CHAPTER V

CONCLUSION AND SUGGESTION

V.1 Conclusion

Based on the result of research and discussion that have been explained in the previous chapter, several conclusions can be concluded as follows:

1. Water addition to clay causes the increment of clay unit weight. Addition of water will increase the unit weight.

2. Clay reaches the optimum moisture content when added with 901.54 ml of water. With MDD 1.18 gram/cm^3 and OMC 32.24%.

3. The change of friction angle value (Φ) caused by the exchange of positive ion between fly ash and clay.

4. Friction angle value (Φ) reach the optimum value on 7th day of curing time.

5. The increment of clay cohesive value caused by hydration reaction.

6. Cohesive value (c) increment determined by fly ash addition and curing time period.

7. Fly ash addition increases the shear strength of clay.

8. Clay which is stabilized with fly ash as much as 30% reaches the maximum shear strength, with 2 kg/cm^2 pressure given.

V.2 Suggestion

Based on the result of research that has been done, several suggestions can be made for the next researcher, as follows:

1. The triaxial test which has been done is Unconsolidated-Undrained (UU test), means it does not represent the real condition on the field. For the next research, it is suggested to be more cautious when performing triaxial test.

2. In this research the curing time period only 14 days, for the next research, it is suggested to extend the curing time period until 56 days. Please consider that hydration needs a long period to take place.

REFERENCES

1. Abadi, Taufan Candra (2007): "Perbandingan Hasil Stabilisasi dengan Fly Ash dan Semen pada Tanah Ekspansif Cikampek"

2. Atkinson, J. H. (1993): "The Mechanics of Cemented Carbonate Sand" Geotechnique, London, Vol. 43, No. 1, pp. 53 – 67.

3. Bowless, J. E. (1984): "Physical and Geotechnical Properties of Soil" McGraw-Hill, Inc.

4. Chang, T. and Woods, R.D. (1992): "Effects of Particle Contact Bond on Shear Modulus" Journal of Geotechnical Engineering, ASCE, Vol. 118, No. 8, pp. 1216 – 1233.

5. Clough (1981): "Cemented Sand under Static Loading" Journal of Geotechnical Engineering, ASCE, Vol. 115, No. 8, pp. 1102 – 1117.

6. Gens, A. (1993): "Conceptual Bases for Constitutive Models for Bounded Soils and Weak Rock" Proc. Of International Symposium on geotechnical Engineering, Vol. 1, Balkema, Rotterdam, The Netherlands, pp. 485 – 494.

7. Hapsoro, STU. (1996): "Stabilisasi Tanah Lempung dengan Abu Terbang dan GEOSTA" Media Teknik edisi Desember, 1996.

8. Hatmoko, John. T. and Lulie, Y. (2004): "Perilaku Tanah Pasir Tersementasi di dalam Alat Uji Triaksial Konvensional" Laporan Penelitian Universitas Atma Jaya Yogyakarta.

9. Hatmoko, John. T. and Lulie, Y. (2006): "Model Konstitutif Tanah Lempung Ekspansif yang Distabilisasi dengan Abu Ampas Tebu" Laporan Penelitian Universitas Atma Jaya Yogyakarta.

10. Leroueil, S. and Vaughan, P.R. (1990): "The General and Congruent Effects of Structure in Natural Soil and Weak Rocks" Geotechnique, London, Vol. 40, No. 3, pp. 467 – 488.

11. Muhardi, Reni Suryanita, Alsaidi (2007): "Perbaikan Karakteristik Batu Bata Lempung dengan Penambahan Abu Terbang"

12. Rad, N.S. and Clough, G.W. (1982): "The Influence of Cementation on The Static Dynamic Behavior of Sand" Geotechnical Testing Journal, pp. 117 – 125.

13. Soelarno (1990): Data Penelitian Soil-Cement dengan Teknik Baru, Universitas Parahyangan, Bandung.

14. Vatsala, Nova and Srinivasa Murthy (2001): "Elastoplastic Model for Cemented Soils" Journal of Geotechnical and Geo-environmental Engineering, Vol. 127, No. 8, August 2001, pp. 679 – 687.

APPENDIX

D = 3.74

H = 7.56

A = 10.9858

V = 83.0529

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	10.9858	0.0000	0.0000	1.0000
20	15	1	2.6455	11.2843	0.1256	0.0628	1.0628
40	16	1	5.2910	11.5995	0.1304	0.0652	1.0652
60	17	1	7.9365	11.9329	0.1346	0.0673	1.0673
80	18	1	10.5820	12.2859	0.1385	0.0692	1.0692
100	24	1	13.2275	12.6605	0.1791	0.0896	1.0896
120	32	1	15.8730	13.0586	0.2316	0.1158	1.1158
140	35	1	18.5185	13.4826	0.2453	0.1227	1.1227
160	40	1	21.1640	13.9350	0.2713	0.1356	1.1356
180	46	1	23.8095	14.4189	0.3015	0.1507	1.1507
200	47	1	26.4550	14.9375	0.2973	0.1487	1.1487
220	50	1	29.1005	15.4949	0.3049	0.1525	1.1525
240	53	1	31.7460	16.0955	0.3112	0.1556	1.1556
260	58	1	34.3915	16.7445	0.3273	0.1637	1.1637
280	61	1	37.0370	17.4480	0.3304	0.1652	1.1652
300	66	1	39.6825	18.2133	0.3424	0.1712	1.1712
320	70	1	42.3280	19.0488	0.3473	**0.1736**	**1.1736**
340	72	1	44.9735	19.9646	0.3408	0.1704	1.1704
360	74	1	47.6190	20.9729	0.3334	0.1667	1.1667
380	75	1	50.2646	22.0885	0.3209	0.1604	1.1604
400	76	1	52.9101	23.3294	0.3079	0.1539	1.1539
420	78	1	55.5556	24.7181	0.2982	0.1491	1.1491
440	79	1	58.2011	26.2825	0.2840	0.1420	1.1420
460	79	1	60.8466	28.0583	0.2661	0.1330	1.1330
480	80	1	63.4921	30.0915	0.2512	0.1256	1.1256
500	81	1	66.1376	32.4424	0.2359	0.1180	1.1180
520	82	1	68.7831	35.1918	0.2202	0.1101	1.1101
540	82	1	71.4286	38.4503	0.2015	0.1008	1.1008
560	83	1	74.0741	42.3738	0.1851	0.0926	1.0926
580	84	1	76.7196	47.1890	0.1682	0.0841	1.0841
600	85	1	79.3651	53.2389	0.1509	0.0754	1.0754
620	85	1	82.0106	61.0681	0.1315	0.0658	1.0658
640	87	1	84.6561	71.5971	0.1148	0.0574	1.0574
660	88	1	87.3016	86.5132	0.0961	0.0481	1.0481
680	89	1	89.9471	109.2798	0.0770	0.0385	1.0385
700	89	1	92.5926	148.3083	0.0567	0.0284	1.0284
720	89	1	95.2381	230.7018	0.0365	0.0182	1.0182
740	89	1	97.8836	519.0791	0.0162	0.0081	1.0081

