--Specimen #**5, X-42** base material. Test began **12-27-96.**

The purpose of this test was to see if pressure reversal could be initiated without cycling the load more than the one cycle required for a pressure reversal. Gages were located on the back surface, parallel to the flaw, at the right corner of the flaw and at the left corner of the flaw, as described with Specimen #**4**. **A** data summary is given below.

Time,sec	Load,lbs	eback	epara	elft-cor	ert-cor	displ
0	**0**	**0**	**0**	**0**	**0**	**1.125**
(The first load cycle is initiated)						
0.63	**46125**	**-377**	**-95**	**2210**	**2741**	**1.195**
(the largest negative strain from the back surface gage)						
0.95	**69100**	0	**-322**	**8605**	**10055**	**1.294**
(the back surface strain gage reads zero)						
1.06	**77375**	**3879**	**-642**	---	---	**1.405**
(The maximum load on the first load cycle is achieved. The corner gages failed.)						
1.07	**0**	**3479**	**-508**	---	---	**1.298**
(This data occurred at the end of the first load cycle.)						
1.10	**0**	**3480**	**-508**	---	---	**1.300**
(The strains are residual strains at the beginning of the second load cycle)						
2.06	**70050**	**3796**	**-570**	---	---	**1.395**
(Data occurs at the first load pause on the second load cycle.)						
2.60	**70050**	**3741**	**-562**	---	---	**1.399**
(End of the first load pause on the second load cycle.)						
3.10	**72050**	**3717**	**-561**	---	---	**1.400**
(Data occurs at the beginning of the second load pause of the second load cycle. The strains have changed very little.)						
21.60	**72050**	**3155**	**-505**	---	---	**1.400**
(End of the second load pause of the second load cycle. Note that the strain values have decreased during the **18+** hours of load hold.)						
22.60	**73050**	**3140**	**-500**	**---**	**---**	**1.403**
(The load is increased on this data marks the beginning of the third load pause of the second load cycle.)						
65.60	**73100**	**2365**	**-368**	---	---	**1.405**
(This data marks the end on the third load pause of the second load cycle. The strains continually decrease in magnitude.)						
66.46	**74025**	**2368**	**-370**	**---**	---	**1.389**
(The load is increased slightly and notes the fourth load pause of the second load cycle.)						
69.96	**74050**	**2346**	**-375**	**---**	---	**1.405**
(This data is at end of the fourth load pause of the second load cycle.)						
69.97	**75000**	**2350**	**-375**	---	---	**1.405**
(This data marks the beginning of the fifth load pause of the second load cycle.						
91.48	**75050**	**2368**	**-346**	---	---	**1.408**
(This data marks the end of the fifth load pause of the second load cycle. The hold period was **21.51** hours.)						

91.49 77500 [--data not recorded-----------------------------]

(This is the maximum load achieved on the second load cycle. The strains were not recorded due to a **30** minute time interval between data collections.)

91.49 0 2023 -260 --- --- 1.310

(This data marks the end of the second load cycle and the beginning of the third load cycle.)

92.84 77525 3380 -381 --- --- 1.415

(Data corresponding to the maximum load on the third load cycle.)

92.85 0 2677 -296 --- --- 1.315

(The residual strains after the third load cycle indicate that the residual is increasing in comparison with the second load cycle but not with respect to the first cycle.)

92.86 0 2741 -295 --- --- 1.316

(This data marks the beginning of the fourth load cycle.)

93.93 77500 4960 -394 --- --- 1.410

(Maximum load on the fourth load cycle.)

93.94 0 4220 -325 --- --- 1.320

(End **of** the fourth load cycle. The residual strains are continuing to increase over the previous load cycle with the lone exception being the first load cycle.)

94.77 0 3731 -329 --- --- 1.319

(Data at the beginning of the fifth load cycle.)

95.84 77225 6150 -425 --- --- 1.418

(Data at the maximum load of the fifth load cycle.)

95.86 0 **5270 -362** --- --- **1.325**

(Data marks the end of the fifth load cycle.)

95.87 0 **5270 -362** --- --- **1.325**

(Start of the sixth load cycle.)

96.94 76275 8290 -458 --- --- 1.424

(Maximum load of the sixth load cycle.)

96.95 0 **7040 -399 --- --- 1.329**

(End of the sixth load cycle.)

96.98 0 6915 -398 --- --- 1.327

(Start of the seventh load cycle.)

98.03 76625 9065 -502 --- --- 1.430

(Maximum load of the seventh load cycle.)

98.04 0 **7835 -448 --- --- 1.331**

(End of the seventh load cycle.)

98.06 0 7775 -446 --- --- 1.332

(Start of the eighth load cycle. The residual strains continue to build. This is also the beginning of the failure cycle.)

99.17 73550 6420 -505 --- --- 1.428

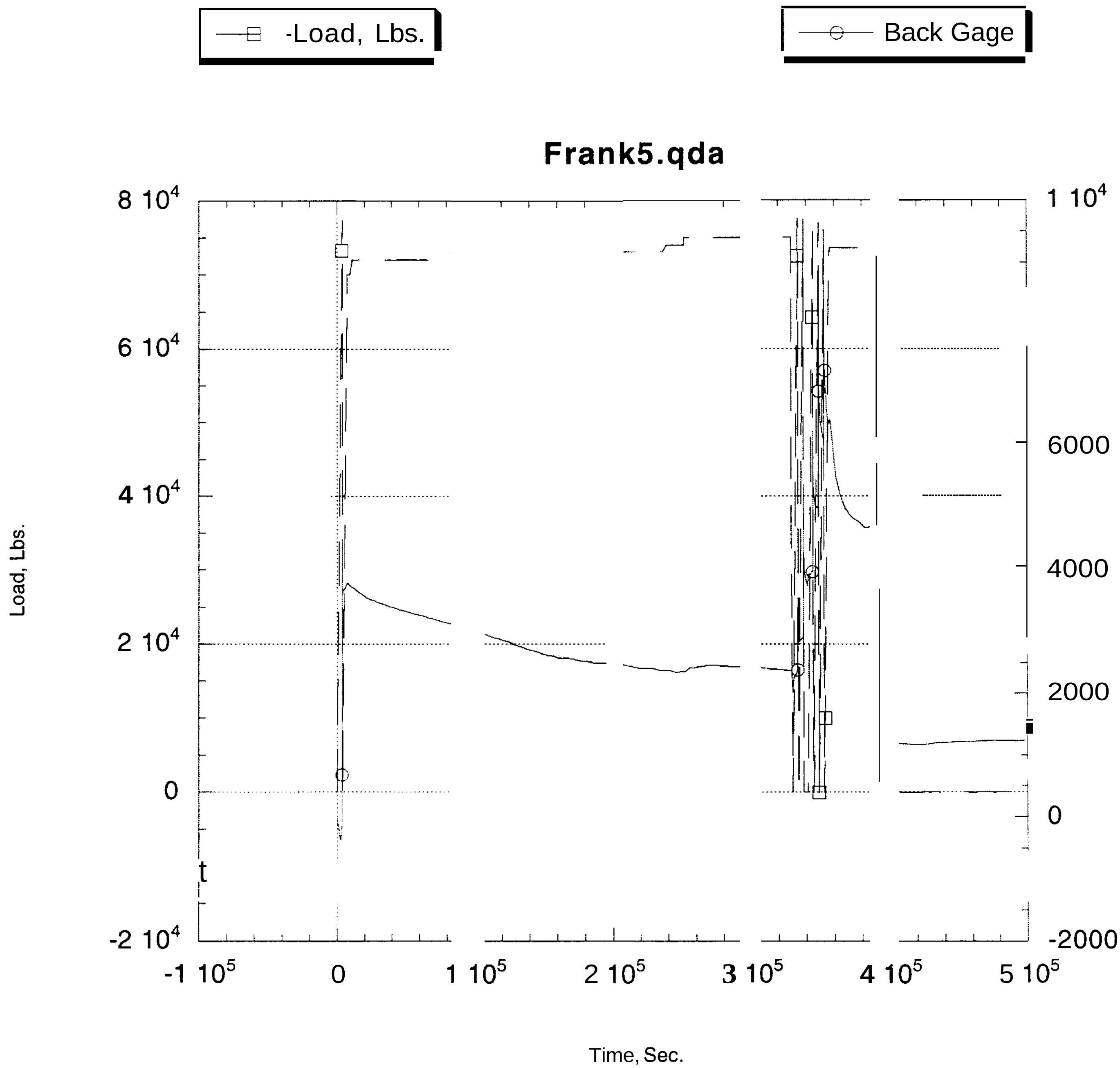
(Start of the first load pause of the eighth load cycle.)

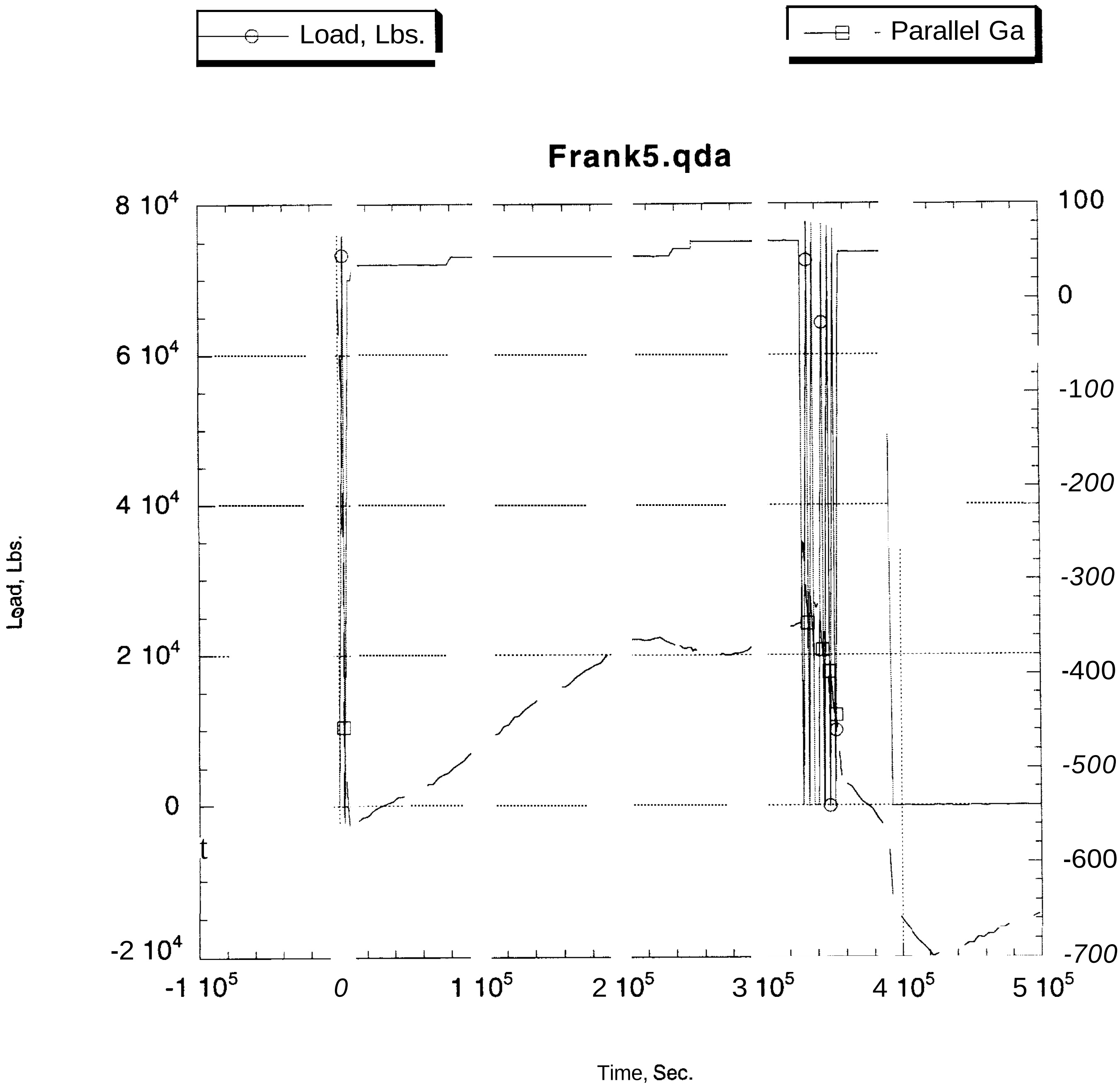
108.30 73550 4940 -574 --- --- 1.431

(Failure occurred after holding load for **9.13** hours. The back gage indicated decreasing strain during the failure loading process and could indicate a failed gage. The parallel gage was consistent with an increasing magnitude with respect to time and load. This calculates to be a 5.1% pressure reversal.)

