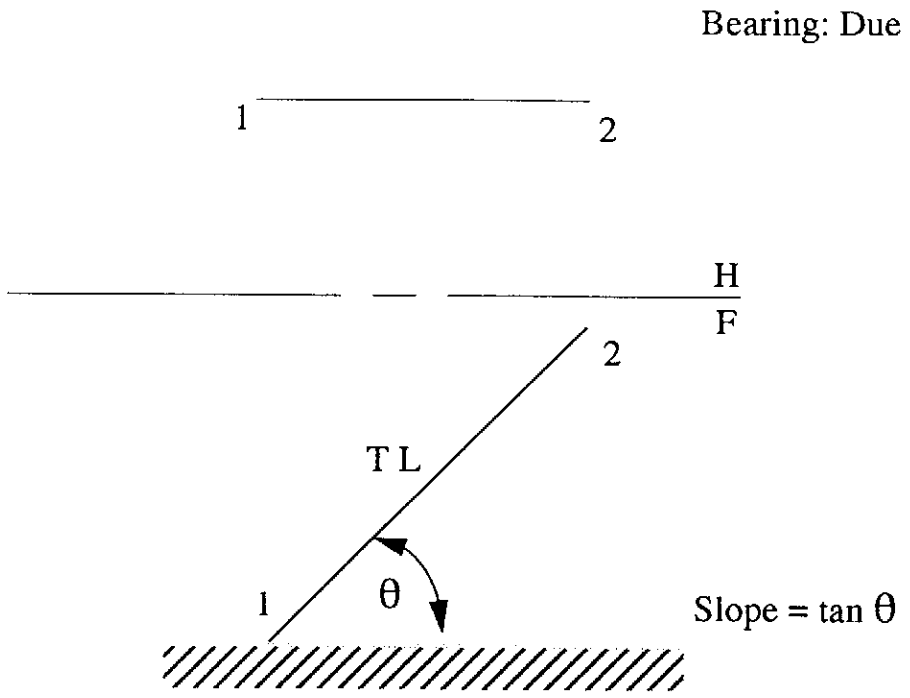
True Length of a Line

Definitions:

Bearing - direction (from due North) of line in **HORIZONTAL** view

Slope - angle that the TL view of the line makes with the Horizontal fold line. (i.e. must have TL view and edge view of the horizontal plane)

Example:



Finding the TL of a Line

Three methods are available:

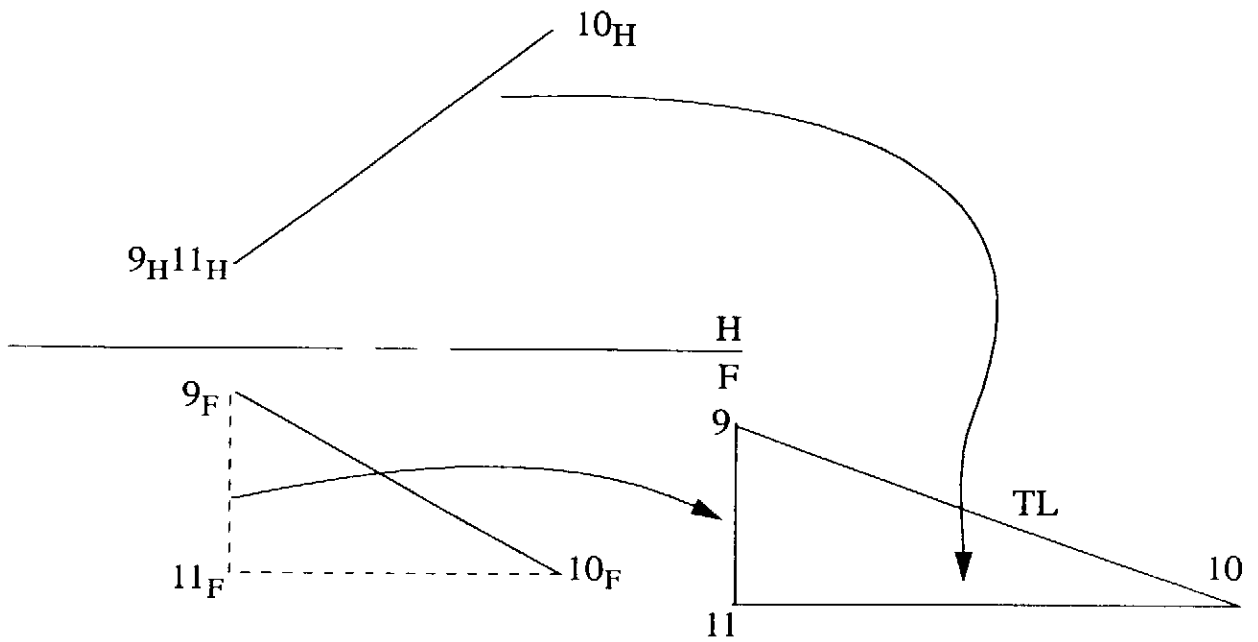
1. True Length Diagram
2. Revolution
3. Auxiliary View

