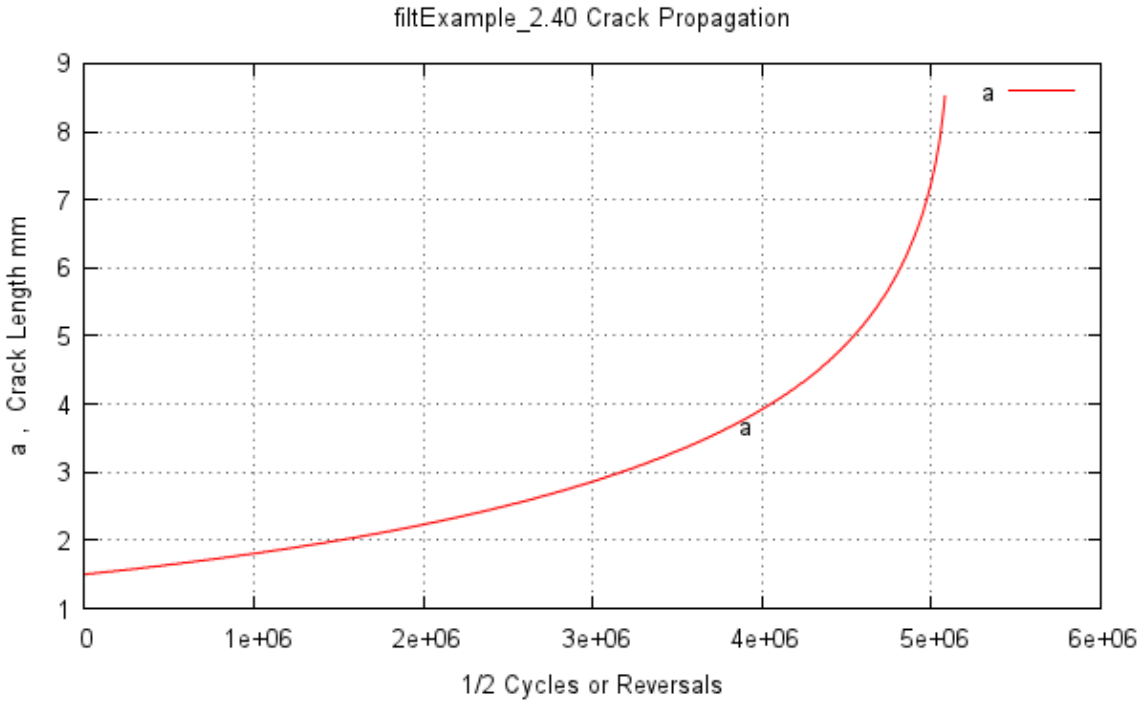
# Results for filtExample_2.40 : Crack Propagation Rod Surface Flaw

**Author: edit this in file makereport7**
***Affiliation:***
Sun Nov 3 15:25:16 EST 2013

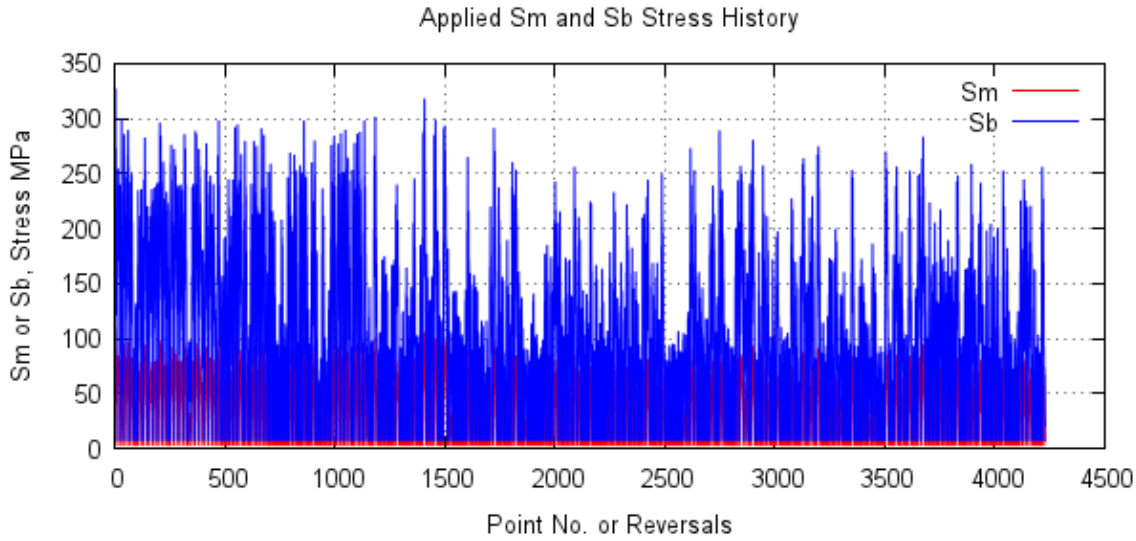
Simulation input data:
**Radius=** 13. mm
**$a_0$=** 1.5 mm
#MATERIAL= merged_a36_fitted.html
#TYPE= rod_surface_flaw
#ACTIVATE_MmMb= 1
M=Mkm=Mkb=fw=1.0

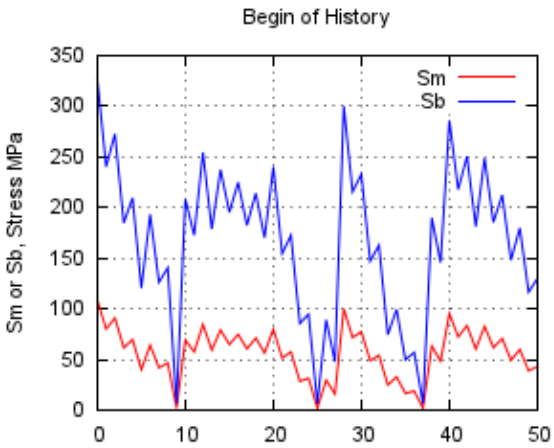
Crack Propagation Results:
( *# rodSurfFlaw.f vers. 3.10 # makereport7 vers. 2.1* )

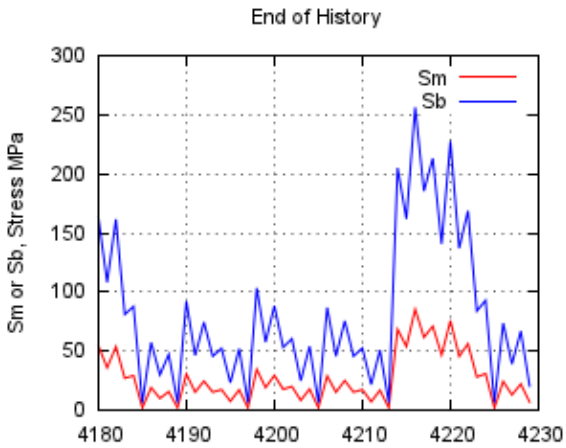
- No. of Reversals= 5080231 revs. or 2.54012e+06 cycles
- Final _____ **a** = 0.852E+01 mm
- No. of History Reps.= 1202 reps. + 1 revs.