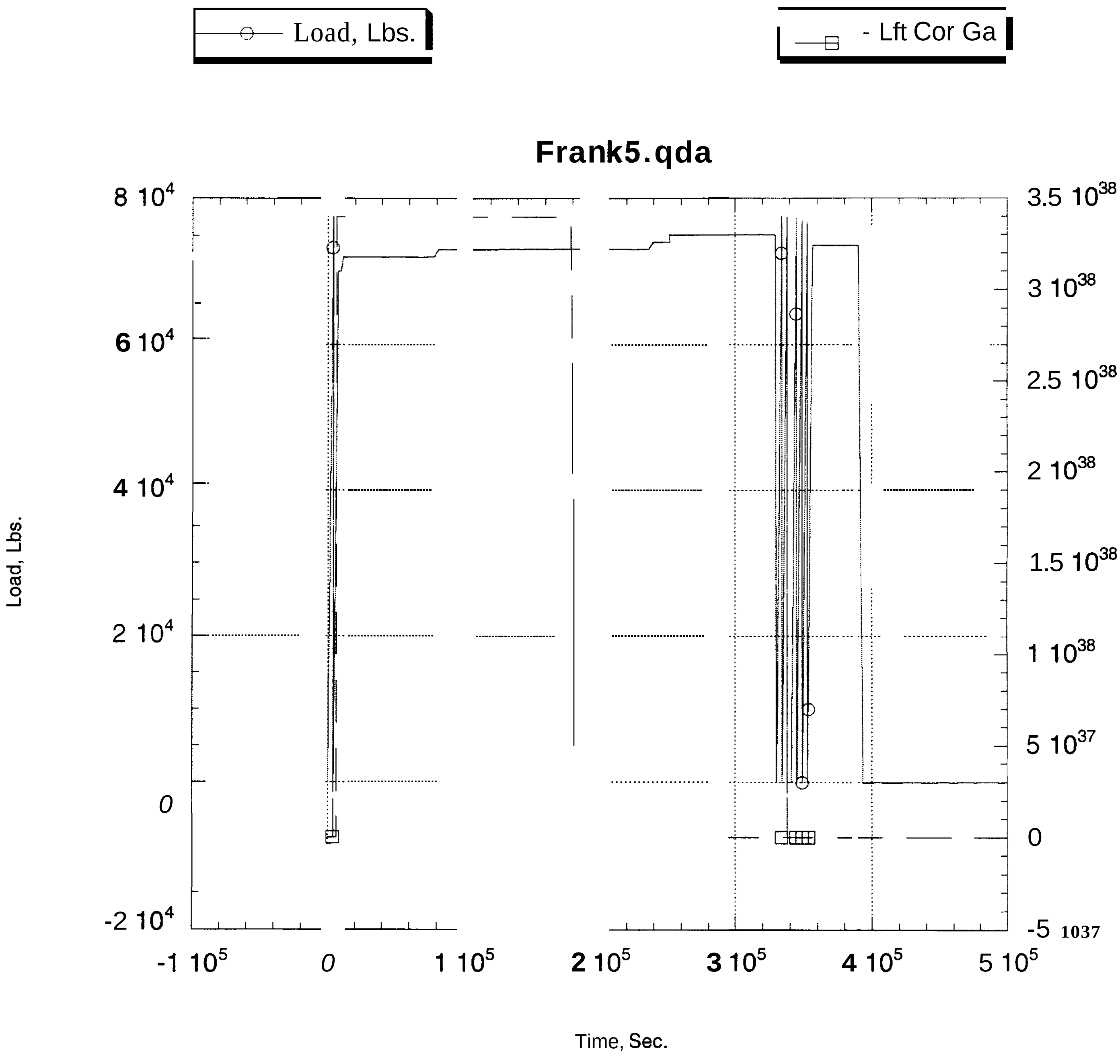
Graphs of load and back gage strain versus time, of load and parallel gage strain versus time, of load and left corner gage strain versus time, of load and right corner strain versus time,

and of load and displacement versus time are attached. Graphs of the back gage strain and load and of the parallel gage strain versus load are included.

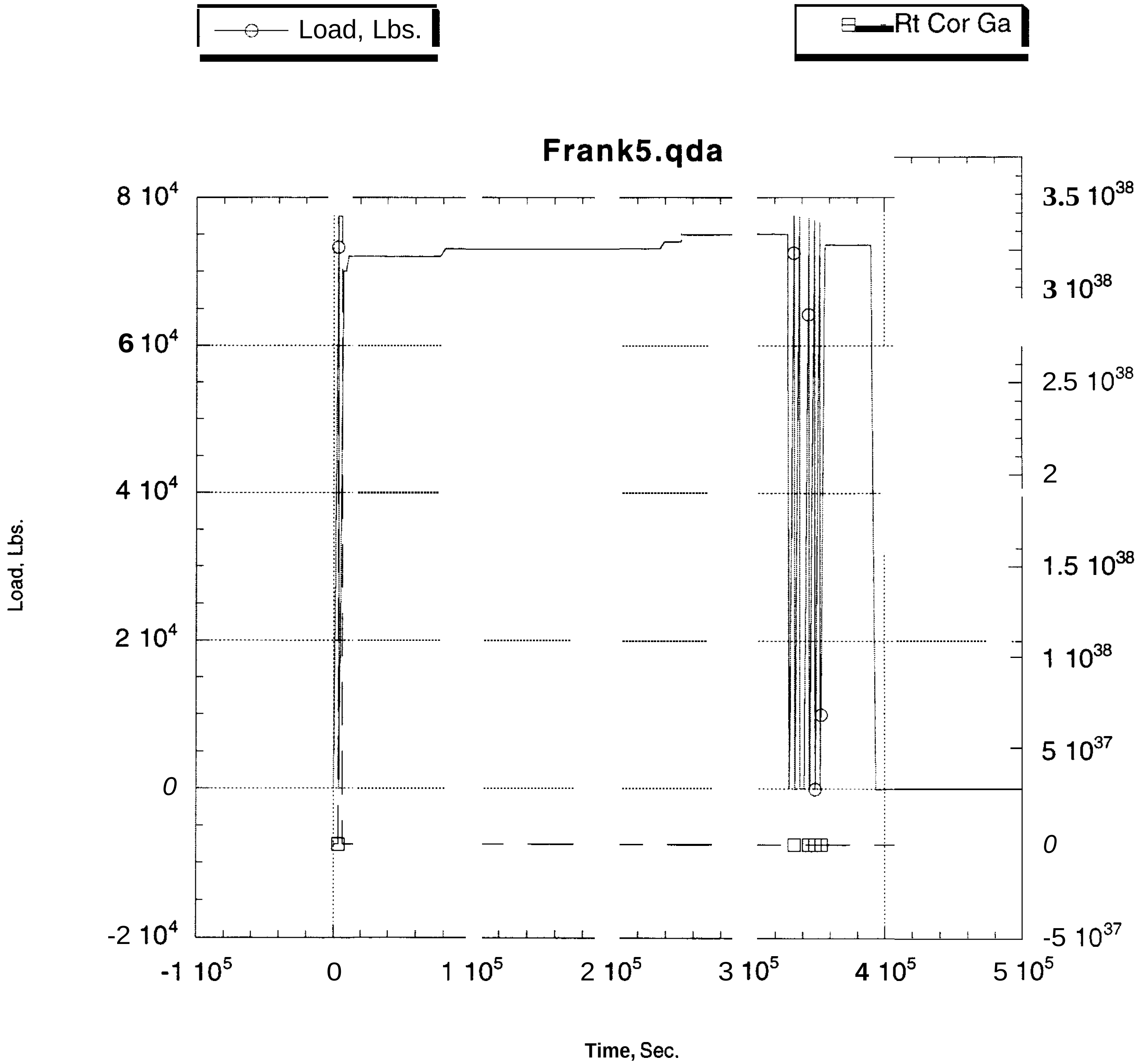

-Load, Lbs.
Back Gage
Frank5.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
1 10^4
6000
4000
2000
0
-2000
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
5 10^5
Load, Lbs.
Time, Sec.

