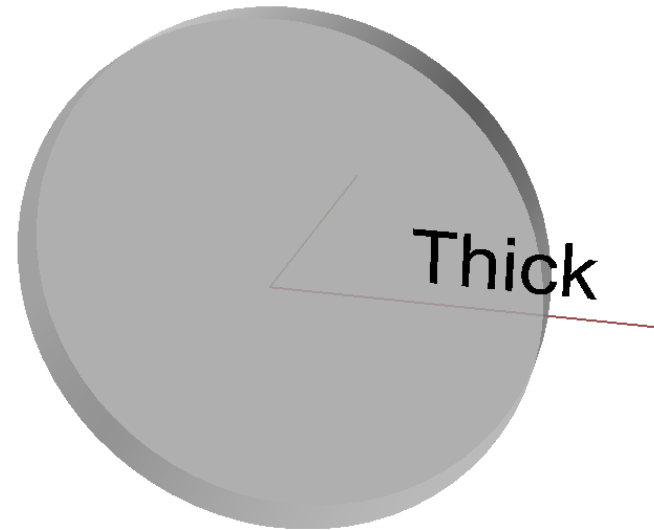
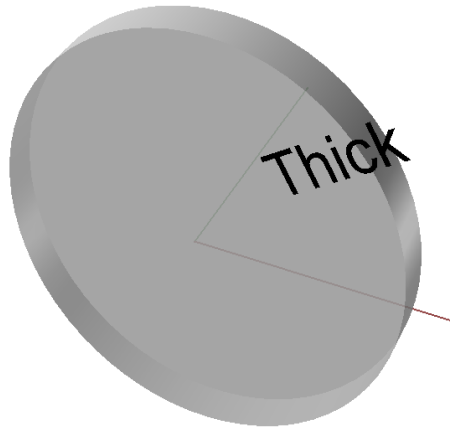


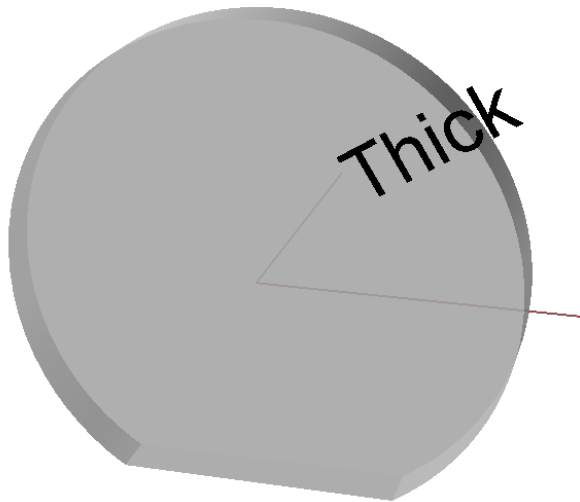
# Measurement of parallelism and angle

# Think of a window with wedge



We can always rotate the window to make the thick part line up with the coordinate axes. Then we can state the wedge with one number

# What if degree of freedom removed?

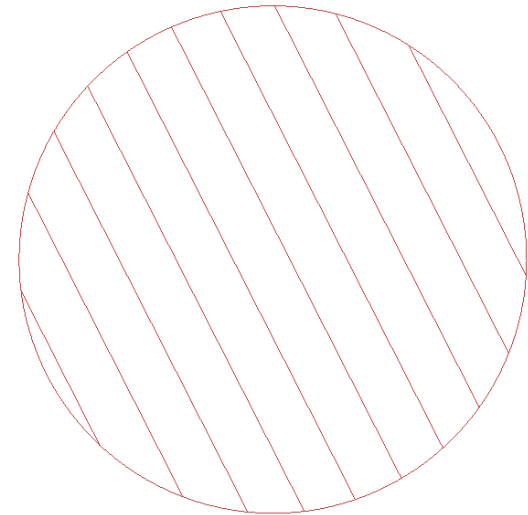
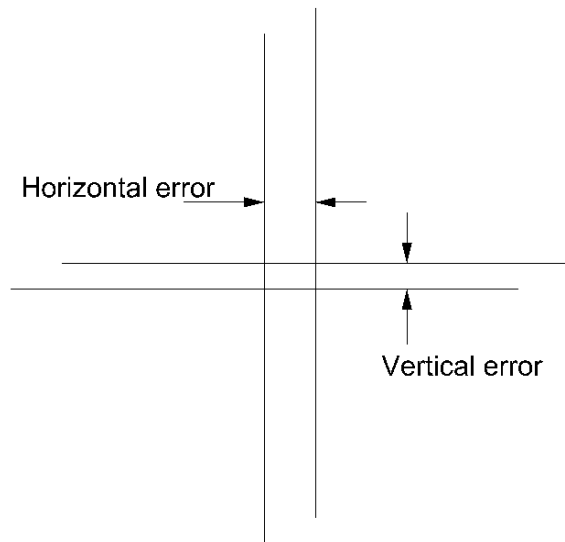


Now the wedge has a horizontal and vertical component relative to the datum defined by the sliced off bottom.

