

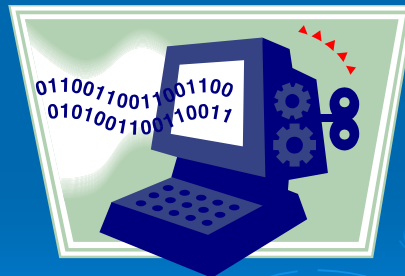


Survey Features - Objectives

- What is Coding?
- The Style Manager – Survey Styles
- Survey Style Characteristics
- Survey Style Attributes
- Survey Style Custom Operations
- Understanding Control Coding
- Correcting some code errors while loading an electronic field book file

Coding is the Key!!

- Coding is how In-Survey interprets the collected data
 - Good coding makes the interpretation more accurate
 - Lack of, or poor coding makes it more difficult



Coding (alpha or numeric)

- Coding is just a shorthand method to describe the points collected in the field
- Codes can be anything, and are sometimes descriptive of the item that is being collected.
 - ♣ MH to collect a **manhole** field feature
 - ♣ FH to collect a **fire hydrant**
- Also, a **tree** could have the alpha codes **oak**, **maple** and **elm** used for collection purposes
- Coding the collected data can also indicate if the points should be connected, and how they are to be connected. (...more on this later)

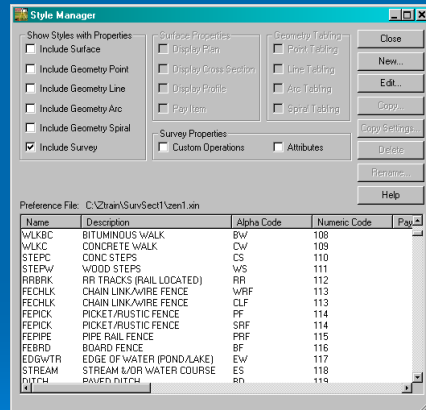
2 Types of Coding

- Feature Coding
 - ♣ Physically describes what the item being shot is
- Control Coding
 - ♣ Indicates *if* the points should be connected
 - ♣ How they are to be connected
 - ♣ Are they in some way 'special'
 - ♣ Provides a 'quality' to the Feature Code
 - ♣ Gives a 'command' instruction

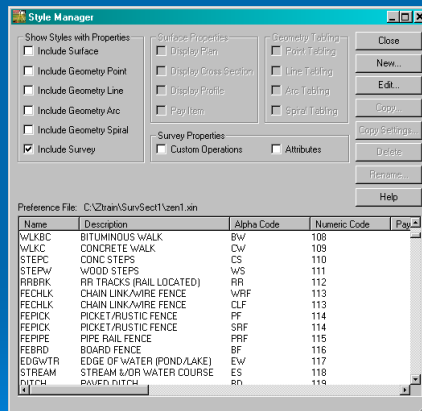
The Brains of In-Survey

- The *Style Manager* defines how the field Coding is interpreted

- For CAD Display
- For Surface creation
- For Geometry



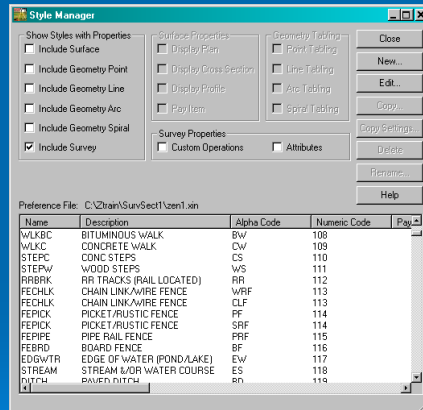
Survey Field Codes



- Each shot collected in the field is represented by an item in this manager
- The table defines the characteristics for each field item

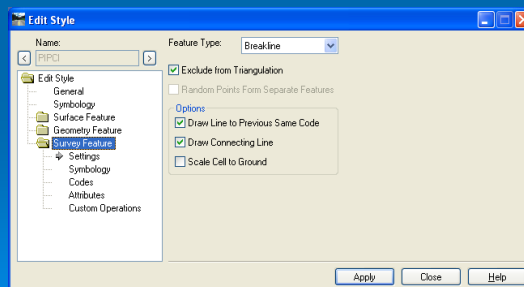
The Style Manager

- Style Manager is the heart of In-Survey
- This Manager contains the list of usable field codes
- Characteristics are assigned to each Code so they can be interpreted
- Has to be set up to correspond with your field codes and your CAD standards