D = 3.74
H = 7.56
A = 10.9858
V = 83.0529

Day = 0
FA = 0%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	10.9858	0.0000	0.0000	2.0000
20	5	2	2.6455	11.2843	0.0419	0.0209	2.0209
40	6	2	5.2910	11.5995	0.0489	0.0244	2.0244
60	7	2	7.9365	11.9329	0.0554	0.0277	2.0277
80	8	2	10.5820	12.2859	0.0615	0.0308	2.0308
100	11	2	13.2275	12.6605	0.0821	0.0411	2.0411
120	19	2	15.8730	13.0586	0.1375	0.0687	2.0687
140	30	2	18.5185	13.4826	0.2103	0.1051	2.1051
160	44	2	21.1640	13.9350	0.2984	0.1492	2.1492
180	53	2	23.8095	14.4189	0.3474	0.1737	2.1737
200	60	2	26.4550	14.9375	0.3796	0.1898	2.1898
220	64	2	29.1005	15.4949	0.3903	**0.1952**	**2.1952**
240	66	2	31.7460	16.0955	0.3875	0.1938	2.1938
260	67	2	34.3915	16.7445	0.3781	0.1891	2.1891
280	68	2	37.0370	17.4480	0.3683	0.1841	2.1841
300	70	2	39.6825	18.2133	0.3632	0.1816	2.1816
320	71	2	42.3280	19.0488	0.3522	0.1761	2.1761
340	71	2	44.9735	19.9646	0.3361	0.1680	2.1680
360	70	2	47.6190	20.9729	0.3154	0.1577	2.1577
380	67	2	50.2646	22.0885	0.2866	0.1433	2.1433
400	67	2	52.9101	23.3294	0.2714	0.1357	2.1357
420	67	2	55.5556	24.7181	0.2561	0.1281	2.1281
440	67	2	58.2011	26.2825	0.2409	0.1205	2.1205

D = 3.61   Day = 7

H = 7.23   FA = 0%

A = 10.2354

V = 74.0019

ΔH	Proving Ring	σ_3	ε	A'	$\sigma_1-\sigma_3$	$(\sigma_1-\sigma_3)/2$	$(\sigma_1+\sigma_3)/2$
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	10.2354	0.0000	0.0000	1.0000
20	130	1	2.7663	10.5266	1.1670	0.5835	1.5835
40	317	1	5.5325	10.8348	2.8087	1.4044	2.4044
60	380	1	8.2988	11.1617	3.2683	1.6342	2.6342
80	463	1	11.0650	11.5089	3.8688	1.9344	2.9344
100	491	1	13.8313	11.8783	3.9751	1.9876	2.9876
120	535	1	16.5975	12.2723	4.1923	2.0962	3.0962
140	584	1	19.3638	12.6933	4.4245	2.2122	3.2122
160	634	1	22.1300	13.1442	4.6667	2.3333	3.3333
180	697	1	24.8963	13.6284	4.9481	2.4741	3.4741
200	735	1	27.6625	14.1495	5.0257	2.5129	3.5129
220	788	1	30.4288	14.7121	5.1821	2.5910	3.5910
240	824	1	33.1950	15.3213	5.2114	2.6057	3.6057
260	922	1	35.9613	15.9831	5.5898	2.7949	3.7949
280	987	1	38.7275	16.7047	5.7253	2.8627	3.8627
300	1042	1	41.4938	17.4945	5.7775	**2.8887**	**3.8887**
320	1042	1	44.2600	18.3628	5.5043	2.7521	3.7521
340	1042	1	47.0263	19.3217	5.2311	2.6156	3.6156

D = 3.58

H = 7.24

A = 10.0659

V = 72.8777

Day = 7

FA = 0%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	10.0659	0.0000	0.0000	2.0000
20	111	2	2.7624	10.3519	1.0133	0.5066	2.5066
40	250	2	5.5249	10.6545	2.2526	1.1263	3.1263
60	345	2	8.2873	10.9755	3.0176	1.5088	3.5088
80	473	2	11.0497	11.3163	4.0196	2.0098	4.0098
100	527	2	13.8122	11.6790	4.3394	2.1697	4.1697
120	685	2	16.5746	12.0657	5.4927	2.7464	4.7464
140	715	2	19.3370	12.4790	5.5434	2.7717	4.7717
160	895	2	22.0994	12.9215	6.7117	3.3559	5.3559
180	1033	2	24.8619	13.3965	7.4796	3.7398	5.7398
200	1124	2	27.6243	13.9078	7.8393	3.9197	5.9197
220	1203	2	30.3867	14.4597	8.0819	4.0410	6.0410
240	1356	2	33.1492	15.0573	8.7483	4.3742	6.3742
260	1421	2	35.9116	15.7063	8.7929	**4.3964**	**6.3964**
280	1421	2	38.6740	16.4138	8.4139	4.2069	6.2069
300	1421	2	41.4365	17.1880	8.0349	4.0174	6.0174

D = 3.62
H = 7.38
A = 10.2922
V = 75.9562

Day = 14
FA = 0%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	1	0.0000	10.2922	0.0000	0.0000	1.0000
20	185	1	2.7100	10.5789	1.6526	0.8263	1.8263
40	360	1	5.4201	10.8820	3.1759	1.5879	2.5879
60	475	1	8.1301	11.2030	4.0774	2.0387	3.0387
80	580	1	10.8401	11.5435	4.8319	2.4159	3.4159
100	645	1	13.5501	11.9054	5.2416	2.6208	3.6208
120	718	1	16.2602	12.2907	5.6520	2.8260	3.8260
140	895	1	18.9702	12.7017	6.8278	3.4139	4.4139
160	935	1	21.6802	13.1413	6.8944	3.4472	4.4472
180	1039	1	24.3902	13.6123	7.4038	3.7019	4.7019
200	1158	1	27.1003	14.1183	7.9561	**3.9780**	**4.9780**
220	1158	1	29.8103	14.6634	7.6603	3.8301	4.8301
240	1158	1	32.5203	15.2523	7.3645	3.6823	4.6823

D = 3.60

H = 7.32

A = 10.1788

V = 74.5085

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	10.1788	0.0000	0.0000	2.0000
20	228	2	2.7322	10.4647	2.0916	1.0458	3.0458
40	490	2	5.4645	10.7672	4.3764	2.1882	4.1882
60	865	2	8.1967	11.0876	7.5596	3.7798	5.7798
80	985	2	10.9290	11.4277	8.3522	4.1761	6.1761
100	1053	2	13.6612	11.7894	8.6638	4.3319	6.3319
120	1160	2	16.3934	12.1746	9.2422	4.6211	6.6211
140	1241	2	19.1257	12.5859	9.5785	4.7892	6.7892
160	1310	2	21.8579	13.0260	9.7695	4.8847	6.8847
180	1435	2	24.5902	13.4980	10.3322	**5.1661**	**7.1661**
200	1435	2	27.3224	14.0054	9.9579	4.9789	6.9789
220	1435	2	30.0546	14.5525	9.5835	4.7918	6.7918