True Length Diagram

We know that if we have two TL edges of a right triangle, we can find the length of the of the remaining side (by the Pythagorean Theorem)

We can use this knowledge to find the TL of a line.

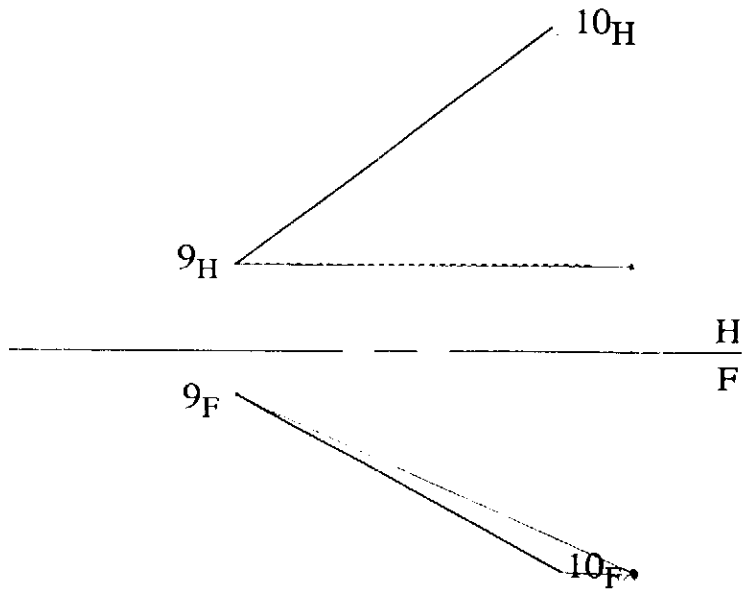
Given the oblique line as shown



- lines $9_H 10_H$ and $9_F 11_F$ are at 90° to each other
- ∴ can use these lines to construct a right angle triangle and find the TL of line 9 10.

TL of line by Revolution

- We know that we have a TL line in a given view if the line is parallel to the fold line in one of the other views.
- ∴ Revolve the line about an axis in a circular path until the line is parallel to the required plane.



- Then generate a projection line from the newly formed parallel line.
- This projection line locates the end of the TL line.

TL by Auxiliary View

Steps for generating a TL of a line by auxiliary view:

f) Set line of sight at 90° to the line

g) Place projection plane at 90° to the line of sight and label the fold line

h) Project end points of line into the auxiliary view

i) Transfer end points into auxiliary view by noting that

ANY TWO PLANES, BOTH PERPENDICULAR TO A COMMON PLANE, HAVE THE SAME MEASUREMENT DISTANCE PERPENDICULAR TO THE FOLD LINES.