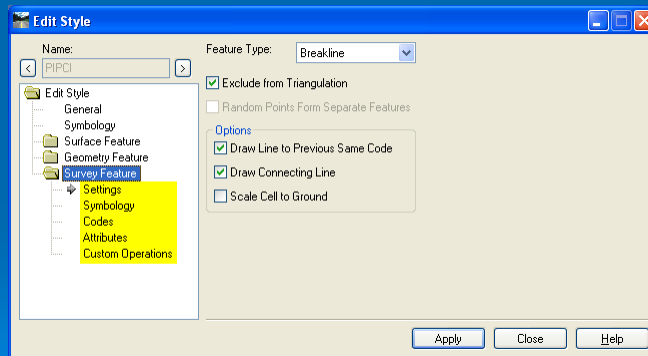
Survey Style

- The Survey Style defines:
 - ♣ How the surveyed point will display
 - ♣ If the point should be included in the Surface model
 - ...among other things.

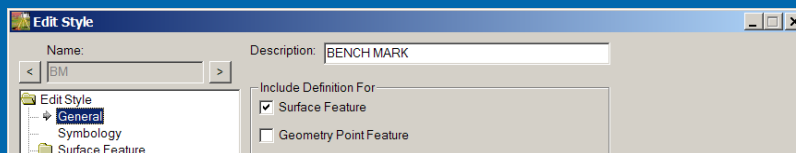


Survey Style

Let's look at one leaf at a time ...

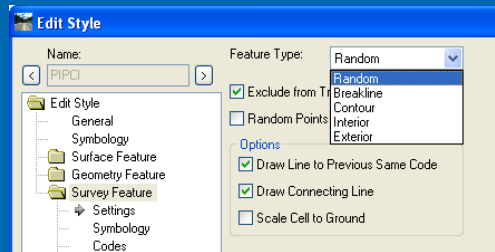


General – Description



- You have to give your Styles a **Description**.
 - On the General Leaf
 - Any reporting that you may do on this table will be better organized
 - This *Description* can also be assigned to the surface and geometry information when exporting it

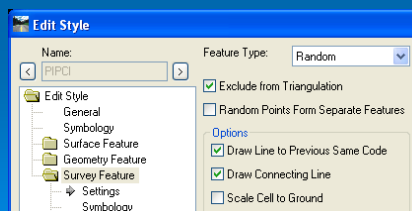
Settings – Feature Type



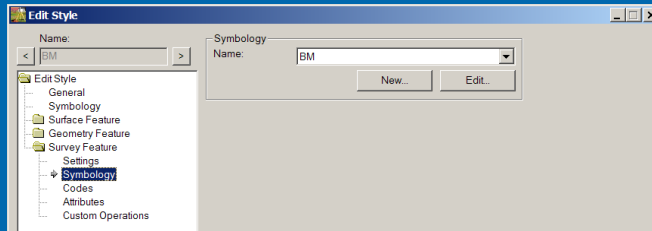
- **Feature Type** refers to how the collected point is added to the Surface Model (more later)
 - ♣ Exclude from Triangulation
 - ♣ Random Points Form Separate Features

Settings – Options

- **Draw Line ...**
 - ♣ refers to the linear connection of coded points (ST)
- **Draw Connecting ...**
 - ♣ For JPT, JNC and (-)
- **Scale Cell ...**
 - ♣ This is a scale factor override to the *Survey Options* & *Named Symbology* scaling factors

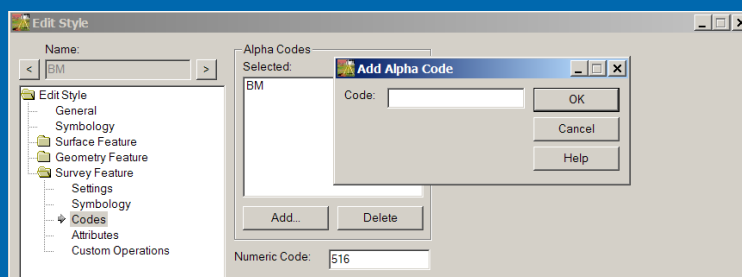


Symbology – SymMan Link



- Defines the color, weight, level and line style of the displayed point symbol and any **line work**
- Sets which **Cell / Block** or **Symbol** is to be used in displaying the point location
- Determines the default **Text** settings that will be used for this Feature

