



PRACTICE CHAIR

Setting Up for 3D Entiles

Make or verify the setting shown in the chair drawing settings thable

Command: VPOINT enter a view point -1,-1, 0.5
Command: ZOOM Zoom center at 0,0 and hieght , and a height of 480
Command: VIEW save view as CHAIR
Command: UCS set origin at 0,2112,0
Command: ZOOM Zoom center at 0,0 and a hieght of 240 mm
Command: VIEW save view as BUILD

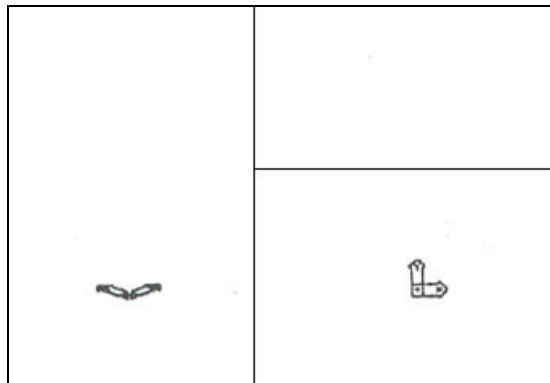
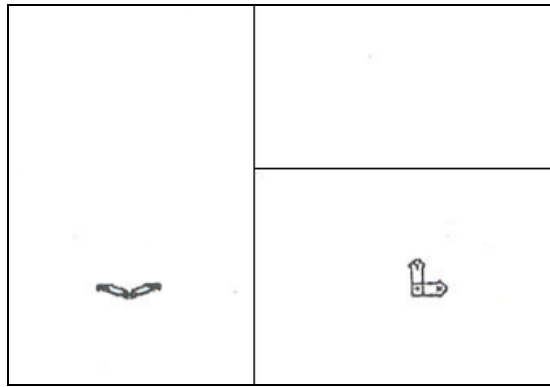
Command: VPORTS create 3 viewports
Save/restore/Delete/Join/Single/?/2/<3>/4: 3
Horizontal/Vertical/above/Below/Left/<Right>: L

Make upper right viewport active.

Command: UCSICON | turn ico off.
Command: VIEW Restore view CHAIR

Make loewr right viewport active

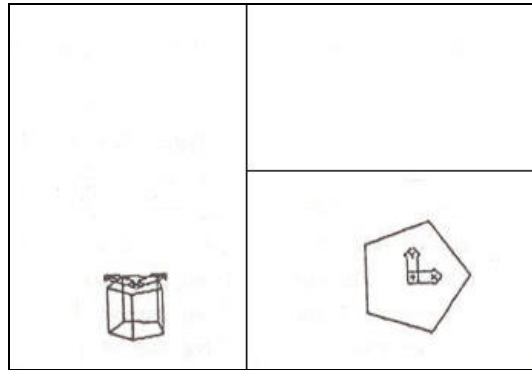
Command: PLAN Go to view of Current UCS
Command: ZOOM Zoonm center at 0,0 and a height of 120 mm
Command: VPORTS Save Vports as BUILD



Using CHPROP to extrude a 2D Polyline

Command: COLOR Set color to yellow.
 Command: POLYGON Create the center base in lower right viewport.
 Number of sides: 5
 Edge/<Center of polygon>: 0,0
 Inscribed in circle/Circumscribed about circle (I/C): C
 Radius of circle: @-30, 0 Entering on 1y 30 won't align the polygon at the correct angle.

Command: CHPROP Extrude polygon to a thickness of 60 mm.
 Select objects: L
 1 found.
 Select objects: <RETURN>
 Change what property (Color/LAyer/LType/Thickness) ? T
 New thickness <O>: -60 UCS is at top of polygon so thickness is negative.
 Change what property (Color/LAyer/LType/Thickness) ? <RETURN>



Using 3DFACE to make first leg

Make left viewport active.

Command: 3DFACE

First point:

Second point:

Third point:

Fourth point:

Third point:

Command: OSNAP -

Command: 3DFACE

First point:

Second point:

Third point: .'

Fourth point: .

Third point:

Fourth point:

Third point:

Fourth point:

Third point:

Command: OSNAP

Command: SAVE

Create end cap o leg.

-300,18,-48

-300,-18,-48

-300,-18,-18

-300,18,-18

<RETURN>

Set Object snap mode ENDP to draw the leg.

Draw the log's left. Face first, then the remaining faces clockwise.

Upper left. corner of polygon face at 1.

Upper left. corner of leg cap at 2.

Lower left. corner of leg cap at 3.

Lower left. corner of polygon face at 4.

Lower right corner of polygon face at 5.

Lower right corner of leg cap at 6.

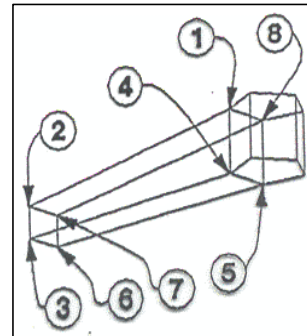
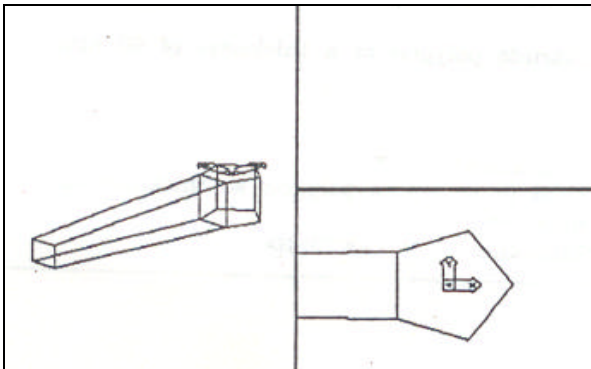
Upper right corner of leg cap at (7).

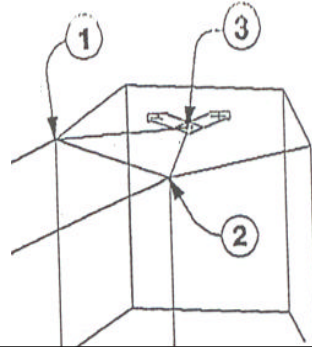
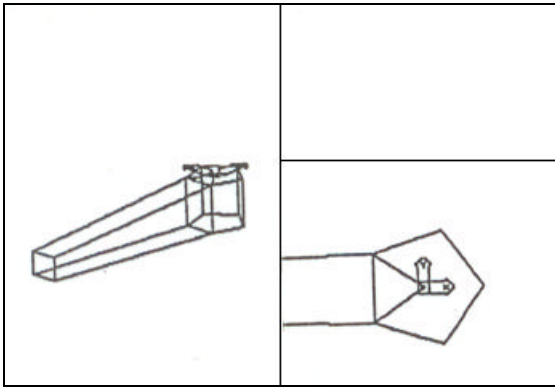
Upper right corner of polygon face at (8).