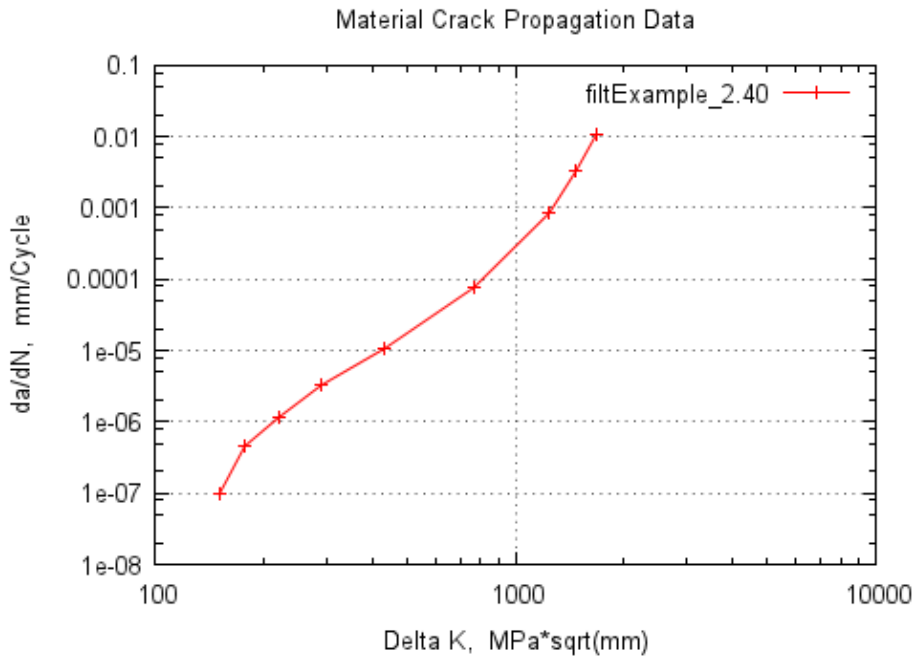


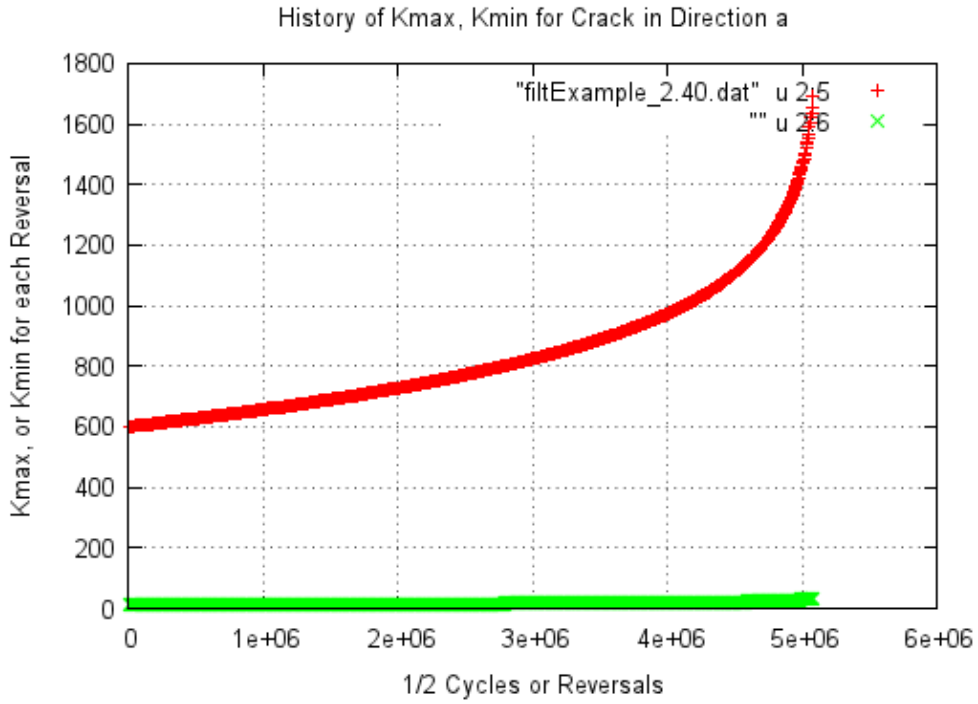
Results for filtExample_2.40 : Crack Propagation Rod SurfaceFlaw

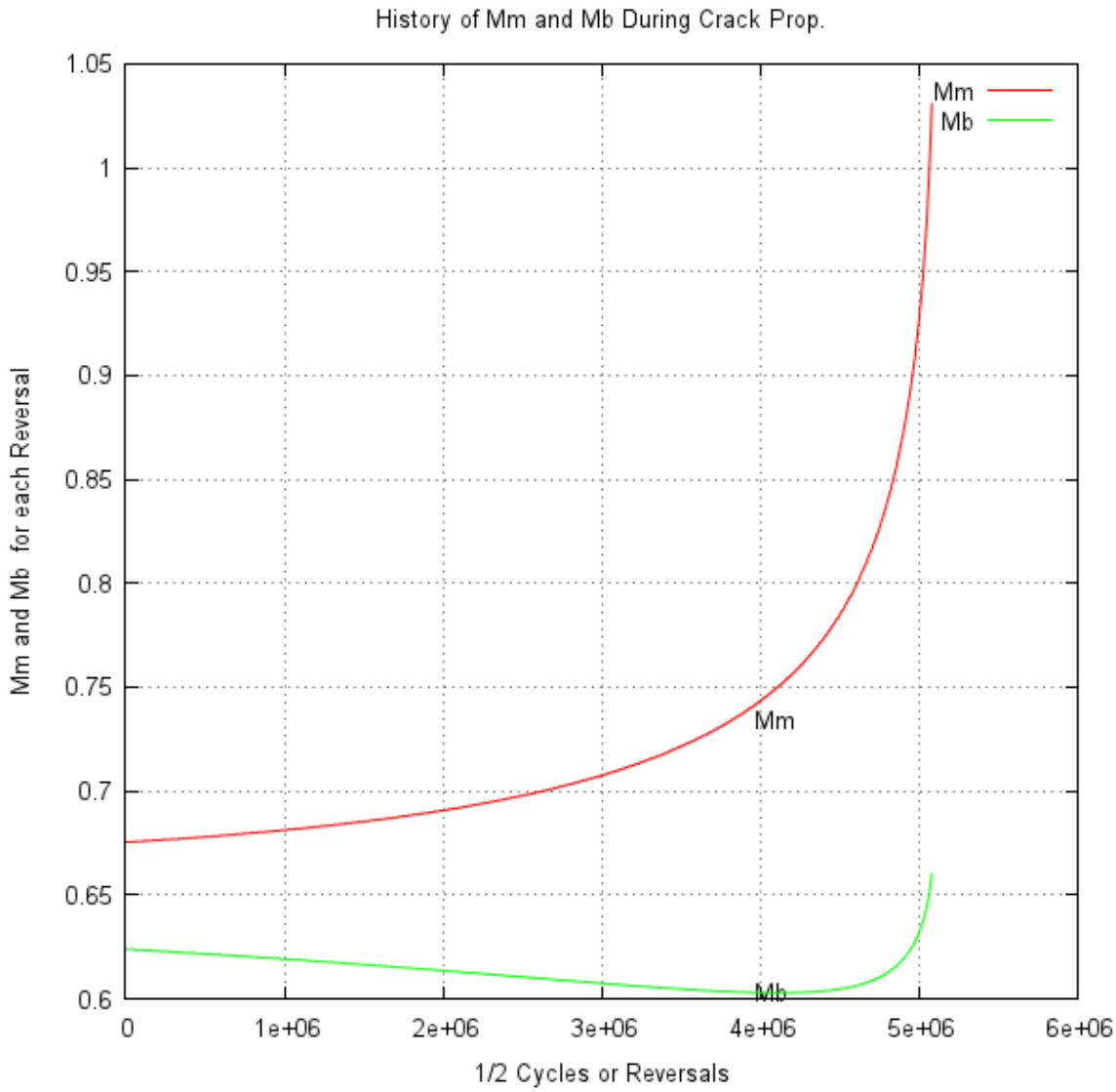


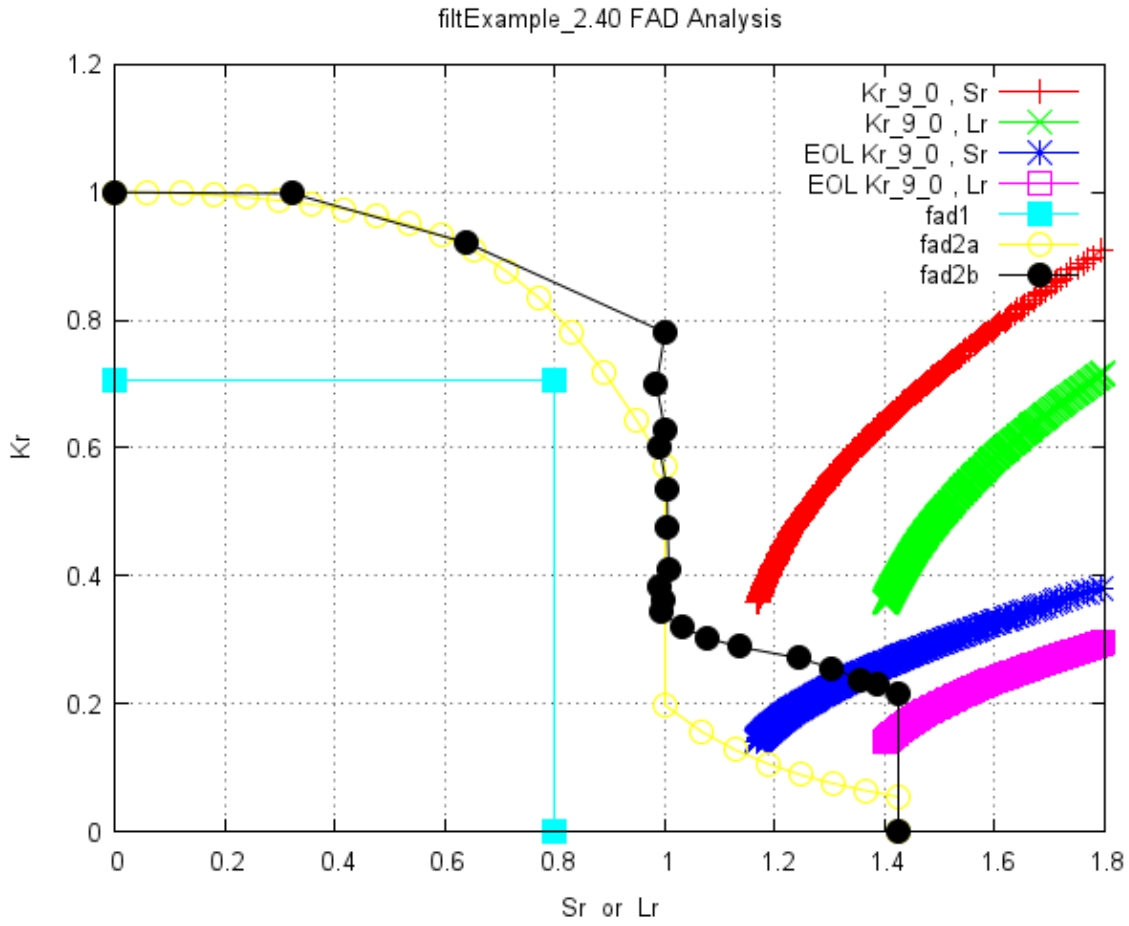




History of Kmax, Kmin for Crack in Direction a
"filtExample_2.40.dat" u 2:5
"" u 2:6
Kmax, or Kmin for each Reversal
1/2 Cycles or Reversals
0
200
400
600
800
1000
1200
1400
1600
1800
0
1e+06
2e+06
3e+06
4e+06
5e+06
6e+06


History of Mm and Mb During Crack Prop.
Mm and Mb for each Reversal
1/2 Cycles or Reversals
Mm
Mb
Mm
Mb
1.05
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0
1e+06
2e+06
3e+06
4e+06
5e+06
6e+06

# FAD Results for filtExample_2.40 #TensileFile= a36_Mattos_mono_engrSS_FLAT.txt

#PmEOL= 70. #PbEOL= 100.
#Kmat= 1675.