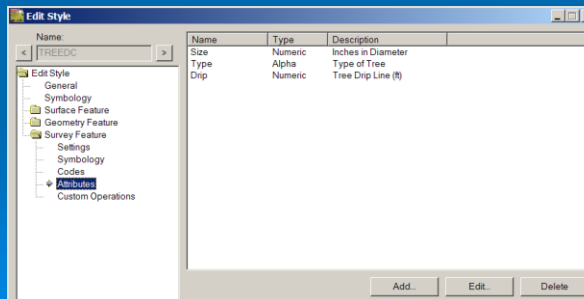
Code – Coding Characters



- Only 1 **Numeric Code** per unique field item
- **Add & Delete Alpha Codes**
 - No numbers, spaces, or special characters
 - Can not have conflicting codes with other features
 - No case sensitivity (always defaults to all-uppercase)

Attributes

- Attributes take advantage of data collector ability to store additional data about a specific Feature that is being collected
- Many Data Collectors have this ability
 - Wild data collectors have INFO fields that would go here

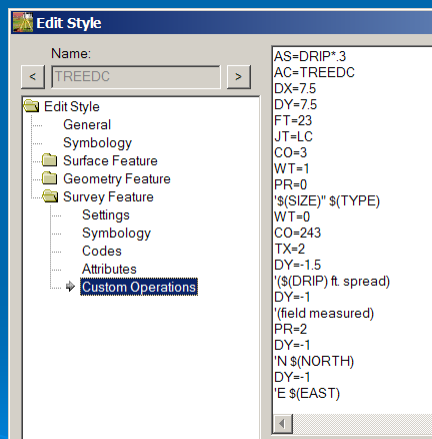


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Custom Operations

- Used to create custom info around point data.
 - Set text sizes, fonts, levels, place cells, ...
 - Set precision, place lines, apply math functions, ...
- Place any text, ...
 - '\$(name)', code, N, E, elev., attribute data, ...
 - See the On-Line Help for more information.



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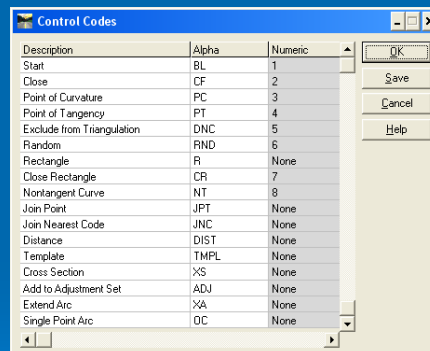
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More on Coding

- **Feature Coding** identifies *items, objects* and *things* in the field
 - ♣ Trees
 - ♣ Manholes
 - ♣ Valve Boxes
 - ♣ ... etc
- **Control Coding** identifies *qualities* or *actions* that In-Survey will take relative to that specific *Feature Code*.
 - Connect points
 - Start a curve
 - Close a series of collected points

Control Codes

- Start
- Close
- Point of Curvature
- Point of Tangency
- Exclude from Triangulation
- Random
- Rectangle
- Close Rectangle
- Nontangent Curve
- Join Point
- Join Nearest Code
- Distance
- Template
- Cross Section
- Add to Adjustment Set (Relates to Least Squares adjustments)



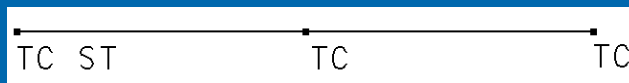
Description	Alpha	Numeric
Start	BL	1
Close	CF	2
Point of Curvature	PC	3
Point of Tangency	PT	4
Exclude from Triangulation	DNC	5
Random	RND	6
Rectangle	R	None
Close Rectangle	CR	7
Nontangent Curve	NT	8
Join Point	JPT	None
Join Nearest Code	JNC	None
Distance	DIST	None
Template	TMPL	None
Cross Section	XS	None
Add to Adjustment Set	ADJ	None
Extend Arc	XA	None
Single Point Arc	OC	None