<RETURN>

Set OSNAP back to NONE.

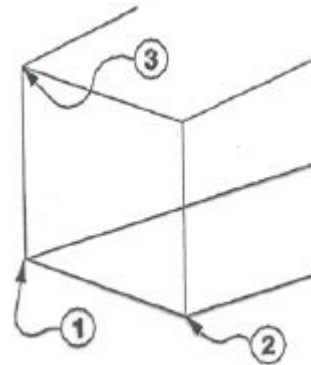
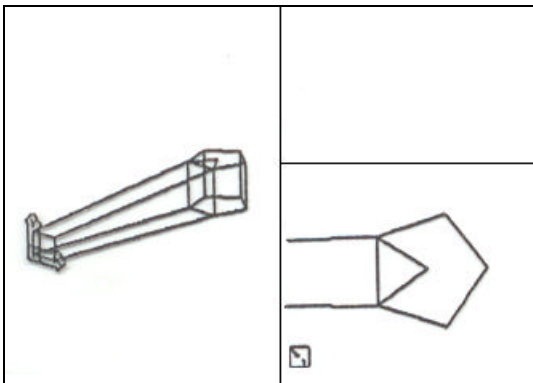
Save the drawing.





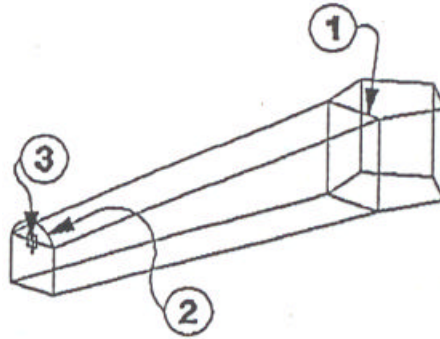
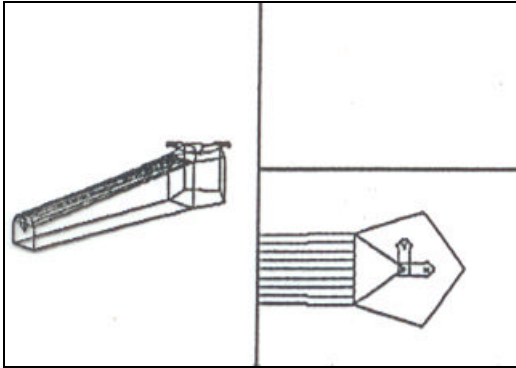
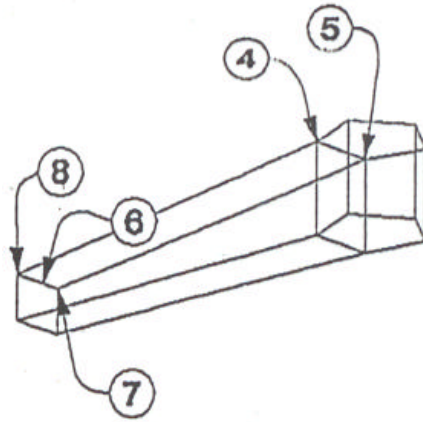
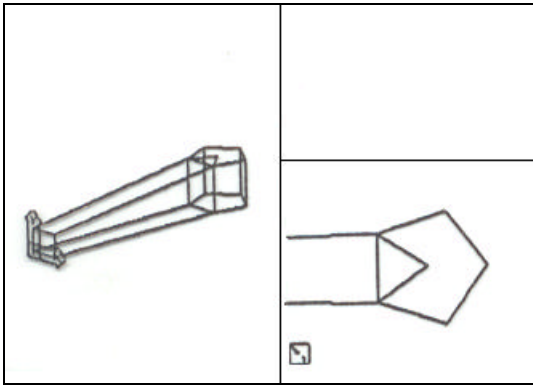
Using 3DFACE With Invisible Edges

Command: SETVAR	Set SPLFRAME to 1.
Command: 3DFACE	Remember to precede all picks with I.
First point: I	Pick first corner of Polygon at (1).
Second point: I	Pick second corner of Polygon at (2).
Third point: I	Pick center of Polygon at (3) or type 0,0.
Fourth point: <RETURN>	
Third point: <RETURN>	
Command: SETVAR	Set SPLFRAME to 0.
Command: REGENALL	Regen to verify edges are invisible.
Command: SETVAR	Set SPLFRAME to 1.



Preparing for RULESURF

Command: LAYER	Set layer to BUILD.
Command: COLOR	Set color to BYLAYER.
Command: UCS	use the 3 point option and set the UCS on the leg cap,picking (1), 2, and 3.
Command: LINE	Draw a line from 4 to 5.
Command: SETVAR	Set PDMODE to 66 for a square and cross point symbol.
Command: POINT	Draw a point at 6, the mid-point.
Command: ARC	Draw an arc beginning at 7, ending at 8, and included angle of 135 degrees.



Using RULESURF to Complete the Leg

Command: **LAYER**
 Command: **COLOUR**
 Command: **UCS**
 Command: **SETVAR**

Set layer CHAIR current.
 Set colour to yellow.
 Change UCS to Previous.
 Set SURFTAB 1 to 8.

Command: **RULESURF**
 Select first defining curve:
 Select second defining curve:

Select line at (1).
 Select arc at (2).

Command: **MOVE**
 Select objects: L
 1 found.
 Select objects: <**RETURN**>
 Base point or displacement: 0, 0
 Second point of displacement: *0, 0
 Command: **REDRAWALL**

Temporarily move the Rulesurf to the WCS.
 Selects the Rulesurf entity.
 Origin of current UCS.
 Origin of WCS.
 Redraw all viewports.

