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THE ORTHOGONAL IN-SITU MACHINING OF SINGLE AND POLYCRYSTALLINE ALUMINUM AND COPPER

VOLUME II

Dissertation
by
Paul H. Cohen, B.S., M.S.

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DUE TO WEAR AND MACHINING AT HIGH SPEEDS

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THE ORTHOGONAL IN-SITU MACHINING OF SINGLE AND POLYCRYSTALLINE ALUMINUM AND COPPER

VOLUME II

DISSERTATION

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By

Paul H. Cohen, B.S., M.S.

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Raw Data

Table A.1. Raw Data for Aluminum With 30° Tool, Test Al 63, Revolution 1, [100] Direction: DEG = 762

OBS	REV	DEC	FH	FV	PHI
1	1	670	13.9376	4.7208	40
2	1	675	14.8368	4.6084	39
3	1	680	14.6120	4.6084	37
4	1	685	14.8368	4.4960	37
5	1	690	15.5112	4.7208	35
6	1	695	15.7360	4.7208	35
7	1	700	17.3096	5.0580	33
8	1	705	20.0072	5.6200	28
9	1	710	22.9296	6.1820	26
10	1	715	26.7512	6.8564	18
11	2	720	29.2240	6.9688	8
12	2	725	30.5728	7.4184	7
13	2	730	31.9216	7.6432	7
14	2	735	32.3712	8.0928	7
15	2	740	32.3712	8.2052	7
16	2	745	30.7976	7.5308	12
17	2	750	27.2008	6.8564	15
18	2	755	23.1544	6.1820	19
19	2	760	15.7360	4.6084	37
20	2	766	15.2864	4.3836	40
21	2	770	15.7360	4.6084	40
22	2	775	17.9840	4.6084	36
23	2	780	18.2088	5.0580	36
24	2	785	18.8832	5.0580	34
25	2	791	20.4568	5.2828	33
26	2	795	22.0304	5.7324	31
27	2	800	24.5032	6.0696	26
28	2	805	27.6504	6.5192	20
29	2	810	30.5728	7.1936	16
30	2	815	32.5960	7.6432	14
31	2	820	33.2704	7.8680	13
32	2	825	33.9448	7.8680	11
33	2	830	33.2704	7.8680	13
34	2	835	32.1464	7.5308	16
35	2	840	30.3480	7.1936	17
36	2	845	26.9760	6.6316	18
37	2	850	22.0304	5.5076	25
38	2	855	15.2864	4.3836	36
39	2	860	14.6120	4.1588	39
40	2	865	15.0616	4.2712	39
41	2	870	15.0616	4.2712	37
42	2	875	17.0848	4.4960	34
43	2	880	17.9840	4.9456	31
44	2	885	20.2320	5.1704	29
45	2	890	23.1544	5.2828	25
46	2	895	24.5032	5.7324	23
47	2	900	26.9760	6.0696	21
48	2	905	28.5496	6.4068	14
49	2	910	28.7744	6.7440	12
50	2	915	26.9760	6.5192	15
51	2	920	24.7280	6.1820	18
52	2	925	23.3792	5.7324	20
53	2	930	19.7824	5.2828	25
54	2	935	13.2632	4.0464	42

Table A.1 (Continued)

OBS	REV	DEG	FH	FV	PRI
55	2	940	13.7128	3.9340	41
56	2	945	15.0616	4.2712	34
57	2	950	15.5112	4.3836	32
58	2	955	16.4104	4.4960	31
59	2	960	16.4104	4.6084	31
60	2	965	16.8600	4.3836	30
61	2	970	17.7592	4.3836	29
62	2	975	19.1080	4.8332	27
63	2	980	20.6816	5.1704	23
64	2	985	23.1544	5.3952	18
65	2	990	22.9296	4.9456	19
66	2	995	24.7200	5.3952	16
67	2	1000	27.4256	5.7324	11
68	2	1006	26.9760	6.1820	13
69	2	1010	27.4256	6.1820	12
70	2	1015	27.4256	6.5192	12
71	2	1020	26.0768	6.4068	15
72	2	1025	23.1544	5.8448	19
73	2	1030	18.6584	5.2828	26

Table A.2. Raw Data for Aluminum With 30° Tool, Test Al 63, Revolution 2

OBS	REV	DEG	FH	FV	PHI
1	2	1035	14.1624	4.2712	39
2	2	1040	14.8368	4.4960	38
3	2	1045	16.1856	4.7208	35
4	2	1050	16.4104	4.9456	34
5	2	1055	17.0848	5.0580	32
6	2	1060	17.3096	5.3952	30
7	2	1065	18.4336	5.6200	29
8	2	1070	19.3576	5.6200	26
9	2	1075	23.3792	6.2944	23
10	3	1080	26.3016	6.9688	22
11	3	1085	28.3248	7.0812	17
12	3	1090	29.8984	7.3060	13
13	3	1095	31.2472	7.6432	11
14	3	1100	31.4720	7.7556	11
15	3	1105	30.1232	7.8680	.
16	3	1110	28.3248	7.3308	.
17	3	1115	26.5264	6.0696	.
18	3	1120	22.7048	5.7324	28
19	3	1125	12.3640	4.4960	38
20	3	1130	11.0152	4.2712	41
21	3	1135	11.6896	4.7208	39
22	3	1140	12.1392	4.6084	34
23	3	1146	12.3640	4.7208	32
24	3	1150	13.0384	4.9456	31
25	3	1155	13.4880	5.0580	30
26	2	800	16.1856	5.1704	28
27	3	1165	19.7824	6.2944	.
28	3	1170	21.1312	6.6316	25
29	3	1175	24.0536	6.9688	.
30	3	1180	26.3016	7.3060	16
31	3	1185	27.8752	7.8680	14
32	3	1190	28.3248	8.2052	.
33	3	1195	26.9760	7.8680	.
34	3	1200	26.0768	7.6432	.
35	3	1205	24.7260	7.3060	20
36	3	1210	22.0304	6.8564	25
37	3	1215	13.0384	5.5076	35
38	3	1220	10.3408	4.3836	42
39	3	1226	10.5656	4.3836	42
40	3	1230	8.9920	0.8992	.
41	3	1235	12.1392	4.8332	35
42	3	1240	12.3640	4.9456	35
43	3	1245	12.3640	4.9456	35
44	3	1250	13.0384	5.0580	33
45	3	1255	16.4104	5.6200	25
46	3	1260	17.9840	5.8448	24
47	3	1265	19.3328	5.9572	22
48	3	1270	22.2552	6.4068	18
49	3	1275	22.4800	6.8564	18
50	3	1280	22.0304	6.9688	19
51	3	1285	20.6816	6.5192	21
52	3	1290	18.4336	6.0696	22
53	3	1295	16.6352	5.8448	24
54	3	1300	9.8912	4.3836	33

Table A.2 (Continued)

OBS	REV	DEG	FH	FV	PHI
55	3	1305	7.1936	3.8216	40
56	3	1310	7.8680	3.8216	39
57	3	1315	7.8680	4.0464	39
58	3	1320	7.1936	3.9340	41
59	3	1325	6.7440	4.0464	41
60	3	1330	7.1936	4.0464	38
61	3	1335	8.5424	4.2712	35
62	3	1340	10.7904	4.8332	33
63	3	1345	12.8136	5.2828	28
64	3	1350	13.7128	5.2828	24
65	3	1355	14.6120	5.3952	23
66	3	1360	17.0848	5.6200	20
67	3	1365	17.9840	6.1820	.
68	3	1370	18.4336	6.2944	.
69	3	1375	18.4336	6.4068	.
70	3	1380	17.9840	6.4068	15
71	3	1385	17.7592	6.2944	15
72	3	1390	17.0848	5.6200	22
73	3	1395	11.6896	4.4960	26

Table A.3. Raw Data for Aluminum With 40° Tool, Test Al 56, Revolution 1, [100] Direction: DEG = 1821

OBS	REV	DEG	FH	FV	PHI
1	5	1825	6.0696	1.3488	48
2	5	1830	6.9688	1.3488	47
3	5	1836	7.1936	1.3488	47
4	5	1840	8.3176	1.3488	46
5	5	1845	8.5424	1.5736	46
6	5	1850	7.8680	1.3488	46
7	5	185	8.5424	1.3488	44
8	5	186	8.9920	1.3488	42
9	5	1865	10.5656	1.3488	36
10	5	1870	11.9144	1.3488	34
11	5	1875	12.5888	1.3488	33
12	5	1880	13.9376	1.5736	30
13	5	1885	15.0616	1.5736	27
14	5	1890	14.6120	1.3488	26
15	5	1895	13.9376	1.3488	25
16	5	1900	13.2632	1.1240	20
17	5	1905	7.6432	1.1240	41
18	5	1910	4.7208	1.1240	45
19	5	1915	6.0696	1.1240	46
20	5	1920	6.5192	1.1240	44
21	5	1925	7.6432	1.1240	42
22	5	1930	8.5424	1.1240	41
23	5	1935	8.7672	1.1240	41
24	5	1940	9.2168	1.1240	41
25	5	1945	9.6664	1.3488	38
26	5	1950	10.5656	1.3488	37
27	5	1955	11.2400	1.3488	35
28	5	1960	13.4880	1.3488	35
29	5	1965	14.3872	1.1240	32
30	5	1970	15.5112	1.1240	27
31	5	1975	15.9608	1.1240	25
32	5	1980	15.2864	1.3488	21
33	5	1985	13.7128	1.1240	25
34	5	1990	13.7128	1.1240	25
35	5	1995	6.5192	1.1240	47
36	5	2000	4.9456	1.1240	48
37	5	2005	5.3952	1.1240	49
38	5	2010	6.0696	1.1240	48
39	5	2015	6.7440	1.1240	47
40	5	2020	6.5192	1.1240	47
41	5	2025	5.6200	0.8992	.
42	5	2030	7.4184	0.8992	45
43	5	2035	8.5424	0.6744	44
44	5	2040	9.8912	1.3488	42
45	5	2045	11.0152	1.3488	32
46	5	2050	11.2400	1.3488	31
47	5	2055	13.7128	1.1240	.
48	5	2060	15.2864	1.3488	20
49	5	2065	14.1624	1.3488	24
50	5	2070	9.4416	0.8992	30
51	5	2075	5.6200	0.8992	38
52	5	2080	4.2712	0.8992	48
53	5	2085	4.9456	1.1240	50
54	5	2090	4.9456	1.1240	48

Table A.3 (Continued)

OBS	REV	DEG	FH	FV	PHI
55	5	2095	5.6200	1.1240	47
56	5	2100	6.7440	1.1240	46
57	5	2105	7.6432	1.1240	45
58	5	2110	8.0928	1.1240	43
59	5	2115	8.5424	1.1240	43
60	5	2120	9.2168	1.1240	36
61	5	2125	9.2168	1.1240	36
62	5	2130	10.1160	1.1240	35
63	5	2135	10.1160	1.1240	34
64	5	2140	12.5808	1.1240	29
65	5	2145	13.4800	0.8992	28
66	5	2150	14.8368	0.8992	18
67	5	2155	14.1624	0.8992	18
68	6	2160	13.7128	0.8992	18
69	6	2165	12.3640	0.8992	22
70	6	2170	9.2168	1.1240	38
71	6	2175	5.1704	1.1240	51
72	6	2180	5.3952	1.1240	52
73	6	2185	5.6200	1.1240	51

Table A.4. Raw Data for Aluminum With 40° Tool, Test AL 56, Revolution 2

OBS	REV	DEG	FH	FV	PHI
1	6	2190	5.8448	1.1240	48
2	6	2195	6.5192	1.1240	48
3	6	2200	7.1936	1.1240	45
4	6	2205	8.7672	1.3488	41
5	6	2210	10.1160	1.1240	36
6	6	2216	11.0152	1.1240	32
7	6	2220	11.6896	1.1240	31
8	6	2225	12.3640	1.1240	29
9	6	2230	13.7128	1.1240	26
10	6	2235	14.6120	1.1240	23
11	6	2240	15.7360	1.1240	22
12	6	2246	17.7592	1.1240	13
13	6	2250	16.8600	1.1240	18
14	6	2256	15.5112	0.8992	24
15	6	2261	14.6120	0.8992	.
16	6	2265	11.0152	0.8992	29
17	6	2270	5.8448	1.1240	43
18	6	2275	6.7440	1.1240	47
19	6	2280	7.4184	1.1240	45
20	6	2285	8.3176	1.1240	42
21	6	2290	8.7672	1.1240	41
22	6	2295	9.2168	1.1240	39
23	6	2300	9.4416	1.1240	39
24	6	2305	10.1160	1.1240	38
25	6	2310	11.4648	1.1240	36
26	6	2315	13.7128	1.1240	30
27	6	2320	15.7360	1.1240	.
28	6	2325	16.1856	1.1240	.
29	6	2330	16.4104	1.1240	16
30	6	2335	16.8600	1.1240	15
31	6	2340	16.6352	1.1240	16
32	6	2345	15.2864	0.8992	20
33	6	2350	15.0616	0.8992	20
34	6	2355	10.3408	1.3488	26
35	6	2360	6.0696	1.1240	47
36	6	2365	6.7440	1.1240	47
37	6	2370	7.1936	1.1240	46
38	6	2375	7.8680	1.1240	45
39	6	2380	9.2168	1.1240	43
40	6	2385	9.4416	1.1240	43
41	6	2390	9.8912	1.1240	43
42	6	2395	9.8912	0.8992	42
43	6	2400	11.6896	1.3488	35
44	6	2405	12.5888	1.3488	32
45	6	2410	13.4880	1.3488	31
46	6	2415	14.1624	1.1240	29
47	6	2420	14.1624	1.1240	29
48	6	2425	15.2864	1.1240	27
49	6	2430	15.0616	1.1240	24
50	6	2435	14.1624	0.8992	25
51	6	2441	12.1392	0.8992	28
52	6	2445	7.4184	1.1240	44
53	6	2450	5.6200	1.1240	49
54	6	2455	6.7440	1.1240	48

Table A.4 (Continued)

OBS	REV	DEC	FH	FV	PHI
55	6	2460	7.4184	1.3488	46
56	6	2465	8.0928	1.1240	45
57	6	2470	8.3176	1.1240	44
58	6	2475	8.5424	1.1240	42
59	6	2480	9.4416	1.1240	41
60	6	2485	10.1160	1.3488	40
61	6	2490	11.0152	1.3488	39
62	6	2495	12.5888	1.1240	35
63	6	2500	14.6120	1.1240	30
64	6	2505	15.2864	1.1240	26
65	6	2510	16.1856	1.1240	25
66	6	2515	16.6352	0.8992	23
67	7	2520	16.4104	0.8992	20
68	7	2525	16.1856	0.8992	21
69	7	2530	14.1624	1.1240	21
70	7	2535	5.8448	1.1240	46
71	7	2540	5.8448	1.1240	48
72	7	2545	6.5192	1.1240	47

Table A.5. Raw Data for Aluminum With 40° Tool, Test Al 63, Revolution 3

OBS	REV	DEG	FH	FV	PHI
1	7	2550	7.4184	1.1240	45
2	7	2555	8.3176	1.1240	45
3	7	2560	8.9920	1.1240	42
4	7	2565	9.8912	1.3488	41
5	7	2570	9.6664	1.1240	41
6	7	2575	10.1160	1.1240	37
7	7	2585	12.8136	0.8992	32
8	7	2580	11.0152	0.8992	.
9	7	2590	13.9376	1.1240	28
10	7	2595	14.8368	1.1240	26
11	7	2600	15.7360	1.1240	.
12	7	2605	15.9608	0.8992	21
13	7	2610	16.4104	0.8992	21
14	7	2615	15.9608	0.6744	20
15	7	2620	15.2864	0.8992	22
16	7	2625	13.4880	0.8992	25
17	7	2630	6.2944	0.8992	48
18	7	2635	6.5192	1.1240	50
19	7	2640	7.1936	1.1240	48
20	7	2645	8.3176	1.1240	46
21	7	2650	8.5424	1.1240	45
22	7	2656	9.2168	1.1240	41
23	7	2660	9.6664	1.1240	40
24	7	2666	10.1160	1.1240	40
25	7	2670	11.0152	1.1240	.
26	7	2675	13.0384	1.1240	.
27	7	2680	13.7128	1.1240	.
28	7	2685	14.3872	1.1240	.
29	7	2690	14.3872	1.1240	.

Table A.6. Raw Data for Aluminum With 40° Tool, Test Al 03, [100] Cutting Direction: DEG = 171

OBS	REV	DEG	FH	FV	PHI
1	0	161	8.9920	0.8992	27
2	0	165	4.4960	0.4496	30
3	0	170	4.4960	0.4496	30
4	0	175	5.3952	0.8992	29
5	0	180	6.2944	0.8992	28
6	0	185	7.1936	0.8992	27
7	0	190	8.5424	0.8992	25
8	0	195	11.2400	0.8992	22
9	0	200	12.1392	0.4496	22
10	0	205	15.2864	0.8992	21
11	0	211	17.5344	1.3488	17
12	0	215	17.9840	1.3488	15
13	0	220	20.6816	1.3488	15
14	0	225	21.5808	1.3488	12
15	0	230	22.4800	1.7984	11
16	0	235	23.3792	1.3488	6
17	0	240	23.8288	1.3488	6
18	0	245	25.1776	1.3488	6
19	0	250	23.8288	0.8992	8
20	0	255	12.5888	1.3488	24
21	0	260	7.1936	0.4496	28
22	0	265	8.0928	0.8992	30
23	0	270	9.4416	1.3488	26
24	0	275	10.7904	0.8992	32
25	0	280	11.6896	1.3488	32
26	0	285	12.1392	1.3488	22
27	0	290	13.0384	1.3488	20
28	0	295	14.3872	1.3488	20
29	0	300	17.9840	1.3488	19
30	0	305	22.0304	1.3488	13
31	0	315	26.9760	1.3488	4
32	0	320	28.3248	1.7984	3
33	0	325	30.5728	1.7984	.
34	0	330	30.5728	1.3488	.
35	0	335	28.7744	1.3488	5
36	0	340	25.6272	0.4496	6
37	0	345	14.3872	1.3488	21
38	0	350	10.3408	0.8992	34
39	0	355	11.6896	0.0992	38
40	1	360	14.3872	1.3488	32
41	1	366	19.7824	1.7984	29
42	1	370	22.9296	1.7984	20
43	1	375	24.7280	1.7984	.
44	1	380	25.6272	1.7984	.

Table A.7. Raw Data for Aluminum With 50° Tool, Test Al 57, Revolution 1, [100] Direction: DEG = 3576

OBS	REV	DEG	FH	FV	PHI
1	9	3495	4.9456	1.3488	48
2	9	3501	5.8448	1.2364	.
3	9	3506	6.2944	1.2364	40
4	9	3510	6.2944	1.2364	40
5	9	3515	6.7440	1.1240	35
6	9	3520	6.9688	1.2364	.
7	9	3525	7.1936	1.1240	34
8	9	3530	7.6432	1.2364	.
9	9	3535	8.7672	0.8992	30
10	9	3540	9.4416	0.7868	28
11	9	3546	11.2400	0.7868	25
12	9	3550	10.7904	0.7868	22
13	9	3555	10.3408	0.7868	25
14	9	3560	10.5656	0.6744	25
15	9	3565	9.4416	0.7868	26
16	9	3570	4.9456	1.2364	46
17	9	3575	4.9456	1.3488	48
18	9	3580	4.9456	1.3488	47
19	9	3585	5.1704	1.2364	45
20	9	3590	5.6200	1.2364	44
21	9	3596	6.2944	1.1240	43
22	10	3600	6.2944	1.1240	40
23	10	3605	6.7440	1.0116	35
24	10	3610	7.1936	0.8992	34
25	10	3615	7.8680	0.7868	.
26	10	3620	8.0928	0.6744	.
27	10	3625	8.7672	0.5620	31
28	10	3630	8.9920	0.5620	25
29	10	3635	8.3176	0.4496	25
30	10	3640	7.6432	0.3372	.
31	10	3645	6.9688	0.2248	.
32	10	3650	7.4184	0.5620	.
33	10	3655	6.5192	1.0116	.
34	10	3660	4.7208	1.0116	.
35	10	3665	4.7208	1.1240	.
36	10	3670	4.9456	1.2364	.
37	10	3675	5.3952	1.2364	.
38	10	3680	5.8448	1.1240	.
39	10	3685	6.0696	1.1240	.
40	10	3695	6.9688	1.0116	.
41	10	3700	7.4184	0.8992	.

Table A.8. Raw Data for Aluminum With 50° Tool, Test Al 57, Revolution 2

OBS	REV	DEC	FH	FV	PHI
1	10	3860	6.7440	1.3488	47
2	10	3866	7.6432	1.1240	46
3	10	3871	7.8680	1.1240	41
4	10	3875	8.0928	1.0116	40
5	10	3880	8.5424	1.0116	39
6	10	3885	9.2168	0.8992	37
7	10	3890	9.8912	0.8992	36
8	10	3895	11.4648	0.6744	35
9	10	3900	12.1392	0.5620	33
10	10	3905	13.7128	0.5620	22
11	10	3910	13.7128	0.5620	24
12	10	3915	12.8136	0.5620	24
13	10	3920	12.1392	0.4496	22
14	10	3925	9.6664	0.7868	25
15	10	3930	5.8448	1.2364	44
16	10	3935	5.6200	1.2364	46
17	10	3940	5.8448	1.2364	46
18	10	3945	6.0696	1.2364	45
19	10	3950	6.5192	1.1240	42
20	10	3955	6.9688	1.1240	41
21	11	3960	7.6432	1.0116	40
22	11	3965	8.3176	1.0116	39
23	11	3970	8.5424	0.7868	39
24	11	3975	9.2168	0.6744	37
25	11	3980	9.4416	0.5620	36
26	11	3985	10.7904	0.4496	28
27	11	3990	11.2400	0.4496	26
28	11	3995	10.7904	0.3372	21
29	11	4000	9.6664	0.3372	.
30	11	4005	8.9920	0.4496	24
31	11	4010	8.9920	0.4496	24
32	11	4015	7.1936	0.8992	31
33	11	4020	5.3952	1.0116	36
34	11	4025	5.1704	1.1240	44
35	11	4030	5.6200	1.2364	43
36	11	4035	6.0696	1.2364	42
37	11	4040	6.5192	1.1240	42
38	11	4045	6.9688	1.0116	41
39	11	4050	7.4184	1.0116	39
40	11	4055	7.8680	0.8992	37
41	11	4060	8.0928	0.8992	37
42	11	4065	8.7672	0.7868	37
43	11	4070	9.4416	0.7868	34
44	11	4075	10.7904	0.6744	28
45	11	4080	11.9144	0.5620	25
46	11	4085	12.8136	0.4496	25
47	11	4090	12.8136	0.4496	25
48	11	4096	12.5888	0.5620	26
49	11	4100	12.1392	0.3372	.
50	11	4105	9.6664	0.6744	28
51	11	4110	5.6200	1.1240	47
52	11	4115	5.6200	1.2364	48
53	11	4120	5.8448	1.2364	48
54	11	4125	6.2944	1.1240	44

Table A.8 (Continued)

OBS	REV	DEG	FH	FV	PHI
55	11	4130	6.5192	1.1240	42
56	11	4135	7.4184	1.1240	41
57	11	4141	8.0928	1.1240	39
58	11	4145	8.5424	1.0116	38
59	11	4150	9.6664	0.6744	37
60	11	4160	9.8912	0.4496	37
61	11	4165	11.9144	0.4496	26
62	11	4170	12.8136	0.3372	23
63	11	4175	12.8136	0.3372	23
64	11	4180	12.3640	0.3372	24
65	11	4185	7.8680	0.4496	30
66	11	4190	2.6976	0.3372	48
67	11	4201	5.6200	1.3488	46
68	11	4206	6.0696	1.2364	46
69	11	4210	6.2944	1.3488	43
70	11	4215	6.7440	1.3488	42
71	11	4220	7.4184	1.2364	40

Table A.9. Raw Data for Aluminum With 50° Tool, Test Al 57, Revolution 3

OBS	REV	DEC	FH	FV	PHI
1	11	4225	8.3176	1.1240	39
2	11	4230	8.7672	1.0116	37
3	11	4235	9.2168	1.0116	35
4	11	4240	9.4416	0.8992	34
5	11	4245	10.1160	0.7868	34
6	11	4250	10.7904	0.7868	32
7	11	4255	12.3640	0.6744	28
8	11	4260	13.4880	0.4496	22
9	11	4265	14.3872	0.4496	21
10	11	4270	14.3872	0.4496	21
11	11	4276	13.7128	0.5620	27
12	11	4280	13.2632	0.3372	.
13	11	4285	10.3408	0.5620	.
14	11	4290	6.0696	1.1240	.
15	11	4295	6.0696	1.2364	.
16	11	4300	6.2944	1.2364	.
17	11	4306	6.7440	1.1240	.
18	11	4311	7.4184	1.1240	.
19	11	4315	7.8680	1.0116	.
20	12	4320	8.3176	1.0116	.
21	12	4325	8.7672	0.8992	.
22	12	4330	9.4416	0.7868	.
23	12	4336	10.5656	0.6744	.
24	12	4340	10.5656	0.5620	.
25	12	4345	11.6896	0.4496	.
26	12	4350	12.8136	0.3372	27
27	12	4355	12.5888	0.3372	27
28	12	4360	12.5888	0.3372	27
29	12	4365	10.7904	0.3372	28
30	12	4370	9.2168	0.3372	30
31	12	4375	7.6432	0.8992	37
32	12	4380	5.8448	0.8992	48
33	12	4385	5.6200	1.0116	49
34	12	4390	6.0696	1.1240	49
35	12	4395	6.7440	1.1240	49
36	12	4400	6.9688	1.1240	48
37	12	4405	7.6432	1.0116	44
38	12	4410	8.0928	0.8992	43
39	12	4415	8.7672	0.7868	41
40	12	4420	8.9920	0.7868	41
41	12	4425	9.4416	0.7868	40
42	12	4430	10.5656	0.7868	38
43	12	4435	12.1392	0.5620	32
44	12	4440	13.0384	0.4496	31
45	12	4446	14.1624	0.3372	24
46	12	4450	14.1624	0.3372	24
47	12	4456	13.7128	0.4496	27
48	12	4460	13.0384	0.2248	29
49	12	4465	12.1392	0.5620	30
50	12	4470	6.0696	1.1240	43
51	12	4475	6.0696	1.1240	43
52	12	4480	6.2944	1.1240	.
53	12	4485	6.9688	1.1240	.
54	12	4490	7.1936	1.1240	.

Table A.9 (Continued)

OBS	REV	DEG	FH	FV	PHI
55	12	4495	8.3176	1.0116	.
56	12	4501	8.9920	1.0116	.
57	12	4505	10.1160	0.8992	.
58	12	4510	10.7904	0.7868	.
59	12	4515	11.9144	0.4496	30
60	12	4520	13.7128	0.3372	23
61	12	4526	15.0616	0.2248	19
62	12	4530	15.5112	0.2248	19
63	12	4535	16.4104	0.2248	18
64	12	4540	17.3096	0.0000	17
65	12	4545	15.7360	0.2248	19
66	12	4550	13.4880	0.1124	22
67	12	4555	6.2944	0.7868	37
68	12	4560	6.2944	1.1240	44
69	12	4565	6.5192	1.2364	49
70	12	4570	7.1936	1.2364	47
71	12	4575	7.6432	1.2364	45
72	12	4580	8.3176	1.1240	40
73	12	4585	8.9920	1.0116	39

Table A.10. Raw Data for Aluminum With 50° Tool, Test Al 57, Revolution 4

OBS	REV	DEG	FH	FV	PHI
1	12	4590	9.4416	0.8992	37
2	12	4595	9.8912	0.8992	37
3	12	4600	10.1160	0.7868	37
4	12	4605	11.0152	0.7868	36
5	12	4610	11.6896	0.6744	30
6	12	4615	13.0384	0.5620	24
7	12	4620	14.8368	0.3372	21
8	12	4625	15.7360	0.2248	19
9	12	4630	15.7360	0.3372	19
10	12	4635	15.0616	0.2248	23
11	12	4640	13.9376	0.2248	26
12	12	4645	11.0152	0.5620	29
13	12	4650	6.7440	1.0116	41
14	12	4655	6.5192	1.1240	41
15	12	4660	6.7440	1.1240	40
16	12	4665	6.9688	1.1240	40
17	12	4670	7.6432	1.0116	39
18	12	4675	8.5424	1.0116	36
19	13	4680	8.9920	0.8992	.
20	13	4685	9.6664	0.8992	35
21	13	4690	10.3408	0.7868	34
22	13	4695	11.4648	0.5620	33
23	13	4700	11.6896	0.4496	33
24	13	4705	12.3640	0.4496	32
25	13	4710	13.7128	0.4496	.
26	13	4715	14.1624	0.1124	.
27	13	4720	14.1624	0.3372	29
28	13	4725	12.8136	0.2248	26
29	13	4730	11.0152	0.4496	.
30	13	4737	7.4184	0.8992	31
31	13	4740	6.0696	0.8992	40
32	13	4745	6.0696	1.0116	42
33	13	4750	6.2944	1.1240	47
34	13	4755	6.9688	1.1240	41
35	13	4760	7.4184	1.0116	40
36	13	4770	7.0680	0.8992	40
37	13	4775	8.7672	0.8992	.
38	13	4780	8.9920	0.7868	34
39	13	4785	9.4416	0.7868	33
40	13	4790	10.1160	0.7868	32
41	13	4795	12.5888	0.5620	30
42	13	4800	14.3872	0.4496	21
43	13	4805	14.6120	0.3372	21
44	13	4810	14.6120	0.3372	21
45	13	4815	14.3872	0.3372	23
46	13	4820	13.9376	0.2248	25
47	13	4825	11.9144	0.5620	26
48	13	4830	6.2944	1.0116	40
49	13	4835	6.2944	1.1240	50
50	13	4840	6.5192	1.1240	49
51	13	4845	6.9688	1.1240	48
52	13	4850	7.6432	1.1240	47
53	13	4855	8.0928	1.0116	46
54	13	4861	9.2168	1.0116	44

Table A.10 (Continued)

OBS	REV	DEC	FR	FV	PHI
55	13	4865	9.6664	0.8992	38
56	13	4870	11.0152	0.7868	35
57	13	4875	12.5888	0.4496	34
58	13	4881	13.2632	0.3372	31
59	13	4885	14.0368	0.2248	26
60	13	4890	15.7360	0.2248	21
61	13	4895	17.0848	0.2248	19
62	13	4900	16.6352	0.2248	19
63	13	4905	16.4104	0.1124	20
64	13	4910	15.9616	0.2248	.
65	13	4915	13.4888	0.1124	
66	13	4920	6.5192	1.0116	43
67	13	4925	6.7440	1.1240	43
68	13	4930	6.9688	1.2364	42
69	13	4935	7.4184	1.2364	41
70	13	4940	8.0928	1.1240	39
71	13	4945	9.2168	1.0116	39
72	13	4950	9.6664	0.8992	37
73	13	4955	10.3408	0.8992	36
74	13	4961	10.8656	0.7868	36
75	13	4965	11.0152	0.6744	35
76	13	4970	12.1392	0.6744	33

Table A.11. Raw Data for Aluminum With 50° Tool, Test A1 57, Revolution 5

OBS	REV	DEG	FH	FV	PHI
1	13	4975	13.4880	0.4496	.
2	13	4985	15.9608	0.2248	.
3	13	4990	15.7360	0.2248	.
4	13	5000	14.6120	0.2248	25
5	13	5005	13.0384	0.2248	27
6	13	5010	6.7440	0.8992	42
7	13	5015	6.5192	1.1240	50
8	13	5020	6.9688	1.1240	48
9	13	5025	7.1936	1.1240	45
10	13	5030	7.6432	1.0116	44
11	13	5035	8.5424	1.0116	.
12	14	5041	9.2168	0.8992	.
13	14	5046	9.6664	0.7868	.
14	14	5050	10.1160	0.7868	.
15	14	5092	1.1240	.	.
16	14	5060	12.1392	0.4496	.
17	14	5065	12.8136	0.3372	.
18	14	5070	13.7128	0.2248	.
19	14	5075	14.1624	0.3372	.
20	14	5080	13.7128	0.1124	.
21	14	5085	13.7128	0.2248	.
22	14	5090	12.1392	0.3372	.
23	14	5096	7.8680	0.7868	.
24	14	5100	6.2944	0.7868	.
25	14	5106	6.2944	1.1240	.
26	14	5110	6.2944	1.1240	.
27	14	5115	6.9688	1.1240	.
28	14	5120	7.4184	1.0116	.
29	14	5125	7.8680	0.8992	.
30	14	5130	8.7672	0.7868	.
31	14	5135	8.9920	0.7868	.
32	14	5141	9.6664	0.7868	.
33	14	5145	10.1160	0.6744	.
34	14	5150	11.0152	0.6744	.
35	14	5155	12.3640	0.5620	.
36	14	5160	13.7128	0.3372	.
37	14	5165	14.3872	0.3372	.
38	14	5171	15.0616	0.4496	.
39	14	5176	14.6120	0.4496	.
40	14	5180	14.1624	0.2248	.

Table A.12. Raw Data for Copper With 20° Tool, Test Cu 06, [100] Cutting Direction: DEG = 830

OBS	REV	DEG	FH	FV	PHI
1	2	735	98.912	24.728	22
2	2	740	97.788	24.728	19
3	2	745	103.408	25.852	15
4	2	750	104.532	25.852	13
5	2	755	104.532	25.852	13
6	2	760	109.028	28.100	12
7	2	765	114.648	30.348	12
8	2	770	121.392	32.596	12
9	2	775	130.384	38.216	9
10	2	780	136.004	41.588	8
11	2	785	144.996	43.836	7
12	2	791	152.864	47.208	7
13	2	795	162.980	49.456	5
14	2	800	165.228	49.456	4
15	2	805	171.972	53.952	2
16	2	810	168.600	53.952	4
17	2	815	149.492	47.208	7
18	2	820	137.128	42.712	8
19	2	825	124.764	35.968	11
20	2	830	98.912	25.852	14
21	2	835	104.532	26.976	3
22	2	840	106.780	29.224	13
23	2	845	104.532	28.100	13
24	2	850	106.780	29.224	12
25	2	855	112.400	31.472	11
26	2	860	118.020	33.720	11
27	2	865	123.640	37.092	8
28	2	870	129.260	39.340	10
29	2	876	137.128	43.836	10
30	2	880	143.872	46.084	9
31	2	885	162.980	51.704	7
32	2	890	171.972	57.324	5
33	2	895	180.964	60.696	4
34	2	900	183.212	61.820	3
35	2	905	179.840	61.820	4
36	2	910	167.476	59.572	7
37	2	915	160.732	57.324	7
38	2	925	125.888	40.464	11
39	2	920	147.244	52.828	9
40	2	930	115.772	30.348	12
41	2	935	116.896	32.596	12
42	2	940	110.152	30.348	13
43	2	945	119.144	34.844	13
44	2	950	121.392	37.092	13
45	2	955	130.384	41.588	12
46	2	960	138.252	46.084	11
47	2	965	151.740	51.704	10
48	2	970	161.856	53.952	8
49	2	975	173.096	58.448	7
50	2	980	182.088	62.944	4
51	2	985	186.584	65.192	3
52	2	990	176.468	64.068	5
53	2	995	165.228	59.572	6
54	2	1000	153.988	53.952	7

Table A.12 (Continued)

OBS	REV	DEC	FH	FV	PHI
55	2	1005	146.120	48.332	8
56	2	1010	138.252	40.464	10
57	2	1015	128.136	38.216	13
58	2	1020	128.136	39.340	13
59	2	1025	130.384	43.836	15
60	2	1031	147.244	49.456	13
61	2	1035	144.996	46.084	13
62	2	1040	144.996	43.836	12
63	2	1045	153.988	48.332	8
64	2	1050	156.236	50.580	9
65	2	1055	166.352	53.952	6
66	2	1060	170.848	55.076	5
67	2	1065	179.840	58.448	4
68	2	1070	185.460	60.696	4
69	2	1076	187.708	64.068	3
70	3	1080	187.708	65.192	3
71	3	1086	183.212	65.192	4
72	3	1090	176.468	62.944	5
73	3	1095	161.856	58.448	6

Table A.13. Raw Data for Copper With 20° Tool, Test Cu 33, Revolution 1, [100] Direction: DEG = 451

OBS	REV	DEG	FH	FV	PHI
1	1	416	83.176	30.348	13
2	1	420	85.424	31.472	12
3	1	425	87.672	32.596	10
4	1	430	87.672	33.720	10
5	1	435	82.052	34.844	14
6	1	440	82.052	35.968	14
7	1	445	76.432	34.844	24
8	1	450	77.556	35.968	25
9	1	455	78.680	35.968	27
10	1	460	83.176	37.092	26
11	1	465	88.796	39.340	24
12	1	470	104.532	41.588	19
13	1	475	113.524	43.836	14
14	1	481	128.136	48.332	16
15	1	485	125.888	47.208	.
16	1	490	115.772	43.836	.
17	1	495	124.764	43.836	14
18	1	500	120.268	42.712	.
19	1	505	111.276	39.340	15
20	1	510	109.028	39.340	16
21	1	515	97.788	39.340	19
22	1	520	89.920	34.844	22
23	1	525	82.052	33.720	23
24	1	530	70.812	32.596	25
25	1	535	74.184	34.844	20
26	1	540	76.432	34.844	20
27	1	545	74.184	33.720	20
28	1	550	70.812	31.472	25
29	1	555	73.060	33.720	25
30	1	561	77.556	33.720	21
31	1	565	80.928	35.968	20
32	1	570	85.424	37.092	19
33	1	575	88.796	38.216	17
34	1	580	96.664	41.588	16
35	1	585	100.036	40.464	13
36	1	590	103.408	41.588	11
37	1	595	102.284	37.092	11
38	1	600	100.036	37.092	12
39	1	605	93.292	35.968	13
40	1	610	88.796	33.720	15
41	1	615	71.936	30.348	18
42	1	620	62.944	29.224	20
43	1	625	53.952	25.852	23
44	1	631	48.332	23.604	31
45	1	635	50.580	24.728	28
46	1	640	53.952	25.852	27
47	1	645	58.448	28.100	26
48	1	650	66.316	31.472	24
49	1	655	73.060	33.720	24
50	1	660	79.804	35.968	22
51	1	665	91.044	40.464	21
52	1	670	109.028	46.084	18
53	1	675	127.012	49.456	14
54	1	680	136.004	51.704	13

Table A.13 (Continued)

OBS	REV	DEC	FH	FV	PHI
55	1	685	144.996	55.076	10
56	1	690	132.632	53.952	12
57	1	695	125.238	52.828	12
58	1	700	123.040	51.704	10
59	1	705	119.144	51.704	20
60	1	710	113.524	50.580	21
61	1	715	109.028	49.456	22
62	2	720	105.656	49.456	22
63	2	725	109.028	51.704	22
64	2	730	111.276	52.828	19
65	2	735	114.648	53.952	15
66	2	740	118.020	55.076	15
67	2	745	116.896	52.828	15
68	2	750	124.764	55.076	12
69	2	755	132.632	56.200	12
70	2	760	141.624	59.572	11
71	2	765	149.492	61.820	9
72	2	770	150.616	61.820	10
73	2	775	150.616	61.820	9

Table A.14. Raw Data for Copper With 20° Tool, Test CU 33, Revolution 2

OBS	REV	DEG	FH	FV	PHI
1	2	780	147.244	61.820	.
2	2	785	146.120	61.820	12
3	2	790	143.872	61.820	12
4	2	795	140.500	61.820	12
5	2	800	137.128	59.572	14
6	2	805	132.632	59.572	15
7	2	810	128.136	57.324	18
8	2	815	125.888	57.324	18
9	2	820	127.012	57.324	18
10	2	825	133.756	60.696	17
11	2	830	143.872	64.068	10
12	2	835	153.988	68.564	5
13	2	840	162.980	70.812	.
14	2	845	167.476	73.060	3
15	2	850	174.220	73.060	3
16	2	855	177.592	74.184	3
17	2	860	183.212	75.308	2
18	2	865	186.584	75.308	2
19	2	870	192.204	76.432	2
20	2	875	182.088	77.556	3
21	2	880	175.344	75.308	3
22	2	885	165.228	70.812	.
23	2	890	159.608	68.564	.
24	2	895	157.360	68.564	.
25	2	900	156.236	69.688	7
26	2	905	155.112	70.812	7
27	2	910	157.360	71.936	.
28	2	915	159.608	71.936	.
29	2	920	162.980	73.060	.
30	2	925	165.228	74.184	.
31	2	930	170.848	76.432	.
32	2	936	180.964	78.680	.
33	2	940	187.708	82.052	.
34	2	945	196.700	84.300	.
35	2	950	201.196	84.300	.
36	2	955	200.072	83.176	.
37	2	960	195.576	82.052	.
38	2	965	193.328	82.052	.
39	2	970	186.584	78.680	.
40	2	975	185.460	78.680	.
41	2	980	177.592	77 556	3
42	2	985	170.848	76.432	4
43	2	990	166.352	74.184	5
44	2	995	161.856	73.060	6
45	2	1000	166.352	74.184	.
46	2	1005	170.848	76.432	.
47	2	1010	179.840	78.680	.
48	2	1015	188.832	83.176	.
49	2	1020	195.576	85.424	.
50	2	1025	198.948	86.548	.
51	2	1030	202.320	86.548	.
52	2	1035	205.692	88.796	.
53	2	1040	206.816	87.672	.

Table A.15. Raw Data for Copper With 40° Tool, Test CU 01, [100] Direction: DEG = 1825

OBS	REV	DEG	FH	FV	PHI
1	5	1806	71.936	25.852	20
2	5	1811	64.068	23.604	16
3	5	1816	61.820	21.356	14
4	5	1821	43.836	16.860	44
5	5	1826	47.208	16.860	43
6	5	1831	48.332	17.984	40
7	5	1836	51.704	17.984	31
8	5	1841	53.952	20.232	26
9	5	1846	57.324	20.232	31
10	5	1851	59.572	22.480	29
11	5	1861	92.168	35.968	14
12	5	1868	114.648	44.960	5
13	5	1871	116.896	43.836	5
14	5	1876	115.772	43.836	5
15	5	1881	111.276	42.712	6
16	5	1886	103.408	40.464	9
17	5	1891	94.416	37.092	12
18	5	1896	86.548	32.596	14
19	5	1901	74.184	25.852	21
20	5	1906	77.556	29.224	15
21	5	1911	65.192	24.728	15
22	5	1916	67.440	23.604	15
23	5	1921	47.208	15.736	34
24	5	1926	55.076	19.108	30
25	5	1931	57.324	20.232	35
26	5	1936	60.696	22.480	33
27	5	1941	65.192	24.728	28
28	5	1946	73.060	29.224	22
29	5	1951	86.548	34.844	13
30	5	1956	98.912	38.216	12
31	5	1961	109.028	40.464	7
32	5	1967	110.152	41.588	6
33	5	1971	103.408	39.340	7
34	5	1976	92.168	33.720	8
35	5	1981	77.556	28.100	13
36	5	1986	71.936	28.100	20
37	5	1991	73.060	29.224	24
38	5	1996	78.680	30.348	28
39	5	2001	65.192	23.604	31
40	5	2006	59.572	21.356	45
41	5	2011	64.068	21.356	35
42	5	2016	65.192	22.480	42
43	5	2021	67.440	23.604	36
44	5	2026	69.688	25.852	30
45	5	2031	74.184	28.100	30
46	5	2036	77.556	31.472	32
47	5	2041	91.044	35.968	19
48	5	2046	110.152	40.464	9
49	5	2051	120.268	43.836	4
50	5	2056	119.144	43.836	4
51	5	2061	115.772	42.712	6
52	5	2066	104.532	40.464	9
53	5	2071	92.168	34.844	12
54	5	2076	88.796	34.844	12

Table A.15 (Continued)

OBS	REV	DEC	FH	FV	PHI
55	5	2081	85.424	31.472	15
56	5	2086	92.168	33.720	14
57	5	2091	68.564	24.728	28
58	5	2096	62.944	22.480	32
59	5	2101	62.944	21.356	32
60	5	2106	65.192	22.480	32
61	5	2111	70.812	25.852	30
62	5	2116	77.556	28.104	28
63	5	2121	84.300	31.472	27
64	5	2126	68.564	38.216	22
65	5	2130	116.896	43.836	13
66	5	2136	132.632	49.456	9
67	5	2141	143.872	52.828	6
68	5	2146	148.368	53.952	4
69	5	2151	149.492	53.952	4
70	5	2156	141.624	51.704	6
71	5	2161	123.640	48.332	8

Table A.16. Raw Data for Copper With 40° Tool, Test Cu 32, [100] Direction: DEG = 425

OBS	REV	DEG	FH	FV	PHI
1	1	360	26.976	.	50
2	1	365	32.596	.	48
3	1	370	40.464	.	45
4	1	375	49.456	.	42
5	1	380	56.200	.	40
6	1	385	59.572	.	35
7	1	390	69.688	.	30
8	1	395	80.928	.	26
9	1	400	92.168	.	22
10	1	405	98.912	.	18
11	1	410	105.656	.	20
12	1	415	107.904	.	25
13	1	420	88.796	.	30
14	1	425	51.704	.	42
15	1	430	55.076	.	41
16	1	435	60.696	.	38
17	1	440	68.564	.	37
18	1	445	74.184	.	35
19	1	450	79.804	.	34
20	1	455	85.424	.	33
21	1	460	91.044	.	31
22	1	465	98.912	.	30
23	1	470	104.532	.	27
24	1	475	107.904	.	25
25	1	480	114.648	.	22
26	1	485	124.764	.	17
27	1	490	125.888	.	17
28	1	495	124.764	.	19
29	1	500	121.392	.	24
30	1	505	120.268	.	25
31	1	510	106.780	.	27
32	1	515	55.076	.	41
33	1	520	52.828	.	42
34	1	525	57.324	.	40
35	1	530	62.944	.	40
36	1	535	69.688	.	36
37	1	540	76.432	.	35
38	1	545	84.300	.	30
39	1	550	77.556	.	32
40	1	555	93.292	.	28
41	1	560	95.540	.	28
42	1	565	101.160	.	26
43	1	570	106.780	.	.
44	1	575	115.772	.	23
45	1	580	122.516	.	17
46	1	585	121.392	.	17
47	1	590	119.144	.	21
48	1	595	113.524	.	23
49	1	600	65.192	.	39
50	1	605	50.580	.	45
51	1	610	160.732	.	46
52	1	615	50.580	.	45
53	1	620	48.332	.	45
54	1	625	55.076	.	39

Table A.16 (Continued)

OBS	REV	DEC	FH	FV	PHI
55	1	630	61.820	.	38
56	1	635	62.944	.	33
57	1	657	65.192	.	33
58	1	660	70.812	.	32
59	1	665	82.052	.	.
60	1	670	88.796	.	22
61	1	375	93.292	.	25
62	1	680	92.168	.	25
63	1	685	84.300	.	28
64	1	690	60.696	.	39
65	1	695	52.828	.	42
66	1	700	56.200	.	40
67	1	705	64.068	.	38
68	1	710	74.184	.	37
69	1	715	82.052	.	35
70	2	721	88.796	.	33
71	2	725	94.416	.	33
72	2	730	97.788	.	30
73	2	735	100.036	.	30
74	2	740	100.036	.	30
75	2	745	95.540	.	.
76	2	750	93.292	.	34
77	2	755	83.176	.	35
78	2	760	75.308	.	38
79	2	765	68.564	.	39

APPENDIX B

Computed Mechanics on the Shear Plane

Table B.1. Computed Mechanics on the Shear Plane for Aluminum With 30° Tool, Test Al 63, Revolution 1

OBS	DEG	FS	FN	AS
1	670	7.6423	12.5753	0.00050405
2	675	8.6302	12.9185	0.00051484
3	680	8.8962	12.4742	0.00053837
4	685	9.1434	12.5197	0.00053837
5	690	9.9983	12.7639	0.00056488
6	695	10.1824	12.8929	0.00056488
7	700	11.7622	13.6695	0.00059489
8	705	15.0269	14.3550	0.00069014
9	710	17.8990	15.6080	0.00073910
10	715	23.3231	14.7874	0.00104848
11	720	27.9697	10.9682	0.00232803
12	725	29.4408	11.0890	0.00265858
13	730	30.7522	11.4765	0.00265858
14	735	31.1436	11.9775	0.00265858
15	740	31.1299	12.0891	0.00265858
16	745	28.5589	13.7694	0.00155835
17	750	24.4994	13.6629	0.00125184
18	755	19.8802	13.3835	0.00099518
19	760	9.7939	13.1506	0.00053837
20	766	8.8923	13.1840	0.00050405
21	770	9.0922	13.6452	0.00050405
22	775	11.8406	14.2990	0.00055122
23	780	11.7582	14.7949	0.00055122
24	785	12.8265	14.7526	0.00057941
25	791	14.2793	15.5721	0.00059489
26	795	15.9313	16.2601	0.00062908
27	800	19.3626	16.1968	0.00073910
28	805	23.7532	15.5831	0.00094731
29	810	27.4056	15.3420	0.00117545
30	815	29.7787	15.3019	0.00133927
31	820	30.6478	15.1506	0.00144031
32	825	31.8198	14.2004	0.00169803
33	830	30.6478	15.1506	0.00144031
34	835	28.8253	16.0998	0.00117545
35	840	26.9187	15.7522	0.00110818
36	845	23.6064	14.6431	0.00104848
37	850	17.6387	14.3020	0.00076665
38	855	9.7903	12.5315	0.00055122
39	860	8.7384	12.4276	0.00051484
40	865	9.0171	12.7979	0.00051484
41	870	9.4582	12.4754	0.00053837
42	875	11.6498	13.2811	0.00057941
43	880	12.8681	13.5017	0.00062908
44	885	15.1886	14.3308	0.00066830
45	890	18.7524	14.5733	0.00076665
46	895	20.3155	14.8509	0.00082921
47	900	23.0091	15.3338	0.00090410
48	905	26.1516	13.1233	0.00133927
49	910	26.7434	12.5792	0.00155835
50	915	24.3695	13.2790	0.00125184
51	920	21.6074	13.5208	0.00104848
52	925	20.0087	13.3829	0.00094731
53	930	15.6963	13.1483	0.00076665
54	935	7.1489	11.8819	0.00040421

Table B.1 (Continued)

OBS	DEG	FS	FN	AS
55	940	7.7682	11.9654	0.00049386
56	945	10.0982	11.9633	0.00057941
57	950	10.8313	11.9372	0.00061141
58	955	11.7508	12.3058	0.00062908
59	960	11.6929	12.4022	0.00062908
60	965	12.4094	12.2263	0.00064800
61	970	13.4073	12.4438	0.00066830
62	975	14.8311	12.9813	0.00071367
63	980	17.0173	12.8403	0.00082921
64	985	20.3539	12.2863	0.00104848
65	990	20.0702	12.1413	0.00099518
66	995	22.2830	12.0022	0.00117545
67	1000	25.8279	10.8601	0.00169803
68	1006	24.8940	12.0918	0.00144031
69	1010	25.5410	11.7490	0.00155835
70	1015	25.4709	12.0789	0.00155835
71	1020	23.5300	12.9377	0.00125184
72	1025	19.9900	13.0647	0.00099518
73	1030	14.4542	12.9275	0.00073910

Table B.2. Computed Mechanics on the Shear Plane for Aluminum With 30° Tool, Test Al 61, Revolution 1

OBS	DEG	FS	FN	AS
1	1035	8.3183	12.2320	0.00051484
2	1040	8.9235	12.6774	0.00052626
3	1045	10.3507	13.1507	0.00056488
4	1050	10.8393	13.2767	0.00057941
5	1055	11.8084	13.3430	0.00061141
6	1060	12.2929	13.3272	0.00064800
7	1065	13.3977	13.8522	0.00066830
8	1070	15.1146	13.6247	0.00073910
9	1075	19.0612	14.9290	0.00082921
10	1080	21.7758	16.3141	0.00086491
11	1085	25.0168	15.0532	0.00110818
12	1090	27.4886	13.8444	0.00144031
13	1095	29.2147	13.4[illegible]0	0.00169803
14	1100	29.4139	13.6183	0.00169803
15	1105	.	.	.
16	1110	.	.	.
17	1115	.	.	.
18	1120	17.3559	15.7207	0.00069014
19	1125	6.9749	11.1549	0.00052626
20	1130	5.5111	10.4501	0.00049386
21	1135	6.1136	11.0253	0.00051484
22	1140	7.4869	10.6087	0.00057941
23	1146	7.9836	10.5554	0.00061141
24	1150	8.6289	10.9545	0.00062908
25	1155	9.1519	11.1244	0.00064800
26	800	11.8637	12.1639	0.00069014
27	1165	.	.	.
28	1170	16.3487	14.9407	0.00076663
29	1175	.	.	.
30	1180	23.2689	14.2727	0.00117543
31	1185	25.1437	14.3779	0.00133927
32	1190	.	.	.
33	1195	.	.	.
34	1200	.	.	.
35	1205	20.7379	15.3229	0.00094731
36	1210	17.0687	15.5245	0.00076663
37	1215	7.5214	11.9901	0.00056488
38	1220	4.7515	10.1770	0.00048421
39	1226	4.9186	10.3274	0.00048421
40	1230	.	.	.
41	1235	7.1716	10.9219	0.00056488
42	1240	7.2913	11.1429	0.00056488
43	1245	7.2913	11.1429	0.00056488
44	1250	8.1801	11.3432	0.00059489
45	1255	12.4977	12.0288	0.00076663
46	1260	14.0519	12.6543	0.00079638
47	1265	15.6934	12.7656	0.00086491
48	1270	19.1861	12.9705	0.00104848
49	1275	19.2610	13.4675	0.00104848
50	1280	18.5613	13.7615	0.00099518
51	1285	16.9717	13.4978	0.00090410
52	1290	14.8176	12.5330	0.00086491
53	1295	12.8197	12.1056	0.00079638
54	1300	5.9080	9.0635	0.00059489

Table B.2 (Continued)

OBS	DEG	FS	FN	AS
55	1305	3.0541	7.5515	0.00050405
56	1310	3.7096	7.9214	0.00051484
57	1315	3.5681	8.0961	0.00051484
58	1320	2.8481	7.6885	0.00049386
59	1325	2.4351	7.4783	0.00049386
60	1330	3.1774	7.6174	0.00052626
61	1335	4.5477	8.3985	0.00056488
62	1340	6.4172	9.9303	0.00059489
63	1345	8.8336	10.6801	0.00069014
64	1350	10.3785	10.4036	0.00079658
65	1355	11.3423	10.6757	0.00082921
66	1360	14.1323	11.1244	0.00094731
67	1365	.	.	.
68	1370	.	.	.
69	1375	.	.	.
70	1380	15.7130	10.8431	0.00125184
71	1385	15.5250	10.6764	0.00125184
72	1390	13.7355	11.6109	0.00086491
73	1395	8.5356	9.1654	0.00073910

Table B.3. Computed Mechanics on the Shear Plane for Aluminum With 40° Tool, Test Al 56, Revolution 1

OBS	DEG	FS	FN	AS
1	1825	3.0590	5.41312	0.000339099
2	1830	3.7662	6.01654	0.000344566
3	1836	3.9196	6.18095	0.000344566
4	1840	4.8076	6.92014	0.000350321
5	1845	4.8021	7.23801	0.000350321
6	1850	4.4953	6.59673	0.000350321
7	1856	5.2079	6.90430	0.000362768
8	1860	5.7798	7.01919	0.000376607
9	1865	7.7549	7.30152	0.000428727
10	1870	9.1232	7.78067	0.000450649
11	1875	9.8232	7.98756	0.000462691
12	1880	11.2835	8.33159	0.000503999
13	1885	12.7056	8.23993	0.000555076
14	1890	12.5419	7.61779	0.000574854
15	1895	12.0617	7.11272	0.000596281
16	1900	12.0789	5.59251	0.000736797
17	1905	5.0310	5.86269	0.000384111
18	1910	2.5433	4.13290	0.000356381
19	1915	3.4078	5.14691	0.000350321
20	1920	3.9087	5.33716	0.000362768
21	1925	4.9279	5.94960	0.000376607
22	1930	5.7096	6.45262	0.000384111
23	1935	5.8793	6.60010	0.000384111
24	1940	6.2186	6.89507	0.000384111
25	1945	6.7868	7.01411	0.000409315
26	1950	7.6263	7.43575	0.000418732
27	1955	8.4336	7.55188	0.000439348
28	1960	10.2751	8.84129	0.000439348
29	1965	11.6054	8.57728	0.000475543
30	1970	13.3103	8.04344	0.000555076
31	1975	13.9904	7.76403	0.000596281
32	1980	13.7877	6.73738	0.000703186
33	1985	11.9530	6.81398	0.000596281
34	1990	11.9530	6.81398	0.000596281
35	1995	3.6240	5.53441	0.000344566
36	2000	2.4739	4.42740	0.000339099
37	2005	2.6913	4.80922	0.000333903
38	2010	3.2261	5.26270	0.000339099
39	2015	3.7773	5.69802	0.000344566
40	2020	3.6240	5.53441	0.000344566
41	2025	.	.	.
42	2030	4.6098	5.88144	0.000356381
43	2035	5.6764	6.41918	0.000362768
44	2040	6.4481	7.62087	0.000376607
45	2045	8.6267	6.98103	0.000475543
46	2050	8.9399	6.94519	0.000489283
47	2055	.	.	.
48	2060	13.9032	6.49573	0.000736797
49	2065	12.3894	6.99257	0.000619564
50	2070	7.7271	5.49954	0.000503999
51	2075	3.8750	4.16860	0.000409315
52	2080	2.1897	3.77581	0.000339099
53	2085	2.3179	4.51105	0.000328962
54	2090	2.4739	4.42740	0.000339099

Table B.3 (Continued)

OBS	DEG	FS	FN	AS
55	2095	3.0108	4.87678	0.000344566
56	2100	3.8762	5.63203	0.000350321
57	2105	4.6098	6.19936	0.000356381
58	2110	5.1521	6.34133	0.000369502
59	2115	5.4809	6.64795	0.000369502
60	2120	6.7959	6.32684	0.000428727
61	2125	6.7959	6.32684	0.000428727
62	2130	7.6418	6.72304	0.000439348
63	2135	7.7580	6.58864	0.000450649
64	2140	10.4655	7.08626	0.000519791
65	2145	11.4870	7.12619	0.000536773
66	2150	13.8328	5.44002	0.000815487
67	2155	13.1914	5.23162	0.000815487
68	2160	12.7638	5.09269	0.000815487
69	2165	11.1269	5.46537	0.000672704
70	2170	6.5709	6.56016	0.000409315
71	2175	2.3803	4.72552	0.000324263
72	2180	2.4359	4.94348	0.000319792
73	2185	2.6633	5.07492	0.000324263

Table B.4. Computed Mechanics on the Shear Plane for Aluminum With 40° Tool, Test Al 56, Revolution 2

OBS	DEC	FS	FN	AS
1	2190	3.0756	5.09564	0.00033910
2	2195	3.5269	5.59682	0.00033910
3	2200	4.2918	5.88144	0.00035638
4	2205	5.7318	6.76976	0.00038411
5	2210	7.5233	6.85538	0.00042873
6	2216	8.7458	6.79038	0.00047554
7	2220	9.4410	6.98406	0.00048928
8	2225	10.2689	6.97727	0.00051979
9	2230	11.8322	7.02155	0.00057485
10	2235	13.0112	6.74402	0.00064494
11	2240	14.1691	6.93698	0.00067270
12	2246	17.0512	5.09015	0.00112024
13	2250	15.6875	6.27903	0.00081549
14	2256	13.8044	7.13045	0.00061956
15	2261	.	.	.
16	2265	9.1982	6.12674	0.00051979
17	2270	3.5080	4.00819	0.00036950
18	2275	3.7773	5.69882	0.00034457
19	2280	4.4508	6.04040	0.00035638
20	2285	5.4291	6.40086	0.00037661
21	2290	5.8793	6.60010	0.00038411
22	2295	6.4534	6.67384	0.00040043
23	2300	6.6301	6.81531	0.00040043
24	2305	7.2795	7.11377	0.00040932
25	2310	8.6145	7.64819	0.00042873
26	2315	11.3136	7.82983	0.00050400
27	2320	.	.	.
28	2325	.	.	.
29	2330	15.4649	5.60379	0.00091424
30	2335	15.9946	5.44940	0.00097365
31	2340	15.6810	5.66575	0.00091424
32	2345	14.0570	6.07324	0.00073680
33	2350	13.8457	5.99635	0.00073680
34	2355	8.7030	5.74541	0.00057485
35	2360	3.3174	5.20560	0.00034457
36	2365	3.7773	5.69882	0.00034457
37	2370	4.1885	5.95545	0.00035032
38	2375	4.7687	6.35831	0.00035638
39	2380	5.9742	7.10789	0.00036950
40	2385	6.1386	7.26121	0.00036950
41	2390	6.4674	7.56784	0.00036950
42	2395	6.7489	7.28675	0.00037661
43	2400	8.8019	7.80976	0.00043935
44	2405	9.9611	7.81491	0.00047554
45	2410	10.8668	8.10299	0.00048928
46	2415	11.8418	7.84915	0.00051979
47	2420	11.8418	7.84915	0.00051979
48	2425	13.1100	7.94139	0.00055508
49	2430	13.3023	7.15294	0.00061956
50	2435	12.4555	6.80025	0.00059628
51	2441	10.2961	6.49297	0.00053677
52	2445	4.5555	5.96180	0.00036277
53	2450	2.8387	4.97888	0.00033390
54	2455	3.6773	5.76308	0.00033910

Table B.4 (Continued)

OBS	DEC	FS	FN	AS
55	2460	4.1830	6.27331	0.000350321
56	2465	4.9277	6.51727	0.000356381
57	2470	5.2024	6.58644	0.000362768
58	2475	5.5961	6.55129	0.000376607
59	2480	6.3882	7.04255	0.000384111
60	2485	6.8823	7.53569	0.000392042
61	2490	7.7116	7.98032	0.000400431
62	2495	9.6674	8.14138	0.000439348
63	2500	12.0924	8.27943	0.000503999
64	2505	13.2466	7.71138	0.000574854
65	2510	14.1941	7.85903	0.000596281
66	2515	14.9614	7.32762	0.000644943
67	2520	15.1132	6.45767	0.000736797
68	2525	14 7883	6.63989	0.000703186
69	2530	12.8189	6.12471	0.000703186
70	2535	3.2516	4.98520	0.000350321
71	2540	3.0756	5.09564	0.000339099
72	2545	3.6240	5.53441	0.000344566

Table B.5. Computed Mechanics on the Shear Plane for Aluminum With 40° Tool, Test Al 56, Revolution 3

OBS	DEG	FS	FN.	AS
1	2550	4.4508	6.04040	0.000356381
2	2555	5.0866	6.67623	0.000356381
3	2560	5.9302	6.85213	0.000376607
4	2565	6.5801	7.50717	0.000384111
5	2570	6.5579	7.19003	0.000384111
6	2575	7.4025	6.98564	0.000418732
7	2585	10.3900	7.55275	0.000475543
8	2580	.	.	.
9	2590	11.7785	7.53575	0.000536773
10	2595	12.8425	7.51428	0.000574854
11	2600	.	.	.
12	2605	14.5784	6.55933	0.000703186
13	2610	14.9982	6.72045	0.000703186
14	2615	14.7676	6.09266	0.000736797
15	2620	13.8365	6.56012	0.000672704
16	2625	11.8443	6.51524	0.000596281
17	2630	3.5435	5.27934	0.000339099
18	2635	3.3294	5.71650	0.000328962
19	2640	3.9782	6.09800	0.000339099
20	2645	4.9693	6.76399	0.000350321
21	2650	5.2456	6.83519	0.000356381
22	2656	6.2186	6.89507	0.000384111
23	2660	6.6824	7.07449	0.000392042
24	2666	7.0268	7.36348	0.000392042
25	2670	.	.	.
26	2675	.	.	.
27	2680	.	.	.
28	2685	.	.	.
29	2690	.	.	.

