC/TS • PT/ST • POT The equation will be placed at the selected location (type). If the equation is at a No Radius PI, use either the PC or PT equation type.
Apply	Click to execute the command.
Design Parameters	Click to view/modify the design parameters for the PI.
Reset	Click to reset values.
Close	Click to dismiss dialog box.
Help	Click to display help for this command



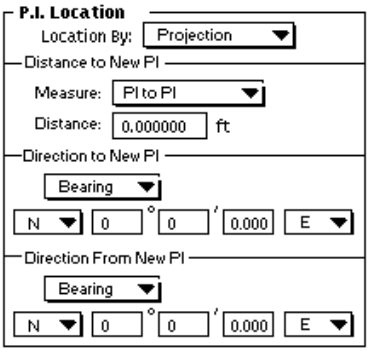
PI Location	Select Desired Option • Location By Coordinates (Discussed below) • Location By Projection (Discussed below)





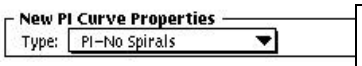


Location by Coordinates	Select input type • Coordinates Enter values or digitize a point • Select Select Geometry Point or enter point number • POT Station Enter a station where the new POT will be placed. (This option is not available if changes have been made to the alignment without executing the Create/Update command.



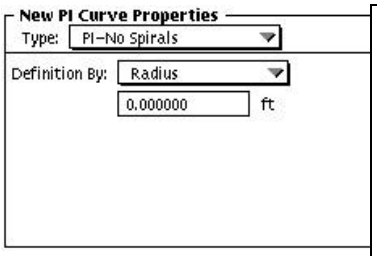
Location by Projection (PIs can be located by projection at the end of an existing horizontal alignment.)	
Distance to New PI	• Select Measure and Enter Distance ° PI to PI ° PT/ST to PI ° PI to PC/TS ° PT/ST to PC/TS
Direction to New PI (Must be given the first time projection is used, thereafter it will be taken from the previous PI ahead direction and grayed out.)	• Select Method and Enter Data ° Bearing ° Azimuth (From south) ° Line (Azimuth or) ° Point (In Direction of)
Direction from New PI (Must be given, except at the last PI.)	• Select Method and Enter Data ° Bearing ° Azimuth (From south) ° Line (Azimuth of) ° Point (In Direction of) ° Delta (Angle of the curve)

See next page for Curve Property options.



New PI Curve Properties	Select Curve Type and Complete Input • PI No Spirals • PI with Spirals • POT • PI Compound Curve Line)

The **PI-No Spirals** curve type just contains a horizontal curve. A **PI with Spirals** contains a horizontal curve with an in and/or out spiral. A **POT** (Point on Tangent) point can be the first PI, intermediate POT, or the last PI. An intermediate POT is projected to the tangent line from the preceding PI to the next PI. A **PI Compound Curve** can contain an in spiral, first horizontal curve, connecting spiral, second horizontal curve, and an out spiral. The **PI Compound Curve** does not necessarily have to contain all the above listed elements.

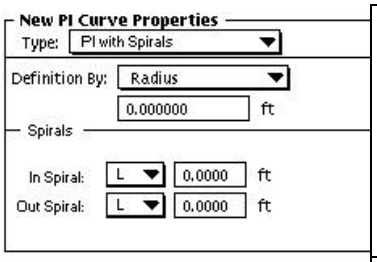


Note: When Auto Curve Properties is pushed, radius will be selected and displayed.

PI-No Spirals

Select method for defining curvature and enter appropriate data

- Radius
- Degree of Curve
- Select Arc
- Curve Length
- Tangent Length
- External Distance
- Chord Length
- Middle Ordinate
- Point on Curve



Note: When Auto Curve properties is pushed, radius will be selected and radius and spiral data will be displayed.*

PI with Spirals

Select method for defining curvature and enter appropriate data.

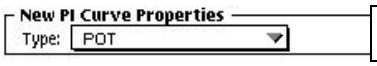
- Radius
- Degree of Curve
- Select Arc

In and Out Spirals

Select Definition Method and enter length or angle.

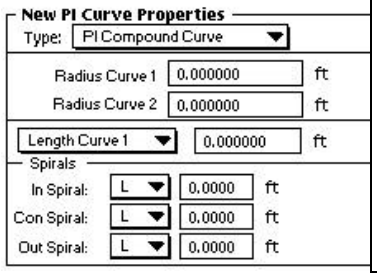
- Length
- Angle

** Spiral values cannot be edited when Auto Curve properties is enabled. To edit spiral values, turn off Auto Curve properties.*



POT

No additional data is required.

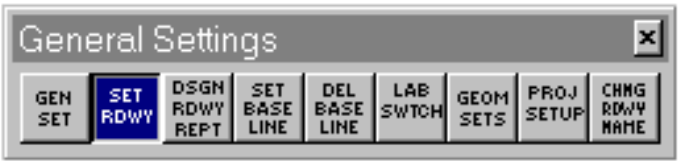


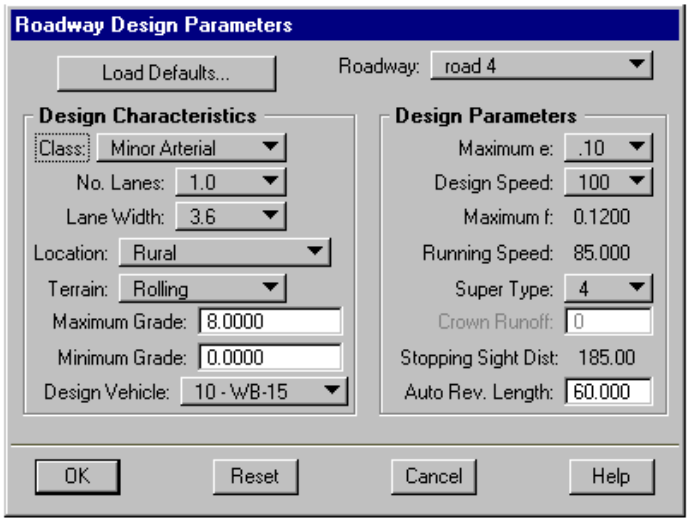
Compound Curve

Radius Curve1	Enter Value
Radius Curve2	Enter Value
Curve Length	Enter Value
Which Curve Length	Select • First Curve • Second Curve

Spirals	
In, Connecting, and Out Spirals	Select definition method and enter length or angle. • Length • Angle