Command: **RULESURF**
 Select first defining curve:
 Select second defining curve:

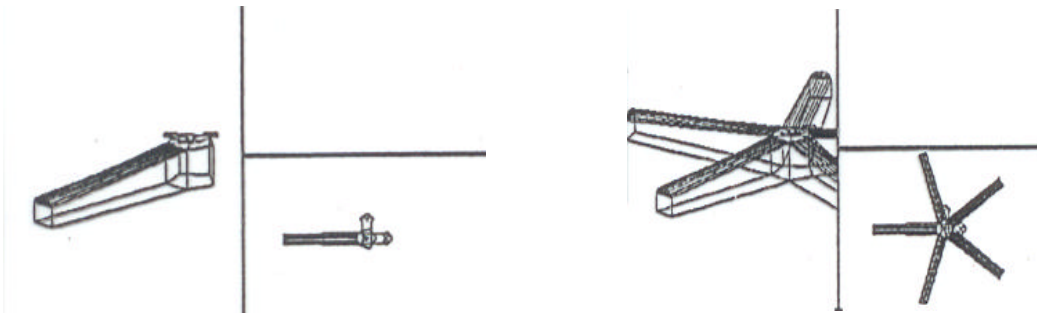
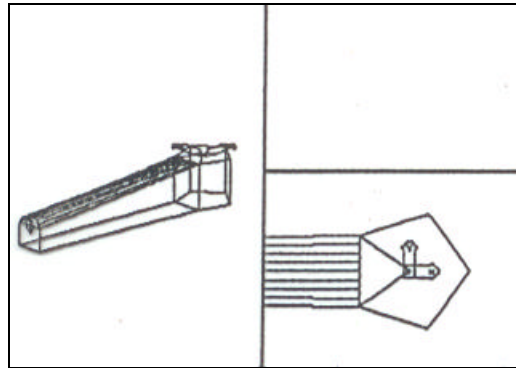
Select the Point at (3) with NODE osnap.
 Select Arc at (2).

Command: **MOVE**
 Select objects:

Move the rulesurf in the WCS back to the UCS.
 Select the RULESURF entity in the upper right viewport.

Select objects: <**RETURN**>
 Base point or displacement: *0, 0
 Second point of displacement: 0, 0

Origin of WCS.
 Origin of current UCS.



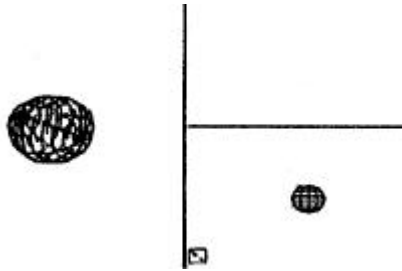
Arraying, the Legs to Complete the Base

Make the lower right viewport active.

Command **Layer**
 Command:ZOOM
 Command:ARRAY

Command:BLOCK

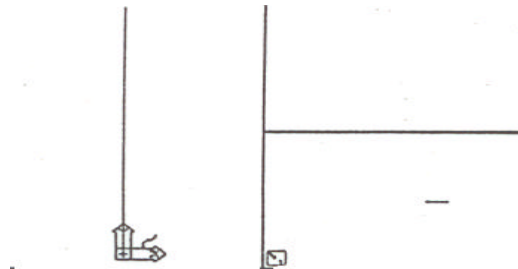
Turn layer BUIL off.
 to a scale of 2 for array.
 Array leg and cap of hub 5 places in 360
 degrees with center point at 0,0.
 Block to BASE with the insert point at 0,0.



Using a Pre-Built 3D Sphere to Make a Simple Castor

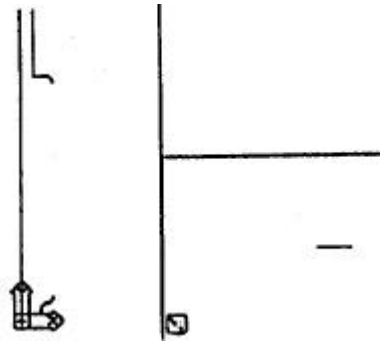
Make the left viewport active.

Command: UCS	Rotate the X axis 90 degrees. .
Command: COLOR	Set color to red.
Select[Sphere]	Select sphere from the screen or icon menu.
Please wait... Loading 3D Objects. nil	
Command: Sphere	The sphere command is started.
Center of sphere: 0,0	
Diameter/<radius>: 30	
Number of longitudinal segments <16>: 12	
Number of latitudinal segments <16>: 12	
Command: UCS	Restore the previous UCS.
Command: BLOCK	Block sphere, selecting as last, to CASTOR with insert point at top of sphere (0,0,30).
Comand: SAVE	Save DRAWING



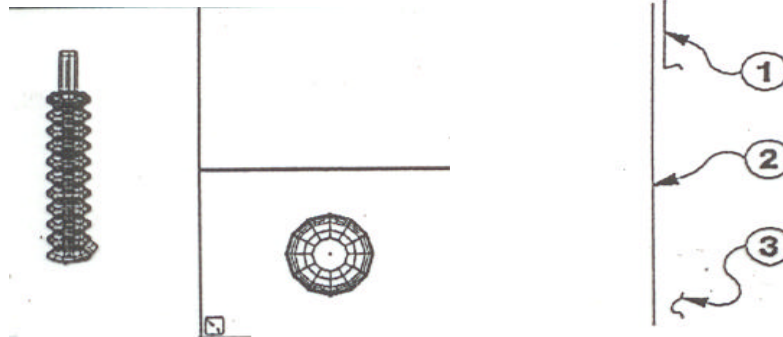
Preparing Axis and Bottom Path Curve for REVSURF .

Command: LAYER	Set layer BUILD current.
Command: COLOR	Set colour to BYLAYER.
Command: ERASE	Erase any remaining build entities.
Command: UCS	Rotate the X axis 90 degrees.
Command: LINE	From 0,0 to 0,312 for axis of revolution.
Command: PLAN	Default to current plan view.
Command: PLINE	From 30,0 to 18,12 to 30,24.
Command: PEDIT	
Select polyline: L	
Close/Join/Width/Edit vertex/Fit curve/Spline curve/Decurve/Undo/eXit <x>: E	
Next/Previous/Break/Insert/Move/Regen/Straighten/Tangent/Width/eXit <N>: T	
Direction of tangent: 90	
Next/Previous/Break/Insert/Move/Regen/Straighten/Tangent/Width/eXit <N>: N	
Next/Previous/Break/Insert/Move/Regen/Straighten/Tangent/Width/eXit <N>: N	
Next/Previous/Break/Insert/Move/Regen/Straighten/Tangent/Width/ eXit <N>: T	
Direction of tangent: 90	
Next/Previous/Break/Insert/Move/Regen/Straighten/Tangent/ Width /eXit <N>: X	
Close/Join/With/Edit vertex/Fit curve/Spline curve/Decurve/Undo/ eXit <X>: F	
Close/Join/Width/Edit vertex/Fit curve/Spline curve/Decurve/Undo/ eXit <X>: X	



Creating Top Path Curve for the Shaft Top

Command: **PLINE**
 From point: 30,240
 Current line-width is 0
 Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>: **A**
 Angle/CENTER/Close/Direction/Halfwidth/Line/Radius/Second pt/Undo/Width/
 <Endpoint of arc>: **D**
 Direction from start point: Pick any point at 90 degrees.
 End point: **24,246** .
 Angle/CENTER/Close/Direction/Halfwidth/Line/Radius/Second pt/Undo/Width/
 <Endpoint of arc>: **L**
 Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>: **12,246**
 Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>: **12,312**
 Arc/Close/Halfwidth/Length/Undo/Width/<Endpoint of line>: **<RETURN>**



Using REVSURF to Make the Pedestal Surface

Command: VPORTS	Restore Build viewport.
Command: LAYER	Set layer CHAIR current.
Command: COLOUR	Set color to cyan.
Command: SETVAR	Set SURTAB 1 to 12.
Command: SETVAR	Set SURTAB 2 to 4.