Table B.6. Computed Mechanics on the Shear Plane for Aluminum With 40° Tool, Test Al 03

OBS	DEG	FS	FN	AS
1	161	7.6037	4.8835	0.00064429
2	165	3.6688	2.6374	0.00058500
3	170	3.6688	2.6374	0.00058500
4	175	4.2828	3.4021	0.00060333
5	180	5.1355	3.7490	0.00062304
6	185	6.0013	4.0670	0.00064429
7	190	7.3620	4.4251	0.00069211
8	195	10.0847	5.0443	0.00078082
9	200	11.0868	4.9643	0.00078082
10	205	13.9488	6.3176	0.00081620
11	211	16.3739	6.4164	0.00100044
12	215	17.0221	5.9575	0.00113013
13	220	19.6278	6.6556	0.00113013
14	225	20.8288	5.8062	0.00140684
15	230	21.7238	6.0548	0.00153294
16	235	23.1101	3.7852	0.00279827
17	240	23.5573	3.8322	0.00279827
18	245	24.8987	3.9732	0.00279827
19	250	23.4718	4.2068	0.00210169
20	255	10.9518	6.3525	0.00071914
21	260	6.1405	3.7742	0.00062304
22	265	6.5590	4.8251	0.00058500
23	270	7.8948	5.3512	0.00066724
24	275	8.6743	6.4806	0.00055197
25	280	9.1986	7.3384	0.00055197
26	285	10.7500	5.7980	0.00078082
27	290	11.7908	5.7269	0.00085521
28	295	13.0582	6.1882	0.00085521
29	300	16.5651	7.1303	0.00089843
30	305	21.1623	6.2700	0.00130028
31	315	26.8162	3.2273	0.00419315
32	320	28.1919	3.2783	0.00558088
33	325	.	.	.
34	330	.	.	.
35	335	28.5473	3.8515	0.00335605
36	340	25.4398	3.1259	0.00279827
37	345	12.9482	6.4151	0.00081620
38	350	8.0701	6.5280	0.00052307
39	355	8.6579	7.9054	0.00047510
40	360	11.4863	8.7679	0.00055197
41	366	16.4302	11.1636	0.00060333
42	370	20.9317	9.5323	0.00085521
43	375	.	.	.
44	380	.	.	.

Table B.7. Computed Mechanics on the Shear Plane for Aluminum With 50° Tool, TEst Al 57, Revolution 1

OBS	DEG	FS	FN	AS
1	3495	2.30689	4.57782	0.000454150
2	3501	.	.	.
3	3506	4.02704	4.99311	0.000525056
4	3510	4.02704	4.99311	0.000525056
5	3515	4.87965	4.78893	0.000588412
6	3520	.	.	.
7	3525	5.33522	4.95446	0.000603547
8	3530	.	.	.
9	3535	7.14301	5.16234	0.000674999
10	3540	7.96705	5.12727	0.000718892
11	3546	9.85438	5.46332	0.000798591
12	3550	9.70994	4.77167	0.000900943
13	3555	9.03943	5.08330	0.000798591
14	3560	9.29067	5.07644	0.000798591
15	3565	8.14114	4.84610	0.000769894
16	3570	2.54610	4.41645	0.000469179
17	3575	2.30689	4.57782	0.000454150
18	3580	2.38643	4.53687	0.000461472
19	3585	2.78175	4.53030	0.000477296
20	3590	3.18381	4.79338	0.000485849
21	3596	3.83686	5.11482	0.000494868
22	3600	4.09929	4.90700	0.000525056
23	3605	4.94412	4.69686	0.000588412
24	3610	5.46093	4.76809	0.000603547
25	3615	.	.	.
26	3620	.	.	.
27	3625	7.22550	4.99718	0.000655290
28	3630	7.91200	4.30954	0.000798591
29	3635	7.34829	3.92265	0.000798591
30	3640	.	.	.
31	3645	.	.	.
32	3650	.	.	.
33	3655	.	.	.
34	3660	.	.	.
35	3665	.	.	.
36	3670	.	.	.
37	3675	.	.	.
38	3680	.	.	.
39	3685	.	.	.
40	3695	.	.	.
41	3700	.	.	.

Table B.8. Computed Mechanics on the Shear Plane for Aluminum With 50° Tool, Test Al 57, Revolution 2

OBS	DEG	FS	FN	AS
1	3860	3.6129	5.85214	0.000461472
2	3866	4.5009	6.27886	0.000469179
3	3871	5.2006	6.01017	0.000514434
4	3875	5.5492	5.97689	0.000525056
5	3880	6.0021	6.16208	0.000536292
6	3885	6.8197	6.26495	0.000560802
7	3890	7.4736	6.54138	0.000574188
8	3895	9.0046	7.12839	0.000508412
9	3900	9.8747	7.08283	0.000619675
10	3905	12.5038	5.65799	0.000900943
11	3910	12.2987	6.09092	0.000829773
12	3915	11.4772	5.72518	0.000829773
13	3920	11.0868	4.96430	0.000900943
14	3925	8.4282	4.79829	0.000798591
15	3930	3.3455	4.94954	0.000485849
16	3935	3.0146	4.90157	0.000469179
17	3940	3.1707	5.06328	0.000469179
18	3945	3.4176	5.16613	0.000477296
19	3950	4.0926	5.19750	0.000504385
20	3955	4.5220	5.42025	0.000514434
21	3960	5.2048	5.68789	0.000525056
22	3965	5.8274	6.02061	0.000536292
23	3970	6.1435	5.98737	0.000536292
24	3975	6.9550	6.08542	0.000560802
25	3980	7.3081	6.00431	0.000574188
26	3985	9.3163	5.46277	0.000718892
27	3990	9.9053	5.33140	0.000769894
28	3995	9.9529	4.18175	0.000941767
29	4000	.	.	.
30	4005	8.0317	4.06811	0.000829773
31	4010	8.0317	4.06811	0.000829773
32	4015	5.7030	4.47575	0.000655290
33	4020	3.7702	3.98963	0.000574188
34	4025	2.9385	4.40020	0.000485849
35	4030	3.2670	4.73708	0.000494868
36	4035	3.6833	4.98019	0.000504385
37	4040	4.0926	5.19750	0.000504385
38	4045	4.5957	5.33542	0.000514434
39	4050	5.1286	5.45472	0.000536292
40	4055	5.7425	5.45322	0.000560802
41	4060	5.9220	5.58851	0.000560802
42	4065	6.5283	5.90461	0.000560802
43	4070	7.3875	5.93197	0.000603547
44	4075	9.2107	5.66126	0.000718892
45	4080	10.5606	5.54460	0.000798591
46	4085	11.4231	5.62275	0.000798591
47	4090	11.4231	5.62275	0.000798591
48	4096	11.0684	6.02370	0.000769894
49	4100	.	.	.
50	4105	8.2183	5.13357	0.000718892
51	4110	3.0108	4.87678	0.000461472
52	4115	2.8417	5.00379	0.000454150
53	4120	2.9921	5.17085	0.000454150
54	4125	3.7470	5.18100	0.000485849

Table B.8 (Continued)

OBS	DEC	FS	FN	AS
55	4130	4.0926	5.19750	0.000504385
56	4135	4.0613	5.71521	0.000514434
57	4141	5.5819	5.96649	0.000536292
58	4145	6.1087	6.05639	0.000548190
59	4150	7.3141	6.35600	0.000560802
60	4160	7.6289	6.31175	0.000560802
61	4165	10.5115	5.62704	0.000769894
62	4170	11.6632	5.31708	0.000863763
63	4175	11.6632	5.31708	0.000863763
64	4180	11.1579	5.33695	0.000829773
65	4185	6.5891	4.32337	0.000674999
66	4190	1.5545	2.23034	0.000454150
67	4201	2.9337	4.97965	0.000469179
68	4206	3.3269	5.22499	0.000469179
69	4210	3.6835	5.27923	0.000494868
70	4215	4.1092	5.51490	0.000504385
71	4220	4.8881	5.71560	0.000525056

Table B.9. Computed Mechanics on the Shear Plane for Aluminum With 50° Tool, Test A1 57, Revolution 3

OBS	DEC	FS	FN	AS
1	4225	5.7566	6.10796	0.000536292
2	4230	6.3930	6.08414	0.000560802
3	4235	6.9697	6.11520	0.000588412
4	4240	7.3246	6.02516	0.000603547
5	4245	7.9466	6.30909	0.000603547
6	4250	8.7338	6.38530	0.000636888
7	4255	10.6001	6.40002	0.000718892
8	4260	12.3374	5.46957	0.000900943
9	4265	13.2705	5.57566	0.000941767
10	4270	13.2705	5.57566	0.000941767
11	4276	11.9630	6.72624	0.000743406
12	4280	.	.	.
13	4285	.	.	.
14	4290	.	.	.
15	4295	.	.	.
16	4300	.	.	.
17	4306	.	.	.
18	4311	.	.	.
19	4315	.	.	.
20	4320	.	.	.
21	4325	.	.	.
22	4330	.	.	.
23	4336	.	.	.
24	4340	.	.	.
25	4345	.	.	.
26	4350	11.2639	6.11771	0.000743406
27	4355	11.0636	6.01566	0.000743406
28	4360	11.0636	6.01566	0.000743406
29	4365	9.3690	5.36353	0.000718892
30	4370	7.8134	4.90043	0.000674999
31	4375	5.5630	5.31793	0.000560802
32	4380	3.2427	4.94522	0.000454150
33	4385	2.9236	4.90514	0.000447191
34	4390	3.1337	5.31820	0.000447191
35	4395	3.5762	5.82718	0.000447191
36	4400	3.8277	5.93094	0.000454150
37	4405	4.7953	6.93711	0.000485849
38	4410	5.3054	6.17692	0.000494868
39	4415	6.1005	6.34562	0.000514434
40	4420	6.2702	6.49310	0.000514434
41	4425	6.7269	6.67168	0.000525056
42	4430	7.8414	7.12485	0.000548190
43	4435	9.9968	6.90941	0.000636888
44	4440	10.9445	7.10067	0.000655290
45	4446	12.8008	6.06043	0.000829773
46	4450	12.8008	6.06843	0.000829773
47	4456	12.0141	6.62609	0.000743406
48	4460	11.2946	6.51777	0.000696148
49	4465	10.2318	6.55632	0.000674999
50	4470	3.6724	4.9615	0.000494868
51	4475	3.6724	4.96151	0.000494868
52	4480	.	.	.
53	4485	.	.	.
54	4490	.	.	.

Table B.9 (Continued)

OBS	DEG	FS	FN	AS
55	4495	.	.	.
56	4501	.	.	.
57	4505	.	.	.
58	4510	.	.	.
59	4515	10.0934	6.34658	0.00067500
60	4520	12.4909	5.66842	0.00086376
61	4526	14.1678	5.11614	0.00103665
62	4530	14.5929	5.26252	0.00103665
63	4535	15.5377	5.28490	0.00109217
64	4540	16.5532	5.06985	0.00115435
65	4545	14.8055	5.33570	0.00103665
66	4550	12.4637	5.15692	0.00090094
67	4555	4.5534	4.41644	0.00056080
68	4560	3.7470	5.18100	0.00048585
69	4565	3.3438	5.73126	0.00044719
70	4570	4.0018	6.10430	0.00046147
71	4575	4.5303	6.27883	0.00047730
72	4580	5.6491	6.20749	0.00052506
73	4585	6.3515	6.44502	0.00053629

Table B.10. Computed Mechanics on the Shear Plane for Aluminum With 50° Tool, Test Al 57, Revolution 4

OBS	DEG	FS	FN	AS
1	4590	6.9992	6.46024	0.00056080
2	4595	7.3583	6.67082	0.00056080
3	4600	7.6055	6.71634	0.00056080
4	4605	8.4490	7.11112	0.00057419
5	4610	9.7863	6.42886	0.00067500
6	4615	11.6826	5.81662	0.00082977
7	4620	13.7305	5.63185	0.00094177
8	4626	14.8055	5.33570	0.00103665
9	4630	14.7689	5.44198	0.00103665
10	4635	13.7764	6.09198	0.00086376
11	4640	12.4285	6.31190	0.00076989
12	4645	9.3616	5.83182	0.00069615
13	4650	4.4261	5.18793	0.00051443
14	4655	4.1827	5.12528	0.00051443
15	4660	4.4437	5.19600	0.00052506
16	4665	4.6159	5.34050	0.00052506
17	4670	5.3033	5.59619	0.00053629
18	4676	6.3163	5.8395	0.00057419
19	4680	.	.	.
20	4685	7.4025	6.2810	0.00058841
21	4690	8.1329	6.434	0.00060355
22	4695	9.3091	6.715	0.00061968
23	4700	9.5588	6.74 09	0.00061968
24	4705	10.2470	6.93322	0.00063689
25	4710	.	.	.
26	4715	.	.	.
27	4720	12.2232	7.16100	0.00069615
28	4725	11.4182	5.81917	0.00076989
29	4730	.	.	.
30	4737	5.8957	4.59153	0.00065529
31	4740	4.0716	4.59030	0.00052506
32	4745	3.8337	4.81313	0.00050438
33	4750	3.4707	5.37001	0.00046147
34	4755	4.5220	5.42025	0.00051443
35	4760	5.0326	5.54339	0.00052506
36	4770	5.4492	5.74629	0.00052506
37	4775	.	.	.
38	4780	7.0147	5.68056	0.00060355
39	4785	7.4899	5.80214	0.00061968
40	4790	8.1619	6.02792	0.00063689
41	4795	10.6212	6.78112	0.00067500
42	4800	13.2705	5.57566	0.00094177
43	4805	13.5206	5.55129	0.00094177
44	810	13.5206	5.55129	0.00094177
45	4815	13.1117	5.93193	0.00086376
46	4820	12.5367	6.09404	0.00079859
47	4825	10.4622	5.72806	0.00076989
48	4830	4.1715	4.82090	0.00052506
49	4835	3.1849	5.54429	0.00044057
50	4840	3.4287	5.65752	0.00044719
51	4845	3.8277	5.93094	0.00045415
52	4850	4.3906	6.35646	0.00046147
53	4855	4.0940	6.52420	0.00046918
54	4861	5.9273	7.13022	0.00048585

Table B.10 (Continued)

OBS	DEC	FS	FN	AS
55	4865	7.0636	6.65982	0.00054819
56	4870	8.5718	6.96258	0.00058841
57	4875	10.1852	7.41232	0.00060355
58	4881	11.1951	7.12010	0.00065529
59	4885	13.2367	6.70609	0.00076989
60	4890	14.6103	5.84916	0.00094177
61	4895	16.0800	5.77483	0.00103665
62	4900	15.6557	5.62846	0.00103665
63	4905	15.3823	5.71832	0.00098678
64	4910	.	.	.
65	4915	.	.	.
66	4920	4.0779	5.18593	0.00049487
67	4925	4.1657	5.42145	0.00049487
68	4930	4.3515	5.58187	0.00050438
69	4935	4.7876	5.00004	0.00051443
70	4940	5.5819	5.96649	0.00053629
71	4945	6.3262	6.58649	0.00053629
72	4950	7.1788	6.53553	0.00056080
73	4955	7.8373	6.80565	0.00057419
74	4961	8.0853	6.84685	0.00057419
75	4965	8.6363	6.87051	0.00058841
76	4970	9.8135	7.17709	0.00061968

Table B.11. Computed Mechanics on the Shear Plane for Copper With 20° Tool, Test Cu 06

OBS	DEC	FS	FN	AS
1	735	82.446	59.9806	0.0009970
2	740	84.410	55.2175	0.0011472
3	745	93.193	51.7351	0.0014431
4	750	96.037	48.7040	0.0016604
5	755	96.037	48.7040	0.0016604
6	760	100.803	50.1542	0.0017964
7	765	105.833	53.5215	0.0017964
8	770	111.962	57.1226	0.0017964
9	775	122.800	58.1421	0.0023876
10	780	128.892	60.1114	0.0026837
11	785	138.573	61.1799	0.0030648
12	791	145.971	65.4856	0.0030648
13	795	158.049	63.4725	0.0042854
14	800	161.376	60.8613	0.0053543
15	805	169.984	59.9209	0.0107021
16	810	164.426	65.5815	0.0053543
17	815	142.624	65.0747	0.0030648
18	820	129.849	61.0809	0.0026837
19	825	115.609	59.1133	0.0019575
20	830	89.720	49.0131	0.0015439
21	835	102.977	32.4098	0.0071366
22	840	97.469	52.4953	0.0016604
23	845	95.532	50.8944	0.0016604
24	850	98.371	50.7862	0.0017964
25	855	104.330	52.3407	0.0019575
26	860	109.418	55.6198	0.0019575
27	865	117.275	53.9384	0.0026837
28	870	120.465	61.1881	0.0021509
29	876	127.433	66.9821	0.0021509
30	880	134.892	68.0232	0.0023876
31	885	155.464	71.1809	0.0030648
32	890	166.321	72.0942	0.0042854
33	895	176.289	73.1716	0.0053543
34	900	179.725	71.3239	0.0071366
35	905	175.090	74.2144	0.0053543
36	910	158.968	79.5382	0.0030648
37	915	152.548	76.4851	0.0030648
38	925	115.854	63.7412	0.0019575
39	920	137.167	75.2117	0.0023876
40	930	106.932	53.7552	0.0017964
41	935	107.564	56.1878	0.0017964
42	940	100.502	54.3490	0.0016604
43	945	106.066	64.4935	0.0014431
44	950	109.937	63.4487	0.0016604
45	955	118.880	67.7876	0.0017964
46	960	126.919	71.6171	0.0019575
47	965	140.456	77.2679	0.0021509
48	970	152.772	75.9530	0.0026837
49	975	164.683	79.1075	0.0030648
50	980	177.254	75.4925	0.0053543
51	985	182.916	74.8677	0.0071366
52	990	170.213	79.2044	0.0042854
53	995	158.096	76.5167	0.0035732
54	1000	146.265	72.3163	0.0030648

Table B.11 (Continued)

OBS	DEG	FS	FN	AS
55	1005	137.971	68.1977	0.00268370
56	1010	129.125	63.8565	0.00215090
57	1015	116.255	66.0609	0.00166036
58	1020	116.002	67.1561	0.00166036
59	1025	114.596	76.0883	0.00144309
60	1031	132.345	81.3112	0.00166036
61	1035	130.913	77.5199	0.00166036
62	1040	132.713	73.0245	0.00179643
63	1045	145.763	69.2927	0.00268370
64	1050	146.400	74.3980	0.00238758
65	1055	159.801	71.0450	0.00357318
66	1060	165.398	69.7568	0.00428542
67	1065	175.325	70.8507	0.00535433
68	1070	180.774	73.4852	0.00535433
69	1076	184.098	73.8041	0.00713657
70	1080	184.039	74.9266	0.00713657
71	1086	178.218	77.8134	0.00535433
72	1090	170.311	78.0847	0.00428542
73	1095	154.860	75.0464	0.00357318

Table B.12. Computed Mechanics on the Shear Plane for Copper With 20° Tool, Test Cu 33, Revolution

OBS	DEG	FS	FN	AS
1	416	74.217	48.2808	0.00184040
2	420	77.014	48.5449	0.00199123
3	425	80.680	47.3249	0.00238413
4	430	80.485	48.4318	0.00238413
5	435	71.185	53.6592	0.00171129
6	440	70.913	54.7498	0.00171129
7	445	55.652	62.9193	0.00101786
8	450	55.089	65.3747	0.00097961
9	455	53.775	67.7678	0.00091191
10	460	58.498	69.8001	0.00094440
11	465	65.118	72.0555	0.00101786
12	470	85.297	73.3546	0.00127162
13	475	99.547	69.9979	0.00171129
14	481	109.850	81.7788	0.00150197
15	485	.	.	.
16	490	.	.	.
17	495	110.453	72.7171	0.00171129
18	500	.	.	.
19	505	97.302	66.7999	0.00159957
20	510	93.961	67.8683	0.00150197
21	515	79.652	69.0334	0.00127162
22	520	70.320	65.9915	0.00110516
23	525	62.354	63.0998	0.00105955
24	530	58.402	59.4685	0.00097961
25	535	57.793	58.1151	0.00121045
26	540	59.905	58.8840	0.00121045
27	545	58.177	57.0589	0.00121045
28	550	58.877	58.4498	0.00097961
29	555	51.964	61.4372	0.00097961
30	561	60.321	59.2740	0.00115523
31	565	63.746	61.4779	0.00121045
32	570	68.694	62.8826	0.00127162
33	575	73.743	62.5076	0.00141600
34	580	81.456	66.6212	0.00150197
35	585	88.370	61.9302	0.00184040
36	590	93.573	60.5551	0.00216970
37	595	93.327	55.9273	0.00216970
38	600	90.138	57.0801	0.00199123
39	605	82.810	56.0323	0.00184040
40	610	77.043	55.5532	0.00159957
41	615	59.037	51.0922	0.00133973
42	620	49.153	48.9897	0.00121045
43	625	39.562	44.8777	0.00105955
44	631	29.272	45.1254	0.00080382
45	635	33.050	45.5794	0.00088184
46	640	36.335	47.5280	0.00091191
47	645	40.214	50.8781	0.00094440
48	650	47.782	55.7243	0.00101786
49	655	53.028	60.5210	0.00101786
50	660	60.519	63.2441	0.00110516
51	665	70.496	70.4037	0.00115523
52	670	89.451	77.5201	0.00133973
53	675	111.275	78.7140	0.00171129
54	680	120.887	80.9731	.00184040

Table B.12 (Continued)

OBS	DEG	FS	FN	AS
55	685	133.229	79.4176	0.00238413
56	690	118.516	80.3488	0.00199123
57	695	112.153	77.8472	0.00199123
58	700	101.611	87.3804	0.00133973
59	705	94.275	89.3356	0.00121045
60	710	87.857	87.9039	0.00115523
61	715	82.562	86.6975	0.00110516
62	720	79.436	85.4343	0.00110516
63	725	81.720	88.7818	0.00110516
64	730	88.014	86.1778	0.00127162
65	735	96.778	81.7868	0.00159957
66	740	99.744	83.7452	0.00159957
67	745	99.240	81.2829	0.00159957
68	750	110.587	79.8124	0.00199123
69	755	118.049	82.5477	0.00199123
70	760	127.655	85.5007	0.00216970
71	765	137.981	84.4446	0.00264647
72	770	137.593	87.0351	0.00238413
73	775	139.091	84.6205	0.00264647

Table B.13. Computed Mechanics on the Shear Plane for Copper With 20° Tool, Test Cu 33, Revolution 2

OBS	DEG	FS	FN	AS
1	780	.	.	.
2	786	130.074	90.8492	0.0019912
3	790	127.875	90.3818	0.0019912
4	795	124.577	89.6807	0.0019912
5	800	118.643	90.9768	0.0017113
6	805	112.694	91.8699	0.0015996
7	810	104.150	94.1146	0.0013397
8	815	102.012	93.4200	0.0013397
9	820	103.081	93.7673	0.0013397
10	825	110.166	97.1504	0.0014160
11	830	130.561	88.0778	0.0023841
12	835	147.426	81.7241	0.0047501
13	840	.	.	.
14	845	163.423	81.7249	0.0079104
15	850	170.158	82.0779	0.0079104
16	855	173.466	83.3768	0.0079104
17	860	180.472	81.6561	0.0118626
18	865	183.842	81.7738	0.0118626
19	870	189.419	83.0933	0.0118626
20	875	177.779	86.9795	0.0079104
21	880	171.162	84.3816	0.0079104
22	885	.	.	.
23	890	.	.	.
24	895	.	.	.
25	900	146.579	88.2090	0.0033971
26	905	145.326	89.1876	0.0033971
27	910	.	.	.
28	915	.	.	.
29	920	.	.	.
30	925	.	.	.
31	930	.	.	.
32	936	.	.	.
33	940	.	.	.
34	945	.	.	.
35	950	.	.	.
36	955	.	.	.
37	960	.	.	.
38	965	.	.	.
39	970	.	.	.
40	975	.	.	.
41	980	173.290	86.7442	0.0079104
42	985	165.100	88.1636	0.0059349
43	990	159.253	88.4003	0.0047501
44	995	153.332	89.5784	0.0039606
45	1000	.	.	.
46	1005	.	.	.
47	1010	.	.	.
48	1015	.	.	.
49	1020	.	.	.
50	1025	.	.	.
51	1030	.	.	.
52	1035	.	.	.
53	1040	.	.	.

Table B.14. Computed Mechanics on the Shear Plane for Copper With 20° Tool, Test Cu 01

OBS	DEG	FS	FN	AS
1	1806	58.756	48.8965	0.00113151
2	1811	55.080	40.3492	0.00140402
3	1816	54.817	35.6773	0.00159969
4	1821	19.821	42.5791	0.00055711
5	1826	23.027	44.5264	0.00056745
6	1831	25.464	44.8438	0.00060206
7	1836	35.056	42.0449	0.00075140
8	1841	39.623	41.8354	0.00088281
9	1846	38.716	46.8663	0.00075140
10	1851	41.204	48.5426	0.00079825
11	1861	80.729	57.1971	0.00159969
12	1868	110.293	54.7812	0.00444032
13	1871	112.631	53.8574	0.00444032
14	1876	111.511	53.7594	0.00444032
15	1881	106.202	54.1096	0.00370233
16	1886	95.805	56.1424	0.00247387
17	1891	84.641	55.9117	0.00186136
18	1896	76.091	52.5657	0.00159969
19	1901	59.992	50.7201	0.00107989
20	1906	67.350	48.3012	0.00149525
21	1911	56.571	40.7584	0.00149525
22	1916	59.033	40.2545	0.00149525
23	1921	30.338	39.4442	0.00069207
24	1926	38.143	44.0861	0.00077400
25	1931	35.352	49.4528	0.00067471
26	1936	38.660	51.9108	0.00071056
27	1941	45.952	52.4394	0.00082433
28	1946	56.793	54.4648	0.00103308
29	1951	76.492	53.4201	0.00172037
30	1956	88.805	57.9459	0.00186136
31	1961	103.284	53.4496	0.00317552
32	1967	105.201	52.8742	0.00370233
33	1971	97.843	51.6491	0.00317552
34	1976	86.578	46.2192	0.00278070
35	1981	69.247	44.8261	0.00172037
36	1986	57.987	51.0090	0.00113151
37	1991	54.857	56.4137	0.00095147
38	1996	55.223	63.7338	0.00082433
39	2001	43.723	53.8090	0.00075140
40	2006	27.023	57.2248	0.00054730
41	2011	40.232	54.2418	0.00067471
42	2016	33.495	60.3279	0.00057836
43	2021	40.686	58.7363	0.00065840
44	2026	47.426	57.2325	0.00077400
45	2031	50.195	61.4274	0.00077400
46	2036	49.094	67.7883	0.00073030
47	2041	74.374	63.6495	0.00118869
48	2046	102.466	57.1974	0.00247387
49	2051	116.917	52.1187	0.00554786
50	2056	115.796	52.0403	0.00554786
51	2061	110.673	54.5795	0.00370233
52	2066	96.915	56.3183	0.00247387
53	2071	82.909	53.2454	0.00186136
54	2076	79.611	52.5443	0.00186136

Table B.14 (Continued)

OBS	DEC	FS	FN	AS
55	2081	74.368	52.5090	0.00149525
56	2086	81.273	55.0159	0.00159969
57	2091	48.929	54.0224	0.00082433
58	2096	41.467	52.4194	0.00073030
59	2101	42.063	51.4662	0.00073030
60	2106	43.373	53.6107	0.00073030
61	2111	48.399	57.7945	0.00077400
62	2116	55.286	61.2212	0.00082433
63	2121	60.824	66.3132	0.00085244
64	2126	49.255	61.1178	0.00103308
65	2130	104.039	69.0084	0.00172037
66	2136	123.262	69.5954	0.00247387
67	2141	137.562	67.5774	0.00370233
68	2146	144.243	64.1702	0.00554786
69	2151	145.364	64.2486	0.00554786
70	2156	135.444	66.2245	0.00370233
71	2161	115.710	65.0690	0.00278070

Table B.15. Computed Mechanics on the Shear Plane for Copper With 40° Tool, Test Cu 32

OBS	DEG	FS	FN	AS
1	360	.	.	0.00052869
2	365	.	.	0.00054498
3	370	.	.	0.00057276
4	375	.	.	0.00060526
5	380	.	.	0.00063007
6	385	.	.	0.00070609
7	390	.	.	0.00081000
8	395	.	.	0.00092387
9	400	.	.	0.00108113
10	405	.	.	0.00131060
11	410	.	.	0.00118414
12	415	.	.	0.00095831
13	420	.	.	0.00081000
14	425	.	.	0.00060526
15	430	.	.	0.00061732
16	435	.	.	0.00065783
17	440	.	.	0.00067296
18	445	.	.	0.00070609
19	450	.	.	0.00072426
20	455	.	.	0.00074361
21	460	.	.	0.00078635
22	465	.	.	0.00081000
23	470	.	.	0.00089209
24	475	.	.	0.00095831
25	480	.	.	0.00108113
26	485	.	.	0.00138522
27	490	.	.	0.00138522
28	495	.	.	0.00124398
29	500	.	.	0.00099573
30	505	.	.	0.00095831
31	510	.	.	0.00089209
32	515	.	.	0.00061732
33	520	.	.	0.00060526
34	525	.	.	0.00063007
35	530	.	.	0.00063007
36	535	.	.	0.00068903
37	540	.	.	0.00070609
38	545	.	.	0.00081000
39	550	.	.	0.00076427
40	555	.	.	0.00086267
41	560	.	.	0.00086267
42	565	.	.	0.00092387
43	570	.	.	.
44	575	.	.	0.00103652
45	580	.	.	0.00138522
46	585	.	.	0.00138522
47	590	.	.	0.00113012
48	595	.	.	0.00103652
49	600	.	.	0.00064355
50	605	.	.	0.00057276
51	610	.	.	0.00056302
52	615	.	.	0.00057276
53	620	.	.	0.00057276
54	625	.	.	0.00064355

Table B.15 (Continued)

OBS	DEC	FS	FN	AS
55	630	.	.	0.00065783
56	635	.	.	0.00074361
57	657	.	.	0.00074361
58	660	.	.	0.00076427
59	665	.	.	.
60	670	.	.	0.00108113
61	375	.	.	0.00095831
62	680	.	.	0.00095831
63	685	.	.	0.00086267
64	690	.	.	0.00064355
65	695	.	.	0.00060526
66	700	.	.	0.00063007
67	705	.	.	0.00065783
68	710	.	.	0.00067296
69	715	.	.	0.00070609
70	721	.	.	0.00074361
71	725	.	.	0.00074361
72	730	.	.	0.00081000
73	735	.	.	0.00081000
74	740	.	.	0.00081000
75	745	.	.	.
76	750	.	.	0.00072426
77	755	.	.	0.00070609
78	760	.	.	0.00065783
79	765	.	.	0.00064355

APPENDIX C

Computed Mechanics on the Rake Face

Table C.1. Computed Mechanics on the Rake Face for Aluminum With 30° Tool, Test Al 63, Revolution 1

OBS	DEG	F	N	R	DIR
1	670	11.0671	9.7099	14.7154	18.7117
2	675	11.4094	10.5448	15.5360	17.2551
3	680	11.2970	10.3501	15.3215	17.5044
4	685	11.3121	10.6010	15.5031	16.8584
5	690	11.8439	11.0727	16.2137	16.9275
6	695	11.9563	11.2674	16.4289	16.6992
7	700	13.0352	12.4615	18.0335	16.2887
8	705	14.8707	14.5167	20.7815	15.6900
9	710	16.8186	16.7666	23.7483	15.0886
10	715	19.3134	19.7390	27.6159	14.3756
11	720	20.6472	21.8243	30.0434	13.4123
12	725	21.7110	22.7676	31.4600	13.6390
13	730	22.5800	23.8233	32.8239	13.4652
14	735	23.1942	23.9079	33.3675	14.0362
15	740	23.2915	23.9317	33.3949	14.2233
16	745	21.9207	22.9061	31.7050	13.7406
17	750	19.5382	20.1284	28.0516	14.1476
18	755	16.9310	16.9613	23.9655	14.9487
19	760	11.8590	11.3236	16.3969	16.3230
20	766	11.4395	11.0466	15.9025	16.0010
21	770	11.8590	11.3236	16.3969	16.3230
22	775	12.9830	13.2704	18.5651	14.3727
23	780	13.4848	13.2403	18.8982	15.5241
24	785	13.8220	13.8243	19.5489	14.9950
25	791	14.8035	15.0747	21.1279	14.4798
26	795	15.9796	16.2127	22.7640	14.5851
27	800	17.5081	18.1656	25.2437	13.9125
28	805	19.4710	20.6863	28.4085	13.2664
29	810	21.5163	22.8800	31.4077	13.2405
30	815	22.9172	24.4073	33.4801	13.1964
31	820	23.4491	24.8790	34.1081	13.3052
32	825	23.7863	25.4630	34.8447	13.0500
33	830	23.4491	24.8790	34.1881	13.3052
34	835	22.5951	24.0742	33.0167	13.1846
35	840	21.4039	22.6853	31.1889	13.3351
36	845	19.2312	20.0461	27.7792	13.8113
37	850	15.7849	16.3251	22.7084	14.0362
38	855	11.4395	11.0466	15.9025	16.0010
39	860	10.9076	10.5749	15.1923	15.0071
40	865	11.2298	10.9081	15.6555	15.8323
41	870	11.2298	10.9081	15.6555	15.8323
42	875	12.4361	12.5479	17.6665	14.7435
43	880	13.2750	13.1018	18.6516	15.3762
44	885	14.5937	14.9362	20.8822	14.3354
45	890	16.1523	17.4109	23.7494	12.8523
46	895	17.2160	18.3542	25.1648	13.1672
47	900	18.7445	20.3271	27.6504	12.6804
48	905	19.8233	21.5213	29.2596	12.6481
49	910	20.2277	21.5473	29.5541	13.1906
50	915	19.1338	20.1023	27.7526	13.5860
51	920	17.7176	18.3241	25.4890	14.0362
52	925	16.6540	17.3808	24.0717	13.7767
53	930	14.4663	14.4906	20.4756	14.9516
54	935	10.1359	9.4631	13.8667	16.9661

Table C.1 (Continued)

OBS	DEC	F	N	R	DIR
55	940	10.2634	9.9086	14.2659	16.0074
56	945	11.2298	10.9081	15.6555	15.8323
57	950	11.5519	11.2413	16.1187	15.7807
58	955	12.0989	11.9638	17.0151	15.3215
59	960	12.1962	11.9076	17.0452	15.6859
60	965	12.2263	12.4094	17.4205	14.5742
61	970	12.6759	13.1881	18.2922	13.8654
62	975	13.7397	14.1314	19.7098	14.1947
63	980	14.8185	15.3256	21.3181	14.0362
64	985	16.2496	17.3547	23.7747	13.1164
65	990	15.7478	17.3848	23.4569	12.1714
66	995	17.0364	18.7173	25.3097	12.3080
67	1000	18.6772	20.8850	28.0183	11.8058
68	1006	18.8418	20.2709	27.6753	12.9074
69	1010	19.0666	20.6602	28.1127	12.7027
70	1015	19.3586	20.4916	28.1098	13.3713
71	1020	18.5869	19.3797	26.8523	13.8035
72	1025	16.6390	17.1299	23.8807	14.1670
73	1030	13.9043	13.5172	19.3919	15.8085

Table C.2. Computed Mechanics on the Rake Face for Aluminum With 30° Tool, Test Al 63, Revolution 1

OBS	DEG	F	N	R	DIR
1	1035	10.7802	10.1294	14.7925	16.7826
2	1040	11.3121	10.6010	15.5031	16.8584
3	1045	12.1811	11.6567	16.8600	16.2602
4	1050	12.4882	11.7390	17.1394	16.7712
5	1055	12.9228	12.2669	17.8178	16.4915
6	1060	13.3272	12.2929	18.1309	17.3116
7	1065	14.0839	13.1539	19.2713	16.9553
8	1070	14.6459	14.1274	20.3491	16.0323
9	1075	17.1407	17.0998	24.2117	15.0685
10	1080	19.1860	19.2934	27.2092	14.8399
11	1085	20.2949	20.9894	29.1965	14.0362
12	1090	21.2764	22.2397	30.7781	13.7317
13	1095	22.2428	[illegible].2392	32.1684	13.7449
14	1100	22.4526	[illegible].3777	32.4135	13.8435
15	1105	21.8753	[illegible].1534	31.1338	14.6382
16	1110	20.6843	20.7646	29.3088	14.8889
17	1115	18.5197	19.9377	27.2119	12.8882
18	1120	16.3168	16.7967	23.4173	14.1696
19	1125	10.0757	8.4595	13.1561	19.9831
20	1130	9.2066	7.4038	11.8143	21.1940
21	1135	9.9331	7.7631	12.6069	21.9911
22	1140	10.0606	8.2086	12.9845	20.7882
23	1146	10.2703	8.3471	13.2346	20.8977
24	1150	10.8022	8.8188	13.9448	20.7722
25	1155	11.1244	9.1519	14.4052	20.5560
26	800	12.3705	11.4319	16.9914	17.7158
27	1165	15.3423	13.9848	20.7596	17.6501
28	1170	16.3088	14.9843	22.1474	17.4234
29	1175	18.0620	17.3466	25.0428	16.1573
30	1180	19.4780	19.1248	27.2975	15.5241
31	1185	20.7515	20.2066	28.9643	15.7621
32	1190	21.2682	20.4274	29.4893	16.1553
33	1195	20.3019	19.4279	28.1000	16.2602
34	1200	19.6576	18.7615	27.1738	16.3360
35	1205	18.6912	17.7621	25.7847	16.4600
36	1210	16.9530	15.6507	23.0727	17.2874
37	1215	11.2889	8.3378	14.1539	22.8998
38	1220	8.9667	6.7636	11.2316	22.9727
39	1226	9.0791	6.9583	11.4389	22.5332
40	1230	5.2747	7.3377	9.0368	5.7106
41	1235	10.2553	8.0962	13.0660	21.7098
42	1240	10.4650	8.2347	13.3164	21.8014
43	1245	10.4650	8.2347	13.3164	21.8014
44	1250	10.8996	8.7626	13.9851	21.2028
45	1255	13.0723	11.4018	17.3461	18.9045
46	1260	14.0538	12.6522	18.9099	18.0041
47	1265	14.8255	13.7641	20.2298	17.1261
48	1270	16.6761	16.0701	23.1390	16.0599
49	1275	17.1778	16.0400	23.5024	16.9617
50	1280	17.0504	15.5945	23.1063	17.5535
51	1285	15.9866	14.6512	21.6848	17.4957
52	1290	14.4732	12.9291	19.4072	18.2250
53	1295	13.3794	11.4841	17.6321	19.3589
54	1300	8.7419	6.3742	10.8190	23.9020

Table C.2 (Continued)

OBS	DEG	F	N	R	DIR
55	1305	6.9064	4.3190	8.1457	27.9794
56	1310	7.2436	4.9031	8.7476	25.9064
57	1315	7.4383	4.7907	8.8475	27.2160
58	1320	7.0037	4.2628	8.1990	28.6731
59	1325	6.8763	3.8173	7.8648	30.9637
60	1330	7.1011	4.2066	8.2536	29.3577
61	1335	7.9792	5.2623	9.5507	26.5650
62	1340	9.5809	6.9281	11.8234	24.1283
63	1345	10.9818	8.4555	13.8599	22.4054
64	1350	11.4315	9.2342	14.6952	21.0689
65	1355	11.9784	9.9567	15.5762	20.2657
66	1360	13.4095	11.9859	17.9834	18.2084
67	1365	14.3458	12.4836	19.0169	18.9704
68	1370	14.6679	12.8167	19.4786	18.8531
69	1375	14.7653	12.7605	19.5152	19.1654
70	1380	14.5405	12.3712	19.0911	19.6084
71	1385	14.3307	12.2327	18.8417	19.5158
72	1390	13.4095	11.9859	17.9854	18.2084
73	1395	9.7385	7.8755	12.5244	21.0375

Table C.3. Computed Mechanics on the Rake Face for Aluminum With 40° Tool, Test Al 63, Revolution 1

OBS	DEG	F	N	R	DIR
1	1825	4.9347	3.7826	6.2177	12.5288
2	1830	5.5127	4.4714	7.0981	10.9540
3	1836	5.6572	4.6436	7.3190	10.6196
4	1840	6.3797	5.5046	8.4263	9.2110
5	1845	6.6964	5.5324	8.6861	10.4375
6	1850	6.0907	5.1602	7.9828	9.7276
7	1856	6.5242	5.6769	8.6482	8.9726
8	1860	6.8132	6.0213	9.0926	8.5307
9	1865	7.8247	7.2267	10.6513	7.2750
10	1870	8.6917	8.2600	11.9905	6.4588
11	1875	9.1252	8.7766	12.6609	6.1155
12	1880	10.1644	9.6653	14.0262	6.4416
13	1885	10.8869	10.5263	15.1436	5.9645
14	1890	10.4257	10.3264	14.6741	5.2739
15	1895	9.9922	9.8098	14.0027	5.5275
16	1900	9.3865	9.4377	13.3107	4.8440
17	1905	5.7740	5.1325	7.7254	8.3659
18	1910	3.8955	2.8938	4.8528	13.3925
19	1915	4.7625	3.9271	6.1728	10.4915
20	1920	5.0515	4.2715	6.6154	9.7824
21	1925	5.7740	5.1325	7.7254	8.3659
22	1930	6.3520	5.8214	8.6160	7.4958
23	1935	6.4965	5.9936	8.8390	7.3057
24	1940	6.7855	6.3380	9.2851	6.9529
25	1945	7.2467	6.5379	9.7600	7.9435
26	1950	7.8247	7.2267	10.6513	7.2750
27	1955	8.2582	7.7433	11.3206	6.8428
28	1960	9.7032	9.4654	13.5553	5.7106
29	1965	10.1090	10.2987	14.4310	4.4671
30	1970	10.8315	11.1598	15.5519	4.1446
31	1975	11.1205	11.5042	16.0003	4.0283
32	1980	10.8592	10.8431	15.3458	5.0424
33	1985	9.6755	9.7821	13.7588	4.6859
34	1990	9.6755	9.7821	13.7588	4.6859
35	1995	5.0515	4.2715	6.6154	9.7824
36	2000	4.0400	3.0660	5.0717	12.8042
37	2005	4.3290	3.4105	5.5110	11.7683
38	2010	4.7625	3.9271	6.1728	10.4915
39	2015	5.1960	4.4437	6.8370	9.4623
40	2020	5.0515	4.2715	6.6154	9.7824
41	2025	4.3013	3.7272	5.6915	9.0903
42	2030	5.4573	5.1048	7.4727	6.9112
43	2035	6.0076	6.1104	8.5690	4.5140
44	2040	7.3912	6.7101	9.9827	7.7651
45	2045	8.1137	7.5711	11.0975	6.9010
46	2050	8.2582	7.7433	11.3206	6.8428
47	2055	9.6755	9.7821	13.7588	4.6859
48	2060	10.8592	10.8431	15.3458	5.0424
49	2065	10.1367	9.9820	14.2265	5.4403
50	2070	6.7578	6.6547	9.4843	5.4403
51	2075	4.3013	3.7272	5.6915	9.0903
52	2080	3.4343	2.6939	4.3648	11.8086
53	2085	4.0400	3.0660	5.0717	12.8042
54	2090	4.0400	3.0660	5.0717	12.8042

Table C.3 (Continued)

OBS	DEC	F	N	R	DIR
55	2095	4.4735	3.5827	5.7313	11.3099
56	2100	5.1960	4.4437	6.8370	9.4623
57	2105	5.7740	5.1325	7.7254	8.3659
58	2110	6.0630	5.4769	8.1705	7.9071
59	2115	6.3520	5.8214	8.6160	7.4958
60	2120	6.7855	6.3380	9.2851	6.9529
61	2125	6.7855	6.3380	9.2851	6.9529
62	2130	7.3635	7.0268	10.1783	6.3402
63	2135	7.3635	7.0268	10.1783	6.3402
64	2140	8.9530	8.9211	12.6389	5.1022
65	2145	9.3588	9.7544	13.5179	3.8141
66	2150	10.2258	10.7876	14.8640	3.4682
67	2155	9.7923	10.2710	14.1909	3.6329
68	2160	9.5033	9.9266	13.7423	3.7517
69	2165	8.6363	8.8934	12.3967	4.1596
70	2170	6.7855	6.3380	9.2851	6.9529
71	2175	4.1345	3.2383	5.2912	12.2647
72	2180	4.3290	3.4105	5.5110	11.7683
73	2185	4.4735	3.5827	5.7313	11.3099

Table C.4. Computed Mechanics on the Rake Face for Aluminum With 40° Tool, Test A1 56, Revolution 1

OBS	DEG	F	N	R	DIR
1	2190	4.6180	3.7549	5.9519	10.8855
2	2195	5.0515	4.2715	6.6154	9.7824
3	2200	5.4850	4.7881	7.2809	8.8006
4	2205	6.6687	5.8491	8.8703	8.7461
5	2210	7.3635	7.0268	10.1783	6.3402
6	2216	7.9415	7.7156	11.0724	5.8263
7	2220	8.3750	8.2322	11.7435	5.4923
8	2225	8.8085	8.7489	12.4150	5.1944
9	2230	9.6755	9.7821	13.7588	4.6859
10	2235	10.2535	10.4709	14.6552	4.3987
11	2240	10.9760	11.3320	15.7761	4.0856
12	2246	12.2764	12.8818	17.7947	3.6215
13	2250	11.6985	12.1930	16.8974	3.8141
14	2256	10.6593	11.3043	15.5372	3.3178
15	2261	10.0813	10.6154	14.6396	3.5214
16	2265	7.7693	7.8601	11.0518	4.6668
17	2270	4.6180	3.7549	5.9519	10.8855
18	2275	5.1960	4.4437	6.8370	9.4623
19	2280	5.6295	4.9603	7.5031	8.6156
20	2285	6.2075	5.6491	8.3932	7.6960
21	2290	6.4965	5.9936	8.8390	7.3057
22	2295	6.7855	6.3380	9.2851	6.9529
23	2300	6.9300	6.5102	9.5083	6.7890
24	2305	7.3635	7.0268	10.1783	6.3402
25	2310	8.2305	8.0600	11.5198	5.5993
26	2315	9.6755	9.7821	13.7588	4.6859
27	2320	10.9760	11.3320	15.7761	4.0856
28	2325	11.2650	11.6764	16.2246	3.9725
29	2330	11.4095	11.8486	16.4488	3.9182
30	2335	11.6985	12.1930	16.8974	3.8141
31	2340	11.5540	12.0208	16.6731	3.8655
32	2345	10.5148	11.1320	15.3128	3.3665
33	2350	10.3703	10.9598	15.0884	3.4166
34	2355	7.6802	7.0545	10.4284	7.4314
35	2360	4.7625	3.9271	6.1728	10.4915
36	2365	5.1960	4.4437	6.8370	9.4623
37	2370	5.4850	4.7881	7.2809	8.8806
38	2375	5.9185	5.3047	7.9479	8.1301
39	2380	6.7855	6.3380	9.2851	6.9529
40	2385	6.9300	6.5102	9.5083	6.7890
41	2390	7.2190	6.8546	9.9549	6.4831
42	2395	7.0468	6.9991	9.9320	5.1944
43	2400	8.5472	8.0877	11.7672	6.5819
44	2405	9.1252	8.7766	12.6609	6.1155
45	2410	9.7032	9.4654	13.5553	5.7106
46	2415	9.9645	10.1265	14.2069	4.5378
47	2420	9.9645	10.1265	14.2069	4.5378
48	2425	10.6870	10.9876	15.3277	4.2053
49	2430	10.5425	10.8153	15.1035	4 2679
50	2435	9.7923	10.2719	14.1909	3.6329
51	2441	8.4918	8.7212	12.1725	4.2364
52	2445	5.6295	4.9603	7.5031	8.6156
53	2450	4.4735	3.5827	5.7313	11.3099
54	2455	5.1960	4.4437	6.8370	9.4623

Table C.4 (Continued)

OBS	DEC	F	N	R	DIR
55	2460	5.8017	4.8158	7.5400	10.3048
56	2465	6.0630	5.4769	8.1705	7.9071
57	2470	6.2075	5.6491	8.3932	7.6960
58	2475	6.3520	5.8214	8.6160	7.4958
59	2480	6.9300	6.5102	9.5083	6.7890
60	2485	7.5357	6.8823	10.2055	7.5946
61	2490	8.1137	7.5711	11.0975	6.9810
62	2495	8.9530	8.9211	12.6389	5.1022
63	2500	10.2505	10.4709	14.6552	4.3987
64	2505	10.6870	10.9876	15.3277	4.2053
65	2510	11.2650	11.6764	16.2246	3.9725
66	2515	11.3817	12.1653	16.6595	3.0941
67	2520	11.2372	11.9931	16.4350	3.1364
68	2525	11.0927	11.8209	16.2106	3.1798
69	2530	9.9645	10.1265	14.2069	4.5378
70	2535	4.6180	3.7549	5.9519	10.8855
71	2540	4.6180	3.7549	5.9519	10.8855
72	2545	5.0515	4.2715	6.6154	9.7824

Table C.5. Computed Mechanics on the Rake Face for Aluminum With 40° Tool, Test Al 56, Revolution 1

OBS	DEG	F	N	R	DIR
1	2550	5.6295	4.9603	7.5031	8.61563
2	2555	6.2075	5.6491	8.3932	7.69603
3	2560	6.6410	6.1658	9.0620	7.12500
4	2565	7.3912	6.7101	9.9827	7.76515
5	2570	7.0745	6.6824	9.7315	6.63250
6	2575	7.3635	7.0268	10.1783	6.34018
7	2585	8.9253	9.2378	12.8451	4.01417
8	2580	7.7693	7.8601	11.0518	4.66685
9	2590	9.8200	9.9543	13.9828	4.61064
10	2595	10.3980	10.6431	14.8793	4.33230
11	2600	10.9760	11.3320	15.7761	4.08561
12	2605	10.9483	11.6487	15.9861	3.22452
13	2610	11.2372	11.9931	16.4350	3.13635
14	2615	10.7760	11.7932	15.9750	2.41950
15	2620	10.5148	11.1320	15.3128	3.36645
16	2625	9.3588	9.7544	13.5179	3.81407
17	2630	4.7348	4.2438	6.3583	8.13008
18	2635	5.0515	4.2715	6.6154	9.78238
19	2640	5.4850	4.7881	7.2809	8.88064
20	2645	6.2075	5.6491	8.3932	7.69603
21	2650	6.3520	5.8214	8.6160	7.49584
22	2656	6.7855	6.3386	9.2851	6.95294
23	2660	7.0745	6.6824	9.7315	6.63250
24	2666	7.3635	7.0268	10.1783	6.34018
25	2670	7.9415	7.7156	11.0724	5.82633
26	2675	9.2420	9.2653	13.0868	4.92710
27	2680	9.6755	9.7821	13.7588	4.68589
28	2685	10.1090	10.2987	14.4310	4.46715
29	2690	10.1090	10.2987	14.4310	4.46715

Table C.6. Computed Mechanics on the Rake Face for Aluminum With 40° Tool, Test Al 03

OBS	DEG	F	N	R	DIR
1	161	6.4688	6.3103	9.0368	5.71058
2	165	3.2344	3.1551	4.5184	5.71058
3	170	3.2344	3.1551	4.5184	5.71058
4	175	4.1568	3.5550	5.4696	9.46230
5	180	4.7348	4.2438	6.3583	8.13008
6	185	5.3128	4.9326	7.2496	7.12500
7	190	6.1798	5.9659	8.5896	6.00899
8	195	7.9138	8.0323	11.2759	4.57391
9	200	8.1474	9.0102	12.1475	2.12109
10	205	10.5148	11.1320	15.3128	3.36645
11	211	12.3042	12.5651	17.5862	4.39870
12	215	12.5932	12.9096	18.0345	4.28914
13	220	14.3271	14.9760	20.7255	3.73139
14	225	14.9051	15.6648	21.6229	3.57633
15	230	15.8275	16.0647	22.5518	4.57391
16	235	16.0611	17.0425	23.4181	3.30186
17	240	16.3501	17.3869	23.8669	3.23969
18	245	17.2171	18.4201	25.2137	3.06648
19	250	16.0057	17.6759	23.8458	2.16107
20	255	9.1252	8.7766	12.6609	6.11549
21	260	4.9684	5.2216	7.2076	3.57633
22	265	5.8908	5.6214	8.1426	6.34018
23	270	7.1022	6.3657	9.5375	8.13008
24	275	7.6248	7.6879	10.8278	4.76363
25	280	8.5472	8.0877	11.7672	6.58193
26	285	8.8362	8.4322	12.2139	6.34018
27	290	9.4142	9.1210	13.1080	5.90613
28	295	10.2812	10.1542	14.4503	5.35581
29	300	12.5932	12.9095	18.0345	4.28914
30	305	15.1941	16.0092	22.0717	3.50352
31	315	18.3731	19.7978	27.0097	2.86240
32	320	19.5845	20.5420	28.3818	3.63294
33	325	21.0295	22.2641	30.6256	3.36645
34	330	20.6851	22.5531	30.6025	2.52611
35	335	19.5291	21.1754	28.8060	2.68377
36	340	16.8173	19.3425	25.6311	1.00508
37	345	10.2812	10.1542	14.4503	5.35581
38	350	7.3358	7.3435	10.3798	4.96973
39	355	8.2028	8.3767	11.7241	4.39870
40	360	10.2812	10.1542	14.4503	5.35581
41	366	14.0936	13.9982	19.8640	5.19442
42	370	16.1165	16.4091	23.0000	4.48460
43	375	17.2725	17.7867	24.7933	4.15963
44	380	17.8505	18.4756	25.6902	4.01417