This is the situation with a prism. The ground surfaces define datums and face errors are usually defined relative to them

Prisms, in a tunnel diagram sense, that have parallel faces can be thought of as thick windows

# Views in different test instruments



Using an autocollimator

PSM and collimator

Interferometer

Read error from scale in

Read spot separation

Remove TF, count

Eyepiece

Multiply by collimator efl

fringes, measure angle

PSM so much easier to set up than either of other methods



# A more sensitive method

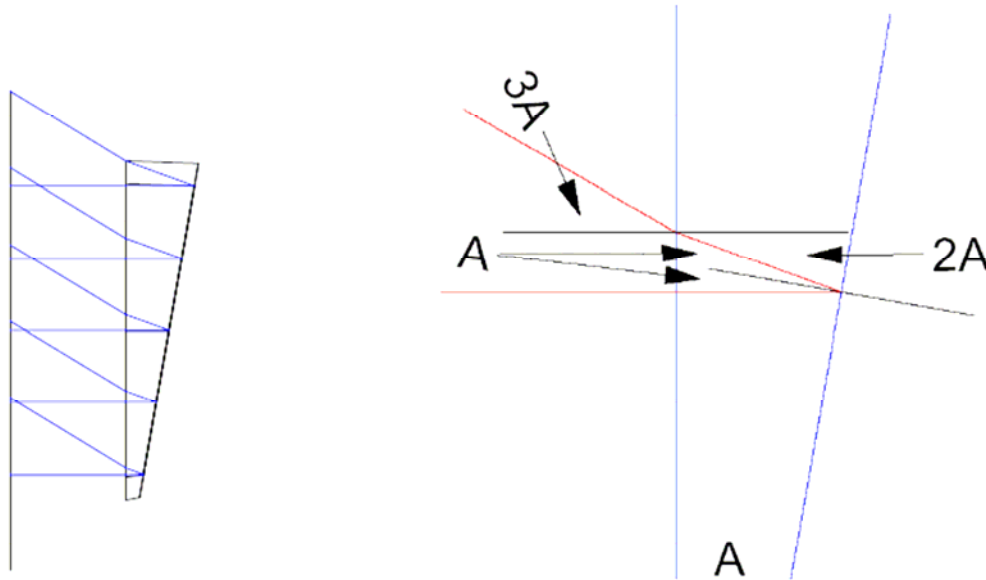
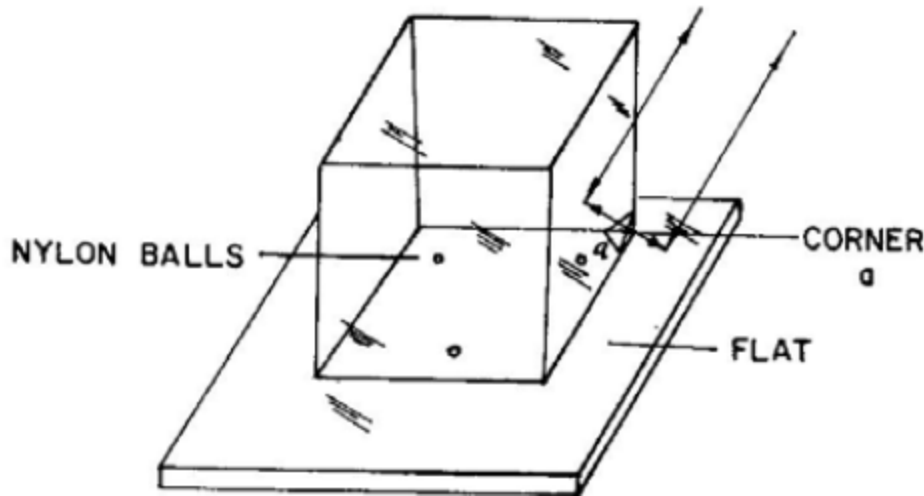


Diagram drawn for  $n = 1.5$ , assumes near parallel window  
Obviously a more sensitive method of measuring wedge  
Wedge in double pass  $\sim 6A(n-1)$