D = 3.74   Day = 0
H = 7.56   FA = 15%
A = 10.9858
V = 83.5531

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	1	0.0000	10.9858	0.0000	0.0000	1.0000
20	3	1	2.6455	11.2843	0.0251	0.0126	1.0126
40	6	1	5.2910	11.5995	0.0489	0.0244	1.0244
60	32	1	7.9365	11.9329	0.2534	0.1267	1.1267
80	63	1	10.5820	12.2859	0.4846	0.2423	1.2423
100	91	1	13.2275	12.6605	0.6792	0.3396	1.3396
120	119	1	15.8730	13.0586	0.8612	0.4306	1.4306
140	143	1	18.5185	13.4826	1.0023	0.5011	1.5011
160	158	1	21.1640	13.9350	1.0715	0.5357	1.5357
180	171	1	23.8095	14.4189	1.1207	0.5604	1.5604
200	182	1	26.4550	14.9375	1.1514	0.5757	1.5757
220	189	1	29.1005	15.4949	1.1527	0.5763	1.5763
240	197	1	31.7460	16.0955	1.1566	0.5783	1.5783
260	205	1	34.3915	16.7445	1.1753	**0.5877**	**1.5877**
280	210	1	37.0370	17.4480	1.1554	0.5777	1.5777
300	216	1	39.6825	18.2133	1.1385	0.5693	1.5693
320	220	1	42.3280	19.0488	1.1087	0.5544	1.5544
340	224	1	44.9735	19.9646	1.0771	0.5386	1.5386
360	228	1	47.6190	20.9729	1.0436	0.5218	1.5218
380	232	1	50.2646	22.0885	1.0083	0.5042	1.5042
400	237	1	52.9101	23.3294	0.9753	0.4876	1.4876
420	240	1	55.5556	24.7181	0.9321	0.4661	1.4661
440	243	1	58.2011	26.2825	0.8876	0.4438	1.4438
460	246	1	60.8466	28.0583	0.8417	0.4208	1.4208
480	249	1	63.4921	30.0915	0.7944	0.3972	1.3972
500	251	1	66.1376	32.4424	0.7427	0.3714	1.3714
520	253	1	68.7831	35.1918	0.6902	0.3451	1.3451
540	255	1	71.4286	38.4503	0.6367	0.3183	1.3183
560	256	1	74.0741	42.3738	0.5800	0.2900	1.2900
580	256	1	76.7196	47.1890	0.5208	0.2604	1.2604
600	257	1	79.3651	53.2389	0.4634	0.2317	1.2317
620	257	1	82.0106	61.0681	0.4040	0.2020	1.2020
640	257	1	84.6561	71.5971	0.3446	0.1723	1.1723

D = 3.74   Day = 0
H = 7.56   FA = 15%
A = 10.9858
V = 83.5531

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	10.9858	0.0000	0.0000	2.0000
20	17	2	2.6455	11.2843	0.1424	0.0712	2.0712
40	24	2	5.2910	11.5995	0.1955	0.0978	2.0978
60	35	2	7.9365	11.9329	0.2772	0.1386	2.1386
80	82	2	10.5820	12.2859	0.6307	0.3154	2.3154
100	111	2	13.2275	12.6605	0.8285	0.4143	2.4143
120	134	2	15.8730	13.0586	0.9697	0.4849	2.4849
140	173	2	18.5185	13.4826	1.2126	0.6063	2.6063
160	195	2	21.1640	13.9350	1.3224	0.6612	2.6612
180	225	2	23.8095	14.4189	1.4980	0.7490	2.7490
200	252	2	26.4550	14.9375	1.6195	0.8098	2.8098
220	273	2	29.1005	15.4949	1.6914	0.8457	2.8457
240	281	2	31.7460	16.0955	1.6760	0.8380	2.8380
260	298	2	34.3915	16.7445	1.7085	0.8543	2.8543
280	320	2	37.0370	17.4480	1.7607	0.8803	2.8803
300	342	2	39.6825	18.2133	1.8026	0.9013	2.9013
320	356	2	42.3280	19.0488	1.7941	0.8971	2.8971
340	375	2	44.9735	19.9646	1.8032	**0.9016**	**2.9016**
360	384	2	47.6190	20.9729	1.7577	0.8788	2.8788
380	396	2	50.2646	22.0885	1.7211	0.8605	2.8605
400	412	2	52.9101	23.3294	1.6983	0.8492	2.8492
420	419	2	55.5556	24.7181	1.6301	0.8151	2.8151
440	428	2	58.2011	26.2825	1.5660	0.7830	2.7830
460	439	2	60.8466	28.0583	1.5046	0.7523	2.7523
480	445	2	63.4921	30.0915	1.4221	0.7111	2.7111
500	449	2	66.1376	32.4424	1.3309	0.6655	2.6655
520	458	2	68.7831	35.1918	1.2516	0.6258	2.6258
540	458	2	71.4286	38.4503	1.1455	0.5727	2.5727
560	462	2	74.0741	42.3738	1.0485	0.5243	2.5243
580	465	2	76.7196	47.1890	0.9476	0.4738	2.4738
600	466	2	79.3651	53.2389	0.8417	0.4209	2.4209
620	467	2	82.0106	61.0681	0.7354	0.3677	2.3677
640	467	2	84.6561	71.5971	0.6273	0.3136	2.3136
660	467	2	87.3016	86.5132	0.5191	0.2596	2.2596

D = 3.52   Day = 7
H = 7.24   FA = 15%
A = 9.7314
V = 70.4553

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	9.7314	0.0000	0.0000	1.0000
20	71	1	2.7624	10.0079	0.6704	0.3352	1.3352
40	140	1	5.5249	10.3005	1.2844	0.6422	1.6422
60	265	1	8.2873	10.6107	2.3976	1.1988	2.1988
80	367	1	11.0497	10.9403	3.2204	1.6102	2.6102
100	498	1	13.8122	11.2909	4.2416	2.1208	3.1208
120	645	1	16.5746	11.6648	5.3498	2.6749	3.6749
140	807	1	19.3370	12.0643	6.4818	3.2409	4.2409
160	952	1	22.0994	12.4921	7.3846	3.6923	4.6923
180	1102	1	24.8619	12.9513	8.2535	4.1268	5.1268
200	1255	1	27.6243	13.4457	9.0672	4.5336	5.5336
220	1430	1	30.3867	13.9792	9.9418	4.9709	5.9709
240	1585	1	33.1492	14.5569	10.5821	5.2910	6.2910
260	1753	1	35.9116	15.1843	11.2241	5.6121	6.6121
280	1895	1	38.6740	15.8683	11.6196	5.8098	6.8098
300	2024	1	41.4365	16.6168	11.8538	5.9269	6.9269
320	2128	1	44.1989	17.4394	11.8750	**5.9375**	**6.9375**
340	2236	1	46.9613	18.3477	11.8618	5.9309	6.9309
360	2323	1	49.7238	19.3559	11.6815	5.8407	6.8407
380	2323	1	52.4862	20.4812	11.0397	5.5198	6.5198
400	2323	1	55.2486	21.7455	10.3978	5.1989	6.1989

D = 3.48   Day = 7
H = 7.16   FA = 15%
A = 9.5115
V = 68.1022

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	9.5115	0.0000	0.0000	2.0000
20	68	2	2.7933	9.7848	0.6567	0.3284	2.3284
40	97	2	5.5866	10.0743	0.9099	0.4549	2.4549
60	126	2	8.3799	10.3815	1.1469	0.5735	2.5735
80	185	2	11.1732	10.7079	1.6327	0.8163	2.8163
100	210	2	13.9665	11.0556	1.8235	0.9118	2.9118
120	266	2	16.7598	11.4266	2.2348	1.1174	3.1174
140	496	2	19.5531	11.8233	4.0343	2.0171	4.0171
160	765	2	22.3464	12.2486	6.0426	3.0213	5.0213
180	1095	2	25.1397	12.7057	8.3597	4.1798	6.1798
200	1420	2	27.9330	13.1981	10.4565	5.2283	7.2283
220	1677	2	30.7263	13.7303	11.8746	5.9373	7.9373
240	1925	2	33.5196	14.3072	13.0915	6.5457	8.5457
260	2136	2	36.3128	14.9347	13.9187	6.9593	8.9593
280	2455	2	39.1061	15.6198	15.3062	**7.6531**	**9.6531**
300	2455	2	41.8994	16.3708	14.6040	7.3020	9.3020
320	2455	2	44.6927	17.1976	13.9019	6.9510	8.9510

