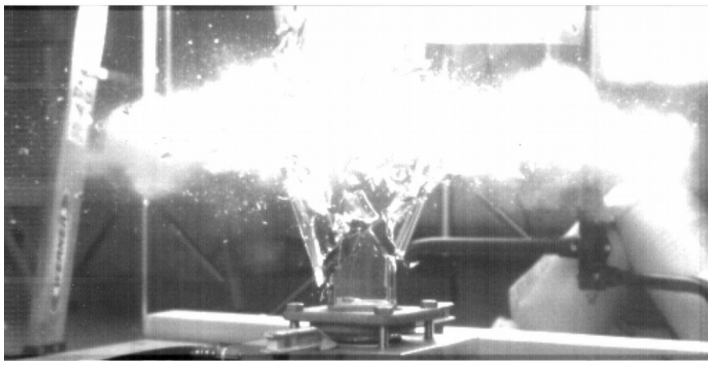
Symmetry Deviation

Symmetry is a java app that was developed for the National Science Foundation For Novel High Voltage/Temperature Materials and Structures to calculate and display the deviation of glass fragments as a result of glass tubes under pressure being shot by a pneumatic air rifle. The program was used to determine the position and velocity of the fragments over time. The program generates a symmetrical deviation plot comparing the blast profile to a perfect circle. An overhead high speed camera was used and the blast pattern was digitized. The profile was compared at every 10 degrees. Data output is the percentage of deviation from the initial shape.

Initial Pellet Impact on Glass Tube



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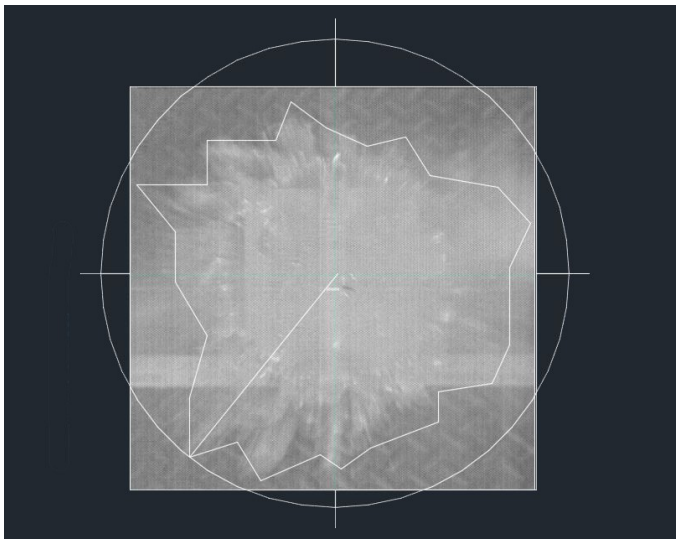
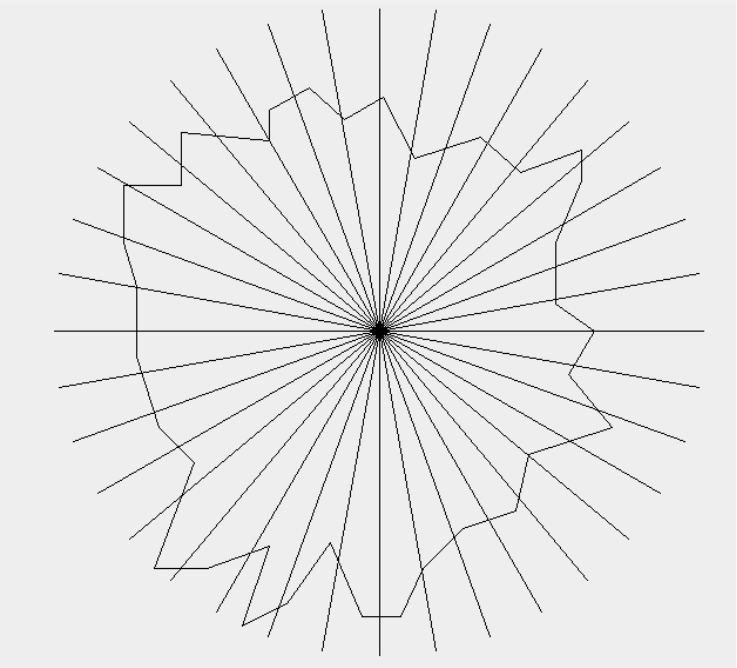
Digitized Outline of Glass Exploding



Data Output by Program

Angle	Deviation
0	0.3360433604336043
10	0.4496332726906531
20	0.42320987941684973
30	0.3465774628537621
40	0.1863314998741895
50	0.34707369747214933
60	0.3336504798550306
70	0.40374228735176987
80	0.4405411349569126
90	0.2893706714844928
100	0.3329589345659427
110	0.23369020034655275
120	0.32249322493224886
130	0.21800039277593997
140	0.2040199455290982
150	0.10569105691056913
160	0.16365432515443223
170	0.24324574994964798
180	0.2547425474254742
190	0.25831573080280545
200	0.2636316029183451
210	0.28580409017670505
220	0.20634782990921663
230	0.04482393463491785
240	0.21016779820425946
250	0.09217143134590167
260	0.2802197820862049
270	0.1192411924119241
280	0.24657237742748905
290	0.3233985832326254
300	0.3264462444269114
310	0.3310378966551203
320	0.40040322234429715
330	0.3213938286603215
340	0.2824875979386111
350	0.3903042459260303

Deviation Plot Output by Program



Usage: In a command shell to the test directory and run

java -jar Symmetry.jar sample1.svg test.dat