

P.E.P. TECHNOLOGY[©]

Automated Manufacturing with High Tech Software

The P.E.P. CAD CONVERTER

CAD Part 7054.DXF The following are HIGHLIGHTS of the P.E.P. CAD Converter describing how the software found and fixed numerous problems with CAD file 7054.dxf AUTOMATICALLY .

Directory Features of the P.E.P. CAD Converter

1. CAD PREVIEW, P.E.P. displays the DXF CAD part from within the CAD file directory.
The preview picture can be located and scaled to any size the user wishes. As the directory highlight bar is moved up and down the PREVIEW feature instantly draws the part. If the up down arrows are moved faster than large files can be drawn, the software stops and immediately begins drawing the next.
2. Consecutive Character Search (CCS) will find CAD files instantly by typing the name of the CAD file. CCS finds the first occurrence of the consecutive Alpha and Numeric characters entered by the user. The 1st, 2nd, 3rd, characters entered do not need to be the 1st characters of the CAD drawing name, merely consecutive. Characters entered by the user will appear as circled just below the directory.

#	File	Size	Date	Time
1	6070.dxf	113522	10-03-2003	13:15
2	6116.dxf	46951	10-03-2003	13:12
3	6123.dxf	16338	10-03-2003	13:20
4	6125.dxf	6850	10-03-2003	13:20
5	6130.dxf	84135	04-11-2000	09:46
6	6132.dxf	111862	04-30-2001	10:46
7	6133.dxf			
8	6134.dxf			
9	6136.dxf			
10	6172.dxf			
11	6173.dxf			
12	6179.dxf			
13	6181.dxf			
14	6191.dxf			
15	6199.dxf			
16	6203.dxf			
17	7054.dxf			
18	7055.dxf			
19	7056.dxf			
20	7057.dxf			
21	7058.dxf			
22	7059.dxf			
23	7060.dxf			
24	7061.dxf			
25	7062.dxf			
26	7063.dxf			
27	7064.dxf			
28	7065.dxf			
29	7066.dxf			
30	7067.dxf			
31	7070.dxf			
32	7071.dxf			
33	7072.dxf			
34	7073.dxf			

Loading and Filtering Features of the P.E.P. CAD Converter

The table below describes **SOME** of the many different data types that are filtered at the time of loading the CAD file. As each of the invalid data types is found, it is placed in a separate box and deleted as shown in the three boxes that are crossed out.

Invalid data found in CAD file 7054.DXF

Picture	Description of data	Filtered Results
1. Top left box	Valid CAD geometry	Separated automatically
2. Top right box	Dimensioning lines and arrows	<u>removed automatically</u>
3. Bottom left box	294 invalid line segments	<u>removed automatically</u>
4. Bottom right box	Text and dimensions	<u>removed automatically</u>

Invalid data is moved to a separate box and deleted (reference the boxes with red circles).

The screenshot displays the CAD-CONVERTER software interface with the following elements:

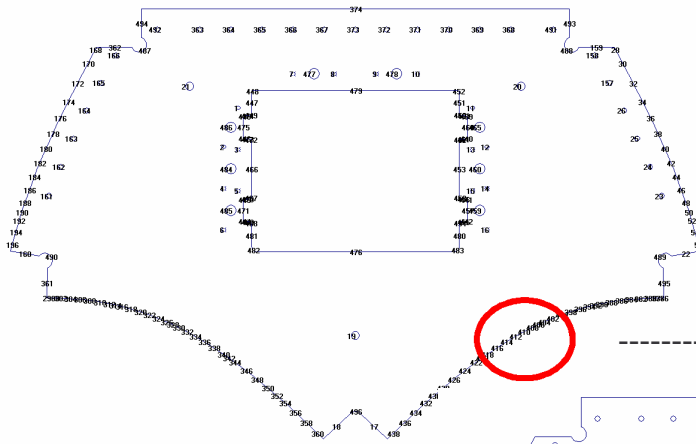
- Top Panel:**
 - Left: CK_LEVEL_2, Count=202
 - Right: DIMENSION, Counts=48
- Bottom-Left Panel:**
 - MINIMUM SEGMENT LENGTH, Count=294
- Bottom-Right Panel:**
 - Text, Count=0
 - BLANK DIMENSION IS NOT JOIN THE ORD-75 ALIGNED LINE-7054 8/15/98
- Status Bar:** LAYERS = 1 | MOVE / DELETE / ADD MENU | W=12.84082 L=17.84048
- Function Key Legend:**
 - F1...Combine layers
 - F4...Move geometry
 - F5...Add geometry
 - F6...Cad Draw
 - F7...Delete geometry
 - F8...Rename layer
 - F9...Window
 - F10...Filter / Delete layer
 - E...Edit
 - F...Flicker
 - H...Highlight layer(s)
 - L...List / Edit
 - N.....Number
 - S.....Scale
 - ESC...Exit to Converter Main Menu