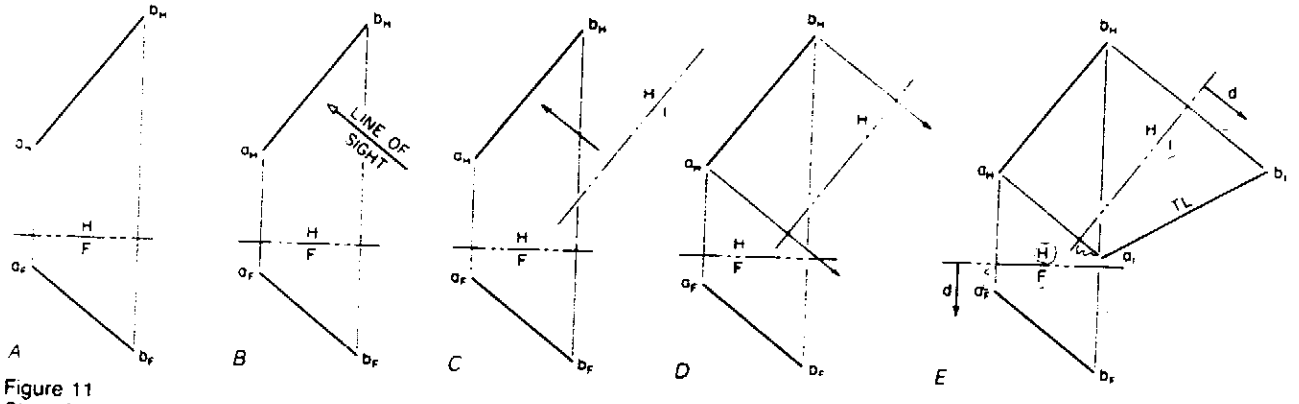
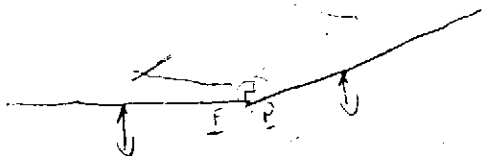


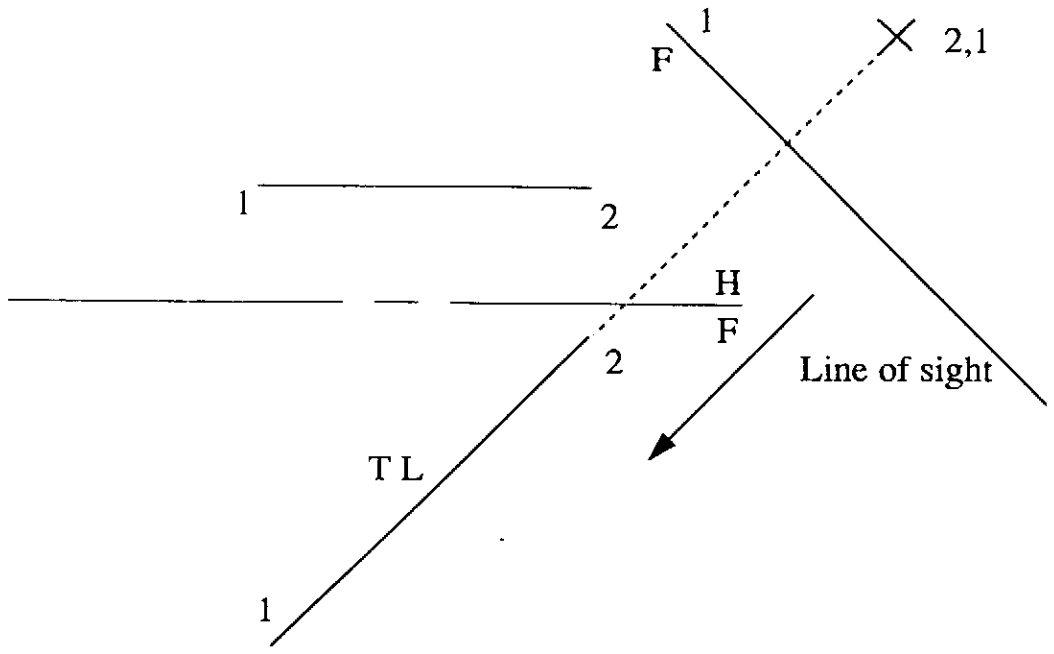
Figure 11
Steps for finding TL by auxiliary view.