# Crack Initiation Life Results for filtExample_2.40 (Assume Kt= 1.8 for welds)

Files Used:

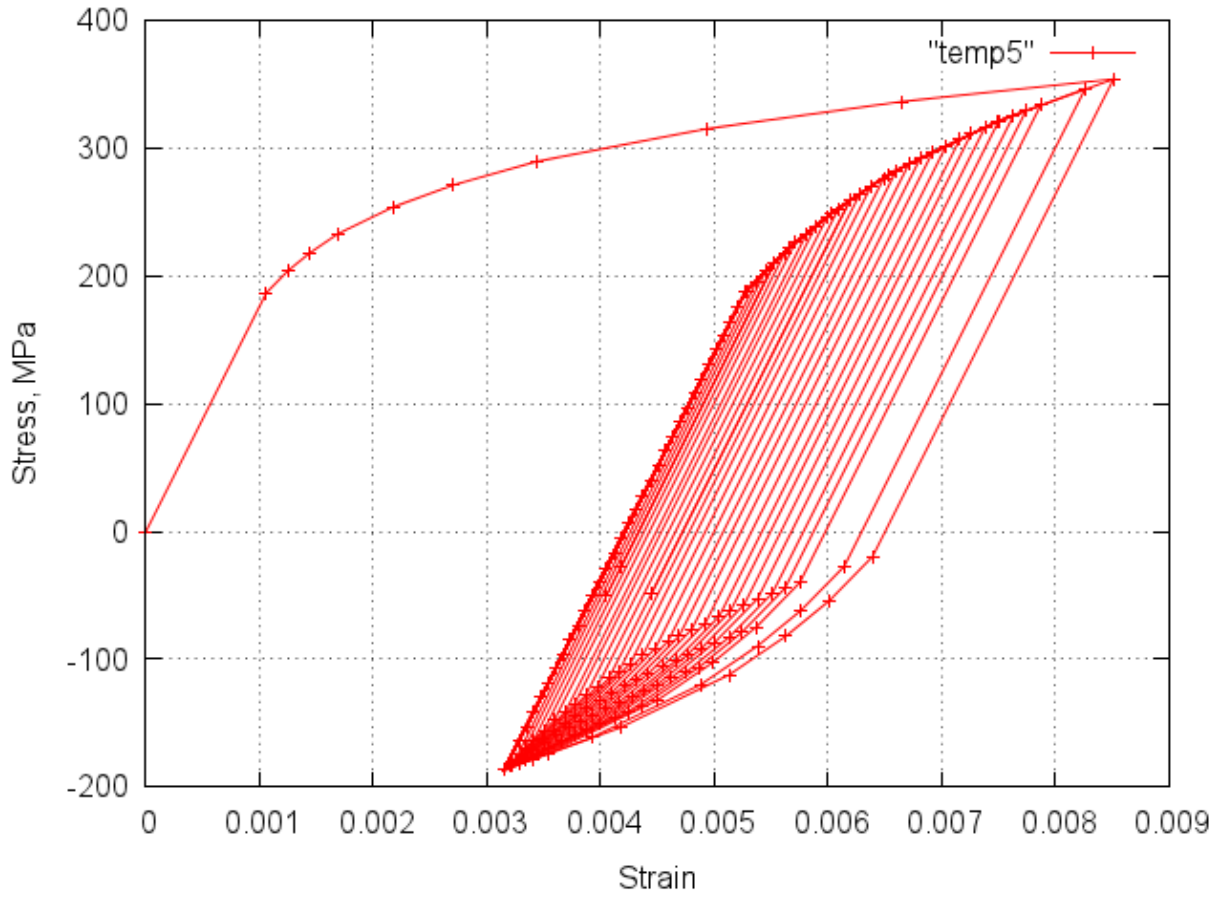
- Stress History (Sb+Sm)
- Rainflow File
- Material File

Predicted History Repetitions to Initiation:

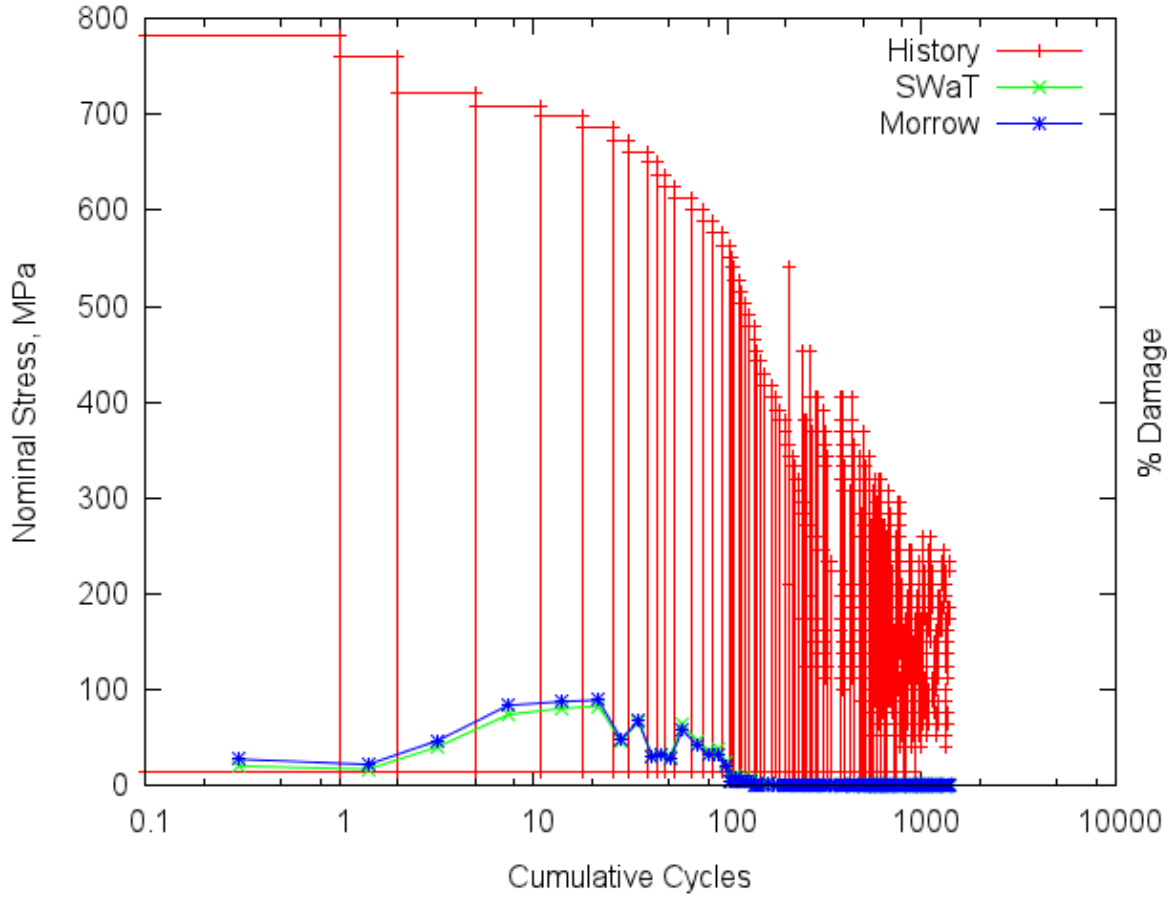
| StrainLife_Reps | SWaT_Life_Reps | StressLife_Reps | Morrow_Reps | Goodman_Reps |
|---|---|---|---|---|
| 1249.6 | 726.7 | 1249.6 | 547.3 | 293.9 |

(Reps= Repetions)