Make the left. viewport active.

Command: REVSURF	Revolve top pedestal shaft..
Select path curve:	Select first path (1).
Select axis of revolution:	Select axis. (2)
Start angle <0>: <RETURN>	
Included angle (+=CCW, -=CW) <Full circle>: <RETURN>	

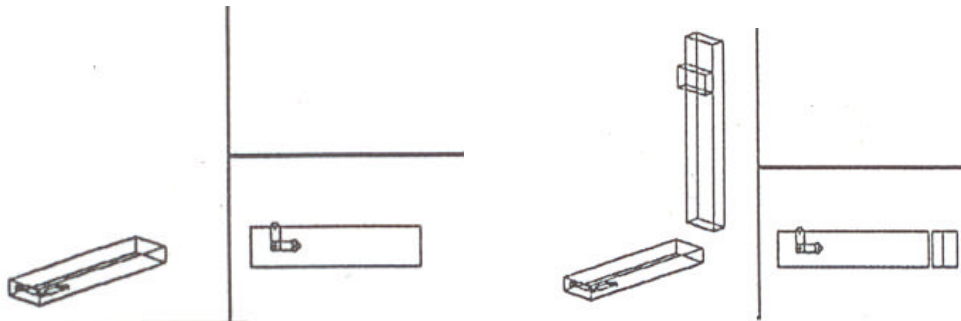
Command: REVSORF	Revolve bottom pedestal segment.
Select path curve:	Select second path (3).
Select axis of revolution:	Select axis (2)
Start angle <O>: <RETURN>	
Included angle (+=CCW, -=CW) <Full circle>: <RETURN>	

Now, use a rectangular array to complete the pedestal.

Command: ARRAY	Array the pedestal segment with 10 rows at 24 mm and 1 column.
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Change your UCS to set up for block.

Command: UCS	Rotate the X axis -90 degrees.
Command: LAYER.	Turn layer BUILD off.
Command: BLOCK	Block, to PEDESTAL with insert point at 0,0.



Combining entities to create seat and back support

The left viewport should still be active and layer CHAIR should be current.

Command: SETVAR	Set THICKNESS to 24 mm.
Command: COLOR	Set color to green.
Command: SOLID	Use SOLID to create seat support base.
First point: -36,-30	
Enter points @0,60 and @252,-60 and @0,60 then <RETURN> end.	
	Note that the 3rd and 4th points are reversed from 3DFACE, which, uses a clockwise/counter-clockwise order.

Command: SETVAR	Set THICKNESS to 312 mm.
Command: SOLID	Create the back support upright.
First point: 240,-30,48	
Enter points @0,60 and @24,-60 and @0,60 then <RETURN>.	
Command: SETVAR	Set THICKNESS to 36 mm.
Command: SOLID	Create back support block.
First point: 222,-30,276	
Enter point @0,60 and @18,-60 and @0,60 then <RETURN>.	

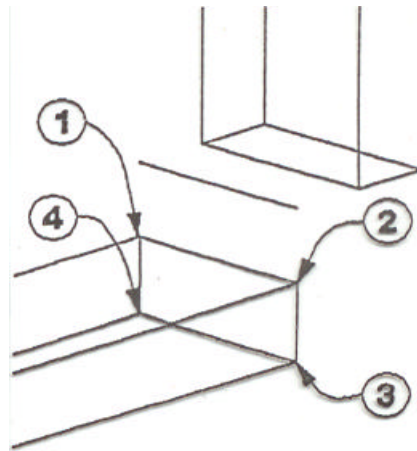
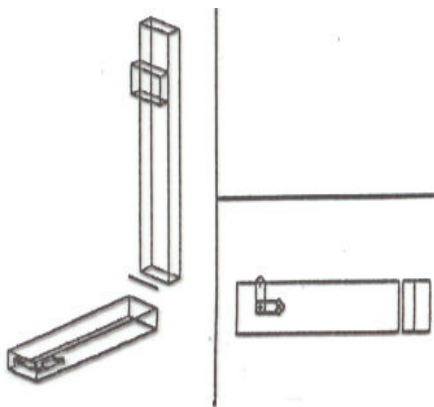
Creating the Axis and Path Curve for REVSURF '

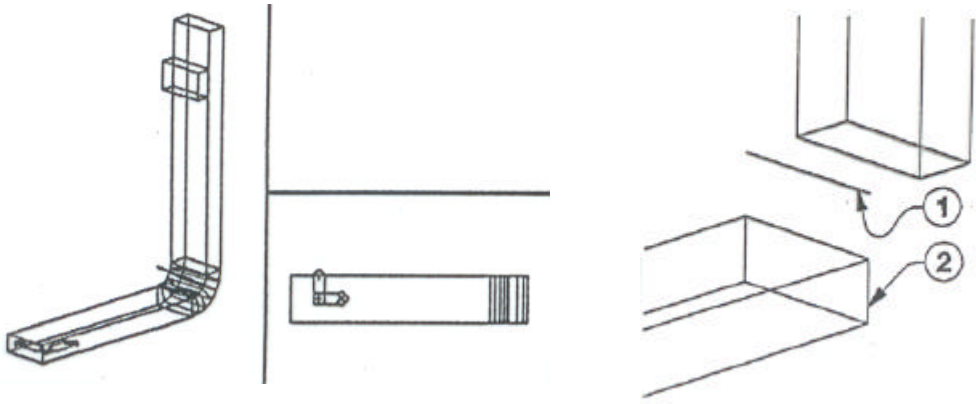
Command: SETVAR
 Command: LAYER
 Command: COLOR
 Command: ERASE
 Command: LINE
 revolution axis.