ROADWAY DESIGN PARAMETERS

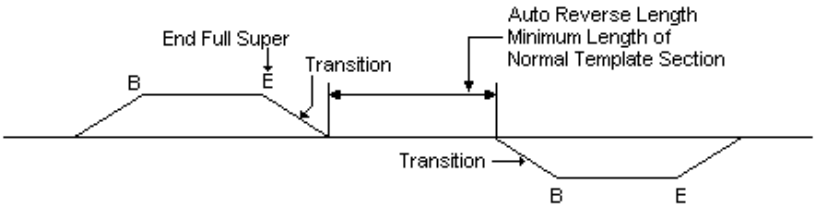




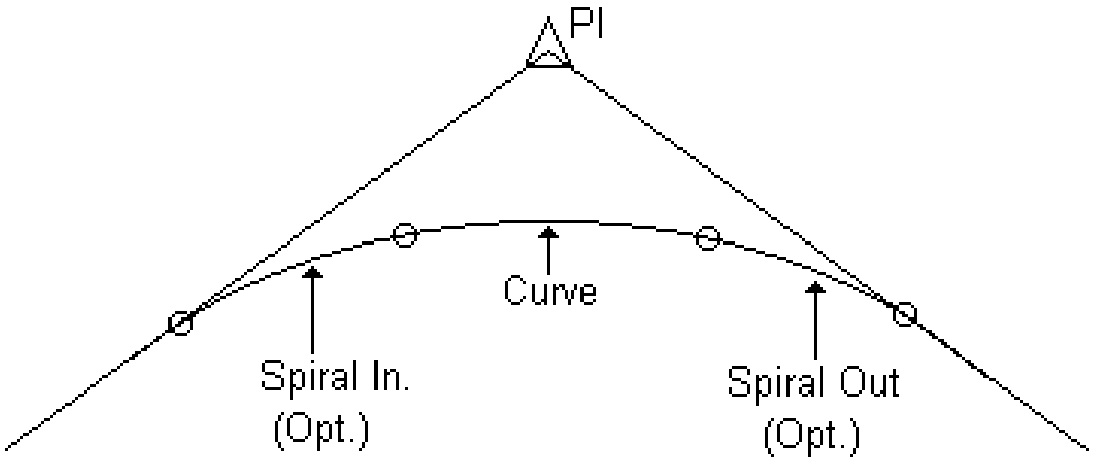
Provides for review or modification of design parameters used by several IGrds design processes. The dialog is initiated from the Set Roadways drop down dialog box, the Add/Insert/Revise dialog box, or if the user requests any automatic calculation such as curvature or superelevation without setting the design parameters for the roadway. (The roadway design parameters are set to default parameters for roadways upgraded from a previous version which did not have design parameters. When creating a new roadway the design parameters MUST be entered.) Design parameters are stored for the roadway as well as for each PI in the alignment. The following parameters are defined for the Roadway only: Class, Maximum Grade, Minimum Grade, and Auto Reverse Length. All other parameters can be modified for the Roadway or the PI.

Roadway	The active roadway is displayed. Use the option button to select a new active roadway.
Load Defaults:	Opens a dialog with an option to select a set of default design parameters which may be changed in the ha.tbl file.
Design Characteristics	
Class	Use the option button to select • Major Arterial • Minor Arterial • Collector • Ramp • Frontage Road • Freeway
No. Lanes	Use the option button to select the number of lanes. The option button values may be changed in the ha.tbl file.
Lane Width	Use the option button to select the lane width. The option button values may be changed in the ha.tbl file.

Location	Use the option button to select • Rural • Urban High Speed • Urban Low Speed
Terrain	Use the option button to select • Rolling • Level • Mountainous
Maximum Grade	• Enter maximum grade
Minimum Grade	• Enter minimum grade
Design Vehicle	Use the option button to select the particular design vehicle to use for the roadway. The option button values may be changed in the ha.tbl file.
Design Parameters	
Maximum e	Use the option button to select the maximum e value. The option button values may be changed in the ha.tbl file.
Design Speed	Use the option button to select the design speed value. The option button values may be changed in the ha.tbl file.
Maximum f	Displays the maximum f based on the design speed. This value may be changed in the ha.tbl file.
Running Speed	Displays the running speed based on the design speed. This value may be changed in the ha.tbl file.
Super Type	Use the option button to select • 0 • 1 • 2 • 3 • 4

Crown Runoff (If Super Type=0)	Enter crown runoff length.
Crown Rate (If Super Type=1,2,3)	Enter crown rate (normal cross slope rate).
Crown Runoff (If Super Type=4)	Value grayed out.
Stopping Sight Dist.	Displays the stopping sight distance based on design speed. This value may be changed in the ha.tbl file.
Auto Rev. Length (Type 0 & 4 Super Only)	Enter Auto Reverse Length for compound superelevation. 
OK	Click to save the parameter values as set by this session.
Reset	Click to reset all parameter values to the value they had at the beginning of this session.
Cancel	Click to dismiss the dialog.

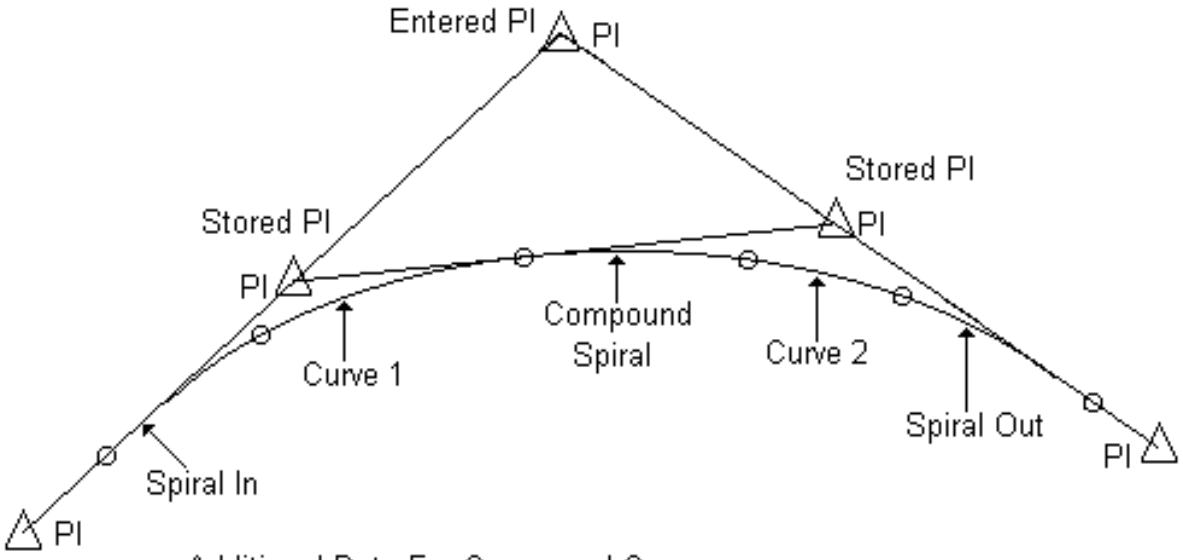
Note: When the length of normal template section between two superelevated curves is less than the Auto Rev. Length, automatic compounding of superelevation between the two curved sections is applied.