D = 3.42   Day = 14
H = 7.12   FA = 15%
A = 9.1863
V = 65.4067

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	9.1863	0.0000	0.0000	1.0000
20	108	1	2.8090	9.4518	1.0798	0.5399	1.5399
40	210	1	5.6180	9.7331	2.0713	1.0356	2.0356
60	340	1	8.4270	10.0317	3.2537	1.6268	2.6268
80	525	1	11.2360	10.3491	4.8784	2.4392	3.4392
100	738	1	14.0449	10.6873	6.6809	3.3405	4.3405
120	965	1	16.8539	11.0484	8.4635	4.2318	5.2318
140	1165	1	19.6629	11.4347	9.8826	4.9413	5.9413
160	1372	1	22.4719	11.8490	11.2482	5.6241	6.6241
180	1645	1	25.2809	12.2944	13.0084	6.5042	7.5042
200	1875	1	28.0899	12.7747	14.2812	7.1406	8.1406
220	2095	1	30.8989	13.2940	15.3364	7.6682	8.6682
240	2270	1	33.7079	13.8573	15.9444	7.9722	8.9722
260	2438	1	36.5169	14.4705	16.4075	8.2037	9.2037
280	2610	1	39.3258	15.1404	16.7892	**8.3946**	**9.3946**
300	2727	1	42.1348	15.8754	16.7297	8.3649	9.3649
320	2755	1	44.9438	16.6853	16.0810	8.0405	9.0405
340	2755	1	47.7528	17.5824	15.2606	7.6303	8.6303
360	2755	1	50.5618	18.5814	14.4401	7.2201	8.2201

D = 3.44   Day = 14
H = 7.21   FA = 15%
A = 9.2941
V = 67.0103

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	9.2941	0.0000	0.0000	2.0000
20	47	2	2.7739	9.5593	0.4646	0.2323	2.2323
40	89	2	5.5479	9.8400	0.8547	0.4274	2.4274
60	242	2	8.3218	10.1377	2.2916	1.1458	3.1458
80	473	2	11.0957	10.4541	4.3511	2.1756	4.1756
100	710	2	13.8696	10.7907	6.3659	3.1829	5.1829
120	948	2	16.6436	11.1498	8.2388	4.1194	6.1194
140	1152	2	19.4175	11.5336	9.6885	4.8443	6.8443
160	1358	2	22.1914	11.9448	11.0441	5.5221	7.5221
180	1650	2	24.9653	12.3864	12.9510	6.4755	8.4755
200	1920	2	27.7393	12.8619	14.5248	7.2624	9.2624
220	2170	2	30.5132	13.3753	15.7888	7.8944	9.8944
240	2380	2	33.2871	13.9315	16.6280	8.3140	10.3140
260	2525	2	36.0610	14.5359	16.9165	**8.4582**	**10.4582**
280	2525	2	38.8350	15.1951	16.1826	8.0913	10.0913
300	2525	2	41.6089	15.9170	15.4487	7.7243	9.7243

D = 3.74
H = 7.56
A = 10.9858
V = 83.5531

Day = 0
FA = 20%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	1	0.0000	10.9858	0.0000	0.0000	1.0000
20	4	1	2.6455	11.2843	0.0335	0.0167	1.0167
40	9	1	5.2910	11.5995	0.0733	0.0367	1.0367
60	40	1	7.9365	11.9329	0.3168	0.1584	1.1584
80	78	1	10.5820	12.2859	0.6000	0.3000	1.3000
100	109	1	13.2275	12.6605	0.8136	0.4068	1.4068
120	139	1	15.8730	13.0586	1.0059	0.5029	1.5029
140	163	1	18.5185	13.4826	1.1425	0.5712	1.5712
160	181	1	21.1640	13.9350	1.2274	0.6137	1.6137
180	201	1	23.8095	14.4189	1.3382	0.6691	1.6691
200	220	1	26.4550	14.9375	1.4139	0.7069	1.7069
220	231	1	29.1005	15.4949	1.4312	0.7156	1.7156
240	242	1	31.7460	16.0955	1.4434	**0.7217**	**1.7217**
260	250	1	34.3915	16.7445	1.4333	0.7167	1.7167
280	259	1	37.0370	17.4480	1.4250	0.7125	1.7125
300	266	1	39.6825	18.2133	1.4021	0.7010	1.7010
320	273	1	42.3280	19.0488	1.3758	0.6879	1.6879
340	280	1	44.9735	19.9646	1.3464	0.6732	1.6732
360	285	1	47.6190	20.9729	1.3045	0.6523	1.6523
380	291	1	50.2646	22.0885	1.2647	0.6324	1.6324
400	297	1	52.9101	23.3294	1.2221	0.6111	1.6111
420	302	1	55.5556	24.7181	1.1729	0.5865	1.5865
440	306	1	58.2011	26.2825	1.1177	0.5589	1.5589
460	311	1	60.8466	28.0583	1.0641	0.5320	1.5320
480	315	1	63.4921	30.0915	1.0049	0.5025	1.5025
500	319	1	66.1376	32.4424	0.9439	0.4720	1.4720
520	323	1	68.7831	35.1918	0.8811	0.4406	1.4406
540	326	1	71.4286	38.4503	0.8139	0.4070	1.4070
560	331	1	74.0741	42.3738	0.7499	0.3749	1.3749
580	334	1	76.7196	47.1890	0.6795	0.3397	1.3397
600	336	1	79.3651	53.2389	0.6059	0.3029	1.3029
620	339	1	82.0106	61.0681	0.5329	0.2665	1.2665
640	342	1	84.6561	71.5971	0.4586	0.2293	1.2293
660	347	1	87.3016	86.5132	0.3851	0.1925	1.1925
680	350	1	89.9471	109.2798	0.3075	0.1537	1.1537
700	354	1	92.5926	148.3083	0.2291	0.1146	1.1146
720	354	1	95.2381	230.7018	0.1473	0.0737	1.0737
740	354	1	97.8836	519.0791	0.0655	0.0327	1.0327

D = 3.74   Day = 0

H = 7.56   FA = 20%

A = 10.9858

V = 83.5531

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	10.9858	0.0000	0.0000	2.0000
20	5	2	2.6455	11.2843	0.0419	0.0209	2.0209
40	48	2	5.2910	11.5995	0.3911	0.1955	2.1955
60	110	2	7.9365	11.9329	0.8711	0.4356	2.4356
80	152	2	10.5820	12.2859	1.1691	0.5846	2.5846
100	191	2	13.2275	12.6605	1.4257	0.7128	2.7128
120	222	2	15.8730	13.0586	1.6320	0.8160	2.8160
140	247	2	18.5185	13.4826	1.7587	0.8794	2.8794
160	268	2	21.1640	13.9350	1.8463	0.9231	2.9231
180	287	2	23.8095	14.4189	1.9108	0.9554	2.9554
200	303	2	26.4550	14.9375	1.9473	0.9737	2.9737
220	319	2	29.1005	15.4949	1.9764	0.9882	2.9882
240	334	2	31.7460	16.0955	1.9921	**0.9961**	**2.9961**
260	346	2	34.3915	16.7445	1.9837	0.9918	2.9918
280	356	2	37.0370	17.4480	1.9587	0.9794	2.9794
300	365	2	39.6825	18.2133	1.9239	0.9619	2.9619
320	375	2	42.3280	19.0488	1.8899	0.9449	2.9449
340	381	2	44.9735	19.9646	1.8320	0.9160	2.9160
360	388	2	47.6190	20.9729	1.7760	0.8880	2.8880
380	392	2	50.2646	22.0885	1.7037	0.8518	2.8518
400	394	2	52.9101	23.3294	1.6213	0.8107	2.8107
420	397	2	55.5556	24.7181	1.5419	0.7709	2.7709
440	401	2	58.2011	26.2825	1.4672	0.7336	2.7336
460	403	2	60.8466	28.0583	1.3812	0.6906	2.6906
480	406	2	63.4921	30.0915	1.2975	0.6487	2.6487
500	409	2	66.1376	32.4424	1.2124	0.6062	2.6062
520	414	2	68.7831	35.1918	1.1313	0.5657	2.5657
540	416	2	71.4286	38.4503	1.0404	0.5202	2.5202
560	417	2	74.0741	42.3738	0.9464	0.4732	2.4732
580	419	2	76.7196	47.1890	0.8539	0.4269	2.4269
600	419	2	79.3651	53.2389	0.7568	0.3784	2.3784
620	419	2	82.0106	61.0681	0.6598	0.3299	2.3299