Point View of a Line

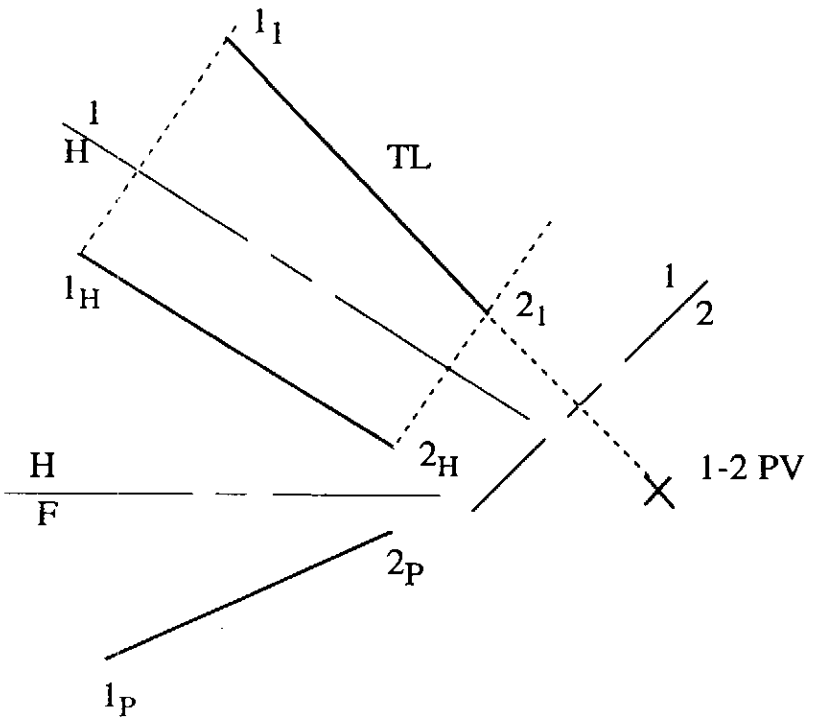
- Useful in analyzing other entities such as planes
- Useful in design for finding clearances between pipes, wires, conduits, etc.

Point view of a line can be found by placing the line of sight parallel to the TL view of the line.



Exercises: #61, #62, #52

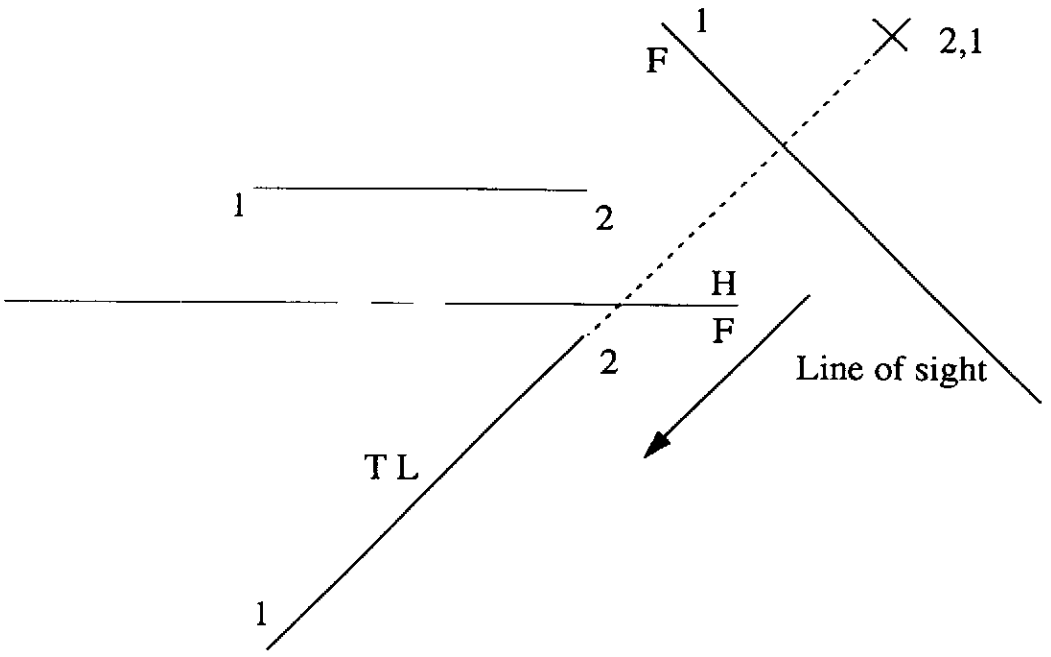
Note: Generally, construct a TL view of the line and then use an auxiliary view to get the PV of the line



True Surface of a Plane

Point View of a Line

Point view of a line can be found by placing the line of sight parallel to the **TL view** of the line.