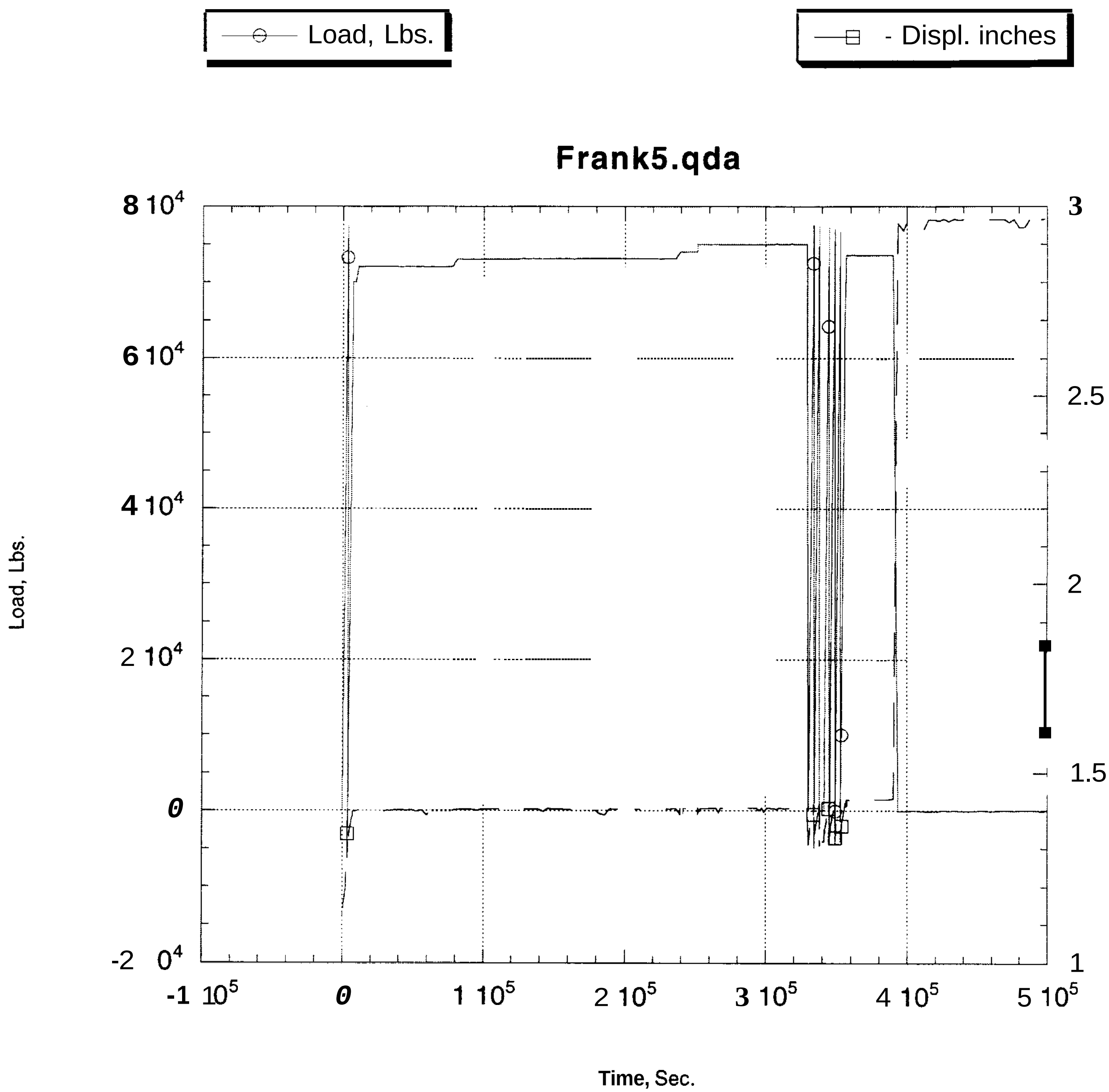


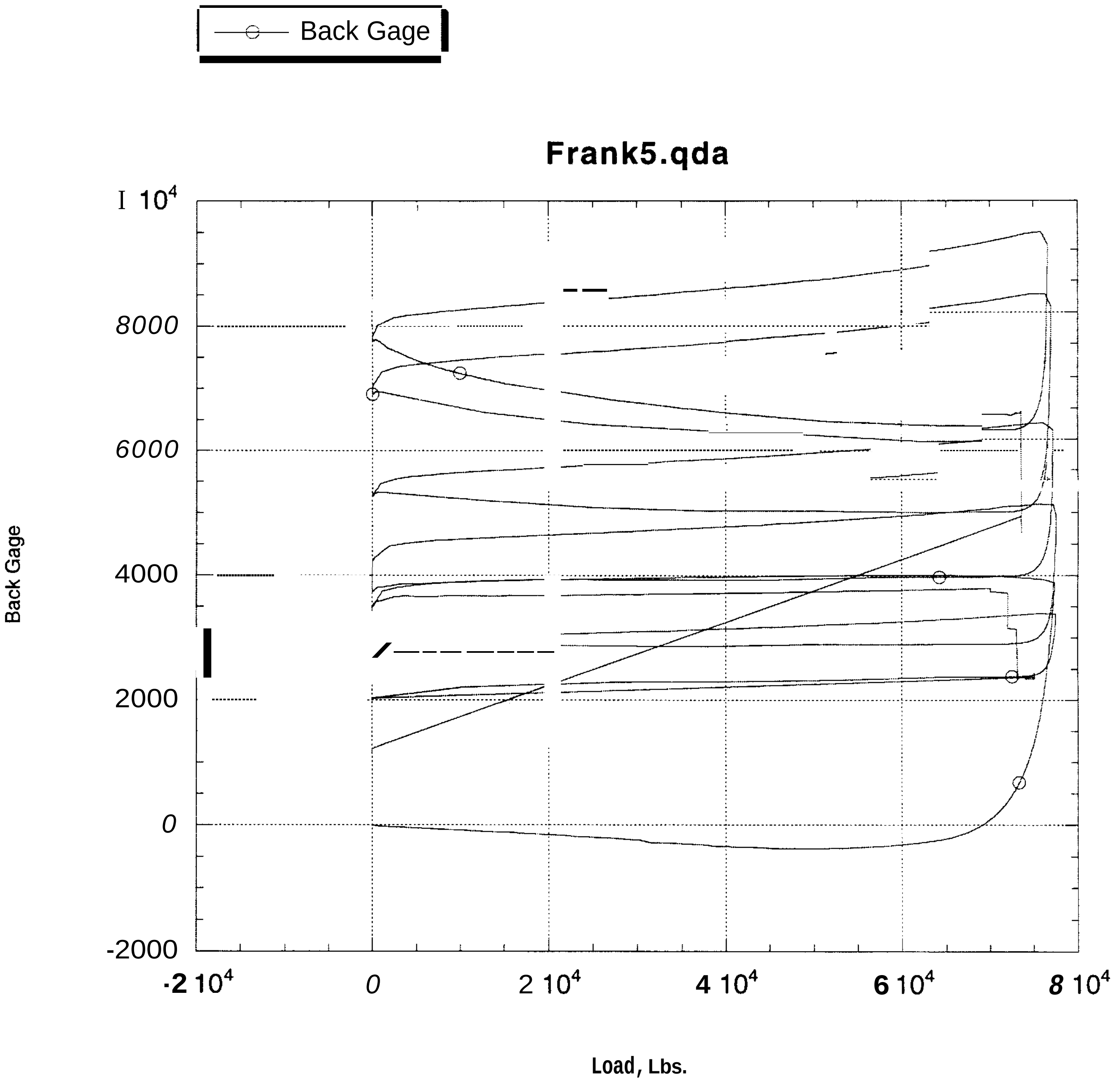
Load, Lbs.
- Parallel Ga
Frank5.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
Load, Lbs.
100
0
-100
-200
-300
-400
-500
-600
-700
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
5 10^5
Time, Sec.

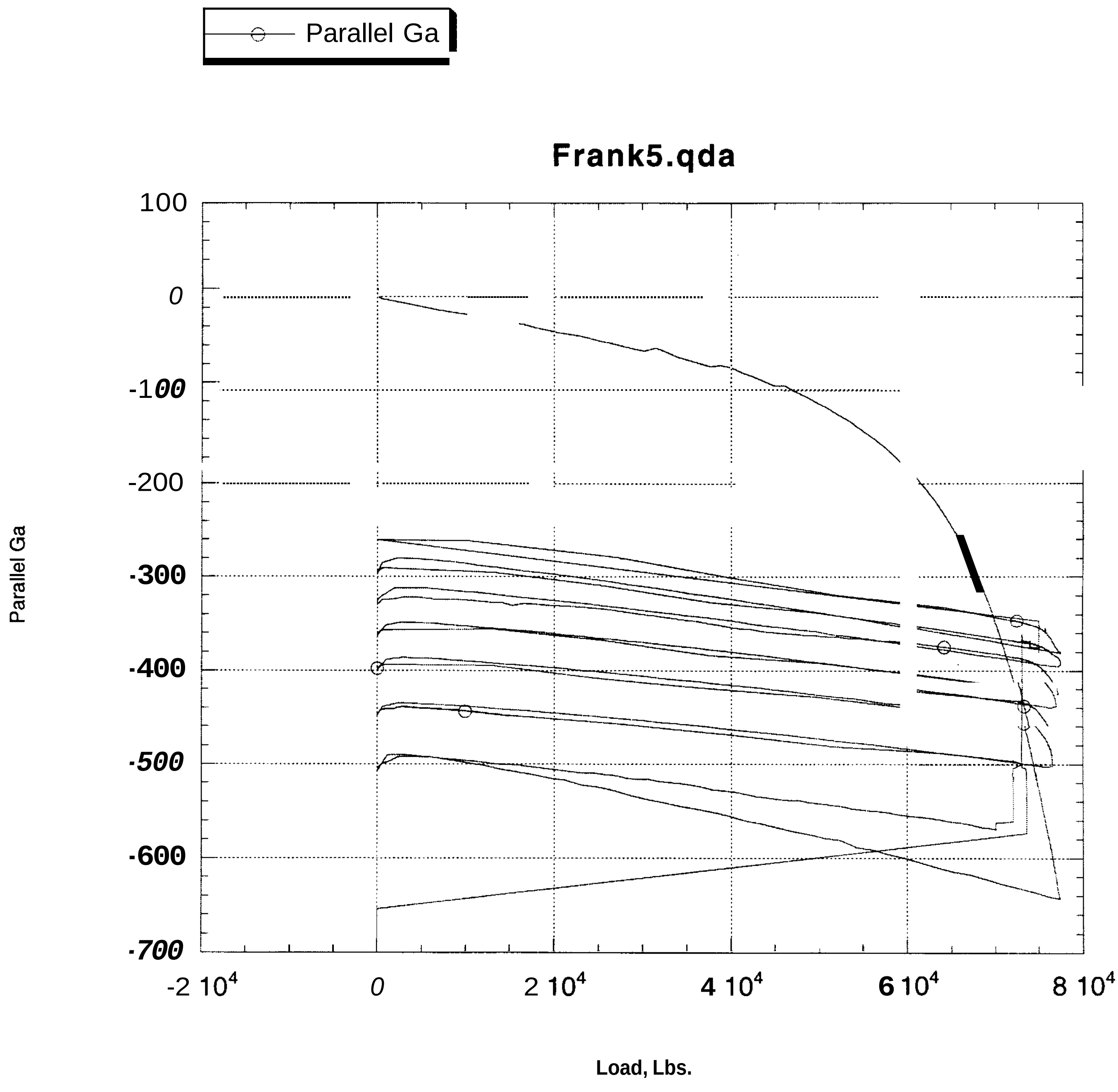


Load, Lbs.
- Lft Cor Ga
Frank5.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
3.5 10^38
3 10^38
2.5 10^38
2 10^38
1.5 10^38
1 10^38
5 10^37
0
-5 1037
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
5 10^5
Load, Lbs.
Time, Sec.


Load, Lbs.
Rt Cor Ga
Frank5.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
3.5 10^38
3 10^38
2.5 10^38
2
1.5 10^38
1 10^38
5 10^37
0
-5 10^37
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
5 10^5
Load, Lbs.
Time, Sec.


Load, Lbs.
- Displ. inches
Frank5.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 0^4
3
2.5
2
1.5
1
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
5 10^5
Load, Lbs.
Time, Sec.


Back Gage
Frank5.qda
1 10^4
8000
6000
4000
2000
0
-2000
Back Gage
-2 10^4
0
2 10^4
4 10^4
6 10^4
8 10^4
Load, Lbs.



Parallel Ga
Frank5.qda
100
0
-100
-200
-300
-400
-500
-600
-700
-2 10^4
0
2 10^4
4 10^4
6 10^4
8 10^4
Parallel Ga
Load, Lbs.

--Specimen #6, X-42 base material. Test Begin Jan.2,1997.
The purpose of this test was to see if a specimen without maximum load strain hardening will fail at 72000 lb. over night. The machine malfunctioned and put the specimen in compression with a compressive bow. The test was restarted but the gage readings were not representative of other test and therefore the data will not be included **as** part of the test program data.

--Specimen #7A, X-42 base material. Test Begin Jan.6, 1997.
An operator error caused the specimen to fail in compression without any data being collected.

--Specimen #8, **X-42** base material. Test Begin Jan. 8, **1997.** The purposes of this test were to examine the strain distribution using a photoelastic coating, to trigger reversal by using the parallel gage, and look for flaw growth. (Photoelastic data actually is proportional to the difference in principal strains or to the maximum shear strain rather than just strain.)

Time,sec	Load,lbs	epara	ε0.5lft	eedge	displ
0	**0**	**0**	**0**	**0**	**1.134**
(Start of the first load cycle.)					
1.91	**73750**	**-622**	**10530**	**7410**	**1.334**
(First maximum load of the first load cycle. Some necking on the back surface in the region of the flaw was evident.)					
1.92	0	**-475**	**8455**	**5575**	**1.236**
(End of the first load cycle.)					
3.22	0	**-472**	**8445**	**5570**	**1.232**
(Start of the second load cycle.)					
4.41	**75475**	**-700**	**12295**	**8430**	**1.389**
(Maximum load on second load cycle.)					
4.41	0	**-547**	**10215**	**6600**	**1.289**
(End **of** second load cycle.)					
4.60	0	**-544**	**10200**	**6590**	**1.286**
(Start of third load cycle.)					
5.83	**76300**	**-741**	**8325**	**9310**	**1.413**
(Maximum load on third load cycle. A dilute acid was injected in the flaw to etch any flaw growth. The gage at point C failed as evidenced from the strain values.)					
5.84	0	**-612**	---	**7650**	**1.340**
(End of third load cycle.)					
5.94	0	**-609**	---	**6935**	**1.339**
(Start fourth load cycle.)					
6.94	**72025**	**-735**	---	**9255**	**1.419**
(First load pause on fourth load cycle, dilute acid was injected in the flaw to etch any flaw extension. Air was used to dry the wetted area and resulted in a large thermal strain spike as can be seen at about the **55000** lb load. The spike dissipates rather quickly as the temperature in the flaw area returns to room temperature.)					
22.39	**72025**	**-730**	---	**9345**	**1.439**
(End first load pause of fourth load cycle with little change in the strains.)					
22.45	**77025**	**-766**	---	**10065**	**1.445**
(Maximum load on the fourth load cycle.)					
22.47	**0**	**-641**	---	**8375**	**1.341**
(End of the foyrth load cycle.)					
22.49	0	**-641**	---	**8375**	**1.349**
(Start of the fifth load cycle.)					
23.55	**77550**	**-818**	---	**10970**	**1.467**
(maximum load on the fifth cycle)					
23.57	0	**-692**	---	**9265**	**1.369**
(End **of** the fifth load cycle.)					
23.67	0	**-689**	---	**9260**	**1.369**
(Start of the sixth load cycle.)					

24.74 77700 -870 --- **11815 1.475**
(Maximum load on the sixth load cycle. Again, dilute acid was used to identify any flaw growth.)

24.75 0 **-765** --- **10150 1.381**
(End of the sixth load cycle.)

24.78 0 **-764** --- **10145 1.380**
(Start of the seventh load cycle.)

25.77 70100 -850 --- **11640 1.470**
(Start of the first load pause on the seventh load cycle.)

29.77 70075 -860 --- **11670 1.459**
(End of the first load pause of the seventh load cycle with little change in strain magnitudes.)

30.09 72050 -863 --- **11725 1.474**
(Start of the second load pause on the seventh load cycle.)

45.10 72075 -865 --- **11765 1.474**
(End of the second load pause of the seventh load cycle with little change in strain magnitudes.)

45.46 77055 -932 --- **not** recorded-------------
(Maximum load on the seventh load cycle. Data was visually recorded as the time interval on computing system was set too large to capture this entry.)

45.46 0 **-863** --- **10930 1.389**
(End of the seventh load cycle.)

45.47 0 **-863** --- **10940 1.388**
(Start of the eighth load cycle.)

46.46 73025 -923 --- **12525 1.481**
(Start of the first load pause on the eighth load cycle.)

52.14 73075 -936 --- **12615 1.481**
(End of the first load pause on the eighth load cycle.)

52.19 76750 -1000 --- **13205 1.489**
(Maximum load on the eighth load cycle.)

52.20 0 **-969** --- **11525 1.393**
(End of the eighth load cycle.)

52.21 0 **-969** --- **11535 1.393**
(Start the ninth and fail load cycle.)

53.21 73075 -999 --- **13155 1.485**
(Start the first load pause on the ninth load cycle. Also, this is the failure load.)