D = 3.40

H = 7.16

A = 9.0792

V = 65.0071

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	9.0792	0.0000	0.0000	1.0000
20	85	1	2.7933	9.3401	0.8600	0.4300	1.4300
40	148	1	5.5866	9.6164	1.4544	0.7272	1.7272
60	214	1	8.3799	9.9096	2.0731	1.0366	2.0366
80	305	1	11.1732	10.2212	2.8646	1.4323	2.4323
100	428	1	13.9665	10.5531	3.9002	1.9501	2.9501
120	569	1	16.7598	10.9072	5.0168	2.5084	3.5084
140	727	1	19.5531	11.2860	6.2323	3.1161	4.1161
160	865	1	22.3464	11.6919	7.1689	3.5845	4.5845
180	985	1	25.1397	12.1282	7.8698	3.9349	4.9349
200	1112	1	27.9330	12.5983	8.5618	4.2809	5.2809
220	1265	1	30.7263	13.1063	9.3761	4.6881	5.6881
240	1415	1	33.5196	13.6569	10.0696	5.0348	6.0348
260	1570	1	36.3128	14.2559	10.7032	5.3516	6.3516
280	1705	1	39.1061	14.9099	11.1177	5.5589	6.5589
300	1821	1	41.8994	15.6267	11.3385	5.6692	6.6692
320	1930	1	44.6927	16.4159	11.4394	5.7197	6.7197
340	2049	1	47.4860	17.2891	11.5336	5.7668	6.7668
360	2174	1	50.2793	18.2604	11.5863	**5.7931**	**6.7931**
380	2276	1	53.0726	19.3473	11.4502	5.7251	6.7251
400	2360	1	55.8659	20.5719	11.1661	5.5830	6.5830
420	2405	1	58.6592	21.9618	10.6644	5.3322	6.3322
440	2421	1	61.4525	23.5533	10.0100	5.0050	6.0050
460	2421	1	64.2458	25.3934	9.2846	4.6423	5.6423
480	2421	1	67.0391	27.5454	8.5593	4.2796	5.2796

D = 3.41   Day = 7
H = 7.11   FA = 20%
A = 9.1327
V = 64.9334

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	9.1327	0.0000	0.0000	2.0000
20	118	2	2.8129	9.3970	1.1867	0.5933	2.5933
40	273	2	5.6259	9.6771	2.7082	1.3541	3.3541
60	498	2	8.4388	9.9744	4.8014	2.4007	4.4007
80	565	2	11.2518	10.2906	5.2800	2.6400	4.6400
100	673	2	14.0647	10.6274	6.1269	3.0634	5.0634
120	758	2	16.8776	10.9871	6.6748	3.3374	5.3374
140	854	2	19.6906	11.3719	7.2769	3.6385	5.6385
160	936	2	22.5035	11.7847	7.6963	3.8482	5.8482
180	1059	2	25.3165	12.2285	8.4003	4.2001	6.2001
200	1331	2	28.1294	12.7071	10.1752	5.0876	7.0876
220	1552	2	30.9423	13.2247	11.4055	5.7028	7.7028
240	1805	2	33.7553	13.7863	12.7392	**6.3696**	**8.3696**
260	1846	2	36.5682	14.3977	12.4753	6.2377	8.2377
280	1920	2	39.3812	15.0658	12.4000	6.2000	8.2000
300	1920	2	42.1941	15.7989	11.8246	5.9123	7.9123
320	1920	2	45.0070	16.6070	11.2492	5.6246	7.6246

D = 3.38   Day = 14
H = 6.98   FA = 20%
A = 8.9727
V = 62.6295

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	8.9727	0.0000	0.0000	1.0000
20	88	1	2.8653	9.2374	0.9003	0.4501	1.4501
40	194	1	5.7307	9.5182	1.9261	0.9631	1.9631
60	271	1	8.5960	9.8165	2.6502	1.3251	2.3251
80	358	1	11.4613	10.1342	3.3913	1.6956	2.6956
100	492	1	14.3266	10.4732	4.5176	2.2588	3.2588
120	634	1	17.1920	10.8355	5.6610	2.8305	3.8305
140	788	1	20.0573	11.2239	6.7925	3.3963	4.3963
160	928	1	22.9226	11.6412	7.7246	3.8623	4.8623
180	1052	1	25.7880	12.0906	8.4399	4.2200	5.2200
200	1185	1	28.6533	12.5762	9.1399	4.5699	5.5699
220	1348	1	31.5186	13.1024	9.9942	4.9971	5.9971
240	1532	1	34.3840	13.6746	10.8882	5.4441	6.4441
260	1690	1	37.2493	14.2990	11.4907	5.7454	6.7454
280	1825	1	40.1146	14.9831	11.8515	5.9258	6.9258
300	1934	1	42.9799	15.7360	11.9584	**5.9792**	**6.9792**
320	2012	1	45.8453	16.5686	11.8178	5.9089	6.9089
340	2075	1	48.7106	17.4943	11.5429	5.7715	6.7715
360	2120	1	51.5759	18.5294	11.1344	5.5672	6.5672
380	2132	1	54.4413	19.6948	10.5349	5.2674	6.2674
400	2132	1	57.3066	21.0166	9.8723	4.9362	5.9362
420	2132	1	60.1719	22.5286	9.2097	4.6049	5.6049

D = 3.37   Day = 14
H = 7.01   FA = 20%
A = 8.9197
V = 62.5270

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	8.9197	0.0000	0.0000	2.0000
20	104	2	2.8531	9.1817	1.0704	0.5352	2.5352
40	123	2	5.7061	9.4595	1.2288	0.6144	2.6144
60	195	2	8.5592	9.7546	1.8891	0.9446	2.9446
80	295	2	11.4123	10.0688	2.8127	1.4063	3.4063
100	440	2	14.2653	10.4038	4.0671	2.0335	4.0335
120	605	2	17.1184	10.7620	5.4389	2.7195	4.7195
140	780	2	19.9715	11.1457	6.7708	3.3854	5.3854
160	955	2	22.8245	11.5577	8.0067	4.0034	6.0034
180	1090	2	25.6776	12.0014	8.8098	4.4049	6.4049
200	1245	2	28.5307	12.4805	9.6906	4.8453	6.8453
220	1425	2	31.3837	12.9994	10.6537	5.3269	7.3269
240	1648	2	34.2368	13.5634	11.8129	5.9064	7.9064
260	1850	2	37.0899	14.1785	12.6956	6.3478	8.3478
280	2040	2	39.9429	14.8520	13.3671	6.6836	8.6836
300	2210	2	42.7960	15.5928	13.7953	6.8976	8.8976
320	2380	2	45.6491	16.4113	14.1155	7.0577	9.0577
340	2598	2	48.5021	17.3205	14.6072	7.3036	9.3036
360	2865	2	51.3552	18.3364	15.2184	7.6092	9.6092
380	3073	2	54.2083	19.4788	15.3718	**7.6859**	**9.6859**
400	3073	2	57.0613	20.7731	14.4141	7.2070	9.2070
420	3073	2	59.9144	22.2516	13.4563	6.7282	8.7282