Automatic Smoothing Features of the P.E.P. CAD Converter

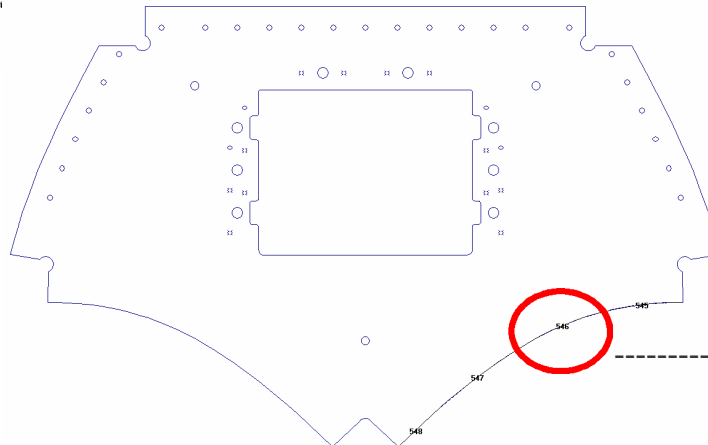
The smoothing feature replaces consecutive intersecting line segments with tangent arc segments. Below are two of the benefits of smoothing CAD drawing 7054.

1. 198 geometry's reduced to 122 geometry
2. 62 consecutive intersecting line segments replaced by 14 Tangent Arc geometry

CAD Part - prior to smoothing

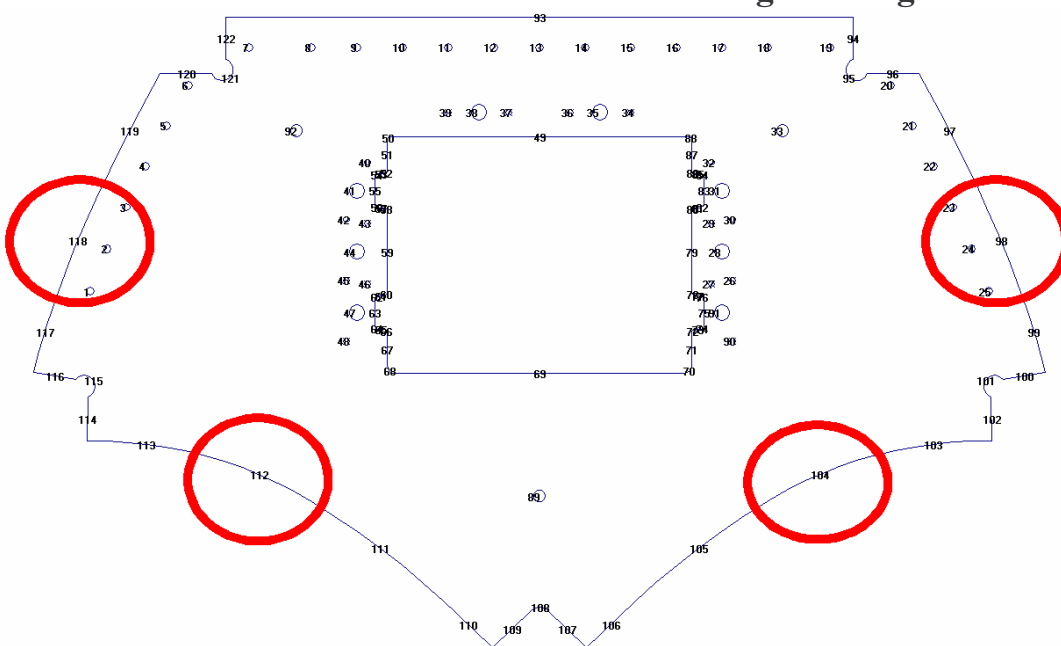


BEFORE SMOOTHING
----- 30 intersecting line segments



AFTER
----- 4 tangent arcs

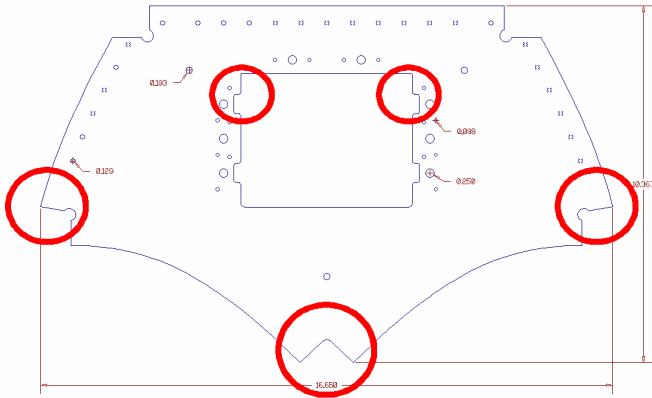
Smoothed Part – without consecutive intersecting lines segment



CAD Errors Fixed Automatically

1. Left Interior error Arc Line Overlap
2. Right Interior error Arc Line Overlap
3. Left Exterior error Line / Line Gap
4. Right Exterior error Line / Line Gap
5. Bottom Exterior error Line / Arc / Line Blend

