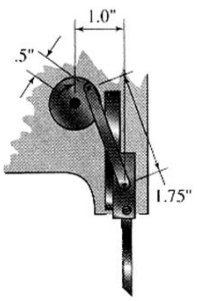
PART 3

Example 1

The mechanism shown the driving linkage for a reciprocating saber saw. Determine the limiting positions of the mechanism that places the saw blade in its extreme position.



1.Draw a kinematics diagram

2.Construct one extreme position

The saw blade (link 4) reaches extreme position as links 2 and 3 move collinear alignment

It provides maximum distance between points A and C. The maximum distance is calculate from length of links 2 and 3

L2 + L3 = 0.5 + 1.75 = 2.25 in

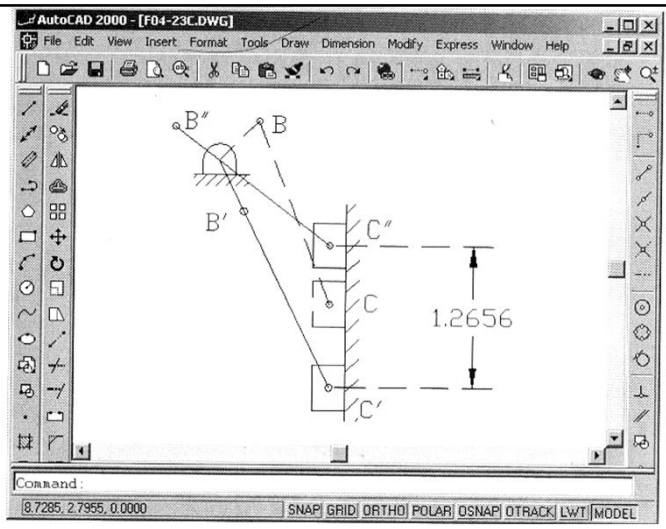
Combination of link 2 and 3 can be construct with point A as center

The intersection of arc and point C path determine the extreme position of C (C') and also B' can be determined.

3.Construct the other extreme position

Maximum distance of points A and C from links 2 and 3 overlapped. The minimum distance is calculated from links 2 and 3 difference.

L3 – L2 = 1.75 + 0.5 = 1.25 in



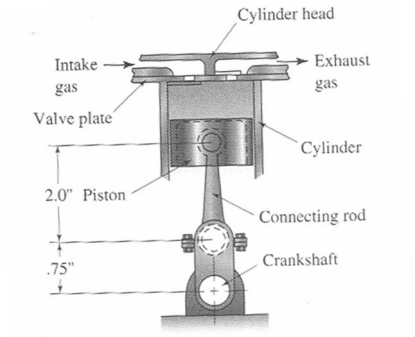
Point C" and B" can be relocated

4.Measure the stroke of the follower link

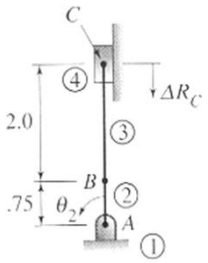
$(\Delta R_C)_{max} = 1.27$ *in*

Example 2

Figure shows the driving mechanism of a reciprocating compressor. Plot a displacement diagram of the piston displacement.



1. Draw the kinematics diagram

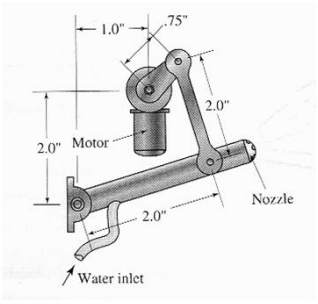


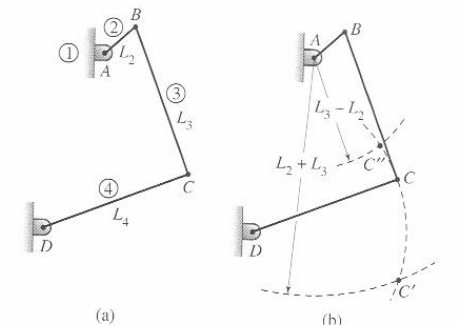
2. Designate the original phase

The crank vertical , placing joint B directly above joint A and point C as original position

Example 3

Figure illustrates a linkage that operates a water nozzle at an automatic car wash. Determine the limiting positions of the mechanism that places the nozzle in its extreme position.