Control Codes

- Not all Control Codes have Numeric codes
 - Alpha coding has additional functionality over Numeric coding
- The alpha names of the codes are user definable
 - Survey > Control Codes*
- Numeric codes are 'hard-coded'
 - What you see is it

Description	Alpha	Numeric
Start	ST	1
Close	CL	2
Point of Curvature	PC	3
Point of Tangency	PT	4
Exclude from Triangulation	DNC	5
Random	RND	6
Rectangle	R	None
Close Rectangle	CLSR	7
Nontangent Curve	NT	8
Join Point	JPT	None
Join Nearest Code	JNC	None
Distance	DIST	None
Template	TMPL	None
Cross Section	XS	None
Add to Adjustment Set	ADJ	None
Extend Arc	EXTARC	None

Control Code – ST (1)

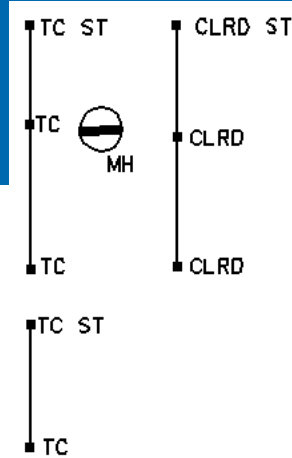


- Once a line is started, all points that follow with the same code, will be attached to the line until another line is started
 - TC** is a point code that is mapped to the Feature *Top of Curb*.
 - ST** tells In-Survey that this point is the start of a line of *Top of Curb* points

Field Coding – ST (1)

- All the points on a line do not need to be surveyed together
 - They DO need collected in order (no backtracking a missed or skipped shot)

Pnt#	Codes	Description
10	TC ST	Start a Top of Curb
11	CLRD ST	Start a Centerline of Road
12	TC	Top of Curb (FieldWorks joins to point 10)
13	MH	Manhole
14	CLRD	Centerline of Road (FieldWorks joins to point 11)
15	TC	Top of Curb (FieldWorks joins to point 12)
16	CLRD	Centerline of Road (FieldWorks joins to point 14)
17	TC ST	Start a Top of Curb (no connection)
18	TC	Top of Curb (FieldWorks joins to point 17)



Field Code – ST (1)

- Only one Feature code, TC or EP, needs to be created in In-Survey
- For multiple lines of the same feature, numbers can be add in the field
- TC1, TC2, TC3, TC4,... can then be collected and are all mapped to the single In-Survey TC code

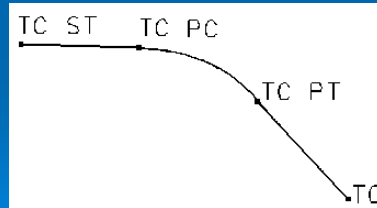
TC1 ST	TC1
EP1 ST	EP1

CLRD ST	CLRD

EP2 ST	EP2
TC2 ST	TC2

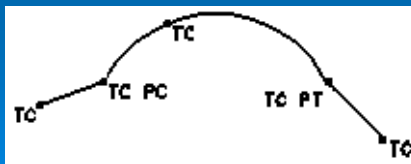
Control Code – PC & PT (3 & 4)

- **PC** (point of curvature) tells In-Survey that this point is the beginning of a curve
- **PT** (point of tangency) tells In-Survey that this point is the end of a curve
- When this data is processed by In-Survey a tangent curve will be placed passing through the PC and the PT
- Exported Geometry will recognize this as a curve and the actual PC & PT points will be calc'ed



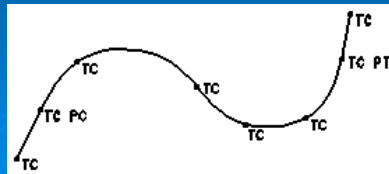
Control Code – PC & PT (3 & 4)

- Adding a **POC** while collecting data on a curve causes In-Survey to create a curve that is forced through the 3 collected points
- This will be a non-tangent curve (whether it is graphically obvious or not)
- Exported Geometry will identify this as a curve



Control Code – PC & PT (3 & 4)

