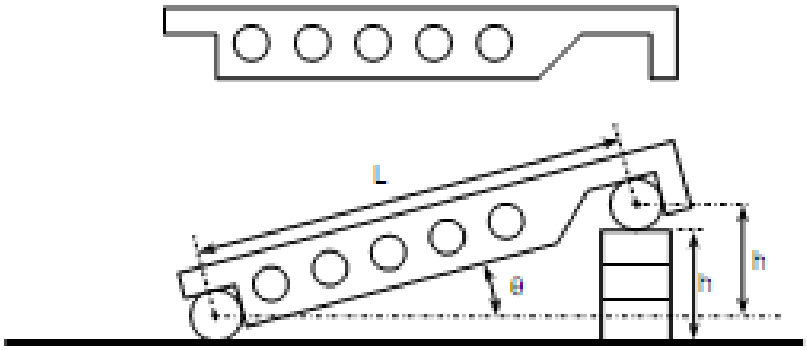
The Sine Principle

Dividing the Circle vs. the Sine Principle

- Proof of any angle can be traced to
  - dividing the circle
  - the sine principle
- Sine principle uses the ratio of two sides of a right triangle in deriving a given angle
  - any scale may be employed, as the ratio of the sides is used
- Dividing the circle is based upon the fact that the circle can be divided into any equal number of parts
  - the accuracy of the circular division is proven when the circle is closed.

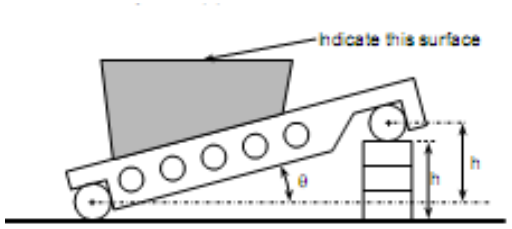
Sine Bar



$$\theta = \sin^{-1}\left(\frac{h}{L}\right)$$

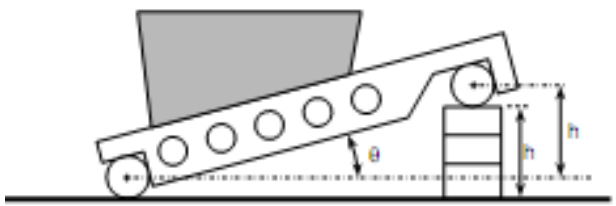
Using Sine Bar

- Set-up sine bar
- Identify low end of surface with indicators
- Adjust gage block height by an amount equal to the distance in the indicator readings multiplied by the proportion of sine bar length to work length
- Note this is only an approximation



- For example assume:
- if end of work piece is 0.01 mm low
- sine bar is 250 mm long
- work piece is 100 mm long
- gage block height increase is given by:

$$0.01\,mm\left(\frac{250\,mm}{100\,mm}\right)=0.25\,mm$$



Limitations

- Do not use sine bars for angles greater than 45º
- Large angles should be off-set by 90º
  - set to the complement rather than the angle
  - datum to and angle plate known to be square to the table surface.