Edge View of a Plane

The edge view of a plane is useful for finding:

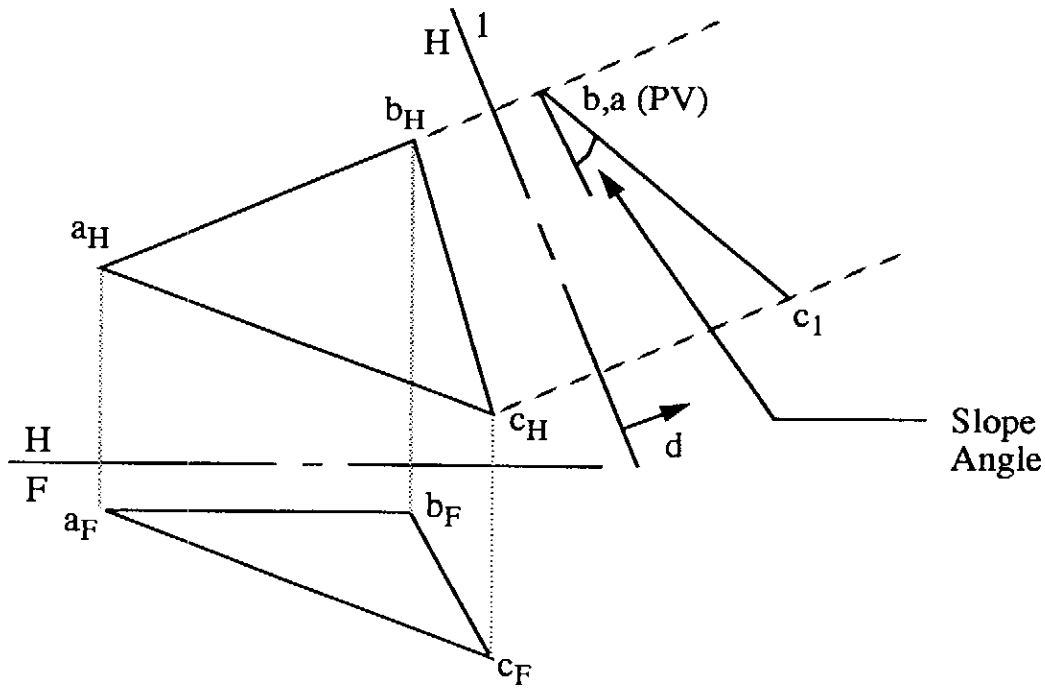
- The slope of the plane
- To see lines perpendicular to a plane
- To find the angle between planes
- Needed to find the true shape of the plane

Edge view of plane can be found by placing the line of sight parallel to a TL line on the plane.

There are 3 cases to be considered:

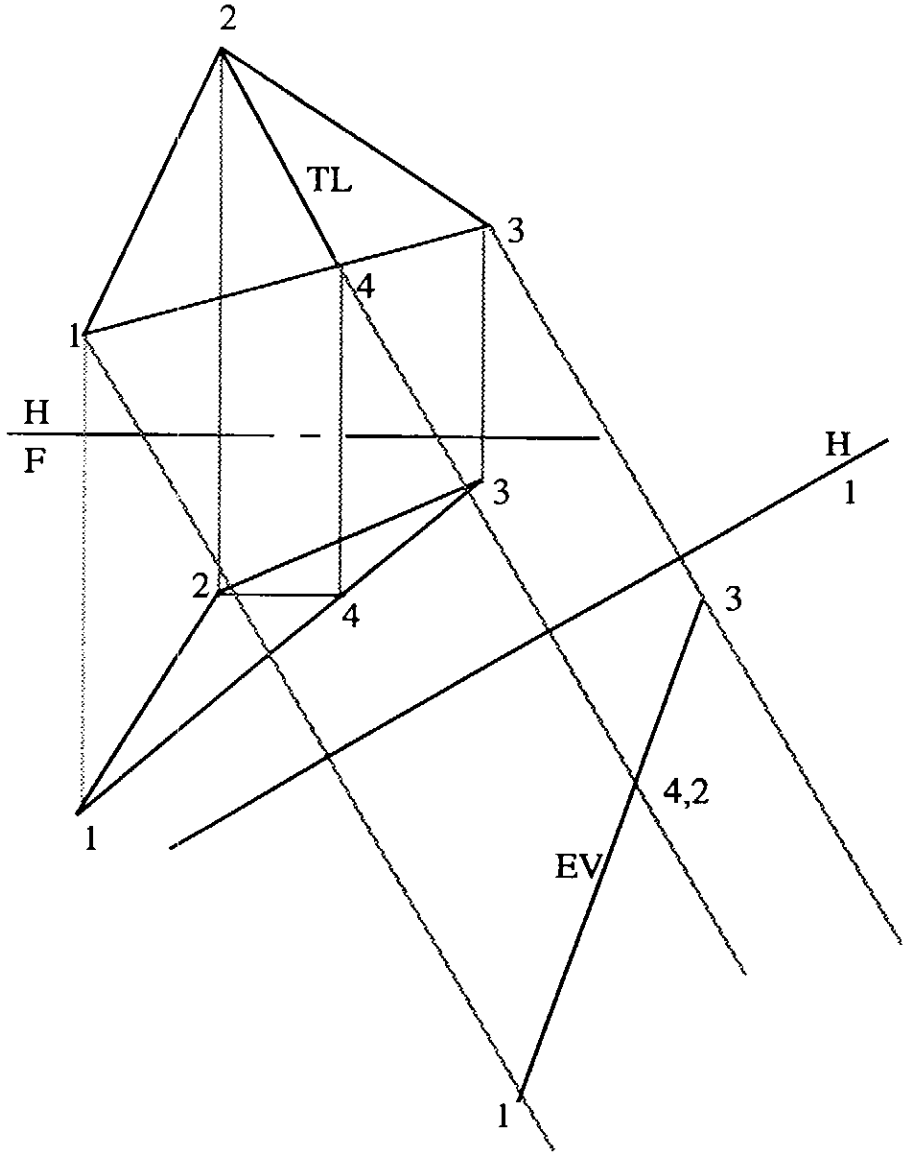
1. TL line on a plane is given
2. No TL line is given on plane
3. No TL line given and use revolution to generate EV