D = 3.74
H = 7.56
A = 10.9858
V = 83.5531

Day = 0
FA = 25%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	1	0.0000	10.9858	0.0000	0.0000	1.0000
20	37	1	2.6455	11.2843	0.3099	0.1549	1.1549
40	93	1	5.2910	11.5995	0.7577	0.3788	1.3788
60	150	1	7.9365	11.9329	1.1879	0.5939	1.5939
80	211	1	10.5820	12.2859	1.6487	0.8244	1.8244
100	251	1	13.2275	12.6605	1.9032	0.9516	1.9516
120	288	1	15.8730	13.0586	2.1172	1.0586	2.0586
140	317	1	18.5185	13.4826	2.2571	1.1286	2.1286
160	341	1	21.1640	13.9350	2.3492	1.1746	2.1746
180	361	1	23.8095	14.4189	2.4035	1.2018	2.2018
200	378	1	26.4550	14.9375	2.4293	1.2147	2.2147
220	393	1	29.1005	15.4949	2.4349	**1.2174**	**2.2174**
240	407	1	31.7460	16.0955	2.4317	1.2159	2.2159
260	421	1	34.3915	16.7445	2.4179	1.2089	2.2089
280	433	1	37.0370	17.4480	2.3865	1.1933	2.1933
300	442	1	39.6825	18.2133	2.3338	1.1669	2.1669
320	448	1	42.3280	19.0488	2.2617	1.1309	2.1309
340	455	1	44.9735	19.9646	2.1917	1.0958	2.0958
360	462	1	47.6190	20.9729	2.1184	1.0592	2.0592
380	469	1	50.2646	22.0885	2.0419	1.0209	2.0209
400	476	1	52.9101	23.3294	1.9621	0.9811	1.9811
420	484	1	55.5556	24.7181	1.8830	0.9415	1.9415
440	493	1	58.2011	26.2825	1.8039	0.9019	1.9019
460	501	1	60.8466	28.0583	1.7171	0.8586	1.8586
480	507	1	63.4921	30.0915	1.6203	0.8101	1.8101
500	510	1	66.1376	32.4424	1.5118	0.7559	1.7559
520	510	1	68.7831	35.1918	1.3936	0.6968	1.6968
540	510	1	71.4286	38.4503	1.2755	0.6378	1.6378

D = 3.74
H = 7.56
A = 10.9858
V = 83.5531

Day = 0
FA = 25%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	10.9858	0.0000	0.0000	2.0000
20	75	2	2.6455	11.2843	0.6281	0.3140	2.3140
40	104	2	5.2910	11.5995	0.8473	0.4236	2.4236
60	148	2	7.9365	11.9329	1.1721	0.5860	2.5860
80	192	2	10.5820	12.2859	1.4768	0.7384	2.7384
100	246	2	13.2275	12.6605	1.8653	0.9327	2.9327
120	205	2	15.8730	13.0586	1.5071	0.7535	2.7535
140	267	2	18.5185	13.4826	1.9011	0.9506	2.9506
160	335	2	21.1640	13.9350	2.3079	1.1539	3.1539
180	389	2	23.8095	14.4189	2.5899	1.2950	3.2950
200	452	2	26.4550	14.9375	2.9099	1.4550	3.4550
220	496	2	29.1005	15.4949	3.0783	1.5392	3.5392
240	520	2	31.7460	16.0955	3.1069	1.5534	3.5534
260	556	2	34.3915	16.7445	3.1932	1.5966	3.5966
280	583	2	37.0370	17.4480	3.2133	1.6066	3.6066
300	615	2	39.6825	18.2133	3.2669	1.6335	3.6335
320	653	2	42.3280	19.0488	3.3166	1.6583	3.6583
340	687	2	44.9735	19.9646	3.3293	**1.6646**	**3.6646**
360	706	2	47.6190	20.9729	3.2568	1.6284	3.6284
380	728	2	50.2646	22.0885	3.1887	1.5944	3.5944
400	745	2	52.9101	23.3294	3.0896	1.5448	3.5448
420	758	2	55.5556	24.7181	2.9669	1.4835	3.4835
440	760	2	58.2011	26.2825	2.7977	1.3988	3.3988
460	762	2	60.8466	28.0583	2.6275	1.3138	3.3138
480	763	2	63.4921	30.0915	2.4532	1.2266	3.2266
500	764	2	66.1376	32.4424	2.2784	1.1392	3.1392
520	764	2	68.7831	35.1918	2.1004	1.0502	3.0502
540	765	2	71.4286	38.4503	1.9249	0.9625	2.9625
560	765	2	74.0741	42.3738	1.7467	0.8733	2.8733
580	765	2	76.7196	47.1890	1.5685	0.7842	2.7842

D = 3.36

H = 6.96

A = 8.8668

V = 61.7131

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	1	0.0000	8.8668	0.0000	0.0000	1.0000
20	75	1	2.8736	9.1291	0.7764	0.3882	1.3882
40	155	1	5.7471	9.4075	1.5570	0.7785	1.7785
60	240	1	8.6207	9.7033	2.3745	1.1872	2.1872
80	345	1	11.4943	10.0183	3.3059	1.6530	2.6530
100	467	1	14.3678	10.3545	4.3372	2.1686	3.1686
120	604	1	17.2414	10.7141	5.4542	2.7271	3.7271
140	751	1	20.1149	11.0994	6.5462	3.2731	4.2731
160	905	1	22.9885	11.5136	7.6166	3.8083	4.8083
180	1042	1	25.8621	11.9599	8.4511	4.2255	5.2255
200	1193	1	28.7356	12.4421	9.3007	4.6504	5.6504
220	1360	1	31.6092	12.9649	10.1902	5.0951	6.0951
240	1523	1	34.4828	13.5335	10.9370	5.4685	6.4685
260	1682	1	37.3563	14.1543	11.5532	5.7766	6.7766
280	1831	1	40.2299	14.8348	12.0093	6.0047	7.0047
300	1968	1	43.1034	15.5841	12.2873	6.1437	7.1437
320	2103	1	45.9770	16.4130	12.4694	6.2347	7.2347
340	2235	1	48.8506	17.3351	12.5491	**6.2746**	**7.2746**
360	2354	1	51.7241	18.3669	12.4747	6.2374	7.2374
380	2422	1	54.5977	19.5294	12.0775	6.0387	7.0387
400	2441	1	57.4713	20.8490	11.4018	5.7009	6.7009
420	2441	1	60.3448	22.3598	10.6314	5.3157	6.3157
440	2441	1	63.2184	24.1066	9.8610	4.9305	5.9305

D = 3.38   Day = 7
H = 6.97   FA = 25%
A = 8.9727
V = 62.5397

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	8.9727	0.0000	0.0000	2.0000
20	67	2	2.8694	9.2378	0.6854	0.3427	2.3427
40	80	2	5.7389	9.5190	0.7942	0.3971	2.3971
60	95	2	8.6083	9.8179	0.9144	0.4572	2.4572
80	140	2	11.4778	10.1361	1.3052	0.6526	2.6526
100	223	2	14.3472	10.4757	2.0436	1.0218	3.0218
120	329	2	17.2166	10.8388	2.9140	1.4570	3.4570
140	436	2	20.0861	11.2280	3.7343	1.8672	3.8672
160	658	2	22.9555	11.6461	5.4663	2.7332	4.7332
180	871	2	25.8250	12.0967	6.9771	3.4886	5.4886
200	1208	2	28.6944	12.5834	9.3256	4.6628	6.6628
220	1535	2	31.5638	13.1111	11.3784	5.6892	7.6892
240	1874	2	34.4333	13.6848	13.3242	6.6621	8.6621
260	2117	2	37.3027	14.3111	14.3960	7.1980	9.1980
280	2383	2	40.1722	14.9975	15.4656	7.7328	9.7328
300	2485	2	43.0416	15.7531	15.3621	7.6811	9.6811
320	2535	2	45.9110	16.5888	14.8817	7.4409	9.4409
340	2665	2	48.7805	17.5181	14.8162	7.4081	9.4081
360	2978	2	51.6499	18.5578	15.6300	**7.8150**	**9.8150**
380	3052	2	54.5194	19.7286	15.0735	7.5367	9.5367
400	3068	2	57.3888	21.0571	14.1965	7.0983	9.0983
420	3068	2	60.2582	22.5775	13.2405	6.6203	8.6203
440	3068	2	63.1277	24.3345	12.2845	6.1423	8.1423