83.39 73075 -1122 --- **13720 1.490**
(Last data entry before failure on ninth load cycle. This represents a **6.0%** pressure reversal. Dilute acid was inserted on this cycle at about **27,000** lbs. to etch any flaw extension. Flaw extension and the before observed necking was evident on the failed parts.)

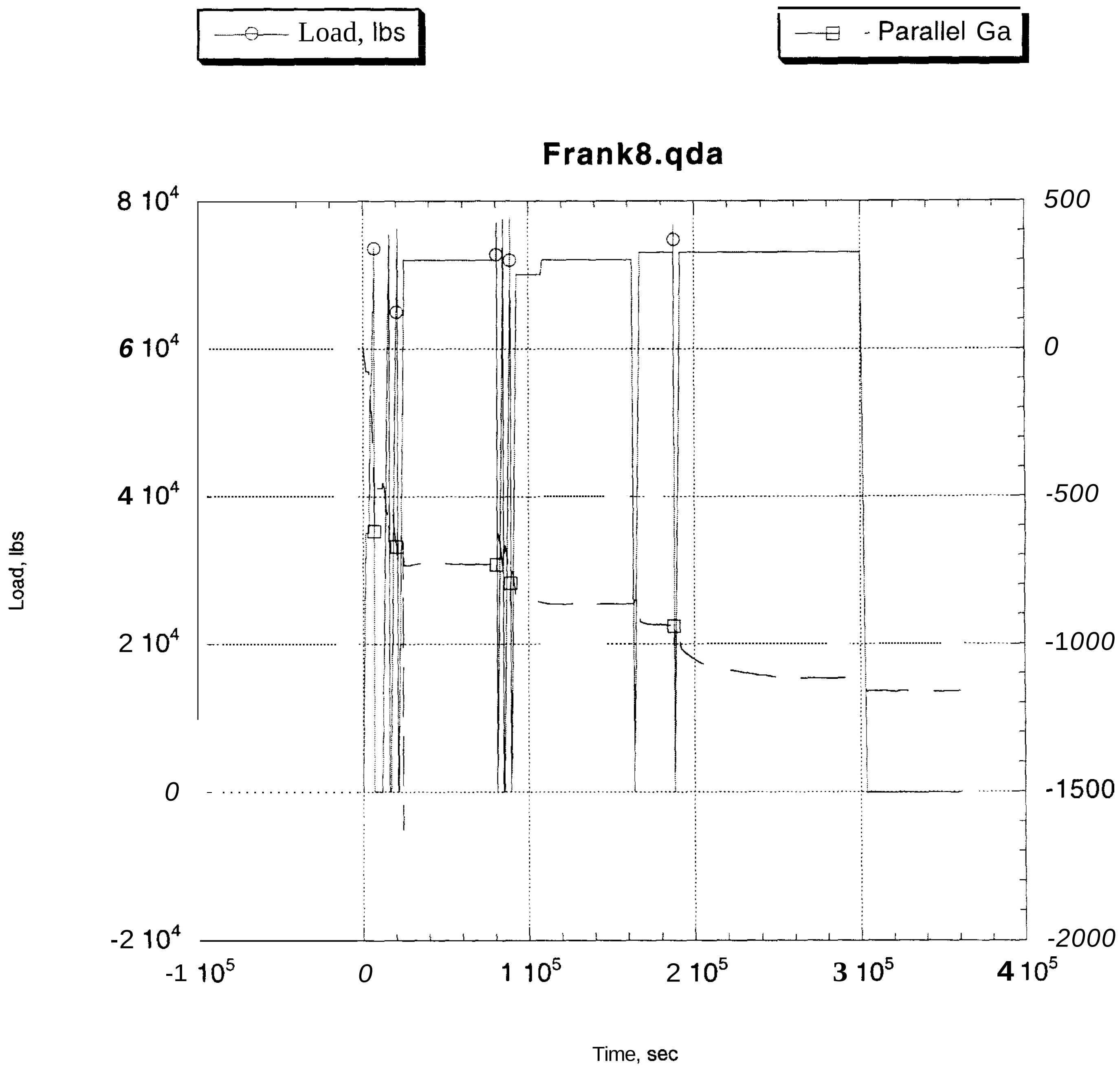
The attached graphs include: load and parallel gage strain versus time, load and edge gage strain versus time, load and strain at C versus time, load and cross head displacement versus time, and parallel gage strain versus load.

Also attached are photographs taken from this test and include:

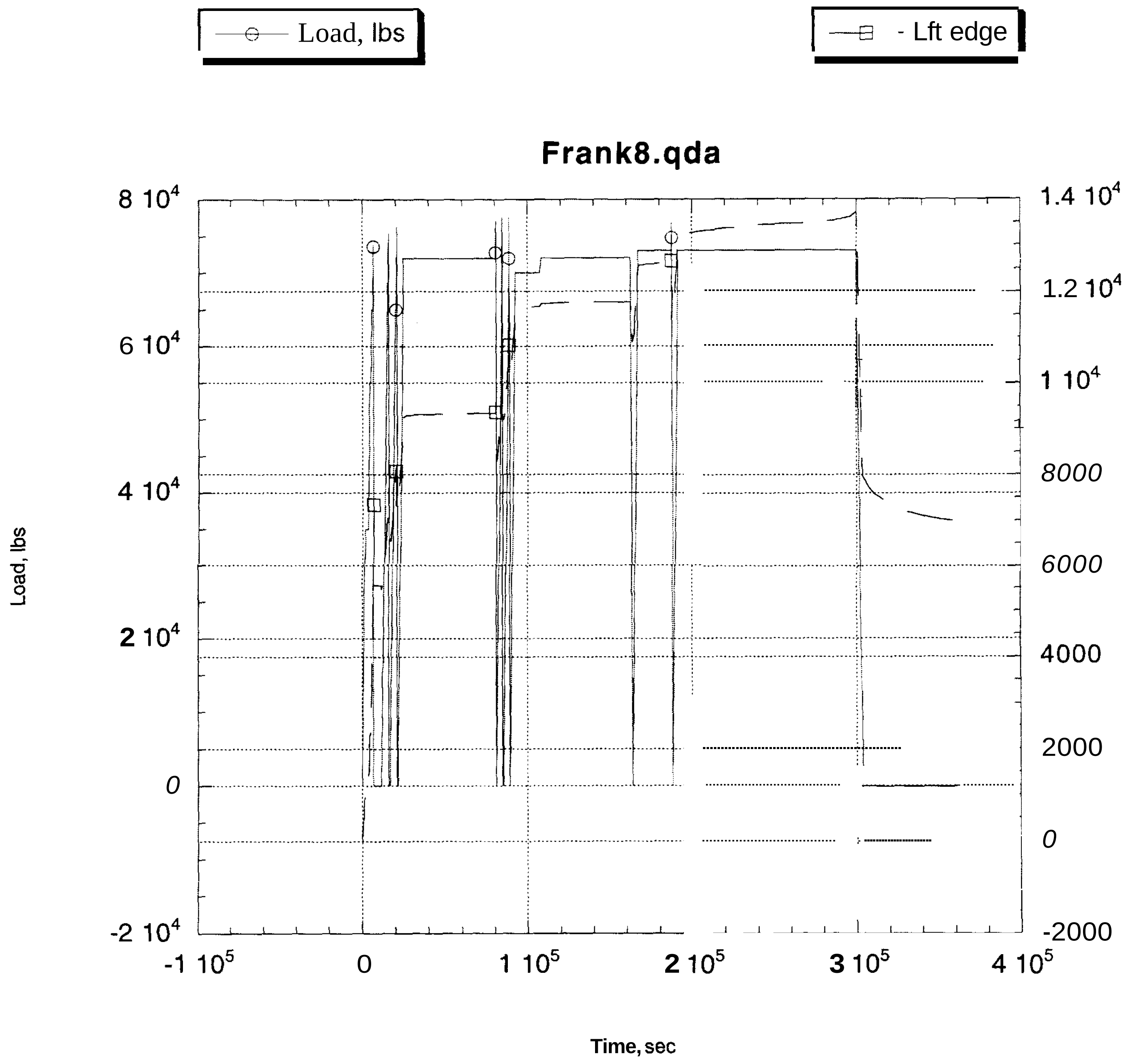
1. This photo shows the strain gage location on the front side of the specimen.
2. Pictures the photoelastic coating on the back surface of

the specimen.

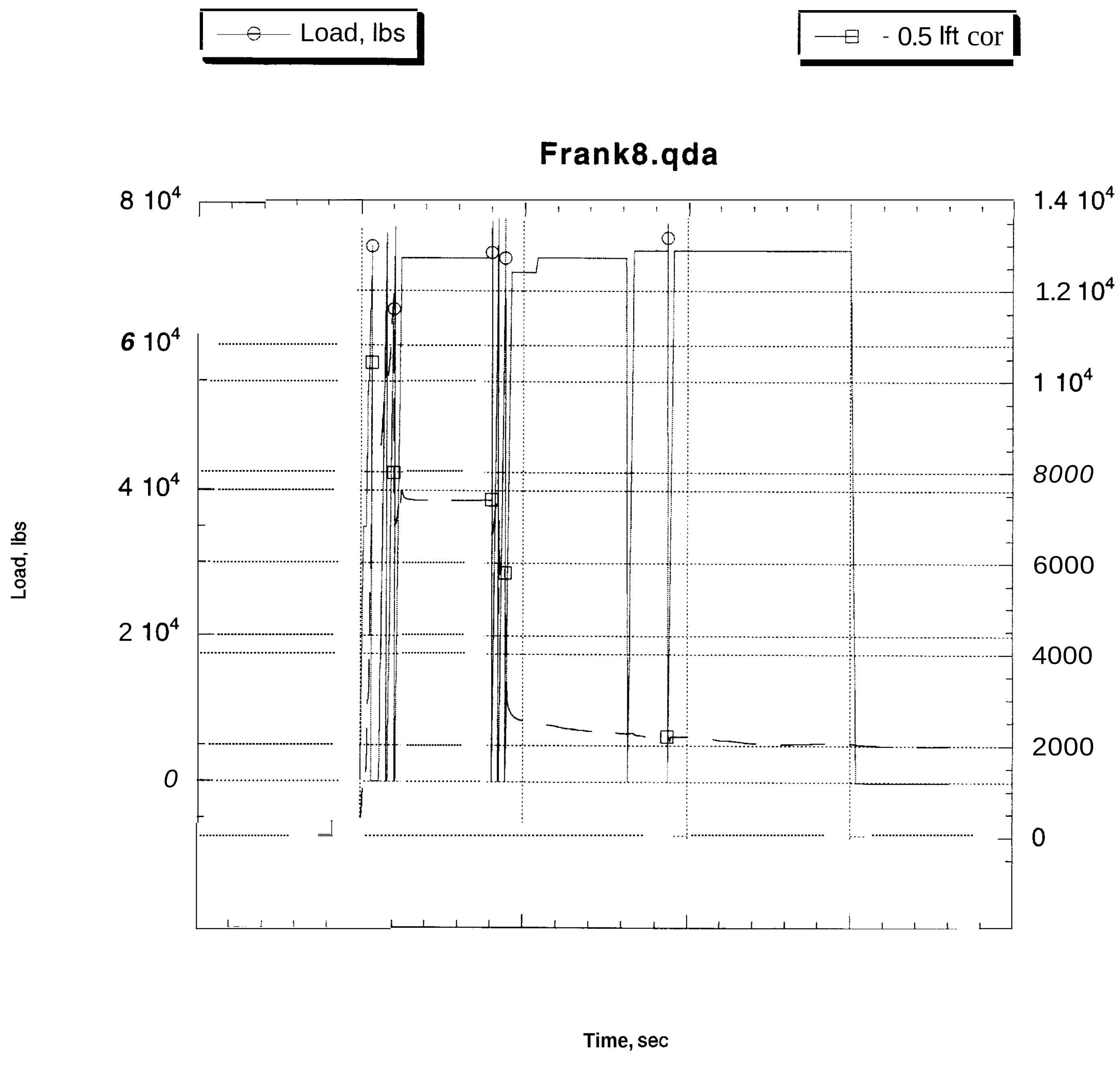
3. Pictures the photoelastic fringe pattern at a load of 35025 lbs. There are some air bubbles in the coating bond and also an anomaly on one side of the flaw that can be seen in the photo. The general symmetry of the pattern indicates that immediately away from the anomalies the pattern is not. altered. Probably most significant of the pattern is the hydrostatic strain state on the back surface in the flaw region. The hydrostatic strain is indicated by the zero fringe order (black fringe) at the flaw. The failure mechanism for hydrostatic strain states is thought to be by cleavage. The fringe pattern becomes uniform for **a** short distance between the flaw and the pinned ends which indicates that the boundary effects from the pins do not alter the strain pattern at the flaw.
4. Pictures the photoelastic pattern at a load of ***55050*** lbs. At this load the back surface strain gage is still in compression. More photoelastic patterns were taken at higher loads but above this load the necking of the back surface starts and the photoelastic pattern my not give a true indication of the back surface strain difference.
5. The last photo pictures the fractured surface of the specimen. Looking carefully around the flaw boundary a darker outline of the flaw can be seen. This dark outline of the flaw was caused by the dilute acid reacting with an exposed surface and is the growth of the flaw before failure. Thus, two things that contribute to failure are flaw growth at the root of the flaw and necking on the back surface opposite the flaw.