Table C.7. Computed Mechanics on the Rake Face for Aluminum With 50° Tool, Test Al 57, Revolution 1

OBS	DEG	F	N	R	DIR
1	3495	4.65555	2.14572	5.1262	15.2551
2	3501	5.27212	2.80982	5.9741	11.9441
3	3506	5.61654	3.09881	6.4147	11.1130
4	3510	5.61654	3.09881	6.4147	11.1130
5	3515	5.88870	3.47391	6.8370	9.4623
6	3520	6.13316	3.53231	7.0776	10.0607
7	3525	6.23312	3.76291	7.2809	8.8806
8	3530	6.64978	3.96580	7.7426	9.1888
9	3535	7.29407	4.94661	8.8132	5.8560
10	3540	7.73844	5.46620	9.4743	4.7636
11	3546	9.11610	6.62219	11.2675	4.0042
12	3550	8.77168	6.33319	10.8190	4.1704
13	3555	8.42727	6.04420	10.3707	4.3511
14	3560	8.52723	6.27480	10.5871	3.6522
15	3565	7.73844	5.46620	9.4743	4.7636
16	3570	4.58330	2.23182	5.0978	14.0362
17	3575	4.65555	2.14572	5.1262	15.2551
18	3580	4.65555	2.14572	5.1262	15.2551
19	3585	4.75550	2.37632	5.3162	13.4486
20	3590	5.09992	2.66532	5.7544	12.4074
21	3596	5.54429	3.18492	6.3940	10.1246
22	3600	5.54429	3.18492	6.3940	10.1246
23	3605	5.81645	3.56002	6.8194	8.5307
24	3610	6.08862	3.93512	7.2496	7.1250
25	3615	6.53299	4.45472	7.9072	5.7106
26	3620	6.63295	4.68532	8.1209	4.7636
27	3625	7.07732	5.20492	8.7852	3.6678
28	3630	7.24953	5.34941	9.0095	3.5763
29	3635	6.66066	5.00202	8.3297	3.0941
30	3640	6.07179	4.65463	7.6506	2.5261
31	3645	5.48292	4.30724	6.9724	1.8476
32	3650	6.04408	4.33793	7.4397	4.3323
33	3655	5.64425	3.41552	6.5972	8.8204
34	3660	4.26659	2.25953	4.8280	12.0947
35	3665	4.33884	2.17343	4.8528	13.3925
36	3670	4.58330	2.23182	5.0978	14.0362
37	3675	4.92771	2.52082	5.5351	12.9074
38	3680	5.19980	2.89592	5.9519	10.8855
39	3685	5.37208	3.04042	6.1728	10.4915
40	3695	5.98866	3.70452	7.0418	8.2594
41	3700	6.26083	4.07962	7.4727	6.9112

Table C.8. Computed Mechanics on the Rake Face for Aluminum With 50° Tool, Test Al 57, Revolution 2

OBS	DEG	F	N	R	DIR
1	3860	6.0332	3.30171	6.8776	11.3099
2	3866	6.5775	4.05191	7.7254	8.3659
3	3871	6.7497	4.19641	7.9479	8.1301
4	3875	6.8497	4.42701	8.1558	7.1250
5	3880	7.1941	4.71600	8.6021	6.7536
6	3885	7.6385	5.23560	9.2606	5.5722
7	3890	8.1551	5.66910	9.9320	5.1944
8	3895	9.2161	6.85279	11.4846	3.3665
9	3900	9.6604	7.37239	12.1522	2.6507
10	3905	10.8659	8.38388	13.7243	2.3469
11	3910	10.8659	8.38388	13.7243	2.3469
12	3915	10.1770	7.80589	12.8259	2.5114
13	3920	9.5882	7.45849	12.1475	2.1211
14	3925	7.9106	5.61070	9.6984	4.6533
15	3930	5.2721	2.80982	5.9741	11.9441
16	3935	5.0999	2.66532	5.7544	12.4074
17	3940	5.2721	2.80982	5.9741	11.9441
18	3945	5.4443	2.95432	6.1942	11.5138
19	3950	5.7165	3.32942	6.6154	9.7824
20	3955	6.0609	3.61841	7.0589	9.1623
21	3960	6.5053	4.13801	7.7099	7.5394
22	3965	7.0219	4.57151	8.3789	6.9343
23	3970	7.0496	4.88821	8.5786	5.2624
24	3975	7.4940	5.40781	9.2414	4.1849
25	3980	7.5939	5.63841	9.4583	3.4064
26	3985	8.5549	6.59150	10.7998	2.3859
27	3990	8.8994	6.88050	11.2490	2.2906
28	3995	8.4827	6.67761	10.7957	1.7899
29	4000	7.6217	5.95512	9.6723	1.9979
30	4005	7.1773	5.43552	9.0032	2.8624
31	4010	7.1773	5.43552	9.0032	2.8624
32	4015	6.0886	3.93512	7.2496	7.1250
33	4020	4.7832	2.69303	5.4892	10.6196
34	4025	4.6833	2.46243	5.2912	12.2647
35	4030	5.0999	2.66532	5.7544	12.4074
36	4035	5.4443	2.95432	6.1942	11.5138
37	4040	5.7165	3.32942	6.6154	9.7824
38	4045	5.9887	3.70452	7.0418	8.2594
39	4050	6.3331	3.99351	7.4871	7.7651
40	4055	6.6052	4.36861	7.9192	6.5198
41	4060	6.7774	4.51311	8.1426	6.3402
42	4065	7.2218	5.03271	8.8024	5.1282
43	4070	7.7384	5.46620	9.4743	4.7636
44	4075	8.6994	6.41930	10.8115	3.5763
45	4080	9.4862	7.22789	11.9276	2.7006
46	4085	10.1048	7.89199	12.8215	2.0095
47	4090	10.1048	7.89199	12.8215	2.0095
48	4096	10.0048	7.66139	12.6013	2.5561
49	4100	9.5159	7.54460	12.1439	1.5911
50	4105	7.8384	5.69681	9.6899	3.9909
51	4110	5.0277	2.75142	5.7313	11.3099
52	4115	5.0999	2.66532	5.7544	12.4074
53	4120	5.2721	2.80982	5.9741	11.9441
54	4125	5.5443	3.18492	6.3940	10.1246

Table C.8 (Continued)

OBS	DEC	F	N	R	DIR
55	4130	5.7165	3.32942	6.6154	9.7824
56	4135	6.4053	3.90741	7.5031	8.6156
57	4141	6.9219	4.34090	8.1705	7.9071
58	4145	7.1941	4.71600	8.6621	6.7536
59	4150	7.0384	5.69681	9.6899	3.9909
60	4160	7.3661	6.01351	9.9014	2.6026
61	4165	9.4160	7.31400	11.9229	2.1611
62	4170	10.0326	7.97809	12.8180	1.5074
63	4175	10.0326	7.97809	12.8180	1.5074
64	4180	9.6881	7.68910	12.3686	1.5622
65	4185	6.3162	4.71303	7.8808	3.2705
66	4190	2.2832	1.47567	2.7186	7.1250
67	4201	5.1722	2.57922	5.7796	13.4957
68	4206	5.4443	2.95432	6.1942	11.5138
69	4210	5.6888	3.01271	6.4373	12.0947
70	4215	6.0332	3.30171	6.8776	11.3099
71	4220	6.4776	3.82131	7.5207	9.4623

Table C.9. Computed Mechanics on the Rake Face for Aluminum With 50° Tool, Test Al 57. Revolution 2

OBS	DEG	F	N	R	DIR
1	4225	7.0942	4.48540	8.3932	7.6960
2	4230	7.3663	4.86050	8.8254	6.5819
3	4235	7.7107	5.14950	9.2721	6.2635
4	4240	7.8107	5.38010	9.4843	5.4403
5	4245	8.2551	5.89970	10.1466	4.4474
6	4250	8.7717	6.33319	10.8190	4.1704
7	4255	9.9049	7.43079	12.3824	3.1221
8	4260	10.6214	8.32548	13.4955	1.9091
9	4265	11.3103	8.90348	14.3942	1.7899
10	4270	11.3103	8.90348	14.3942	1.7899
11	4276	10.8659	8.38388	13.7243	2.3469
12	4280	10.3770	8.26709	13.2675	1.4564
13	4285	8.2828	6.21640	10.3561	3.1108
14	4290	5.3721	3.04042	6.1728	10.4915
15	4295	5.4443	2.95432	6.1942	11.5138
16	4300	5.6165	3.09881	6.4147	11.1130
17	4306	5.8887	3.47391	6.8370	9.4623
18	4311	6.4053	3.90741	7.5031	8.6156
19	4315	6.6775	4.28251	7.9328	7.3264
20	4320	7.0219	4.57151	8.3789	6.9343
21	4325	7.2941	4.94661	8.8132	5.8560
22	4330	7.7384	5.46620	9.4743	4.7636
23	4336	8.5272	6.27480	10.5871	3.6522
24	4340	8.4550	6.36090	10.5805	3.0448
25	4345	9.2438	7.16950	11.6982	2.2026
26	4350	10.0326	7.97809	12.8180	1.5074
27	4355	9.8603	7.83359	12.5933	1.5343
28	4360	9.8603	7.83359	12.5933	1.5343
29	4365	8.4027	6.67761	10.7957	1.7899
30	4370	7.2772	5.66612	9.2230	2.0952
31	4375	6.4330	4.22411	7.6959	6.7098
32	4380	5.0554	3.06813	5.9136	8.7461
33	4385	4.9554	2.83753	5.7103	10.2039
34	4390	5.3721	3.04042	6.1728	10.4915
35	4395	5.0887	3.47391	6.8370	9.4623
36	4400	6.0609	3.61841	7.0589	9.1623
37	4405	6.5053	4.13801	7.7099	7.5394
38	4410	6.7774	4.51311	8.1426	6.3402
39	4415	7.2218	5.03271	8.8024	5.1282
40	4420	7.3940	5.17721	9.0264	5.0006
41	4425	7.7384	5.46620	9.4743	4.7636
42	4430	8.5995	6.18870	10.5949	4.2508
43	4435	9.6604	7.37239	12.1522	2.6507
44	4440	10.2770	8.03649	13.0461	1.9749
45	4446	11.0658	8.84508	14.1664	1.3639
46	4450	11.0658	8.84508	14.1664	1.3639
47	4456	10.7936	8.46998	13.7202	1.8779
48	4460	10.1325	8.20869	13.0403	0.9878
49	4465	9.6604	7.37239	12.1522	2.6507
50	4470	5.3721	3.04042	6.1728	10.4915
51	4475	5.3721	3.04042	6.1728	10.4915
52	4480	5.5443	3.18492	6.3940	10.1246
53	4485	6.0609	3.61841	7.0589	9.1623
54	4490	6.2331	3.76291	7.2809	8.8806

Table C.9 (Continued)

OBS	DEC	F	N	R	DIR
55	4495	7.0219	4.5715	8.3789	6.9343
56	4501	7.5385	5.0050	9.0487	6.4188
57	4505	8.[illegible]3	5.8136	10.1559	5.0796
58	4510	8.7717	6.3332	10.8190	4.1704
59	4515	9.4160	7.3140	11.9229	2.1611
60	4520	10.7214	8.5561	13.7169	1.4086
61	4526	11.6824	9.5092	15.0633	0.8551
62	4530	12.0268	9.7982	15.5128	0.8303
63	4535	12.7156	10.3762	16.4119	0.7848
64	4540	13.2599	11.1264	17.3096	-0.0000
65	4545	12.1990	9.9427	15.7376	0.8185
66	4550	10.4047	8.5838	13.4885	0.4775
67	4555	5.3275	3.4432	6.3434	7.1259
68	4560	5.5443	3.1849	6.3940	10.1246
69	4565	5.7887	3.2433	6.6354	10.7389
70	4570	6.3054	3.6768	7.2991	9.7524
71	4575	6.6498	3.9658	7.7426	9.1888
72	4580	7.0942	4.4854	8.3932	7.6960
73	4585	7.5385	5.0050	9.0487	6.4188

Table C.10. Computed Mechanics on the Rake Face for Aluminum With 50° Tool, Test Al 57, Revolution 4

OBS	DEG	F	N	R	DIR
1	4590	7.8107	5.38010	9.4843	5.4403
2	4595	8.1551	5.66910	9.9320	5.1944
3	4600	8.2551	5.89970	10.1466	4.4474
4	4605	8.9439	6.47769	11.0433	4.0856
5	4610	9.3883	6.99729	11.7090	3.3019
6	4615	10.3493	7.95038	13.0505	2.4681
7	4620	11.3824	9.27858	14.8406	1.3019
8	4626	12.1990	9.94267	15.7376	0.8185
9	4630	12.2712	9.85657	15.7396	1.2276
10	4635	11.6824	9.50918	15.0633	0.8551
11	4640	10.8213	8.78669	13.9394	0.9240
12	4645	8.7994	6.64990	11.0295	2.9207
13	4650	5.8165	3.56002	6.8194	8.5307
14	4655	5.7165	3.32942	6.6154	9.7824
15	4660	5.8887	3.47391	6.8370	9.4623
16	4665	6.0609	3.61841	7.0589	9.1623
17	4670	6.5053	4.13801	7.7099	7.5394
18	4676	7.1941	4.71600	8.6021	6.7536
19	4680	7.4663	5.09110	9.0368	5.7106
20	4685	7.9829	5.52460	9.7081	5.3145
21	4690	8.4273	6.04420	10.3707	4.3511
22	4695	9.1438	6.93890	11.4786	2.0064
23	4700	9.2438	7.16950	11.6982	2.2026
24	4705	9.7604	7.60299	12.3722	2.0826
25	4710	10.7936	8.46998	13.7202	1.8779
26	4715	10.9213	9.01729	14.1628	0.4547
27	4720	11.0658	8.84508	14.1664	1.3639
28	4725	9.9603	8.06420	12.8156	1.0051
29	4730	8.7271	6.73600	11.0244	2.3373
30	4737	6.2608	4.07962	7.4727	6.9112
31	4740	5.2276	3.21263	6.1358	8.4269
32	4745	5.2998	3.12652	6.1533	9.4623
33	4750	5.5443	3.18492	6.3940	10.1246
34	4755	6.0609	3.61841	7.0589	9.1623
35	4760	6.3331	3.99351	7.4871	7.7651
36	4770	6.6652	4.36861	7.9192	6.5198
37	4775	7.2941	4.94661	8.8132	5.8560
38	4780	7.3940	5.17721	9.0264	5.0006
39	4785	7.7384	5.46620	9.4743	4.7636
40	4790	8.2551	5.89970	10.1466	4.4474
41	4795	10.0048	7.66139	12.6013	2.5561
42	4800	11.3103	8.90348	14.3942	1.7899
43	4805	11.4102	9.13408	14.6159	1.3220
44	4810	11.4102	9.13408	14.6159	1.3220
45	4815	11.2380	8.98958	14.3912	1.3426
46	4820	10.8213	8.78669	13.9394	0.9240
47	4825	9.4882	7.22789	11.9276	2.7006
48	4830	5.4720	3.27102	6.3752	9.1302
49	4835	5.5443	3.18492	6.3940	10.1246
50	4840	5.7165	3.32942	6.6154	9.7824
51	4845	6.0609	3.61841	7.0589	9.1623
52	4850	6.5775	4.05191	7.7254	8.3659
53	4855	6.8497	4.42701	8.1558	7.1250
54	4861	7.7167	5.14950	9.2721	6.2635

Table C.10 (Continued)

OBS	DEC	F	N	R	DIR
55	4865	7.9829	5.5246	9.7081	5.3145
56	4870	8.9439	6.4777	11.0433	4.0856
57	4875	9.9326	7.7475	12.5968	2.0454
58	4881	10.3770	8.2671	13.2675	1.4564
59	4885	11.5102	9.3647	14.8385	0.8680
60	4890	12.1990	9.9427	15.7376	0.8185
61	4895	13.2322	10.8097	17.0863	0.7538
62	4900	12.8878	10.5207	16.6367	0.7742
63	4905	12.6434	10.4623	16.4108	0.3924
64	4910	11.6824	9.5092	15.0633	0.8551
65	4915	10.4047	8.5838	13.4885	0.4775
66	4920	5.6442	3.4155	6.5972	8.8204
67	4925	5.8887	3.4739	6.8370	9.4623
68	4930	6.1332	3.5323	7.0776	10.0607
69	4935	6.4776	3.8213	7.5207	9.4623
70	4940	6.9219	4.3409	8.1705	7.9071
71	4945	7.7107	5.1495	9.2721	6.2635
72	4950	7.9829	5.5246	9.7081	5.3145
73	4955	8.4995	5.9581	10.3798	4.9697
74	4961	8.5995	6.1887	10.5949	4.2588
75	4965	8.8716	6.5638	11.0358	3.5035
76	4970	9.7327	7.2863	12.1579	3.1798

Table C.11. Computed Mechanics on the Rake Face for Aluminum With 50° Tool, Test Al 57, Revolution 5

OBS	DEG	F	N	R	DIR
1	4975	10.6214	8.3253	13.4955	1.9091
2	4985	12.3712	10.0872	15.9624	0.8069
3	4990	12.1990	9.9427	15.7376	0.8185
4	5000	11.3380	9.2202	14.6137	0.8814
5	5005	10.1325	8.2087	13.0403	0.9878
6	5010	5.7442	3.6461	6.8037	7.5946
7	5015	5.7165	3.3294	6.6154	9.7824
8	5020	6.0609	3.6184	7.0589	9.1623
9	5025	6.2331	3.7629	7.2809	8.8806
10	5030	6.5053	4.1380	7.7099	7.5394
11	5035	7.1941	4.7160	8.6021	6.7536
12	5041	7.6385	5.2356	9.2606	5.5722
13	5046	7.9106	5.6107	9.6984	4.6533
14	5050	8.2551	5.8997	10.1466	4.4474
15	5092	.	.	.	.
16	5060	9.5882	7.4585	12.1475	2.1211
17	5065	10.0326	7.9781	12.8180	1.5074
18	5070	10.6491	8.6422	13.7146	0.9392
19	5075	11.0658	8.8451	14.1664	1.3639
20	5080	10.5769	8.7283	13.7133	0.4696
21	5085	10.6491	8.6422	13.7146	0.9392
22	5090	9.5159	7.5446	12.1439	1.5911
23	5096	6.5330	4.4547	7.9072	5.7106
24	5100	5.3275	3.4432	6.3434	7.1250
25	5106	5.5443	3.1849	6.3940	10.1246
26	5110	5.5443	3.1849	6.3940	10.1246
27	5115	6.0609	3.6184	7.0589	9.1623
28	5120	6.3331	3.9935	7.4871	7.7651
29	5125	6.6052	4.3686	7.9192	6.5198
30	5130	7.2218	5.0327	8.8024	5.1282
31	5135	7.3940	5.1772	9.0264	5.0006
32	5141	7.9106	5.6107	9.6984	4.6533
33	5145	8.1828	5.9858	10.1385	3.8141
34	5150	8.8716	6.5638	11.0358	3.5035
35	5155	9.8326	7.5169	12.3768	2.6026
36	5160	10.7214	8.5561	13.7169	1.4086
37	5165	11.2380	8.9896	14.3912	1.3426
38	5171	11.8269	9.3370	15.0683	1.7098
39	5176	11.4825	9.0480	14.6189	1.7624
40	5180	10.9935	8.9312	14.1642	0.9094

Table C.12. Computed Mechanics on the Rake Face for Copper With 20° Tool, Test Cu 06

OBS	DEG	F	N	R	DIR
1	735	57.667	84.489	101.956	14.0362
2	740	56.682	83.433	100.866	14.1911
3	745	59.661	88.330	106.591	14.0362
4	750	60.045	89.386	107.681	13.8912
5	755	60.045	89.386	107.681	13.8912
6	760	63.695	92.842	112.591	14.4524
7	765	67.730	97.354	118.597	14.8264
8	770	72.149	102.923	125.692	15.0304
9	775	80.505	109.450	135.869	16.3360
10	780	85.596	113.578	142.220	17.0028
11	785	90.784	121.259	151.478	16.8214
12	791	96.644	127.499	159.987	17.1619
13	795	102.216	136.236	170.318	16.8803
14	800	102.985	138.349	172.471	16.6634
15	805	109.516	143.148	180.236	17.4179
16	810	108.363	139.979	177.022	17.7446
17	815	95.490	124.330	156.769	17.5255
18	820	87.037	114.250	143.626	17.3005
19	825	76.471	104.938	129.845	16.0816
20	830	58.123	84.105	102.235	14.6473
21	835	61.101	89.002	107.957	14.4703
22	840	63.983	90.345	110.707	15.3061
23	845	62.157	88.617	108.243	15.0464
24	850	63.983	90.345	110.707	15.3061
25	855	68.017	94.857	116.723	15.6422
26	860	72.052	99.370	122.743	15.9454
27	865	77.143	103.497	129.084	16.6992
28	870	81.177	108.010	135.114	16.9275
29	876	88.093	113.865	143.964	17.7276
30	880	92.512	119.434	151.072	17.7609
31	885	104.328	135.467	170.985	17.6011
32	890	112.685	141.995	181.274	18.4349
33	895	118.929	149.291	190.872	18.5416
34	900	120.754	151.019	193.361	18.6456
35	905	119.601	147.851	190.169	18.9704
36	910	113.260	137.001	177.756	19.5807
37	915	108.841	131.433	170.648	19.6284
38	925	81.080	104.456	132.231	17.8188
39	920	100.003	120.296	156.434	19.7369
40	930	68.114	98.410	119.684	14.6888
41	935	70.611	98.698	121.356	15.5809
42	940	66.192	93.129	114.256	15.4034
43	945	73.492	100.041	124.135	16.3017
44	950	76.374	101.385	126.932	16.9908
45	955	83.674	108.297	136.856	17.6908
46	960	90.590	114.153	145.730	18.4349
47	965	100.484	124.905	160.307	18.8160
48	970	106.056	133.642	170.611	18.4349
49	975	114.126	142.667	182.698	18.6578
50	980	121.426	149.579	192.660	19.0691
51	985	125.076	153.035	197.645	19.2592
52	990	120.560	143.913	187.738	19.9538
53	995	112.491	134.889	175.639	19.8264
54	1000	103.365	126.249	163.166	19.3086

Table C.12 (Continued)

OBS	DEG	F	N	R	DIR
55	1005	95.393	120.777	153.906	18.3026
56	1010	85.309	116.075	144.052	16.3138
57	1015	79.736	107.338	133.713	16.6069
58	1020	80.793	106.953	134.039	17.0674
59	1025	85.786	107.528	137.556	18.5830
60	1031	96.834	121.449	155.328	18.5660
61	1035	92.896	120.490	152.143	17.6317
62	1040	90.784	121.259	151.478	16.8214
63	1045	98.084	128.171	161.395	17.4254
64	1050	100.966	129.514	164.219	17.9389
65	1055	107.594	137.867	174.882	17.9691
66	1060	110.188	141.707	179.506	17.8676
67	1065	116.432	149.004	189.099	18.0041
68	1070	120.467	153.516	195.139	18.1218
69	1076	124.404	154.475	198.341	18.8456
70	1080	125.460	154.091	198.707	19.1523
71	1086	123.923	149.866	194.465	19.5869
72	1090	119.504	144.297	187.358	19.6307
7[illegible]	1095	110.291	132.104	172.086	19.8552

Table C.13. Computed Mechanics on the Rake Face for Copper With 20° Tool, Test Cu 33, Revolution 1

OBS	DEG	F	N	R	DIR
1	416	56.9657	67.700	88.540	20.0452
2	420	58.7908	69.508	91.037	20.2248
3	425	60.6159	71.236	93.535	20.3948
4	430	61.6721	70.852	93.933	21.0375
5	435	60.8061	65.186	89.144	23.0088
6	440	61.8624	64.802	89.589	23.6705
7	445	58.8840	59.905	84.000	24.5073
8	450	60.3246	60.577	85.491	24.8803
9	455	60.7091	61.633	86.511	24.5671
10	460	63.3030	65.474	91.072	24.0342
11	465	67.3376	69.986	97.120	23.8951
12	470	74.8321	84.004	112.501	21.6951
13	475	80.0199	91.685	121.693	21.1135
14	481	89.2424	103.878	136.948	20.6661
15	485	87.4173	102.150	134.448	20.5560
16	490	80.7888	93.797	123.793	20.7387
17	495	83.8643	102.247	132.241	19.3589
18	500	81.2703	98.407	127.627	19.5519
19	505	75.0262	91.110	118.025	19.4703
20	510	74.2574	88.998	115.908	19.8407
21	515	70.4130	78.436	105.405	21.9148
22	520	63.4972	72.580	96.435	21.1813
23	525	59.7499	65.571	88.711	22.3406
24	530	54.8494	55.393	77.954	24.7174
25	535	58.1151	57.793	81.960	25.1592
26	540	58.8840	59.905	84.000	24.5073
27	545	57.0589	58.177	81.488	24.4439
28	550	53.7932	55.777	77.491	23.9624
29	555	56.6745	57.121	80.466	24.7751
30	561	58.2122	61.346	84.569	23.4985
31	565	61.4779	63.746	88.561	23.9624
32	570	64.0719	67.586	93.129	23.4709
33	575	66.2814	70.370	96.671	23.2860
34	580	72.1410	76.610	105.231	23.2789
35	585	72.2381	80.164	107.910	22.0230
36	590	74.4476	82.948	111.458	21.9087
37	595	69.8383	83.429	108.802	19.9325
38	600	69.0695	81.317	106.691	20.3441
39	605	65.7067	75.364	99.985	21.0837
40	610	62.0565	71.908	94.983	20.7941
41	615	53.1214	57.218	78.076	22.8736
42	620	48.9897	49.153	69.397	24.9047
43	625	42.7456	41.856	59.826	25.6021
44	631	38.7111	37.344	53.788	26.0295
45	635	40.5361	39.072	56.301	26.0534
46	640	42.7456	41.856	59.826	25.6021
47	645	46.3958	45.312	64.852	25.6768
48	650	52.2555	51.553	73.405	25.3878
49	655	56.6745	57.121	80.466	24.7751
50	660	61.0935	62.689	87.535	24.2612
51	665	69.1627	71.714	99.631	23.9624
52	670	80.5946	86.691	118.367	22.9128
53	675	89.9142	102.437	136.301	21.2749
54	680	95.1021	110.118	145.500	20.8150

Table C.13 (Continued)

OBS	DEC	F	N	R	DIR
55	685	101.346	117.414	155.104	20.7990
56	690	96.061	106.181	143.185	22.1354
57	695	92.698	100.228	136.523	22.7650
58	700	90.873	98.500	134.015	22.6937
59	705	89.336	94.275	129.879	23.4590
60	710	86.357	89.378	124.282	24.0150
61	715	83.763	85.538	119.721	24.3994
62	720	82.610	82.369	116.658	25.0835
63	725	85.876	84.769	120.667	25.3715
64	730	87.701	86.497	123.179	25.3959
65	735	89.910	89.281	126.708	25.2011
66	740	92.120	92.065	130.239	25.0168
67	745	89.623	91.778	128.279	24.3193
68	750	94.426	98.403	136.380	23.8186
69	755	98.174	105.412	144.048	22.9637
70	760	104.418	112.708	153.643	22.8133
71	765	109.221	119.333	161.770	22.4667
72	770	109.606	120.389	162.809	22.3155
73	.775	109.606	120.389	162.809	22.3155

Table C.14. Computed Mechanics on the Rake Face for Copper With 20° Tool, Test Cu 33, Revolution 2

OBS	DEG	F	N	R	DIR
1	780	108.452	117.220	159.695	22.7749
2	786	108.068	116.164	158.659	22.9320
3	790	107.299	114.052	156.591	23.2525
4	795	106.146	110.883	153.499	23.7494
5	800	102.880	108.483	149.509	23.4813
6	805	101.342	104.258	145.396	24.1873
7	810	97.692	100.802	140.374	24. .022
8	815	96.923	98.690	138.325	24.4824
9	820	97.308	99.746	139.349	24.2909
10	825	102.783	104.930	146.883	24.4076
11	830	109.411	113.283	157.492	24.0040
12	835	117.096	121.251	168.563	24.0012
13	840	122.284	128.932	177.699	23.4841
14	845	125.934	132.388	182.718	23.5688
15	850	128.241	138.725	188.919	22.7509
16	855	130.450	141.509	192.463	22.6713
17	860	133.429	146.406	198.086	22.3447
18	865	134.582	149.575	201.209	21.9797
19	870	137.560	154.471	206.843	21.6857
20	875	135.157	144.581	197.917	23.0704
21	880	130.738	139.013	190.832	23.2428
22	885	123.053	131.044	179.763	23.1985
23	890	119.018	126.532	173.712	23.2472
24	895	118.249	124.420	171.648	23.5434
25	900	118.921	122.979	171.073	24.0389
26	905	119.593	121.538	170.511	24.5377
27	910	121.418	123.266	173.023	24.5671
28	915	122.187	125.379	175.070	24.2612
29	920	124.396	128.163	178.606	24.1455
30	925	126.222	129.891	181.118	24.1791
31	930	130.256	134.403	187.165	24.1022
32	936	135.028	143.140	197.328	23.4985
33	940	141.304	148.324	204.858	23.6113
34	945	146.492	156.005	214.003	23.1985
35	950	148.029	160.230	218.143	22.7334
36	955	146.589	159.558	216.673	22.5741
37	960	143.995	155.718	212.091	22.7600
38	965	143.226	153.605	210.020	22.9972
39	970	137.751	148.421	202.495	22.8645
40	975	137.366	147.365	201.460	22.9887
41	980	133.619	140.356	193.788	23.5913
42	985	130.256	134.403	187.165	24.1022
43	990	126.606	130.947	182.143	24.0342
44	995	124.012	127.107	177.581	24.2938
45	1000	126.606	130.947	182.143	24.0342
46	1005	130.256	134.403	187.165	24.1022
47	1010	135.444	142.084	196.298	23.6293
48	1015	142.744	148.996	206.339	23.7723
49	1020	147.163	154.564	213.418	23.5948
50	1025	149.373	157.349	216.958	23.5103
51	1030	150.526	160.517	220.054	23.1601
52	1035	153.792	162.917	224.040	23.3495
53	1040	153.120	164.358	224.631	22.9727

Table C.15. Computed Mechanics on the Rake Face for Copper With 40° Tool, Test Cu 01

OBS	DEG	F	N	R	DIR
1	1806	66.043	38.4887	76.440	19.7671
2	1811	59.264	33.9065	68.278	20.2248
3	1816	56.097	33.6394	65.405	19.0577
4	1821	41.093	22.7429	46.967	21.0375
5	1826	43.260	25.3260	50.128	19.6538
6	1831	44.844	25.4645	51.569	20.4098
7	1836	47.011	28.0476	54.742	19.1790
8	1841	50.178	28.3247	57.621	20.5560
9	1846	52.346	30.9078	60.790	19.4400
10	1851	55.513	31.1848	63.672	20.6744
11	1861	86.798	47.4849	98.938	21.3179
12	1868	108.136	58.9256	123.149	21.4129
13	1871	108.720	61.3791	124.845	20.5560
14	1876	107.997	60.5091	123.793	20.7387
15	1881	104.246	57.7874	119.192	20.9987
16	1886	97.467	53.2052	111.043	21.3706
17	1891	89.104	48.4844	101.441	21.4477
18	1896	80.602	45.3472	92.483	20.6375
19	1901	67.488	40.2108	78.559	19.2126
20	1906	72.239	40.6264	82.879	20.6469
21	1911	60.847	34.0450	69.724	20.7722
22	1916	61.431	36.4896	71.451	19.2900
23	1921	42.399	26.0485	49.762	18.4349
24	1926	50.040	29.9082	58.296	19.1336
25	1931	52.346	30.9078	60.790	19.4400
26	1936	56.235	32.0459	64.725	20.3231
27	1941	60.847	34.0450	69.724	20.7722
28	1946	69.349	37.1823	78.688	21.8014
29	1951	82.324	43.9022	93.299	21.9295
30	1956	92.855	51.2061	106.038	21.1247
31	1961	101.079	57.5104	116.295	20.3616
32	1967	102.663	57.6489	117.741	20.6840
33	1971	96.606	53.9277	110.638	20.8285
34	1976	83.076	48.9298	98.143	20.0952
35	1981	71.378	41.3489	82.490	19.9164
36	1986	67.765	37.0437	77.230	21.3368
37	1991	69.349	37.1823	78.688	21.8014
38	1996	73.823	40.7649	84.330	21.0923
39	2001	59.986	34.7675	69.334	19.9037
40	2006	54.652	31.9073	63.284	19.7222
41	2011	57.542	35.3515	67.534	18.4349
42	2016	59.125	35.4900	68.959	19.0256
43	2021	61.431	36.4896	71.451	19.2900
44	2026	64.598	36.7667	74.329	20.3532
45	2031	69.210	38.7658	79.328	20.7460
46	2036	73.961	39.1814	83.698	22.0871
47	2041	86.075	46.6238	97.891	21.5570
48	2046	101.892	58.3714	117.349	20.1706
49	2051	110.887	63.9532	128.008	20.0260
50	2056	110.165	63.0922	126.952	20.1998
51	2061	107.136	61.2316	123.400	20.2506
52	2066	98.189	54.0662	112.090	21.1612
53	2071	85.937	48.2074	98.534	20.7090
54	2076	83.769	45.6243	95.388	21.4252

Table C.15 (Continued)

OBS	DEC	F	N	R	DIR
55	2081	79.019	45.2086	91.037	20.2248
56	2086	85.076	48.9298	98.143	20.0952
57	2091	63.015	36.6281	72.887	19.8321
58	2096	57.680	33.7679	66.038	19.6538
59	2101	56.819	34.4904	66.468	18.7413
60	2106	59.125	35.4900	68.959	19.0256
61	2111	65.321	37.6277	75.383	20.0560
62	2116	71.378	41.3489	82.490	19.9164
63	2121	78.296	44.3476	89.983	20.4722
64	2126	73.347	27.9582	78.495	29.1342
65	2130	108.720	61.3701	124.845	20.5560
66	2136	123.140	69.8121	141.553	20.4495
67	2141	132.948	76.2549	153.264	20.1626
68	2146	136.699	78.9766	157.873	19.9831
69	2151	137.421	79.8376	158.930	19.8446
70	2156	130.642	75.2554	150.767	20.0560
71	2161	116.499	63.6463	132.751	21.3509

APPENDIX D

Computed Mechanics

Table D.1. Computed Mechanics for Aluminum With 30° Tool, Test Al 63, Revolution 1

OBS	DEG	TAU	BPU	MU	SN	STR	PUS
1	670	15161.7	0.108630	1.10875	24948.3	1.36808	0.879385
2	675	16762.8	0.115638	1.08199	25092.3	1.39328	0.876820
3	680	16524.4	0.113886	1.09148	23170.2	1.44983	0.872529
4	685	16983.5	0.115638	1.06707	23254.8	1.44983	0.872529
5	690	17700.0	0.120894	1.06966	22596.0	1.51563	0.869333
6	695	18025.9	0.122644	1.06115	22824.3	1.51563	0.869333
7	700	19772.2	0.134911	1.04603	22978.3	1.59227	0.867213
8	705	21773.8	0.155936	1.02438	20800.2	1.84580	0.866553
9	710	24217.3	0.178713	1.00310	21117.7	1.90037	0.868140
10	715	22244.6	0.208499	0.97844	14103.6	2.06512	0.885372
11	720	12014.3	0.227772	0.94406	4711.4	6.71103	0.934030
12	725	11073.9	0.238284	0.95059	4171.0	7.71985	0.940815
13	730	11867.2	0.248797	0.94781	4316.8	7.71985	0.940815
14	735	11714.4	0.252301	0.96691	4505.2	7.71985	0.940815
15	740	11709.2	0.252301	0.97325	4547.2	7.71985	0.940815
16	745	18326.3	0.240036	0.95698	8815.9	4.37970	0.910593
17	750	19570.7	0.212003	0.97068	10914.3	3.46409	0.896575
18	755	19976.5	0.180465	0.99821	13448.4	2.70982	0.882234
19	760	18191.8	0.122644	1.04729	24426.7	1.44983	0.872529
20	765	17641.6	0.119142	1.03557	26155.9	1.36808	0.879385
21	770	18038.2	0.122644	1.04729	27070.9	1.36808	0.879385
22	775	21480.7	0.140167	0.97834	25940.7	1.48148	0.870795
23	780	21331.2	0.141919	1.01847	26040.2	1.48148	0.870795
24	785	22137.3	0.147175	0.99983	25461.7	1.55248	0.868140
25	791	24003.3	0.159440	0.98201	26176.5	1.59227	0.867213
26	795	25324.8	0.171705	0.98563	25847.6	1.68173	0.866157
27	800	26197.6	0.190978	0.96274	21914.3	1.90037	0.868140
28	805	26074.3	0.215507	0.94125	16449.8	2.57114	0.879385
29	810	23314.9	0.238284	0.94040	13081.9	3.23808	0.892537
30	815	22208.0	0.254053	0.93895	11425.5	3.72403	0.900925
31	820	21278.6	0.259309	0.94253	10519.0	4.02573	0.905595
32	825	18739.3	0.264565	0.93415	8362.9	4.80021	0.915926
33	830	21270.6	0.259309	0.94253	10519.0	4.02573	0.905595
34	835	24822.7	0.250549	0.93856	13696.7	3.23808	0.892537
35	840	24291.0	0.236532	0.94351	14214.5	3.03998	0.889065
36	845	22514.8	0.210251	0.95935	13966.0	2.86512	0.885372
37	850	23007.6	0.171705	0.96691	10655.3	2.05701	0.869333
38	855	17761.2	0.119142	1.03557	22734.2	1.48148	0.870795
39	860	16973.1	0.113886	1.03146	24138.8	1.39328	0.876820
40	865	17514.3	0.117390	1.02949	24838.1	1.39328	0.876820
41	870	17568.3	0.117390	1.02949	23172.6	1.44983	0.872529
42	875	20106.5	0.133159	0.99109	22921.9	1.55248	0.868140
43	880	20455.5	0.140167	1.01322	21462.6	1.68173	0.866157
44	885	22727.2	0.157688	0.97707	21443.6	1.78659	0.866157
45	890	24460.2	0.180465	0.92771	19009.2	2.05701	0.869333
46	895	24499.7	0.190978	0.93799	17909.6	2.23306	0.872529
47	900	25449.8	0.210251	0.92214	16960.4	2.44670	0.876820
48	905	19526.7	0.222515	0.92110	9790.8	3.72403	0.900925
49	910	17161.4	0.224267	0.93876	8072.1	4.37970	0.910593
50	915	19467.0	0.210251	0.95182	10607.6	3.46409	0.896575
51	920	20608.2	0.192730	0.96691	12805.6	2.86512	0.885372
52	925	21121.5	0.182217	0.95819	14127.2	2.57114	0.879385
53	930	20474.0	0.154184	0.99832	17150.3	2.05701	0.869333
54	935	14764.0	0.103373	1.07110	24838.7	1.32317	0.885372
55	940	15729.7	0.106877	1.03800	24223.6	1.34473	0.8822[illegible]
56	945	17428.5	0.117390	1.02949	20647.6	1.55248	0.868140
57	950	17715.2	0.120894	1.02763	19524.0	1.63525	0.866633
58	955	18679.4	0.127902	1.01129	19561.7	1.68173	0.866157
59	960	18887.4	0.127902	1.02424	19714.8	1.68173	0.866157
60	965	19150.3	0.131407	0.98525	18867.8	1.73205	0.866025
61	970	20061.8	0.138415	0.96116	18620.1	1.78659	0.866157
62	975	20701.5	0.140928	0.97228	18189.5	1.91020	0.867213
63	980	20822.2	0.161192	0.96691	15485.0	2.23306	0.872529
64	985	19412.7	0.180465	0.93632	11718.1	2.86512	0.885372
65	990	20167.4	0.178713	0.90504	12200.1	2.70982	0.882234
66	995	18956.9	0.192730	0.91019	10210.7	3.23808	0.892537
67	1000	15210.5	0.213755	0.89429	6395.7	4.80021	0.915926
68	1005	17283.7	0.210251	0.92950	8395.3	4.02573	0.905595
69	1010	1635[illegible].7	0.213755	0.92286	7339.4	4.37970	0.910593
70	1015	16344.8	0.213755	0.94471	7751.1	4.37970	0.910593
71	1020	18796.4	0.203242	0.95909	10335.0	3.46409	0.896575
72	1025	20936.8	0.180465	0.97134	13128.9	2.70982	0.882234
73	1030	19556.6	0.145423	1.02863	17490.9	1.90037	0.868140

Table D.2. Computed Mechanics for Aluminum With 30° Tool, Test Al 63, Revolution 2

OBS	DEG	TAU	EPU	MU	SN	STR	PUB
1	1035	16[illegible]7.0	0.110382	1.90425	23758.9	1.39328	0.876820
2	1040	16956.9	0.115638	1.06707	24089.4	1.42048	0.874836
3	1045	18677.9	0.120150	1.04499	20280.8	1.51563	0.869333
4	1050	18707.6	0.127902	1.06382	22914.3	1.55248	0.868140
5	1055	19313.3	0.133159	1.05347	21823.2	1.63528	0.866583
6	1060	18970.6	0.134911	1.08413	20560.7	1.73206	0.866023
7	1065	20047.4	0.143671	1.07070	20727.4	1.78859	0.866157
8	1070	20480.1	0.152482	1.08670	18434.3	1.98037	0.868140
9	1075	22987.1	0.182217	1.00240	18008.9	2.23306	0.872529
10	1080	25177.1	0.204994	0.99443	18002.3	2.33484	0.874836
11	1085	22874.7	0.220763	0.96691	13588.7	3.38998	[illegible]
12	1090	19083.2	0.230028	0.97468	9612.1	4.[illegible]2873	0.905595
13	1095	17208.1	0.248840	0.94712	7929.8	4.80021	0.915926
14	1100	17322.4	0.245292	0.96043	8020.0	4.80021	0.915926
15	1105	.	0.234780	0.93744	.	.	.
16	1110	.	0.220763	0.99613	.	.	.
17	1115	.	0.200744	0.92888	.	.	.
18	1120	25148.6	0.176961	0.97143	22779.1	1.84580	0.866583
19	1125	13258.7	0.096365	1.19194	21196.6	1.42048	0.874836
20	1130	11159.3	0.085852	1.24340	21160.3	1.34478	0.882234
21	1135	11874.8	0.091109	1.27959	21414.9	1.39328	0.876820
22	1140	12921.6	0.094413	1.22861	18309.6	1.55248	0.868140
23	1145	13067.6	0.096365	1.23040	17264.0	1.63528	0.866583
24	1150	13716.7	0.101621	1.22491	17413.6	1.68173	0.866157
25	1155	14123.4	0.105125	1.21552	17167.3	1.73206	0.866023
26	[illegible]	17190.3	0.120150	[illegible].09960	17625.3	1.84580	0.866583
27	1165	.	0.154184	1.09707	.	.	.
28	1170	21334.9	0.164696	1.08809	19488.4	2.06701	0.869333
29	1175	.	0.187474	1.04124	.	.	.
30	1180	19795.7	0.204994	1.01847	12142.3	3.23808	0.892537
31	1185	18774.2	0.217289	1.02097	10735.6	3.72403	0.900925
32	1190	.	0.220763	1.04117	.	.	.
33	1195	.	0.210281	1.04499	.	.	.
34	1200	.	0.203842	1.04776	.	.	.
35	1205	21891.4	0.192730	1.06231	16178.1	2.57114	0.879386
36	1210	22264.0	0.171706	1.08022	20249.8	2.06701	0.869333
37	1215	13315.1	0.101621	1.32223	21220.1	1.51563	0.869333
38	1220	9812.9	0.080596	1.32573	21017.8	1.32317	0.885372
39	1225	10157.9	0.082348	1.30480	21328.4	1.32317	0.885372
40	1230	.	0.070084	0.71880	.	.	.
41	1235	12698.9	0.094413	1.29067	19835.0	1.51563	0.869333
42	1240	12907.8	0.096365	1.27084	19726.3	1.51563	0.869333
43	1245	12907.8	0.096365	1.27084	19726.3	1.51563	0.869333
44	1250	13750.7	0.101621	1.24088	19067.8	1.39227	0.867213
45	1255	16701.8	0.127902	1.14681	15690.1	2.06701	0.869333
46	1260	17040.2	0.140167	1.11078	15888.7	2.14093	0.870795
47	1265	18344.7	0.159680	1.07712	14789.6	2.33484	0.874836
48	1270	18293.9	0.173457	1.06770	12379.7	2.86512	0.885372
49	1275	18570.3	0.175209	1.07094	12844.8	2.86512	0.885372
50	1280	18681.2	0.171706	1.09836	13828.2	2.70983	0.882234
51	1285	18771.9	0.161192	1.09115	14939.6	2.44670	0.876820
52	1290	17132.1	0.143671	1.11943	14490.6	2.33484	0.874836
53	1295	16093.4	0.129655	1.16503	15197.0	2.14093	0.870795
54	1300	9931.2	0.077092	1.37145	18235.7	1.39227	0.867213
55	1305	6089.1	0.056067	1.59906	14981.5	1.36808	0.879386
56	1310	7208.3	0.061332	1.47736	15386.2	1.39328	0.876820
57	1315	6930.5	0.061323	1.55266	15725.5	1.39328	0.876820
58	1320	8767.1	0.056067	1.64298	15568.2	1.34478	0.882234
59	1325	4930.7	0.052563	1.80136	15142.7	1.34478	0.882234
60	1330	6007.7	0.056067	1.68807	14474.6	1.42048	0.874836
61	1335	8060.7	0.066579	1.51487	14867.9	1.51563	0.869333
62	1340	10787.3	0.084100	1.38289	16692.8	1.39227	0.867213
63	1345	12799.8	0.099869	1.29878	15475.3	1.84580	0.866583
64	1350	13028.8	0.106877	1.23794	13060.3	2.14093	0.870795
65	1355	13478.4	0.113886	1.20304	12874.5	2.23306	0.872529
66	1360	14918.3	0.133159	1.11878	11743.2	2.57114	0.879386
67	1365	.	0.140167	1.14917	.	.	.
68	1370	.	0.143671	1.14443	.	.	.
69	1375	.	0.143671	1.18716	.	.	.
70	1380	12382.0	0.140167	1.17838	8441.8	3.44409	0.896573
71	1385	12401.7	0.138415	1.17151	8528.5	3.44409	0.896573
72	1390	18800.9	0.133159	1.11878	13424.4	2.33484	0.874836
73	1395	11848.7	0.091109	1.23488	13490.7	1.98037	0.868140

Table D.3. Computed Mechanics for Aluminum With 40° Tool, Test Al 56, Revolution 1

OBS	DEC	TAU	EPU	MU	SN	STR	PUS
1	1825	9020.9	0.060823	1.30459	15963.3	1.04094	0.773572
2	1830	10930.4	0.069833	1.23288	17461.2	1.06530	0.771796
3	1836	11375.4	0.072006	1.21828	17938.4	1.06530	0.771796
4	1840	13723.5	0.085349	1.15097	19753.7	1.07079	0.770263
5	1845	13707.7	0.085402	1.21041	20661.1	1.07079	0.770263
6	1850	12832.0	0.078844	1.18831	18830.5	1.07079	0.770263
7	1854	14356.1	0.088402	1.14926	19032.3	1.10645	0.767914
8	1860	15347.1	0.099107	1.13152	18437.9	1.14583	0.766510
9	1865	18088.3	0.106876	1.08275	17830.7	1.30645	0.767914
10	1870	20244.7	0.119392	1.06227	17265.5	1.37745	0.770263
11	1875	21230.7	0.126150	1.05973	17263.3	1.41708	0.771796
12	1880	22388.0	0.139667	1.06163	16831.0	1.58372	0.777861
13	1885	22889.8	0.150930	1.03425	14844.7	1.73174	0.786194
14	1890	21817.5	0.146425	1.00961	13251.7	1.80997	0.789495
15	1895	20228.2	0.139667	1.01859	11928.5	1.87655	0.793067
16	1900	16393.8	0.132908	0.99457	7390.3	2.38358	0.815207
17	1905	13097.7	0.076891	1.12498	15263.0	1.16782	0.766160
18	1910	7136.5	0.047306	1.34614	11596.9	1.08749	0.768970
19	1915	9727.5	0.060823	1.21273	14492.0	1.07079	0.770263
20	1920	10774.7	0.065328	1.18261	14712.3	1.10545	0.767914
21	1925	13085.0	0.076891	1.12498	15797.9	1.14583	0.766510
22	1930	14864.5	0.085602	1.09115	16798.8	1.16782	0.766160
23	1935	15306.2	0.087865	1.08391	17182.8	1.16782	0.766160
24	1940	16189.6	0.092360	1.07061	17950.7	1.16782	0.766160
25	1945	16580.9	0.096865	1.10642	17136.2	1.24502	0.766510
26	1950	18212.9	0.106876	1.08275	17757.8	1.27463	0.767095
27	1955	19195.8	0.112634	1.06649	17188.9	1.34065	0.768970
28	1960	23367.1	0.135161	1.02312	20123.7	1.34065	0.768970
29	1965	24484.5	0.144172	0.98157	18836.8	1.45979	0.773572
30	1970	23979.2	0.135435	0.97868	14490.7	1.73174	0.786194
31	1975	23462.7	0.139941	0.96665	13020.7	1.87655	0.793067
32	1980	19607.5	0.153183	1.00149	9581.2	2.26075	0.810184
33	1985	20045.9	0.137414	0.98910	11427.5	1.87655	0.793067
34	1990	20045.9	0.137414	0.98910	11427.5	1.87655	0.793067
35	1995	10617.7	0.065328	1.18261	16062.0	1.06530	0.771796
36	2000	7295.7	0.049589	1.31766	13056.4	1.04094	0.773572
37	2005	8060.0	0.054064	1.26933	14403.1	1.02767	0.775892
38	2010	9513.6	0.060823	1.21273	15319.7	1.04094	0.773572
39	2015	10962.6	0.067581	1.16930	16539.1	1.06530	0.771796
40	2020	10617.7	0.065328	1.18261	16062.0	1.06530	0.771796
41	2025	.	0.056317	1.15404	.	.	.
42	2030	12934.9	0.074339	1.06906	16303.2	1.08749	0.768970
43	2035	13647.5	0.085602	0.98318	17493.0	1.10545	0.767914
44	2040	17121.4	0.099118	1.10150	20235.6	1.14583	0.766510
45	2045	18140.6	0.110382	1.07166	14480.1	1.45979	0.773572
46	2050	18271.4	0.112634	1.06449	14194.6	1.30589	0.775892
47	2055	.	0.137414	0.98910	.	.	.
48	2060	18869.8	0.153183	1.00149	8016.2	2.38358	0.815207
49	2065	19996.9	0.141919	1.01549	11286.3	1.95928	0.794915
50	2070	15331.5	0.094613	1.01549	10911.8	1.58372	0.777861
51	2075	9467.1	0.056317	1.15404	10184.3	1.24502	0.766510
52	2080	6457.5	0.042801	1.27483	11134.8	1.04094	0.773572
53	2085	7046.2	0.049589	1.31766	13713.0	1.01542	0.777861
54	2090	7295.7	0.049589	1.31766	13056.4	1.04094	0.773572
55	2095	8737.9	0.056317	1.24865	14153.4	1.06530	0.771796
56	2100	11064.8	0.067581	1.16930	16076.8	1.07079	0.770263
57	2105	12934.9	0.076891	1.12498	17096.3	1.08749	0.768970
58	2110	13943.4	0.081997	1.10700	17161.8	1.12477	0.767893
59	2115	14833.3	0.085602	1.09115	17991.7	1.12477	0.767095
60	2120	15861.3	0.092360	1.07061	14757.3	1.30645	0.767914
61	2125	15861.3	0.092360	1.07061	14757.3	1.30645	0.767914
62	2130	17393.6	0.101371	1.04791	15302.3	1.34065	0.768970
63	2135	17215.2	0.101371	1.04791	14620.4	1.37745	0.770263
64	2140	20134.0	0.126150	1.00358	13402.9	1.60966	0.780381
65	2145	21400.2	0.135161	0.98944	13276.0	1.66816	0.783157
66	2150	16962.6	0.148677	0.94791	6670.9	2.67365	0.826205
67	2155	16176.1	0.141919	0.96339	6415.3	2.67365	0.826205
68	2160	15681.7	0.137414	0.96735	6245.0	2.67365	0.826205
69	2165	16540.5	0.123898	0.97109	8124.5	2.15816	0.803466
70	2170	16053.5	0.092360	1.07061	16027.2	1.24502	0.766510
71	2175	7340.7	0.051812	1.29221	14573.1	1.00416	0.780381
72	2180	7617.1	0.054064	1.26933	15458.4	0.99384	0.783157
73	2185	8213.3	0.056317	1.24865	15650.6	1.00416	0.780381

Table D.4. Computed Mechanics for Aluminum With 40° Tool, Test Al 56, Revolution 2

ONS	DEC	TAU	EPU	MU	SN	STR	PUS
1	2190	9070.0	0.058570	1.22987	15027.0	1.04094	0.773572
2	2195	10400.8	0.065328	1.18261	16505.0	1.04094	0.773572
3	2200	12042.8	0.072086	1.14554	16505.2	1.08749	0.768970
4	2205	14022.2	0.087885	1.14013	17624.5	1.16782	0.766160
5	2210	17548.1	0.101371	1.04791	15990.1	1.30645	0.767914
6	2216	18391.1	0.110382	1.02927	14279.2	1.45979	0.773572
7	2220	19296.6	0.117140	1.01734	14274.1	1.50589	0.773592
8	2225	19735.8	0.123898	1.00681	13423.2	1.60966	0.780381
9	2230	20683.0	0.137414	0.98910	12214.5	1.80097	0.789495
10	2235	20174.2	0.144425	0.97923	10436.8	2.05011	0.801045
11	2240	21062.9	0.157688	0.96858	10312.1	2.15016	0.805466
12	2246	15221.0	0.177962	0.95301	4543.8	3.82194	0.839751
13	2250	19236.9	0.168951	0.95944	7699.7	2.67365	0.826205
14	2256	22280.9	0.155435	0.94294	11508.8	1.95928	0.796915
15	2261	.	0.144425	0.94968	.	.	.
16	2265	17695.9	0.110382	0.98844	11786.9	1.60966	0.780381
17	2270	9494.0	0.058570	1.22987	13012.6	1.12477	0.767095
18	2275	10962.6	0.067581	1.16930	16539.1	1.05530	0.771796
19	2280	12488.9	0.074339	1.13491	16949.3	1.08749	0.768970
20	2285	14415.7	0.083349	1.09884	16996.1	1.14553	0.766310
21	2290	15306.2	0.087855	1.08391	17182.8	1.16782	0.766160
22	2295	16121.2	0.092360	1.07061	16666.6	1.21744	0.766160
23	2300	16857.5	0.094613	1.06448	17019.9	1.21744	0.766160
24	2305	17784.6	0.101371	1.04791	17379.7	1.24582	0.766510
25	2310	20093.3	0.114887	1.02115	17839.3	1.30645	0.767914
26	2315	22447.7	0.137414	0.98910	15535.4	1.58572	0.777861
27	2320	.	0.157688	0.96858	.	.	.
28	2325	.	0.162193	0.96476	.	.	.
29	2330	16915.5	0.164446	0.96294	6129.4	3.04218	0.838539
30	2335	16427.4	0.168951	0.95944	5596.9	3.26573	0.843236
31	2340	17151.9	0.166699	0.96116	6197.2	3.04218	0.838539
32	2345	19078.5	0.153183	0.94455	8242.8	2.38350	0.815207
33	2350	18791.8	0.150930	0.94620	8138.4	2.38350	0.815207
34	2355	15139.4	0.103624	1.08869	9994.6	1.80097	0.789495
35	2360	9627.8	0.060823	1.21273	13107.7	1.05530	0.771796
36	2365	10962.6	0.067581	1.16930	16539.1	1.05530	0.771796
37	2370	11956.3	0.072086	1.14554	17000.0	1.07079	0.770263
38	2375	13380.9	0.078844	1.11570	17841.3	1.08749	0.768970
39	2380	16168.2	0.092360	1.07061	19236.4	1.12477	0.767095
40	2385	16613.1	0.094613	1.06448	19651.4	1.12477	0.767095
41	2390	17503.0	0.099118	1.05316	20481.2	1.12477	0.767095
42	2395	17920.3	0.099118	1.06681	19340.4	1.14553	0.766510
43	2400	20034.0	0.117140	1.05681	17775.8	1.34065	0.768970
44	2405	20946.9	0.126150	1.03972	16433.6	1.45979	0.773572
45	2410	22209.6	0.135161	1.02312	16561.0	1.50589	0.773592
46	2415	22701.8	0.141919	0.98400	15100.6	1.60966	0.780381
47	2420	22781.8	0.141919	0.98400	15100.6	1.60966	0.780381
48	2425	23618.3	0.153183	0.97264	14306.8	1.73174	0.786194
49	2430	21470.4	0.150930	0.97477	11545.1	1.95928	0.796915
50	2435	20888.6	0.141919	0.98339	11404.4	1.87655	0.793067
51	2441	19181.5	0.121645	0.97370	12996.3	1.66816	0.783157
52	2445	12557.7	0.074339	1.13491	16434.2	1.19545	0.767914
53	2450	8501.7	0.056377	1.24868	14911.2	1.02767	0.773592
54	2455	10844.4	0.06758	1.16930	16997.9	1.04094	0.773572
55	2460	11940.5	0.074339	1.20472	17907.4	1.07079	0.770263
56	2465	13827.0	0.081097	1.10700	18287.4	1.08749	0.768970
57	2470	14349.8	0.083349	1.09884	18156.1	1.19545	0.767914
58	2475	14889.3	0.085602	1.09115	17395.5	1.14553	0.766510
59	2480	16631.2	0.094613	1.06448	18304.7	1.16782	0.766160
60	2485	17585.0	0.101371	1.04494	19221.7	1.19175	0.766043
61	2490	19258.2	0.110382	1.07166	19929.3	1.21744	0.766160
62	2495	22004.1	0.126150	1.00358	18530.6	1.34065	0.768970
63	2500	23992.8	0.146425	0.97923	16427.5	1.55572	0.777861
64	2505	23043.4	0.153183	0.97264	13414.5	1.80097	0.789495
65	2510	23804.4	0.162193	0.96476	13180.1	1.87655	0.793067
66	2515	23198.1	0.166699	0.93559	11361.7	2.05011	0.801043
67	2520	20512.0	0.164446	0.93698	8764.5	2.38350	0.815207
68	2525	21030.4	0.162193	0.93840	9442.6	2.26075	0.810184
69	2530	18229.8	0.141919	0.98400	8709.9	2.26075	0.810184
70	2535	9281.8	0.058570	1.22987	14230.4	1.07079	0.770263
71	2540	9070.0	0.058570	1.22987	15027.0	1.04094	0.773572
72	2545	10617.7	0.065328	1.18261	16062.0	1.05530	0.771796

Table D.5. Computed Mechanics for Aluminum With 40° Tool, Test Al 56, Revolution 3

OBS	DEG	TAU	EPU	MU	SN	STR	PUS
1	2550	12488.9	0.074339	1.13491	16949.3	1.08749	0.768970
2	2555	14273.8	0.083349	1.09884	18733.4	1.08749	0.768970
3	2560	15746.3	0.090107	1.07707	18194.4	1.14553	0.766510
4	2565	17130.7	0.099118	1.10158	19544.3	1.16782	0.766160
5	2570	17072.9	0.096865	1.05868	18712.6	1.16782	0.766160
6	2575	17678.5	0.101371	1.04791	16682.8	1.27463	0.767095
7	2585	21846.8	0.128403	0.96617	15882.4	1.43979	0.773572
8	2580	.	0.110382	0.98844	.	.	.
9	2590	21943.1	0.139667	0.98650	14039.0	1.66816	0.783157
10	2595	22340.4	0.148677	0.97696	13071.6	1.80097	0.789495
11	2600	.	0.157688	0.96858	.	.	.
12	2605	20732.0	0.159941	0.93967	9328.0	2.26075	0.810184
13	2610	21328.9	0.164446	0.93698	9557.1	2.26075	0.810184
14	2615	20942.9	0.159941	0.91375	8269.1	2.38350	0.815207
15	2620	20568.4	0.153183	0.94455	9751.9	2.15016	0.803466
16	2625	19863.5	0.135161	0.95944	10926.4	1.87655	0.793067
17	2630	18449.8	0.063075	1.11570	15568.7	1.04094	0.773572
18	2635	18121.0	0.045328	1.18261	17377.4	1.01542	0.777861
19	2640	11731.5	0.072086	1.14554	17982.9	1.04094	0.773572
20	2645	14185.1	0.083349	1.09884	19308.0	1.07079	0.770263
21	2650	14719.0	0.085602	1.09115	19179.4	1.08749	0.768970
22	2656	16189.6	0.092360	1.07061	17950.7	1.16782	0.766160
23	2660	17045.1	0.096865	1.05868	18045.2	1.19175	0.766043
24	2666	17923.6	0.101371	1.04791	18782.4	1.19175	0.766043
25	2670	.	0.110382	1.02927	.	.	.
26	2675	.	0.130656	0.99746	.	.	.
27	2680	.	0.137414	0.98910	.	.	.
28	2685	.	0.144172	0.98157	.	.	.
29	2690	.	0.144172	0.98157	.	.	.