Set THICKNISS tow O.
 Set layer BUILD current.
 Set color BYLAYER.
 Erase all entities on the BUILD layer.
 Draw line from 216,48 to 216,-30,48 for

Command: 3DPOLY
 From point:
 Close/Undo/<Endpoint of line>:
 Close/Undo/<Endpoint of line>:
 Close/Undo/<Endpoint of line>:
 Close/Undo/<Endpoint of line>: C

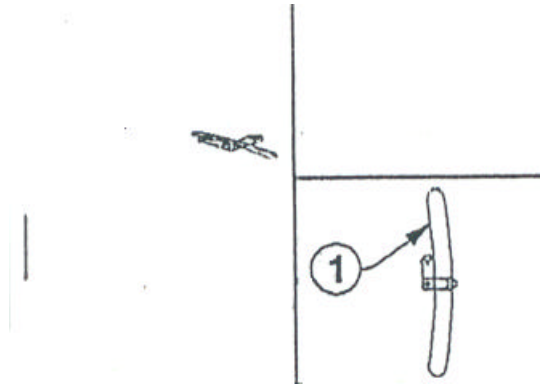
Osnap a rectangle around end of seat .
 Pick. ENDPoInt at (1).
 Pick ENDPoInt at (2).
 Pick ENDPoInt at (3).
 Pick ENDPoInt at (4).
 Close completes the rectangle.





Using REVSURF to Make 90 Degree Section

Command: SETVAR	Set SURFTAB1 to 6.
Command: LAYER	Set layer CHAIR current.
Command: COLOR	Set color green.
Command: REVSURF	
Select path curve:	Select rectangle on near side edge at (2).
Select axis of revolution:	Select axis line at (1)
Start angle <O>:	<RETURN>
Included angle (+-ccw, --cw) <Full circle>:	-PO
Command: LAYER	turn off BUILD layer.
Command: BLOXX	Block as SUPPORT with insert point at 0,0.



Creating a Pline Path Curve of Back Cushion

Make the lower right viewport active,

- | | |
|---|---|
| Command: LAYER | Set layer BUILD current. |
| Command: ERASE | Erase entities on BUILD layer |
| Command: COLOR | Set color BYLAYER. |
| Command: ARC | |
| Center/<Start point>: 0, -168 | |
| Center/End/<Second point>: E | |
| End point: 0,168 | |
| Angle/Direction/Radius/<Center point>: A | |
| Included angle: 20 | |
| Command: OFFSET | Offset arc 36 mm to the right. |
| | Connect ends of arc with another arc. |
| Command: ARC | |
| Center/<Start point>: ENDP | |
| Of | Pick top end of right arc |
| Center/End/<Second point>: E | |
| End point: ENDP | |
| of | Pick top end of left arc |
| Angle/Direction/Radius/<Center point>: A | |
| Included angle: 180 | |
| Command: ARC | Repeat arc command for other end of |
| backrest | |
| Command: PEDIT | Join all the arcs into a single polyline. |
| Command: LINE | Draw a line for a direction vector and |
| | rotation axis. |
| From point: CEN | |
| of | Pick the center point of arc at (1). |
| To point: @ 0,0, -216 | Draw a 216 mm line in the Z direction. |
| To point: <RETURN> | |

Creating Ono Path Curve for Two Meshes

Make left viewport active

Command: ZOOM

Zoom dynamic to comer of chair backrest,

Command: LINE

Connect the endpoints of the small arc at (1) and (2).

Command: UCS

Move UCS to upper left seat comer.

Origin/ZAxis/3point/Entity/View/X/Y/Z/Prev/Restore/Save/Del/?/<World>: 3

Origin point <0,0,0>: ENDP

of

Pick front end of line at (1).

Point on positive portion of the X-axis <1,168,0>: ENDP

of

Pick back end of line at (2)

Point on positive -Y portion of the UCS X-y plane <-0,169,0>: @0,0,1

Command: ARC

Center/<Start point>: ENDP

Far end of short line at (2).

of

Center/End/<Second point>: E

End point: ENDP

of

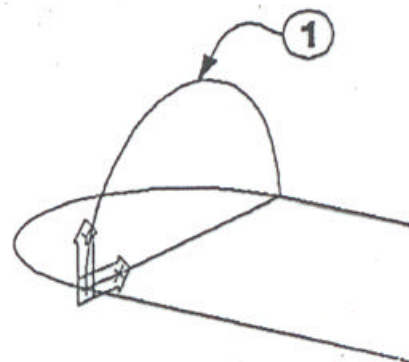
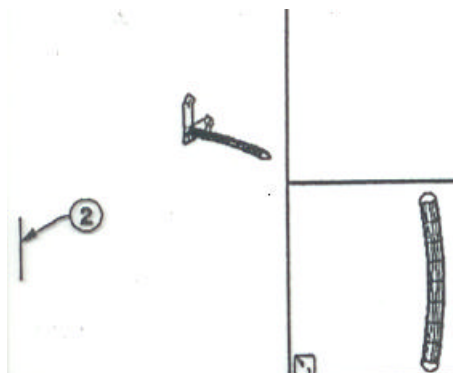
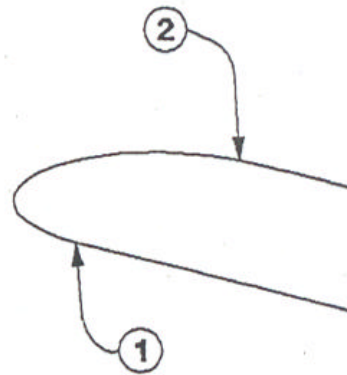
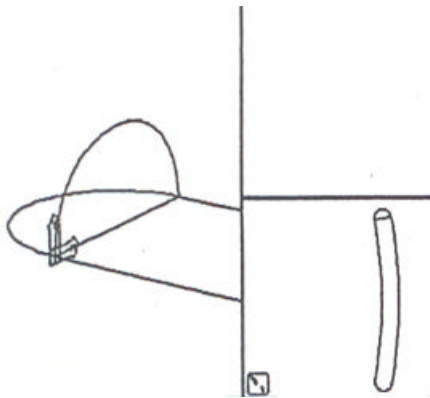
Near end of short line at (1).

Angle/Direction/Radius/<Center point>: A

included angle: 180

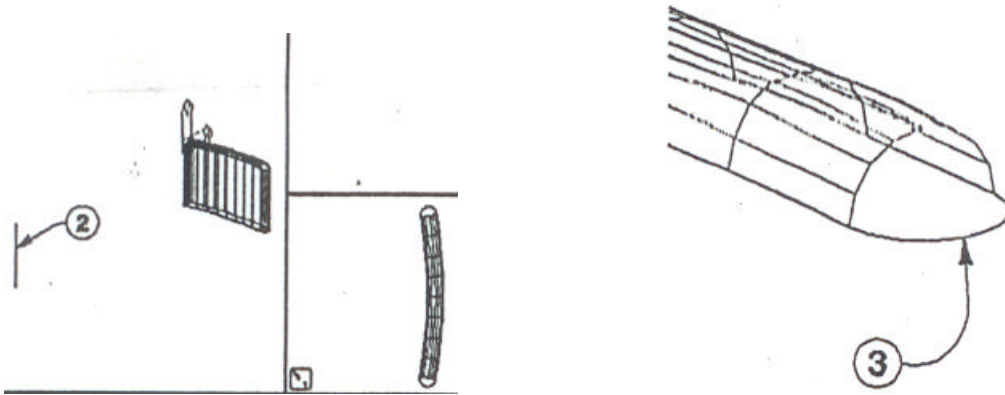
Command: ZOOM

Zoom dynamic to enclose chair back and axis line of first pline arc.