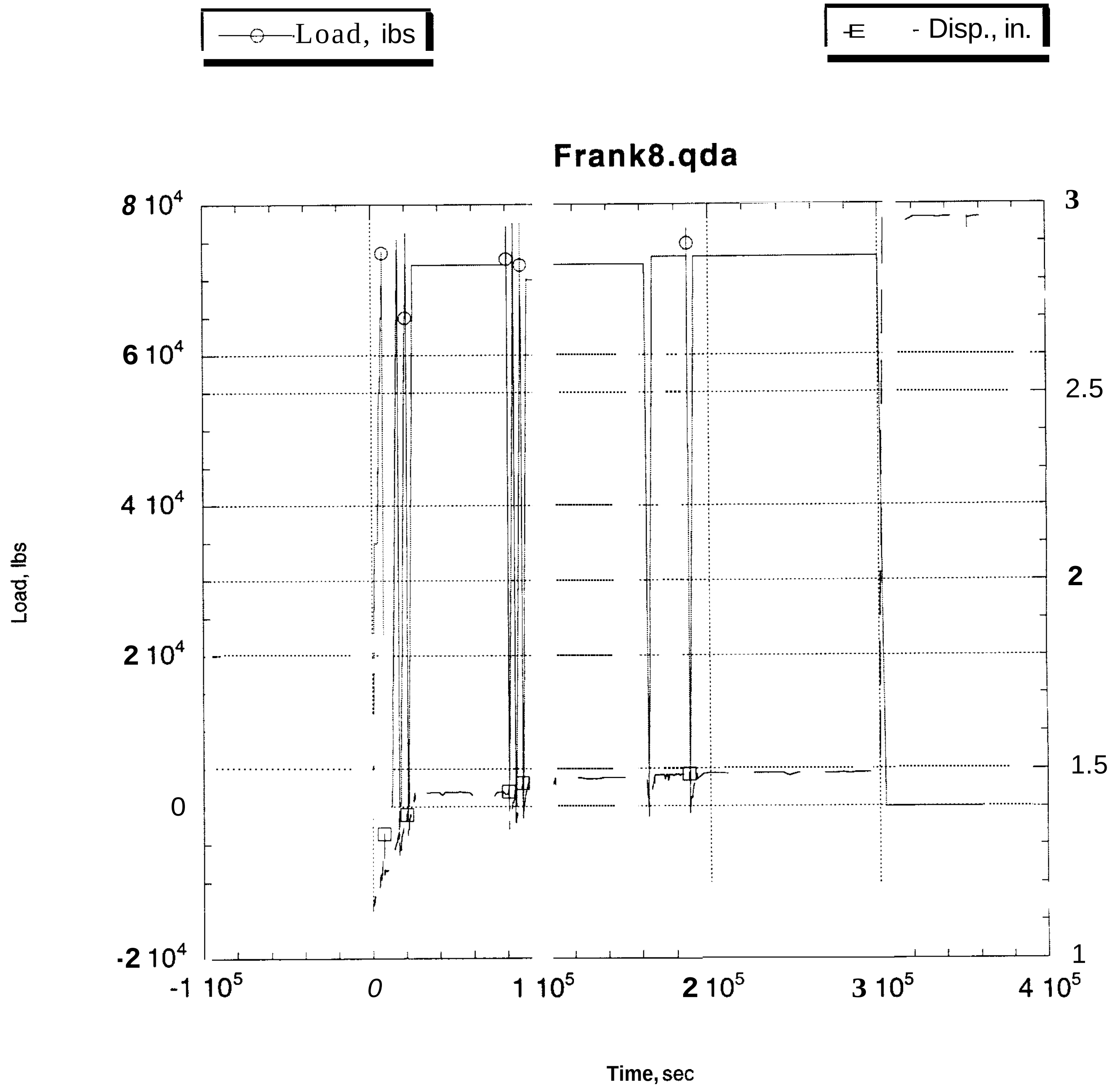


Load, lbs
Parallel Ga
Frank8.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
500
0
-500
-1000
-1500
-2000
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
Time, sec
Load, lbs

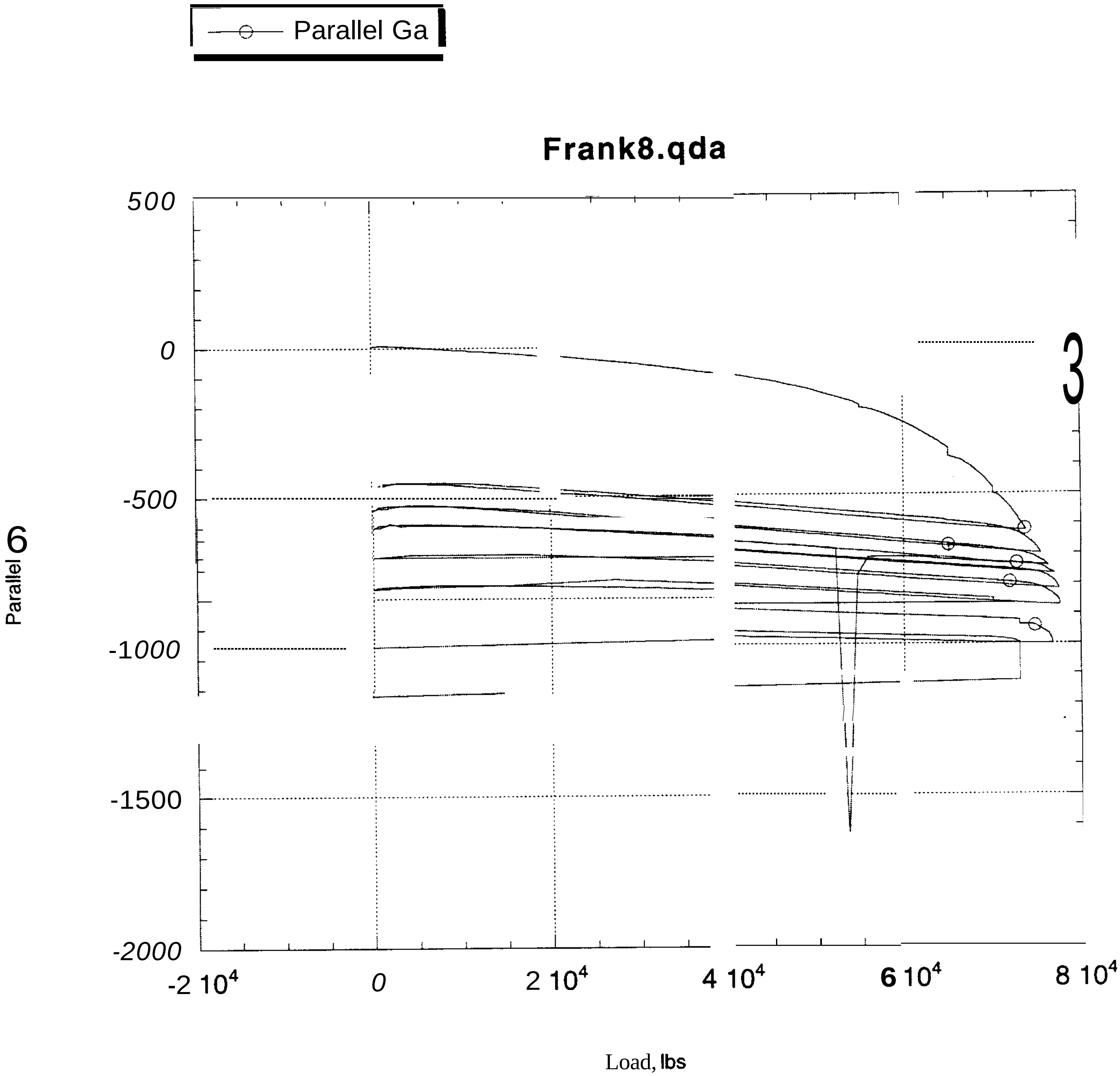


Load, lbs
- Lft edge
Frank8.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
1.4 10^4
1.2 10^4
1 10^4
8000
6000
4000
2000
0
-2000
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
Load, lbs
Time, sec

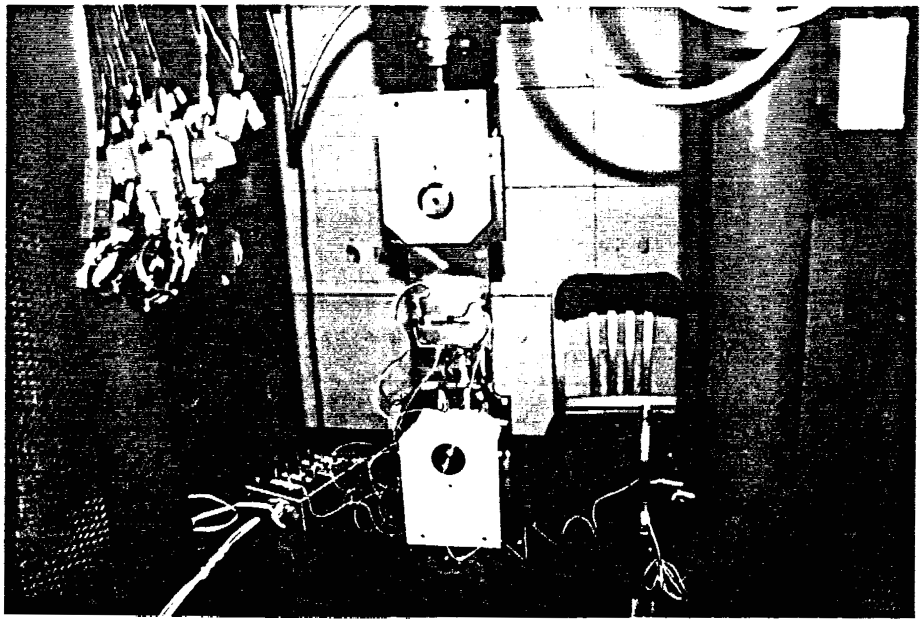

Load, lbs
- 0.5 lft cor
Frank8.qda
8 10⁴
6 10⁴
4 10⁴
2 10⁴
0
1.4 10⁴
1.2 10⁴
1 10⁴
8000
6000
4000
2000
0
Load, lbs
Time, sec