Table D.6. Computed Mechanics for Aluminum With 40° Tool, Test Al 03

OBS	DEC	TAU	EPU	MU	SN	STR	PUS
1	161	11891.8	0.077631	1.02512	7579.7	1.7317	0.786194
2	165	6271.5	0.038816	1.02512	4508.3	1.3557	0.777861
3	170	6271.5	0.038816	1.02512	4508.3	1.3557	0.777861
4	175	7098.6	0.046579	1.16930	5638.9	1.6097	0.780381
5	180	8242.6	0.054342	1.11570	6017.3	1.6682	0.783157
6	185	9314.7	0.062105	1.07707	6312.5	1.7317	0.786194
7	190	10637.0	0.073749	1.03586	6393.7	1.8766	0.793067
8	195	12915.6	0.097039	0.98624	6460.3	2.1502	0.805466
9	200	14199.0	0.104802	0.90424	6357.8	2.1502	0.805466
10	205	17099.0	0.131973	0.94455	7740.3	2.2608	0.810184
11	211	16366.7	0.151380	0.97923	6413.6	2.8464	0.832200
12	215	15062.1	0.155262	0.97549	5271.5	3.2657	0.845236
13	220	17367.7	0.178851	0.95667	5889.3	3.2657	0.845236
14	225	14886.3	0.186314	0.95150	4127.1	4.1729	0.867598
15	230	14171.3	0.194078	0.98624	3949.8	4.5902	0.875859
16	235	8258.7	0.201841	0.94242	1332.7	8.8398	0.924016
17	240	8418.5	0.209722	0.94037	1369.5	8.8398	0.924016
18	245	8897.9	0.217367	0.93469	1419.9	8.8398	0.924016
19	250	11168.0	0.205722	0.99851	2001.6	6.4905	0.903303
20	255	15229.1	0.198683	1.03972	8833.5	1.9393	0.796915
21	260	9885.7	0.062105	0.95150	6057.7	1.6682	0.783157
22	265	11211.9	0.069868	1.04791	8248.1	1.5357	0.777861
23	270	11832.0	0.081513	1.11570	8019.9	1.8010	0.789495
24	275	15715.1	0.093157	0.99179	11749.9	1.4598	0.773572
25	280	16665.8	0.100920	1.05681	13294.9	1.4598	0.773572
26	285	13767.6	0.104802	1.04791	7425.6	2.1502	0.805466
27	290	13787.0	0.112565	1.03214	6696.4	2.3835	0.815207
28	295	15269.0	0.124210	1.01250	7233.9	2.3835	0.815207
29	300	18437.9	0.155262	0.97549	7936.5	2.5203	0.820544
30	305	16275.2	0.198196	0.94908	4822.9	3.8219	0.859731
31	315	6395.2	0.232893	0.92804	769.7	13.5741	0.946883
32	320	5044.3	0.244538	0.95339	586.6	18.3275	0.959191
33	325	.	0.263945	0.94455	.	.	.
34	330	.	0.263945	0.91717	.	.	.
35	335	8506.2	0.248419	0.92225	1147.6	10.7298	0.933167
36	340	9091.3	0.221248	0.86945	1117.1	8.8398	0.924016
37	345	15864.1	0.124210	1.01250	7859.8	2.2607	0.810184
38	350	15428.2	0.089276	0.99895	12480.0	1.3775	0.779263
39	355	18223.4	0.100920	0.97923	16639.6	1.2458	0.766510
40	360	20899.6	0.124210	1.01250	15884.8	1.4598	0.773572
41	366	27232.6	0.170788	1.00681	18503.4	1.6097	0.780381
42	370	24475.5	0.197959	0.98217	11145.2	2.3835	0.815207
43	375	.	0.213485	0.97109	.	.	.
44	380	.	0.221248	0.96617	.	.	.

Table D.7. Computed Mechanics for Aluminum With 50° Tool, Test Al 57, Revolution 1

OBS	DEC	TAU	EPU	MU	SR	STR	PUS
1	3495	5079.6	0.0370041	2.16969	10000.0	0.86548	0.643178
2	3501	.	0.0437321	1.87632	.	.	.
3	3506	7669.7	0.0470961	1.81248	9509.7	1.01542	0.652702
4	3510	7669.7	0.0470961	1.81248	9509.7	1.01542	0.652702
5	3515	8292.9	0.0504602	1.69512	8138.7	1.16019	0.665461
6	3520	.	0.0521422	1.73630	.	.	.
7	3525	8839.8	0.0538242	1.65646	8208.9	1.19581	0.668690
8	3530	.	0.0571882	1.67678	.	.	.
9	3535	10582.3	0.0655982	1.47456	7647.9	1.36807	0.684039
10	3540	11082.4	0.0706442	1.41569	7132.2	1.47669	0.693267
11	3544	12339.7	0.0841003	1.37660	6841.2	1.67819	0.709236
12	3550	10777.5	0.0807363	1.38503	5296.3	1.94337	0.728001
13	3555	11319.2	0.0773722	1.39427	6363.3	1.67819	0.709236
14	3560	11633.8	0.0790542	1.35896	6356.7	1.67819	0.709236
15	3565	10574.4	0.0706442	1.41569	6294.5	1.60507	0.703617
16	3570	5426.7	0.0370041	2.05361	9413.1	0.89576	0.644056
17	3575	5079.6	0.0370041	2.16969	10000.0	0.86548	0.643178
18	3580	5171.3	0.0370041	2.16969	9831.3	0.88010	0.643668
19	3585	5828.1	0.0386861	2.00120	9491.6	0.91251	0.645241
20	3590	6583.1	0.0420501	1.91344	9866.0	0.93642	0.646327
21	3596	7733.3	0.0470961	1.74080	10335.7	0.94958	0.647613
22	3600	7807.3	0.0470961	1.74080	9345.7	1.01542	0.652702
23	3605	8402.5	0.0504602	1.63383	7982.3	1.16019	0.665461
24	3610	9048.1	0.0538242	1.54725	7900.1	1.19581	0.668690
25	3615	.	0.0588702	1.46653	.	.	.
26	3620	.	0.0605522	1.41569	.	.	.
27	3625	11026.4	0.0655982	1.35974	7625.9	1.31995	0.679824
28	3630	9907.5	0.0672802	1.35520	5396.4	1.67819	0.709236
29	3635	9291.6	0.0622342	1.33159	4912.0	1.67819	0.709236
30	3640	.	0.0571882	1.30446	.	.	.
31	3645	.	0.0521422	1.27295	.	.	.
32	3650	.	0.0555062	1.39331	.	.	.
33	3655	.	0.0487782	1.65253	.	.	.
34	3660	.	0.0353221	1.08826	.	.	.
35	3665	.	0.0353221	1.99631	.	.	.
36	3670	.	0.0370041	2.05361	.	.	.
37	3675	.	0.0403681	1.98480	.	.	.
38	3680	.	0.0437321	1.79559	.	.	.
39	3685	.	0.0454141	1.76689	.	.	.
40	3690	.	0.0521422	1.61658	.	.	.
41	3700	.	0.0555062	1.53466	.	.	.

Table D.8. Computed Mechanics for Aluminum With 50° Tool, Test Al 57, Revolution 2

OBS	DEC	TAU	EPU	MU	SR	STR	PUS
1	3860	7829.2	0.038460	1.82730	12681.4	0.88010	0.643668
2	3864	9693.1	0.057188	1.62332	13382.6	0.89576	0.644356
3	3871	10109.4	0.058870	1.60846	11683.1	0.99198	0.650798
4	3875	10668.8	0.060852	1.54725	11383.3	1.01542	0.652702
5	3880	11191.8	0.0639.6	1.52547	11498.2	1.04051	0.654817
6	3885	12160.6	0.068942	1.48895	11171.4	1.09617	0.659694
7	3890	13015.9	0.074008	1.43852	11392.4	1.12705	0.662464
8	3895	15303.2	0.086782	1.34486	12114.6	1.16019	0.665461
9	3900	15935.3	0.090828	1.31035	11429.9	1.23413	0.672156
10	3905	13878.5	0.102602	1.29604	6280.1	1.94337	0.720001
11	3910	14821.7	0.102602	1.29604	7344.5	1.75830	0.715165
12	3915	13831.7	0.095074	1.30377	6899.7	1.75830	0.715165
13	3920	12305.8	0.090028	1.28554	5310.1	1.94337	0.720001
14	3925	10553.8	0.072326	1.40992	6008.4	1.67819	0.709236
15	3930	6883.9	0.043732	1.87632	10187.4	0.93042	0.646327
16	3935	6425.2	0.042050	1.91344	10447.1	0.89576	0.644356
17	3940	6758.1	0.043732	1.87632	10791.8	0.89576	0.644356
18	3945	7160.3	0.045414	1.84284	10023.7	0.91251	0.645241
19	3950	8114.0	0.048778	1.71697	10304.6	0.97007	0.649103
20	3955	8790.2	0.052142	1.67502	10536.3	0.99198	0.650798
21	3960	9912.8	0.057108	1.57208	10832.9	1.01542	0.652702
22	3965	10066.0	0.062234	1.53602	11226.4	1.04051	0.654817
23	3970	11455.6	0.063916	1.44217	11164.4	1.04051	0.654817
24	3975	12401.9	0.068962	1.38677	10851.3	1.09617	0.659694
25	3980	12727.7	0.070644	1.34682	10457.0	1.12705	0.662464
26	3985	12959.2	0.080736	1.29787	7598.9	1.47669	0.693267
27	3990	12865.9	0.084100	1.29342	6924.9	1.60507	0.703617
28	3995	10668.3	0.080736	1.27032	4440.3	2.05077	0.734933
29	4000		0.072326	1.27986			
30	4005	9679.4	0.067280	1.32044	4902.7	1.75830	0.715165
31	4010	9679.4	0.067280	1.3204	4902.7	1.75830	0.715165
32	4015	8703.0	0.063824	1.54725	6830.2	1.31995	0.679824
33	4020	6566.1	0.040368	1.77615	6948.3	1.12705	0.662464
34	4025	6048.1	0.038686	1.90189	9056.7	0.93042	0.646327
35	4030	6601.7	0.042050	1.91344	9572.4	0.94958	0.647613
36	4035	7302.5	0.045414	1.84284	9873.8	0.97007	0.649103
37	4040	8114.0	0.0487 8	1.71697	10304.6	0.97007	0.649103
38	4045	8933.6	0.052142	1.61658	10171.4	0.99198	0.650798
39	4050	9563.0	0.055506	1.58584	10171.2	1.04051	0.654817
40	4055	10239.8	0.058870	1.51198	9724.0	1.09617	0.659694
41	4060	10559.9	0.060852	1.50172	9965.2	1.09617	0.659694
42	4065	11641.0	0.065598	1.43498	10328.9	1.09617	0.659694
43	4070	12240.1	0.070644	1.41869	9828.5	1.19581	0.668698
44	4075	12812.4	0.080736	1.38529	7875.0	1.47669	0.693267
45	4080	13224.0	0.089146	1.31272	6943.0	1.67819	0.709236
46	4085	14304.0	0.095874	1.28039	7291.3	1.67819	0.709236
47	4090	14304.0	0.095874	1.28039	7291.3	1.67819	0.709236
48	4095	14376.5	0.094192	1.30588	7824.1	1.60507	0.703617
49	4100		0.090828	1.26129			
50	4105	11431.9	0.072326	1.37893	7140.9	1.47669	0.693267
51	4110	6524.3	0.042050	1.82730	10567.9	0.88010	0.643668
52	4115	6257.1	0.042050	1.91344	11017.9	0.86548	0.643178
53	4120	6588.3	0.043732	1.87632	11385.8	0.86548	0.643178
54	4125	7712.3	0.047096	1.74880	10663.8	0.93042	0.646327
55	4130	8114.0	0.048778	1.71697	10304.6	0.97007	0.649103
56	4135	9449.8	0.055506	1.63928	11189.7	0.99198	0.650798
57	4141	10408.4	0.060552	1.54459	11125.4	1.04051	0.654817
58	4145	11143.4	0.063916	1.52547	11048.8	1.06738	0.657146
59	4150	13042.1	0.072326	1.37593	11333.8	1.09617	0.659694
60	4160	13603.5	0.074008	1.36867	11254.9	1.09617	0.659694
61	4165	13653.2	0.089146	1.28739	7308.8	1.60507	0.703617
62	4170	13502.8	0.095874	1.25751	6155.7	1.84632	0.721416
63	4175	13502.8	0.095874	1.25751	6155.7	1.84632	0.721416
64	4180	13446.9	0.092510	1.25998	6431.8	1.75830	0.715165
65	4185	9761.6	0.058870	1.34017	6405.0	1.36807	0.684039
66	4190	3422.8	0.020184	1.54725	4911.0	0.85548	0.643178
67	4201	6252.9	0.042050	2.00533	10613.5	0.89576	0.644356
68	4206	7098.9	0.045414	1.84284	11136.4	0.89576	0.644356
69	4210	7443.3	0.047096	1.88826	10667.9	0.94958	0.647613
70	4215	8147.0	0.050460	1.82730	10934.1	0.97007	0.649103
71	4220	9309.6	0.055506	1.69512	10885.7	1.01542	0.652702

Table D.9. Computed Mechanics for Aluminum With 50° Tool, Test Al 57, Revolution 3

OBS	DEC	TAU	MPU	MU	SN	STR	PUS
1	4225	10734.1	0.062234	1.58161	11389.2	1.84051	0.654817
2	4230	11399.7	0.065898	1.51858	10849.0	1.89617	0.659694
3	4235	11845.0	0.068962	1.49738	10692.7	1.86019	0.663461
4	4240	12135.9	0.070644	1.45177	9982.9	1.79581	0.668690
5	4245	13166.4	0.075690	1.39923	10453.4	1.79581	0.668690
6	4250	13713.3	0.080736	1.38803	10025.8	1.87541	0.673865
7	4255	14745.1	0.092510	1.33295	8902.6	1.87669	0.693267
8	4260	13693.9	0.100920	1.27877	6070.9	1.94337	0.728001
9	4265	14091.0	0.107648	1.27032	5920.4	2.05077	0.734933
10	4270	14091.0	0.107648	1.27032	5920.4	2.05077	0.734933
11	4275	16092.2	0.102602	1.29604	9047.9	1.83813	0.690298
12	4280	.	0.099238	1.25521	.	.	.
13	4285	.	0.077372	1.33241	.	.	.
14	4290	.	0.043414	1.76689	.	.	.
15	4295	.	0.043414	1.84284	.	.	.
16	4300	.	0.047096	1.81248	.	.	.
17	4305	.	0.050460	1.69512	.	.	.
18	4311	.	0.055506	1.63928	.	.	.
19	4315	.	0.058870	1.55925	.	.	.
20	4320	.	0.062234	1.53602	.	.	.
21	4325	.	0.063598	1.47456	.	.	.
22	4330	.	0.070644	1.41569	.	.	.
23	4336	.	0.079054	1.35896	.	.	.
24	4340	.	0.079054	1.32921	.	.	.
25	4345	.	0.087464	1.28932	.	.	.
26	4350	15151.8	0.095874	1.25731	8229.3	1.83813	0.698298
27	4355	14882.3	0.094192	1.25873	8092.8	1.83813	0.698298
28	4360	14882.3	0.094192	1.25873	8092.8	1.83813	0.698298
29	4365	13032.6	0.080736	1.27032	7460.8	1.47669	0.693267
30	4370	11575.4	0.068962	1.28434	7259.9	1.36807	0.684039
31	4375	9919.7	0.057188	1.32293	9462.7	1.89617	0.639694
32	4380	7140.1	0.040732	1.64771	10089.0	0.86548	0.643178
33	4385	6537.6	0.042058	1.74639	10960.8	0.85183	0.642884
34	4390	7007.5	0.045414	1.76689	11092.5	0.85183	0.642884
35	4395	7996.9	0.050460	1.69512	13030.6	0.85183	0.642884
36	4400	8428.3	0.052142	1.67582	13059.4	0.86548	0.643178
37	4405	9070.0	0.057188	1.57208	12425.9	0.93042	0.646327
38	4410	10720.9	0.068552	1.50172	12481.9	0.94958	0.647613
39	4415	11858.6	0.065598	1.43498	12335.1	0.99198	0.650798
40	4420	12188.4	0.067280	1.42819	12621.8	0.99198	0.650798
41	4425	12811.8	0.070644	1.41569	12706.6	1.01542	0.652702
42	4430	14304.2	0.079054	1.38955	12997.1	1.06738	0.657116
43	4435	15696.3	0.090828	1.31035	10848.7	1.27541	0.675863
44	4440	16701.8	0.097556	1.27879	10835.9	1.31995	0.679824
45	4446	15426.9	0.105966	1.25107	7313.4	1.75830	0.715163
46	4450	15426.9	0.105966	1.25107	7313.4	1.75830	0.715163
47	4456	16160.8	0.102602	1.27434	8913.2	1.83813	0.698298
48	4460	16224.5	0.097556	1.23436	9362.6	1.42018	0.688517
49	4465	15158.3	0.090828	1.31035	9713.1	1.36807	0.684039
50	4470	7421.1	0.045414	1.76689	10025.9	0.94958	0.647613
51	4475	7421.1	0.045414	1.76689	10025.9	0.94958	0.647613
52	4480	.	0.047096	1.74080	.	.	.
53	4485	.	0.052142	1.67582	.	.	.
54	4490	.	0.053824	1.65646	.	.	.
55	4495	.	0.062234	1.53602	.	.	.
56	4501	.	0.067280	1.50620	.	.	.
57	4505	.	0.075690	1.45239	.	.	.
58	4510	.	0.080736	1.38503	.	.	.
59	4515	14953.2	0.089146	1.28739	9402.4	1.36807	0.684039
60	4520	14461.1	0.102602	1.25307	6562.5	1.84632	0.721416
61	4526	13667.0	0.112694	1.22854	4935.3	2.30334	0.749896
62	4530	14077.1	0.116058	1.22745	5076.5	2.30334	0.749896
63	4535	14226.5	0.122786	1.22546	4038.9	2.45200	0.757960
64	4540	14359.9	0.129514	1.19176	4384.2	2.62143	0.766435
65	4545	14282.1	0.117740	1.22693	5147.1	2.30334	0.749896
66	4550	13834.1	0.100920	1.21213	5723.9	1.94337	0.728001
67	4555	8119.5	0.047096	1.54725	7873.2	1.89617	0.639694
68	4560	7712.3	0.047096	1.74080	10663.8	0.93042	0.646327
69	4565	7477.4	0.048778	1.78403	12816.1	0.85183	0.642804
70	4570	8671.7	0.053824	1.71490	13227.9	0.88010	0.643668
71	4575	9491.5	0.057188	1.67678	13155.0	0.91251	0.643241
72	4580	10759.1	0.062234	1.58161	11823.5	1.01542	0.652792
73	4585	11843.3	0.067280	1.50620	12017.7	1.84051	0.634817

Table D.10. Computed Mechanics for Aluminum With 50° Tool, Test Al 57, Revolution 4

DBS	DEG	TAU	RPU	MU	SR	STR	PUS
1	4590	12480.8	0.070644	1.45177	11412.6	1.09617	0.659694
2	4595	13121.0	0.074008	1.43862	11095.1	1.09617	0.659694
3	4600	13561.8	0.076690	1.39923	11976.3	1.09617	0.659694
4	4605	14714.7	0.082418	1.38072	12384.7	1.12705	0.662464
5	4610	14498.2	0.087444	1.34170	9524.3	1.36807	0.684039
6	4615	14879.2	0.097586	1.30173	7099.9	1.75839	0.715165
7	4620	14579.5	0.111012	1.24830	5988.1	2.05077	0.734933
8	4625	14282.1	0.117740	1.22693	5147.1	2.30334	0.749896
9	4630	14244.8	0.117740	1.24498	5249.6	2.30334	0.749896
10	4635	15949.3	0.112694	1.22854	7052.8	1.84032	0.721416
11	4640	16143.1	0.104284	1.23156	8190.4	1.60587	0.703617
12	4645	13447.8	0.082418	1.32324	8377.3	1.42018	0.688517
13	4650	8603.8	0.060440	1.63583	10084.7	0.99198	0.658798
14	4655	8130.6	0.048778	1.71697	9962.9	0.99198	0.658798
15	4660	8463.3	0.050440	1.69512	9896.1	1.01542	0.652702
16	4665	8791.3	0.052142	1.67502	10171.3	1.01542	0.652702
17	4670	9888.7	0.057188	1.57208	10435.0	1.04051	0.654817
18	4675	11000.5	0.063916	1.52547	10170.0	1.12705	0.662464
19	4680	.	0.067280	1.46583	.	.	.
20	4685	12580.4	0.072326	1.44497	10674.5	1.16019	0.665461
21	4690	13475.2	0.077374	1.39427	10661.6	1.19581	0.668690
22	4695	15022.5	0.085782	1.31776	10037.2	1.23413	0.672156
23	4700	15425.6	0.087444	1.28932	10082.6	1.23413	0.672156
24	4705	16089.2	0.092510	1.28376	10886.1	1.27541	0.675865
25	4710	.	0.102602	1.27434	.	.	.
26	4715	.	0.105966	1.21115	.	.	.
27	4720	17558.4	0.105966	1.25107	10286.6	1.42018	0.688517
28	4725	14830.9	0.095874	1.23513	7558.4	1.60587	0.703617
29	4730	.	0.082418	1.29560	.	.	.
30	4735	8997.1	0.055506	1.53466	7086.9	1.31995	0.679824
31	4740	7754.6	0.045414	1.62720	8742.5	1.01542	0.652702
32	4745	7600.7	0.045414	1.69512	9542.6	0.97007	0.649103
33	4750	7521.0	0.047096	1.74000	11636.7	0.80810	0.643668
34	4755	8790.2	0.052142	1.67502	10536.3	0.99198	0.658798
35	4760	9584.8	0.0[illegible]96	1.58584	10557.7	1.01542	0.652702
36	4765	10378.4	0.05[illegible]70	1.51198	10944.1	1.01542	0.652702
37	4775	.	0.065598	1.47456	.	.	.
38	4780	11622.8	0.067280	1.42819	9412.8	1.19581	0.668690
39	4785	12086.8	0.070644	1.41569	9363.2	1.23413	0.672156
40	4790	12815.3	0.075690	1.39923	9464.6	1.27541	0.675865
41	4795	15735.2	0.094192	1.30508	10046.1	1.36807	0.684039
42	4800	14091.9	0.107648	1.27032	5920.4	2.05077	0.734933
43	4805	14356.7	0.109338	1.24919	5094.5	2.05077	0.734933
44	4810	14356.7	0.109338	1.24919	5094.5	2.05077	0.734933
45	4815	15179.8	0.107648	1.25011	6067.5	1.84032	0.721416
46	4820	15698.6	0.104284	1.23156	7631.0	1.67819	0.709230
47	4825	13589.2	0.089146	1.31272	7440.1	1.60587	0.703617
48	4830	7944.9	0.047096	1.67288	9181.7	1.01542	0.652702
49	4835	7229.9	0.047096	1.74000	12584.2	0.83910	0.642704
50	4840	7667.1	0.048778	1.71697	12651.2	0.85183	0.642084
51	4845	8428.3	0.052142	1.67502	13089.4	0.86548	0.643178
52	4850	9514.3	0.057188	1.62332	13774.3	0.88010	0.643668
53	4855	10431.1	0.060552	1.54725	13905.6	0.89576	0.644356
54	4861	12199.8	0.068962	1.49738	14675.8	0.93042	0.644327
55	4865	12886.3	0.072326	1.44497	12140.7	1.06738	0.657144
56	4870	14567.7	0.082418	1.38072	11832.8	1.16019	0.665461
57	4875	16875.5	0.094192	1.28204	12281.3	1.19581	0.668690
58	4881	17084.2	0.099238	1.25521	10865.6	1.31995	0.679824
59	4885	17192.9	0.111012	1.22910	8710.4	1.60587	0.703617
60	4890	15513.7	0.117740	1.22693	6210.8	2.05077	0.734933
61	4895	15512.3	0.127852	1.22411	5570.7	2.30334	0.749896
62	4900	15102.2	0.124468	1.22500	5429.5	2.30334	0.749896
63	4905	15508.3	0.122786	1.20847	5794.9	2.17012	0.742226
64	4910	.	0.112694	1.22854	.	.	.
65	4915	.	0.100920	1.21213	.	.	.
66	4920	8240.4	0.048778	1.66253	10479.4	0.94958	0.647613
67	4925	8417.7	0.050440	1.69512	10955.3	0.94958	0.647613
68	4930	8627.4	0.052142	1.73630	11066.7	0.97007	0.649103
69	4935	9306.5	0.055506	1.69512	11274.6	0.99198	0.658798
70	4940	10408.4	0.060552	1.59459	11125.4	1.04051	0.654817
71	4945	12169.1	0.068962	1.49738	12281.5	1.04051	0.654817
72	4950	12800.9	0.072326	1.44497	11653.9	1.09617	0.659694
73	4955	13649.4	0.077372	1.42655	11852.6	1.12705	0.662464
74	4961	14081.2	0.079884	1.38955	11924.4	1.12705	0.662464
75	4965	14677.3	0.082418	1.36160	11676.4	1.16019	0.665461
76	4970	15836.5	0.090828	1.33575	11582.0	1.23413	0.672156

Table D.11. Computed Mechanics for Aluminum With 50° Tool, Test A1 57, Revolution 5

OBS	DEG	TAU	MPU	MU	SR	STR	PUS
1	4975	.	0.100920	1.27577	.	.	.
2	4985	.	0.119422	1.22643	.	.	.
3	4990	.	0.117740	1.22693	.	.	.
4	5000	16463.9	0.109330	1.22969	7987.9	1.67819	0.709236
5	5005	15489.8	0.097556	1.23436	8231.9	1.53813	0.698298
6	5010	8743.5	0.050460	1.57543	10271.6	0.97007	0.649103
7	5015	7567.0	0.048778	1.71697	12975.1	0.83910	0.642706
8	5020	8428.3	0.052142	1.67582	13059.4	0.86548	0.643178
9	5025	8992.0	0.053824	1.65646	12322.4	0.91251	0.645241
10	5030	9870.0	0.057188	1.57200	12425.9	0.93042	0.646327
11	5035	.	0.063916	1.52547	.	.	.
12	5041	.	0.068962	1.45895	.	.	.
13	5046	.	0.072326	1.40992	.	.	.
14	5050	.	0.075690	1.39923	.	.	.
15	5092	.	0.008410	.	.	.	.
16	5060	.	0.090828	1.28554	.	.	.
17	5065	.	0.095874	1.25751	.	.	.
18	5070	.	0.102602	1.23223	.	.	.
19	5075	.	0.105966	1.25107	.	.	.
20	5080	.	0.102602	1.21179	.	.	.
21	5085	.	0.102602	1.23223	.	.	.
22	5090	.	0.090828	1.26129	.	.	.
23	5096	.	0.068870	1.46653	.	.	.
24	5100	.	0.047096	1.54725	.	.	.
25	5106	.	0.047096	1.74008	.	.	.
26	5110	.	0.047096	1.74008	.	.	.
27	5115	.	0.052142	1.67582	.	.	.
28	5120	.	0.055506	1.58584	.	.	.
29	5125	.	0.060870	1.51198	.	.	.
30	5130	.	0.065598	1.40498	.	.	.
31	5135	.	0.067280	1.42819	.	.	.
32	5141	.	0.072326	1.40992	.	.	.
33	5145	.	0.075690	1.36704	.	.	.
34	5150	.	0.082418	1.35160	.	.	.
35	5155	.	0.092510	1.30807	.	.	.
36	5160	.	0.102602	1.25307	.	.	.
37	5165	.	0.107648	1.25011	.	.	.
38	5171	.	0.112694	1.26467	.	.	.
39	5176	.	0.109330	1.26906	.	.	.
40	5180	.	0.105966	1.23092	.	.	.

Table D.12. Computed Mechanics for Copper With 20° Tool, Test Cu 06

OBS	DEC	TAU	RPU	MU	SR	STR	PUS
1	735	82690.7	0.66675	0.675430	60158.4	2.5100	0.940265
2	740	73577.4	0.66115	0.679373	48131.5	2.8867	0.939838
3	746	64879.1	0.69915	0.675430	35858.2	3.6446	0.943282
4	750	57841.4	0.70675	0.671750	29333.5	4.2087	0.946749
5	755	57841.4	0.70675	0.671750	29333.5	4.2087	0.946749
6	760	56113.0	0.73714	0.686060	27918.8	4.5641	0.948927
7	765	50912.9	0.77514	0.698705	29793.2	4.5641	0.948927
8	770	62324.8	0.82074	0.701001	31797.8	4.5641	0.948927
9	775	51433.1	0.88153	0.735543	24351.9	6.1194	0.957200
10	780	48027.9	0.91953	0.753633	22398.7	6.9028	0.960686
11	785	40215.1	0.98033	0.740680	19962.4	7.9135	0.964410
12	791	47629.1	1.03352	0.737996	21367.3	7.9135	0.964410
13	795	36800.7	1.10192	0.750206	14811.3	11.1621	0.972841
14	800	30139.3	1.11711	0.744387	11066.7	14.0139	0.977562
15	805	15083.2	1.16271	0.765066	5599.0	20.3113	0.980051
16	810	30708.9	1.13991	0.774135	12248.3	14.0139	0.977562
17	815	46537.1	1.01072	0.760038	21233.3	7.9135	0.964410
18	820	48384.3	0.92713	0.761812	22871.7	6.9028	0.960686
19	825	39060.9	0.84354	0.728723	30199.1	4.9862	0.951406
20	830	58113.0	0.66875	0.691076	31746.6	3.9057	0.944068
21	835	14429.5	0.70675	0.686819	4541.4	18.7754	0.982629
22	840	58703.8	0.72195	0.700202	31616.9	4.2087	0.946749
23	845	57536.8	0.70675	0.701416	30652.7	4.2087	0.946749
24	850	54758.9	0.72195	0.700202	28278.6	4.5641	0.948927
25	855	53298.8	0.75994	0.717047	26739.2	4.9862	0.951406
26	860	55898.0	0.79794	0.725689	28414.4	4.9862	0.951406
27	865	43698.8	0.83594	0.740338	20990.5	6.9028	0.960686
28	870	56006.9	0.87393	0.751574	28447.8	5.4949	0.954109
29	876	59246.3	0.92713	0.773660	31141.5	5.4949	0.954109
30	880	56497.3	0.97273	0.774589	28490.5	6.1194	0.957200
31	885	50726.5	1.10192	0.770138	23225.7	7.9135	0.964410
32	890	38811.0	1.16271	0.793588	16823.1	11.1621	0.972841
33	895	32924.6	1.22351	0.796625	13665.9	14.0139	0.977562
34	900	28103.7	1.23871	0.799595	9994.1	18.7754	0.982629
35	905	32700.6	1.21591	0.800931	13860.6	14.0139	0.977562
36	910	51869.7	1.13231	0.826706	25952.6	7.9135	0.964410
37	915	49775.0	1.08672	0.828110	24956.4	7.9135	0.964410
38	925	59186.3	0.85114	0.776209	32563.4	4.9862	0.951406
39	929	57450.3	0.99382	0.831306	31581.3	6.1194	0.957200
40	930	59624.9	0.78274	0.692145	29923.3	4.5641	0.948927
41	935	59876.7	0.9004	0.715427	31277.4	4.5641	0.948927
42	940	66030.4	0.8474	0.710754	32733.3	4.2087	0.946749
43	945	73499.2	0.8034	0.734620	44691.3	3.6446	0.943282
44	950	66212.7	0.7651	0.753304	38213.9	4.2087	0.946749
45	955	66180.2	0.83153	0.772635	37734.6	4.5641	0.948927
46	960	64836.8	0.83473	0.793585	36586.9	4.9862	0.951406
47	965	65301.3	1.02592	0.804484	33923.6	5.4949	0.954109
48	970	36925.9	1.69432	0.793585	28301.6	6.9028	0.960686
49	975	53734.5	1.17031	0.799946	25812.0	7.9135	0.964410
50	980	33104.7	1.23111	0.811707	14099.3	14.0139	0.977562
51	985	25630.9	1.26180	0.817306	10490.7	18.7754	0.982629
52	990	39719.0	1.19311	0.837728	18482.3	11.1621	0.972841
53	995	44245.1	1.11711	0.803963	21414.2	9.2650	0.968460
54	1000	47723.0	1.04112	0.818748	23396.1	7.9135	0.964410
55	1005	51416.9	0.98792	0.789828	25411.8	6.9028	0.960686
56	1010	60033.2	0.93473	0.734947	29688.3	5.4949	0.954109
57	1015	70018.1	0.86693	0.742856	39787.2	4.2087	0.946749
58	1020	69865.8	0.86693	0.755401	40446.8	4.2087	0.946749
59	1025	79409.9	0.88153	0.797805	52725.9	3.6446	0.943282
60	1031	79708.7	0.99552	0.797321	48972.1	4.2087	0.946749
61	1035	70046.3	0.98033	0.770989	46680.7	4.2087	0.946749
62	1040	73876.1	0.98033	0.740680	49649.8	4.5641	0.948927
63	1045	54314.1	1.04112	0.765263	25819.8	6.9028	0.960686
64	1050	61317.4	1.06632	0.779871	31160.3	6.1194	0.957200
65	1055	44722.4	1.12471	0.780420	19882.8	9.2650	0.968460
66	1060	36895.4	1.15511	0.777575	16277.7	11.1621	0.972841
67	1065	32744.5	1.21591	0.781404	13282.4	14.0139	0.977562
68	1070	33762.3	1.25390	0.784718	13724.4	14.0139	0.977562
69	1075	25796.4	1.26910	0.805335	10341.7	18.7754	0.982629
70	1080	25786.1	1.26910	0.814199	10499.8	18.7754	0.982629
71	1084	33284.9	1.23871	0.824891	14532.8	14.0139	0.977562
72	1090	39741.8	1.19311	0.828176	18221.0	11.1621	0.972841
73	1095	43339.5	1.09432	0.834884	21002.7	9.2650	0.968460

Table D.13. Computed Mechanics for Copper With 20° Tool, Test Cu 33, Revolution 1

OBS	DEG	TAU	RPU	MU	SN	STR	PUS
1	415	40126.8	0.507344	0.84048	26233.9	4.20868	0.946749
2	420	38676.4	0.521866	0.84681	24579.4	4.56408	0.948927
3	425	33840.4	0.534768	0.88091	19858.0	5.49494	0.954189
4	430	33758.6	0.534768	0.87944	20314.3	5.49494	0.954189
5	435	41897.3	0.500488	0.90281	31386.0	3.90567	0.944868
6	440	41438.4	0.500488	0.95464	31993.3	3.90567	0.944868
7	445	54675.5	0.466208	0.98295	61815.6	2.31596	0.941987
8	450	56235.7	0.473044	0.99583	66735.8	2.23199	0.943282
9	455	58969.8	0.479920	0.98501	74314.0	2.08539	0.946749
10	460	61941.7	0.507344	0.96686	73909.2	2.15540	0.944868
11	465	63975.8	0.541624	0.96216	70791.5	2.31596	0.941987
12	470	67077.5	0.607608	0.89002	57685.9	2.88675	0.939835
13	475	58179.6	0.692484	0.87277	40993.5	3.90567	0.944068
14	481	73137.3	0.781584	0.85911	54447.7	3.41748	0.941987
15	485	.	0.767872	0.85578	.	.	.
16	490	.	0.700168	0.86131	.	.	.
17	495	64543.7	0.761016	0.82021	42492.5	3.90567	0.944868
18	500	.	0.733592	0.82586	.	.	.
19	505	60830.4	0.670744	0.82347	41761.2	3.64455	0.943282
20	510	62558.4	0.665032	0.83437	45186.2	3.41748	0.941987
21	515	62638.6	0.596472	0.89772	54207.8	2.88675	0.939835
22	520	63628.5	0.540480	0.87486	59712.3	2.51000	0.940265
23	525	58849.3	0.500488	0.91123	39553.4	2.48825	0.946902
24	530	51451.1	0.431928	0.99019	60706.6	2.23199	0.943282
25	535	47744.8	0.452496	1.00858	48911.1	2.74747	0.939692
26	40	49489.9	0.466208	0.98295	48646.3	2.74747	0.939692
27	545	48062.4	0.452496	0.98078	47138.5	2.74747	0.939692
28	550	51936.0	0.431928	0.96443	59666.7	2.23199	0.943282
29	555	53046.0	0.445640	0.99218	62716.3	2.23199	0.943282
30	561	52215.0	0.473064	0.94892	51309.0	2.62254	0.939835
31	565	52662.6	0.493632	0.96443	50789.2	2.74747	0.939692
32	570	54020.8	0.521056	0.94800	49450.7	2.88675	0.939835
33	575	52078.1	0.541624	0.94109	44143.7	3.21844	0.940982
34	580	54232.9	0.589616	0.94166	44365.9	3.41748	0.941987
35	585	40016.6	0.610184	0.98113	33650.5	4.20868	0.946749
36	590	43126.9	0.630752	0.89752	27909.4	4.98616	0.951406
37	595	43013.8	0.623896	0.83710	25776.4	4.98616	0.951406
38	600	45267.6	0.610184	0.84939	28665.8	4.56408	0.948927
39	605	44998.7	0.569048	0.87186	30445.8	4.20868	0.946749
40	610	48164.8	0.541624	0.86300	34730.1	3.64455	0.943282
41	615	44066.5	0.480784	0.92840	38136.2	3.04275	0.940265
42	620	40604.9	0.383936	0.99668	40472.3	2.74747	0.939692
43	625	37338.4	0.329968	1.02125	42335.4	2.48825	0.940982
44	631	36418.5	0.294808	1.03660	36138.6	1.85866	0.957200
45	635	37478.8	0.308820	1.03747	51686.7	2.02126	0.948927
46	640	39844.8	0.329088	1.02125	52119.1	2.08539	0.946749
47	645	42581.8	0.356512	1.02391	53873.3	2.15540	0.944068
48	650	46943.6	0.404504	1.01363	54746.8	2.31596	0.941987
49	655	52098.2	0.445640	0.99218	59459.3	2.31596	0.941987
50	660	54760.6	0.486776	0.97484	57226.4	2.51000	0.940265
51	665	61023.0	0.555336	0.96443	69943.2	2.62254	0.939835
52	670	66768.0	0.665032	0.92968	67862.5	3.04275	0.940265
53	675	68023.8	0.774728	0.87775	65996.8	3.90567	0.944868
54	680	65686.5	0.829576	0.86364	63997.7	4.20868	0.946749
55	685	55881.8	0.884424	0.88315	53311.0	5.49494	0.954189
56	690	59519.3	0.899008	0.90470	48351.4	4.56408	0.948927
57	695	56323.8	0.767872	0.92488	39995.1	4.56408	0.948927
58	700	75844.5	0.734160	0.92287	65222.4	3.04275	0.940265
59	705	77584.0	0.726736	0.94761	73803.5	2.74747	0.939692
60	710	76681.6	0.692484	0.96620	75091.8	2.62254	0.939835
61	715	74706.5	0.665032	0.97925	70448.1	2.51000	0.940265
62	720	71877.5	0.644444	1.00292	77385.1	2.51000	0.940265
63	725	73944.5	0.665032	1.01366	80334.1	2.51000	0.940265
64	730	69214.3	0.678744	1.01392	67770.1	2.88675	0.939835
65	735	66502.3	0.699312	1.00705	51130.5	3.64455	0.943282
66	740	62356.7	0.719880	1.00069	52354.8	3.64455	0.943282
67	745	62941.6	0.713024	0.97482	56815.5	3.64455	0.943282
68	750	55537.0	0.761016	0.95959	40662.1	4.56408	0.948927
69	755	59204.6	0.809008	0.93134	41456.7	4.56408	0.948927
70	760	58635.2	0.863856	0.92644	39406.6	4.98616	0.951406
71	765	52137.6	0.911048	0.91527	31998.4	6.11936	0.957200
72	770	57712.1	0.918704	0.91043	36586.1	5.49494	0.954189
73	775	52557.1	0.918704	0.91043	31974.9	6.11936	0.957200

Table D.14. Computed Mechanics for Copper With 20° Tool, Test Cu 33, Revolution 2

OBS	DEG	TAU	RPU	MU	SR	STR	PUS
1	780	.	0.89814	0.925201	.	.	.
2	785	65323.5	0.89128	0.930383	45624.8	4.5641	0.948927
3	790	64219.2	0.87757	0.940793	45390.0	4.5641	0.948927
4	795	62562.8	0.85700	0.957276	45038.0	4.5641	0.948927
5	800	59329.4	0.83643	0.948349	53162.6	3.9857	0.944068
6	805	70452.9	0.80981	0.972030	57434.1	3.6446	0.943202
7	810	77739.9	0.78158	0.969145	78249.0	3.0428	0.940265
8	815	76144.1	0.76787	0.982098	69738.5	3.0428	0.940265
9	820	76942.0	0.77473	0.975853	69989.8	3.0428	0.940265
10	825	77000.5	0.81586	0.979836	60606.9	3.2184	0.940983
11	830	54762.6	0.87787	0.965826	36940.5	5.4949	0.954177
12	835	31006.4	0.93927	0.960734	17204.7	11.1621	0.972841
13	840	.	0.99412	0.948409	.	.	.
14	845	20659.2	1.02154	0.951252	10331.3	18.7754	0.982629
15	850	21510.6	1.06268	0.924424	10375.9	18.7754	0.982629
16	855	21928.5	1.08326	0.921849	10540.1	18.7754	0.982629
17	860	18213.5	1.11759	0.911361	6883.5	28.3113	0.988951
18	865	15497.6	1.13818	0.899765	6893.4	28.3113	0.988951
19	870	15967.8	1.17238	0.898524	7004.6	28.3113	0.988951
20	875	22474.1	1.11067	0.934817	10995.6	18.7754	0.982629
21	880	21637.6	1.06954	0.940474	10667.2	18.7754	0.982629
22	885	.	1.00783	0.939018	.	.	.
23	890	.	0.97385	0.948418	.	.	.
24	895	.	0.95984	0.958408	.	.	.
25	900	43148.5	0.95298	0.967004	25946.2	7.9135	0.964418
26	905	42779.8	0.94413	0.983994	26254.3	7.9135	0.964418
27	910	.	0.95984	0.985006	.	.	.
28	915	.	0.97385	0.974543	.	.	.
29	920	.	0.99412	0.970611	.	.	.
30	925	.	1.00783	0.971750	.	.	.
31	930	.	1.04211	0.969145	.	.	.
32	935	.	1.10382	0.948019	.	.	.
33	940	.	1.14495	0.952647	.	.	.
34	945	.	1.19980	0.939018	.	.	.
35	950	.	1.22722	0.923865	.	.	.
36	955	.	1.22937	0.910716	.	.	.
37	960	.	1.19294	0.924716	.	.	.
38	965	.	1.17920	0.932428	.	.	.
39	970	.	1.13810	0.928165	.	.	.
40	975	.	1.13124	0.932149	.	.	.
41	980	21904.5	1.00325	0.952000	10965.8	18.7754	0.982629
42	985	27818.4	1.04211	0.969145	14865.1	14.0139	0.977563
43	990	33824.3	1.01469	0.966848	18618.2	11.1621	0.972841
44	995	38714.1	0.98726	0.975652	22617.2	9.2650	0.968460
45	1000	.	1.01469	0.966848	.	.	.
46	1005	.	1.04211	0.969145	.	.	.
47	1010	.	1.09694	0.953267	.	.	.
48	1015	.	1.15181	0.958841	.	.	.
49	1020	.	1.19294	0.952116	.	.	.
50	1025	.	1.21351	0.949311	.	.	.
51	1030	.	1.23408	0.937756	.	.	.
52	1035	.	1.25465	0.943989	.	.	.
53	1040	.	1.26150	0.931627	.	.	.

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Table D.15. Computed Mechanics for Copper With 40° Tool, Test Cu 01

OBS	DEC	TAU	NPU	MU	SR	STR	PUS
1	1806	51906.9	0.469397	1.71592	40214	2.3835	0.815207
2	1811	39230.3	0.410057	1.74706	28738	3.0422	0.838539
3	1816	34267.5	0.403388	1.66809	22303	3.5230	0.852302
4	1821	35578.4	0.286039	1.80684	76429	1.1055	0.767914
5	1826	40580.2	0.300042	1.70514	78468	1.1248	0.767095
6	1831	42295.3	0.315376	1.76105	74483	1.1917	0.766043
7	1836	46654.9	0.337379	1.67613	55955	1.5059	0.775592
8	1841	44882.2	0.352048	1.77154	47389	1.8010	0.789495
9	1846	51525.1	0.374051	1.69361	62372	1.5059	0.775592
10	1851	51618.3	0.388719	1.78012	60811	1.6097	0.780381
11	1861	50465.4	0.601415	1.82790	35735	3.5230	0.852302
12	1866	24839.0	0.748101	1.80513	12337	10.7298	0.935167
13	1871	25365.4	0.762770	1.77154	12129	10.7298	0.935167
14	1876	25113.3	0.755435	1.78481	12107	10.7298	0.935167
15	1881	2868[illegible]	0.726098	1.80396	14615	8.8398	0.924016
16	1886	3872[illegible]	0.674758	1.83199	22694	5.7129	0.893692
17	1891	45472.5	0.616083	1.83778	30030	4.1729	0.867598
18	1896	47566.5	0.564743	1.77744	32860	3.5230	0.832302
19	1901	55553.8	0.484065	1.67807	46968	2.2608	0.810184
20	1906	45042.4	0.506068	1.77813	32393	3.2657	0.845236
21	1911	37833.5	0.425391	1.78720	27259	3.2657	0.845236
22	1916	39480.3	0.440060	1.68353	26922	3.2657	0.845236
23	1921	40836.3	0.300042	1.62771	56995	1.3775	0.770263
24	1926	49280.7	0.359382	1.67311	56959	1.5557	0.777061
25	1931	52396.2	0.374051	1.69361	73295	1.3407	0.768970
26	1936	54408.3	0.396054	1.75484	73056	1.4171	0.771796
27	1941	55744.7	0.425391	1.78726	63613	1.6682	0.783157
28	1946	54973.9	0.476731	1.86511	52721	2.1502	0.805466
29	1951	44462.3	0.564743	1.87517	31051	3.8219	0.859751
30	1956	47709.6	0.645421	1.81335	31131	4.1729	0.867598
31	1961	32525.0	0.711430	1.75758	16032	7.4949	0.913403
32	1967	28414.9	0.718764	1.78083	14201	8.8398	0.924016
33	1971	30811.6	0.674758	1.79139	16265	7.4949	0.913403
34	1976	31135.3	0.601415	1.73872	16621	6.4905	0.903303
35	1981	40251.3	0.506068	1.72624	26056	3.8219	0.859751
36	1986	51247.4	0.469397	1.82934	45080	2.3835	0.815207
37	1991	57654.9	0.476731	1.86511	59291	1.9593	0.796915
38	1996	66991.1	0.513403	1.81093	77316	1.6682	0.783157
39	2001	58189.3	0.425391	1.72836	71612	1.5059	0.775592
40	2006	49374.6	0.388719	1.71283	104530	1.0875	0.768970
41	2011	59628.4	0.410057	1.62771	80392	1.3407	0.768970
42	2016	57757.9	0.425391	1.66597	104308	1.1455	0.766510
43	2021	61794.9	0.440060	1.68353	89210	1.3065	0.767914
44	2026	61273.4	0.454728	1.75698	73944	1.5557	0.777061
45	2031	64851.8	0.484065	1.78535	79364	1.5557	0.777861
46	2036	67223.9	0.506068	1.88766	92823	1.4598	0.773572
47	2041	62567.9	0.594080	1.84616	53546	2.5293	0.820344
48	2046	41419.2	0.718764	1.74403	23121	5.7129	0.893692
49	2051	21074.3	0.784773	1.73380	9394	13.5741	0.946883
50	2056	20872.2	0.777438	1.74609	9380	13.5741	0.946883
51	2061	29092.8	0.755435	1.74969	14742	8.8398	0.924016
52	2066	39175.4	0.682092	1.81609	22765	5.7129	0.893692
53	2071	44542.3	0.601415	1.78264	20606	4.1729	0.867598
54	2076	42770.3	0.579412	1.83606	28229	4.1729	0.867598
55	2081	49735.9	0.557409	1.74786	35117.2	3.2657	0.845236
56	2086	50806.3	0.601415	1.73872	34391.7	3.5230	0.852302
57	2091	59056.5	0.447394	1.72040	65535.9	1.6682	0.783157
58	2096	56780.7	0.410722	1.70814	71778.1	1.4598	0.773572
59	2101	57596.3	3.410722	1.64739	70472.8	1.4598	0.773572
60	2106	59391.2	0.425391	1.66597	73409.3	1.4598	0.773572
61	2111	62531.0	0.462062	1.73598	74670.1	1.5557	0.777061
62	2116	67067.4	0.506068	1.72624	74267.9	1.6682	0.783157
63	2121	71352.7	0.550074	1.76551	77792.3	1.7317	0.786194
64	2126	47678.1	0.447394	2.62346	59160.7	2.1502	0.805466
65	2130	60474.8	0.762770	1.77154	40112.5	3.8219	0.859751
66	2136	49825.7	0.865450	1.76387	28132.1	5.7129	0.893692
67	2141	37155.4	0.938794	1.74347	18252.6	8.8398	0.924016
68	2146	25999.8	0.968131	1.73088	11566.7	13.5741	0.946883
69	2151	26201.9	0.975465	1.72126	11580.8	13.5741	0.946883
70	2156	36583.3	0.924125	1.73598	17887.2	8.8398	0.924016
71	2161	41611.8	0.806776	1.83041	23400.2	6.4905	[illegible]

Table D.16. Computed Mechanics for Copper With 40° Tool, Test Cu 32

OBS	DEG	TAU	EPU	MU	SN	STR	PUB
1	360	.	0.16820	.	.	1.01542	0.777841
2	365	.	0.20024	.	.	1.04094	0.773572
3	370	.	0.23230	.	.	1.00749	0.768978
4	375	.	0.30607	.	.	1.14553	0.766510
5	380	.	0.25042	.	.	1.19175	0.766043
6	385	.	0.37144	.	.	1.34065	0.768978
7	390	.	0.40462	.	.	1.55572	0.777841
8	395	.	0.50460	.	.	1.80097	0.789495
9	400	.	0.57469	.	.	2.15016	0.805466
10	405	.	0.61674	.	.	2.67365	0.829205
11	410	.	0.65879	.	.	2.38359	0.815287
12	415	.	0.67280	.	.	1.87635	0.793067
13	420	.	0.58364	.	.	1.55572	0.777841
14	425	.	0.52238	.	.	1.14553	0.766510
15	430	.	0.34341	.	.	1.16782	0.766160
16	435	.	0.37845	.	.	1.24502	0.766510
17	440	.	0.42751	.	.	1.27463	0.767045
18	445	.	0.44255	.	.	1.34065	0.768978
19	450	.	0.49759	.	.	1.37745	0.770263
20	455	.	0.53263	.	.	1.41705	0.771796
21	460	.	0.56768	.	.	1.38609	0.775592
22	465	.	0.61674	.	.	1.55572	0.777841
23	470	.	0.65178	.	.	1.73174	0.786194
24	475	.	0.67280	.	.	1.87635	0.793067
25	480	.	0.71485	.	.	2.15016	0.805466
26	485	.	0.77793	.	.	2.84637	0.832200
27	490	.	0.78494	.	.	2.84637	0.832200
28	495	.	0.77793	.	.	2.52034	0.820544
29	500	.	0.75490	.	.	1.98928	0.796915
30	505	.	0.74089	.	.	1.87635	0.793067
31	510	.	0.66879	.	.	1.73174	0.786194
32	515	.	0.34341	.	.	1.16782	0.766160
33	520	.	0.32939	.	.	1.14553	0.766510
34	525	.	0.38743	.	.	1.19175	0.766043
35	530	.	0.39247	.	.	1.19175	0.766043
36	535	.	0.40462	.	.	1.30645	0.767514
37	540	.	0.47667	.	.	1.34065	0.768978
38	545	.	0.52563	.	.	1.55572	0.777841
39	550	.	0.48358	.	.	1.45979	0.773572
40	555	.	0.58169	.	.	1.66816	0.783187
41	560	.	0.59971	.	.	1.66816	0.783187
42	565	.	0.63075	.	.	1.80097	0.789495
43	570	.	0.66879	.	.		
44	575	.	0.72186	.	.	2.05811	0.801045
45	580	.	0.76391	.	.	2.84637	0.832200
46	585	.	0.75690	.	.	2.84637	0.832200
47	590	.	0.74289	.	.	2.26075	0.810184
48	595	.	0.78784	.	.	2.05811	0.801045
49	600	.	0.70648	.	.	1.21744	0.766160
50	605	.	0.31838	.	.	1.08749	0.768978
51	610	.	1.00219	.	.	1.07079	0.770263
52	615	.	0.31838	.	.	1.08749	0.768978
53	620	.	0.30136	.	.	1.08749	0.768978
54	625	.	0.34341	.	.	1.21744	0.766160
55	630	.	0.386440	.	.	1.24502	0.766510
56	635	.	0.392448	.	.	1.41708	0.771796
57	637	.	0.404465	.	.	1.41708	0.771796
58	640	.	0.441526	.	.	1.45979	0.773872
59	645	.	0.511610	.	.		
60	650	.	0.553660	.	.	2.15016	0.805466
61	375	.	0.581693	.	.	1.87635	0.793067
62	660	.	0.574685	.	.	1.87635	0.793067
63	665	.	0.529627	.	.	1.66816	0.783187
64	670	.	0.378451	.	.	1.21744	0.766160
65	675	.	0.329393	.	.	1.14553	0.766510
66	700	.	0.350418	.	.	1.19175	0.766043
67	705	.	0.399476	.	.	1.24502	0.766510
68	710	.	0.442551	.	.	1.27463	0.767045
69	715	.	0.511610	.	.	1.34065	0.768978
70	721	.	0.553660	.	.	1.41708	0.771796
71	725	.	0.588702	.	.	1.41708	0.771796
72	730	.	0.609727	.	.	1.55572	0.777841
73	735	.	0.623744	.	.	1.55572	0.777841
74	740	.	0.623744	.	.	1.55572	0.777841
75	745	.	0.588710	.	.		
76	750	.	0.581693	.	.	1.37745	0.770263
77	755	.	0.518618	.	.	1.34065	0.768978
78	760	.	0.469560	.	.	1.24502	0.766510
79	765	.	0.427510	.	.	1.21744	0.766160