## Local Stress and Strain Response:



## Cumulative Cycle Plot of History and Damage:




*(Rectangles are Rainflow Cycle Sets: Sorted by Range: largest on Left)*

## Detailed Damage for each Rainflow Cycle Set:

| Loop | Smax | Smin | N | Sigmax | Sigmin | Delta | Epsmax | Epsmin | DeltaEps | %Eps | %SWaT | %Sts | %Morr |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 783.0 | 15.5 | 1.0 | 354. | -187. | 541. | 0.00851 | 0.00315 | 0.00535 | 2.4 | 2.6 | 2.4 | 3.5 |
| 2 | 759.6 | 15.5 | 1.0 | 346. | -187. | 533. | 0.00826 | 0.00315 | 0.00510 | 2.1 | 2.2 | 2.1 | 2.8 |
| 3 | 721.8 | 15.5 | 3.0 | 334. | -187. | 520. | 0.00787 | 0.00315 | 0.00471 | 4.9 | 5.1 | 4.9 | 5.9 |
| 4 | 709.2 | 15.5 | 6.0 | 329. | -187. | 516. | 0.00774 | 0.00315 | 0.00458 | 8.9 | 9.3 | 8.9 | 10.5 |
| 5 | 698.4 | 15.5 | 7.0 | 326. | -187. | 512. | 0.00763 | 0.00315 | 0.00447 | 9.6 | 10.1 | 9.6 | 11.0 |
| 6 | 685.8 | 15.5 | 8.0 | 321. | -187. | 508. | 0.00750 | 0.00315 | 0.00435 | 10.0 | 10.4 | 10.0 | 11.2 |
| 7 | 673.2 | 15.5 | 5.0 | 316. | -187. | 503. | 0.00738 | 0.00315 | 0.00423 | 5.7 | 5.8 | 5.7 | 6.1 |
| 8 | 660.6 | 15.5 | 8.0 | 311. | -187. | 498. | 0.00726 | 0.00315 | 0.00411 | 8.2 | 8.4 | 8.2 | 8.5 |
| 9 | 649.8 | 15.5 | 4.0 | 307. | -187. | 494. | 0.00716 | 0.00315 | 0.00400 | 3.7 | 3.8 | 3.7 | 3.8 |
| 10 | 637.2 | 15.5 | 5.0 | 302. | -187. | 489. | 0.00704 | 0.00315 | 0.00389 | 4.2 | 4.2 | 4.2 | 4.1 |
| 11 | 624.6 | 15.5 | 5.0 | 297. | -187. | 484. | 0.00692 | 0.00315 | 0.00377 | 3.7 | 3.8 | 3.7 | 3.5 |
| 12 | 612.0 | 15.5 | 12.0 | 292. | -187. | 479. | 0.00681 | 0.00315 | 0.00365 | 8.0 | 8.0 | 8.0 | 7.3 |
| 13 | 601.2 | 15.5 | 10.0 | 288. | -187. | 474. | 0.00671 | 0.00315 | 0.00355 | 6.0 | 5.9 | 6.0 | 5.3 |
| 14 | 588.6 | 15.5 | 9.0 | 282. | -187. | 469. | 0.00660 | 0.00315 | 0.00344 | 4.8 | 4.6 | 4.8 | 4.1 |
| 15 | 576.0 | 15.5 | 11.0 | 277. | -187. | 463. | 0.00649 | 0.00315 | 0.00333 | 5.2 | 4.9 | 5.2 | 4.2 |
| 16 | 563.4 | 15.5 | 8.0 | 271. | -187. | 457. | 0.00638 | 0.00315 | 0.00323 | 3.3 | 3.1 | 3.3 | 2.5 |
| 17 | 550.8 | 15.5 | 2.0 | 264. | -187. | 451. | 0.00628 | 0.00315 | 0.00312 | 0.7 | 0.7 | 0.7 | 0.5 |
| 18 | 540.0 | 15.5 | 3.0 | 259. | -187. | 445. | 0.00619 | 0.00315 | 0.00303 | 0.9 | 0.9 | 0.9 | 0.7 |
| 19 | 527.4 | 15.5 | 6.0 | 252. | -187. | 439. | 0.00609 | 0.00315 | 0.00293 | 1.6 | 1.4 | 1.6 | 1.1 |
| 20 | 514.8 | 15.5 | 4.0 | 246. | -187. | 432. | 0.00599 | 0.00315 | 0.00283 | 0.9 | 0.8 | 0.9 | 0.6 |
| 21 | 502.2 | 15.5 | 6.0 | 239. | -187. | 425. | 0.00589 | 0.00315 | 0.00273 | 1.2 | 1.0 | 1.2 | 0.7 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 491.4 | 15.5 | 5.0 | 233. | -187. | 419. | 0.00581 | 0.00315 | 0.00265 | 0.8 | 0.7 | 0.8 | 0.5 |
| 23 | 478.8 | 15.5 | 8.0 | 226. | -187. | 412. | 0.00571 | 0.00315 | 0.00256 | 1.1 | 0.9 | 1.1 | 0.6 |
| 24 | 466.2 | 15.5 | 2.0 | 218. | -187. | 405. | 0.00562 | 0.00315 | 0.00246 | 0.2 | 0.2 | 0.2 | 0.1 |
| 25 | 453.6 | 15.5 | 2.0 | 211. | -187. | 397. | 0.00553 | 0.00315 | 0.00237 | 0.2 | 0.1 | 0.2 | 0.1 |
| 26 | 442.8 | 15.5 | 6.0 | 204. | -187. | 390. | 0.00545 | 0.00315 | 0.00230 | 0.5 | 0.3 | 0.5 | 0.2 |
| 27 | 430.2 | 15.5 | 7.0 | 196. | -187. | 382. | 0.00537 | 0.00315 | 0.00221 | 0.4 | 0.3 | 0.4 | 0.2 |
| 28 | 417.6 | 15.5 | 15.0 | 187. | -187. | 374. | 0.00528 | 0.00315 | 0.00212 | 0.8 | 0.4 | 0.8 | 0.3 |
| 29 | 405.0 | 15.5 | 10.0 | 176. | -187. | 362. | 0.00521 | 0.00315 | 0.00206 | 0.0 | 0.0 | 0.0 | 0.0 |
| 30 | 392.4 | 15.5 | 7.0 | 164. | -187. | 351. | 0.00514 | 0.00315 | 0.00199 | 0.0 | 0.0 | 0.0 | 0.0 |
| 31 | 381.6 | 15.5 | 14.0 | 154. | -187. | 341. | 0.00509 | 0.00315 | 0.00193 | 0.0 | 0.0 | 0.0 | 0.0 |
| 32 | 369.0 | 15.5 | 1.0 | 142. | -187. | 329. | 0.00502 | 0.00315 | 0.00187 | 0.0 | 0.0 | 0.0 | 0.0 |
| 33 | 356.4 | 15.5 | 7.0 | 131. | -187. | 317. | 0.00495 | 0.00315 | 0.00180 | 0.0 | 0.0 | 0.0 | 0.0 |
| 34 | 540.0 | 210.6 | 1.0 | 259. | -48. | 307. | 0.00619 | 0.00445 | 0.00174 | 0.0 | 0.0 | 0.0 | 0.0 |
| 35 | 343.8 | 15.5 | 8.0 | 119. | -187. | 306. | 0.00489 | 0.00315 | 0.00173 | 0.0 | 0.0 | 0.0 | 0.0 |
| 36 | 333.0 | 15.5 | 8.0 | 109. | -187. | 295. | 0.00483 | 0.00315 | 0.00168 | 0.0 | 0.0 | 0.0 | 0.0 |
| 37 | 320.4 | 15.5 | 6.0 | 97. | -187. | 284. | 0.00476 | 0.00315 | 0.00161 | 0.0 | 0.0 | 0.0 | 0.0 |
| 38 | 307.8 | 15.5 | 4.0 | 85. | -187. | 272. | 0.00470 | 0.00315 | 0.00154 | 0.0 | 0.0 | 0.0 | 0.0 |
| 39 | 295.2 | 15.5 | 7.0 | 74. | -187. | 260. | 0.00463 | 0.00315 | 0.00148 | 0.0 | 0.0 | 0.0 | 0.0 |
| 40 | 453.6 | 173.9 | 1.0 | 211. | -50. | 260. | 0.00553 | 0.00405 | 0.00148 | 0.0 | 0.0 | 0.0 | 0.0 |
| 41 | 284.4 | 15.5 | 9.0 | 64. | -187. | 250. | 0.00457 | 0.00315 | 0.00142 | 0.0 | 0.0 | 0.0 | 0.0 |
| 42 | 381.6 | 125.1 | 2.0 | 154. | -85. | 239. | 0.00509 | 0.00373 | 0.00135 | 0.0 | 0.0 | 0.0 | 0.0 |
| 43 | 271.8 | 15.5 | 12.0 | 52. | -187. | 239. | 0.00451 | 0.00315 | 0.00135 | 0.0 | 0.0 | 0.0 | 0.0 |
| 44 | 453.6 | 198.0 | 1.0 | 211. | -27. | 238. | 0.00553 | 0.00418 | 0.00135 | 0.0 | 0.0 | 0.0 | 0.0 |
| 45 | 405.0 | 149.6 | 2.0 | 176. | -62. | 238. | 0.00521 | 0.00386 | 0.00135 | 0.0 | 0.0 | 0.0 | 0.0 |
| 46 | 369.0 | 125.1 | 3.0 | 142. | -85. | 227. | 0.00502 | 0.00373 | 0.00129 | 0.0 | 0.0 | 0.0 | 0.0 |
| 47 | 259.2 | 15.5 | 13.0 | 40. | -187. | 227. | 0.00444 | 0.00315 | 0.00129 | 0.0 | 0.0 | 0.0 | 0.0 |
| 48 | 405.0 | 161.6 | 1.0 | 176. | -51. | 226. | 0.00521 | 0.00393 | 0.00128 | 0.0 | 0.0 | 0.0 | 0.0 |
| 49 | 369.0 | 137.3 | 2.0 | 142. | -73. | 216. | 0.00502 | 0.00380 | 0.00122 | 0.0 | 0.0 | 0.0 | 0.0 |
| 50 | 405.0 | 173.9 | 2.0 | 176. | -39. | 215. | 0.00521 | 0.00399 | 0.00122 | 0.0 | 0.0 | 0.0 | 0.0 |
| 51 | 246.6 | 15.5 | 22.0 | 29. | -187. | 215. | 0.00437 | 0.00315 | 0.00122 | 0.0 | 0.0 | 0.0 | 0.0 |
| 52 | 392.4 | 161.6 | 1.0 | 164. | -51. | 215. | 0.00514 | 0.00393 | 0.00122 | 0.0 | 0.0 | 0.0 | 0.0 |
| 53 | 343.8 | 113.0 | 1.0 | 119. | -96. | 215. | 0.00489 | 0.00367 | 0.00122 | 0.0 | 0.0 | 0.0 | 0.0 |
| 54 | 333.0 | 113.0 | 3.0 | 109. | -96. | 205. | 0.00483 | 0.00367 | 0.00116 | 0.0 | 0.0 | 0.0 | 0.0 |
| 55 | 369.0 | 149.6 | 1.0 | 142. | -62. | 204. | 0.00502 | 0.00386 | 0.00116 | 0.0 | 0.0 | 0.0 | 0.0 |
| 56 | 356.4 | 137.3 | 3.0 | 131. | -73. | 204. | 0.00495 | 0.00380 | 0.00116 | 0.0 | 0.0 | 0.0 | 0.0 |
| 57 | 343.8 | 125.1 | 5.0 | 119. | -85. | 203. | 0.00489 | 0.00373 | 0.00115 | 0.0 | 0.0 | 0.0 | 0.0 |
| 58 | 234.0 | 15.5 | 17.0 | 17. | -187. | 203. | 0.00431 | 0.00315 | 0.00115 | 0.0 | 0.0 | 0.0 | 0.0 |
| 59 | 223.2 | 15.5 | 41.0 | 7. | -187. | 193. | 0.00425 | 0.00315 | 0.00110 | 0.0 | 0.0 | 0.0 | 0.0 |
| 60 | 381.6 | 173.9 | 1.0 | 154. | -39. | 193. | 0.00509 | 0.00399 | 0.00110 | 0.0 | 0.0 | 0.0 | 0.0 |
| 61 | 369.0 | 161.6 | 2.0 | 142. | -51. | 193. | 0.00502 | 0.00393 | 0.00109 | 0.0 | 0.0 | 0.0 | 0.0 |
| 62 | 320.4 | 113.0 | 1.0 | 97. | -96. | 193. | 0.00476 | 0.00367 | 0.00109 | 0.0 | 0.0 | 0.0 | 0.0 |
| 63 | 405.0 | 198.0 | 1.0 | 176. | -17. | 193. | 0.00521 | 0.00412 | 0.00109 | 0.0 | 0.0 | 0.0 | 0.0 |
| 64 | 307.8 | 100.8 | 1.0 | 85. | -107. | 193. | 0.00470 | 0.00360 | 0.00109 | 0.0 | 0.0 | 0.0 | 0.0 |
| 65 | 356.4 | 149.6 | 3.0 | 131. | -62. | 192. | 0.00495 | 0.00386 | 0.00109 | 0.0 | 0.0 | 0.0 | 0.0 |
| 66 | 343.8 | 137.3 | 4.0 | 119. | -73. | 192. | 0.00489 | 0.00380 | 0.00109 | 0.0 | 0.0 | 0.0 | 0.0 |
| 67 | 333.0 | 137.3 | 2.0 | 109. | -73. | 182. | 0.00483 | 0.00380 | 0.00103 | 0.0 | 0.0 | 0.0 | 0.0 |
| 68 | 320.4 | 125.1 | 5.0 | 97. | -85. | 182. | 0.00476 | 0.00373 | 0.00103 | 0.0 | 0.0 | 0.0 | 0.0 |
| 69 | 210.6 | 15.5 | 31.0 | -5. | -187. | 182. | 0.00418 | 0.00315 | 0.00103 | 0.0 | 0.0 | 0.0 | 0.0 |
| 70 | 307.8 | 113.0 | 2.0 | 85. | -96. | 181. | 0.00470 | 0.00367 | 0.00103 | 0.0 | 0.0 | 0.0 | 0.0 |
| 71 | 405.0 | 210.6 | 1.0 | 176. | -5. | 181. | 0.00521 | 0.00418 | 0.00103 | 0.0 | 0.0 | 0.0 | 0.0 |
| 72 | 343.8 | 149.6 | 2.0 | 119. | -62. | 181. | 0.00489 | 0.00386 | 0.00103 | 0.0 | 0.0 | 0.0 | 0.0 |
| 73 | 369.0 | 185.4 | 2.0 | 142. | -28. | 171. | 0.00502 | 0.00405 | 0.00097 | 0.0 | 0.0 | 0.0 | 0.0 |
| 74 | 381.6 | 198.0 | 1.0 | 154. | -17. | 171. | 0.00509 | 0.00412 | 0.00097 | 0.0 | 0.0 | 0.0 | 0.0 |
| 75 | 320.4 | 137.3 | 2.0 | 97. | -73. | 170. | 0.00476 | 0.00380 | 0.00097 | 0.0 | 0.0 | 0.0 | 0.0 |
| 76 | 307.8 | 125.1 | 3.0 | 85. | -85. | 170. | 0.00470 | 0.00373 | 0.00096 | 0.0 | 0.0 | 0.0 | 0.0 |
| 77 | 356.4 | 173.9 | 1.0 | 131. | -39. | 170. | 0.00495 | 0.00399 | 0.00096 | 0.0 | 0.0 | 0.0 | 0.0 |
| 78 | 198.0 | 15.5 | 29.0 | -17. | -187. | 170. | 0.00412 | 0.00315 | 0.00096 | 0.0 | 0.0 | 0.0 | 0.0 |
| 79 | 343.8 | 161.6 | 1.0 | 119. | -51. | 169. | 0.00489 | 0.00393 | 0.00096 | 0.0 | 0.0 | 0.0 | 0.0 |
| 80 | 284.4 | 113.0 | 3.0 | 64. | -96. | 159. | 0.00457 | 0.00367 | 0.00090 | 0.0 | 0.0 | 0.0 | 0.0 |
| 81 | 259.2 | 88.6 | 1.0 | 40. | -119. | 159. | 0.00444 | 0.00354 | 0.00090 | 0.0 | 0.0 | 0.0 | 0.0 |
| 82 | 307.8 | 137.3 | 1.0 | 85. | -73. | 159. | 0.00470 | 0.00380 | 0.00090 | 0.0 | 0.0 | 0.0 | 0.0 |
| 83 | 185.4 | 15.5 | 15.0 | -28. | -187. | 158. | 0.00405 | 0.00315 | 0.00090 | 0.0 | 0.0 | 0.0 | 0.0 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84 | 284.4 | 125.1 | 1.0 | 64. | -85. | 148. | 0.00457 | 0.00373 | 0.00084 | 0.0 | 0.0 | 0.0 | 0.0 |
| 85 | 333.0 | 173.9 | 3.0 | 109. | -39. | 148. | 0.00483 | 0.00399 | 0.00084 | 0.0 | 0.0 | 0.0 | 0.0 |
| 86 | 320.4 | 161.6 | 1.0 | 97. | -51. | 148. | 0.00476 | 0.00393 | 0.00084 | 0.0 | 0.0 | 0.0 | 0.0 |
| 87 | 271.8 | 113.0 | 2.0 | 52. | -96. | 148. | 0.00451 | 0.00367 | 0.00084 | 0.0 | 0.0 | 0.0 | 0.0 |
| 88 | 369.0 | 210.6 | 1.0 | 142. | -5. | 147. | 0.00502 | 0.00418 | 0.00084 | 0.0 | 0.0 | 0.0 | 0.0 |
| 89 | 173.9 | 15.5 | 10.0 | -39. | -187. | 147. | 0.00399 | 0.00315 | 0.00084 | 0.0 | 0.0 | 0.0 | 0.0 |
| 90 | 234.0 | 76.3 | 1.0 | 17. | -130. | 147. | 0.00431 | 0.00348 | 0.00083 | 0.0 | 0.0 | 0.0 | 0.0 |
| 91 | 333.0 | 185.4 | 1.0 | 109. | -28. | 137. | 0.00483 | 0.00405 | 0.00078 | 0.0 | 0.0 | 0.0 | 0.0 |
| 92 | 320.4 | 173.9 | 2.0 | 97. | -39. | 136. | 0.00476 | 0.00399 | 0.00077 | 0.0 | 0.0 | 0.0 | 0.0 |
| 93 | 161.6 | 15.5 | 16.0 | -51. | -187. | 136. | 0.00393 | 0.00315 | 0.00077 | 0.0 | 0.0 | 0.0 | 0.0 |
| 94 | 198.0 | 52.0 | 1.0 | -17. | -153. | 136. | 0.00412 | 0.00335 | 0.00077 | 0.0 | 0.0 | 0.0 | 0.0 |
| 95 | 343.8 | 198.0 | 1.0 | 119. | -17. | 136. | 0.00489 | 0.00412 | 0.00077 | 0.0 | 0.0 | 0.0 | 0.0 |
| 96 | 246.6 | 100.8 | 2.0 | 29. | -107. | 136. | 0.00437 | 0.00360 | 0.00077 | 0.0 | 0.0 | 0.0 | 0.0 |
| 97 | 234.0 | 88.6 | 3.0 | 17. | -119. | 135. | 0.00431 | 0.00354 | 0.00077 | 0.0 | 0.0 | 0.0 | 0.0 |
| 98 | 284.4 | 149.6 | 2.0 | 64. | -62. | 125. | 0.00457 | 0.00386 | 0.00071 | 0.0 | 0.0 | 0.0 | 0.0 |
| 99 | 223.2 | 88.6 | 4.0 | 7. | -119. | 125. | 0.00425 | 0.00354 | 0.00071 | 0.0 | 0.0 | 0.0 | 0.0 |
| 100 | 271.8 | 137.3 | 1.0 | 52. | -73. | 125. | 0.00451 | 0.00380 | 0.00071 | 0.0 | 0.0 | 0.0 | 0. |
| 101 | 149.6 | 15.5 | 18.0 | -62. | -187. | 125. | 0.00386 | 0.00315 | 0.00071 | 0.0 | 0.0 | 0.0 | 0. |
| 102 | 259.2 | 125.1 | 1.0 | 40. | -85. | 125. | 0.00444 | 0.00373 | 0.00071 | 0.0 | 0.0 | 0.0 | 0. |
| 103 | 307.8 | 173.9 | 3.0 | 85. | -39. | 125. | 0.00470 | 0.00399 | 0.00071 | 0.0 | 0.0 | 0.0 | 0. |
| 104 | 234.0 | 100.8 | 2.0 | 17. | -107. | 124. | 0.00431 | 0.00360 | 0.00070 | 0.0 | 0.0 | 0.0 | 0. |
| 105 | 284.4 | 161.6 | 1.0 | 64. | -51. | 114. | 0.00457 | 0.00393 | 0.00065 | 0.0 | 0.0 | 0.0 | 0. |
| 106 | 223.2 | 100.8 | 2.0 | 7. | -107. | 114. | 0.00425 | 0.00360 | 0.00065 | 0.0 | 0.0 | 0.0 | 0. |
| 107 | 320.4 | 198.0 | 2.0 | 97. | -17. | 114. | 0.00476 | 0.00412 | 0.00065 | 0.0 | 0.0 | 0.0 | 0. |
| 108 | 307.8 | 185.4 | 1.0 | 85. | -28. | 114. | 0.00470 | 0.00405 | 0.00065 | 0.0 | 0.0 | 0.0 | 0. |
| 109 | 271.8 | 149.6 | 1.0 | 52. | -62. | 114. | 0.00451 | 0.00386 | 0.00065 | 0.0 | 0.0 | 0.0 | 0. |
| 110 | 210.6 | 88.6 | 3.0 | -5. | -119. | 114. | 0.00418 | 0.00354 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 111 | 137.3 | 15.5 | 7.0 | -73. | -187. | 113. | 0.00380 | 0.00315 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 112 | 173.9 | 52.0 | 1.0 | -39. | -153. | 113. | 0.00399 | 0.00335 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 113 | 198.0 | 76.3 | 2.0 | -17. | -130. | 113. | 0.00412 | 0.00348 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 114 | 295.2 | 173.9 | 3.0 | 74. | -39. | 113. | 0.00463 | 0.00399 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 115 | 185.4 | 64.3 | 1.0 | -28. | -141. | 113. | 0.00405 | 0.00341 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 116 | 234.0 | 113.0 | 1.0 | 17. | -96. | 113. | 0.00431 | 0.00367 | 0.00064 | 0.0 | 0.0 | 0.0 | 0. |
| 117 | 284.4 | 173.9 | 4.0 | 64. | -39. | 103. | 0.00457 | 0.00399 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 118 | 223.2 | 113.0 | 2.0 | 7. | -96. | 103. | 0.00425 | 0.00367 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 119 | 271.8 | 161.6 | 3.0 | 52. | -51. | 103. | 0.00451 | 0.00393 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 120 | 320.4 | 210.6 | 3.0 | 97. | -5. | 102. | 0.00476 | 0.00418 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 121 | 307.8 | 198.0 | 3.0 | 85. | -17. | 102. | 0.00470 | 0.00412 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 122 | 295.2 | 185.4 | 1.0 | 74. | -28. | 102. | 0.00463 | 0.00405 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 123 | 125.1 | 15.5 | 5.0 | -85. | -187. | 102. | 0.00373 | 0.00315 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 124 | 259.2 | 149.6 | 1.0 | 40. | -62. | 102. | 0.00444 | 0.00386 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 125 | 173.9 | 64.3 | 3.0 | -39. | -141. | 102. | 0.00399 | 0.00341 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 126 | 185.4 | 76.3 | 4.0 | -28. | -130. | 101. | 0.00405 | 0.00348 | 0.00058 | 0.0 | 0.0 | 0.0 | 0. |