1. Draw the kinematics diagram
2. Construct one extreme position

   The nozzle (link 4) reaches extreme position as links 2 and 3 move collinear alignment

   It provides maximum distance between points A and C.

   The maximum distance is calculate from length of links 2 and 3

   L2 + L3 = 0.75 + 2.00

   = 2.75 in

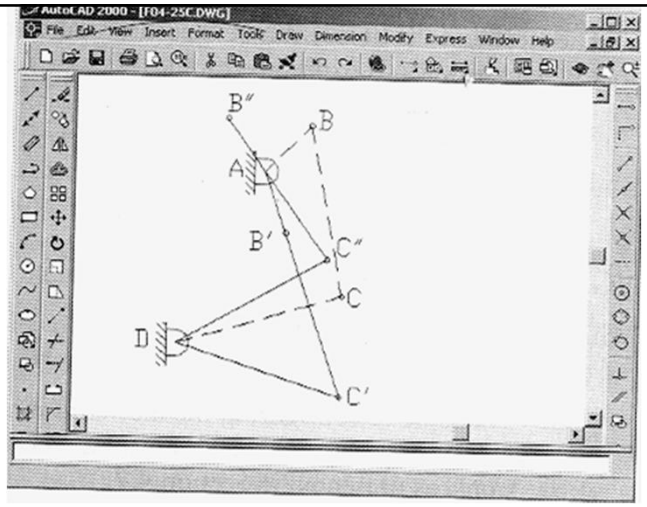
Combination of link 2 and 3 can be construct with point A as center

The intersection of arc and point C path determine the extreme position of C (C') and also B' can be determined.

3 Construct the other extreme position

Nozzle places (link 4) in extreme upper position to be determined. The minimum distance is calculated from links 2 and 3 difference due to its overlapped.

L3 – L2 = 2 + 0.75 = 1.25 in



Point C" and B" can be relocated

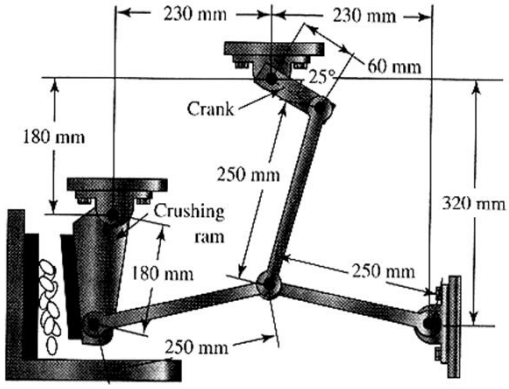
4 Measure the stroke of the follower link

$(\Delta\theta_4)_{max} = 47$

Complete cycle: Graphically position analysis

- The phase mechanism is the configuration at particular instant
- The procedure is repeated at set intervals of input displacement
- Interval phases of its cycle to complete entire cycle of position analysis

Assignment 3



Graphically position the links for the rock crushing mechanism into the configurations that place the ram in its limiting positions. Determine the maximum angular displacement (throw) of the crushing ram.

Gear

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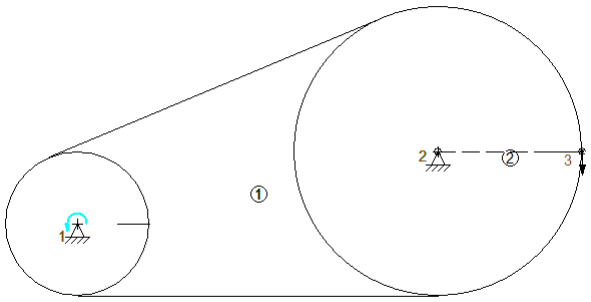
Belting

Example 4



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