D = 3.26   Day = 14
H = 6.89   FA = 25%
A = 8.3469
V = 57.5101

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	1	0.0000	8.3469	0.0000	0.0000	1.0000
20	80	1	2.9028	8.5964	0.8794	0.4397	1.4397
40	155	1	5.8055	8.8613	1.6530	0.8265	1.8265
60	238	1	8.7083	9.1431	2.4989	1.2495	2.2495
80	319	1	11.6110	9.4434	3.2429	1.6215	2.6215
100	425	1	14.5138	9.7640	4.1859	2.0929	3.0929
120	532	1	17.4165	10.1072	5.0618	2.5309	3.5309
140	647	1	20.3193	10.4754	5.9756	2.9878	3.9878
160	758	1	23.2221	10.8715	6.7458	3.3729	4.3729
180	858	1	26.1248	11.2987	7.3584	3.6792	4.6792
200	949	1	29.0276	11.7608	7.8191	3.9095	4.9095
220	1052	1	31.9303	12.2623	8.3218	4.1609	5.1609
240	1170	1	34.8331	12.8085	8.8605	4.4303	5.4303
260	1302	1	37.7358	13.4056	9.4348	4.7174	5.7174
280	1428	1	40.6386	14.0612	9.8700	4.9350	5.9350
300	1538	1	43.5414	14.7841	10.1105	5.0552	6.0552
320	1630	1	46.4441	15.5854	10.1680	**5.0840**	**6.0840**
340	1716	1	49.3469	16.4786	10.1243	5.0621	6.0621
360	1805	1	52.2496	17.4803	10.0471	5.0236	6.0236
380	1890	1	55.1524	18.6117	9.8807	4.9404	5.9404
400	1975	1	58.0552	19.8997	9.6568	4.8284	5.8284
420	2042	1	60.9579	21.3792	9.2952	4.6476	5.6476
440	2074	1	63.8607	23.0964	8.7389	4.3695	5.3695
460	2074	1	66.7634	25.1136	8.0370	4.0185	5.0185
480	2074	1	69.6662	27.5168	7.3351	3.6675	4.6675

D = 3.30   Day = 14
H = 6.85   FA = 25%
A = 8.5530
V = 58.5880

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	8.5530	0.0000	0.0000	2.0000
20	20	2	2.9197	8.8102	0.2145	0.1073	2.1073
40	60	2	5.8394	9.0834	0.6242	0.3121	2.3121
60	105	2	8.7591	9.3741	1.0585	0.5293	2.5293
80	153	2	11.6788	9.6840	1.4930	0.7465	2.7465
100	315	2	14.5985	10.0151	2.9723	1.4861	3.4861
120	589	2	17.5182	10.3696	5.3677	2.6838	4.6838
140	750	2	20.4380	10.7501	6.5930	3.2965	5.2965
160	941	2	23.3577	11.1596	7.9684	3.9842	5.9842
180	1075	2	26.2774	11.6016	8.7563	4.3782	6.3782
200	1206	2	29.1971	12.0800	9.4343	4.7172	6.7172
220	1318	2	32.1168	12.5996	9.8853	4.9427	6.9427
240	1386	2	35.0365	13.1659	9.9482	4.9741	6.9741
260	1487	2	37.9562	13.7854	10.1935	5.0967	7.0967
280	1567	2	40.8759	14.4662	10.2364	**5.1182**	**7.1182**
300	1642	2	43.7956	15.2177	10.1966	5.0983	7.0983
320	1725	2	46.7153	16.0515	10.1556	5.0778	7.0778
340	1840	2	49.6350	16.9820	10.2391	5.1195	7.1195
360	1932	2	52.5547	18.0271	10.1278	5.0639	7.0639
380	1984	2	55.4745	19.2092	9.7603	4.8802	6.8802
400	2134	2	58.3942	20.5572	9.8098	4.9049	6.9049
420	2156	2	61.3139	22.1087	9.2155	4.6077	6.6077
440	2173	2	64.2336	23.9135	8.5871	4.2936	6.2936
460	2228	2	67.1533	26.0391	8.0858	4.0429	6.0429
480	2248	2	70.0730	28.5795	7.4332	3.7166	5.7166
500	2266	2	72.9927	31.6692	6.7617	3.3808	5.3808
520	2286	2	75.9124	35.5079	6.0839	3.0420	5.0420
540	2304	2	78.8321	40.4056	5.3886	2.6943	4.6943
560	2318	2	81.7518	46.8704	4.6735	2.3368	4.3368
580	2318	2	84.6715	55.7981	3.9258	1.9629	3.9629
600	2318	2	87.5912	68.9271	3.1780	1.5890	3.5890

D = 3.74   Day = 0
H = 7.56   FA = 30%
A = 10.9858
V = 83.5531

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	10.9858	0.0000	0.0000	1.0000
20	8	1	2.6455	11.2843	0.0670	0.0335	1.0335
40	14	1	5.2910	11.5995	0.1141	0.0570	1.0570
60	21	1	7.9365	11.9329	0.1663	0.0832	1.0832
80	30	1	10.5820	12.2859	0.2308	0.1154	1.1154
100	41	1	13.2275	12.6605	0.3060	0.1530	1.1530
120	48	1	15.8730	13.0586	0.3474	0.1737	1.1737
140	57	1	18.5185	13.4826	0.3995	0.1998	1.1998
160	64	1	21.1640	13.9350	0.4340	0.2170	1.2170
180	98	1	23.8095	14.4189	0.6423	0.3211	1.3211
200	117	1	26.4550	14.9375	0.7402	0.3701	1.3701
220	139	1	29.1005	15.4949	0.8477	0.4239	1.4239
240	151	1	31.7460	16.0955	0.8866	0.4433	1.4433
260	164	1	34.3915	16.7445	0.9256	0.4628	1.4628
280	173	1	37.0370	17.4480	0.9370	0.4685	1.4685
300	187	1	39.6825	18.2133	0.9703	**0.4851**	**1.4851**
320	195	1	42.3280	19.0488	0.9674	0.4837	1.4837
340	195	1	44.9735	19.9646	0.9230	0.4615	1.4615
360	195	1	47.6190	20.9729	0.8786	0.4393	1.4393

D = 3.74
H = 7.56
A = 10.9858
V = 83.5531

Day = 0
FA = 30%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	10.9858	0.0000	0.0000	2.0000
20	61	2	2.6455	11.2843	0.5108	0.2554	2.2554
40	87	2	5.2910	11.5995	0.7088	0.3544	2.3544
60	112	2	7.9365	11.9329	0.8870	0.4435	2.4435
80	131	2	10.5820	12.2859	1.0076	0.5038	2.5038
100	143	2	13.2275	12.6605	1.0674	0.5337	2.5337
120	151	2	15.8730	13.0586	1.0927	0.5464	2.5464
140	156	2	18.5185	13.4826	1.0934	**0.5467**	**2.5467**
160	160	2	21.1640	13.9350	1.0850	0.5425	2.5425
180	164	2	23.8095	14.4189	1.0748	0.5374	2.5374
200	166	2	26.4550	14.9375	1.0502	0.5251	2.5251
220	166	2	29.1005	15.4949	1.0124	0.5062	2.5062
240	167	2	31.7460	16.0955	0.9805	0.4902	2.4902
260	169	2	34.3915	16.7445	0.9538	0.4769	2.4769
280	173	2	37.0370	17.4480	0.9370	0.4685	2.4685
300	174	2	39.6825	18.2133	0.9028	0.4514	2.4514
320	175	2	42.3280	19.0488	0.8682	0.4341	2.4341
340	176	2	44.9735	19.9646	0.8331	0.4165	2.4165
360	177	2	47.6190	20.9729	0.7975	0.3988	2.3988
380	177	2	50.2646	22.0885	0.7573	0.3786	2.3786
400	178	2	52.9101	23.3294	0.7210	0.3605	2.3605
420	178	2	55.5556	24.7181	0.6805	0.3403	2.3403
440	178	2	58.2011	26.2825	0.6400	0.3200	2.3200