| 127 | 234.0 | 125.1 | 1.0 | 17. | -85. | 101. | 0.00431 | 0.00373 | 0.00057 | 0.0 | 0.0 | 0.0 | 0. |
| 128 | 223.2 | 125.1 | 7.0 | 7. | -85. | 91. | 0.00425 | 0.00373 | 0.00052 | 0.0 | 0.0 | 0.0 | 0. |
| 129 | 271.8 | 173.9 | 4.0 | 52. | -39. | 91. | 0.00451 | 0.00399 | 0.00052 | 0.0 | 0.0 | 0.0 | 0. |
| 130 | 210.6 | 113.0 | 5.0 | -5. | -96. | 91. | 0.00418 | 0.00367 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 131 | 173.9 | 76.3 | 4.0 | -39. | -130. | 91. | 0.00399 | 0.00348 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 132 | 113.0 | 15.5 | 6.0 | -96. | -187. | 91. | 0.00367 | 0.00315 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 133 | 259.2 | 161.6 | 6.0 | 40. | -51. | 91. | 0.00444 | 0.00393 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 134 | 161.6 | 64.3 | 7.0 | -51. | -141. | 91. | 0.00393 | 0.00341 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 135 | 198.0 | 100.8 | 1.0 | -17. | -107. | 90. | 0.00412 | 0.00360 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 136 | 307.8 | 210.6 | 7.0 | 85. | -5. | 90. | 0.00470 | 0.00418 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 137 | 295.2 | 198.0 | 3.0 | 74. | -17. | 90. | 0.00463 | 0.00412 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 138 | 246.6 | 149.6 | 4.0 | 29. | -62. | 90. | 0.00437 | 0.00386 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 139 | 185.4 | 88.6 | 2.0 | -28. | -119. | 90. | 0.00405 | 0.00354 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 140 | 234.0 | 137.3 | 5.0 | 17. | -73. | 90. | 0.00431 | 0.00380 | 0.00051 | 0.0 | 0.0 | 0.0 | 0. |
| 141 | 284.4 | 198.0 | 6.0 | 64. | -17. | 80. | 0.00457 | 0.00412 | 0.00046 | 0.0 | 0.0 | 0.0 | 0. |
| 142 | 271.8 | 185.4 | 1.0 | 52. | -28. | 80. | 0.00451 | 0.00405 | 0.00046 | 0.0 | 0.0 | 0.0 | 0. |
| 143 | 223.2 | 137.3 | 7.0 | 7. | -73. | 80. | 0.00425 | 0.00380 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 144 | 210.6 | 125.1 | 8.0 | -5. | -85. | 80. | 0.00418 | 0.00373 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 145 | 161.6 | 76.3 | 5.0 | -51. | -130. | 79. | 0.00393 | 0.00348 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 146 | 137.3 | 52.0 | 8.0 | -73. | -153. | 79. | 0.00380 | 0.00335 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 147 | 100.8 | 15.5 | 8.0 | -107. | -187. | 79. | 0.00360 | 0.00315 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 148 | 259.2 | 173.9 | 3.0 | 40. | -39. | 79. | 0.00444 | 0.00399 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 149 | 149.6 | 64.3 | 13.0 | -62. | -141. | 79. | 0.00386 | 0.00341 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 150 | 198.0 | 113.0 | 5.0 | -17. | -96. | 79. | 0.00412 | 0.00367 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 151 | 246.6 | 161.6 | 5.0 | 29. | -51. | 79. | 0.00437 | 0.00393 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 152 | 185.4 | 100.8 | 7.0 | -28. | -107. | 79. | 0.00405 | 0.00360 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 153 | 295.2 | 210.6 | 3.0 | 74. | -5. | 79. | 0.00463 | 0.00418 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 154 | 234.0 | 149.6 | 3.0 | 17. | -62. | 79. | 0.00431 | 0.00386 | 0.00045 | 0.0 | 0.0 | 0.0 | 0. |
| 155 | 284.4 | 210.6 | 1.0 | 64. | -5. | 69. | 0.00457 | 0.00418 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 156 | 271.8 | 198.0 | 2.0 | 52. | -17. | 69. | 0.00451 | 0.00412 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 157 | 259.2 | 185.4 | 1.0 | 40. | -28. | 69. | 0.00444 | 0.00405 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 158 | 223.2 | 149.6 | 7.0 | 7. | -62. | 69. | 0.00425 | 0.00386 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 159 | 113.0 | 39.8 | 1.0 | -96. | -164. | 68. | 0.00367 | 0.00328 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 160 | 210.6 | 137.3 | 11.0 | -5. | -73. | 68. | 0.00418 | 0.00380 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 161 | 149.6 | 76.3 | 4.0 | -62. | -130. | 68. | 0.00386 | 0.00348 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 162 | 125.1 | 52.0 | 13.0 | -85. | -153. | 68. | 0.00373 | 0.00335 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 163 | 161.6 | 88.6 | 6.0 | -51. | -119. | 68. | 0.00393 | 0.00354 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 164 | 88.6 | 15.5 | 6.0 | -119. | -187. | 68. | 0.00354 | 0.00315 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 165 | 173.9 | 100.8 | 13.0 | -39. | -107. | 68. | 0.00399 | 0.00360 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 166 | 137.3 | 64.3 | 13.0 | -73. | -141. | 68. | 0.00380 | 0.00341 | 0.00039 | 0.0 | 0.0 | 0.0 | 0. |
| 167 | 198.0 | 125.1 | 15.0 | -17. | -85. | 68. | 0.00412 | 0.00373 | 0.00038 | 0.0 | 0.0 | 0.0 | 0. |
| 168 | 246.6 | 173.9 | 1.0 | 29. | -39. | 68. | 0.00437 | 0.00399 | 0.00038 | 0.0 | 0.0 | 0.0 | 0. |
| 169 | 185.4 | 113.0 | 16.0 | -28. | -96. | 67. | 0.00405 | 0.00367 | 0.00038 | 0.0 | 0.0 | 0.0 | 0. |
| 170 | 234.0 | 161.6 | 4.0 | 17. | -51. | 67. | 0.00431 | 0.00393 | 0.00038 | 0.0 | 0.0 | 0.0 | 0. |
| 171 | 223.2 | 161.6 | 2.0 | 7. | -51. | 57. | 0.00425 | 0.00393 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 172 | 246.6 | 185.4 | 2.0 | 29. | -28. | 57. | 0.00437 | 0.00405 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 173 | 210.6 | 149.6 | 4.0 | -5. | -62. | 57. | 0.00418 | 0.00386 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 174 | 100.8 | 39.8 | 1.0 | -107. | -164. | 57. | 0.00360 | 0.00328 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 175 | 137.3 | 76.3 | 4.0 | -73. | -130. | 57. | 0.00380 | 0.00348 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 176 | 113.0 | 52.0 | 16.0 | -96. | -153. | 57. | 0.00367 | 0.00335 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 177 | 149.6 | 88.6 | 7.0 | -62. | -119. | 57. | 0.00386 | 0.00354 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 178 | 161.6 | 100.8 | 8.0 | -51. | -107. | 57. | 0.00393 | 0.00360 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 179 | 76.3 | 15.5 | 2.0 | -130. | -187. | 57. | 0.00348 | 0.00315 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 180 | 125.1 | 64.3 | 5.0 | -85. | -141. | 57. | 0.00373 | 0.00341 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 181 | 173.9 | 113.0 | 14.0 | -39. | -96. | 57. | 0.00399 | 0.00367 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 182 | 198.0 | 137.3 | 5.0 | -17. | -73. | 56. | 0.00412 | 0.00380 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 183 | 185.4 | 125.1 | 8.0 | -28. | -85. | 56. | 0.00405 | 0.00373 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 184 | 234.0 | 173.9 | 3.0 | 17. | -39. | 56. | 0.00431 | 0.00399 | 0.00032 | 0.0 | 0.0 | 0.0 | 0. |
| 185 | 223.2 | 173.9 | 1.0 | 7. | -39. | 46. | 0.00425 | 0.00399 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 186 | 210.6 | 161.6 | 4.0 | -5. | -51. | 46. | 0.00418 | 0.00393 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 187 | 125.1 | 76.3 | 8.0 | -85. | -130. | 45. | 0.00373 | 0.00348 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 188 | 100.8 | 52.0 | 4.0 | -107. | -153. | 45. | 0.00360 | 0.00335 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 189 | 137.3 | 88.6 | 9.0 | -73. | -119. | 45. | 0.00380 | 0.00354 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 190 | 88.6 | 39.8 | 2.0 | -119. | -164. | 45. | 0.00354 | 0.00328 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 191 | 173.9 | 125.1 | 4.0 | -39. | -85. | 45. | 0.00399 | 0.00373 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 192 | 149.6 | 100.8 | 7.0 | -62. | -107. | 45. | 0.00386 | 0.00360 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 193 | 113.0 | 64.3 | 7.0 | -96. | -141. | 45. | 0.00367 | 0.00341 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 194 | 161.6 | 113.0 | 3.0 | -51. | -96. | 45. | 0.00393 | 0.00367 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 195 | 234.0 | 185.4 | 2.0 | 17. | -28. | 45. | 0.00431 | 0.00405 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 196 | 259.2 | 210.6 | 3.0 | 40. | -5. | 45. | 0.00444 | 0.00418 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 197 | 246.6 | 198.0 | 3.0 | 29. | -17. | 45. | 0.00437 | 0.00412 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 198 | 198.0 | 149.6 | 2.0 | -17. | -62. | 45. | 0.00412 | 0.00386 | 0.00026 | 0.0 | 0.0 | 0.0 | 0. |
| 199 | 223.2 | 185.4 | 10.0 | 7. | -28. | 35. | 0.00425 | 0.00405 | 0.00020 | 0.0 | 0.0 | 0.0 | 0. |
| 200 | 210.6 | 173.9 | 4.0 | -5. | -39. | 34. | 0.00418 | 0.00399 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 201 | 113.0 | 76.3 | 16.0 | -96. | -130. | 34. | 0.00367 | 0.00348 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 202 | 161.6 | 125.1 | 3.0 | -51. | -85. | 34. | 0.00393 | 0.00373 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 203 | 88.6 | 52.0 | 2.0 | -119. | -153. | 34. | 0.00354 | 0.00335 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 204 | 125.1 | 88.6 | 5.0 | -85. | -119. | 34. | 0.00373 | 0.00354 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 205 | 137.3 | 100.8 | 6.0 | -73. | -107. | 34. | 0.00380 | 0.00360 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 206 | 149.6 | 113.0 | 2.0 | -62. | -96. | 34. | 0.00386 | 0.00367 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 207 | 173.9 | 137.3 | 3.0 | -39. | -73. | 34. | 0.00399 | 0.00380 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 208 | 100.8 | 64.3 | 9.0 | -107. | -141. | 34. | 0.00360 | 0.00341 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 209 | 198.0 | 161.6 | 9.0 | -17. | -51. | 34. | 0.00412 | 0.00393 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 210 | 246.6 | 210.6 | 9.0 | 29. | -5. | 33. | 0.00437 | 0.00418 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 211 | 234.0 | 198.0 | 4.0 | 17. | -17. | 33. | 0.00431 | 0.00412 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 212 | 259.2 | 223.2 | 4.0 | 40. | 7. | 33. | 0.00444 | 0.00425 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 213 | 185.4 | 149.6 | 4.0 | -28. | -62. | 33. | 0.00405 | 0.00386 | 0.00019 | 0.0 | 0.0 | 0.0 | 0. |
| 214 | 210.6 | 185.4 | 15.0 | -5. | -28. | 23. | 0.00418 | 0.00405 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 215 | 223.2 | 198.0 | 21.0 | 7. | -17. | 23. | 0.00425 | 0.00412 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 216 | 113.0 | 88.6 | 6.0 | -96. | -119. | 23. | 0.00367 | 0.00354 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 217 | 100.8 | 76.3 | 18.0 | -107. | -130. | 23. | 0.00360 | 0.00348 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 218 | 149.6 | 125.1 | 14.0 | -62. | -85. | 23. | 0.00386 | 0.00373 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 219 | 76.3 | 52.0 | 6.0 | -130. | -153. | 23. | 0.00348 | 0.00335 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 220 | 125.1 | 100.8 | 5.0 | -85. | -107. | 23. | 0.00373 | 0.00360 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 221 | 161.6 | 137.3 | 10.0 | -51. | -73. | 23. | 0.00393 | 0.00380 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 222 | 137.3 | 113.0 | 6.0 | -73. | -96. | 23. | 0.00380 | 0.00367 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 223 | 173.9 | 149.6 | 12.0 | -39. | -62. | 23. | 0.00399 | 0.00386 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 224 | 88.6 | 64.3 | 7.0 | -119. | -141. | 23. | 0.00354 | 0.00341 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 225 | 198.0 | 173.9 | 21.0 | -17. | -39. | 22. | 0.00412 | 0.00399 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 226 | 185.4 | 161.6 | 19.0 | -28. | -51. | 22. | 0.00405 | 0.00393 | 0.00013 | 0.0 | 0.0 | 0.0 | 0. |
| 227 | 234.0 | 210.6 | 23.0 | 17. | -5. | 22. | 0.00431 | 0.00418 | 0.00012 | 0.0 | 0.0 | 0.0 | 0. |
| 228 | 246.6 | 223.2 | 5.0 | 29. | 7. | 22. | 0.00437 | 0.00425 | 0.00012 | 0.0 | 0.0 | 0.0 | 0. |
| 229 | 198.0 | 185.4 | 11.0 | -17. | -28. | 12. | 0.00412 | 0.00405 | 0.00007 | 0.0 | 0.0 | 0.0 | 0. |
| 230 | 223.2 | 210.6 | 9.0 | 7. | -5. | 12. | 0.00425 | 0.00418 | 0.00007 | 0.0 | 0.0 | 0.0 | 0. |
| 231 | 210.6 | 198.0 | 4.0 | -5. | -17. | 12. | 0.00418 | 0.00412 | 0.00007 | 0.0 | 0.0 | 0.0 | 0. |
| 232 | 64.3 | 52.0 | 1.0 | -141. | -153. | 11. | 0.00341 | 0.00335 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 233 | 52.0 | 39.8 | 1.0 | -153. | -164. | 11. | 0.00335 | 0.00328 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 234 | 137.3 | 125.1 | 6.0 | -73. | -85. | 11. | 0.00380 | 0.00373 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 235 | 88.6 | 76.3 | 2.0 | -119. | -130. | 11. | 0.00354 | 0.00348 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 236 | 100.8 | 88.6 | 1.0 | -107. | -119. | 11. | 0.00360 | 0.00354 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 237 | 173.9 | 161.6 | 9.0 | -39. | -51. | 11. | 0.00399 | 0.00393 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 238 | 149.6 | 137.3 | 8.0 | -62. | -73. | 11. | 0.00386 | 0.00380 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 239 | 161.6 | 149.6 | 11.0 | -51. | -62. | 11. | 0.00393 | 0.00386 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 240 | 125.1 | 113.0 | 12.0 | -85. | -96. | 11. | 0.00373 | 0.00367 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 241 | 76.3 | 64.3 | 4.0 | -130. | -141. | 11. | 0.00348 | 0.00341 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 242 | 185.4 | 173.9 | 12.0 | -28. | -39. | 11. | 0.00405 | 0.00399 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |
| 243 | 234.0 | 223.2 | 4.0 | 17. | 7. | 10. | 0.00431 | 0.00425 | 0.00006 | 0.0 | 0.0 | 0.0 | 0. |