Data

- PI Location or Coordinates
- Station if First PI or Equation
- Curve Radius
- Spiral In, Spiral Out

Figure 3-3
GENERAL CURVE ELEMENTS



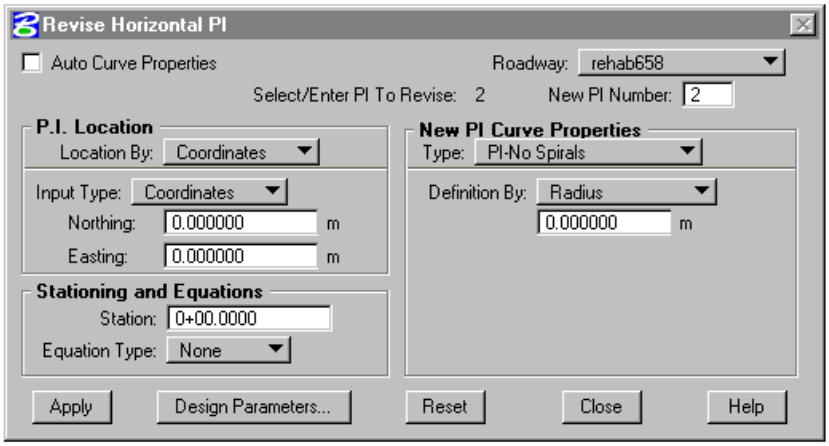
Additional Data For Compound Curves:

- Radius Curve 2
- Compound Spiral Length
- Length of Curve 1 or Curve 2
- Number For Length Entered (1 or 2)

Figure 3-4
COMPOUND CURVE ELEMENTS

REVISE HA PI

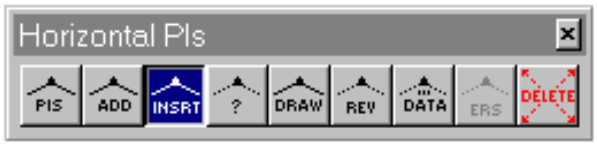
This command revises a PI and its curve data in the IGrds Working files. You may revise any of the curve properties. The PI location of revised coordinates shifts appropriately within the display.



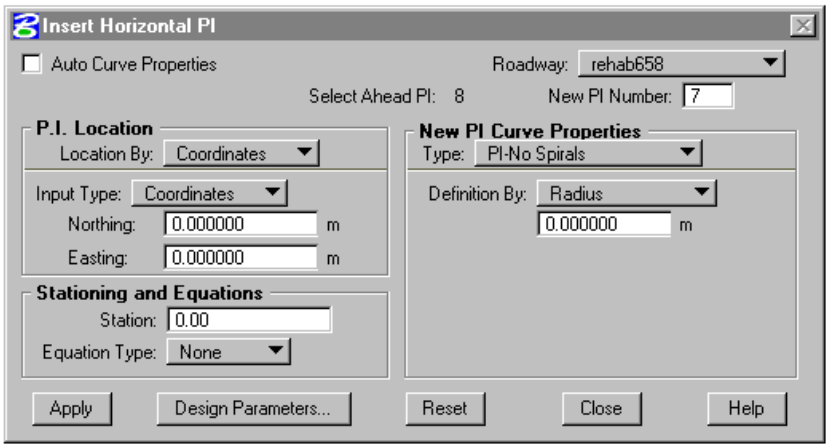
Roadway	Select the desired roadway. The current active roadway is shown.
Prompt **Select PI to be Revised**	Select or enter desired PI.
New PI Number	Automatically set to the next available PI number. This can be edited to reflect a particular PI number. If the number entered is available, it will be used; otherwise the original number will be restored.
Other Data	Same as Add HA PI except that Location by Projection is not allowed.

Note: A PI added as a POT cannot be edited until a create/update has been done and the PIs redrawn. The POT is projected to the closest tangent during the create/update, so unless the POT was placed directly on the tangent, its true position is not shown until a redraw PI is done.

INSERT HA PI

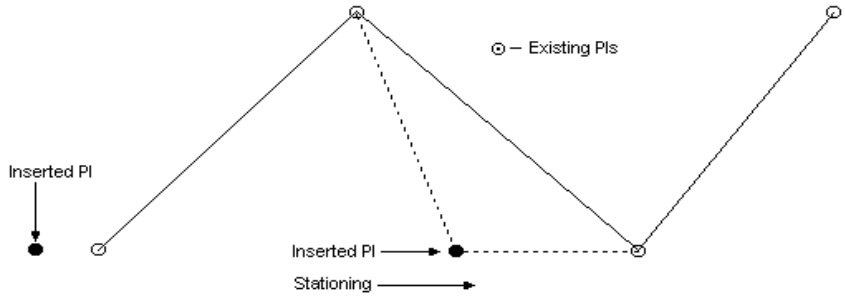


This command inserts a new PI between two existing PIs, or before the beginning PI of the active roadway. (Use the ADD HA PI (3) command to add a PI after the last PI of an existing alignment.)

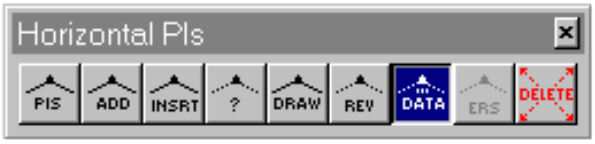


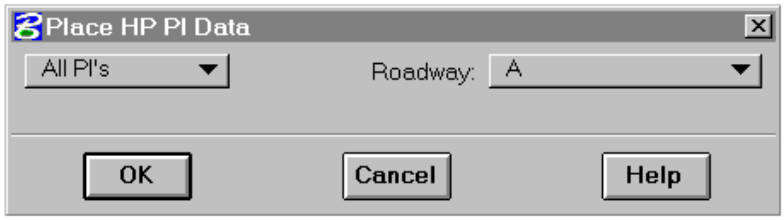
IGrds stores the inserted PI in the IGrds Working files, and displays it on the screen. IGrds displays the new PI the number as the previous PI plus one. If this PI number is already in use, IGrds automatically displays the next available PI number to the user.

Roadway	Select the desired roadway. The current active roadway is shown.
Prompt **Select Ahead PI**	Select or enter desired PI.
New PI Number	Automatically set to the next available PI number. This can be edited to reflect a particular PI number. If the number entered is available, it will be used; otherwise the original number will be restored.
Other Data	Same as Add HA PI except that Location by Projection is not allowed.



PLACE HA PI DATA



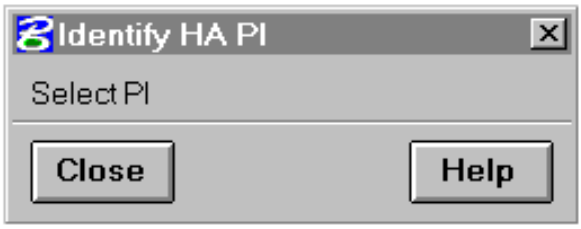


This command displays horizontal curve data for a selected horizontal alignment PI at a user-defined location. It also may be used to display the horizontal curve data for all horizontal alignment PIs of a roadway. This command does not work for a compound PI. The PI curve data that is displayed is the PI Number, the PI Station, Delta angle, Degree of Curve, Tangent Distance, Curve Length, the Radius, and the Spiral in and out lengths, if any, TS, SC, CS, and ST station, if any. In addition, the calculated design velocity and the superelevation rate for each curve are displayed.

Roadway	Select the desired roadway. The current active roadway is shown.
Option	Select option • All PIs • Selected PIs
Leader Lines	Check this box to place a Leader Line with the associated PI number at the center of the curve.
Prompt **Select PI (Selected PIs Option)**	Selection Displays PI data box. Click left cursor button to confirm, right to reject.
Prompt **Select Text Placement Point**	Selection completes PI data annotation.
OK	Click to execute the command.
Cancel	Click to exit the command with no action .
Help	Click to display HELP.