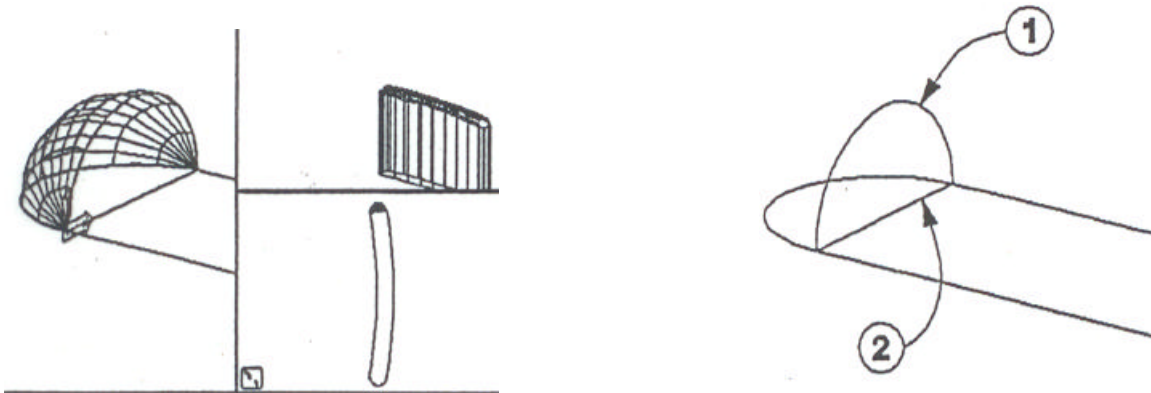


Using REVSURF to Surface the Top Edge Backrest

Command: LAYER	Set layer CHAIR current.
Command: COLOR	Set color magenta.
Command: SETVAR	Set SURFTAB1 to 8.
Command: SETVAR	Set SURFTAB2 to 8.
Command: REVSURF	Create top edge of chair back.
Select path curve:	Select the last arc drawn at (1).
Select axis of revolution:	Pick the axis line at (2).
Start angle <0>: <RETURN>	
Included angle (+ccw, --cw) <Full circle>:20	20 degrees matches the angle of the profile.
Command: TABSURF	Draw the main surface of the chair.
Select path curve:	Pick the joined pline at (3).
Select direction vector:	Pick the top of the same line at (2)
Command: MOVE	Move the two meshes from 0,0 to *0,0.

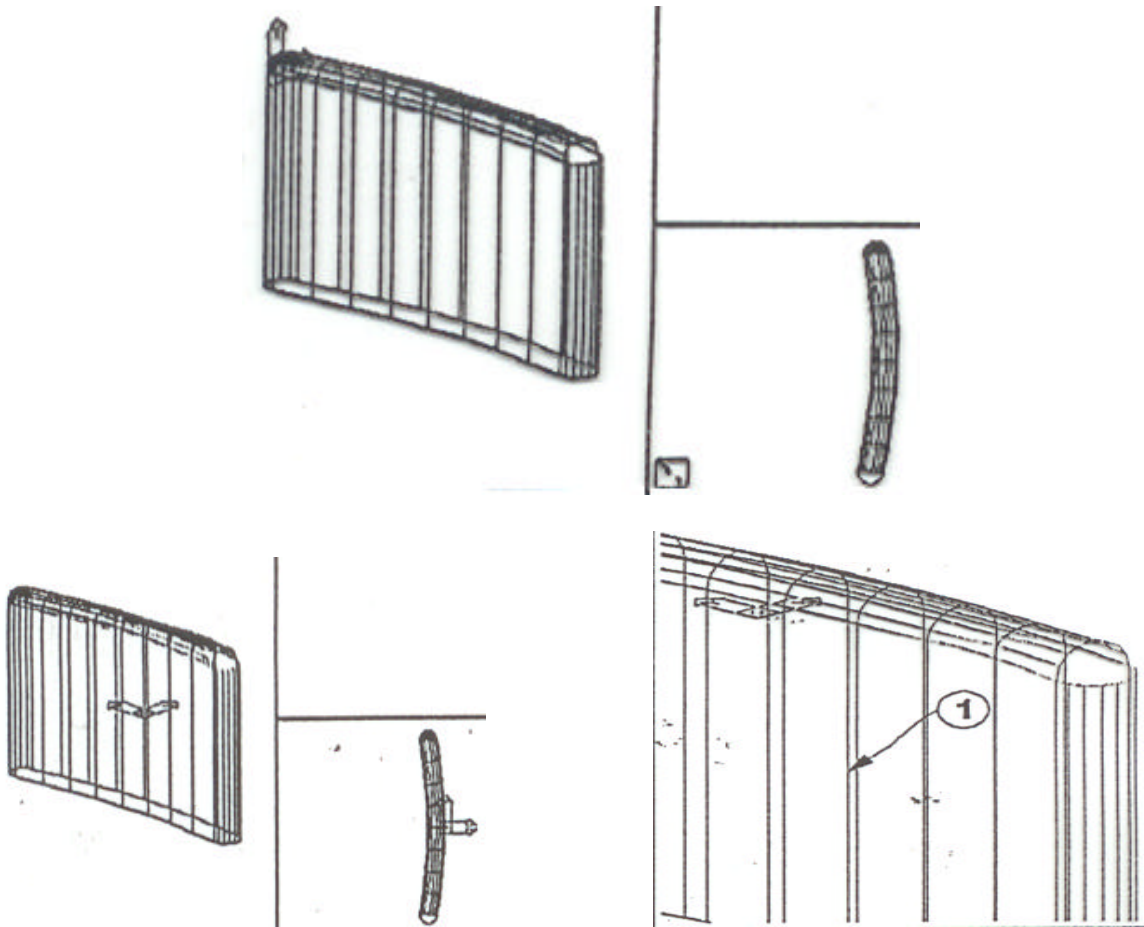


Moving the two meshes to the upper right viewport allows you to select the arc to create the comers,



Using REVSURF to Create the Backrest Corner

Command: REVSURF	Make the first corner of the backrest.
Select path curve:	Pick the arc at (1).
Select axis of revolution:	Pick the short line connecting arc ends at (2).
Start angle <0>: <RETURN>	
Included angle (+ccw, --cw) <Full circle>: 90	
Command: MOVE	Move the meshes in upper right viewport from *0,0 back to 0,0.