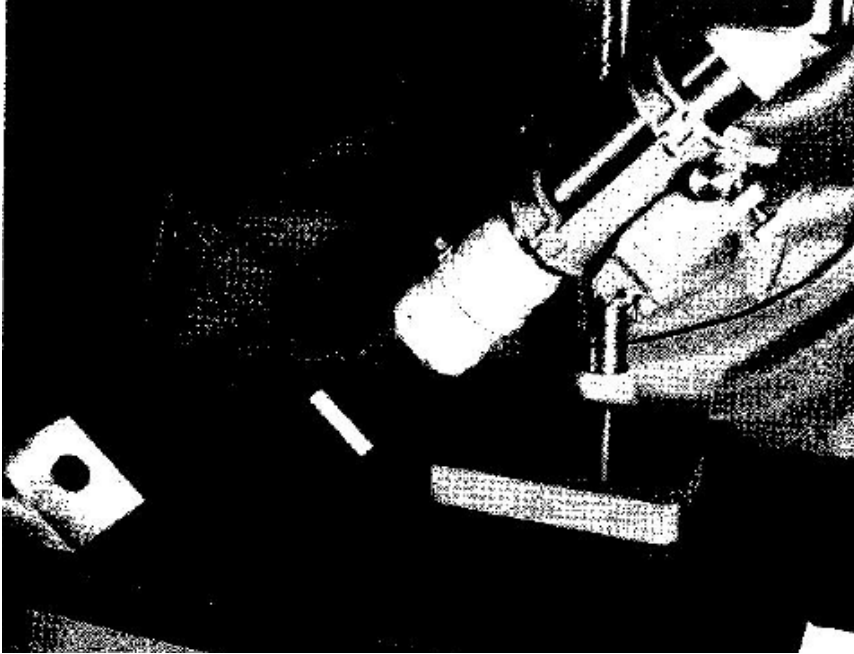
# Measuring the physical angle



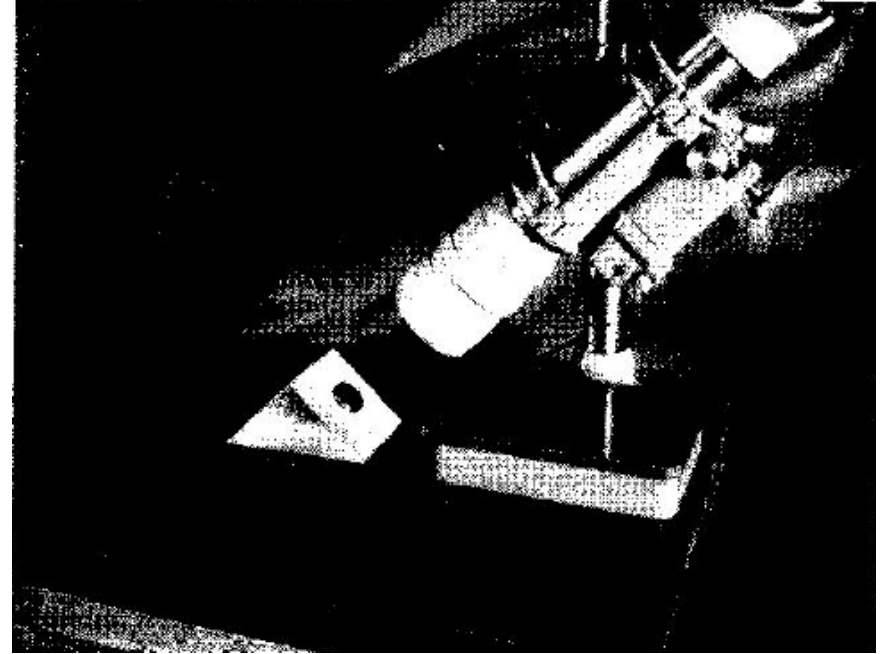
Set prism on 3 balls  
on an optical flat  
Look with collimated  
light incident at  $45^\circ$ ,  
the retro-angle.  
If spots or crosshairs  
coincide angle is  
exactly  $90^\circ$

To determine which way the angle is off move the source in the collimator toward the objective (makes the light diverge slightly). If the spots or crosshairs appear to separate, the  $90^\circ$  roof angle is greater than  $90^\circ$ . The same holds true for looking into the hypotenuse of a right angle prism. (Noticed by Tianquan and Arthur DeVany)

# Using a sine plate or angle gauge block



Measuring against an angle gauge block



Measuring ground prism using a plane parallel master metal mirror

# Sine plate

- Variable tilt plate with 10" hypotenuse
- Adjust to angle using height gauge blocks
- $\text{Sine } 22.5 = .38268$ ,  $10 * \text{sin } 22.5 = 3.8268$ "
- Potential accuracy  $.0001/10 = 2$  seconds
- Also available as compound plates

# Alternate method

- Put sample on top of master angle block
- Set on rotary table
- Look at both surfaces with autocollimator
- Datum surface of sample must be square with surfaces being measured