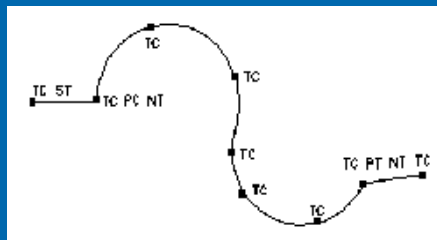
- More than 1 shot between **PC** and **PT** will result in a 'best fit' curve passing through each shot
 - Curves are tangent to incoming & outgoing directions
 - This is primarily for graphic display
- Any Geometry exported may be stroked along this spline 'best-fit' curve
 - Geometry will not contain true curves but 'chords' along the curvature based on the stroking tolerance



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Control Code – NT (8)



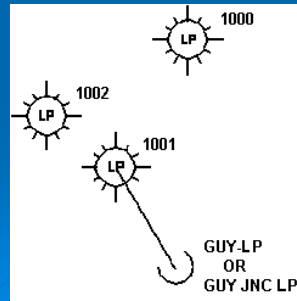
- If the collected **PC** or **PT** is a non-tangent curve then the **NT** control code should be used along with the other control codes
 - TC PC NT for Alpha Coding
 - 100..38 for Numeric Coding
 - (100 = TC, 3=PC, 8=NT)

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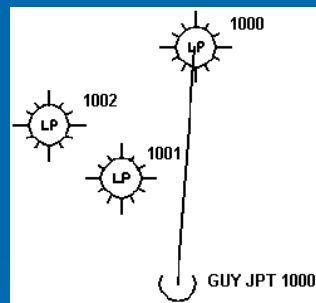
Control Code – JNC & ‘-’

- A ‘-’ (dash) will connect a point shot to the *physically* nearest other point that has been identified and previously collected
 - ♣ Example: GUY-LP
- **JNC (Join Nearest Code)** makes a similar connection
 - ♣ GUY JNC LP
- This joined point has to have been shot prior to the JNC or ‘-’ use



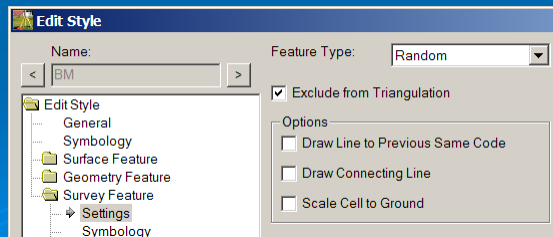
Control Code – JPT

- **JPT (Join Point)** will make a connection between the collected point and the identified point number.
 - ♣ GUY JPT 1000
- The joined point does not have to be shot prior to the JPT coding

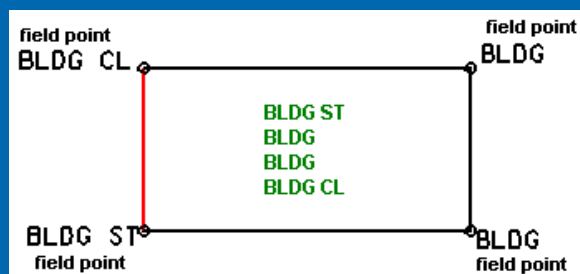


Control Code – DNC (5)

- **DNC** (Do Not Contour) is an override Control Code
 - ♣ This code relates to the creation of the DTM
- Each Code created is assigned a DTM Point type
- If for some reason that point shot is not a valid ground grade, then DNC can be used to note that for the DTM
 - ♣ MAPLE DNC
- DNC's are excluded from surface Triangulation

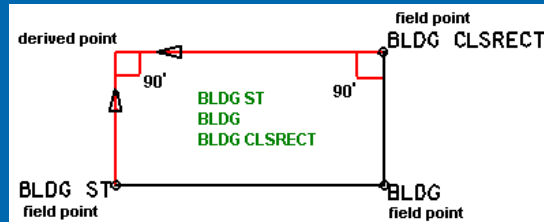


Control Code – CL (2)



- **CL**, or the Close code, makes a connection from the last point collected to the beginning shot of that figure or sequence of shots