Note: Customized Horizontal Curve Annotation - The content and format of the horizontal curve data can now be customized by the user agency. It depends on the setup in the parameter file (parset). See "DISCUSSION OF IGrds IG OPTION CURRENT RELEASE I/M PARAMETER FILE AND CELL LIBRARY FOR CLIPPER AND PC VERSIONS" for setup instructions.

IDENTIFY HA PI



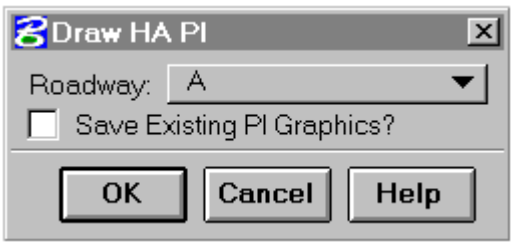
This command identifies the horizontal PIs selected from the display screen, and lists the PI information in a PI data display box. PI data returned in the display consists of:

PI Number
Roadway
Station
Radius
North Coordinate (approximately)
East Coordinate (approximately)
Spiral In
Spiral Out

The command is self-repeating, thus allowing for multiple selections.

Prompt **Select PI**	Selection displays PI data box. Click left cursor button to confirm, right to reject.
Close	Click to dismiss dialog box.
Help	Click to display help for this command.

DRAW HA PIs

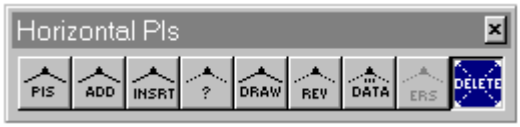


This command displays PIs from the IGrds Working files for the active roadway.

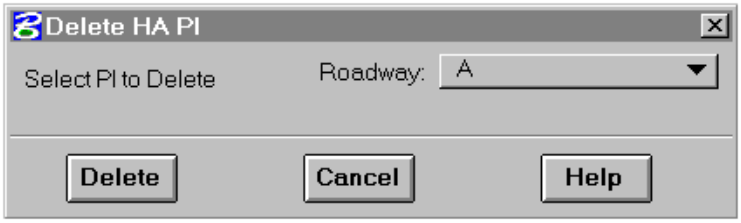
Roadway	Select the desired roadway. The current active roadway is shown.
Save Existing PI Graphics	Push to save existing graphics. If the button is up, existing graphics will be deleted before drawing PIs. Option is grayed when no prior graphics exist.
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

Note: If the PIs do not appear on the screen, use the drafting system FIT and/or WINDOW commands to view them.

DELETE HA PI

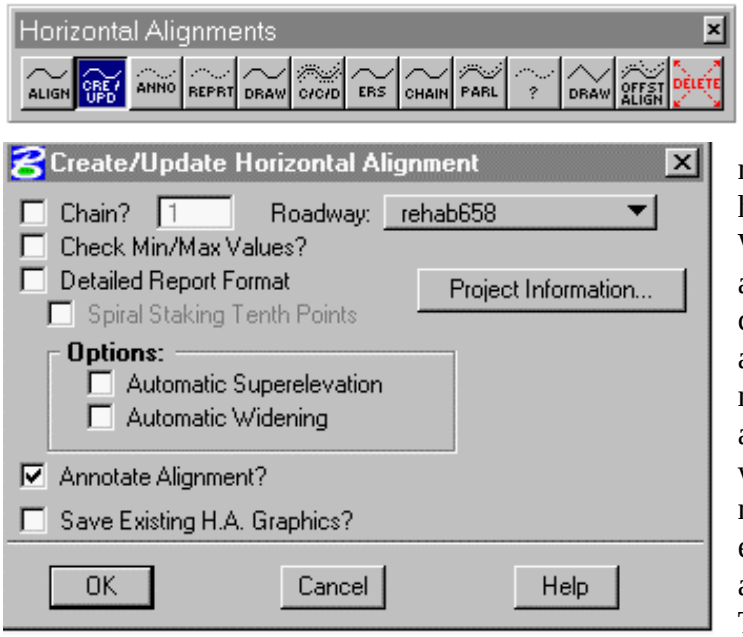


This command deletes PIs from both the graphic file and the IGrds Working file.



Roadway	Select the desired roadway. The current active roadway is shown.
Prompt	
Select PI	Selection displays PI data box. Click left cursor button to confirm, right to reject.
Delete	Click to execute the command. (This action brings up an additional action Alert box stating what PI will be deleted. It offers a last chance to decide to continue or cancel the action. Click OK to delete, or Cancel to stop execution.)
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

CREATE/UPDATE HA



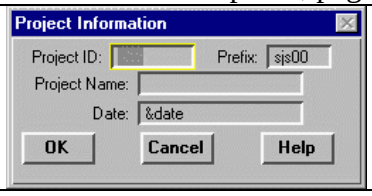
This command performs a horizontal alignment calculation for a given roadway using the current PIs stored in the IGrds Working files. The results of these calculations update the horizontal alignment stored in the IGrds Working files, or create a new alignment if none is present. If no error conditions exist, IGrds produces an alignment listing in the temporary report file (.tmp) and displays the alignment. Superelevation and/or widening data may be computed if roadway design parameters have been entered and automatic superelevation and/or widening has been requested. The Create/Update process will then compute "zones" (station ranges) with the design speed for use in the Vertical Alignment curve computation and report process.

Chain?	Push to create chain coincident with alignment.
Chain No.	Next available chain number is displayed. Enter new number to change.
Roadway	Select the desired roadway. The current active roadway is shown.
Check Min/Max Values?	Push to enable checking of curve lengths vs. the minimum curve length. A check will also be made against the minimum radius. The minimum curve length is specified in the design table ha.tbl. Finally a check will be performed against the minimum and maximum spiral lengths which are computed using coefficients from the ha.tbl (Minimum_ Maximum_Spiral_Length_Coefficients). The results of these checks, i.e., if the minimum curve length check fails, is indicated in the resultant horizontal alignment report (see the .tmp file).

Detailed Report Format	Push to create a more detailed report for the Roadway selected. The detailed format includes more information for spirals and compound curves such as: tangents and PI's for each spiral, long chords for all curves as well as spirals, and external distances for all curves.
Spiral Staking Tenth Points	This option is available only when the Detailed Report Format is selected. Selecting this will compute and print ten staking points along each spiral in the alignment.
Annotate Alignment?	Push to annotate alignment after Create/Update is complete.
Save Existing HA Graphics	Push to save existing graphics. If the button is up, existing graphics will be deleted before drawing alignment. Option is grayed when no prior graphics exist.
Compute Options Select Option	
Automatic Superelevation	Click to automatically generate and store superelevation data.
Automatic Widening	Click to automatically generate curve widening.

Note: If spiral curve easements are used for the alignment and Automatic Curve Widening is selected, then auto curve widening needs to be taken into account when calculating the spiral lengths. See Add PI

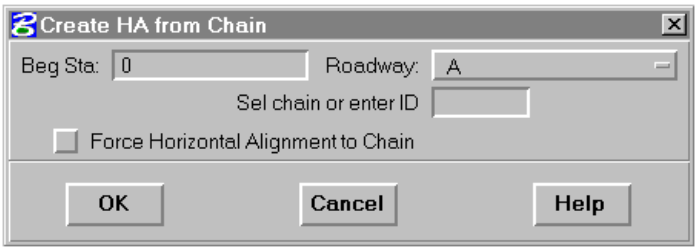
Note: Automatic Superelevation and Widening require design parameters to be set. See Chapter 2, page 2-30.