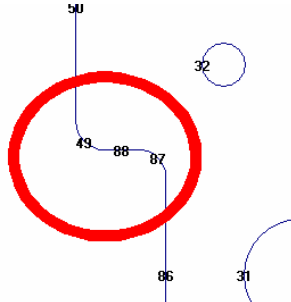
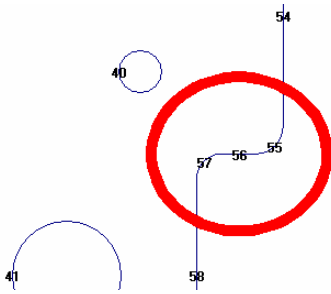
- Line shortened to tangency of arc automatically
- Line shortened to tangency of arc automatically
- Line extended to intersect automatically
- Line extended to intersect automatically
- Center and Start & End of Arc changed automatically



#1 Left side of cutout

#2 Right side of cutout

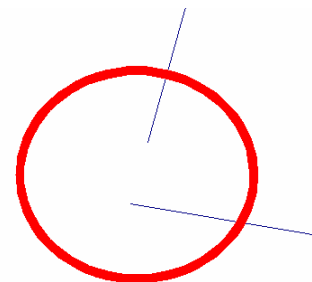
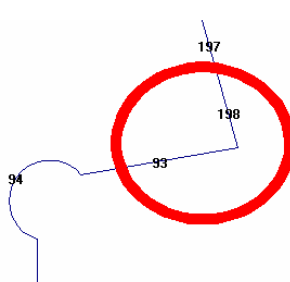
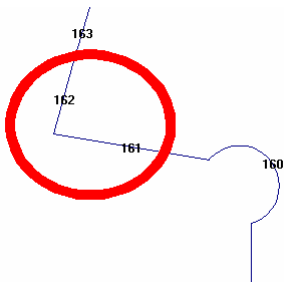
Close up of error prior to being fixed



#3 Exterior gap fixed

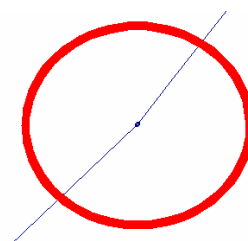
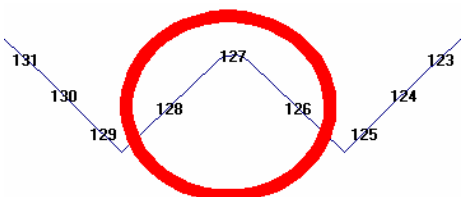
#4 Exterior gap fixed

Close up of gap in geometry



#5 Exterior Blend fixed (Line Arc Line)

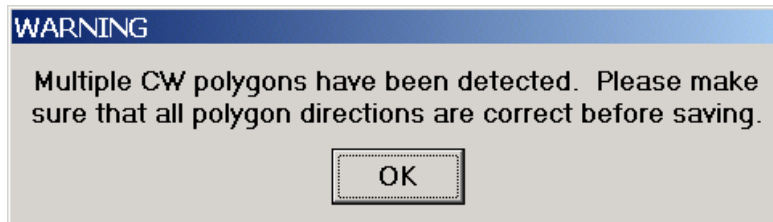
Close up of left tangent / blend error



Automatic Cutter Path Development

Regardless of how the geometry was drawn or sequenced by engineering. The P.E.P. software automatically sequences the internal geometry CCW and the external geometry CW while simultaneously fixing errors. The verification of the cutter path is displayed on the screen and in the report. Should the CAD part be invalid the software will stop the conversion process and display the message below on the screen for 30 seconds allowing the user to interact. After 30 seconds the software continues on converting parts and displays a message in the Log file and the Drawing directory indicating the error that was found.

Example of error prompt



Documented Errors Displayed in the Converter Report

Date : 10-04-2003

CAD File : C:\DXF\ADVANCED LASER\7054.DXF

<u>DESCRIPTION</u>	<u>STATUS</u>	<u>COMMENTS</u>
Duplicate geometry	Ok	No duplicate geometry found
Overlapping geometry	Ok	No overlapping geometry found
Combining arc geometry	Ok	No arcs needed combining
Combining line geometry	4 found	4 lines combined
Orphan geometry	Ok	No orphan geometry were found
Blend alignments	1 found	Geo=127, S=.006, E=.006
Arc slot realignment	Ok	No arc slots needed realigning
Gaps	4 found	Size=.0088, between geo 93 & 198 Size=.0088, between geo 162 & 161 Size=.0029, between geo 88 & 49 Size=.0029, between geo 55 & 56
Blend alignments	Ok	All blends were ok
Shallow arc-arc intersects	Ok	No shallow arc-arc intersects found
Conversion time	00:00:01	
Overall size	10.3669 x 16.6521	
Polygon directions	1-53 = CCW 54 = CW	

Addition Feature of the P.E.P. CAD Converter

Revision control, tracking of grain, soft grain, common cutting, customer name, material, machine number, etc. are covered in the CAD Converter literature and the Web site.