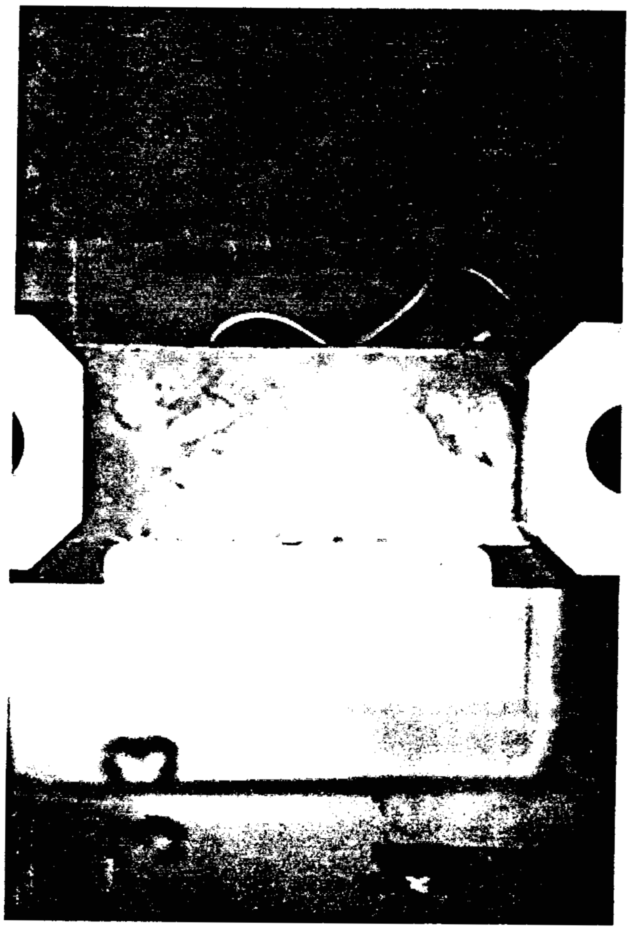


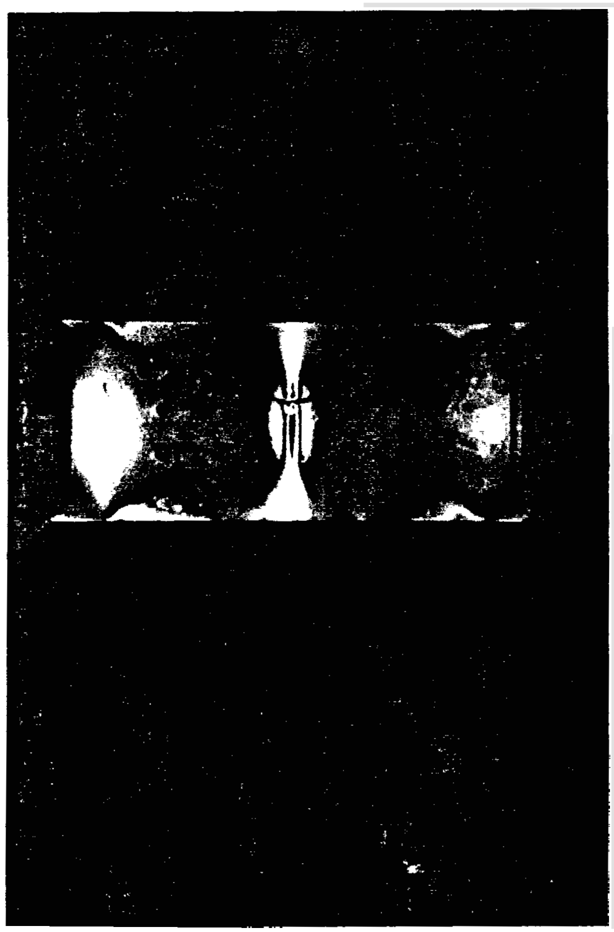
Load, ibs
Disp., in.
Frank8.qda
8 10^4
6 10^4
4 10^4
2 10^4
0
-2 10^4
3
2.5
2
1.5
1
-1 10^5
0
1 10^5
2 10^5
3 10^5
4 10^5
Load, lbs
Time, sec

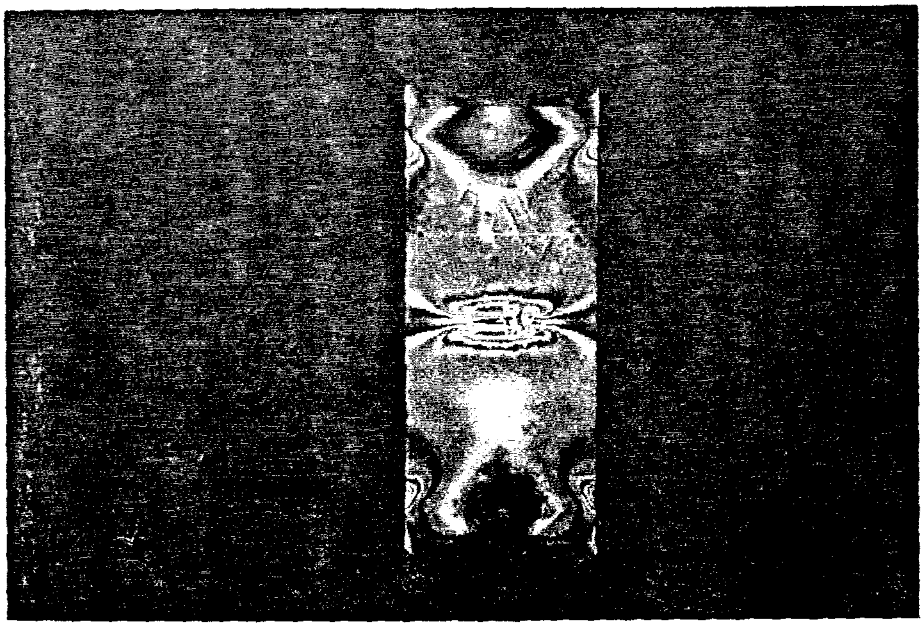


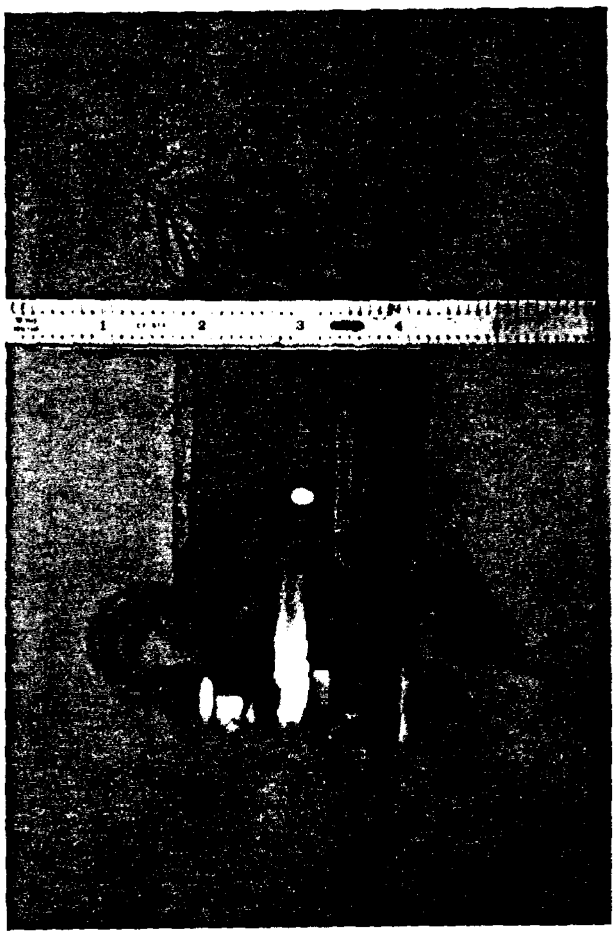
Parallel Ga
Frank8.qda
500
0
-500
-1000
-1500
-2000
-2 10^4
0
2 10^4
4 10^4
6 10^4
8 10^4
Load, lbs
Parallel 6
3









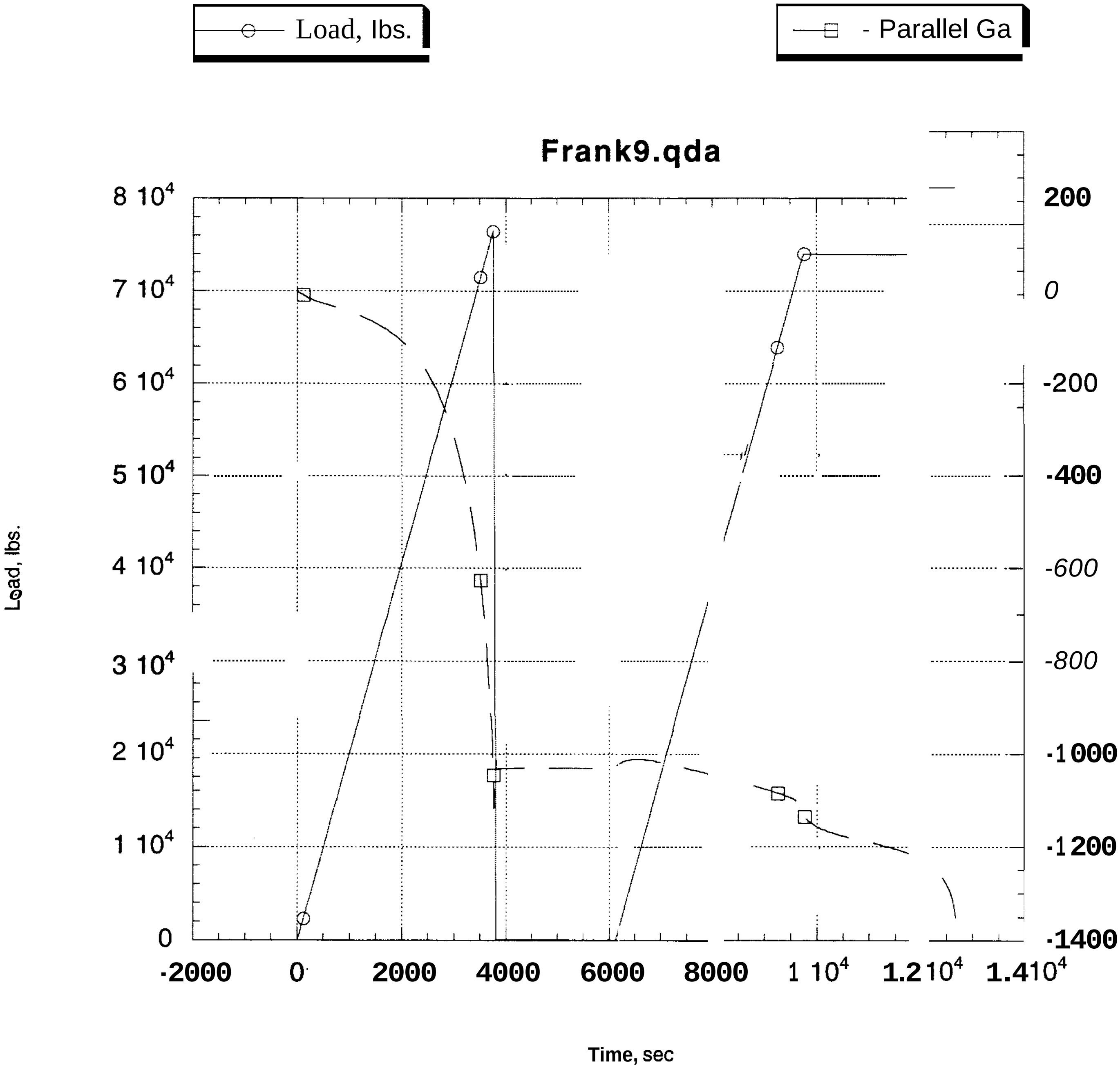

1
2
3
4

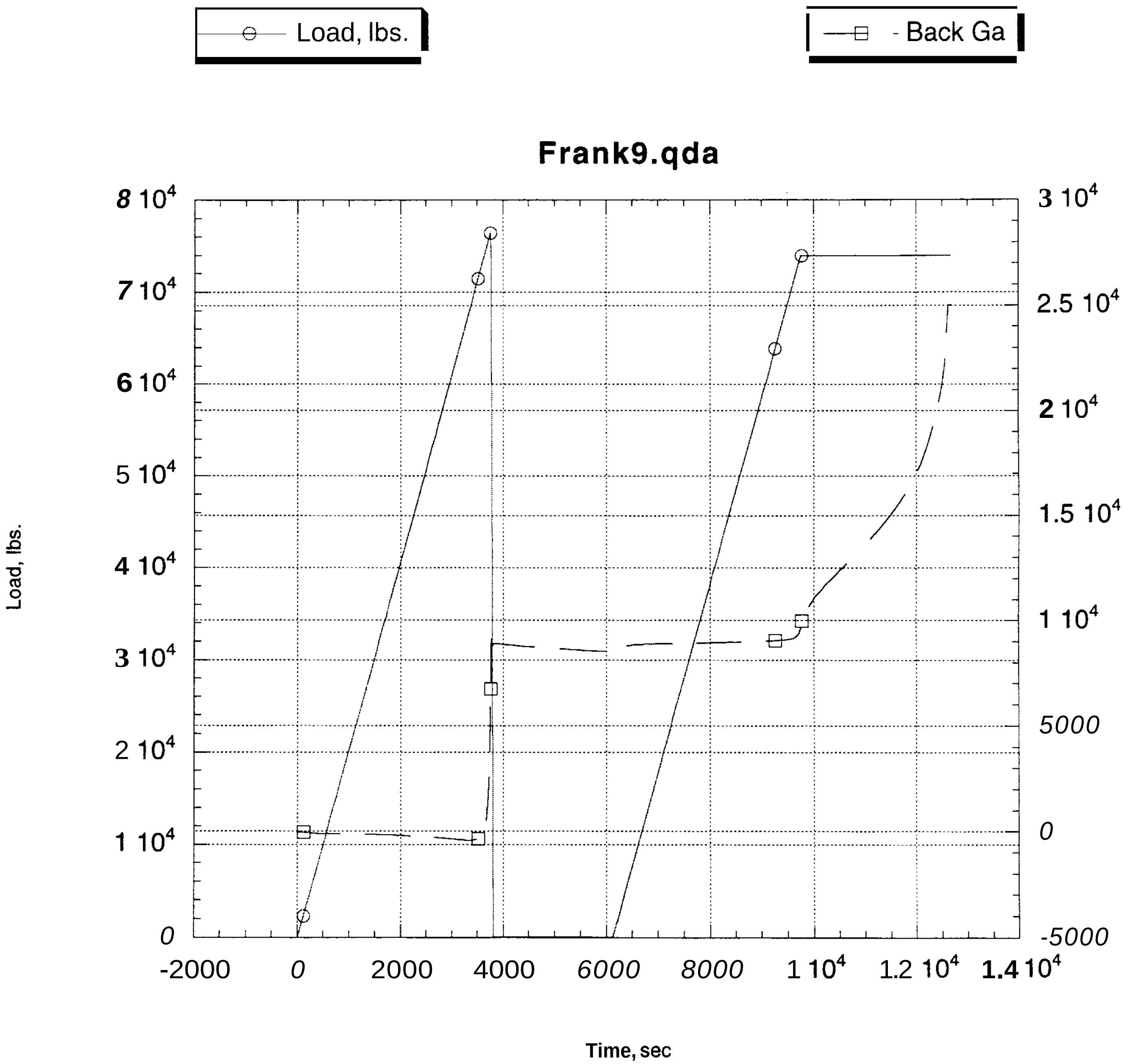
--Specimen #**9, X-42** base material. Tested **Jan.14,1997.**
The purpose of this test was to see if a pressure reversal could be achieved with only one cycle to maximum load. The gages used included a parallel gage, an edge gage, and a back gage.

