

Results for a36sample_5.4 : Crack Initiation Using saefcalc2

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saefcalc2.f vers.= 1.9

Simulation input data:

Material file= merged_a36_fitted.html

Multiplication Factor= 0.5400000E+01

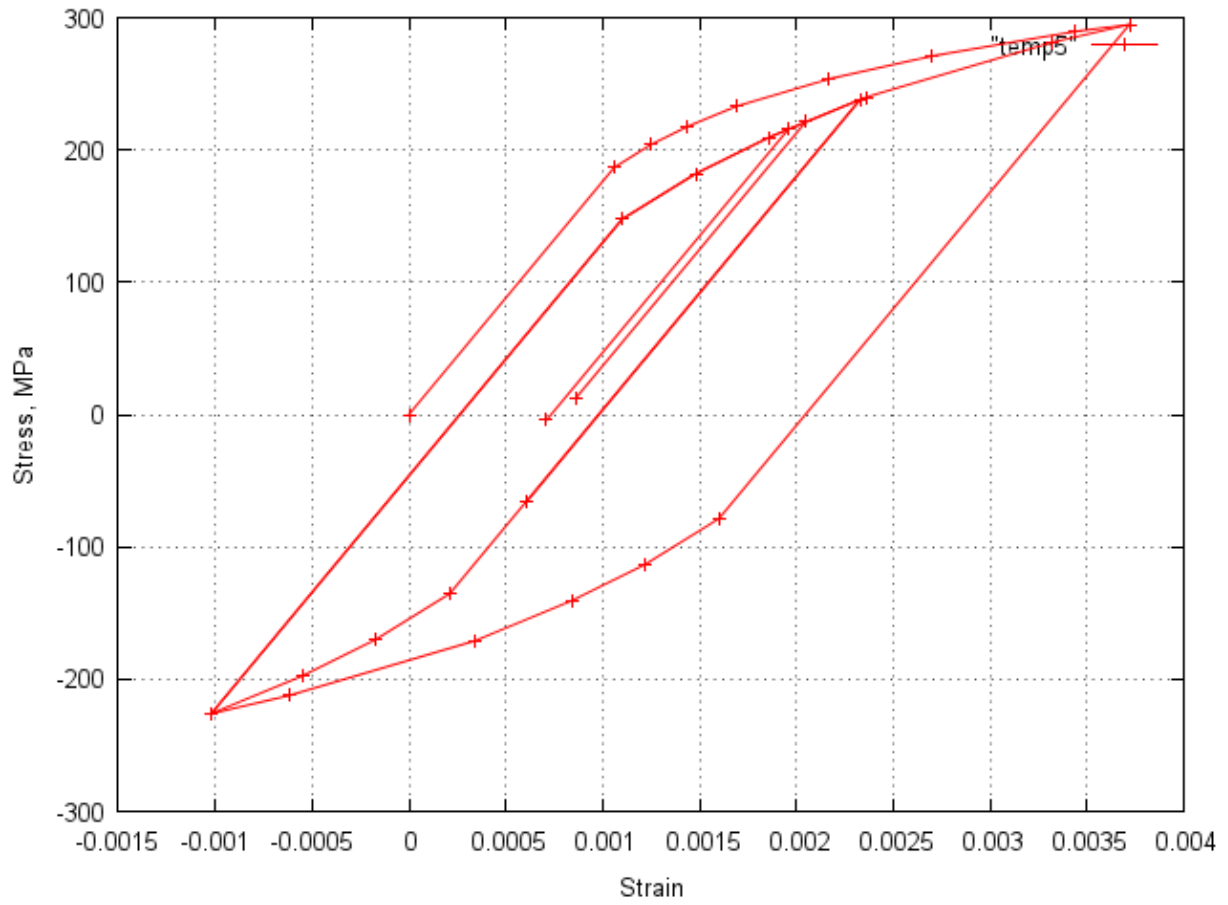
Crack Initiation Life Results for a36sample_5.4

Loop	Smax	Smin	N	Sigmax	Sigmin	Delta	Epsmax	Epsmin	DeltaEps	%Eps	%SWaT	%Sts	%Morr
1	472.5	-236.5	1.0	295.	-226.	521.	0.00372	-.00102	0.00474	77.5	79.6	77.5	83.5
2	326.2	-236.5	1.0	238.	-226.	464.	0.00233	-.00102	0.00335	22.5	18.4	22.5	16.5
3	326.2	-0.2	1.0	238.	-65.	304.	0.00233	0.00061	0.00172	0.0	2.0	0.0	0.0
4	281.3	44.8	2.0	216.	-4.	220.	0.00196	0.00071	0.00125	0.0	0.0	0.0	0.0
5	292.7	67.5	2.0	222.	12.	210.	0.00205	0.00086	0.00119	0.0	0.0	0.0	0.0