D = 3.38

H = 6.88

A = 8.9727

V = 61.7322

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	8.9727	0.0000	0.0000	1.0000
20	58	1	2.9070	9.2413	0.5931	0.2965	1.2965
40	133	1	5.8140	9.5266	1.3193	0.6597	1.6597
60	215	1	8.7209	9.8300	2.0997	1.0499	2.0499
80	302	1	11.6279	10.1533	2.8554	1.4277	2.4277
100	395	1	14.5349	10.4987	3.6119	1.8059	2.8059
120	491	1	17.4419	10.8683	4.3445	2.1723	3.1723
140	595	1	20.3488	11.2650	5.0794	2.5397	3.5397
160	702	1	23.2558	11.6917	5.8091	2.9046	3.9046
180	807	1	26.1628	12.1520	6.4350	3.2175	4.2175
200	920	1	29.0698	12.6500	7.0473	3.5236	4.5236
220	1026	1	31.9767	13.1906	7.5449	3.7724	4.7724
240	1141	1	34.8837	13.7795	8.0320	4.0160	5.0160
260	1258	1	37.7907	14.4234	8.4727	4.2364	5.2364
280	1374	1	40.6977	15.1304	8.8216	4.4108	5.4108
300	1495	1	43.6047	15.9104	9.1321	4.5661	5.5661
320	1600	1	46.5116	16.7750	9.2697	4.6349	5.6349
340	1703	1	49.4186	17.7391	9.3336	**4.6668**	**5.6668**
360	1801	1	52.3256	18.8208	9.3108	4.6554	5.6554
380	1890	1	55.2326	20.0429	9.1752	4.5876	5.5876
400	1975	1	58.1395	21.4348	8.9652	4.4826	5.4826
420	2035	1	61.0465	23.0344	8.5977	4.2988	5.2988
440	2064	1	63.9535	24.8920	8.0694	4.0347	5.0347
460	2064	1	66.8605	27.0755	7.4187	3.7093	4.7093
480	2064	1	69.7674	29.6789	6.7679	3.3840	4.3840

D = 3.36

H = 6.89

A = 8.8668

V = 61.0925

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%			kg/cm2	
0	0	2	0.0000	8.8668	0.0000	0.0000	2.0000
20	125	2	2.9028	9.1319	1.2935	0.6468	2.6468
40	247	2	5.8055	9.4133	2.5190	1.2595	3.2595
60	408	2	8.7083	9.7126	4.0397	2.0199	4.0199
80	527	2	11.6110	10.0316	5.0520	2.5260	4.5260
100	633	2	14.5138	10.3722	5.9045	2.9523	4.9523
120	861	2	17.4165	10.7368	7.7706	3.8853	5.8853
140	1078	2	20.3193	11.1279	9.3967	4.6984	6.6984
160	1282	2	23.2221	11.5486	10.7837	5.3919	7.3919
180	1475	2	26.1248	12.0024	11.9436	5.9718	7.9718
200	1705	2	29.0276	12.4933	13.2682	6.6341	8.6341
220	1822	2	31.9303	13.0261	13.6097	6.8048	8.8048
240	1942	2	34.8331	13.6063	13.8874	6.9437	8.9437
260	2045	2	37.7358	14.2406	13.9752	6.9876	8.9876
280	2232	2	40.6386	14.9370	14.5443	**7.2722**	**9.2722**
300	2290	2	43.5414	15.7049	14.1926	7.0963	9.0963
320	2290	2	46.4441	16.5562	13.4629	6.7314	8.7314
340	2290	2	49.3469	17.5049	12.7332	6.3666	8.3666

D = 3.26
H = 6.75
A = 8.3470
V = 56.3416

Day = 14
FA = 30%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	1	0.0000	8.3470	0.0000	0.0000	1.0000
20	85	1	2.9630	8.6019	0.9338	0.4669	1.4669
40	165	1	5.9259	8.8728	1.7573	0.8787	1.8787
60	270	1	8.8889	9.1613	2.8293	1.4146	2.4146
80	395	1	11.8519	9.4693	4.0045	2.0023	3.0023
100	583	1	14.8148	9.7987	5.7217	2.8609	3.8609
120	778	1	17.7778	10.1518	7.4146	3.7073	4.7073
140	985	1	20.7407	10.5313	9.0632	4.5316	5.5316
160	1165	1	23.7037	10.9402	10.3293	5.1646	6.1646
180	1335	1	26.6667	11.3823	11.3937	5.6968	6.6968
200	1560	1	29.6296	11.8615	12.7819	6.3909	7.3909
220	1848	1	32.5926	12.3829	14.5208	7.2604	8.2604
240	2105	1	35.5556	12.9522	15.8162	7.9081	8.9081
260	2320	1	38.5185	13.5764	16.6327	8.3164	9.3164
280	2528	1	41.4815	14.2639	17.2596	8.6298	9.6298
300	2995	1	44.4444	15.0246	19.4157	9.7078	10.7078
320	3340	1	47.4074	15.8711	20.5061	**10.2531**	**11.2531**
340	3464	1	50.3704	16.8186	20.0699	10.0350	11.0350
360	3464	1	53.3333	17.8864	18.8717	9.4359	10.4359
380	3464	1	56.2963	19.0991	17.6735	8.8368	9.8368

D = 3.20
H = 6.76
A = 8.0425
V = 54.3671

Day = 14
FA = 30%

ΔH	Proving Ring	σ3	ε	A'	σ1-σ3	(σ1-σ3)/2	(σ1+σ3)/2
mm	div	kg/cm2	%		kg/cm2		
0	0	2	0.0000	8.0425	0.0000	0.0000	2.0000
20	68	2	2.9586	8.2877	0.7754	0.3877	2.3877
40	85	2	5.9172	8.5483	0.9397	0.4698	2.4698
60	200	2	8.8757	8.8259	2.1414	1.0707	3.0707
80	400	2	11.8343	9.1220	4.2096	2.1048	4.1048
100	618	2	14.7929	9.4388	6.3347	3.1673	5.1673
120	883	2	17.7515	9.7783	8.7503	4.3751	6.3751
140	1090	2	20.7101	10.1432	10.4238	5.2119	7.2119
160	1305	2	23.6686	10.5363	12.0319	6.0159	8.0159
180	1583	2	26.6272	10.9611	14.0357	7.0179	9.0179
200	1875	2	29.5858	11.4217	15.9729	7.9864	9.9864
220	2171	2	32.5444	11.9227	17.7207	8.8604	10.8604
240	2400	2	35.5030	12.4696	18.7336	9.3668	11.3668
260	2675	2	38.4615	13.0691	19.9346	9.9673	11.9673
280	3020	2	41.4201	13.7291	21.4334	10.7167	12.7167
300	3276	2	44.3787	14.4594	22.0768	**11.0384**	**13.0384**
320	3276	2	47.3373	15.2717	20.9025	10.4513	12.4513
340	3276	2	50.2959	16.1807	19.7282	9.8641	11.8641