Locating a UCS for Mirroring

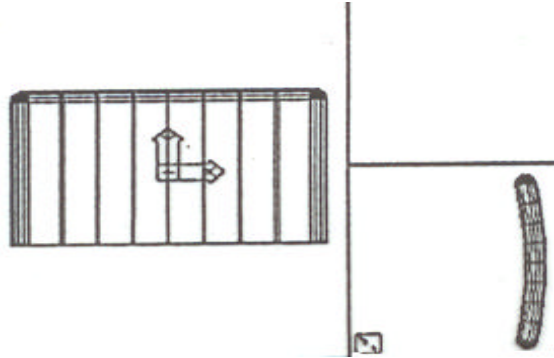
Command: UCS Previous returns the UCS to the centre of the backrest.

Command: UCS
 Origin/ZAxis/3point/Entity/View/X/Y/Z/Prev/Restore/Save/Del/?/<World>: O
 Origin point <0,0,0>: MID
 of Pick the back mid-point of the center segment of the tabsurfmesh at (1) (50.7,0.-108).

This places the UCS at the correct orientation and origin point to create the backrest block.

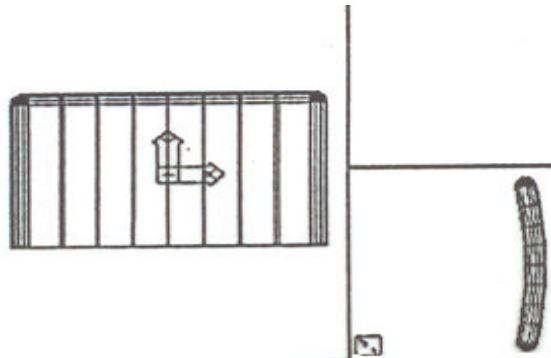
Command: UCS Save UCS as BACK-CENTRE.

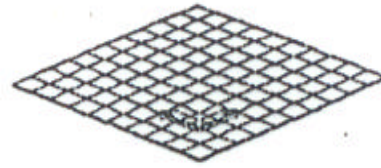
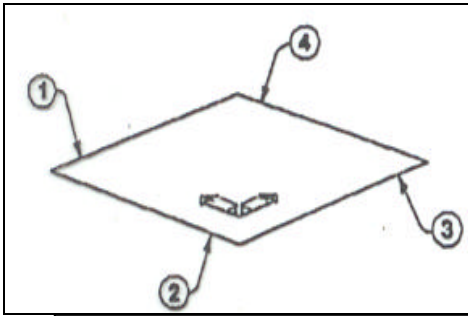
Command: UCS Change the UCS to do the mirrors.
 Origin/ZAxis/3point/Entity/View/X/Y/Z/Prev/Restore/Save/Del/?/<World>: Z
 Rotation angle about Z axis <0.0>: -90
 Command: <RETURN>
 UCS
 Origin/ZAxis/3point/Entity/View/X/Y/Z/Prev/Restore/Save/Del/?/<World>: X
 Rotation angle about X axis <0.0>: 90



Using MIRROR to Complete the Backrest

Command: PLAN	Go to a plan view
<Current UCS>/UCS/World: <RETURN>	
Command: MIRROR	Mirror corner mesh to other side.
Select objects:	Pick corner mesh.
1 selected, 1 found.	
Select objects: <RETURN>	
First point of mirror line: 0,0	
Second point: @0,1	
Delete old objects? <N>	<RETURN>
Command: <RETURN> .	
MIRROR	
Select objects:	Pick the top edge and both corners.
3 selected, 3 found.	
Select object:	<RETURN >
First point of mirror: 0,0	
Second point: @1,0	
Delete old objects? <N>	<RETURN >
Command: UCS	Restore BACK.CENTRE
Command: LAYER	Turn layer BUILD off.
Command: BLOCK	Block to BACK with insert point at 0,0.





Using EDGESURF to create the top surface of the seat cushion

Command: **VPORTS**
 Command: VPORTS
 Command: ZOOM
 Command: SETVAR
 Command: SETVAR
 Command: LAYER
 Command: COLOUR
 Command: ERASE

Restore BUILD viewports.
 Set left viewport to single.
 Zoom Center at 192,192 with 432 mm height.
 Set SURFTAB1 to 10.
 Set SURFTAB2 to 10.
 Set layer BUILD current.
 Set color BYLAYER.
 Erase any remaining build entities.

Command: LINE
 From point:
 To point:
 To point:
 To point:
 To point:

Draw lines for EDGESURF command.
 168,168,48
 168,-168,48
 168,-168,48
 168,168,48
 C

Command: LAYER
 Command: COLOUR

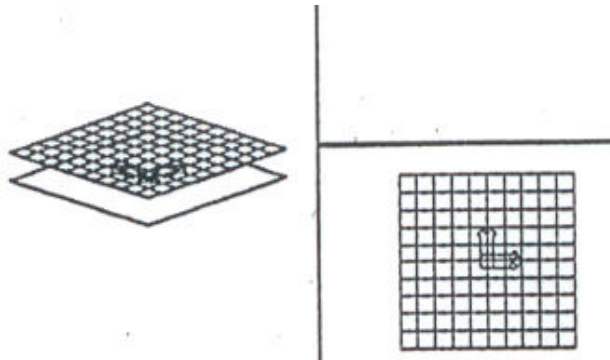
Set layer CHAIR current.
 Set color magenta.

Command: EDGESURF

Create a 10 x 10 mesh 48 mm above seat bottom.

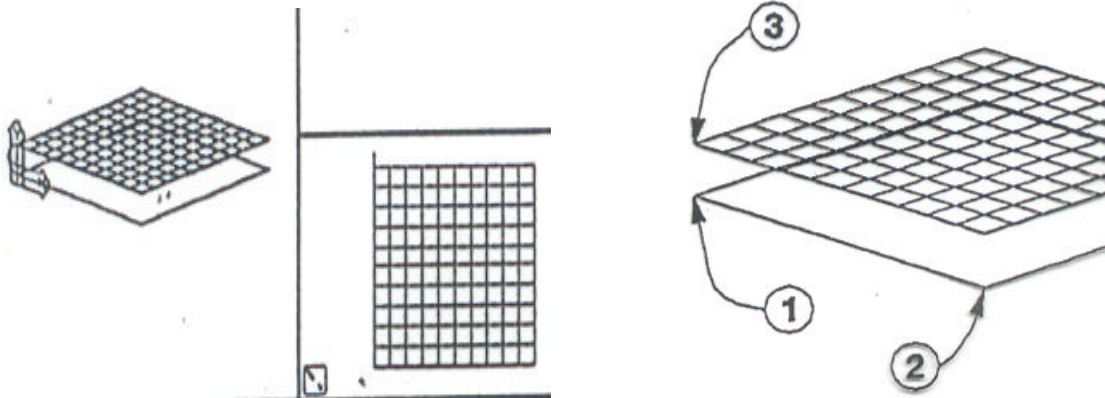
Select edge 1:
 Select edge 2:
 Select edge 3:
 Select edge 4:

Pick line at point (1).
 Pick line at point (2).
 Pick line at point (3).
 Pick line at point (4).