Project Information	Click to review/change Project Information.
Project ID	Project Identification (up to 3 characters).
Prefix	Earthwork Output File Prefix.
Project Name	Project Name.
Date	Date to be shown on reports. "&date" is the current date.

OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

CREATE HA FROM CHAIN



This command creates a new horizontal alignment which coincides with a previously stored geometry chain or MicroStation Chain/ Smartline. (MicroStation elements are selectable from the active DGN file or a reference file with locate turned on.) The process computes new PIs and curve data to produce alignments in the same way as the ADD HA PI (3) and CREATE/UPDATE HA (10) commands. The new roadway cannot contain any existing HA PIs.

Beg. Station	Enter station of beginning of the desired alignment.
Roadway	Select the desired roadway. The current active roadway is shown.
Select Chain or Enter #	Graphically select the desired chain or enter its ID number.
Force Horizontal Alignment to Chain	IGrds, by default, will try to create an alignment that smoothly transitions from chain element to chain element (i.e., tangent to curve). In cases where the chain breaks abruptly (e.g., a broken back curve), the horizontal alignment would smoothly transition through this area. By activating the "Force Horizontal Alignment to Chain" toggle button, P-Line PIs are added at the breaks to force the HA to exactly match the chain.
Prompt	
Select Point Near Beginning of HA	Digitize a point near the end of the chain which is intended to be the beginning of the alignment.
OK	Click to execute the command. A prompt to digitize a point near the end of the chain which is intended to be the beginning of the alignment will appear.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

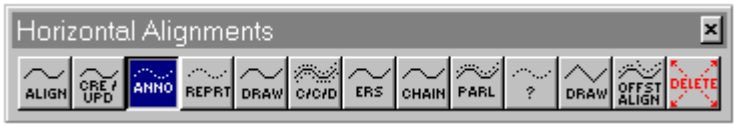
Note: Construct chains (via IG Geometry or MicroStation) used to create alignments so that:

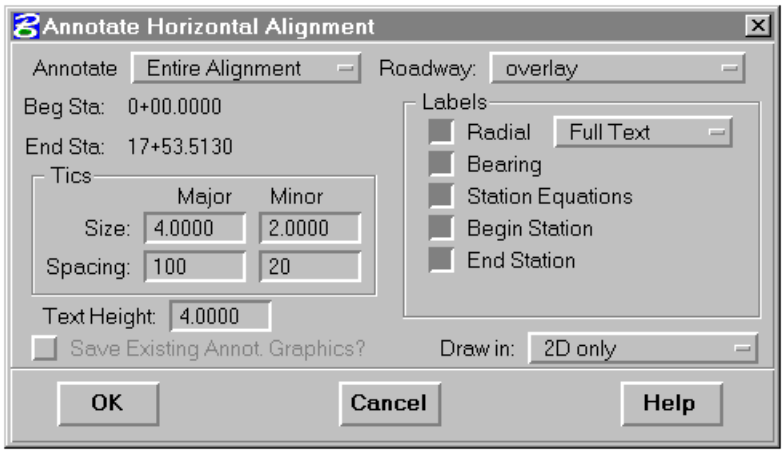
a. A line segment connecting with an arc is tangent to the arc.
b. Two line segments which connect have common end points at the connection.
c. Two arcs which connect have common end points and radial lines at the connection.

You can use the IGrds geometry commands to define points, arcs and lines, and construct chains to satisfy these conditions.

If you fail to construct a chain properly, by default, IGrds inserts elements to fill gaps. This may produce unsatisfactory alignments. The system eliminates minor tangency discrepancies by holding arcs. Use the "Force Horizontal Alignment to Chain" toggle, if the chain is to be absolutely honored.

ANNOTATE HA





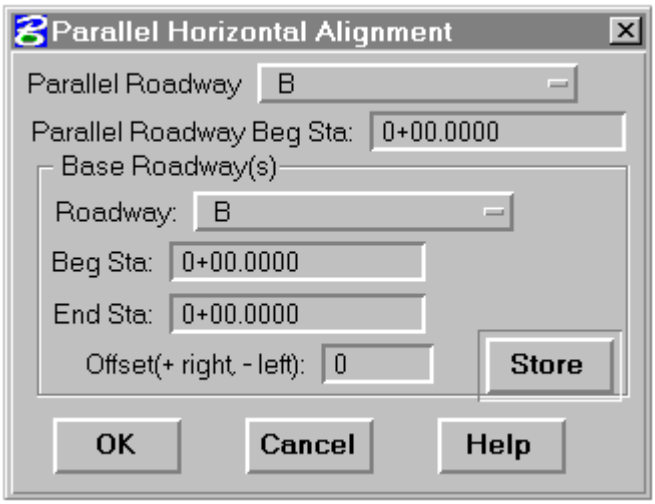
This command displays the horizontal alignment annotation for the active roadway. This includes station tic marks, bearing labels, and station labels for the beginning station, PC, PT, station equations, and end stations.

Roadway	Select the desired roadway. The current active roadway is shown.
Annotate	Select Annotate Station Range option. Entire Alignment: • Entire Alignment station values will be displayed. Station/Station: • Enter or select the beginning and/or ending station covering the range of stations to be annotated.
Tic Spacing	Enter Spacing (in or m). (If other than default)
Label Spacing	Enter Spacing (in or m). (If other than default)
Text Height	Enter Height (in or m). (If other than default)
Save Existing Annot. Graphics?	Push to save existing graphics. If the button is up, existing graphics will be deleted before drawing annotation. Option is grayed when no prior graphics exist.

Label Options	• If the button is up, label will be omitted. Push button for desired label options (one or more). • Radial — Select between one of these options: Full Text — The label contains station and PC or PT. PC/PT Only — Station is omitted. No Text • Bearing • Station Equations • Begin Station • End Station
Draw Options	Select Annotation Draw option. 2D only • Annotate alignment in 2 dimension. 2D and 3D • Annotate alignment in both 2 dimensions and 3 dimensions. (See note) 3D only • Annotate alignment in 3 dimensions. (See note)
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

Note: A vertical alignment must be defined for the horizontal alignment for 3D displays to be meaningful.

CREATE PARALLEL HA



This command creates a horizontal alignment parallel to a previously created horizontal alignments called base roadways. The process computes new PIs and concentric curves to produce alignments in the same way as the ADD HA PI (3) and CREATE/UPDATE HA (10) commands. See Figure 3-5.

Parallel Roadway	Select the parallel roadway name.
Use Base Stationing?	Push to use beginning station of base alignment for the new alignment.
Beg. Station	Enter beginning Station of new alignment if not using Base Stationing.
Base Roadway Definition	
Beg. Station	Select Base Roadway
Beg. Station	Enter or select Beginning Station
End Station	Enter or select End Station
Offset	Enter Value (ft or m) + right, - left
Store	Click to store base line.
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

Note: Base alignments should not include spirals. If they do, the resulting parallel alignment will only contain circular curves at those PIs. Some base alignment configurations may not produce a satisfactory parallel alignment. The parallel roadway cannot contain any existing HA PIs.