APPENDIX E

Variation of Horizontal Force

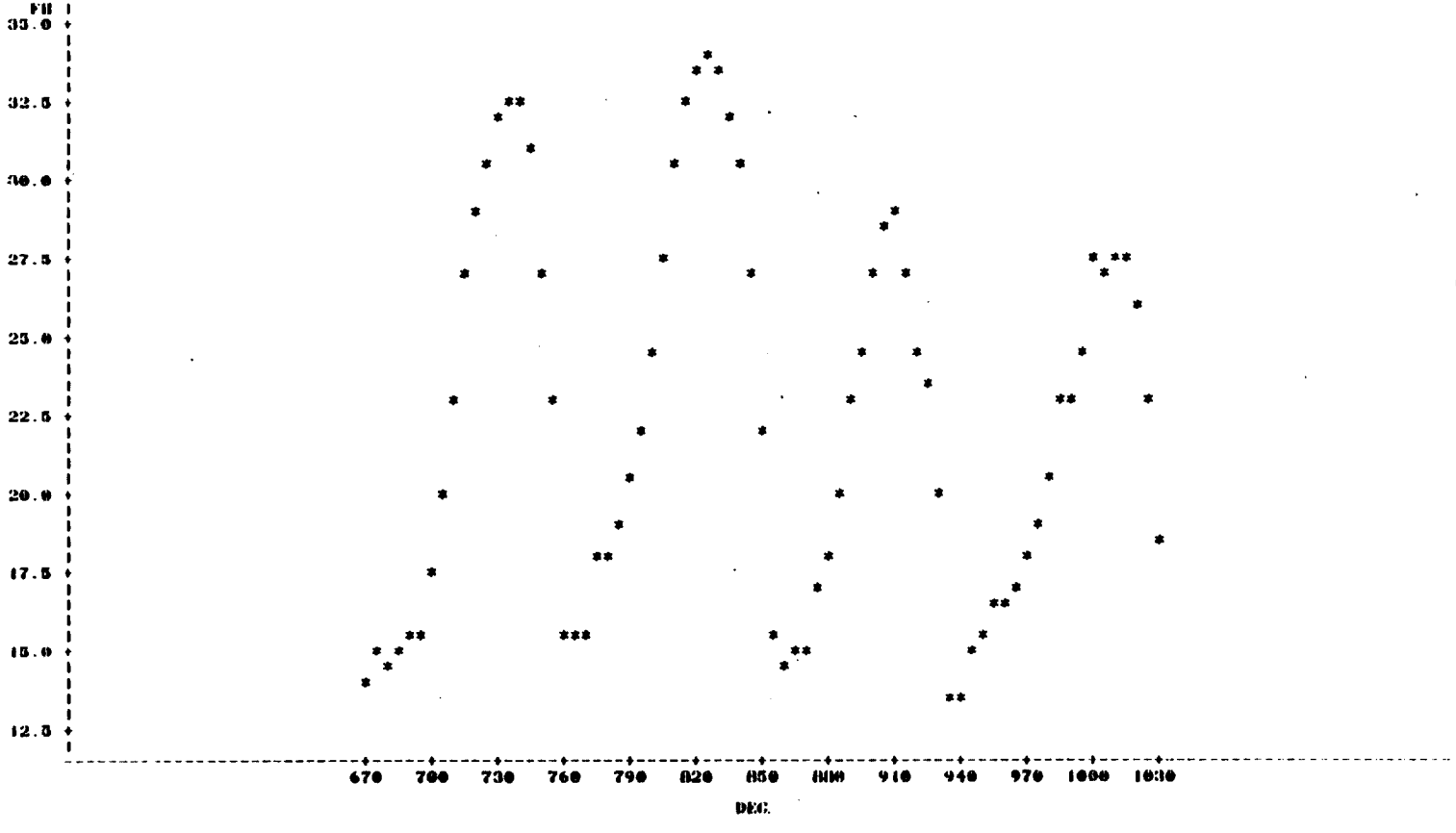

Figure E.1. Variation of Horizontal Force With Orientation for Aluminum With 30° Tool, Test A1 63, Revolution 1

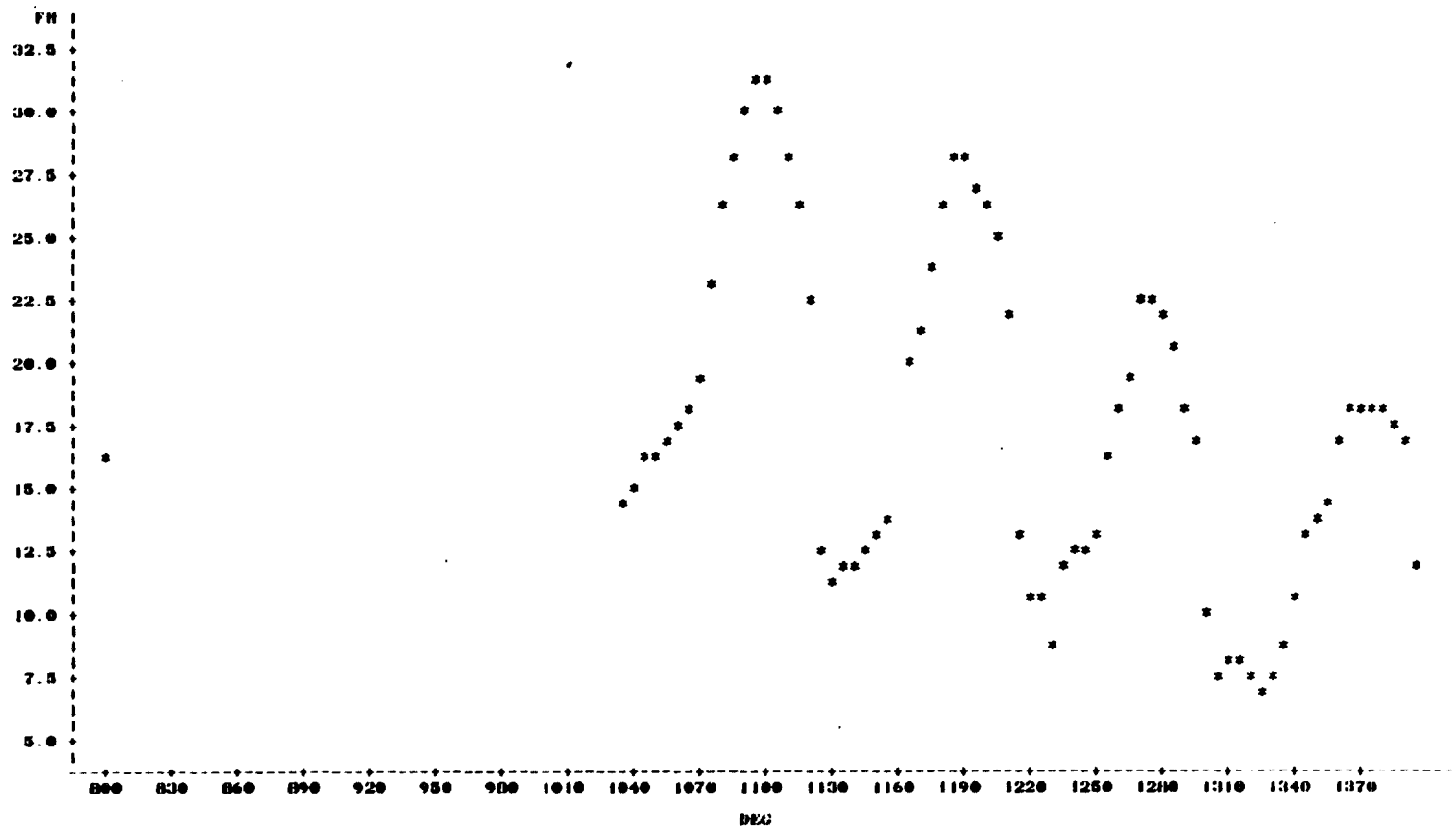

Figure F.2. Variation of Horizontal Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

Figure 4.3. Variation of Horizontal Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

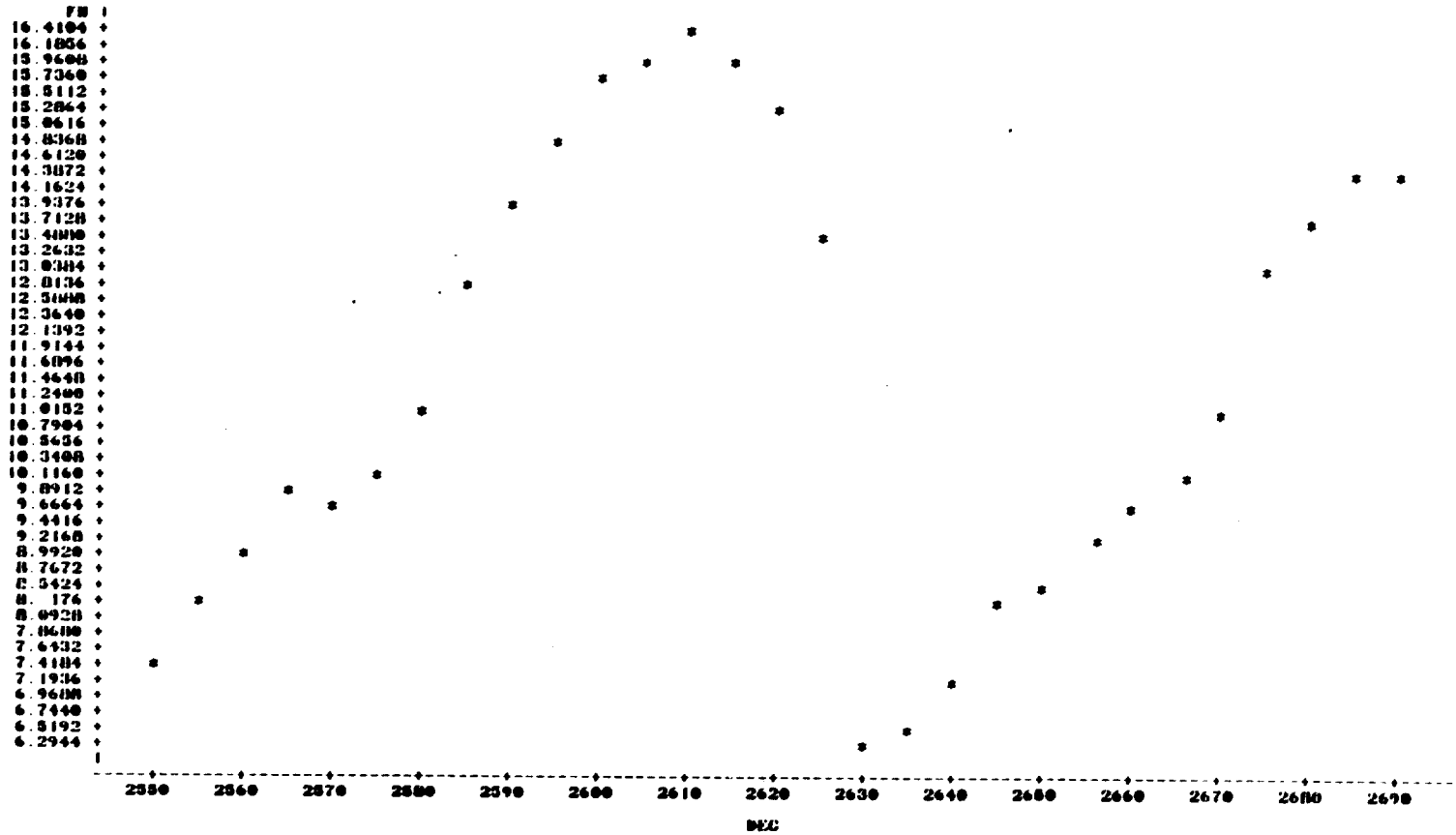

Figure E.4. Variation of Horizontal Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

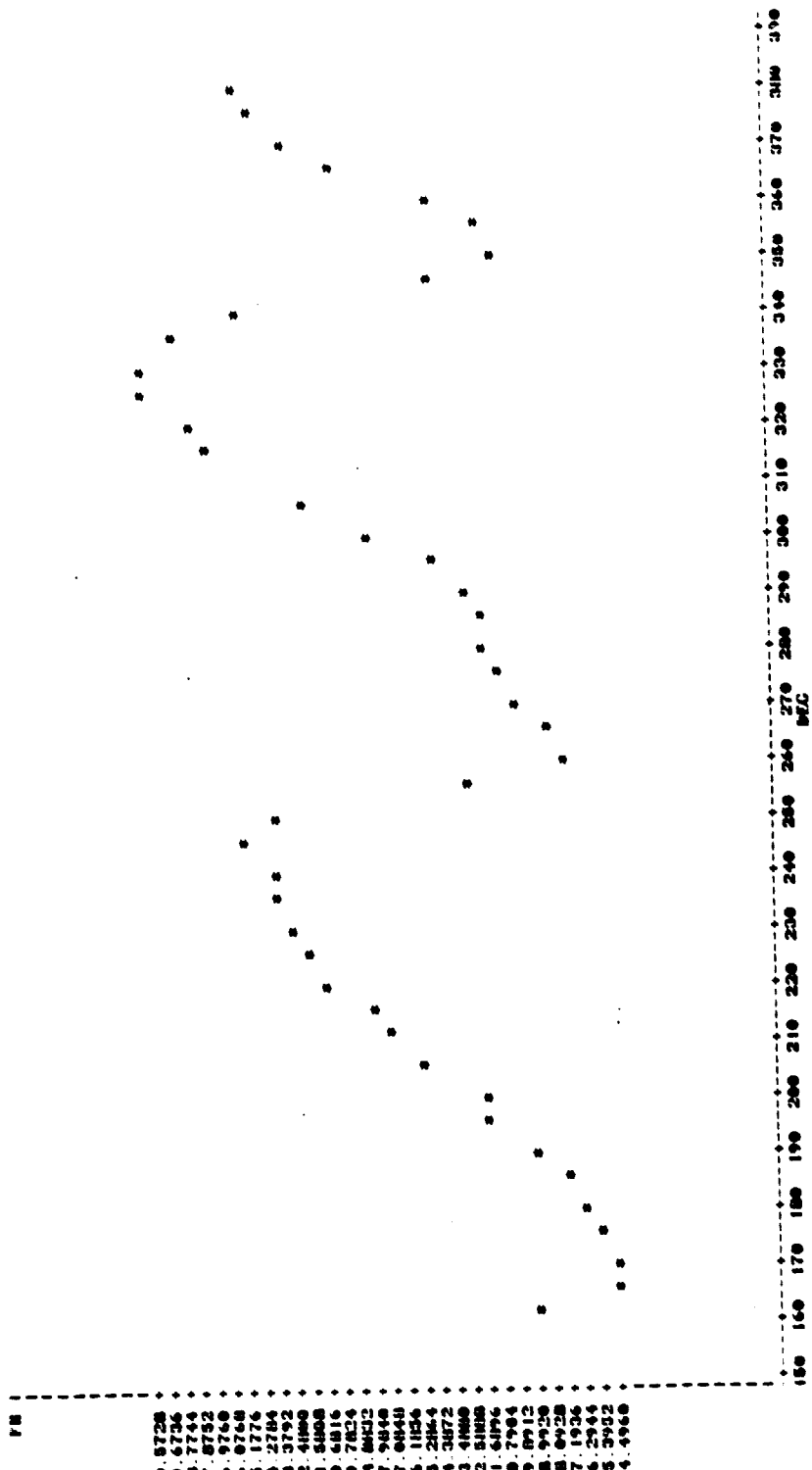

Figure E.5. Variation of Horizontal Force With Orientation for Aluminum With 40° Tool, Test Al 03

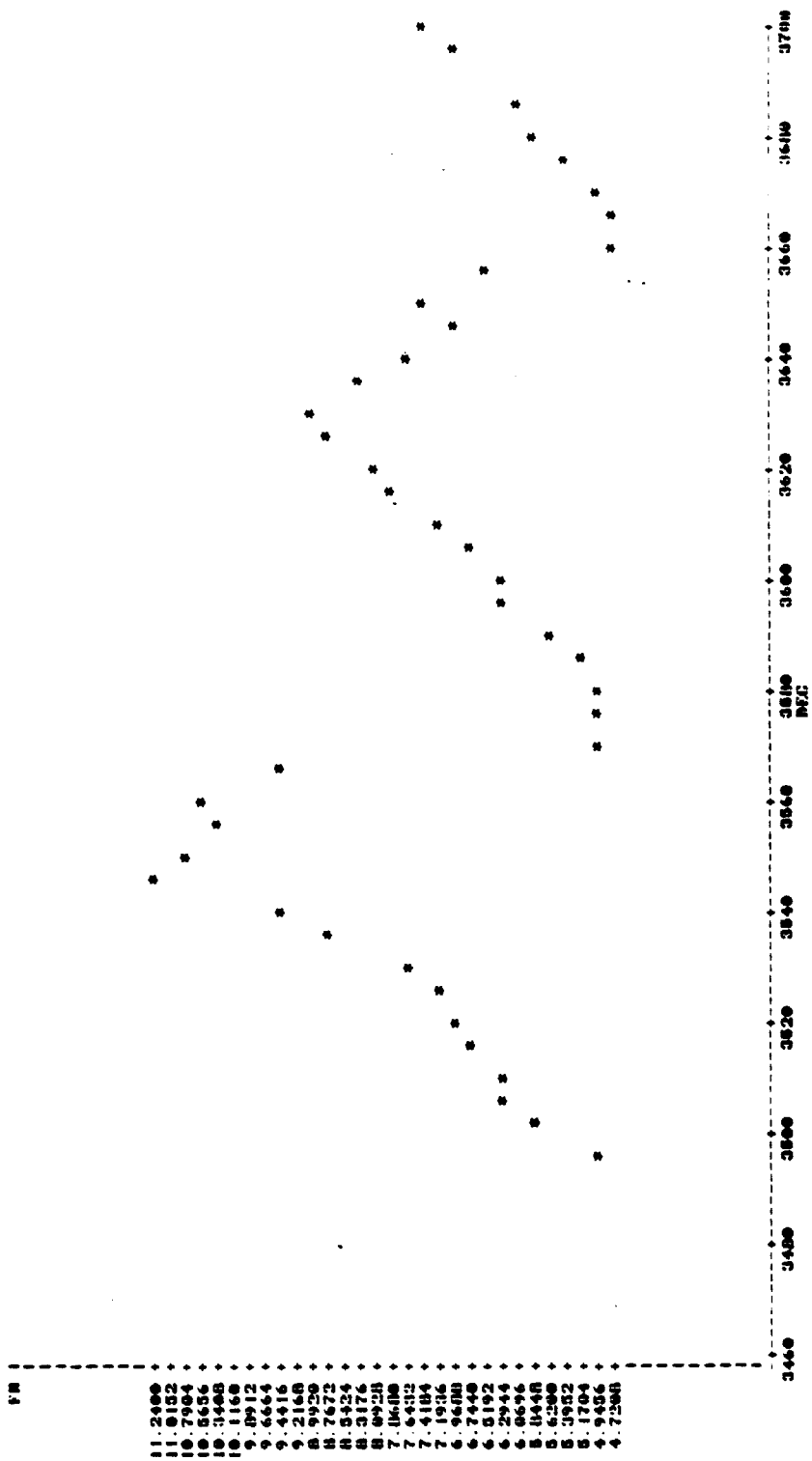

Figure E.6. Variation of Horizontal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

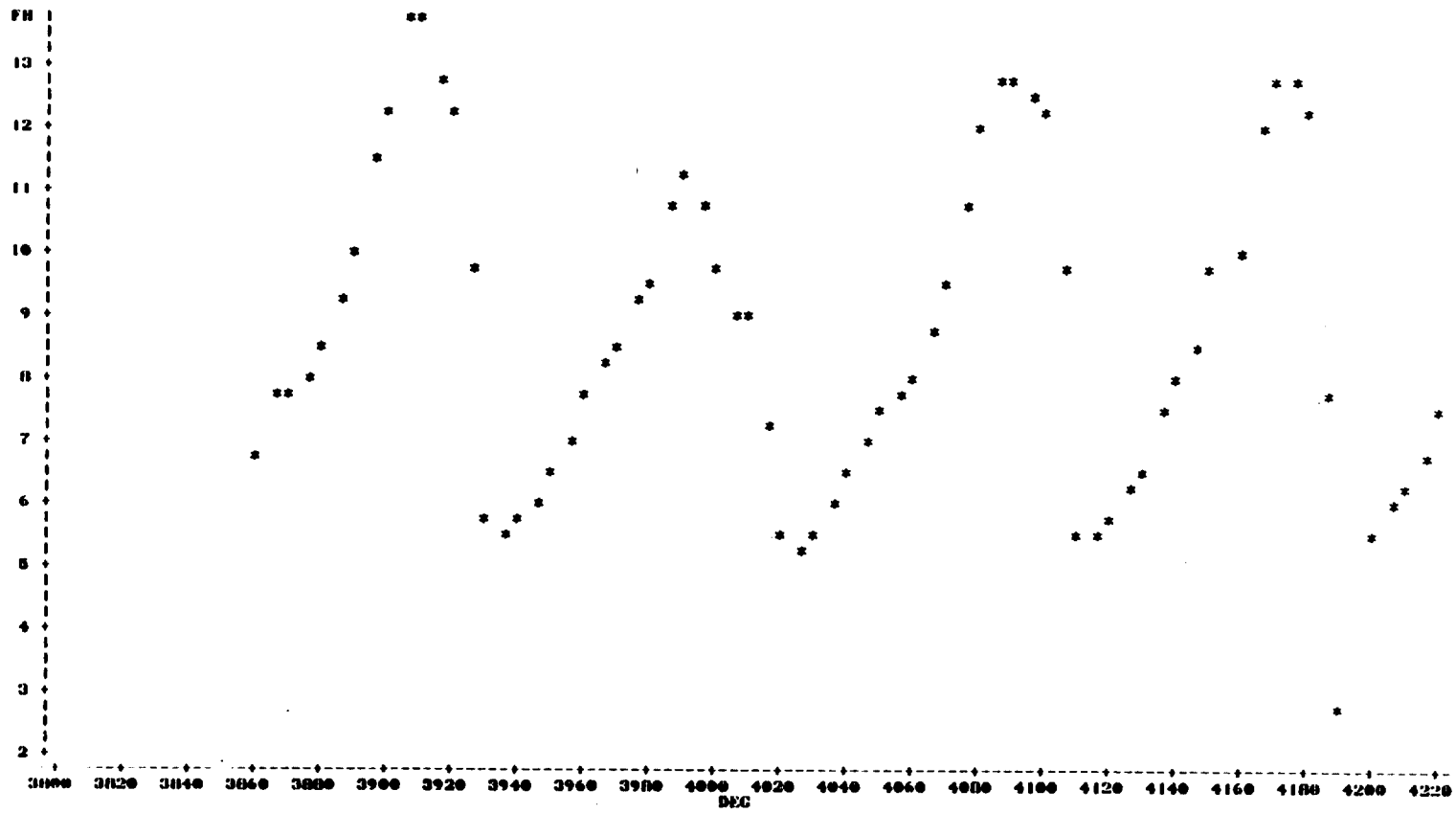

Figure E.7. Variation of Horizontal Force With Orientation for Aluminum With 50° Tool, Test A1 57, Revolution 2

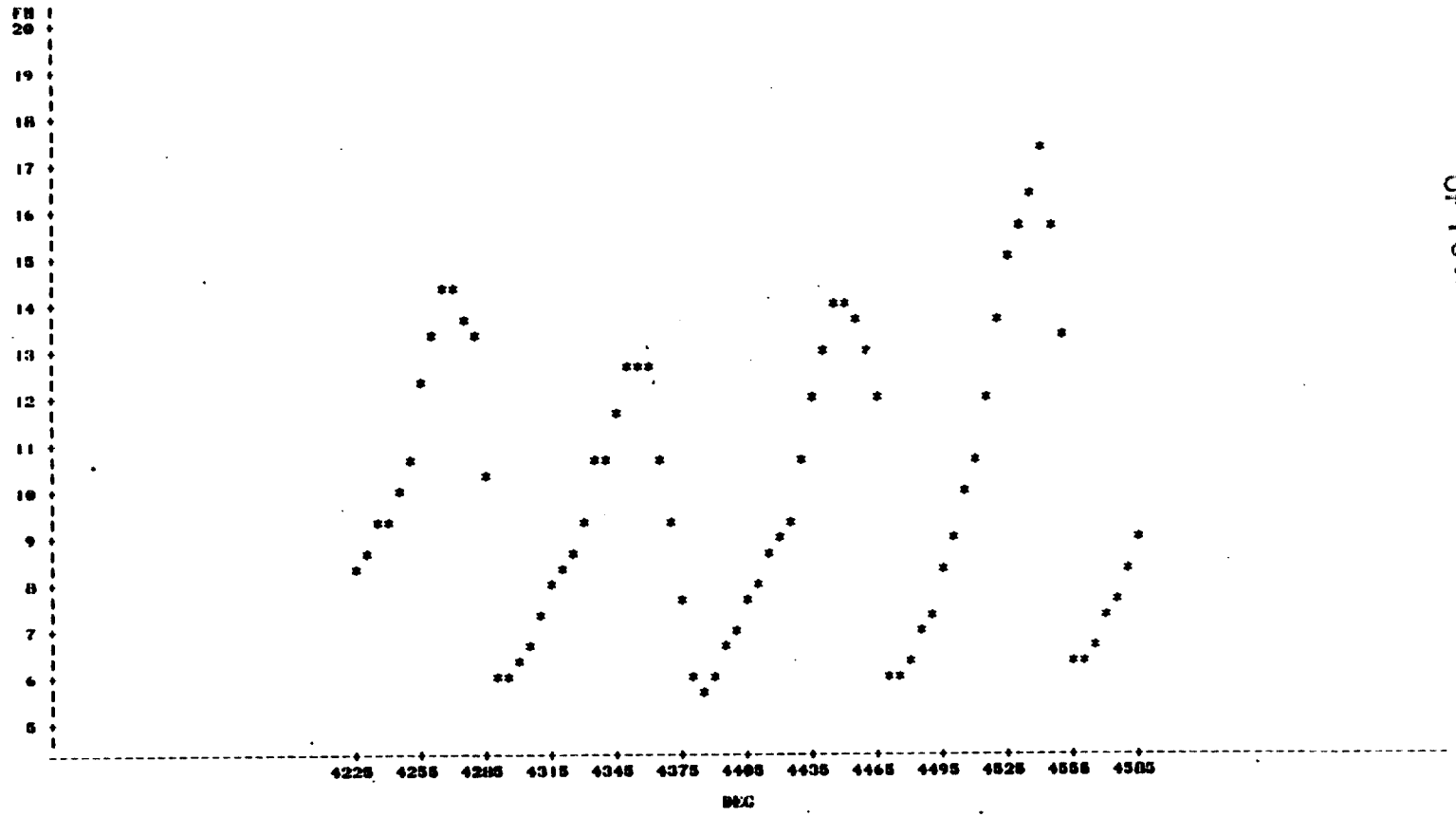

Figure E.8. Variation of Horizontal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

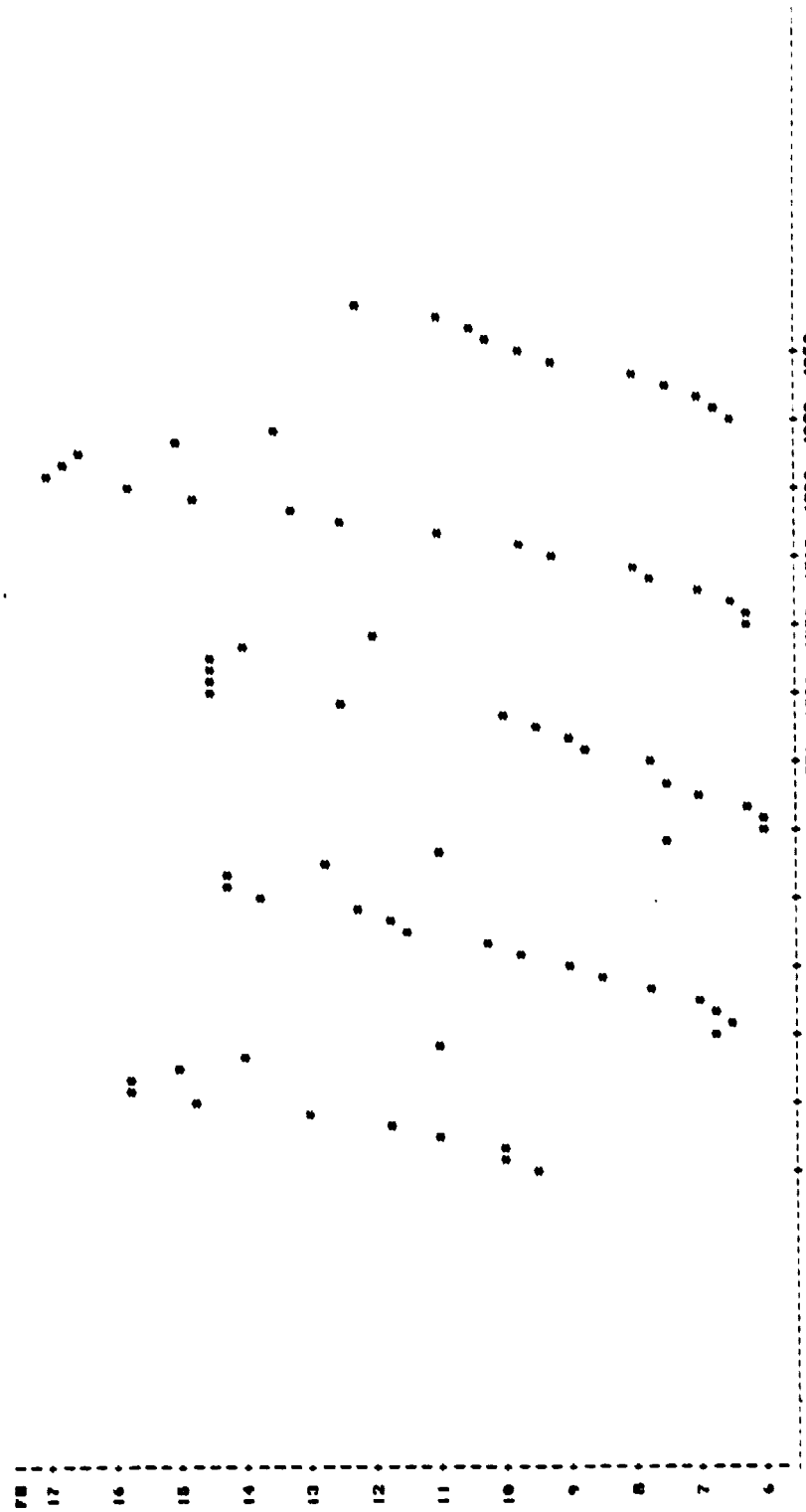

Figure E.9. Variation of Horizontal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

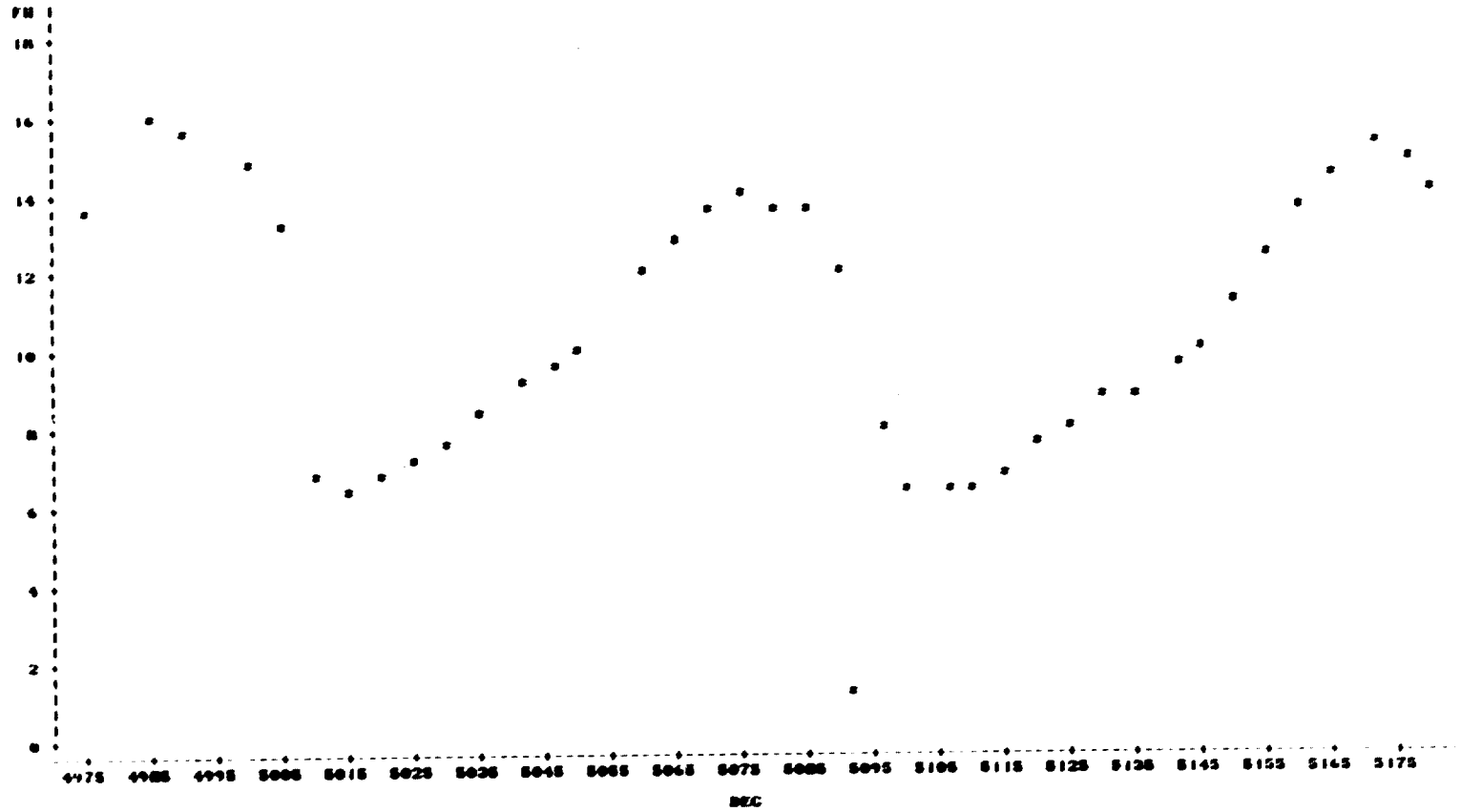

Figure E.10. Variation of Horizontal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

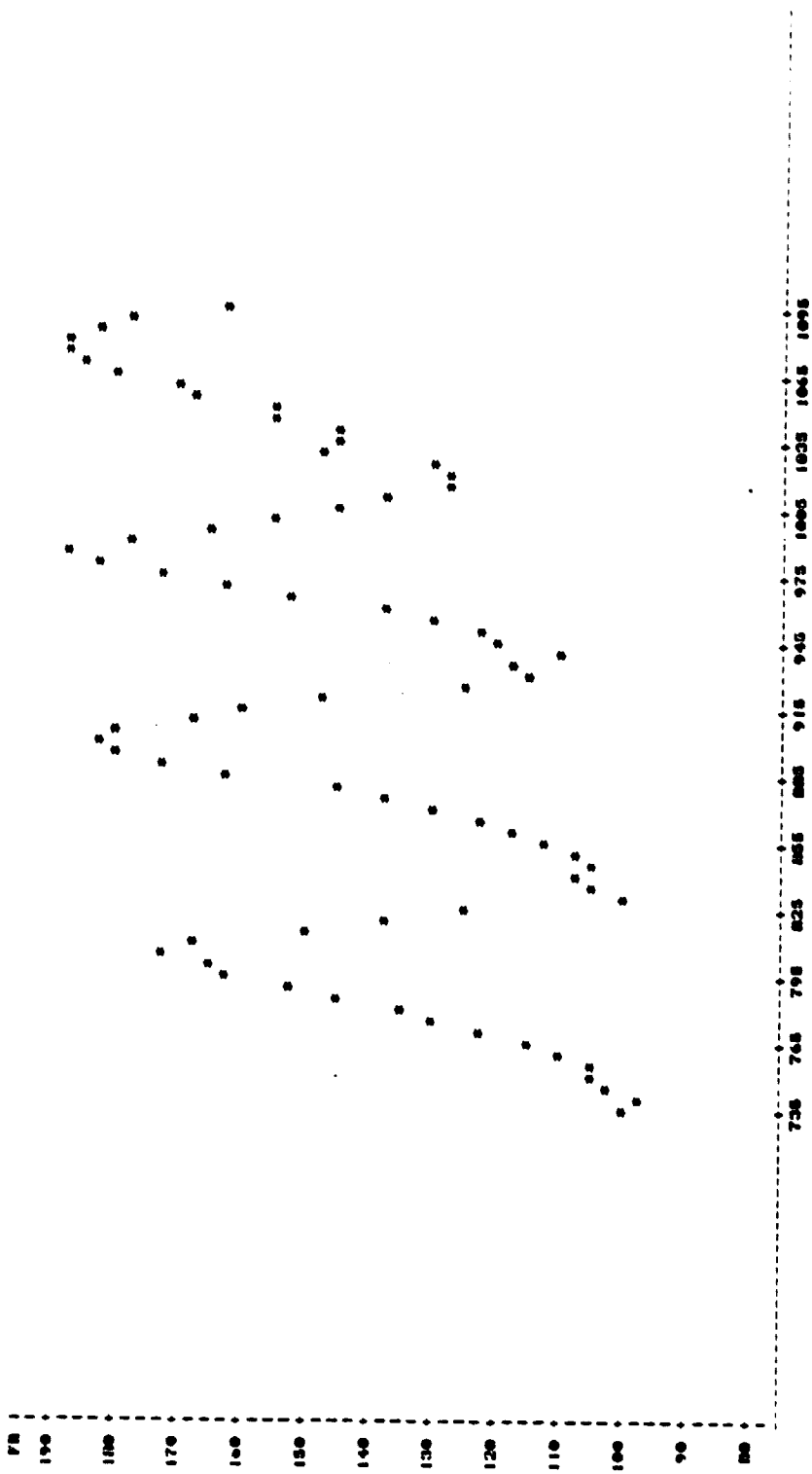

Figure E.11. Variation of Horizontal Force With Orientation for Copper With 20° Tool, Test Cu 06

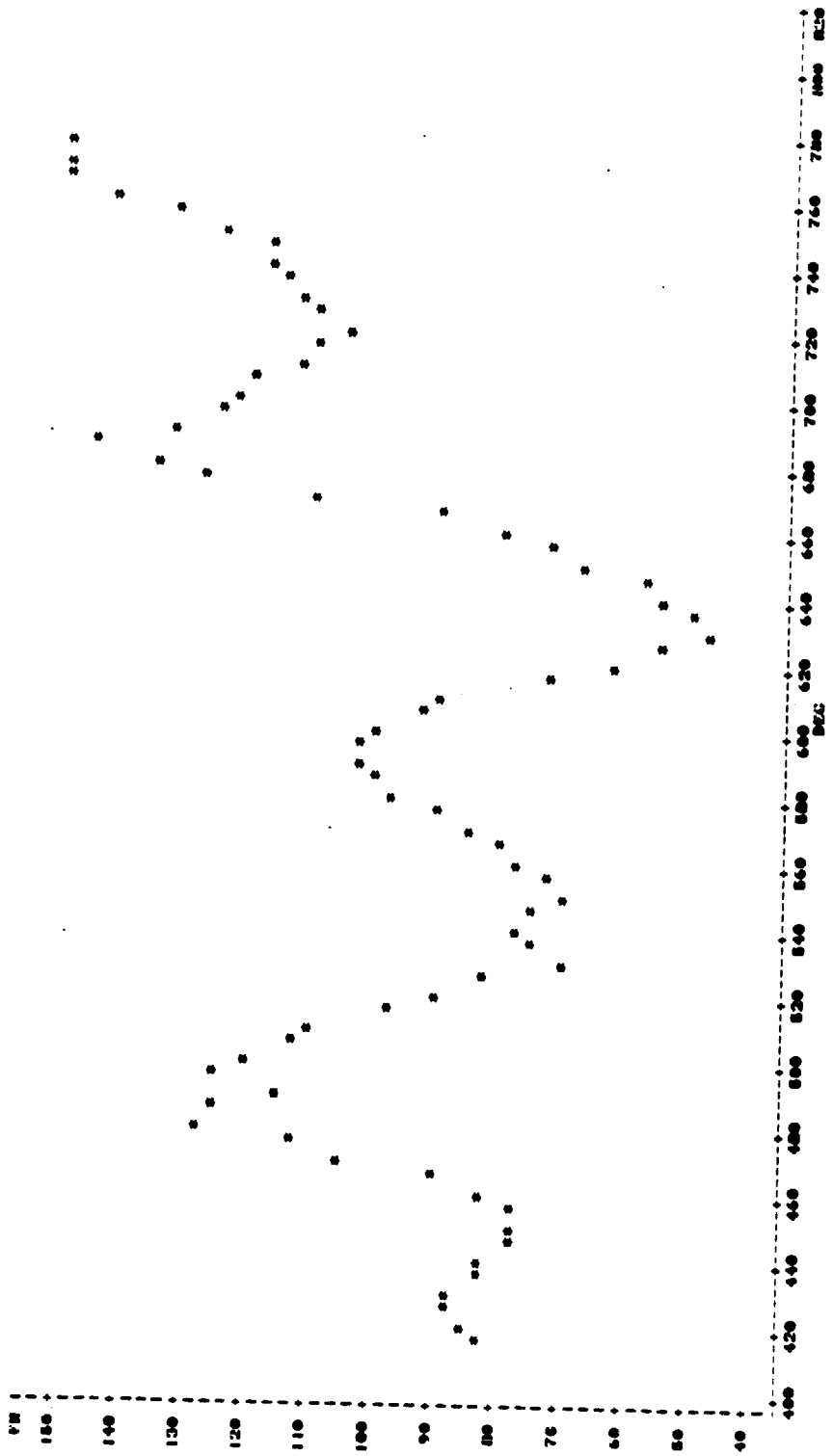

Figure E.12. Variation of Horizontal Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

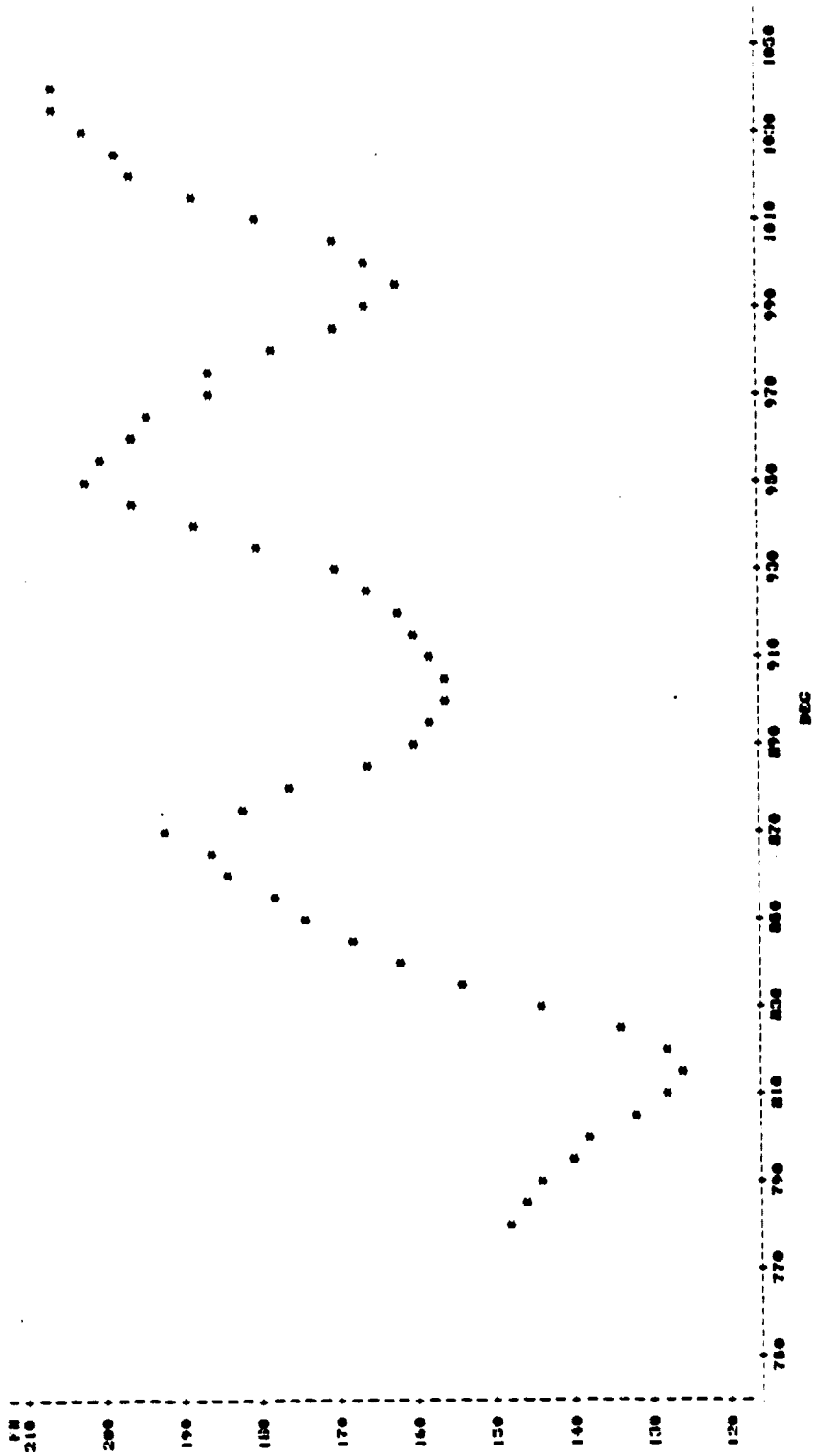

Figure E.13. Variation of Horizontal Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

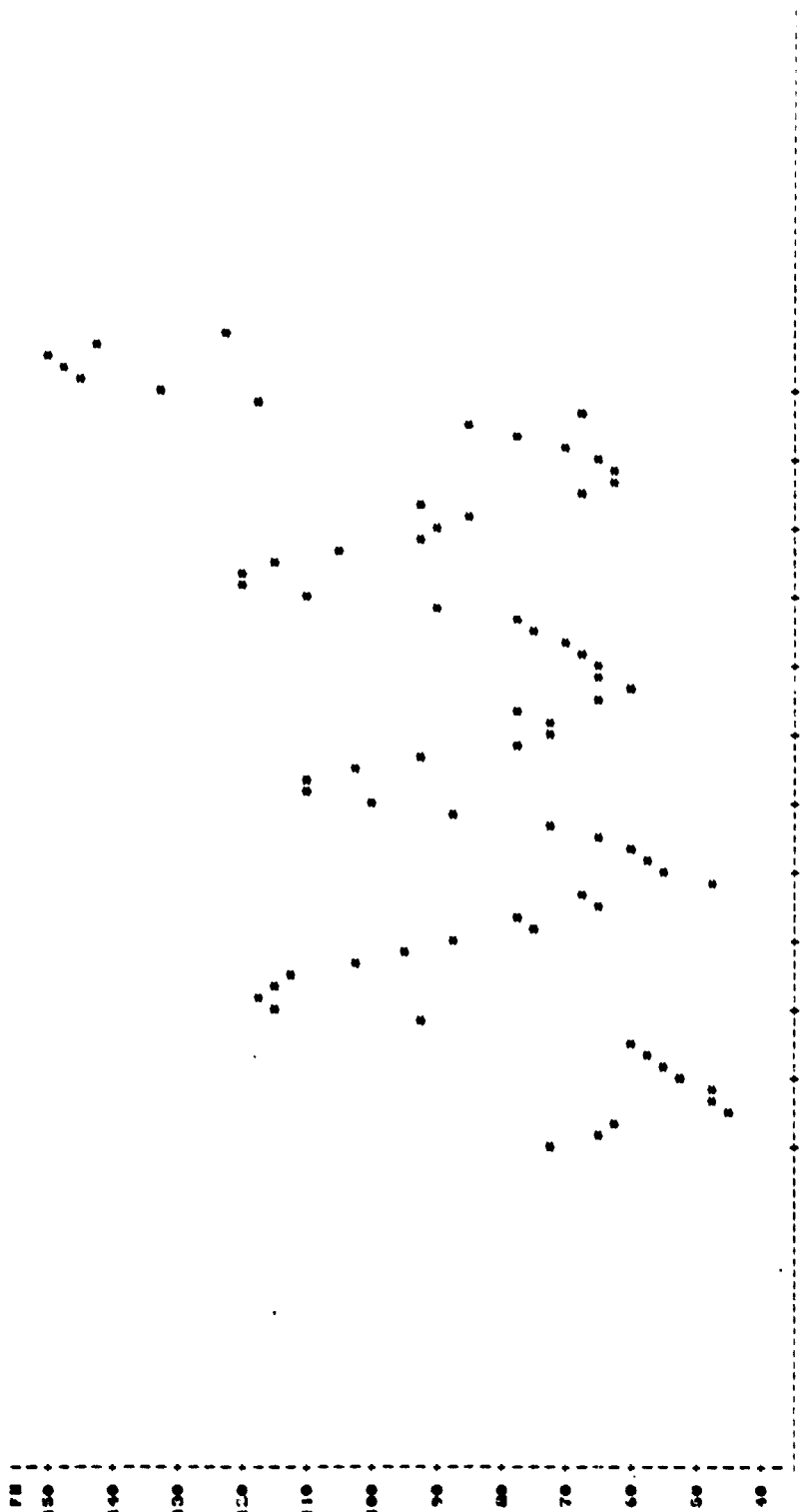

Figure E.14. Variation of Horizontal Force With Orientation for Copper With 40° Tool, Test Cu 01

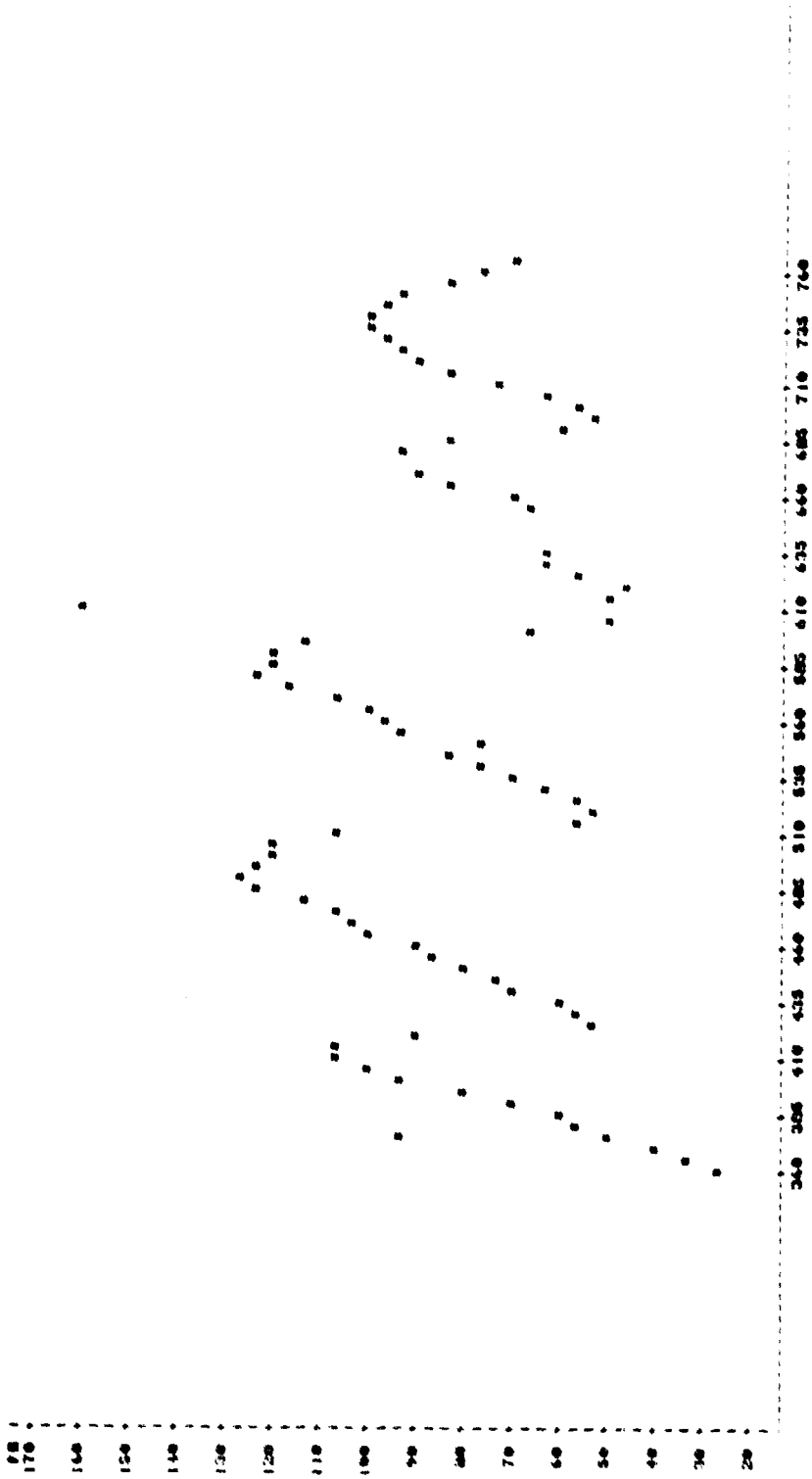

Figure E.15. Variation of Horizontal Force With Orientation for Aluminum With 40° Tool, Test Cu 32

APPENDIX F

Variation of Vertical Force

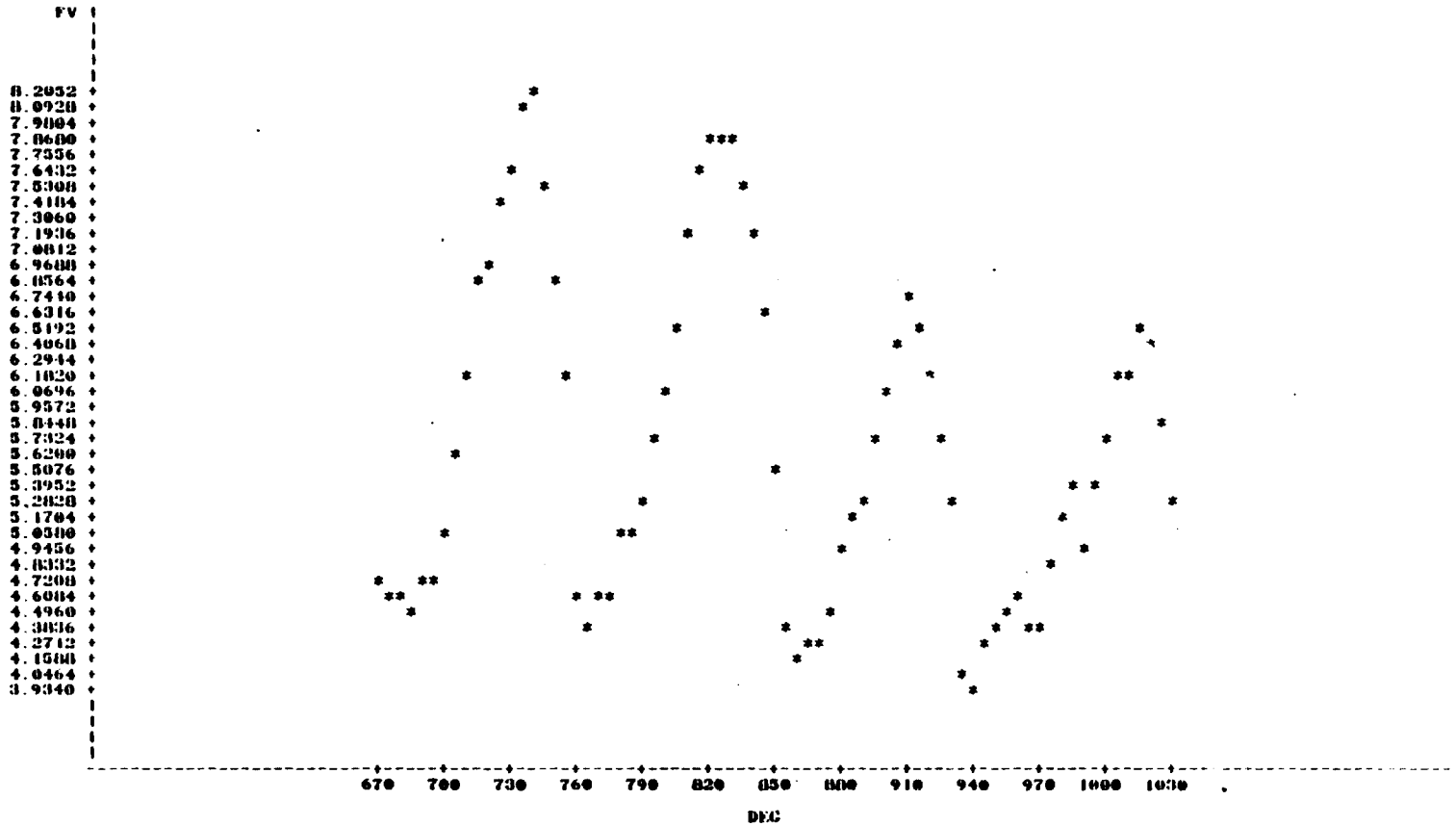

Figure F.1. Variation of Vertical Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