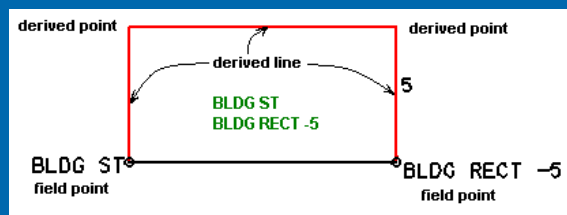
Control Code – CLR (7)



- **CLSRECT**, or the Close Rectangle code, closes a series of shots by creating a derived point from the collected data

- Note the method used to derive the corner point
- A derived Elevation is calc'd from the projection of a planar surface created by the 3 field points

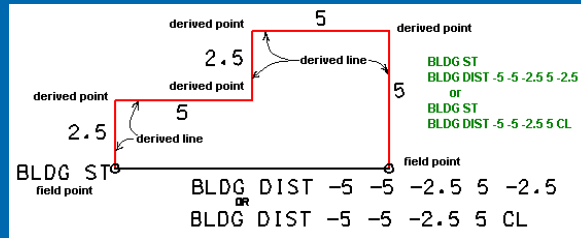
Control Code – RECT



- **RECT**, the Rectangle code, creates a rectangular figure from 2 field shots and a distance

- Distances are (-) counter clock-wise, (+) clock-wise
- Derived Elevations are computed from the perpendicular projection of the 2 field shot grades

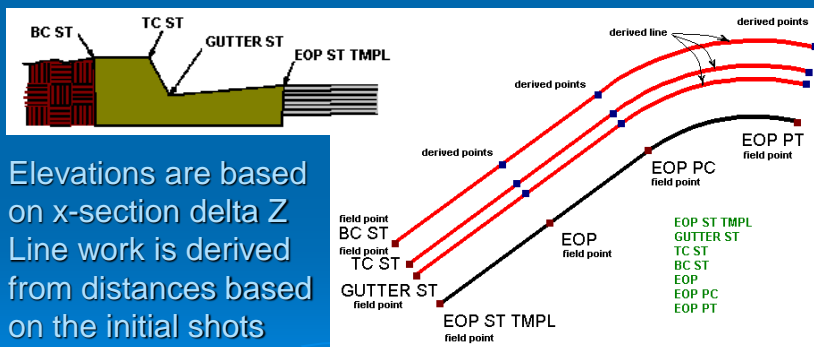
Control Code – DIST



- The distance code, **DIST**, creates a linear feature where angles are perpendicular to the prior leg
 - Shoot 2 points on the shape then tape the distances
 - Distances are (-) counter clock-wise, (+) clock-wise
 - Elevations are derived the same as the prior method

Control Code – TMPL

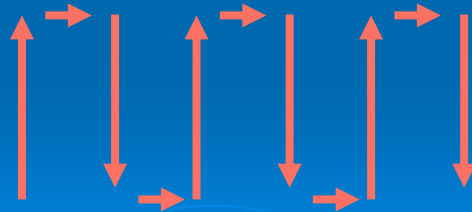
- TMPL**, the Template code, derives points based on a set of 'typical' shots along a field x-section



- Elevations are based on x-section delta Z
- Line work is derived from distances based on the initial shots

Control Code – XS

- **XS**, the cross section code, allows the field crew to collect data based on shots in a x-sectional pattern with minimum of codes
 - ♣ But the pattern is very specific
 - ♣ Number of shots across the section can't vary



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Control Code – EA

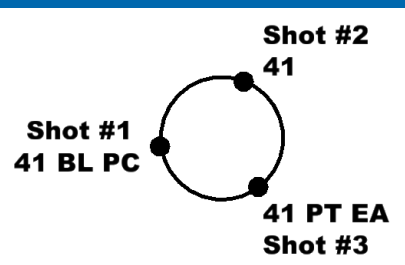
- **EA**, Extend Arc, closes an arc with another arc based on three field points, creating a circle.