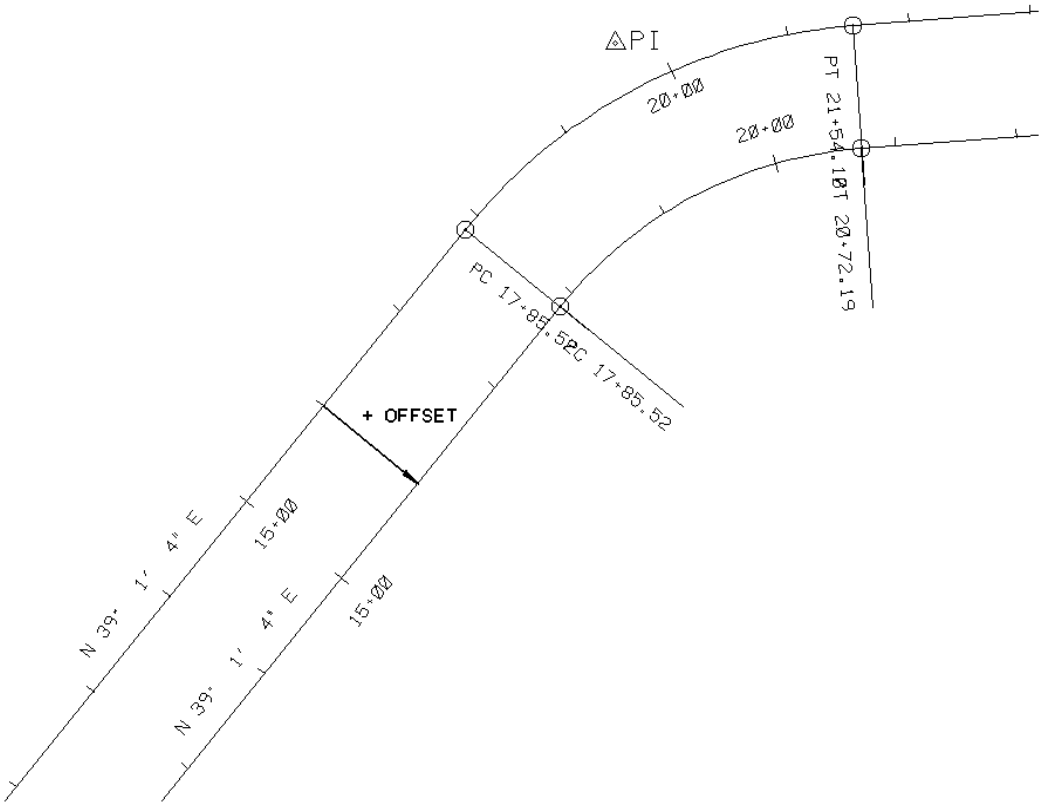
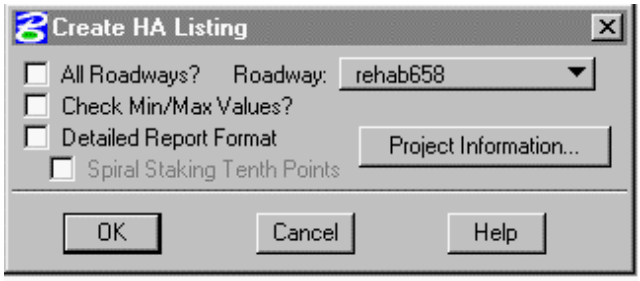


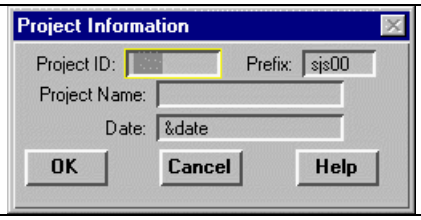
Figure 3-5
PARALLEL ALIGNMENT

CREATE HA REPORT



This command creates a horizontal alignment listing in the temporary report file (.tmp) for the specified roadway(s).

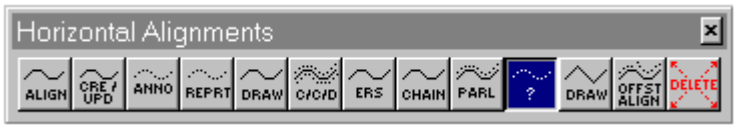
All Roadways?	Push to generate HA reports for all roadways currently in the IGrds Working files. If not pushed, the report will be produced for the specified roadway.
Roadway	The active roadway is displayed. Click on the field to change roadways.
Check Min/Max Values?	Push to enable checking of curve lengths vs. the minimum curve length. The minimum curve length is specified in the design table ha.tbl. The results of the check, i.e., if the minimum curve length check fails, is indicated in the resultant horizontal alignment report (see the .tmp file).
Detailed Report Format	Push to create a more detailed report for the Roadway selected. The detailed format includes more information for spirals and compound curves such as: tangents and PI's for each spiral, long chords for all curves as well as spirals, and external distances for all curves.
Spiral Staking Tenth Points	This option is available only when the Detailed Report Format is selected. Selecting this will compute and print ten staking points along each spiral in the alignment.

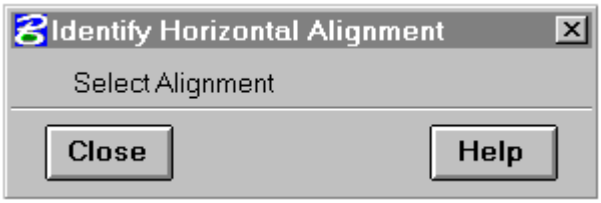


Project Information	Click to review/change Project Information.
Project ID	Project Identification (up to 3 characters).
Prefix	Earthwork Output File Prefix.
Project Name	Project Name.
Date	Date to be shown on reports. “&date” is the current date.
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

Note: This command produces the same calculations and listings as the CREATE/UPDATE HA (10) command, except it does not save the alignment. This command may be used to create trial alignments.

IDENTIFY HA

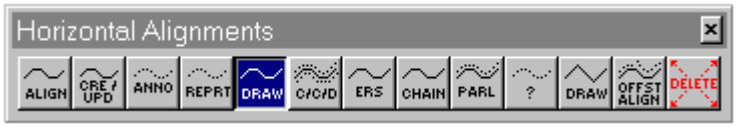




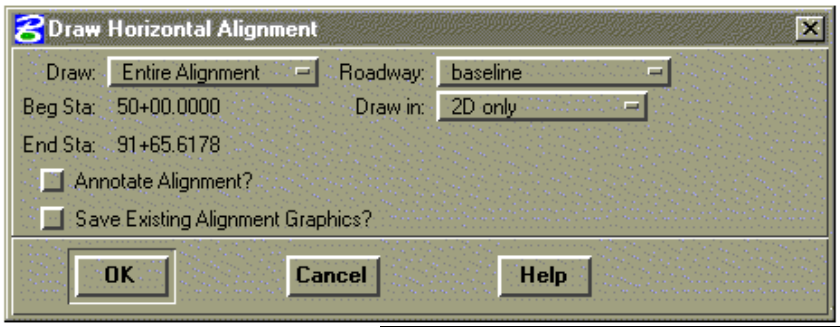
This command identifies horizontal alignments selected from the display screen. IGrds highlights the selected alignment and displays the roadway name. The command is self-repeating, thus allowing for multiple selections.