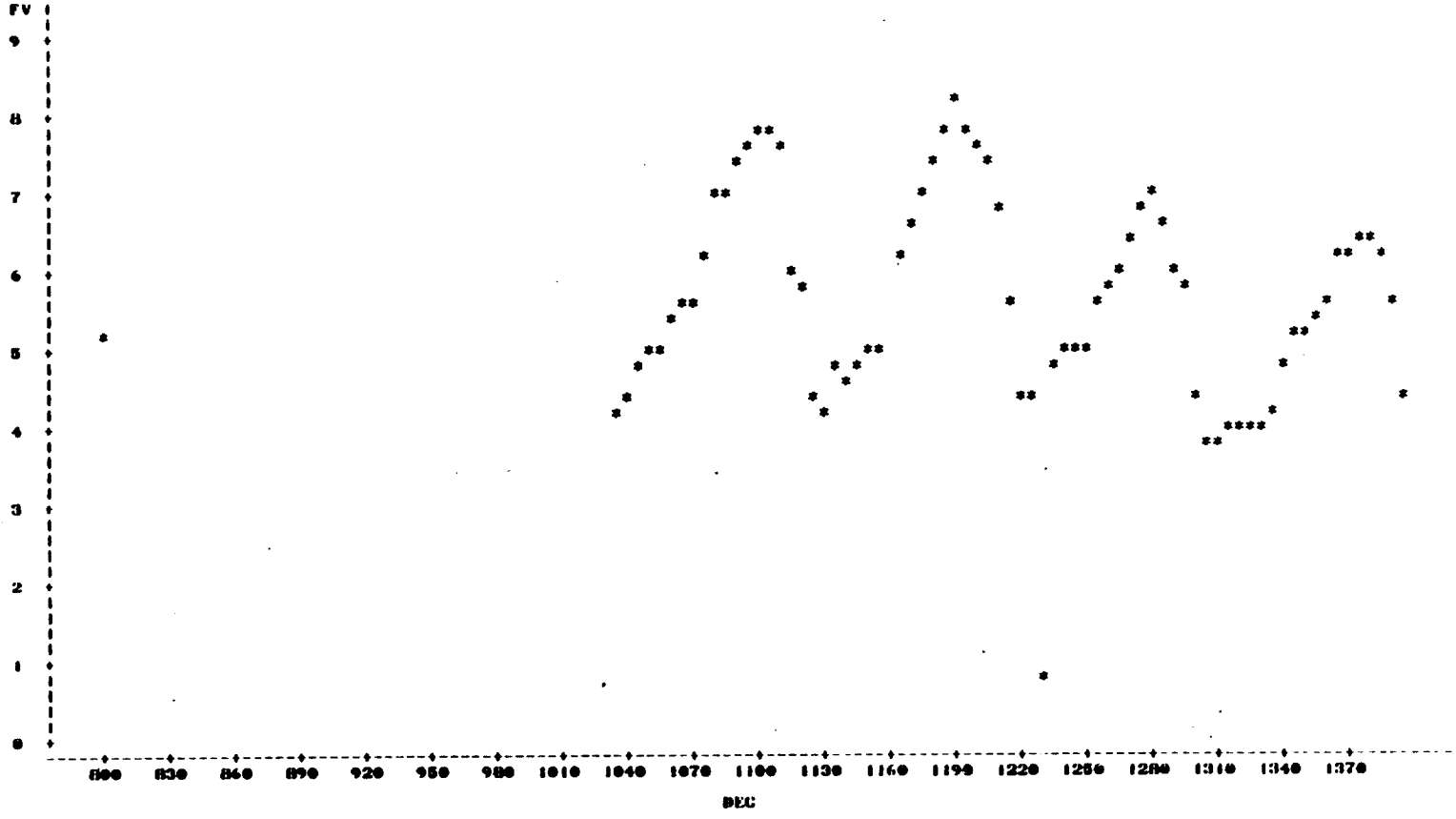

Figure F.2. Variation of Vertical Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

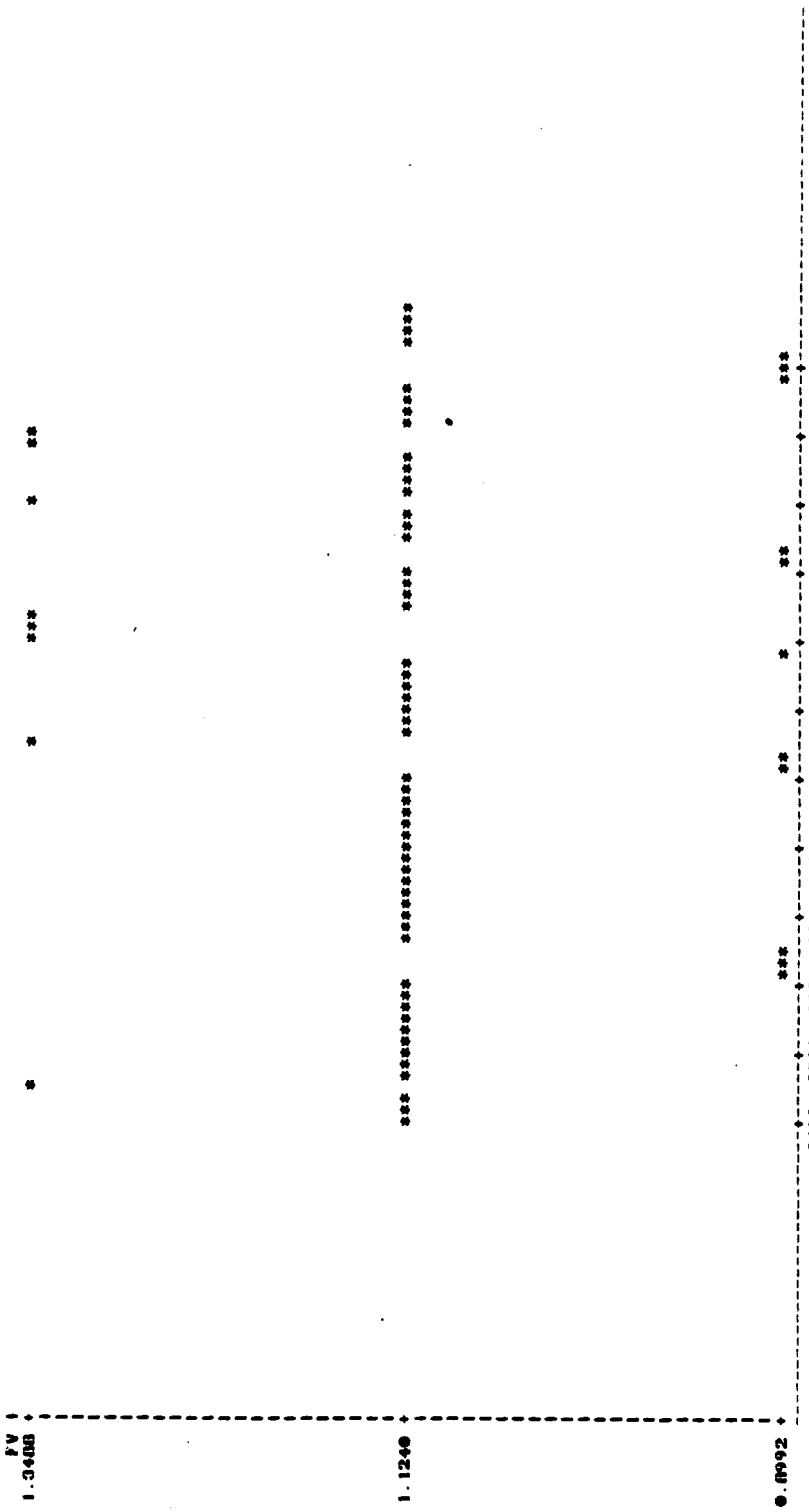

Figure F.3. Variation of Vertical Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

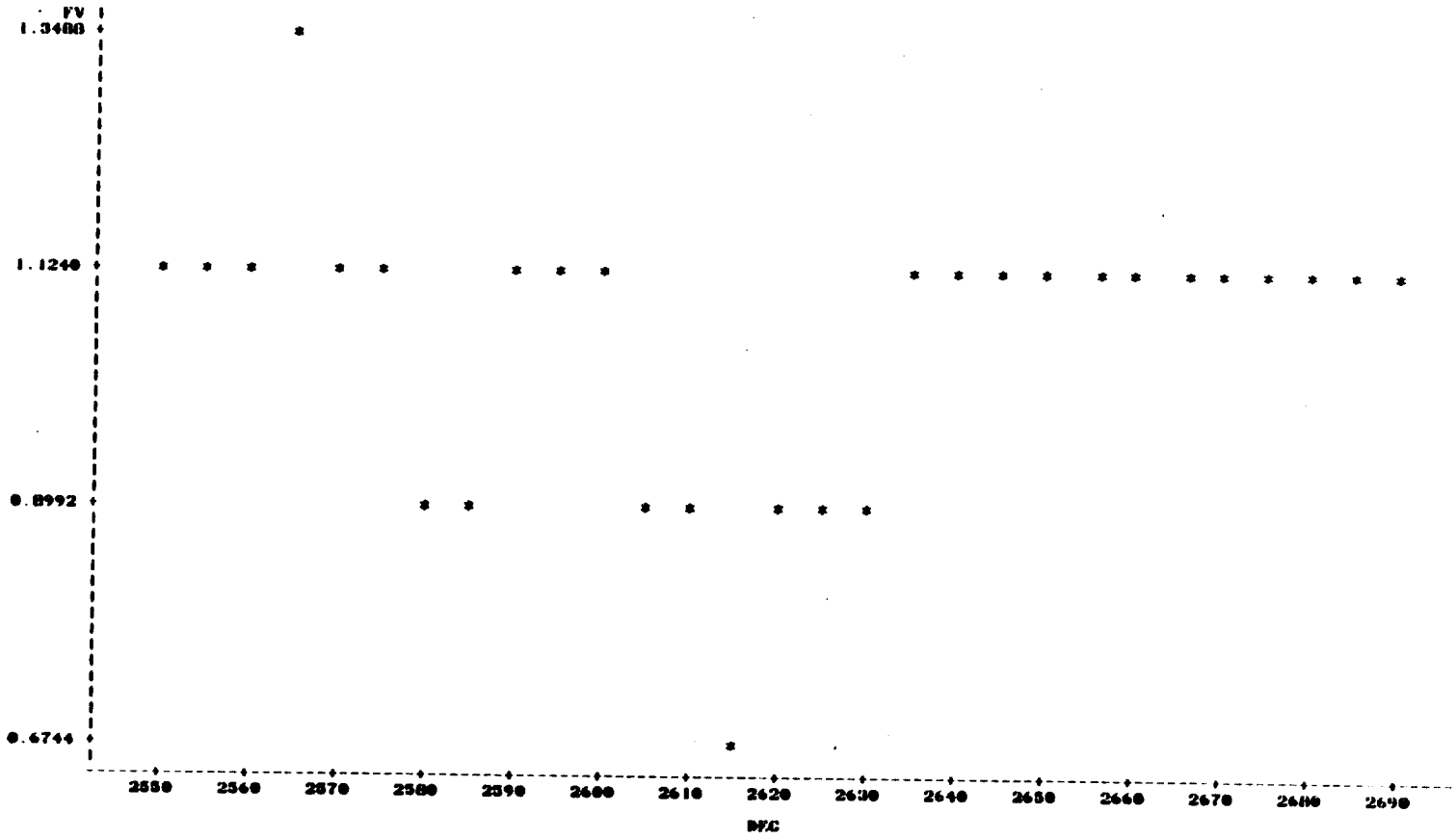

Figure F.4. Variation of Vertical Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

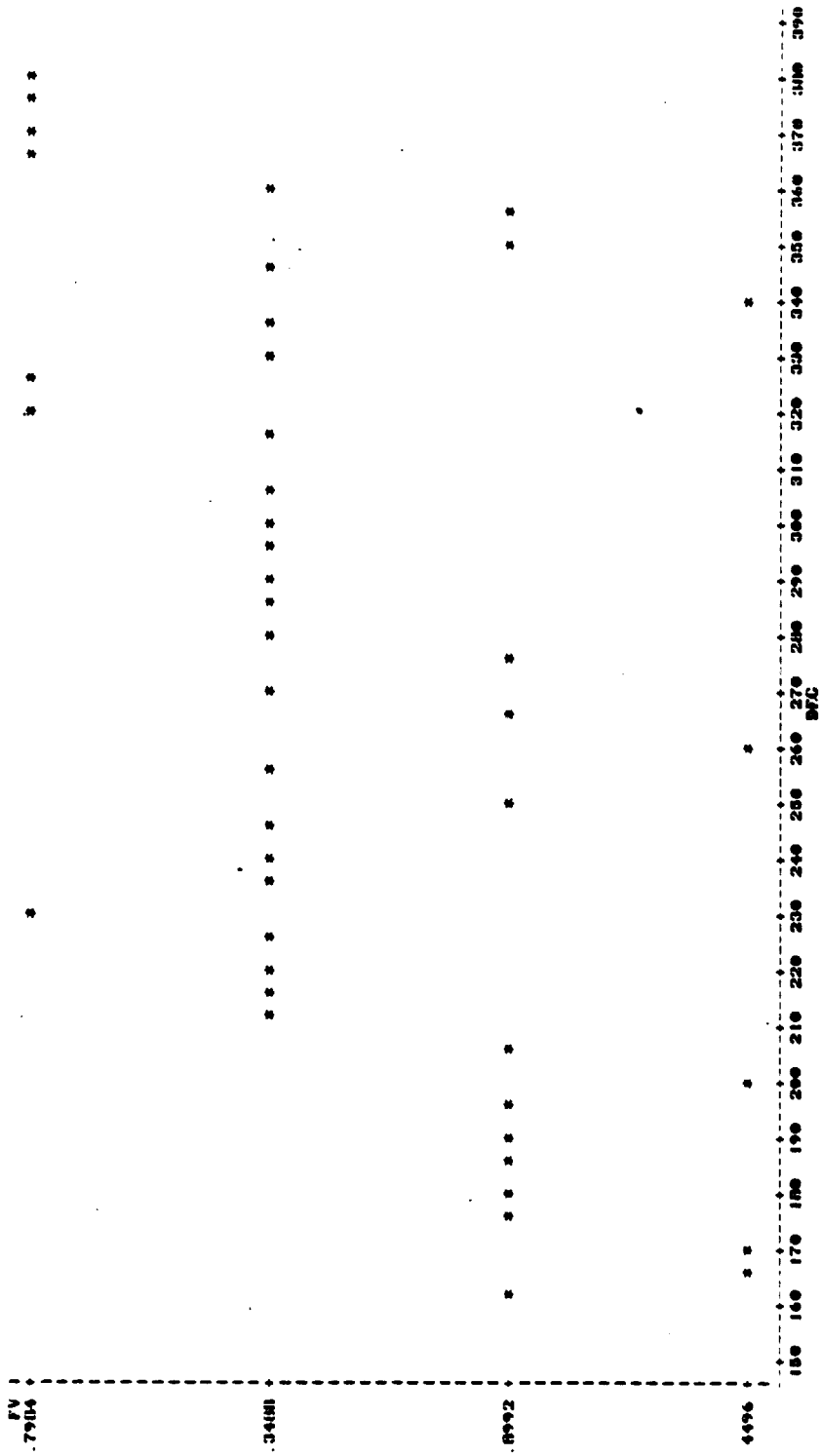

Figure F.5. Variation of Vertical Force With Orientation for Aluminum With 40° Tool, Test Al 03

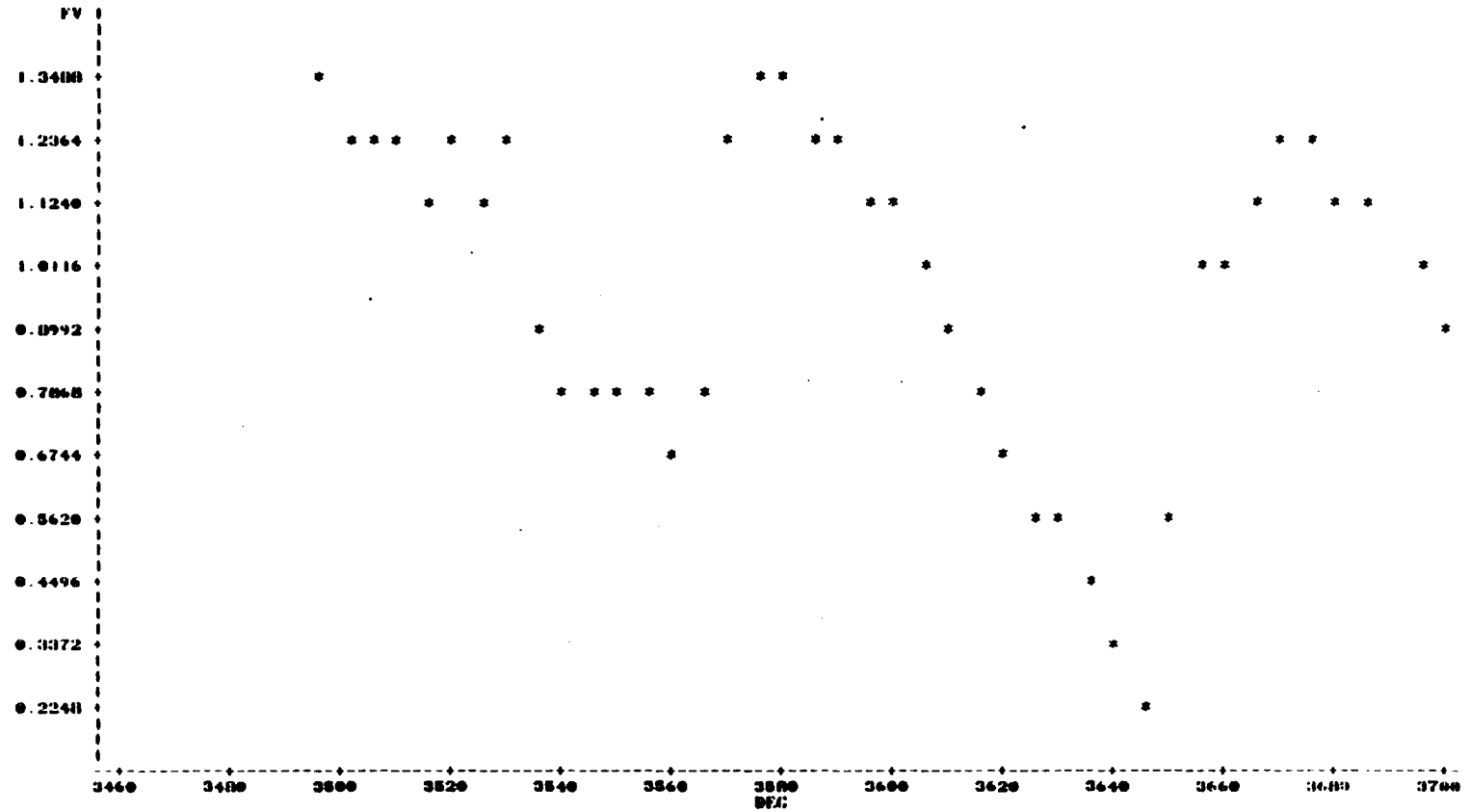

Figure F.6. Variation of Vertical Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

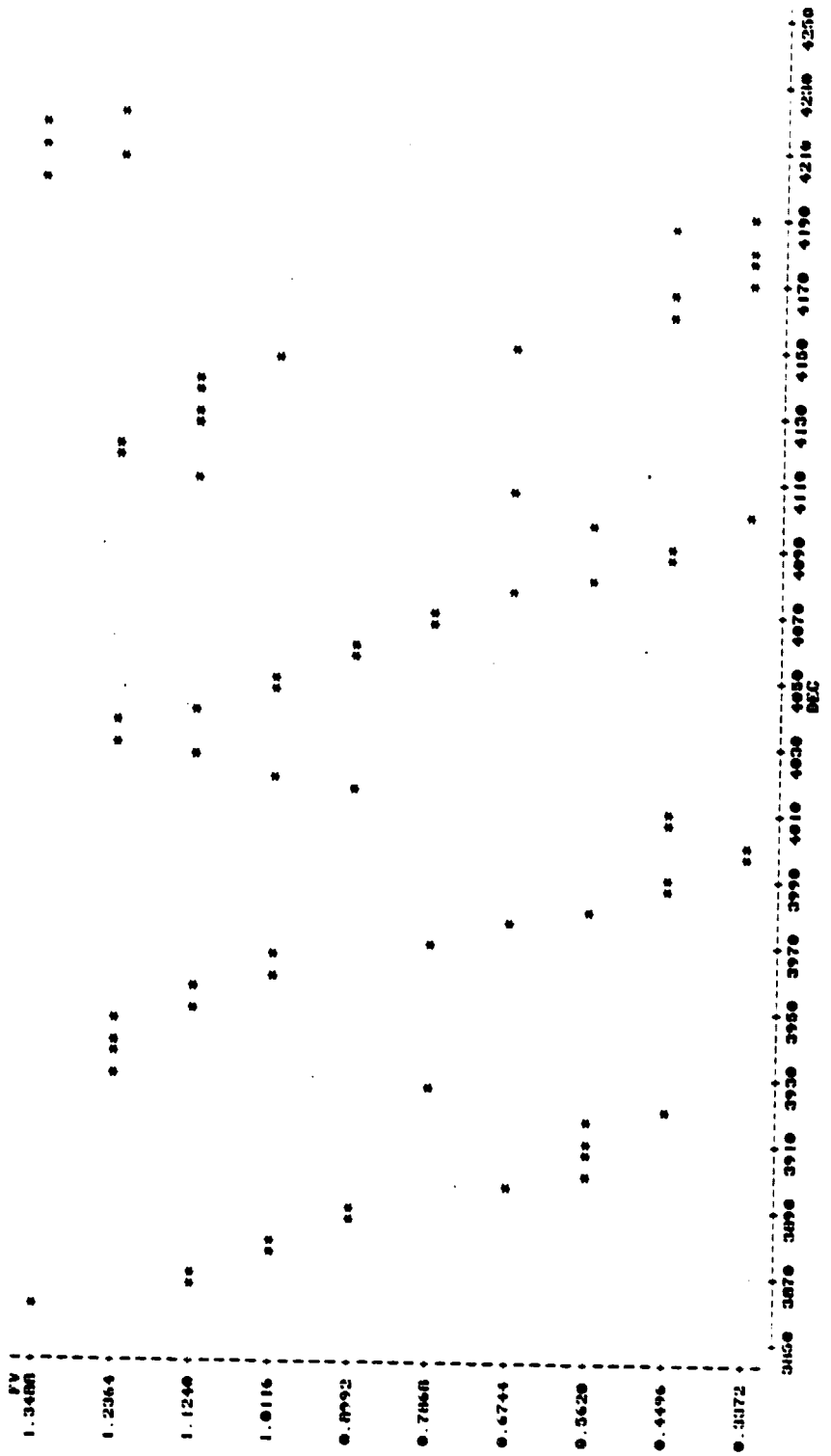

Figure F.7. Variation of Vertical Force With Orientation for Aluminum With 50° Tool, TEst Al 57, Revolution 2

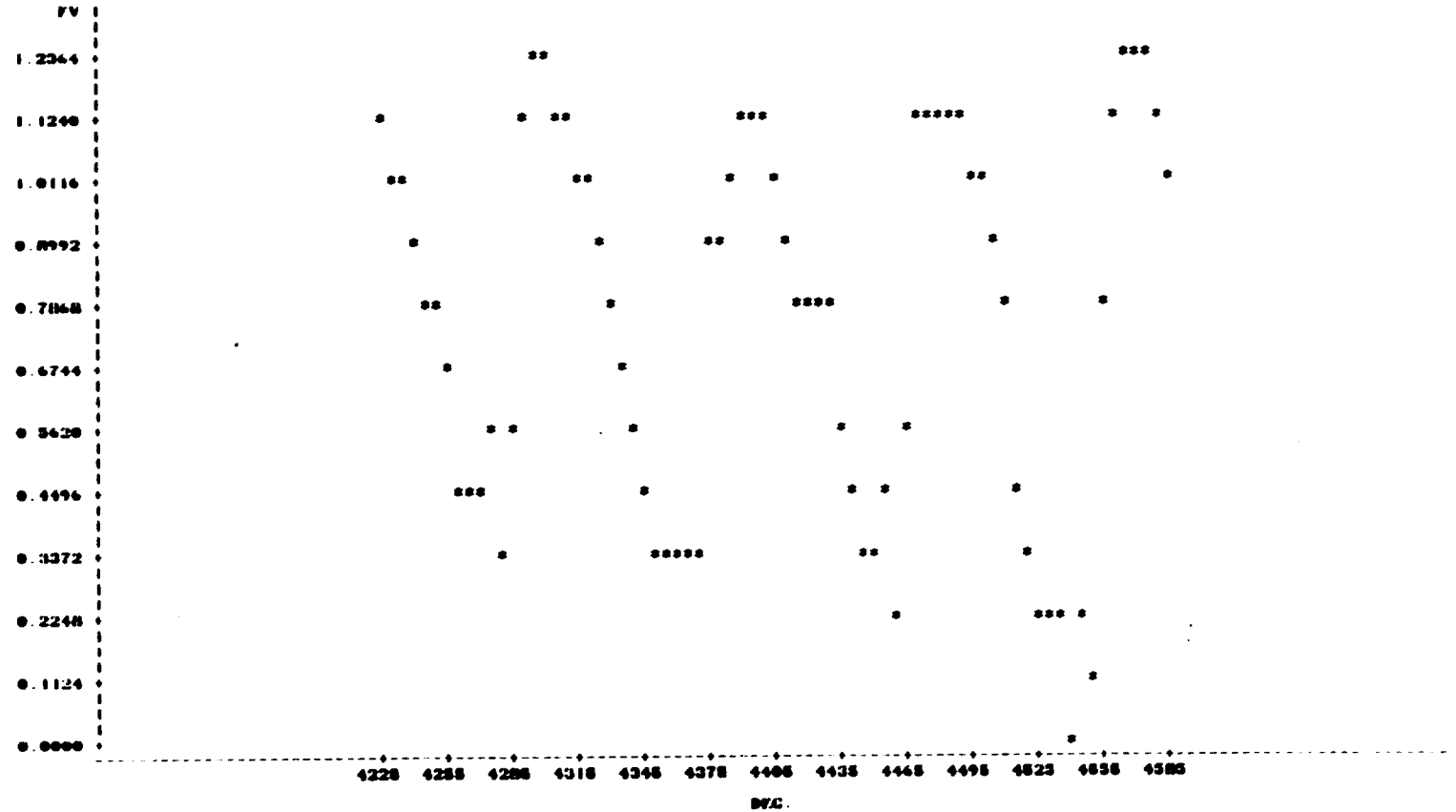

Figure F.8. Variation of Vertical Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

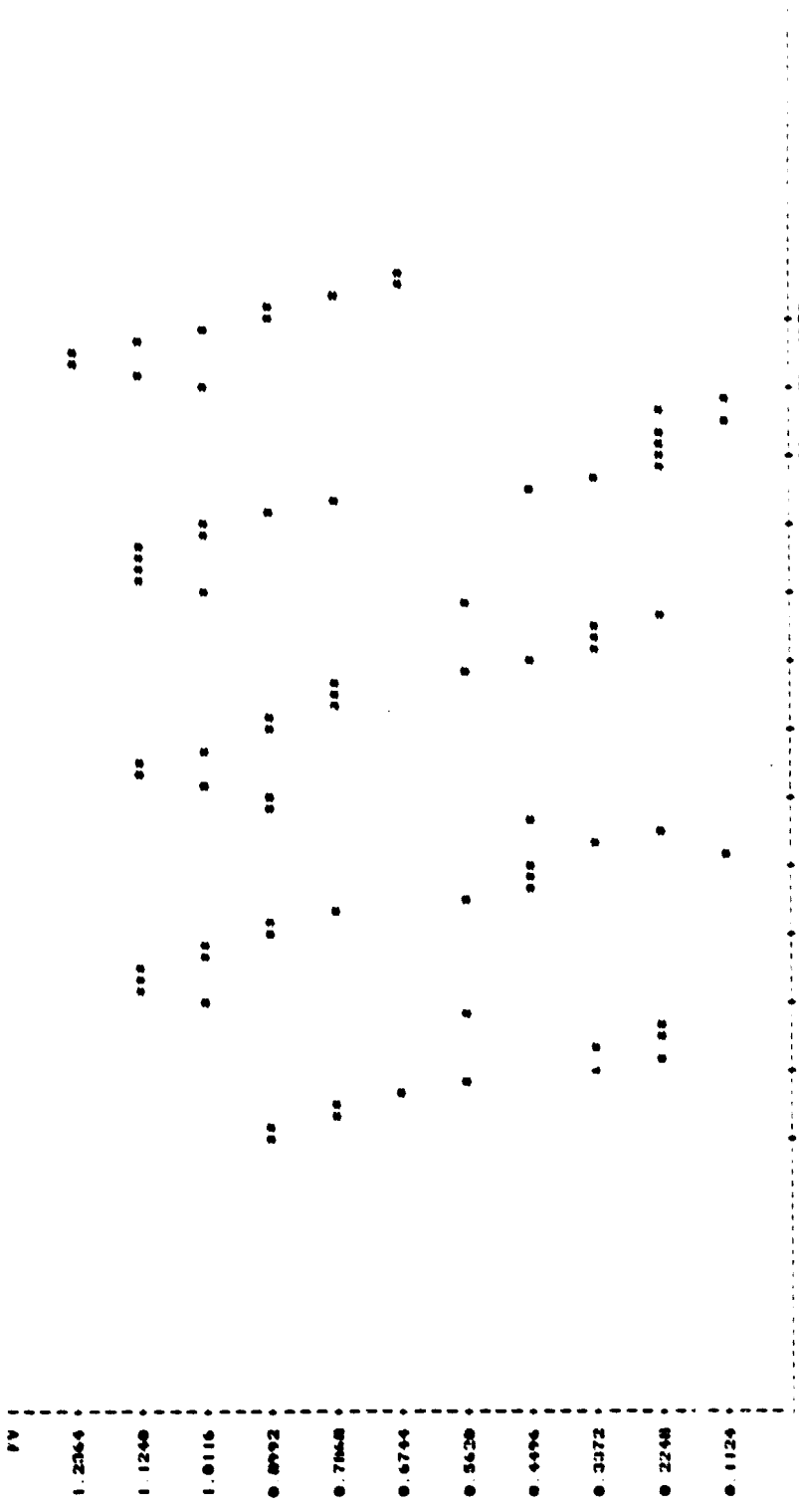

Figure F.9. Variation of Vertical Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

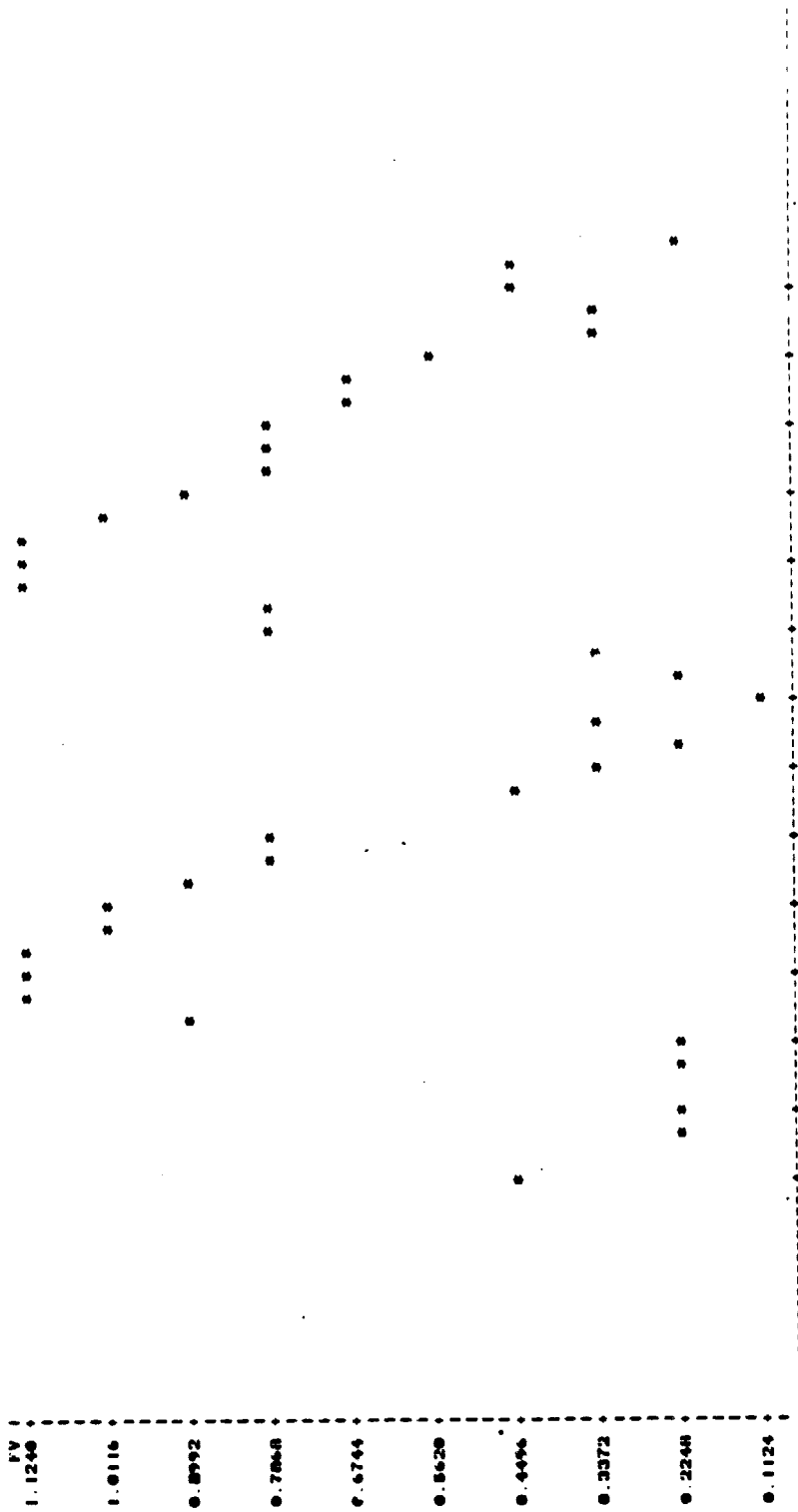

Figure F.10. Variation of Vertical Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

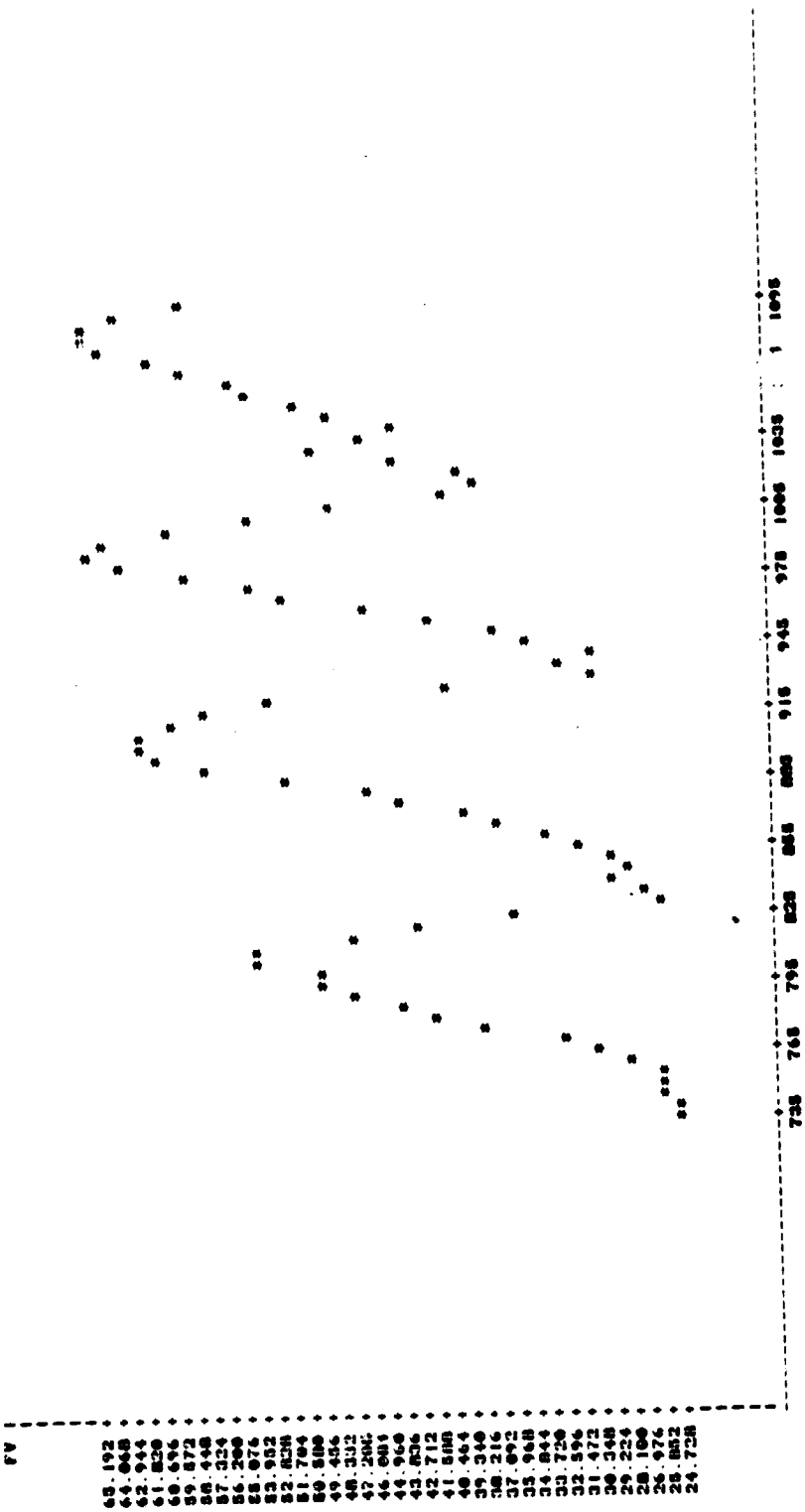

Figure F.11. Variation of Vertical Force With Orientation for Copper With 20° Tool, Test Cu 06

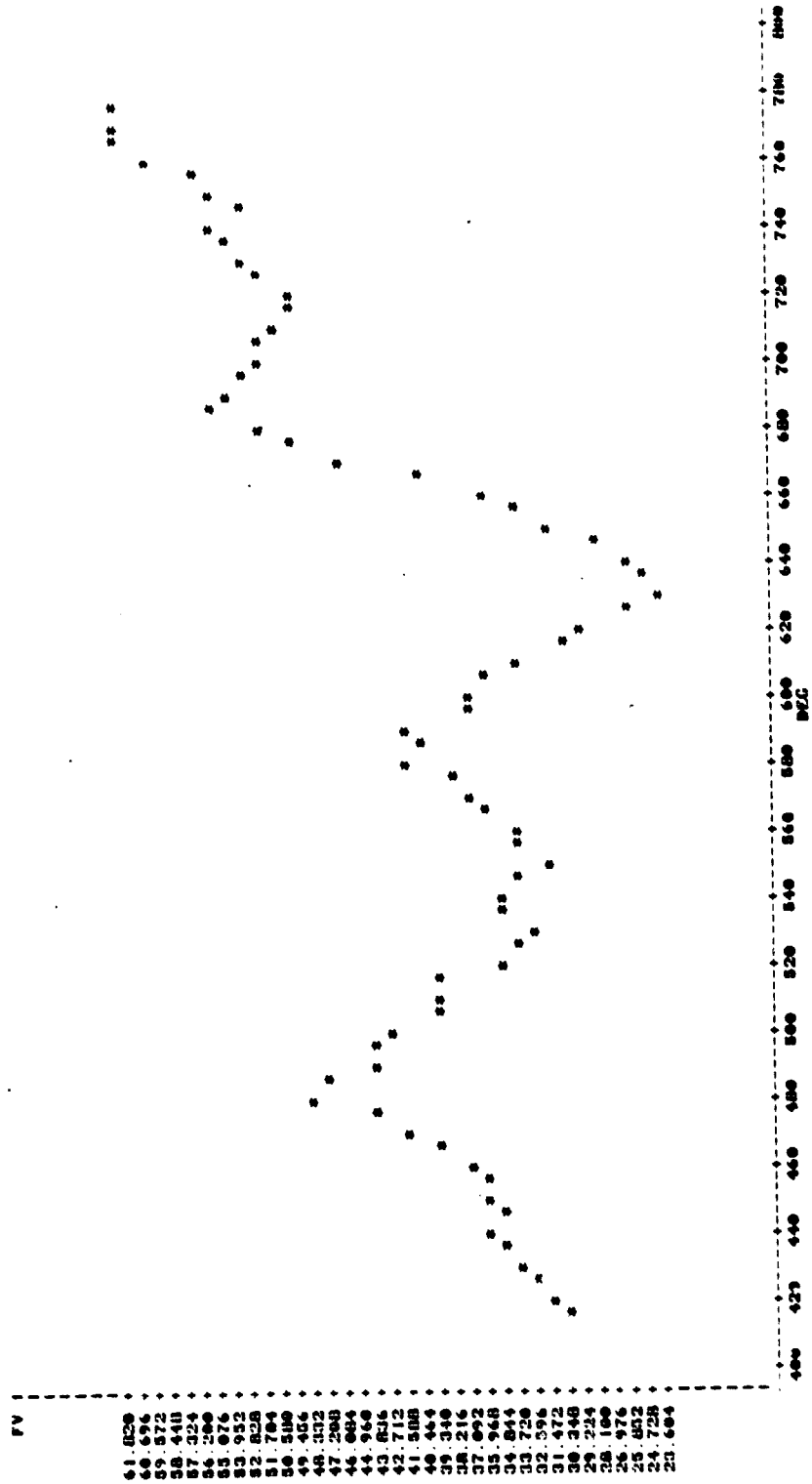

Figure F.12. Variation of Vertical Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

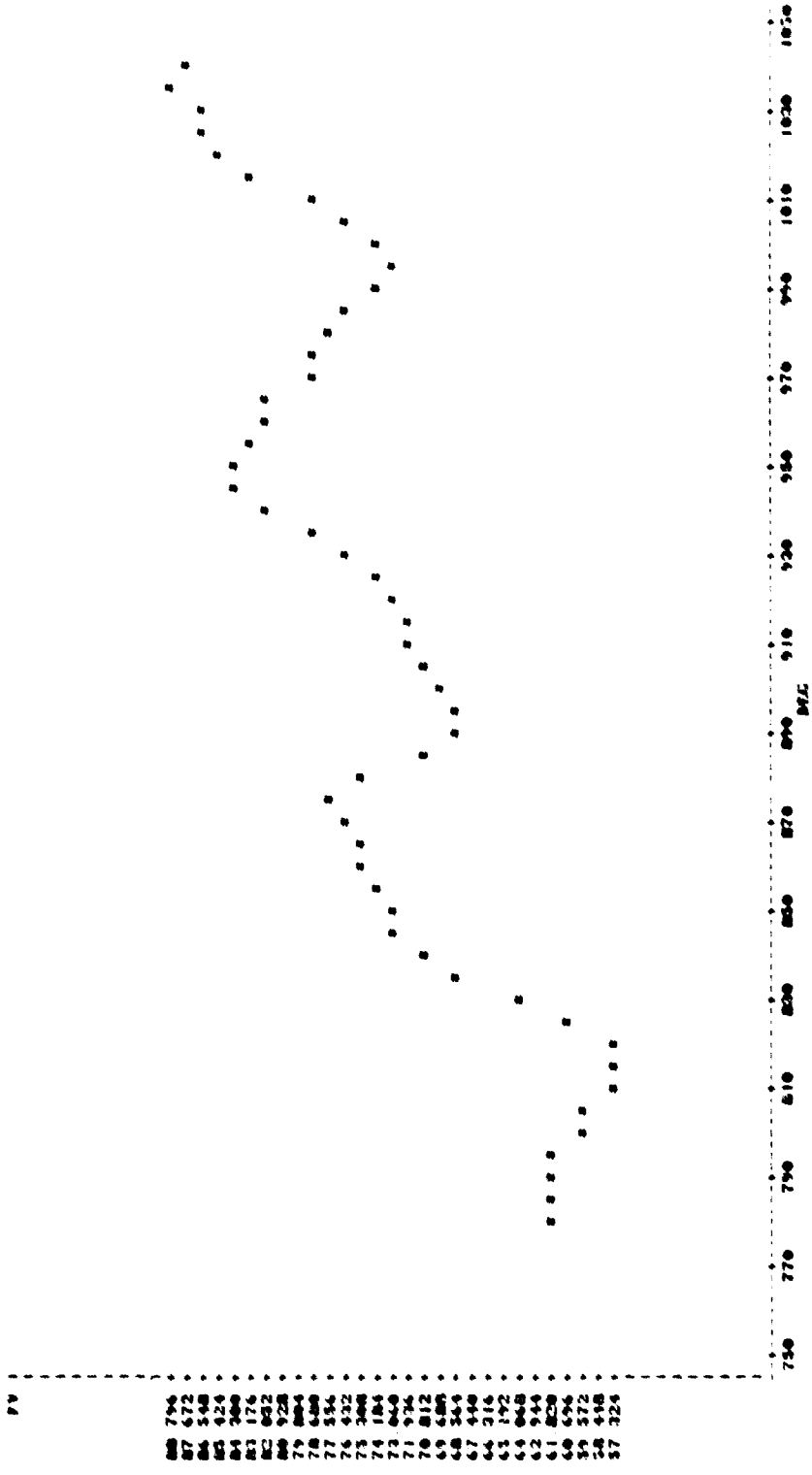

Figure F.13. Variation of Vertical Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

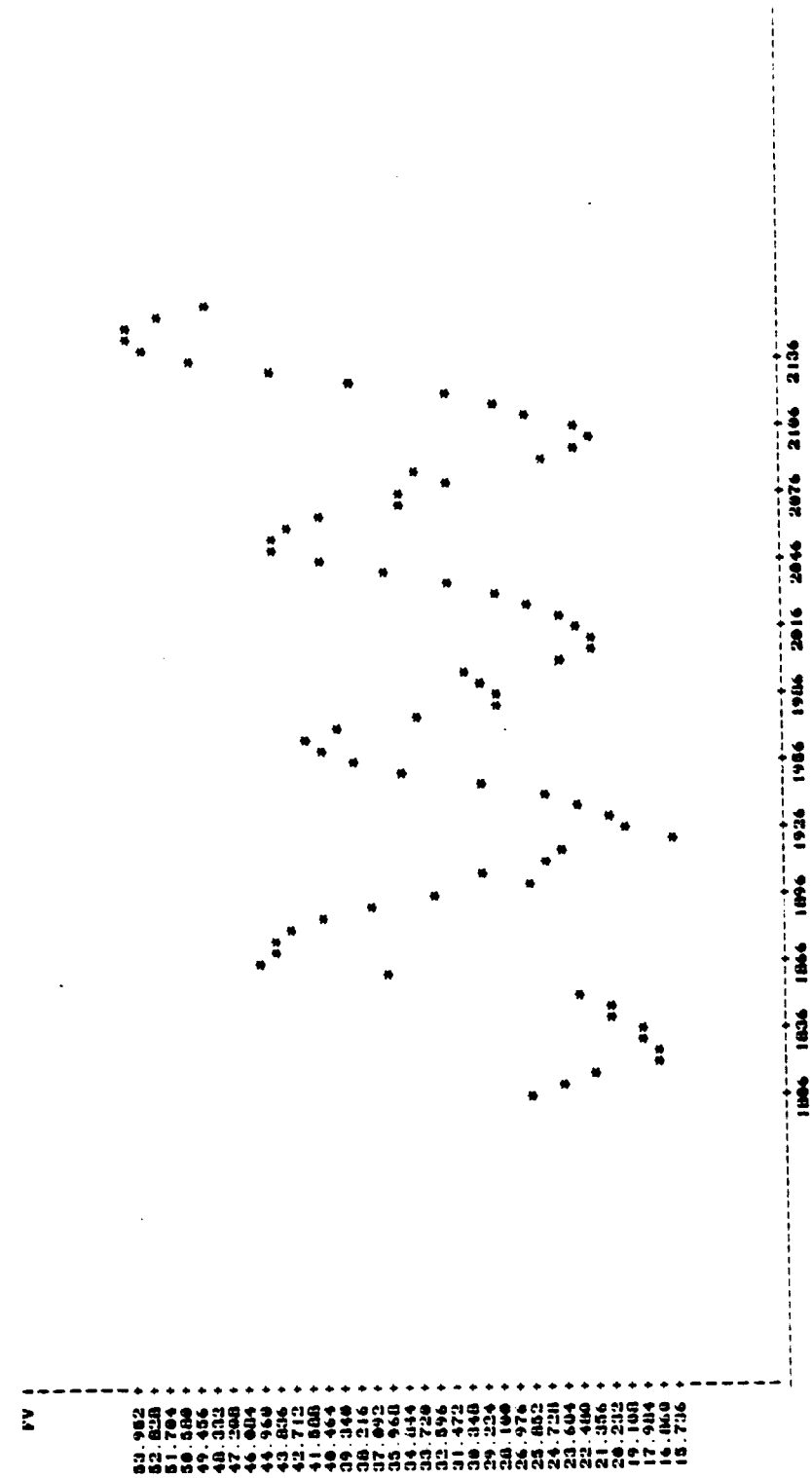

Figure F.14. Variation of Vertical Force With Orientation for Copper With 20° Tool, Test Cu 01

APPENDIX G

Variation of Shear Angle

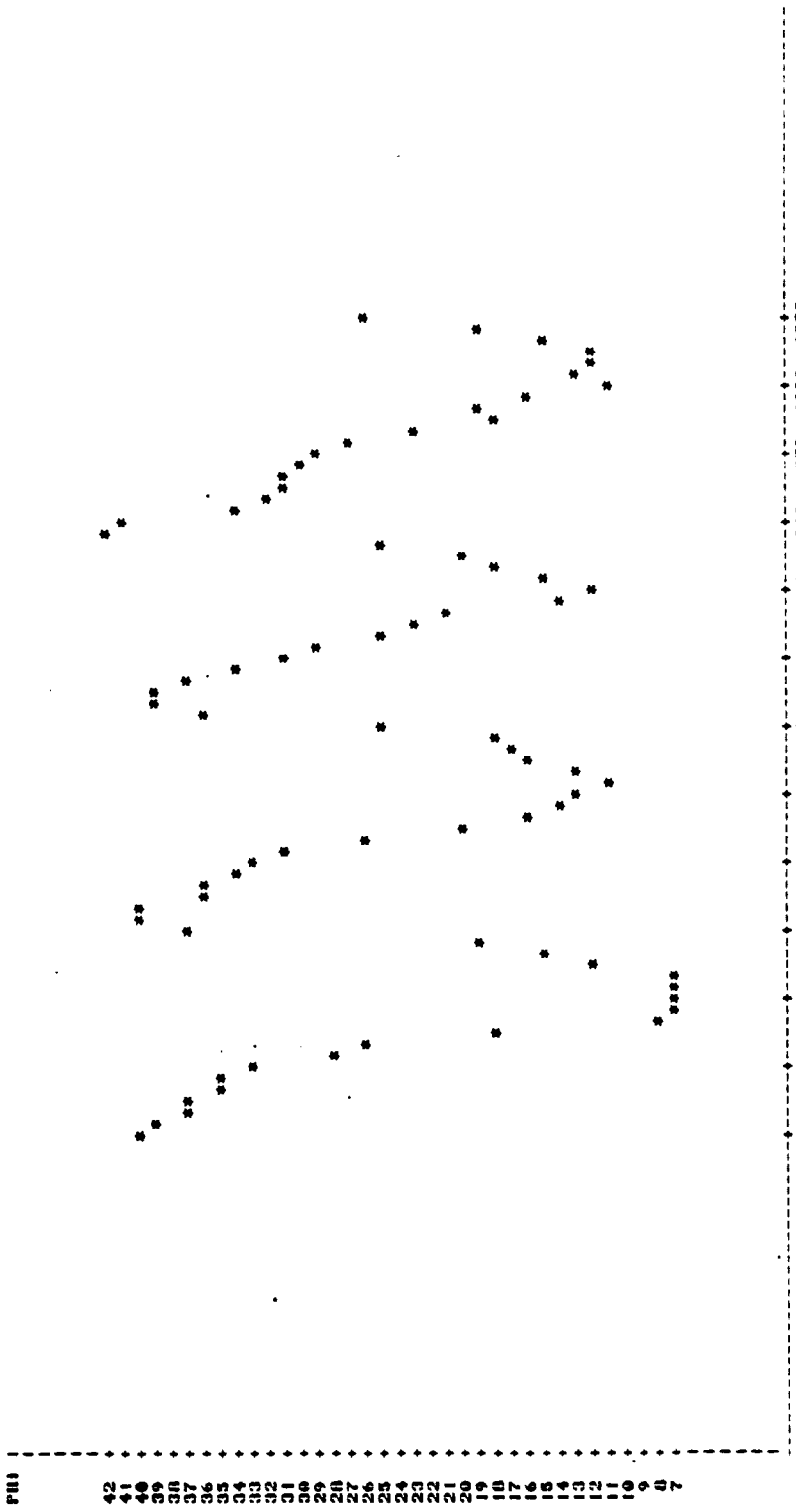

Figure G.1. Variation of Shear Angle With Orientation With 30° Tool for Aluminum, Test Al 63, Revolution 1

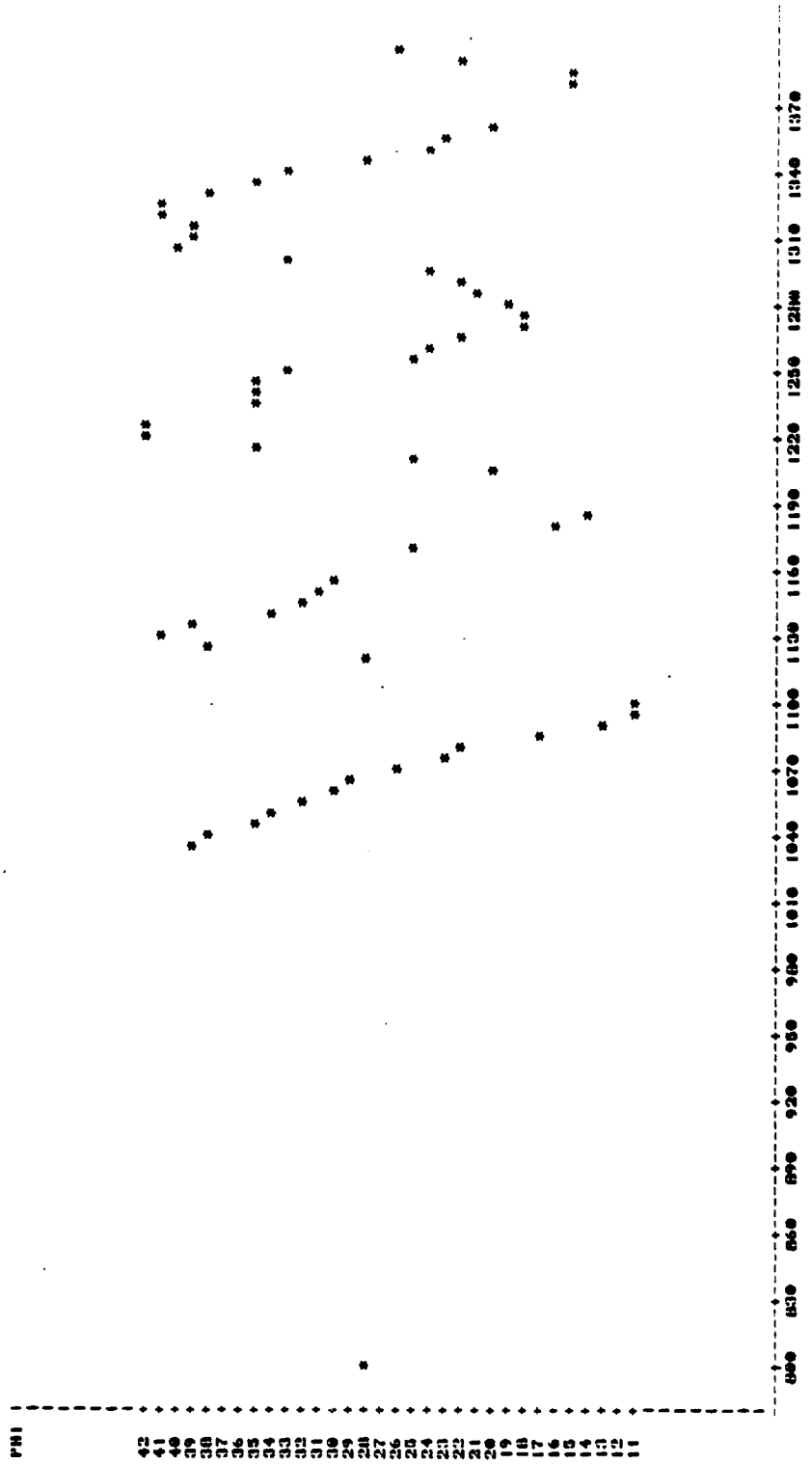

Figure G.2. Variation of Shear Angle With Orientation With 30° Tool for Aluminum, Test Al 63, Revolution 2

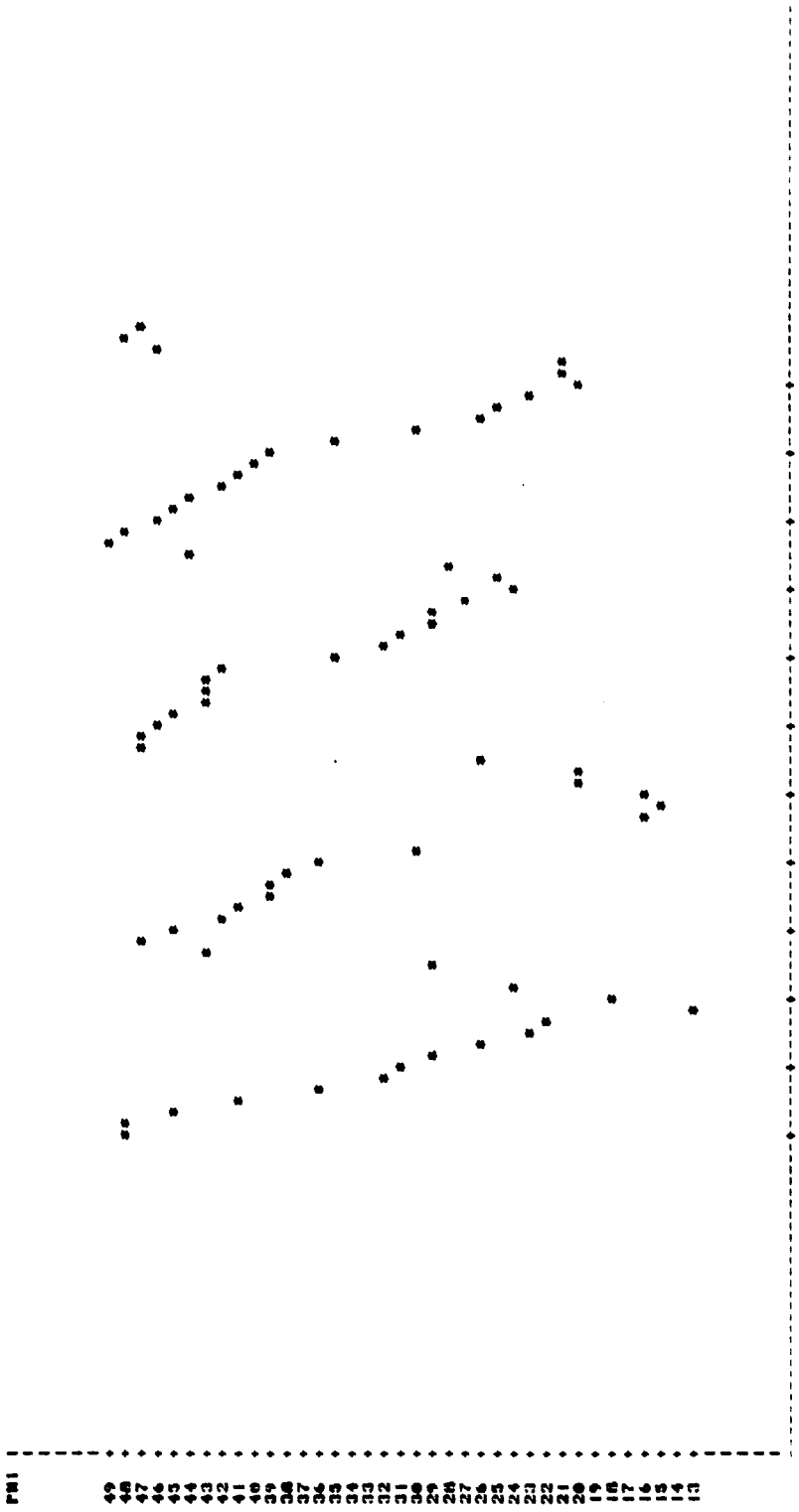

Figure G.3. Variation of Shear Angle With Orientation With 40° Tool for Aluminum, Test Al 56, Revolution 2