# Appendix 1: Print of "pdprop.env" Simulation Control file

```
# This file contains the starting filenames, variables etc
# for the Crack Propagation  programs.   It should be edited by the
# user for each simulation.
#
#TYPE= rod_surface_flaw     #with or without weld using ACTIVATEs:
#ACTIVATE_MmMb=    1   #  Deactivate  = 0
#ACTIVATE_MkmMkb=  0   #  Note used in rod_surface_flaw
#ACTIVATE_fw=      0   #  Note used in rod_surface_flaw
#                              #Other      #TYPE=  options:
#                              # plate_surface_flaw
#                              # plate_tru_flaw
#                              # plate_embedded_flaw
#                              # plate_long_surface_flaw
#                              # plate_edge_flaw
#                              # pipe_inside_flaw
#                              # pipe_full_inside_flaw
#                              # pipe_full_outside_flaw
#                              #
#                              # rod_surface_flaw
#                              # rod_full_outside_flaw

# The factors described in this section may be ignored if not applicable to
```

```
# the particular problem type described above.
# (All dimensions in mm)
#B=  0.0   # plate (or pipe wall) thickness
#W=  0.0   # plate width
#ri=  13.    # Internal diameter if pipe problem. Ignored if not pipe
#azero= 1.5  # initial crack depth
#czero= 0.0  # initial 1/2 crack width at surface. Not used in Rods Surf.
#L= 00.      # Weld Feature width.  Ignored  if ACTIVATE_MkmMkb= 0 (above)

#HISTORYFILE=  load1.txt    # historyFileName
#           # Adjustments to load file variables:
#           # Note that the MEANADD (below) is added AFTER the MAGFACTOR is applied.
#MAGFACTOR_m= 1.0     # Multiply factor on membrane load. Result should be MPa
#MAGFACTOR_b= 1.0     # Multiply factor on bending load term. Result should be MPa
#MEANADD_m=   0.0     # Mean shift in MPa added to membrane stress.
#MEANADD_b=   0.0     # Mean shift in MPa added to bending stress.

#MAXREPS=  1000000    # Max no. history repeats in simulation.
#                    # One repetition or application of the load history is
#                    # also called a "block" of cycles.
#
#
#MATERIAL=  merged_a36_fitted.html   #File name of material fitted data
#                                This file is used to define the cyclic
#                                stress-strain curve, and the Neuber Product curve.
#
#DADN= table                          # Can be "table" or "Paris"
#DADN_PARIS= 0.0 0.0 0.0 0.0 none     # Kth  a  m  Kc units   (ignored if #DADN= table )
#DADN_TABLE= a36+1015.dadn    # da/dN digitized da/dN curve for material,
#                                including the threshold, and KIc.
#                                If a threshold exists, put in a vertical line
#                                (with two identical X-axis points).
#                                If the threshold needs to be "turned off" then
#                                do NOT put in a vertical line at low da/dN.
#                                (Ignored when #DADN= PARIS )
#
#FAD Stuff:
#TensileFile=  a36_Mattos_mono_engrSS_FLAT.txt     #enter "none"  if no FAD
#PmEOL= 70.              #Set these so that Pm+Pb= 0.82*Syield for default.
#PbEOL= 100.
#Kmat= 1675.
#PinJoint= 0             # not used for rodSurfFlaw.f
#
#BLOCKSKIP=   1.0 percent       # At the end of each block check if the previous
#                                two blocks of cycles had similar damage (crack
#                                extension) within this percentage.  If TRUE then
#                                simply skip the simulation of the next block,
#                                but just add the expected damage.  Continue by
#                                simulating the block after the skip.
#                                A value of 0.0 will disallow skipping blocks.
#SAVELEVEL=  0               #Amount of output saved to disk:
#                            #   3=lots  2=medium  1=minimal
#                            #   0= save #crk=  data into binary direct access file only
#                            #      No #crk= data will be written into the text logfile.
#                            #      Use for large output files with lots of cycles.
```