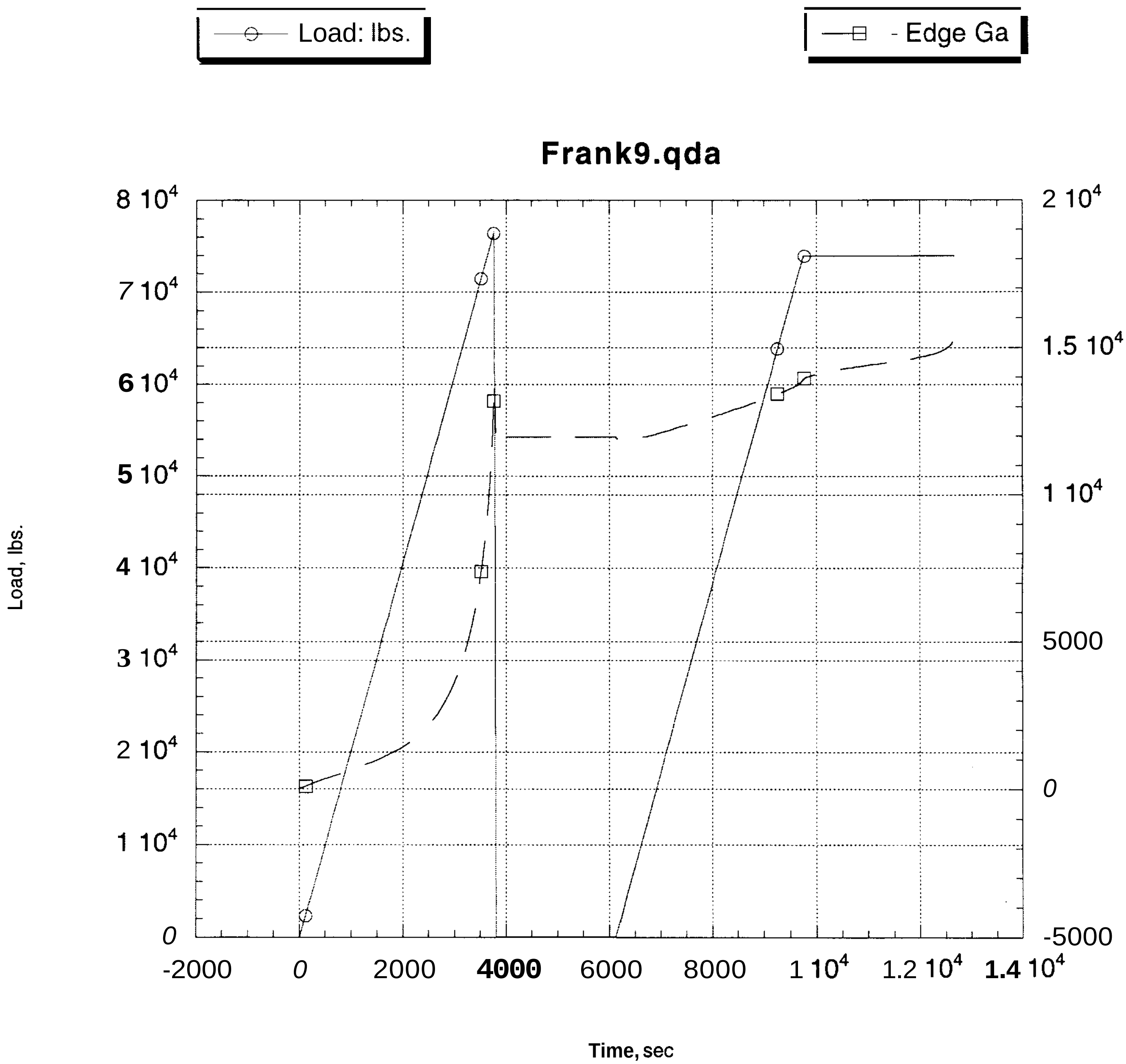
Time,sec	Load,lbs	epara	eback	eedge	displ
0	0	0	**0**	**0**	**1.125**
(Start of test.)					
0.93	**67772**	**-481**	**-432**	**5572**	**1.285**
(Minimum strain on back gage.)					
1.01	**73691**	**-758**	**-1**	**9056**	**1.345**
(The back gage strain approaches zero.)					
1.05	**76597**	**-1108**	**8539**	**13757**	**1.441**
(Maximum load on first load cycle.)					
1.06	0	**-1034**	**8836**	**11965**	**1.337**
(End of first load cycle. Note the residual strain in the parallel gage. **Also**, note the back gage strain is higher than when at the maximum load. This is a temporary state since in the next sequence the back gage strain is approximately the same as the value when loaded.)					
1.70	0	**-1031**	**8522**	**11965**	**1.333**
(Start of the second load cycle, also fail cycle.)					
2.71	**73961**	**-1129**	**9722**	**13924**	**1.440**
(First load pause on second load cycle which is the failure load.)					
3.52	**73960**	**-1352**	**25024**	**15348**	**1.450**
(Last data entry before failure. This calculates to be a **3.4%** pressure reversal and demonstrates pressure reversal after only one load cycle.)					

The attached graphs include: load and parallel gage strain versus time, load and back gage strain versus time, load and strain at point D versus time, load and cross head displacement versus time, parallel gage strain versus load, and back gage strain versus load..

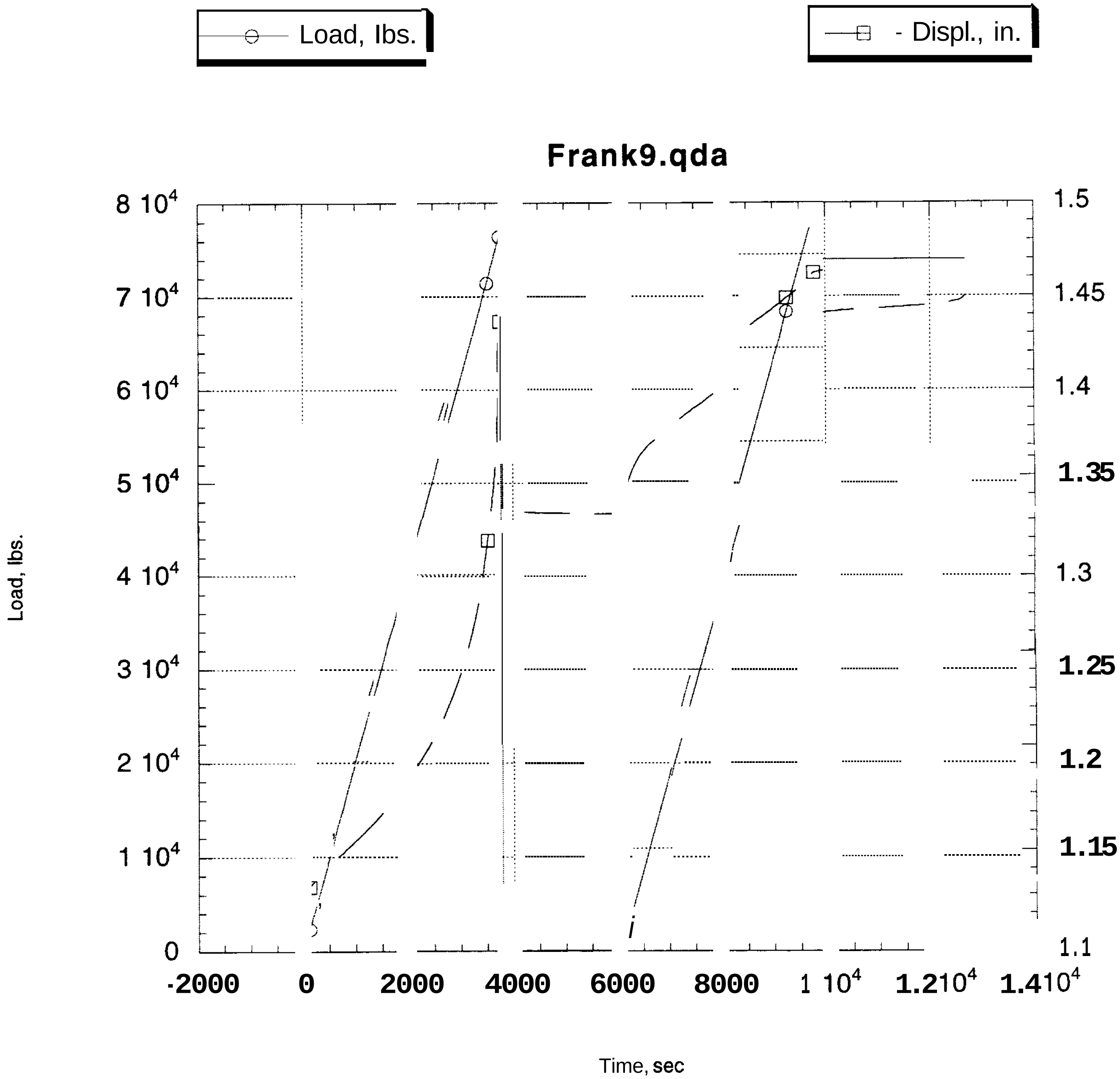
--Specimen **#10, X-42** base material. Tested **Jan.14,1997.**
The loading machine was set up improperly and failed the specimen without any data.


Load, lbs.
- Parallel Ga
Frank9.qda
8 10^4
7 10^4
6 10^4
5 10^4
4 10^4
3 10^4
2 10^4
1 10^4
0
200
0
-200
-400
-600
-800
-1000
-1200
-1400
-2000
0
2000
4000
6000
8000
1 10^4
1.2 10^4
1.4 10^4
Load, lbs.
Time, sec