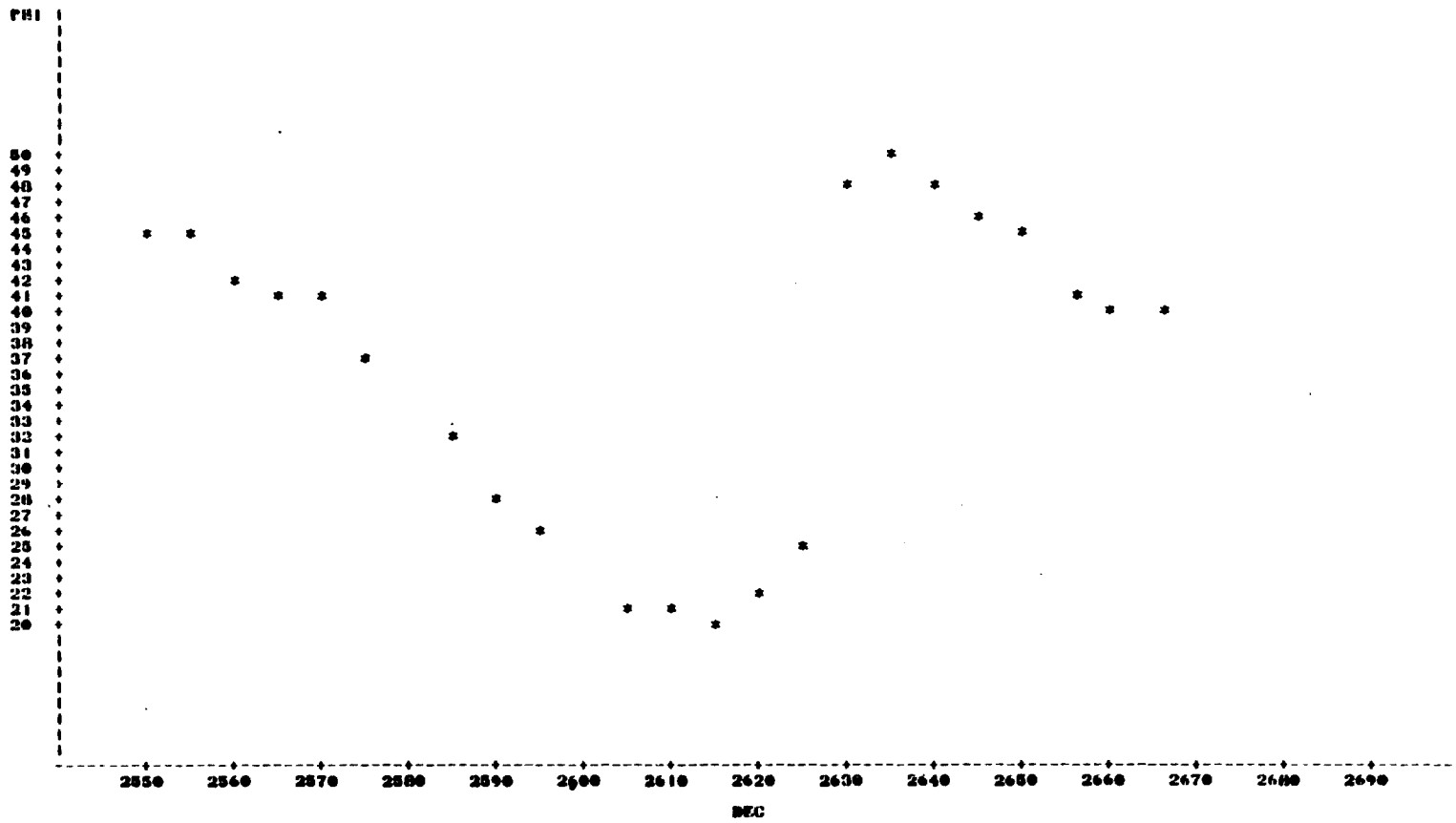

Figure G.4. Variation of Shear Angle With Orientation With 40° Tool for Aluminum, Test Al 56, Revolution 3

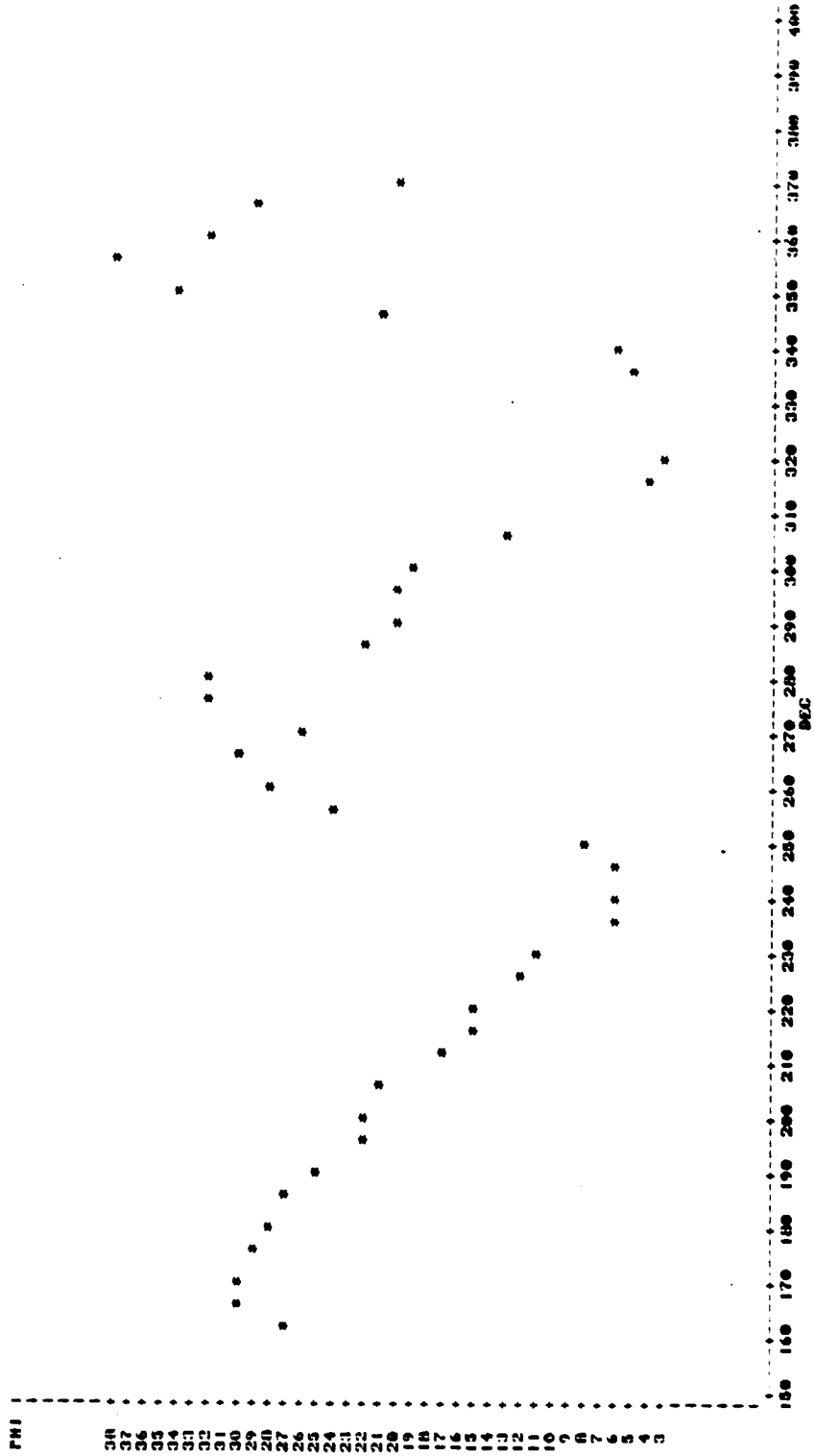

Figure G.5. Variation of Shear Angle With Orientation With 40° Tool for Aluminum, Test Al 03

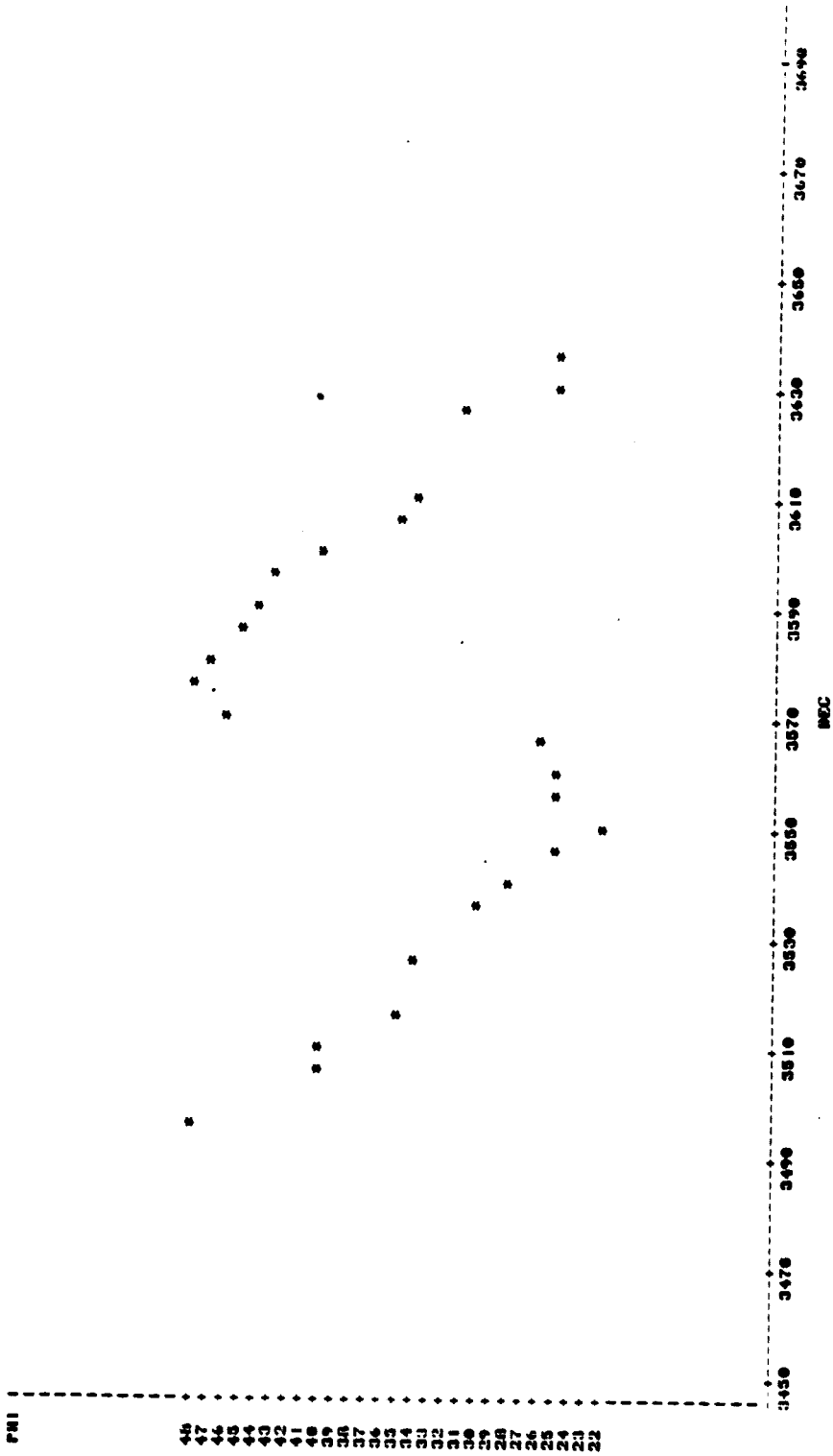

Figure G.6. Variation of Shear Angle With Orientation With 50° Tool for Aluminum, Test Al 57, Revolution 1

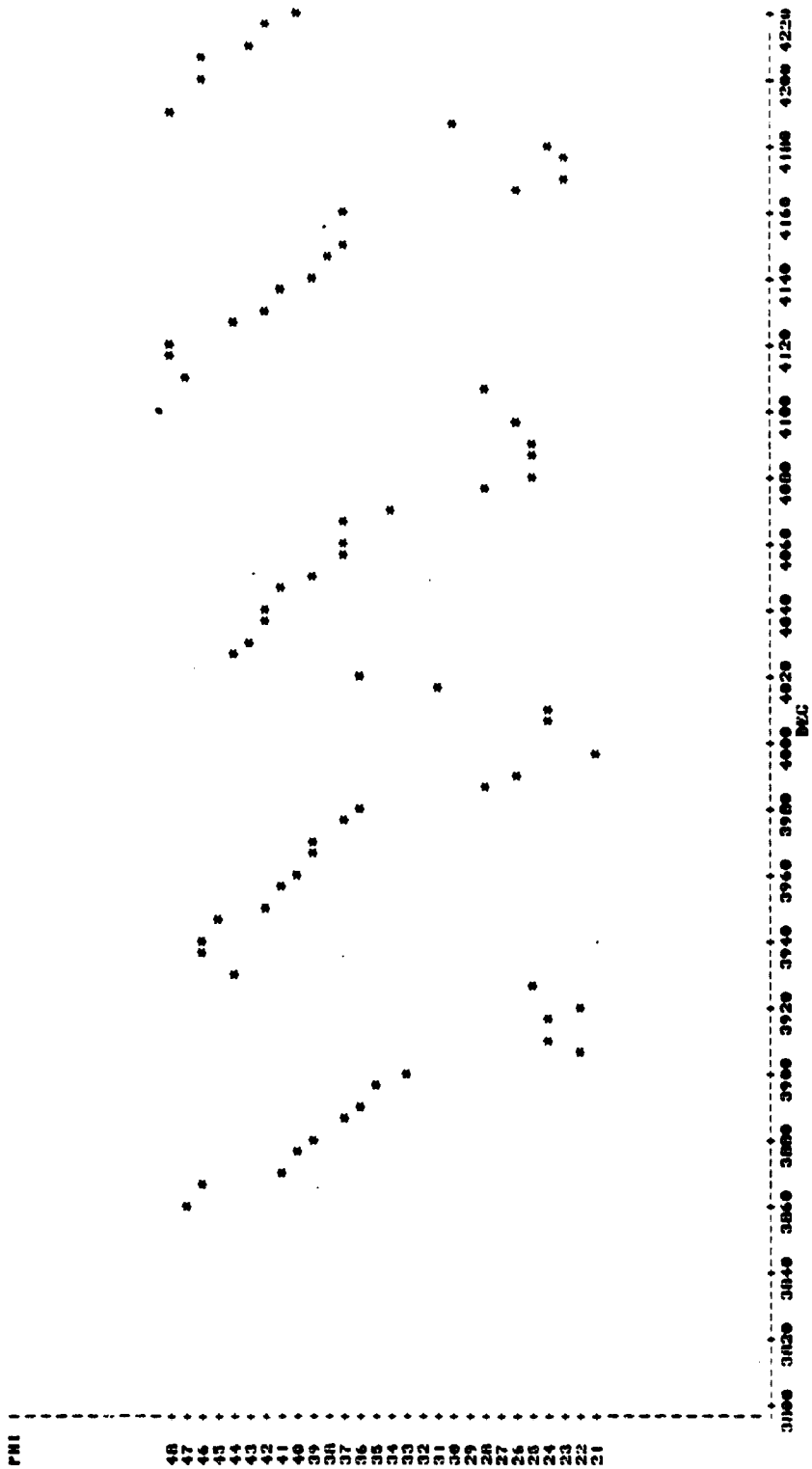

Figure G.7. Variation of Shear Angle With Orientation With 50° Tool for Aluminum, Test Al 57, Revolution 2

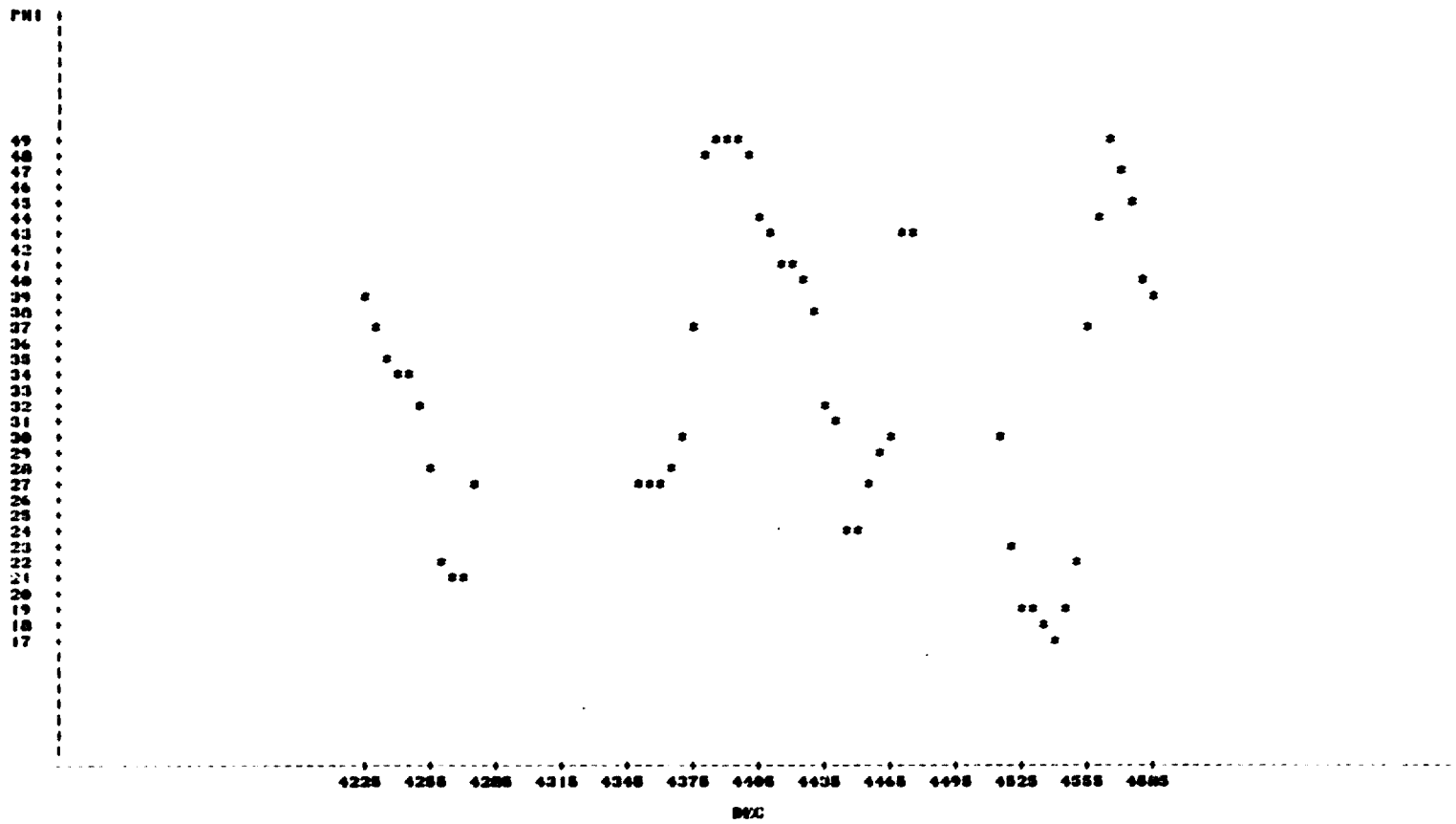

Figure G.8. Variation of Shear Angle With Orientation With 50° Tool for Aluminum, Test Al 57, Revolution 3

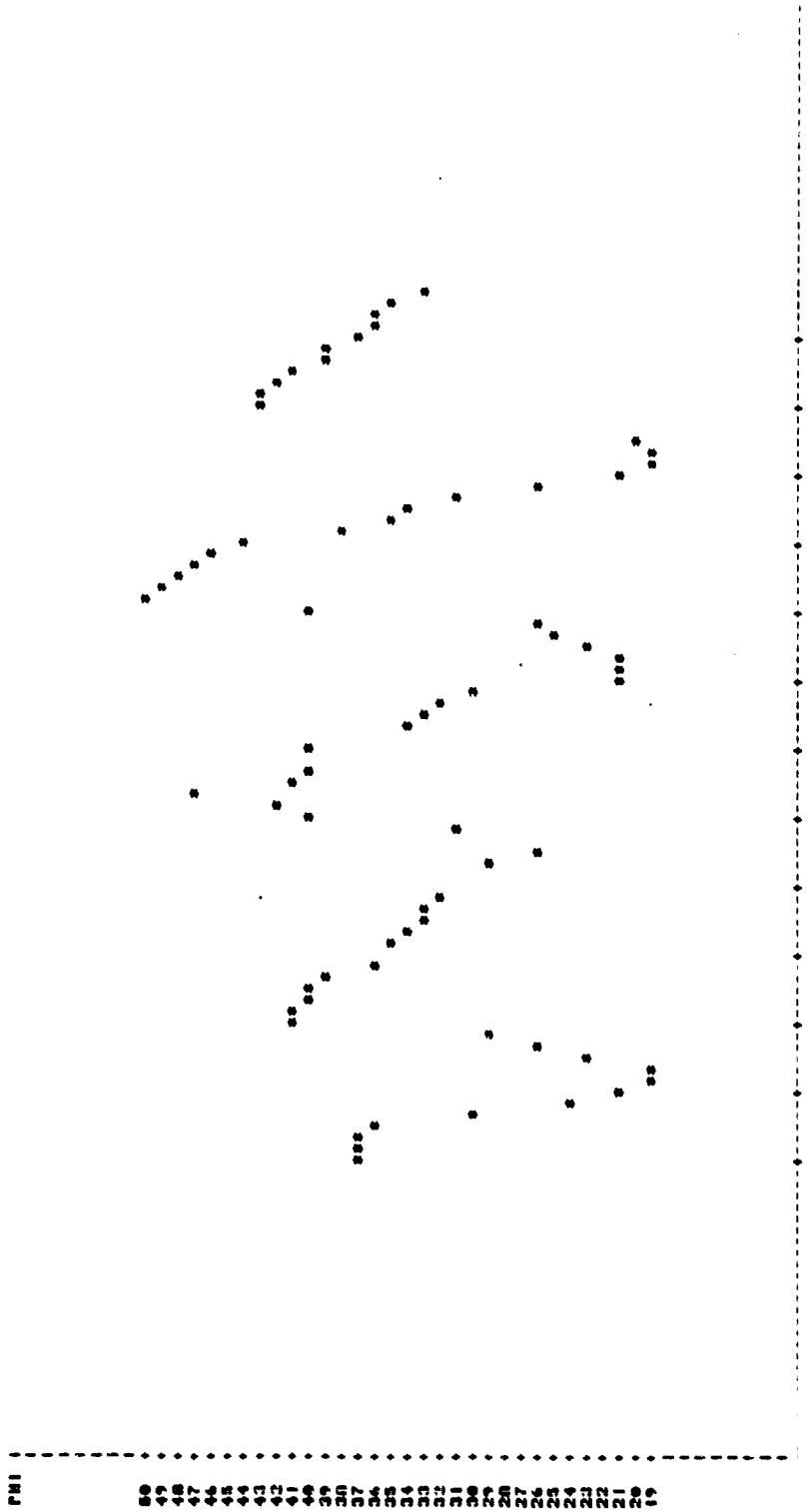

Figure G.9. Variation of Shear Angle With Orientation With 50° Tool for Aluminum, Test Al 57, Revolution 4

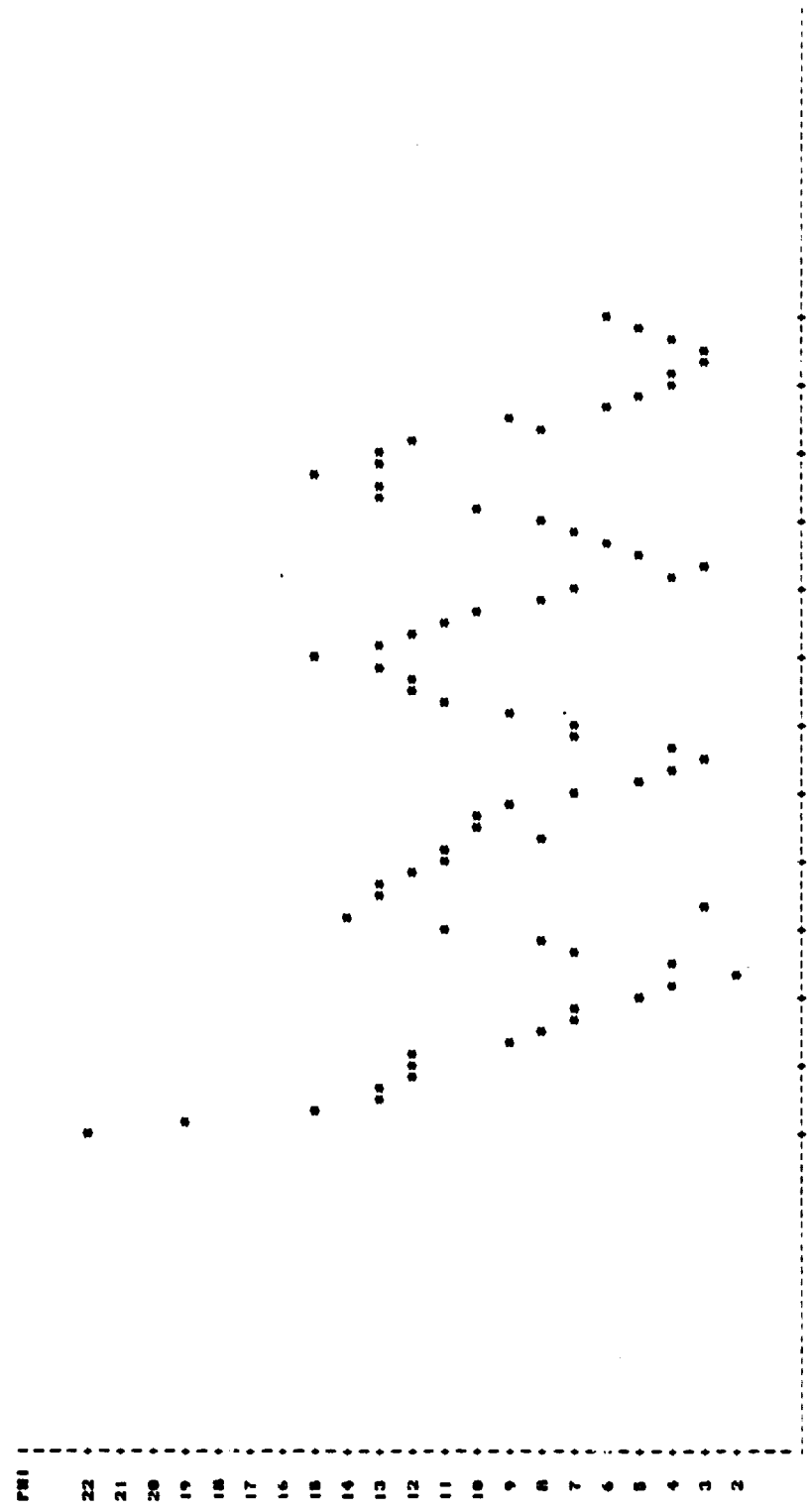

Figure G.10. Variation of Shear Angle With Orientation With 20° Tool for Copper, Test Cu 06

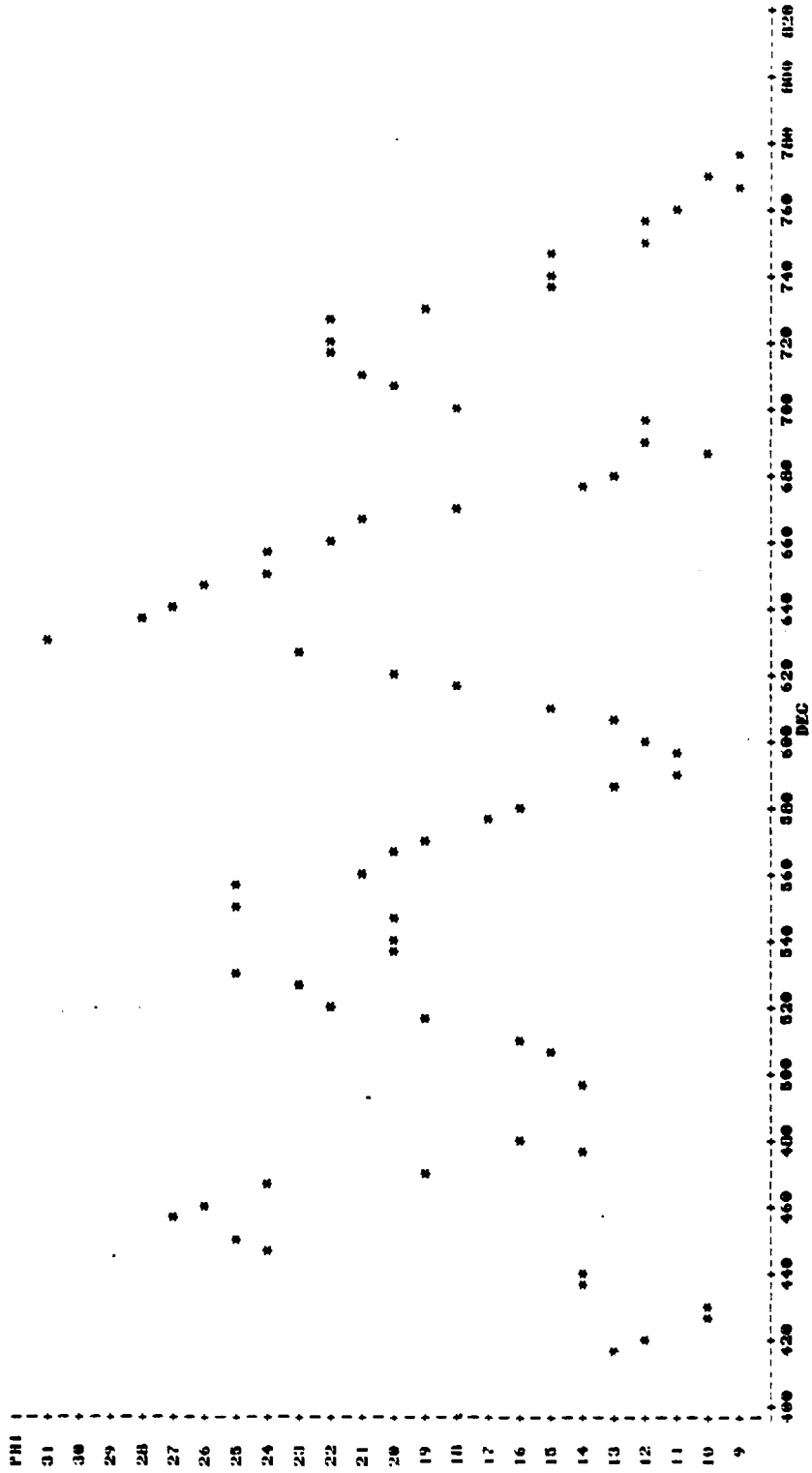

Figure G.11. Variation of Shear Angle With Orientation With 20° Tool for Copper, Test Cu 33, Revolution 1

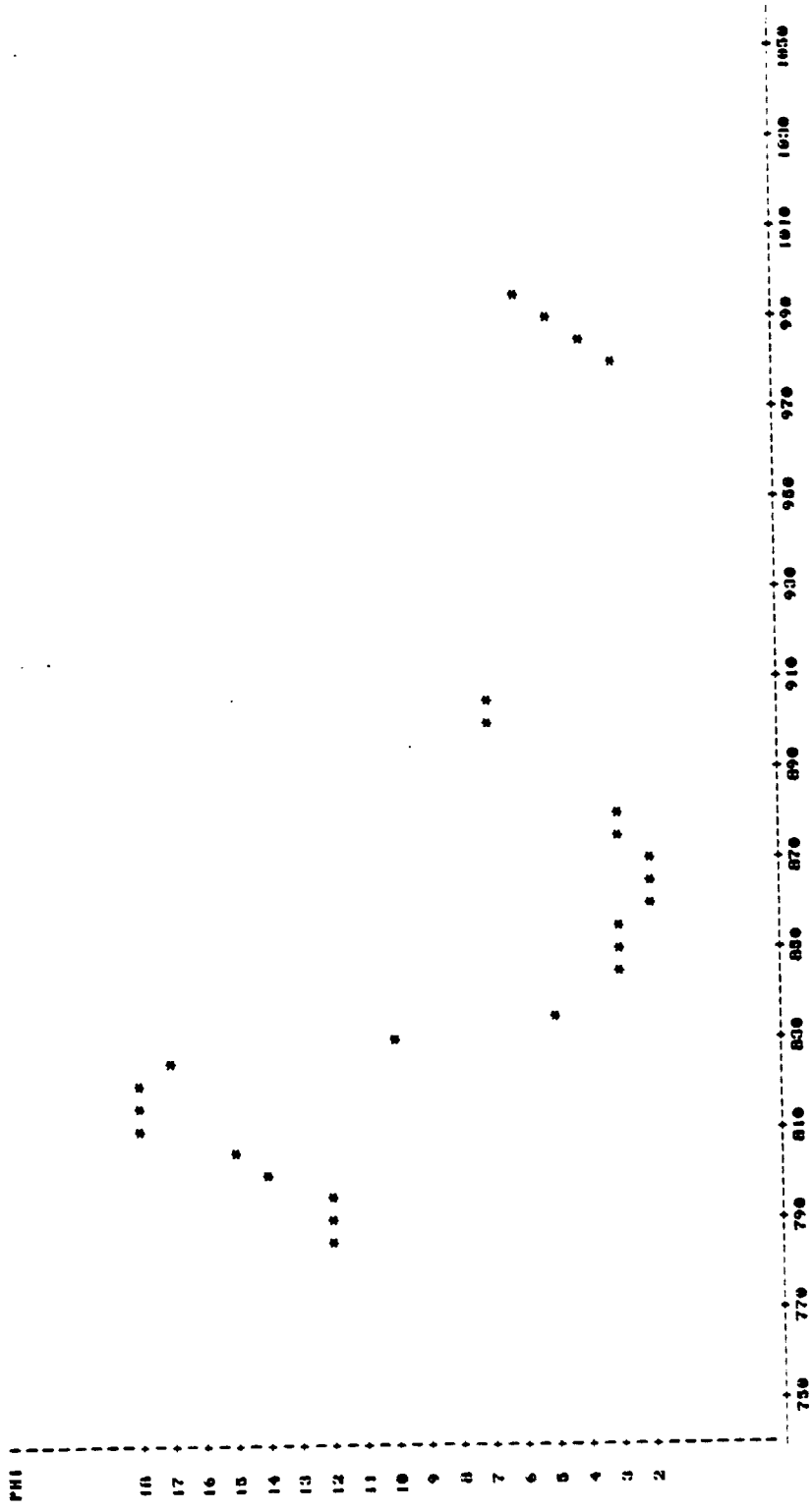

Figure G.12. Variation of Shear Angle With Orientation With 20° Tool for Copper, Test Cu 33, Revolution 2

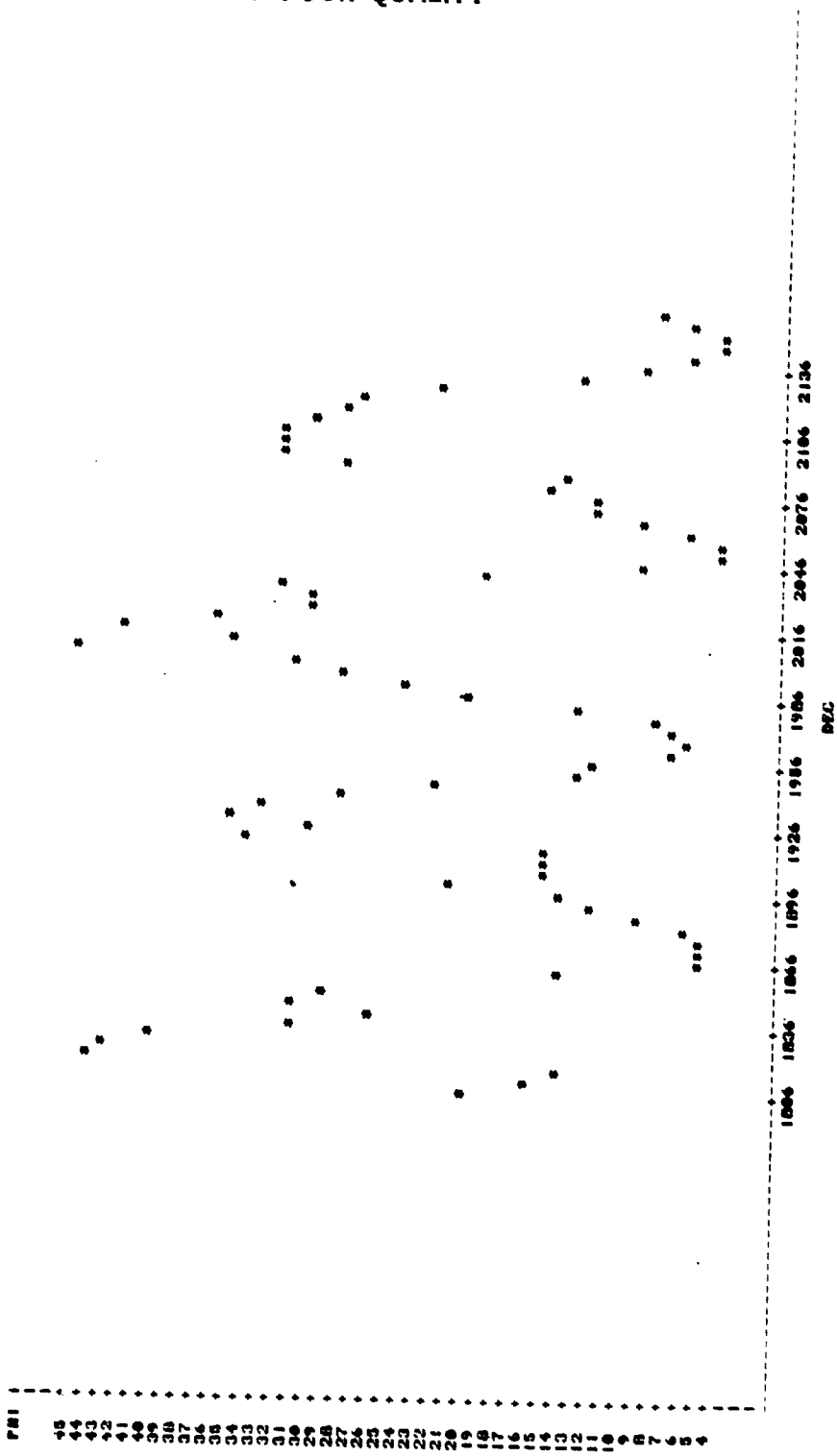

Figure G.13. Variation of Shear Angle With Orientation With 40° Tool for Copper, Test Cu 01

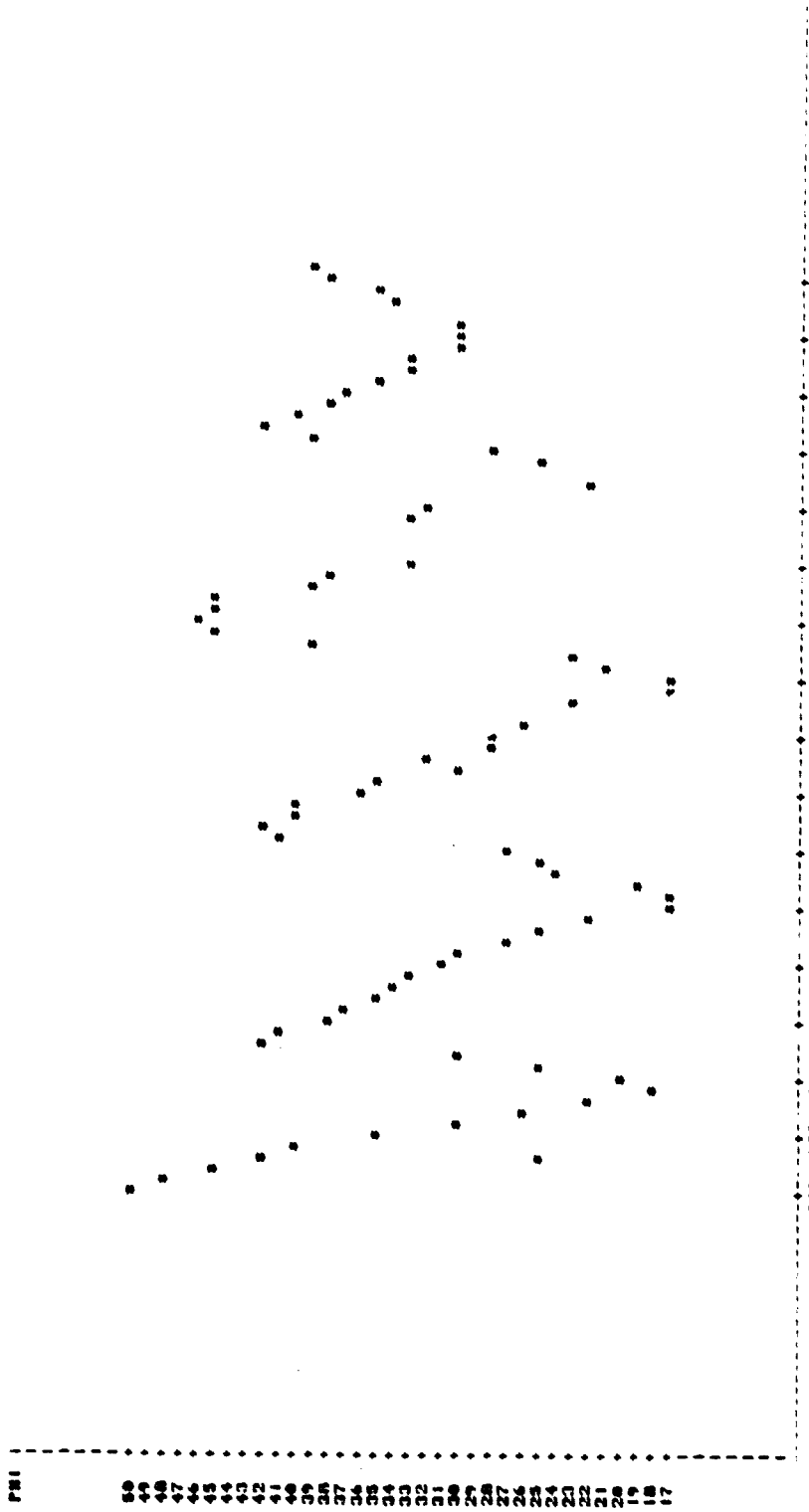

Figure G.14. Variation of Shear Angle With Orientation With 40° Tool for Copper, Test Cu 32

APPENDIX H

Variation of Shear Force

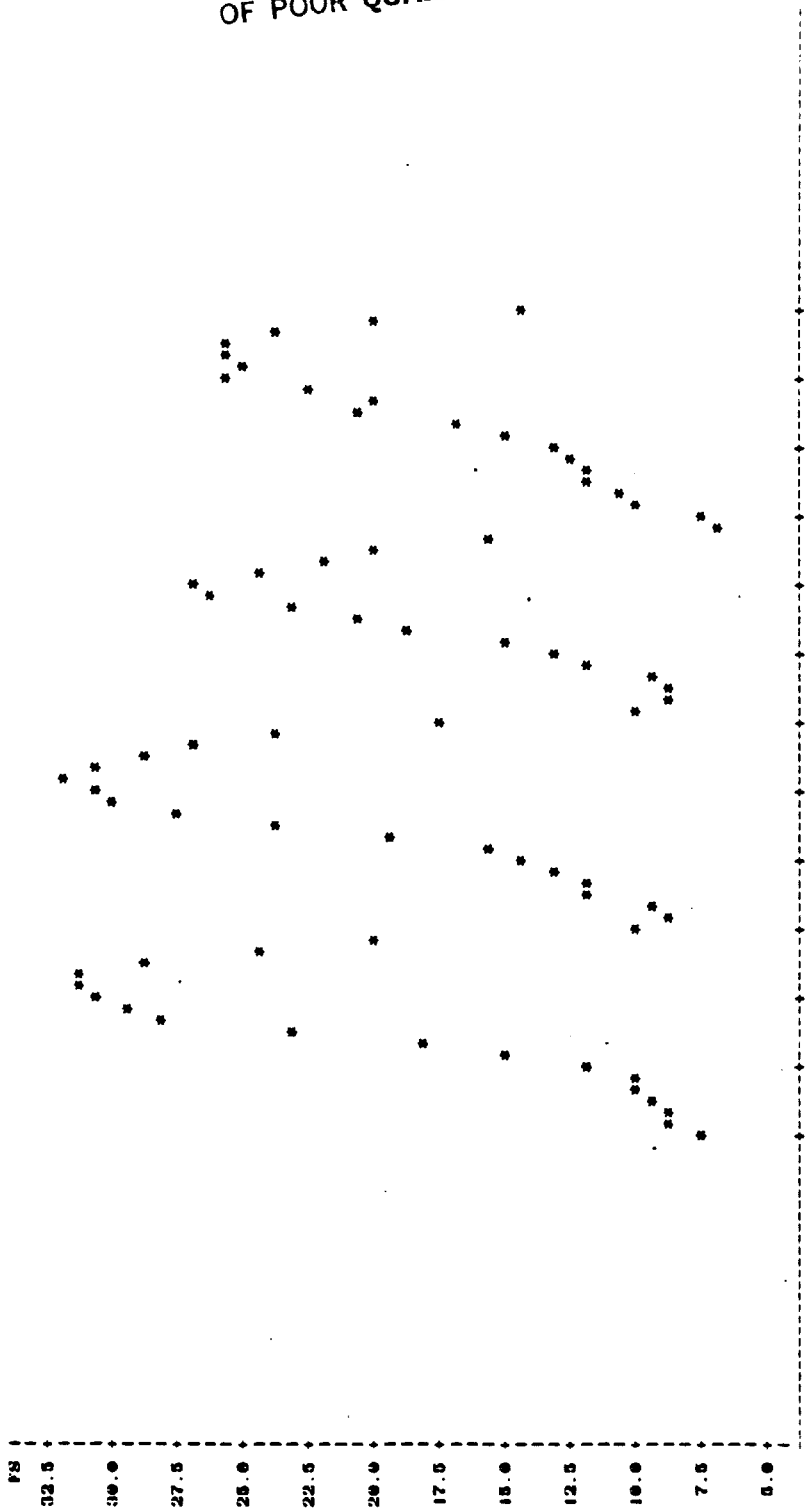

Figure H.1. Variation of Shear Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

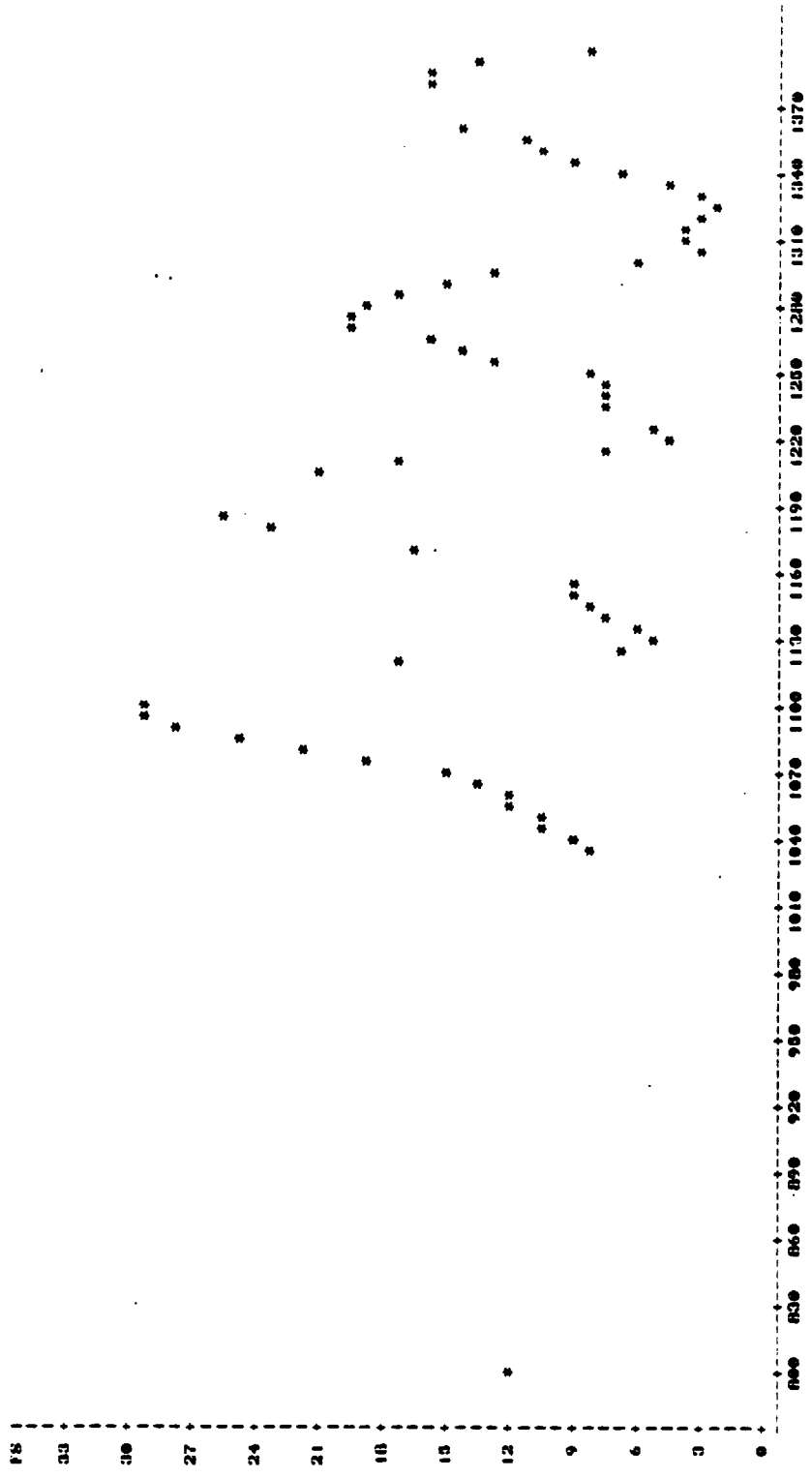

Figure H.2. Variation of Shear Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

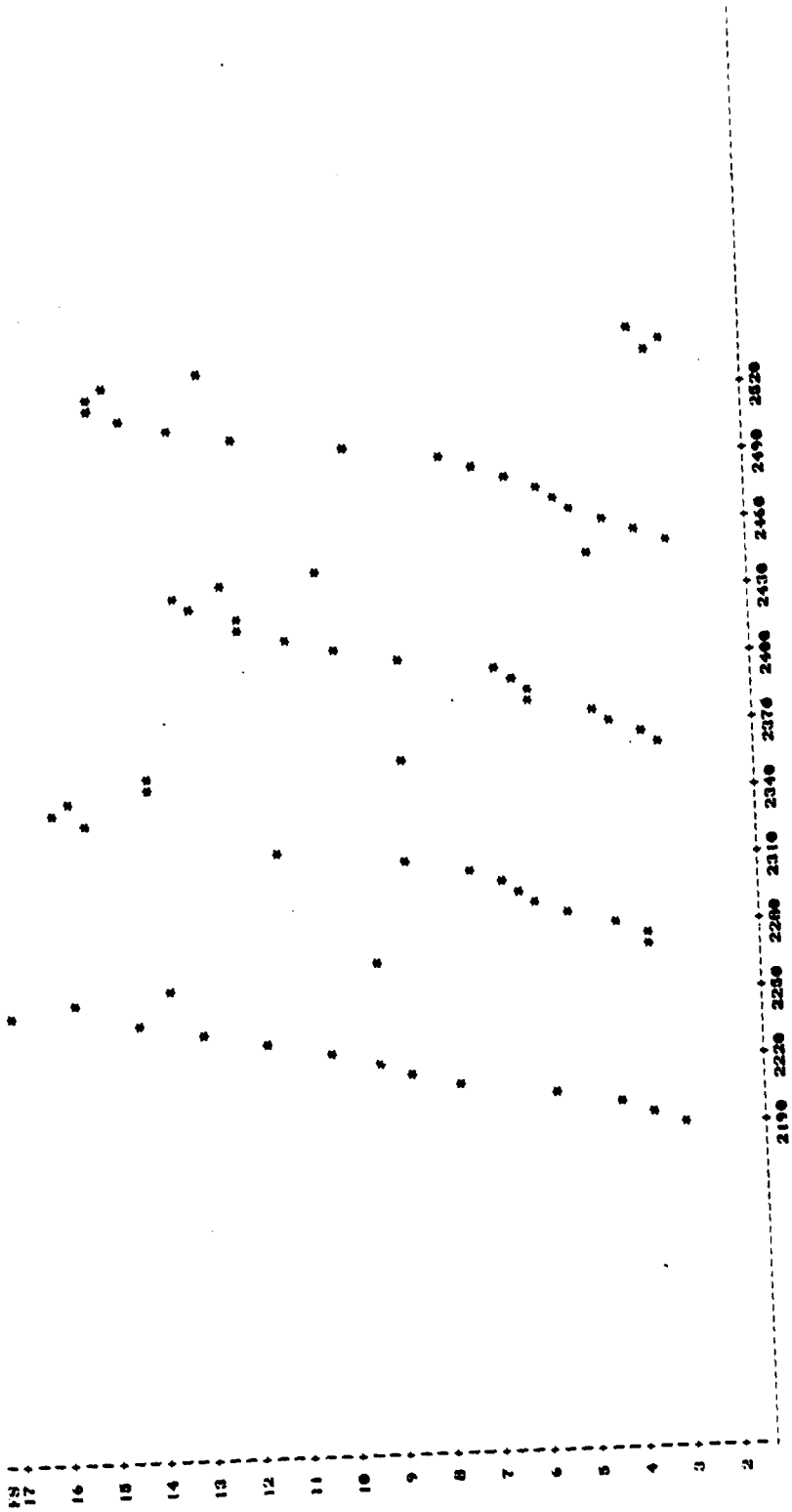

Figure H.3. Variation of Shear Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

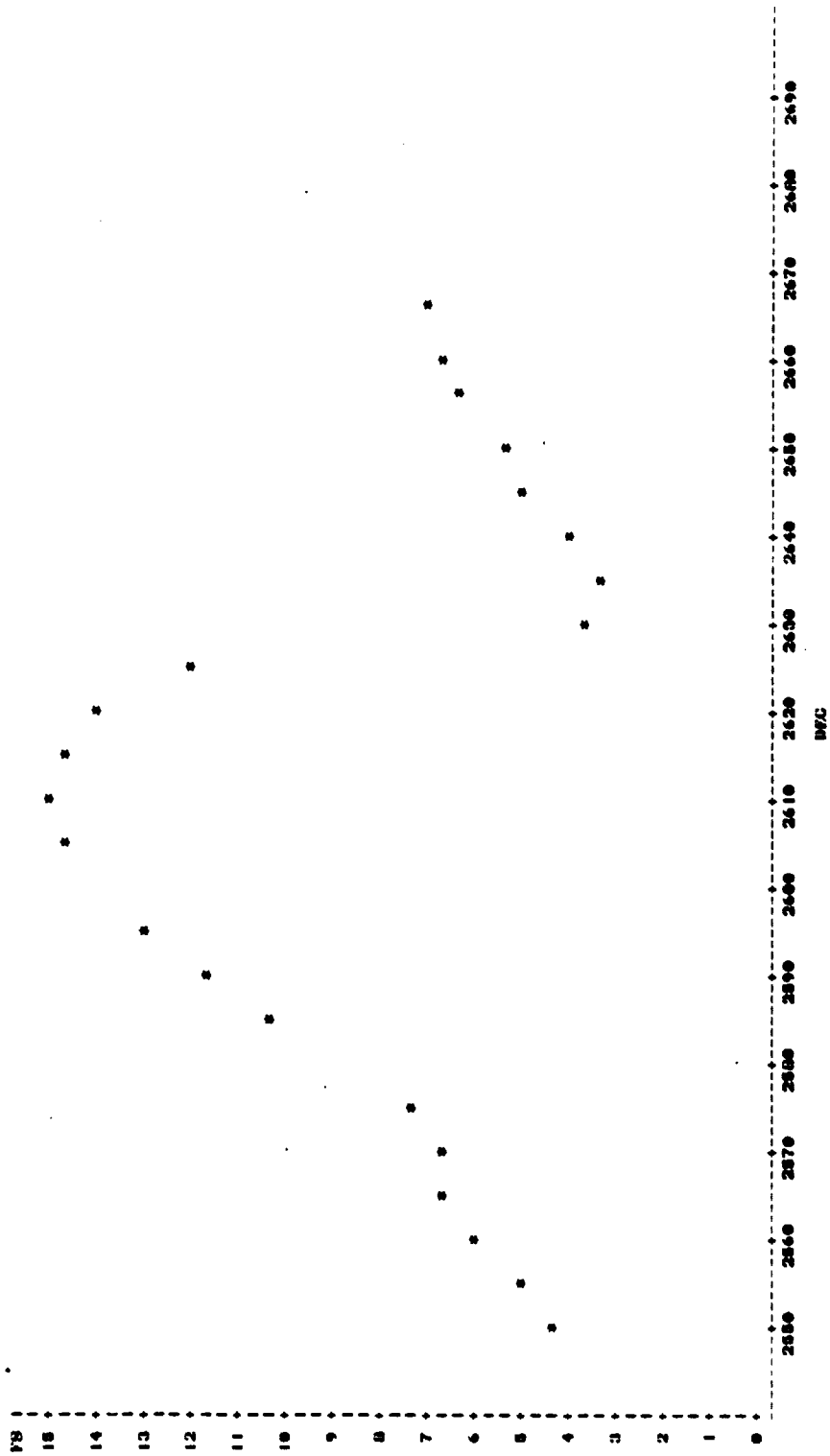

Figure H.4. Variation of Shear Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