Case 1: TL line given on plane



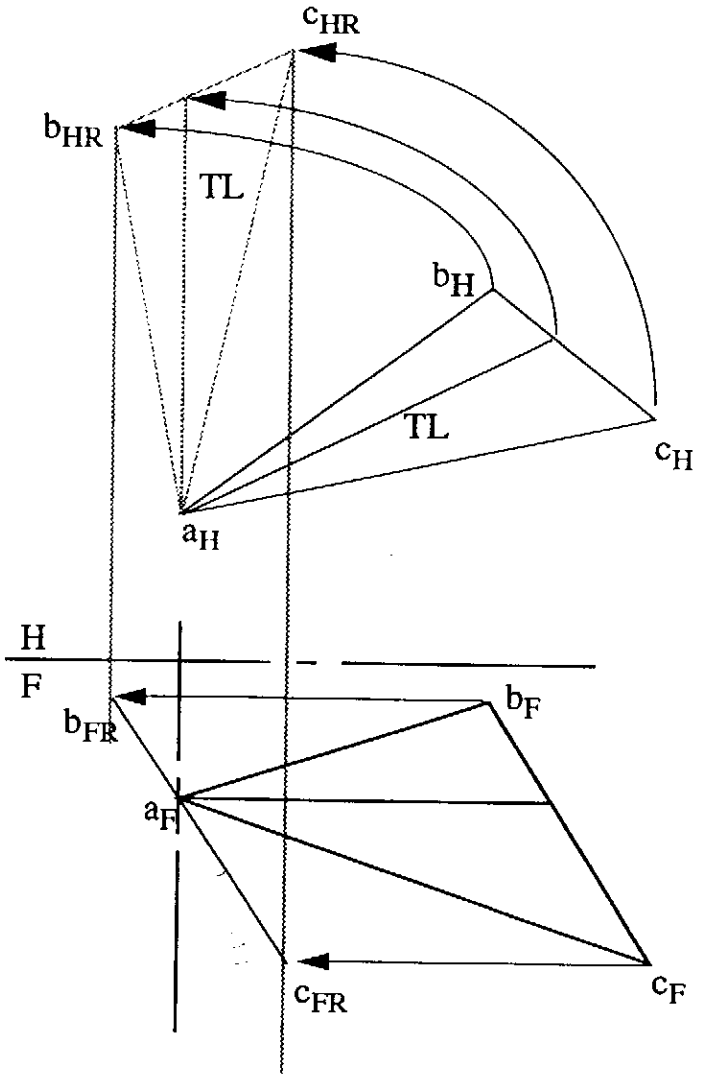
Case 2: No TL line given

- Need TL line to generate PV
- Construct a TL on the plane by (in one of the views) placing a line on the plane that is parallel to the fold line.
- The projection of this new line into the other view will create a TL line in that view.



Case 3: TL line not given and revolution used to generate EV

- TL line added to plane as was done in case 2
- TL line then revolved about and axis until it is perpendicular to the fold line
- PV of the TL line is then obtained, generating the EV of the plane

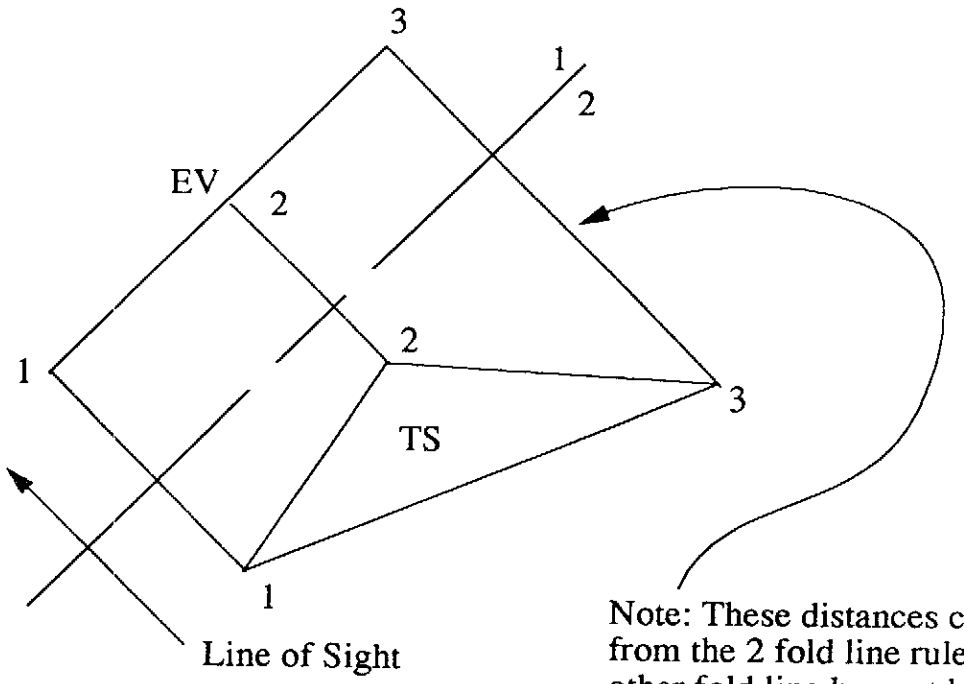


- Note: **Revolution** is easily done in **CAD** systems

True Surface of a Plane

To get a True Surface view of a plane:

1. Generate and EV of the Plane
2. Set the line of site perpendicular to the EV of the plane to get the TS view (i.e. look down on the surface of the plane)



Exercises: #64, #55