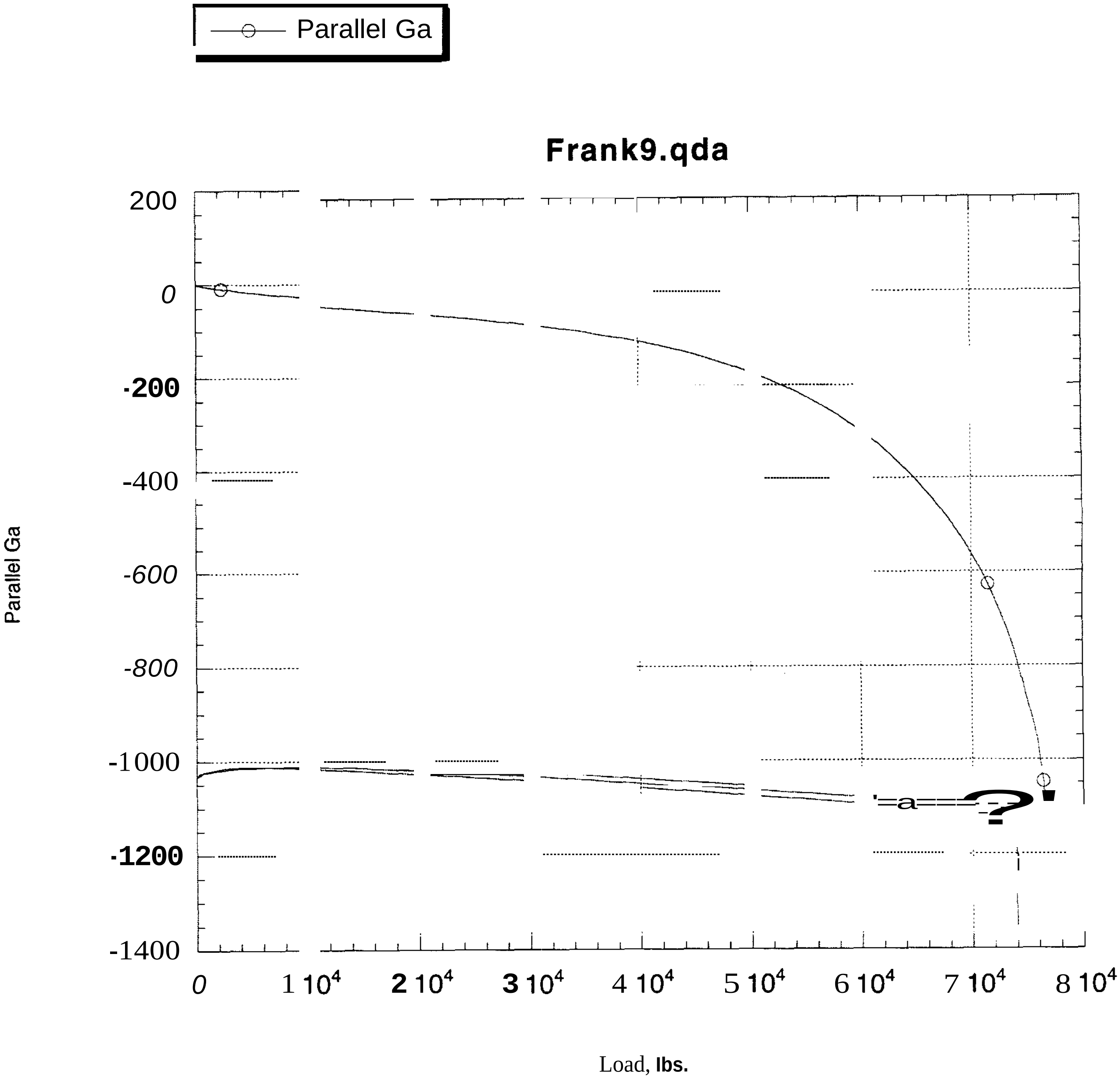

Load, lbs.
- Back Ga
Frank9.qda
8 10^4
7 10^4
6 10^4
5 10^4
4 10^4
3 10^4
2 10^4
1 10^4
0
3 10^4
2.5 10^4
2 10^4
1.5 10^4
1 10^4
5000
0
-5000
-2000
0
2000
4000
6000
8000
1 10^4
1.2 10^4
1.4 10^4
Load, lbs.
Time, sec

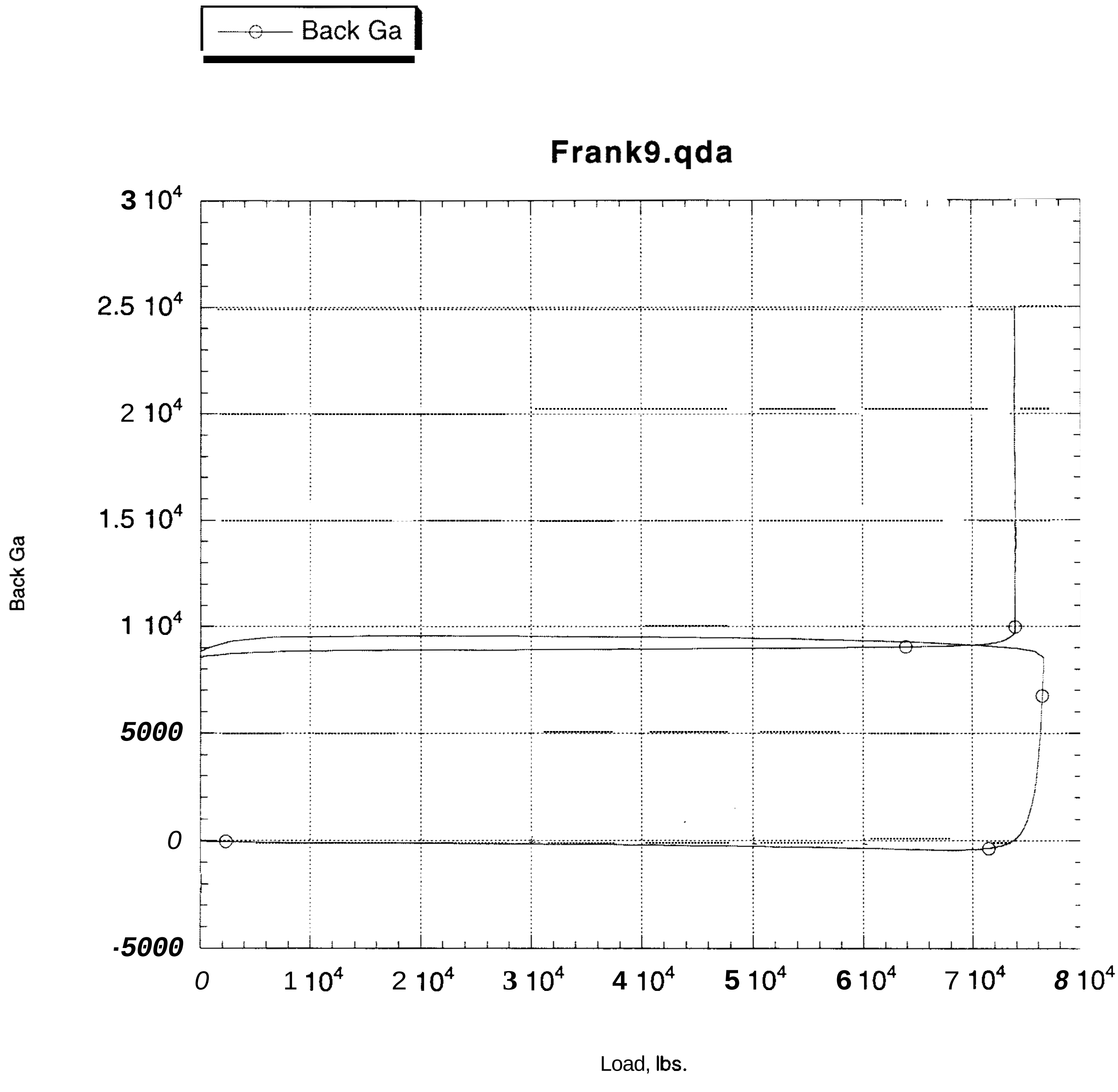


Load: lbs.
- Edge Ga
Frank9.qda
8 10^4
7 10^4
6 10^4
5 10^4
4 10^4
3 10^4
2 10^4
1 10^4
0
2 10^4
1.5 10^4
1 10^4
5000
0
-5000
-2000
0
2000
4000
6000
8000
1 10^4
1.2 10^4
1.4 10^4
Load, lbs.
Time, sec



Load, lbs.
- Displ., in.
Frank9.qda
8 10^4
7 10^4
6 10^4
5 10^4
4 10^4
3 10^4
2 10^4
1 10^4
0
Load, lbs.
1.5
1.45
1.4
1.35
1.3
1.25
1.2
1.15
1.1
-2000
0
2000
4000
6000
8000
1 10^4
1.2 10^4
1.4 10^4
Time, sec


Parallel Ga
Frank9.qda
200
0
-200
-400
-600
-800
-1000
-1200
-1400
0
1 10^4
2 10^4
3 10^4
4 10^4
5 10^4
6 10^4
7 10^4
8 10^4
Parallel Ga
Load, lbs.



Back Ga
Frank9.qda
3 10^4
2.5 10^4
2 10^4
1.5 10^4
1 10^4
5000
0
-5000
Back Ga
0
1 10^4
2 10^4
3 10^4
4 10^4
5 10^4
6 10^4
7 10^4
8 10^4
Load, lbs.

OBSERVATIONS FROM THE TESTS:

A table is given on the next page that includes selected data and calculations for some of the X-42 and X-52 tested specimens.

- A very important variable in the realization of pressure reversal is the time variable. If the load level reaches a certain value the material in the flaw region will start to creep with time. If at some point before failure the load is relaxed there is some recovery of the induced strain but most of it remains as permanent (residual) strain. If the load level is again restored, more strain occurs and more residual strain will occur.

- The strain on the back surface of a specimen and opposite the flaw (point "E" of Fig.1) is negative with increasing load. At some load (approximately **65** kips for the X-42 base material specimens) the strain at point "E" reaches a minimum and starts increasing with increasing load. Equilibrium considerations show that the negative strain with an increasing load is due to an induced moment. It is suspected, but not verified, that at the minimum strain point the flaw region has some stable extension and starts to neck. This will be examined further.

- Failure occurs by the flaw extending through the wall thickness first and then by extending in length.

- The mode of failure is by cleavage as the flaw extends through the wall thickness and then by shear as the flaw extends in length.

- The state of strain (stress) on the back surface opposite the flaw (point "E") is hydrostatic. Material that is under a hydrostatic strain (stress) can sustain higher strain values before failure and fail by cleavage.

- Before final failure the flaw grows and necking of the back surface in the immediate region of the flaw occurs. These two factors greatly reduce the effective cross sectional area and increase the stress.

- There is some evidence that early strain cycles strengthen the material in the flaw region but with several strain cycles the ultimate strength of the material is reduced. This will need further investigation for verification.

No comment about pressure [illegible]

Selected Data from Tensile Tests

Specimen Number	Specimen Width (in.)	Thickness (in.)	Notch Depth (in.)	Notch Length (in.)	Gross Area (sq in.)	Net Area (sq in.)	Failure Load (lb)	Gross Failure Stress (psi)	Net Failure Stress (psi)	Peak Load (lb)	Gross Peak Stress (psi)	Net Peak Stress (psi)
K42 BASE METAL (UTS=76300 psi (ORNL), 81630 psi (Mill))												
1	4.013	0.381	0.191	2	1.529	1.163	73025	47761	62811	76925	50312	66166
2	4.011	0.382	0.189	2	1.532	1.170	77475	50564	66244	77475	50564	66244
3	4.016	0.383	0.200	2	1.538	1.155	73650	47883	63750	73650	47883	63750
4	4.014	0.384	0.193	2	1.541	1.171	78225	50750	66781	78225	50750	66781
5	4.013	0.381	0.199	2	1.529	1.148	73550	48105	64071	77525	50705	67533
6	4.013	0.382	0.195	2	1.533	1.159						
7	4.012	0.381	0.194	2	1.529	1.157	76300	49916	65962	76300	49916	65962
8	4.008	0.38	0.194	2	1.523	1.151	73075	47980	63478	77700	51016	67495
9	4.011	0.378	0.194	2	1.516	1.144	73960	48781	64633	76597	50520	66937
10	4.008	0.379	0.193	2	1.519	1.149						
X52 BASE METAL (UTS=72250 psi (ORNL), 74500 psi (Mill))												
31	4.013	0.39	0.197	2	1.565	1.188	91009	58150	76625	91009	58150	76625
32	4.011	0.389	0.194	2	1.560	1.188	91256	58487	76787	91520	58656	77009
33	4.000	0.388	0.200	2	1.552	1.169	88056	56737	75315	88056	56737	75315
34	4.009	0.389	0.197	2	1.560	1.182	87063	55827	73648	90650	58128	76682

Selected Data from Tensile Tests

Specimen Number	Net Failure Stress Ratio* (ORNL)	Net Peak Stress Ratio* (ORNL)	Net Failure Stress Ratio** (Mill)	Net Peak Stress Ratio** (Mill)	Pressure Reversal (%)	Gross Failure Stress/ Yield (ORNL)	Gross Peak Stress/ Yield (ORNL)	Cycles	Gross Failure Stress/ SMYS	Gross Peak Stress/ SMYS
X42 BASE METAL (UTS=76300 psi (ORNL), 81630 psi (Mill))										
1	0.82	0.87	0.77	0.81	5.1	0.89	0.94	8	1.14	1.20
2	0.87	0.87	0.81	0.81		0.95	0.95	1	1.20	1.20
3	0.84	0.84	0.78	0.78		0.90	0.90	1	1.14	1.14
4	0.88	0.88	0.82	0.82		0.95	0.95	1	1.21	1.21
5	0.84	0.89	0.78	0.83	5.1	0.90	0.95	8	1.15	1.21
6										
7	0.86	0.86	0.81	0.81		0.94	0.94	1	1.19	1.19
8	0.83	0.88	0.78	0.83	6.0	0.90	0.96	9	1.14	1.21
9	0.85	0.88	0.79	0.82	3.4	0.91	0.95	2	1.16	1.20
10										
X52 BASE METAL (UTS=72250(ORNL), 74500(Mill))										
31	1.06	1.06	1.03	1.03		0.93	0.93	1	1.12	1.12
32	1.06	1.07	1.03	1.03	0.3	0.93	0.94	4	1.12	1.13
33	1.04	1.04	1.01	1.01		0.90	0.90	1	1.09	1.09
34	1.02	1.06	0.99	1.03	4.0	0.89	0.93	2	1.07	1.12
	* Net failure stress divided by ultimate tensile strength measured at ORNL.									
	** Net failure stress divided by ultimate tensile strength measured at mill.									