Prompt	
Select Alignment	Click on desired alignment. The selected alignment is highlighted and the alignment designation is displayed in the MicroStation command window. Continue to select alignments as desired.
Close	Click to close dialog.
Help	Click to display HELP.

DRAW HA



This command displays all or part of the horizontal alignment for the active roadway.

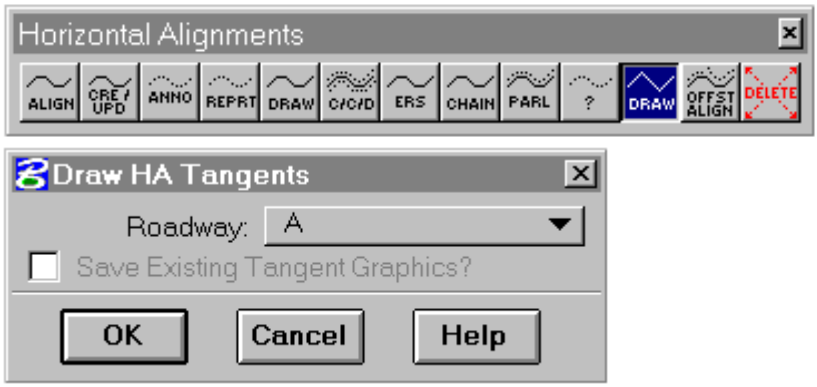


Roadway	Select the desired roadway. The current active roadway is shown.
Draw	Select Alignment Station Range option. Entire Alignment: • Entire Alignment station values will be displayed. Station/Station: • Enter the beginning and/or ending station covering the range of stations to be drawn.
Annotate Alignment?	Push to annotate alignment after Draw is complete.
Save Existing Alignment Graphics?	Push to save existing graphics. If the button is up, existing graphics will be deleted before drawing alignment. Option is grayed when no prior graphics exist.
Draw Option	Select Display option. 2D only • Display alignment in 2 dimensions. 2D and 3D • Display alignment in both 2 dimensions and 3 dimensions. (See note) 3D only • Display alignment in 3 dimension. (See note)

Chord Distance	Enter chord distance for drawing 3 dimensional alignments (shorter distances give better alignments).
Draw as a Bspline	Push button if alignment is to be displayed as a Bspline.
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

Note: A vertical alignment must be defined for the horizontal alignment for 3D displays to be meaningful.

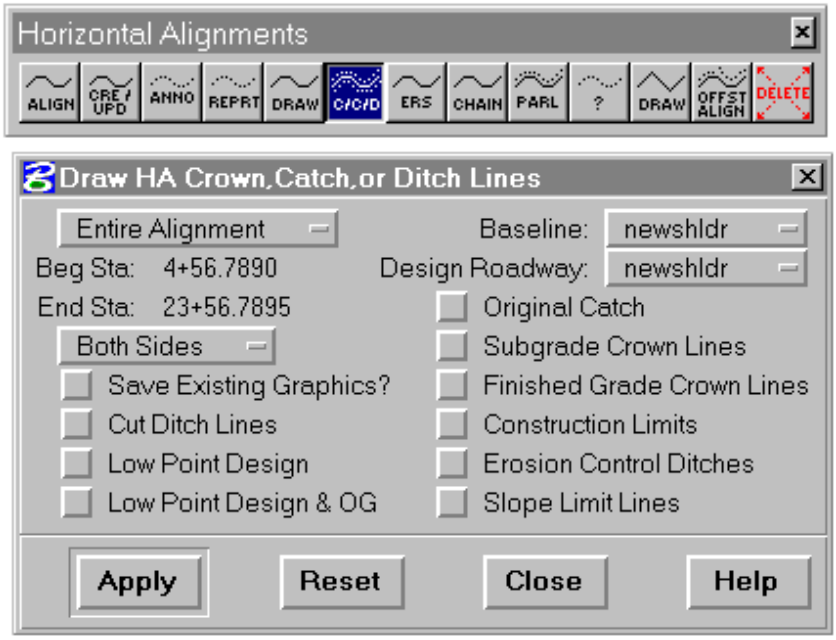
DRAW HA TANGENTS



This command displays tangent lines connecting the horizontal alignment PIs stored in the IGrds Working files for a given roadway. (You do not have to display the PIs before drawing tangents.)

Roadway	Select the desired roadway. The current active roadway is shown.
Save Existing Tangent Graphics	Push to save existing graphics. If the button is up, existing graphics will be deleted before drawing tangents. Option is grayed when no prior graphics exist.
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

DRAW CROWN, CATCH OR DITCH LINES (C/C/D)



This command displays in the horizontal view, the crown, catch, and ditch point lines of a roadway from the IGrds Working files. (Straight lines are drawn between design cross sections.)

Roadway	Select the desired roadway. The current active roadway is shown.
Draw	Select Alignment Station Range option.
	Entire Alignment: • Entire alignment station values will be displayed. Station/Station: • Enter or select the beginning and/or ending station covering the range of stations to be drawn.
Sides Option	Select Option Both Sides Left Side Right Side
Save Existing Graphics?	Check this box to keep the lines previously drawn. Otherwise all CCD lines for the elected roadway are deleted before new ones are drawn.

Line Type Option	Check boxes for desired option. Cut Ditch Lines Low Point Design Low Point Design and Original Ground Original Catch Subgrade Crown Lines Finished Grade Crown Lines Construction Limits Erosion Control Ditches Slope Limit Lines
Apply	Click to execute command.
Reset	Click to reset values.
Close	Click to dismiss dialog box..
Help	Click to display help for this command.

Note: Crown displays the left or right shoulder point (Finished Grade or Subgrade) line of a roadway.

Catch displays the left or right catch point line of a roadway.

Low Point Design displays the left or right ditch point line without terrain (ditch within the design section only). Low Point Design and Original Ground display the same line with terrain (ditch in either design section or in terrain outside of the catch point).

Original Catch Lines are the catch lines prior to slope rounding.

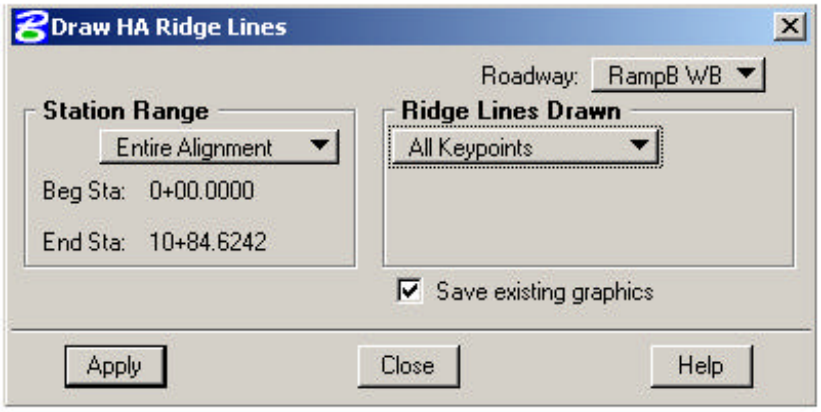
Slope Limit Lines are the catch lines after slope rounding.