# Appendix 2: Print of da/dn vs DeltaK Table in file filtExample_2.40

```
   Delta_K        da/dN
```

```
0.1502160E+03  0.9620540E-07  0.2176716E+01 -0.7016800E+01  0.0000000E+00  0.0000000E+00     1
0.1769830E+03  0.4562300E-06  0.2247931E+01 -0.6340816E+01  0.7121539E-01  0.6759844E+00     2
0.2202350E+03  0.1160170E-05  0.2342886E+01 -0.5935478E+01  0.9495497E-01  0.4053378E+00     3
0.2874840E+03  0.3224090E-05  0.2458614E+01 -0.5491593E+01  0.1157272E+00  0.4438853E+00     4
0.4331670E+03  0.1069760E-04  0.2636655E+01 -0.4970714E+01  0.1780417E+00  0.5208793E+00     5
0.7637410E+03  0.7556810E-04  0.2882946E+01 -0.4121662E+01  0.2462907E+00  0.8490520E+00     6
0.1240590E+04  0.8520410E-03  0.3093628E+01 -0.3069540E+01  0.2106822E+00  0.1052122E+01     7
0.1471680E+04  0.3307300E-02  0.3167813E+01 -0.2480526E+01  0.7418513E-01  0.5890131E+00     8
0.1675690E+04  0.1074680E-01  0.3224194E+01 -0.1968721E+01  0.5638027E-01  0.5118057E+00     9
```