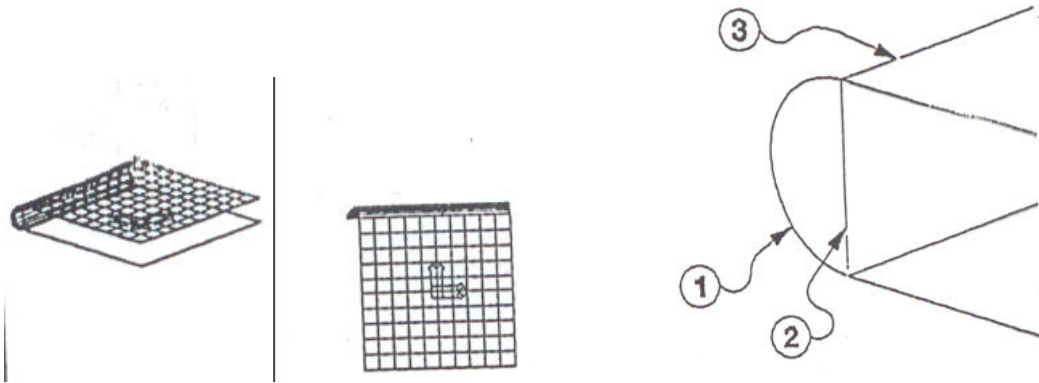


Using 3DFACE and Setting a UCS for Seat Edges

Command: VPORTS	Restore BUILD.
Make left viewport active.	
Command: 3DFACE	Draw bottom of Beat.
First point:	168,168
Second point:	168,-168
Third point:	-168,-168
Fourth point:	-168,168
Third point:	<RETURN>
Command: LAYER	Set layer BUILD current.
Command: COLOR	Set color BYLAYER.
Command: LINE	Draw line connecting top and bottom corner of seat at (3) and (1).

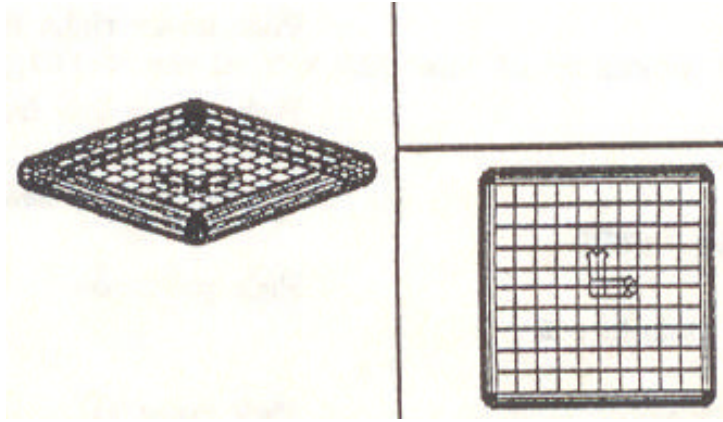


Command: UCS	Place UCS on left. front edge of seat cushion.
Origin/ZAxis/3point/Entity/View/X/y/z/prev/Restore/save/De1/?/<World>: 3	
Origin point <0,0,0>:	ENDP
of	Pick lower left. front corner of seat at (1).
Point on positive portion of the X-axis <-167,168,0>: ENDP	
of	Pick lower right front corner of seat at (2).
Point on positive-Y portion of the UCS X-y plane <-167,168,0>: ENDP	
of	Pick upper left. front corner of seat at (3).
Command: ARC	Create arc for seat corners.
Center/<Start point>:	ENDP
of	Pick point (3)
Center/End/<Second point>: E	
End point:	ENDP
of	Pick point (1).
Angle/Direction/Radius/<Center point>: A	
Included angle:	180



Using REVSURF, TABSURF, and ARRAY to Complete the Seat

Command: LAYER	Set layer CHAIR current.
Command: COLOR	Set colour magenta.
Command: REVSURF	Revolve arc to fin corner.
Select path curve:	Pick arc at (1).
Select axis of revolution:	Pick line at (2).
Start angle <0>: <RETURN>	
Included angle (+=ccw, -=cw) <Full circle>: 90	
Command: UCS	Set UCS back to previous.
Command: MOVE	Move corner and top mesh from 0,0 to .*0,0.
Command: REDRAWALL	
Command: TABSURF	Create edge of seat cushion.
Select path curve:	Pick arc at (1).
Select direction vector:	Pick line at (3).
Command: MOVE	Move meshes in upper right viewport from *0,0 to 0,0.
Command: ARRAY	Array edge and corner mesh to 3 remaining sides.
Select objects:	Pick edge mesh.
1 selected, 1 found.	
Select objects:	Pick corner mesh.
1 select, 1 found.	
Select objects:	<RETURN>
Rectangular or Polar array (R/P):	P
Center point of array:	0,0
Number of items:	4
Angle to fill (+-ccw, --cw) <360>:	<RETURN>
Rotate objects as they are copied <y>	<RETURN>
Command: LAYER	Turn layer BULD off.
Command: BLOCK	Block as SEAT with insert point at 0,0.
Command: SAVE	Save to default drawing.



Using INSERT to Assemble the 3D Chair

Command: UCS	Set Origin to 720,528,0.
Command: VPORTS	Set left. viewport to single.
Command: ZOOM	Zoom Center at 888,600,0 with a height of 1080 mm.
Command: INSERT	Insert CASTOR at -288,0,60 with default scale and rotation.
Command: ARRAY	Polar array the caster 5 times in 360 degrees about 0,0.
Command: INSERT	Insert BASE at 0,0,108 with default scale and rotation.
Command: INSERT	Insert PEDESTAL at 0,0,108 with default scale and rotation.
Command: INSERT	Insert SUPPORT at 0,0,420 with default scale and rotation.
Command: INSERT	Insert SEAT at 0,0,444 with default scale and rotation.
Command: INSERT	Insert BACK at 222,0,714 with default scale and rotation.
Command: BASE	Set base point at VCS origin for future insert
Base point: 0,0,0	



Using HIDE to Remove

Command: VPOINT	Rotate view to 240 in the XY direction and 19 in the Z.
Command: HIDE	this may take 1 to 2 hours
Command: End	Put your chair away