Construct Limits are the catch lines after slope rounding and erosion control ditches.

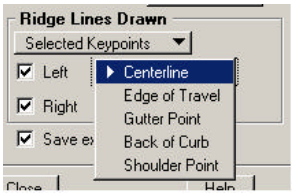
Cut Ditch Lines are the bottom of the ditch in cut areas only.

If the roadway has been modified either horizontally or vertically, re-execute the Earthwork Design Command (see Chapter 8) to update the IGrds Working files with the correct information..

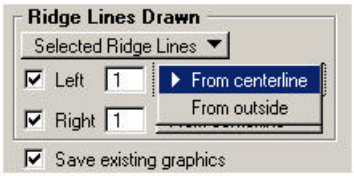
DRAW HA RIDGE LINES



This command displays all or selected ridge lines for a roadway between a specified station range. The ridge lines reflect the changes produced by the Geometric Template Modification command.

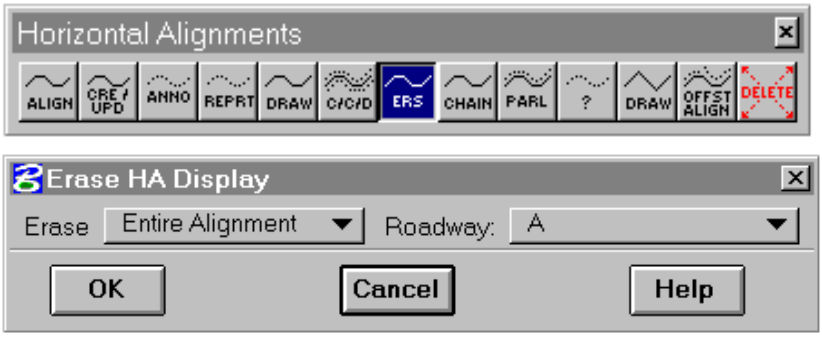


Roadway	Select the desired roadway.
Station Range	Select the station range option.
Entire Alignment	Ridge lines along the entire length of the roadway will be displayed.
Station/Station	Digitize or enter via keyboard the beginning and ending station.
Ridge Lines Drawn	Select the ridge line selection option.
All Keypoints	All ridgelines with a defined keypoint will be drawn.
Selected Keypoints	One or two selected keypoint ridge lines will be drawn.
Left	A ridge line on the left side of the roadway will be drawn if this box is checked.
Keypoint Option	Select the keypoint option for the desired ridgeline.
Right	A ridge line on the right side of the roadway will be drawn if this box is checked.
Keypoint Option	Select the keypoint option for the desired ridgeline.



All Ridge Lines	All ridge lines defined by the roadway design will be drawn.
Selected Ridge Lines	One or two selected ridge lines will be drawn.
Left	A ridge line on the left side of the roadway will be drawn if this box is checked.
Input Box	Enter the number that identifies the desired ridge line.
Ridge Line ID Option	Select the option to identify the desired ridge line.
From Centerline	The selected ridge line is found by counting from the center line (start with 1).
From Outside	The selected ridge line is found by counting from the left (start with 1).
Right	A ridge line on the right side of the roadway will be drawn if this box is checked.
Input Box	Enter the number that identifies the desired ridge line.
Ridge Line ID Option	Select the option to identify the desired ridge line.
From Centerline	The selected ridge line is found by counting from the center line (start with 1).
From Outside	The selected ridge line is found by counting from the right (start with 1).
Save Graphics	Check this box to save the previously displayed ridge lines for the current roadway (if any).
Apply	Click to execute command.
Close	Click to dismiss dialog box..
Help	Click to display help for this command.

ERASE HA



This command removes the specified Horizontal Alignment graphics, but does not remove alignment data from the IGrds Working files. They may be redisplayed as desired.

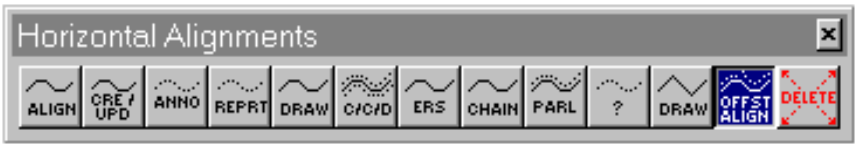
Roadway	Select the desired roadway. The current active roadway is shown.
Erase	Select Option Entire Alignment (alignment, annotation, tangent lines, and all PIs) Annotation Tangent Lines All PIs CCD Lines
OK	Click to execute the command.
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

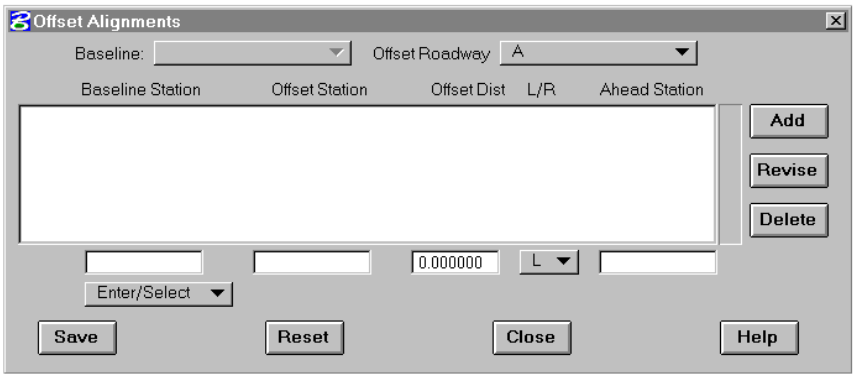
DELETE HA

This command deletes the horizontal alignment, annotation, tangent lines, and PIs from the IGrds Working files and from the display for the active roadway.

Roadway	Select the desired roadway. The current active roadway is shown.
Delete Option	Select Option • Entire Alignment
Delete	Click to execute the command. (This action brings up an additional action Alert box stating what horizontal alignment will be deleted. It offers a last chance to decide to continue or cancel the action. Click OK to delete, or Cancel to stop execution.)
Cancel	Click to exit the command with no action.
Help	Click to display HELP.

OFFSET ALIGNMENTS





This command calculates an offset alignment at an offset from a baseline. The offset roadway cannot contain any HA PIs. Alignment definitions by offset should be limited to those situations where the offset alignments will be essentially parallel to the baseline. There must be at least two data records listing the beginning and ending station. Other data records may list station equations or where the offset from the baseline is changed. Besides the fact that offset alignments may not be displayed horizontally or used with geometry commands, they are the same as other design roadways.

Baseline	Select the desired baseline. The current active baseline is shown.
Offset Roadway	Select the desired roadway to become the offset alignment. The list shows roadways that have not yet been defined.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data	
Baseline Station	Select Option • Enter/Select Enter baseline station or select a graphic point to indicate station. • Beginning The beginning station of the baseline will be displayed. • Ending The ending station of the baseline will be displayed.
Offset Station	Enter the offset alignment station corresponding to the baseline station.
Offset Dist	Enter the offset distance from the baseline to the offset alignment.
L/R	Select L if the offset distance is left of the baseline or R if it is right of the baseline.
Ahead Station	Enter the ahead station if station equation data is being entered. Note: If a station equation is entered, only the offset station (back station) and the ahead station are entered.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.