# Appendix 3: Print of Stress-Strain-Init.Life file: "matfile"

```
#SAE Standard Fatigue Data File format
```

# #

Pick one: #FDE_plot #FDE_fit # #

```
#
#Copyright (C) 2012  F.D.E. Committee
#This data file is free software - you can redistribute it and/or
#modify it under the terms of the GNU General Public License as
#published by the Free Software Foundation; either version 2 of the
#license, or (at your option) any later version.
#This data file is distributed in the hope that it will be useful,
#but WITHOUT ANY WARRANTY - without even the implied warranty of
#MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.  See the
#GNU General PUblic License for more details.
#You should have received a copy of the GNU General PUblic License
#along with this program - if not, write to the Free Software
#Foundation, Inc., 59 Temple Place - Suite 330, Boston, MA 02111-1307, USA
#Try also their web site: http://www.gnu.org/copyleft/gpl.html
#
# NOTE:  Fitted Data !!
# A36 Steel Merged Data Sets from Refs. 1 and 2:
# Ref.1: P.Dindinger report to Fat.Des.+Eval. Comm. Apr.2012
# Ref.2: G.A.Miller and H.S.Reemsnyder, "Strain-Cycle Fatigue of Sheet and
# Plate Steels I:  Test Method Development and Data Presentation,"
# SAE Paper 830175, Detroit MI, Feb28-Mar.4, 1983
#
# NOTE that original test data ends at  2Nf = 1.3million.
#
#FileType= strain_life
#DataType= fitted
#TIMEcol= 0
#NAME=  ASTM-A36
#NAME=  Structural
#NAME=  Steel
#Stress_units= ksi
#Strain_units= strain
#Sy=    38.4 0.2pc offset, 265  mpa
#Su=  69.  ksi from Miller/Reemsnyder = 475 mpa
#eu=       0   #strain at Su not reported
#E= 29528. ksi  = 203600 mpa
#FractureStrain=  0 not reported
#FractureStress=  0. not reported
#monotonic_K= 0  not reported
#monotonic_n= 0  not reported
#BHN= 138.
```

```
#%RA= 0. %  not reported
#
#saedigcurve_v2.2.f starts.
# NOTE!! The Following Points are FITTED DATA:#NOTE!! Fitted Stress computed using Experm.
# Total Strain   2Nf  Stress  Mean   Plastic Strain   Initial
#    Amp               Amp   Stress      Amp        Elastic Mod.
   0.88485          1   115.3      0.   0.88095     29528. #Fitted_point
   0.00914       5000    52.1      0.   0.00737     29528. #Fitted_point
   0.00665      10000    48.8      0.   0.00499     29528. #Fitted_point
   0.00493      20000    45.7      0.   0.00338     29528. #Fitted_point
   0.00344      50000    42.0      0.   0.00202     29528. #Fitted_point
   0.00270     100000    39.3      0.   0.00136     29528. #Fitted_point
   0.00217     200000    36.8      0.   0.00092     29528. #Fitted_point
   0.00169     500000    33.8      0.   0.00055     29528. #Fitted_point
   0.00144    1000000    31.6      0.   0.00037     29528. #Fitted_point
#Original test data ends at  2Nf = 1.3million.
#Points below are extrapolation:
   0.00125    2000000    29.6      0.   0.00025     29528. #Fitted_point
   0.00106    5000000    27.1      0.   0.00014     29528. #Fitted_point
#
#
```