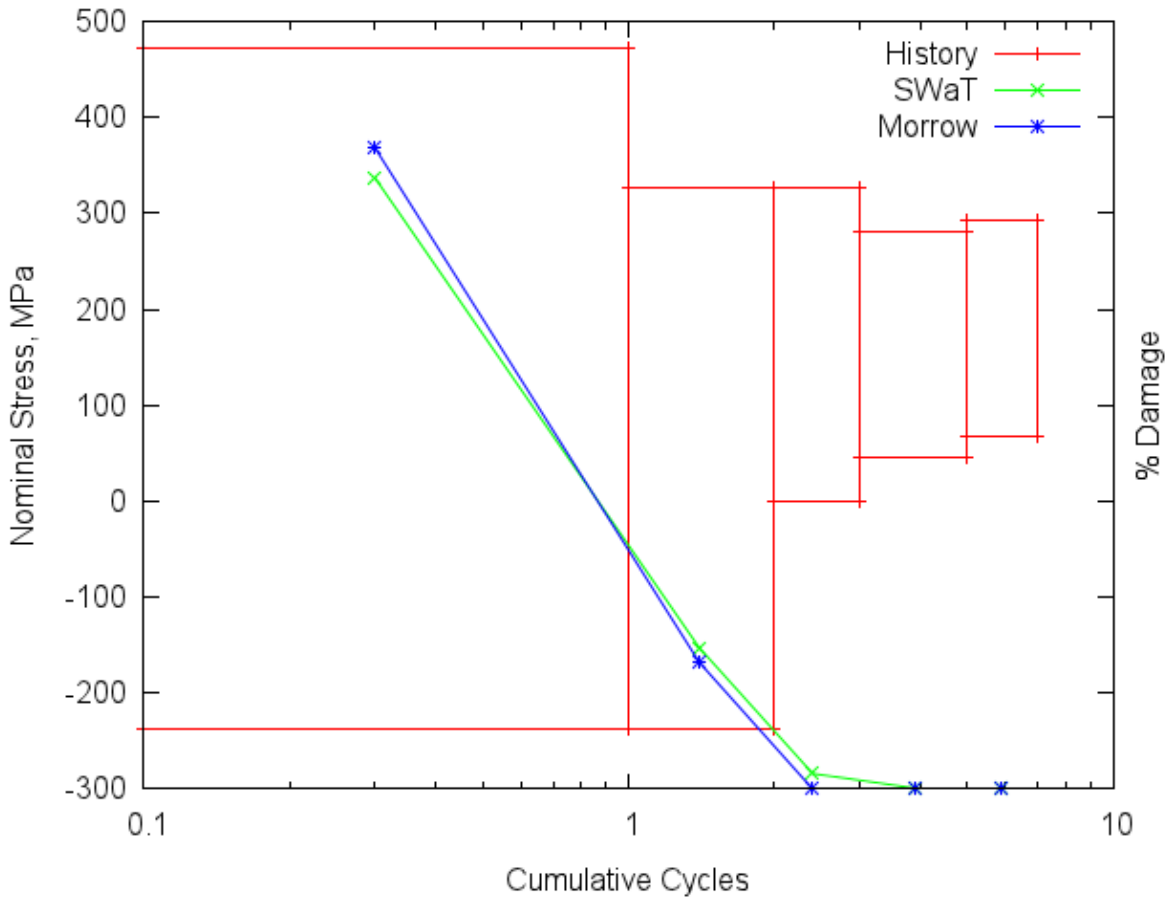
Predicted History Repetitions to Initiation:

StrainLife_Reps	SWaT_Life_Reps	StressLife_Reps	Morrow_Reps	Goodman_Reps (Reps= Repetitions)
58607.6	44488.3	58607.5	39644.9	29902.1

Local Stress and Strain Response:



Cumulative Cycle Plot of History and Damage:



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

Appendix 1: Rainflow Cycles

```
#Inputs after scaling and sorting:
#  Srange  Smean  Cycles  Smax  Smin
709.0  118.0          1.0 472.5 -236.5
562.7   44.8          1.0 326.2 -236.5
326.3  163.0          1.0 326.2  -0.2
236.5  163.1          2.0 281.3   44.8
225.2  180.1          2.0 292.7   67.5
```

Appendix 2: Stress-Strain-Init.Life file: "merged_a36_fitted.html"

```
#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
```

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```

#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
#
#

```