Example Application: Code 41 = Tank above ground

Coding: 41 BL PC

41

41 PT EA



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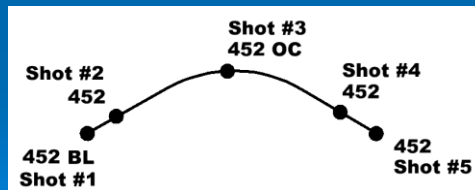
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Control Code – OC

- OC, Single Point Curve, creates an tangential arc from a single shot on the curve, by developing the PC and PT based on the two shots collected before and after the OC shot

Example Application: Code 452 = Back of Curb

Coding: 452 BL
452
452 OC
452
452



Multiple Feature Codes

- Multiple Feature coding is allowed
- In the example the following will be created:

- SW ST
- SW
- SW

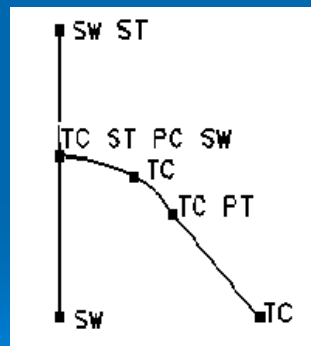
As well as

- TC ST PC
- TC
- TC PT
- TC

- This cannot be done with pure Numeric coding

- Alpha / Numeric:

- 101 120 ST (where 101=SW, 120=TC)

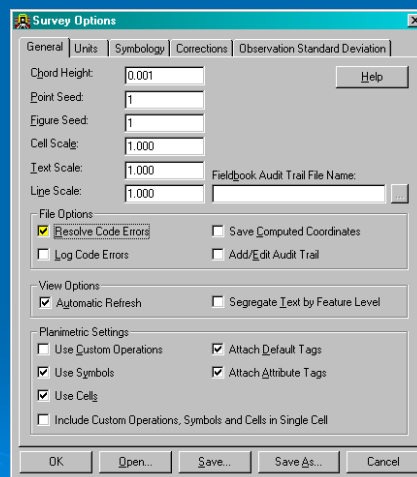


Numeric Coding

- Less flexible than Alpha coding
 - ♣ Numeric = 54.1.1 or 54..1
 - ♣ Alpha = TC1 ST or TC ST
- The ' . ' defines the different parts of the coding
 - ♣ The first numeric is the Feature Code
 - ♣ The second numeric is the String number
 - ♣ The last number is the Control Code
- Two dots in a row are required as a place holder when you are using control codes without string or line numbers

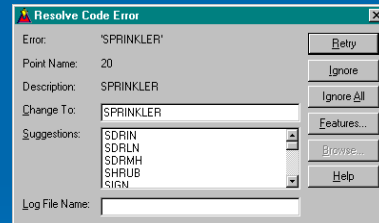
Correcting Some Coding Errors

- Errors can occur during download of the field data because of:
 - ♣ Incorrect Coding
 - ♣ A brand new Code
 - ♣ Missing Control Code
- **Survey Options** has a toggle to allow you to correct some errors while the file is being imported



Correcting Errors

- As the field file imports an Error dialog pops up if it hits a Code that's not in the Features Table
- Either:
 - Pick a Suggestion
 - Set a Log File
 - Ignore it, or Ignore All
 - Features Table (to add it)
 - Or just Change it
- Note that these changes are not logged in the .fwd as changes
- Control Codes are not looked at during this automated error checking process



That's It...

- InRoads Survey is powerful, but...
 - You should have standard coding**
 - You should USE your standard coding**
 - You need to put your coding standards into InRoads Survey**
 - You have to put your CAD standards into InRoads Survey**
 - Your collection crews need to follow some rules and understand how coding affects the results**

Survey Features - Summary

- **New Codes Styles** can be created while loading a raw data file or **anytime** while in InRoads Survey
- **Font** symbols, MStation **cells** or ACAD **Blocks** can be used
- Feature Codes (Styles) govern how the survey data will be graphically represented in the CAD file
- **Custom Operations** expand what can be automatically drawn by InRoads Survey
- If **Attributes** are used, Custom Operations can be built around them to enhance their value
- Use of **Control Coding** adds strength to Survey collection
 - Automates the graphical representation of the data
 - Creating the surface model more accurately
 - Creates Alignments in the geometry file

Lab 2.2 - Overview

- Load the Survey file created in previous lab
- Create Feature code Attributes
- Take a look at Custom Operations
- Take a look at correcting coding errors and add features as the file is processed
- Increase your familiarity with the In-Survey Fieldbook

- **Get started on page 134**