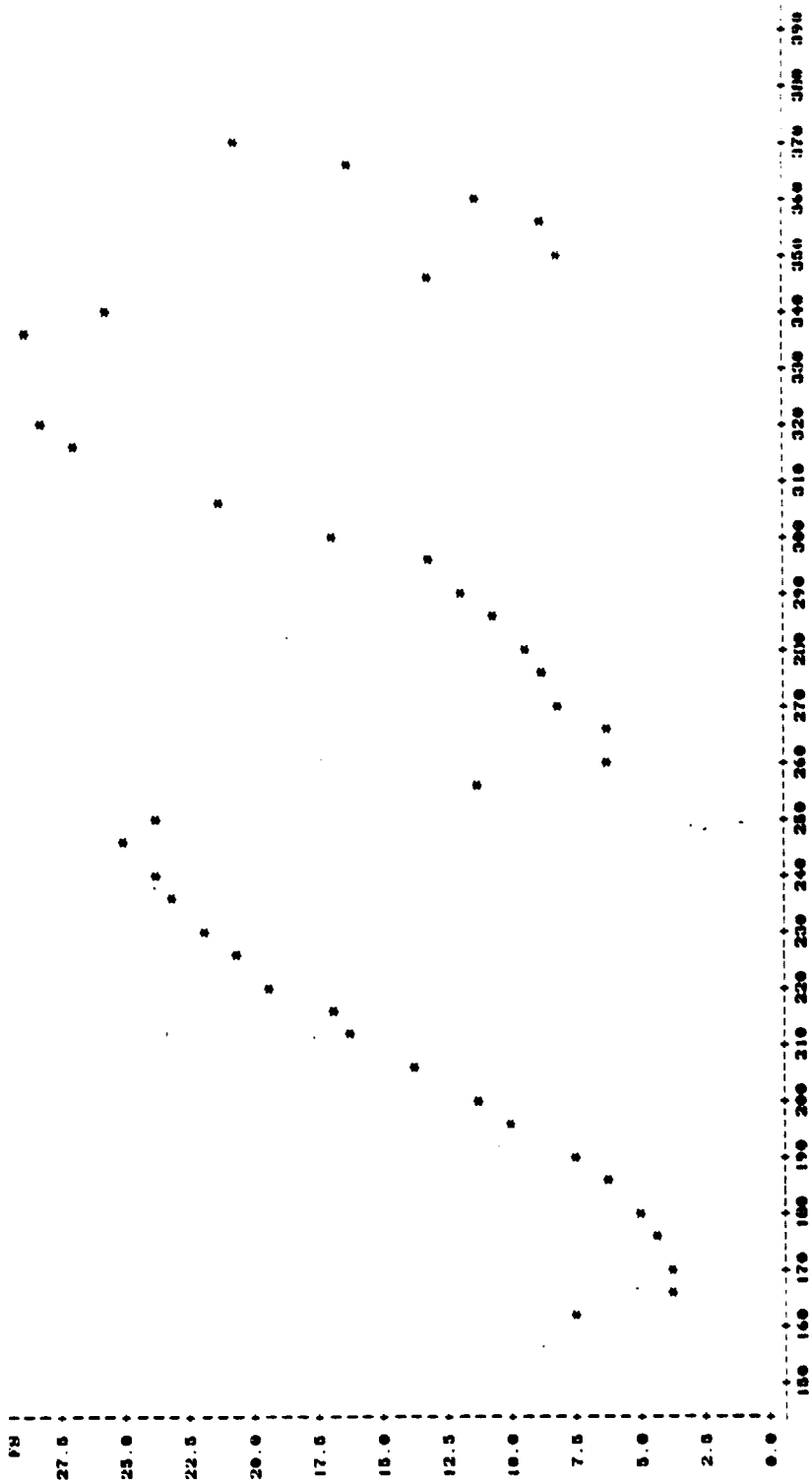

Figure H.5. Variation of Shear Force With Orientation for Aluminum With 40° Tool, Test Al 03

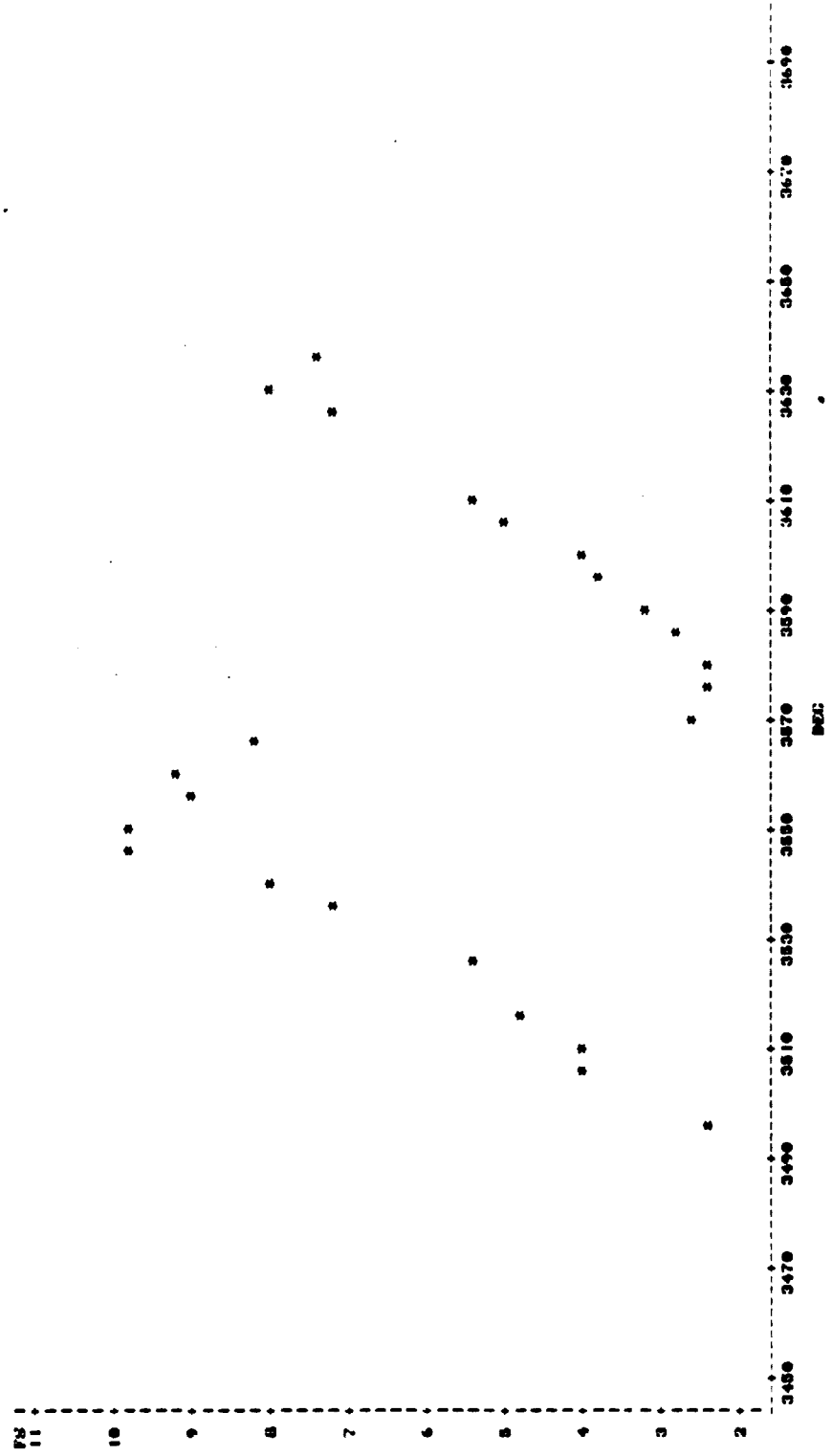

Figure H.6. Variation of Shear Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

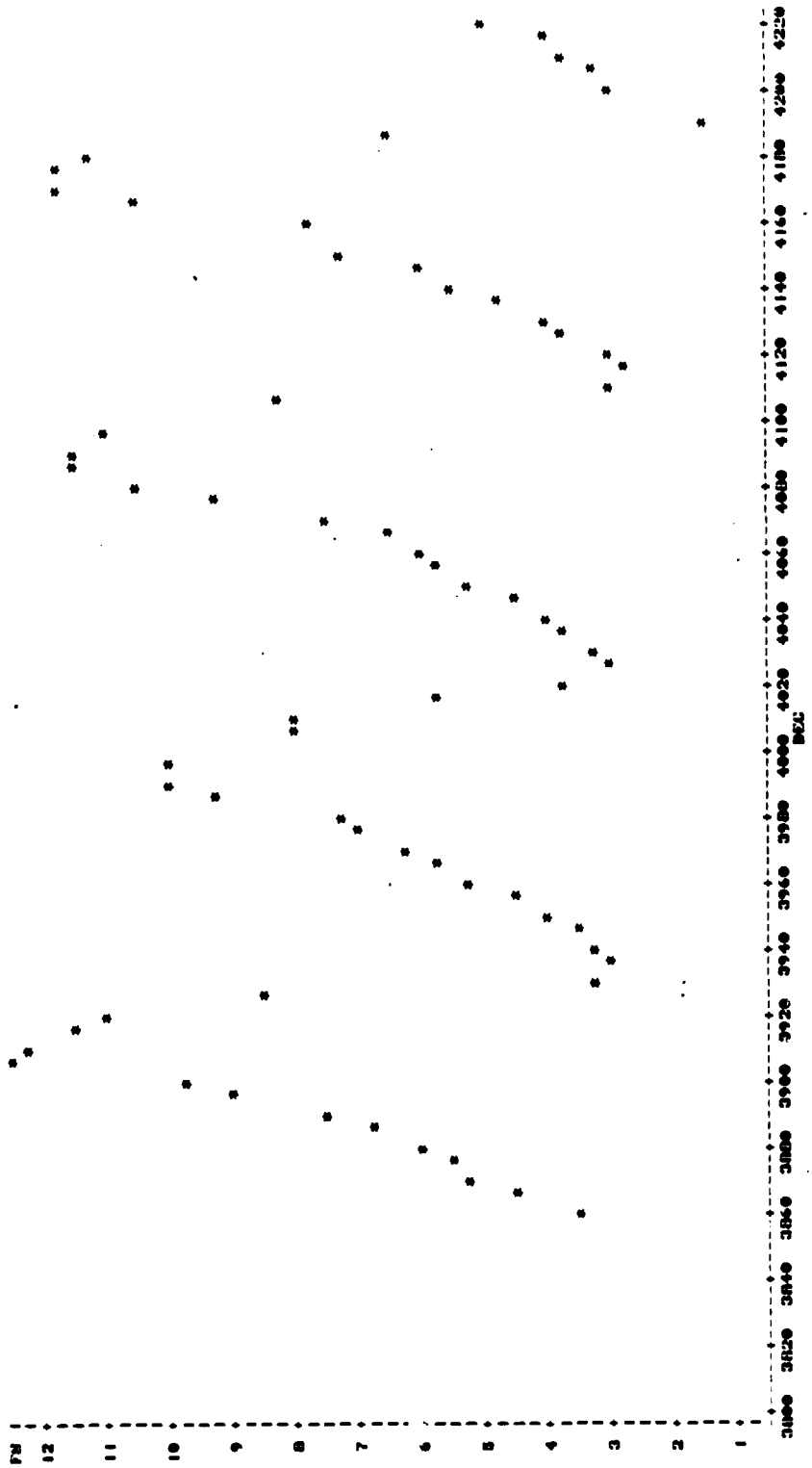

Figure H.7. Variation of Shear Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

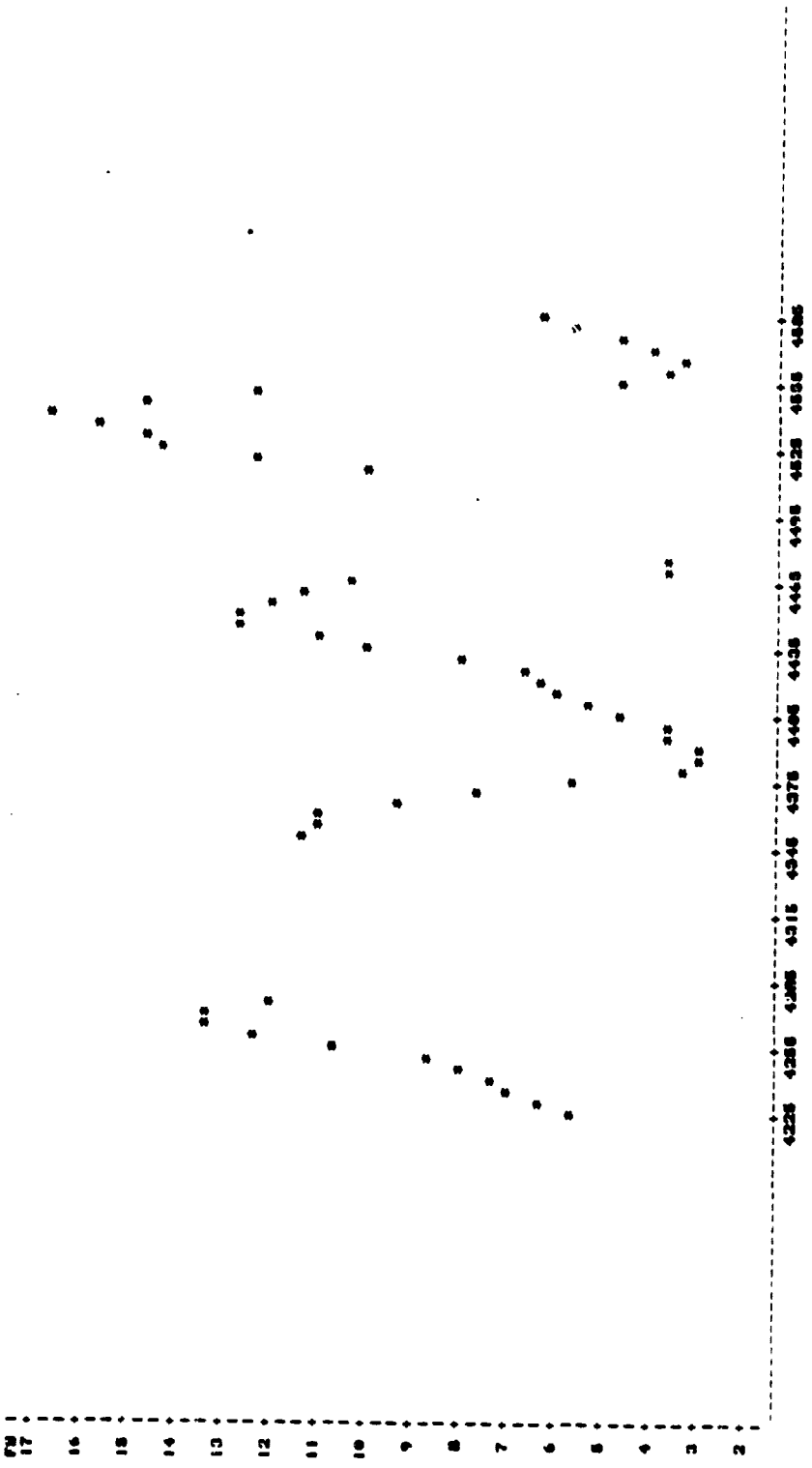

Figure H.8. Variation of Shear Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

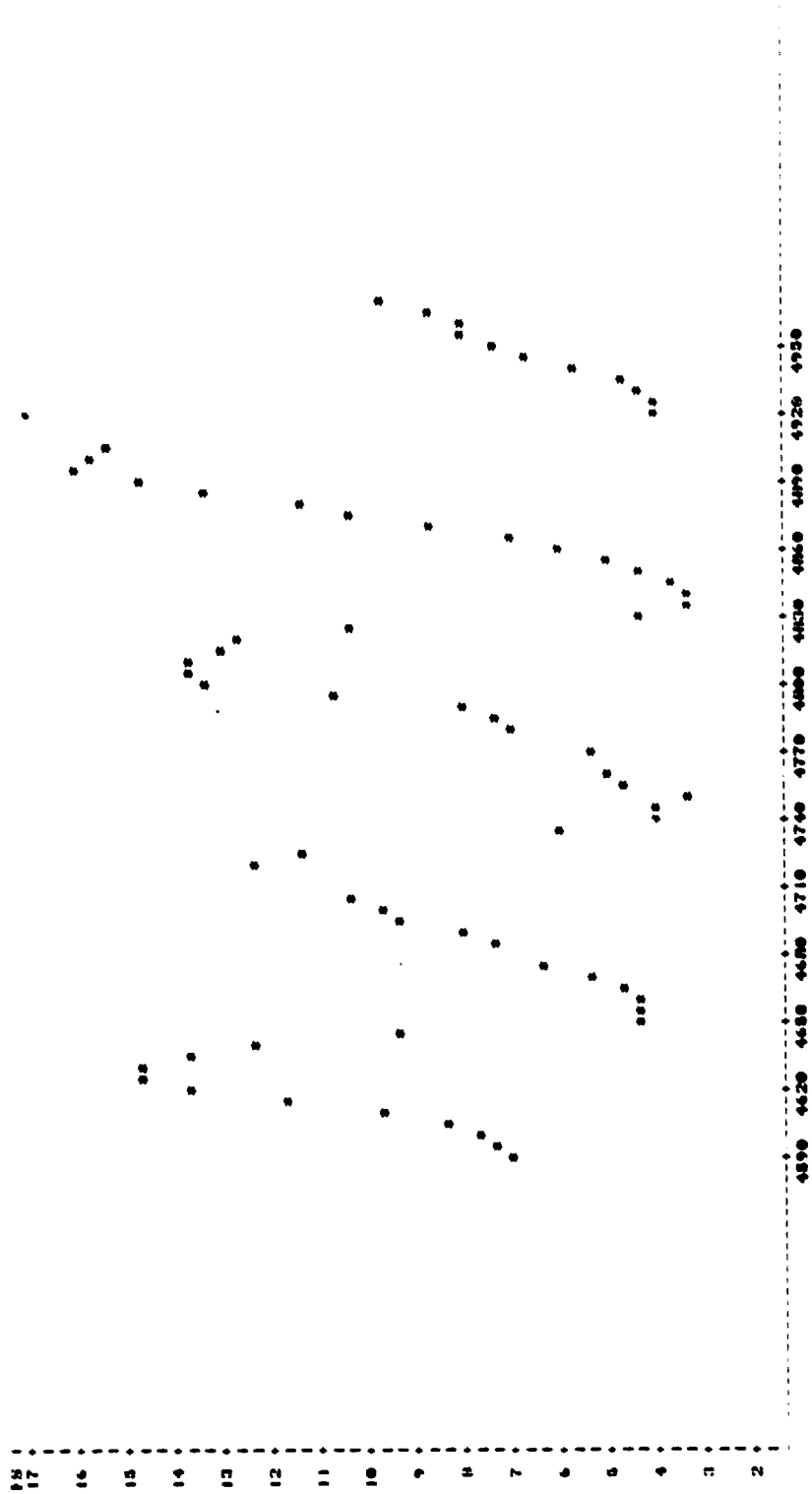

Figure H.9. Variation of Shear Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

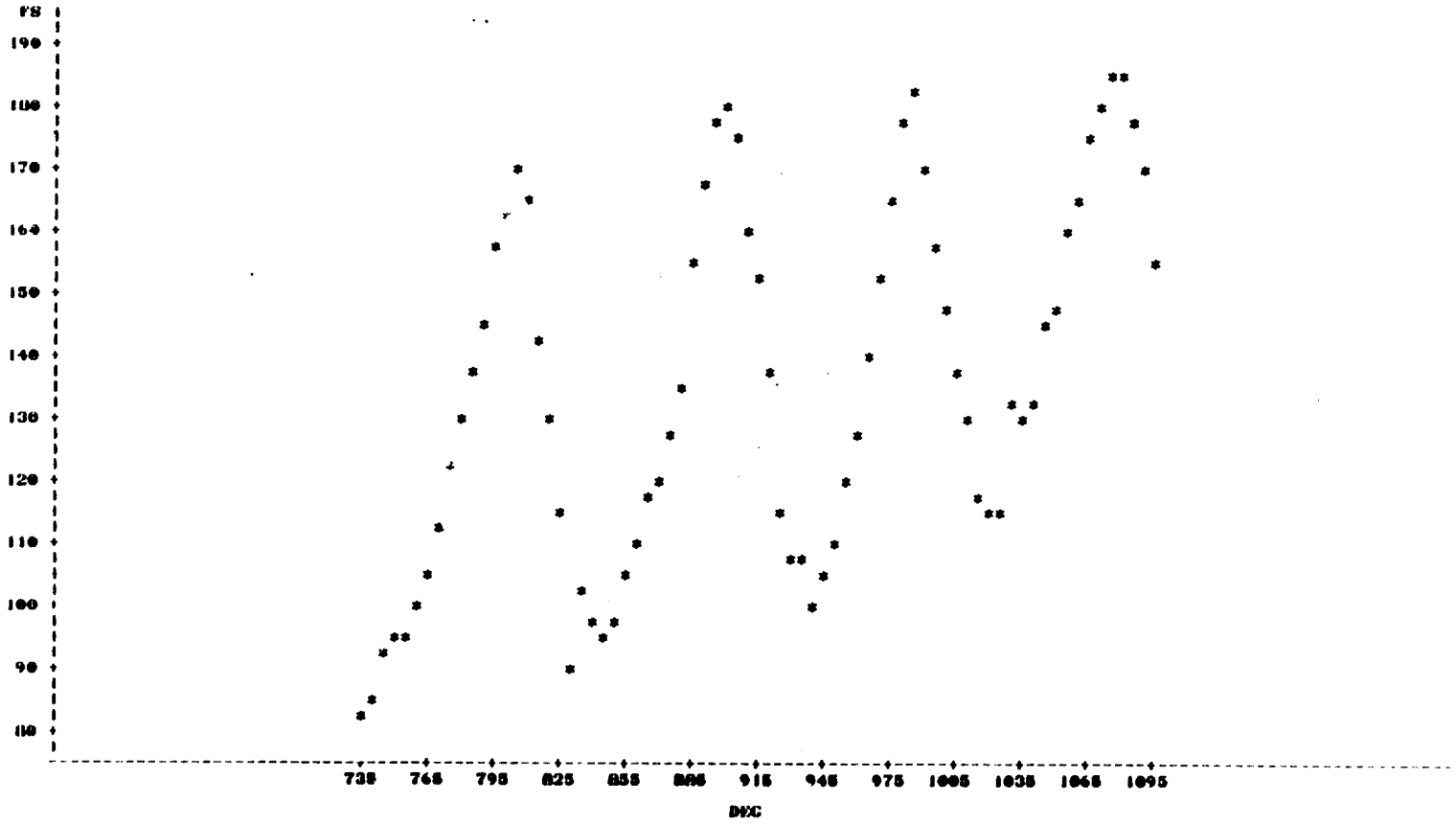

Figure H.10. Variation of Shear Force With Orientation for Copper With 20° Tool, Test Cu 06

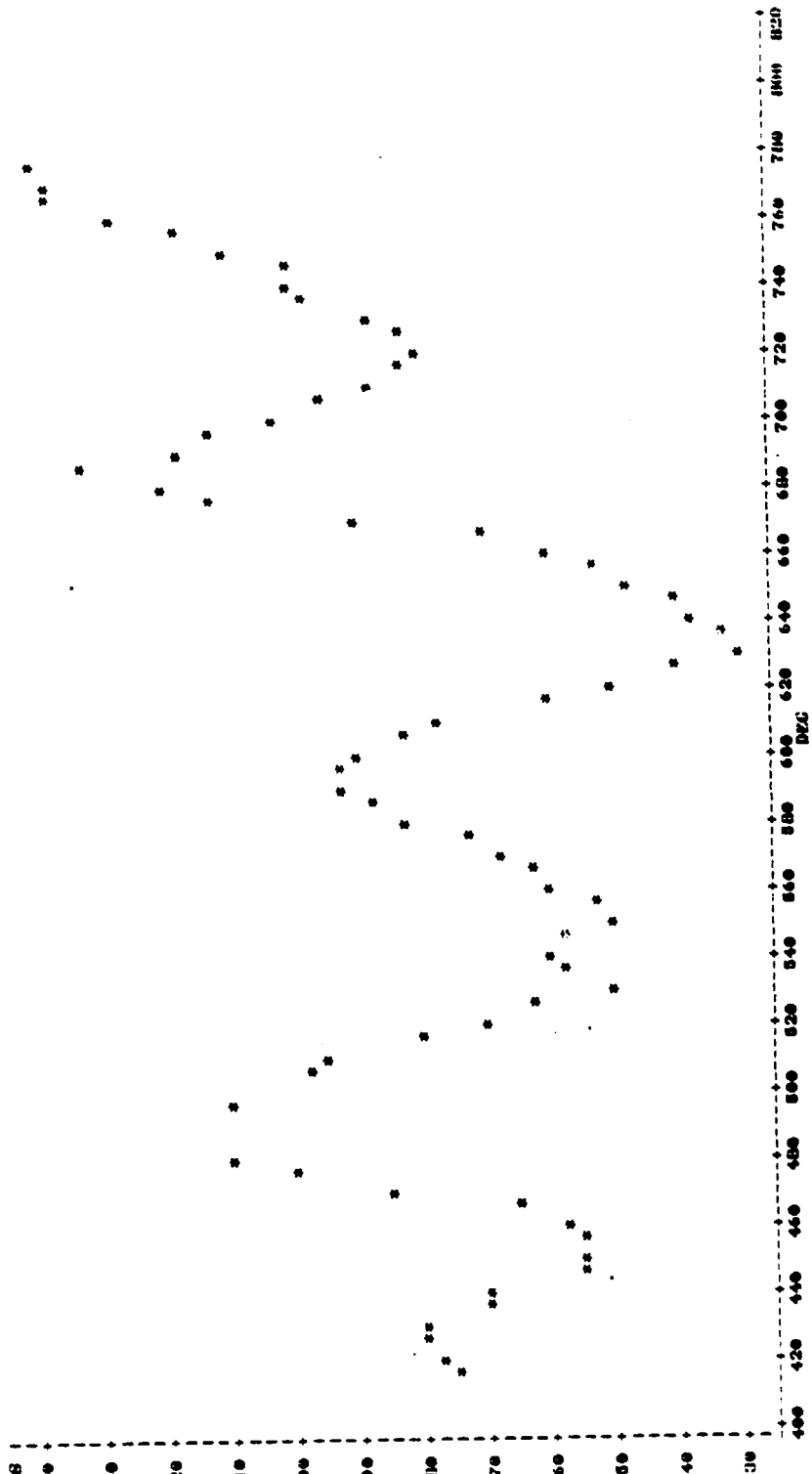

Figure H.11. Variation of Shear Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

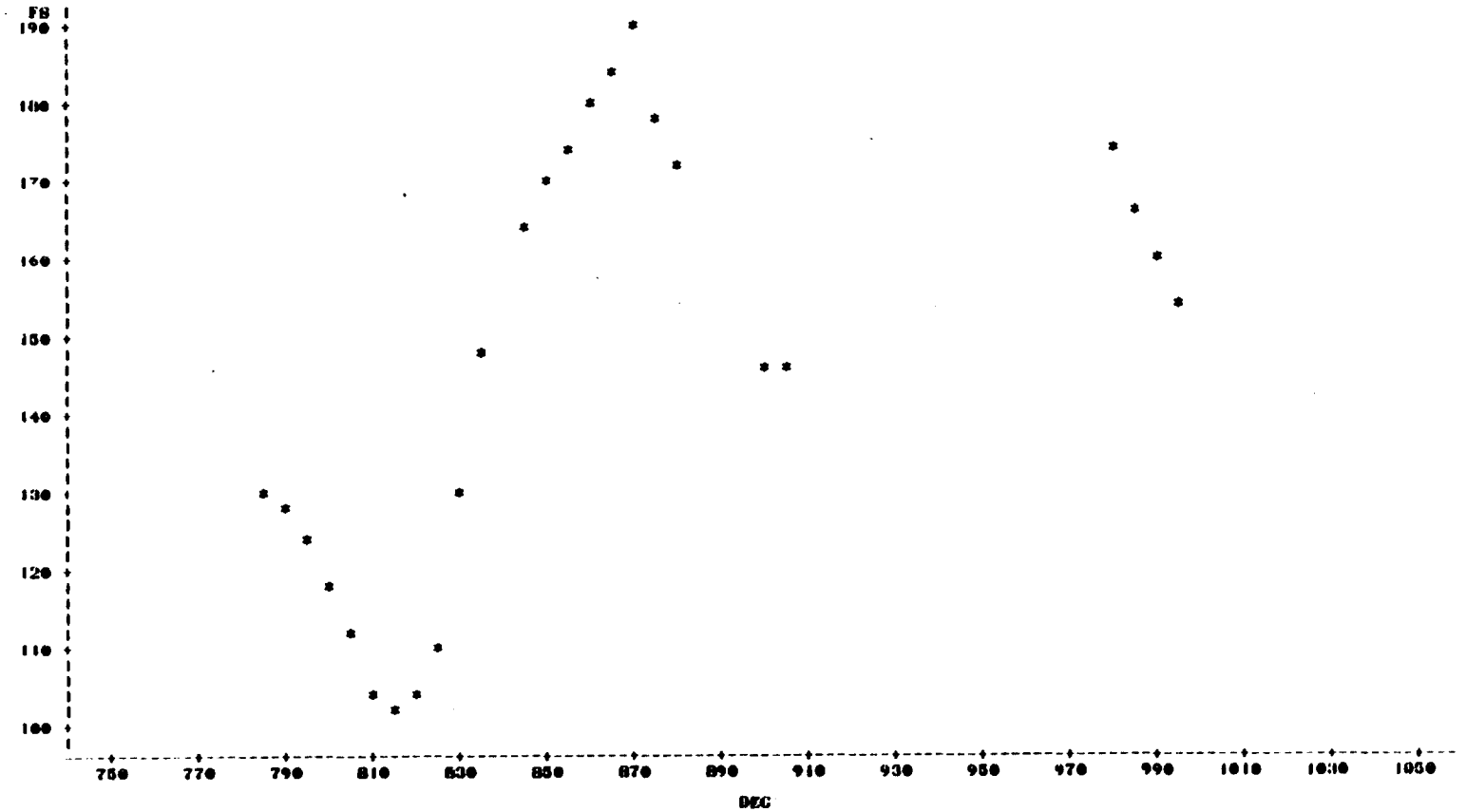

Figure H.12. Variation of Shear Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

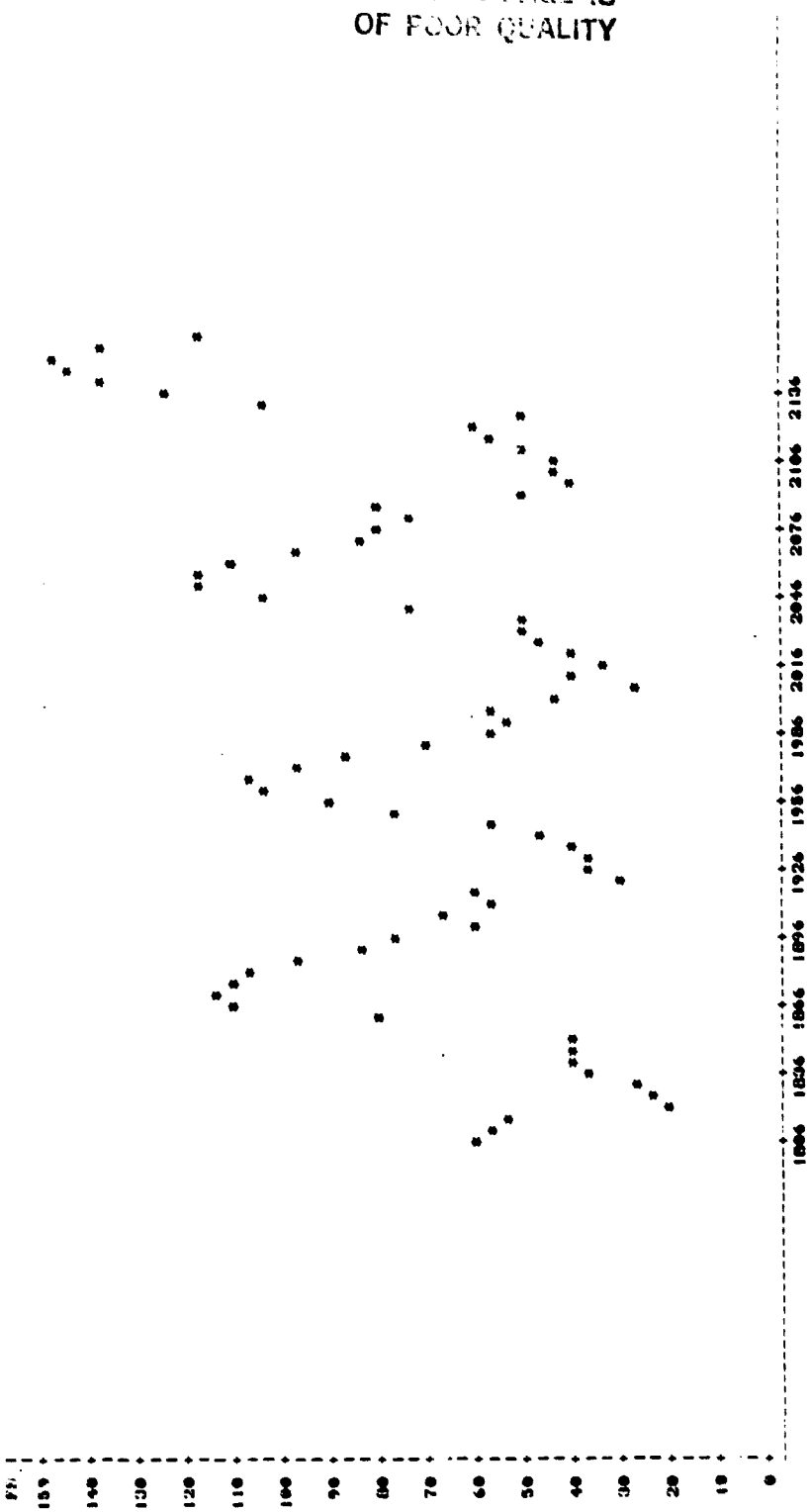

Figure H.13. Variation of Shear Force, With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX I

Variation of Normal Force

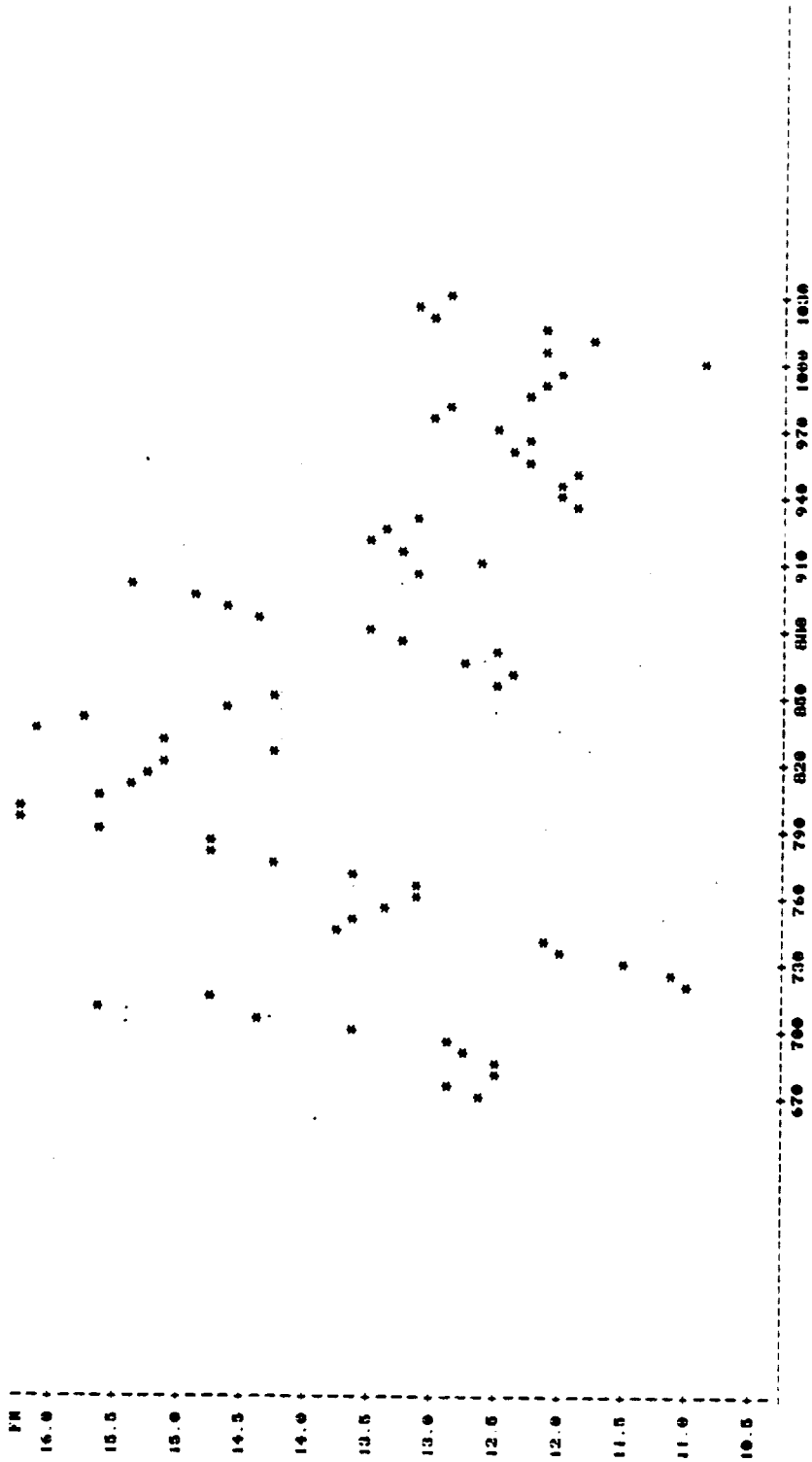

Figure I.1. Variation of Normal Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

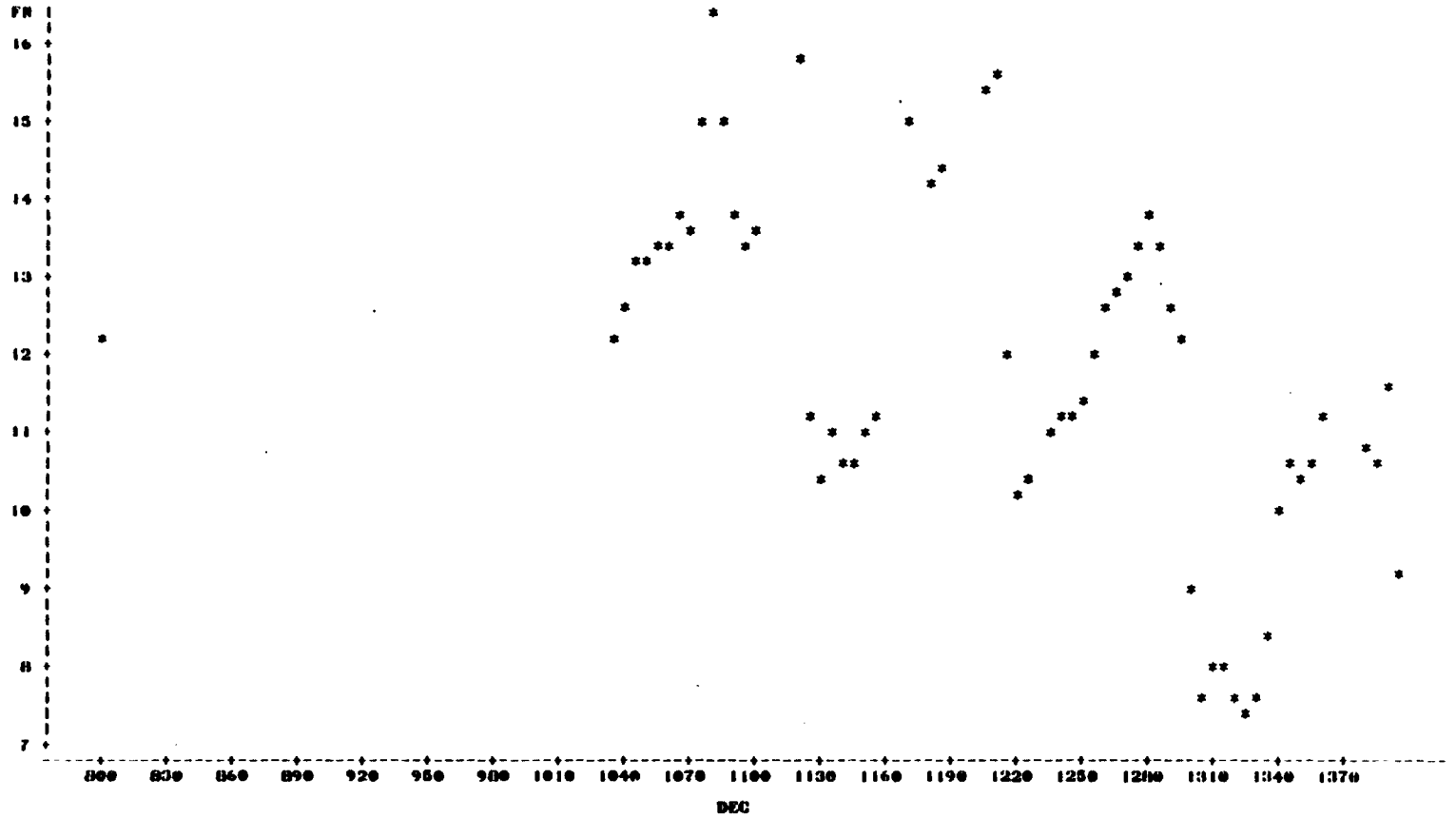

Figure I.2. Variation of Normal Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

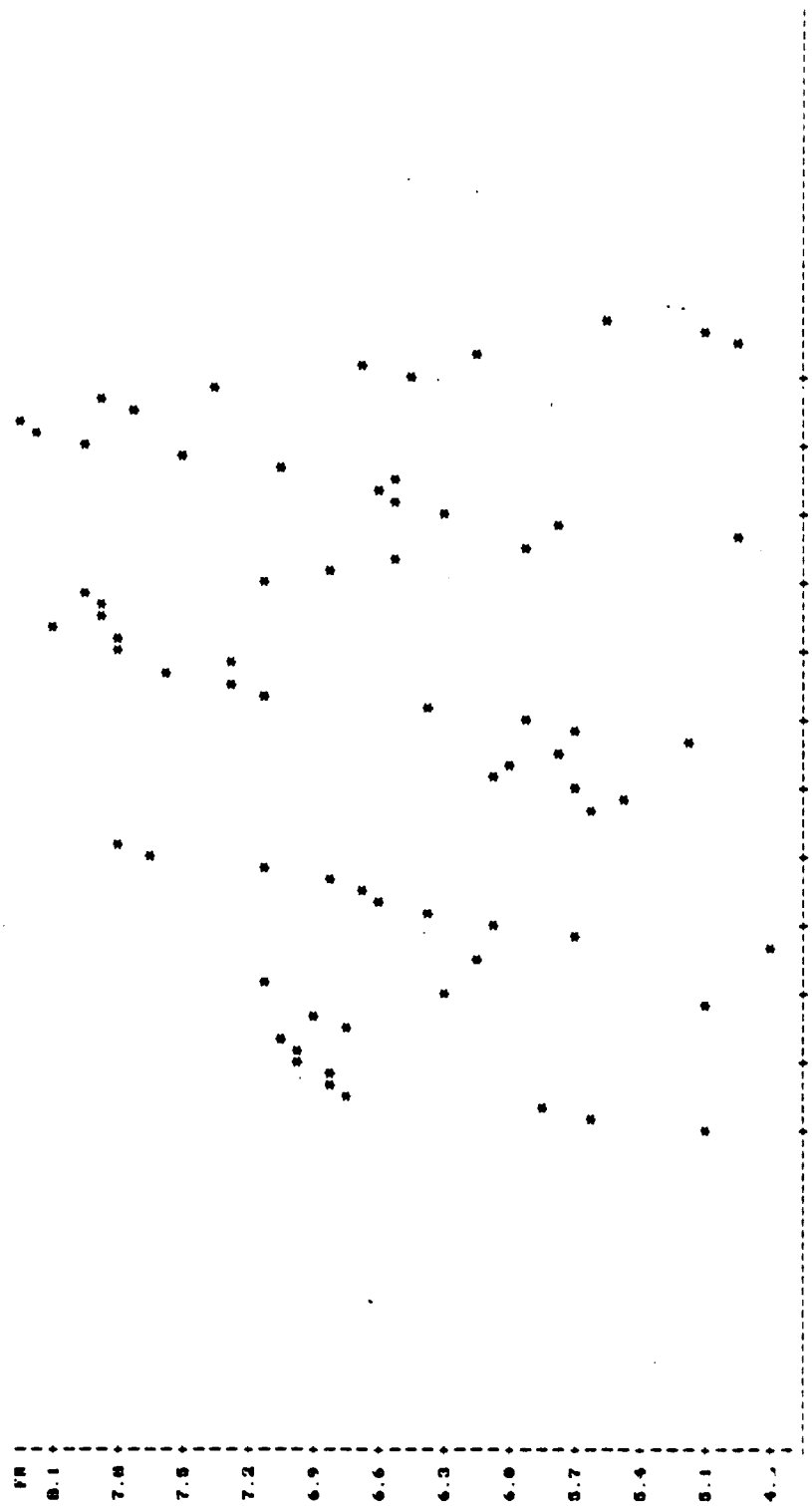

Figure I.3. Variation of Normal Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

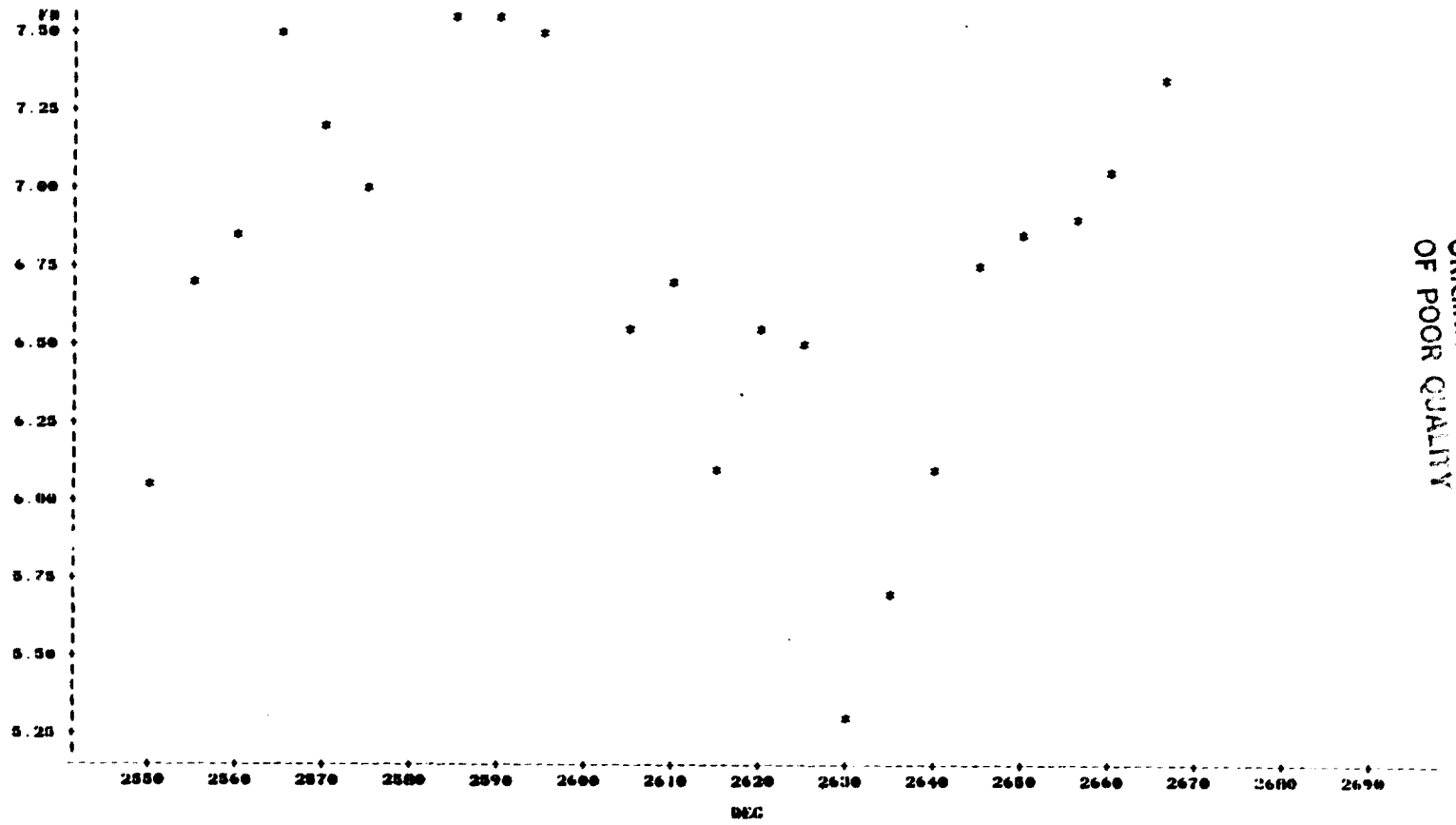

Figure I.4. Variation of Nromal Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

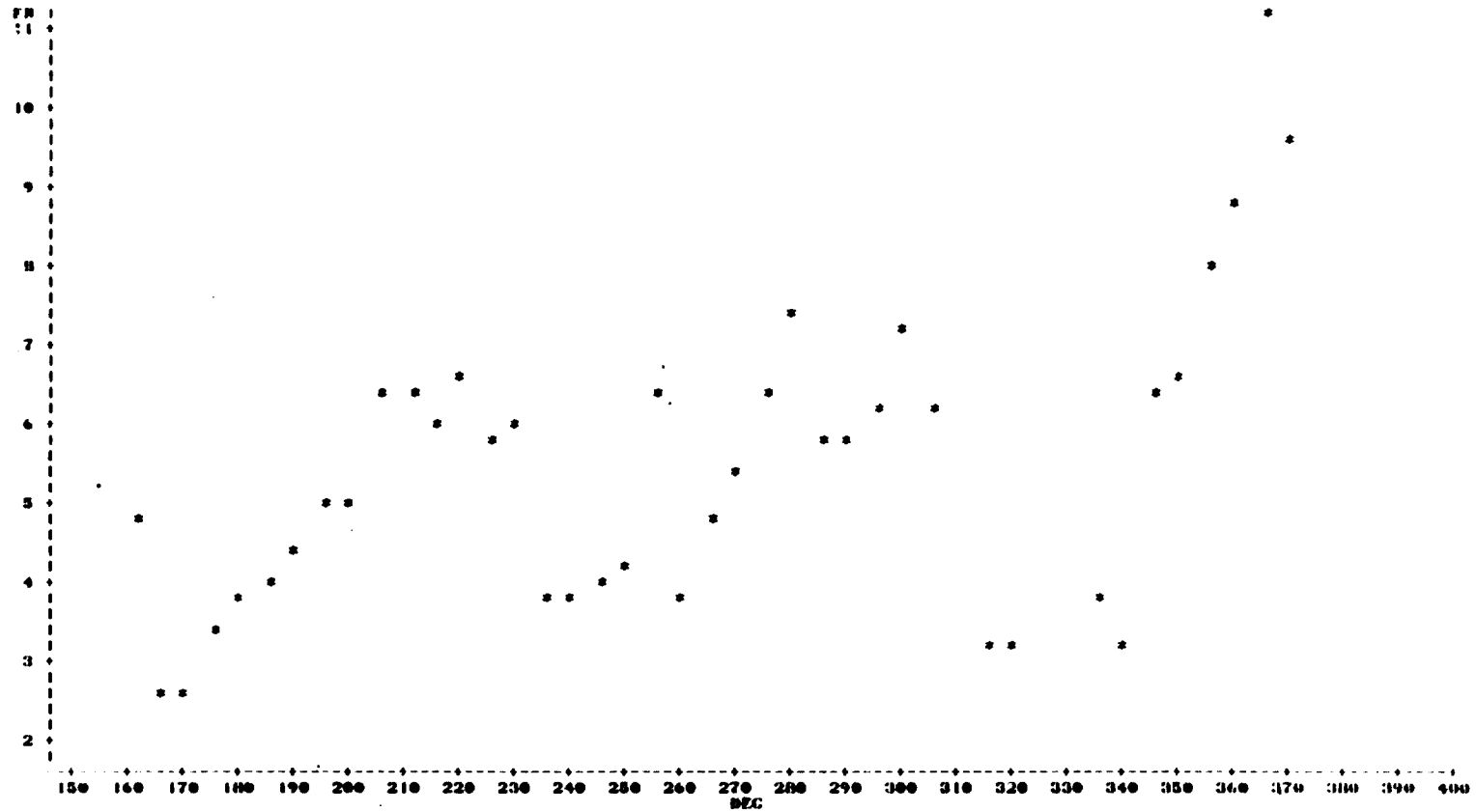

Figure I.5. Variation of Normal Force With Orientation for Aluminum With 40° Tool, Test Al 03

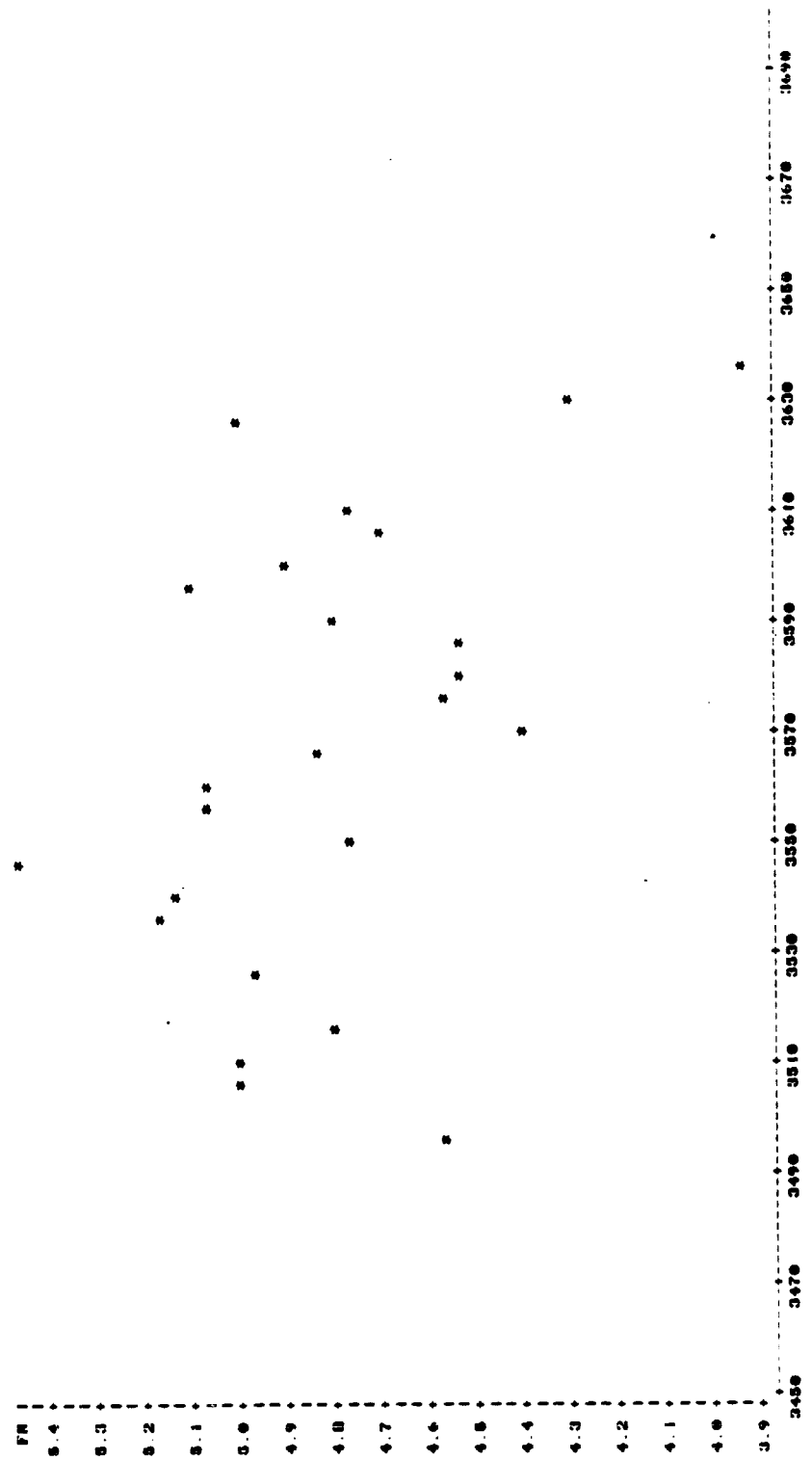

Figure I.6. Variation of Nromal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

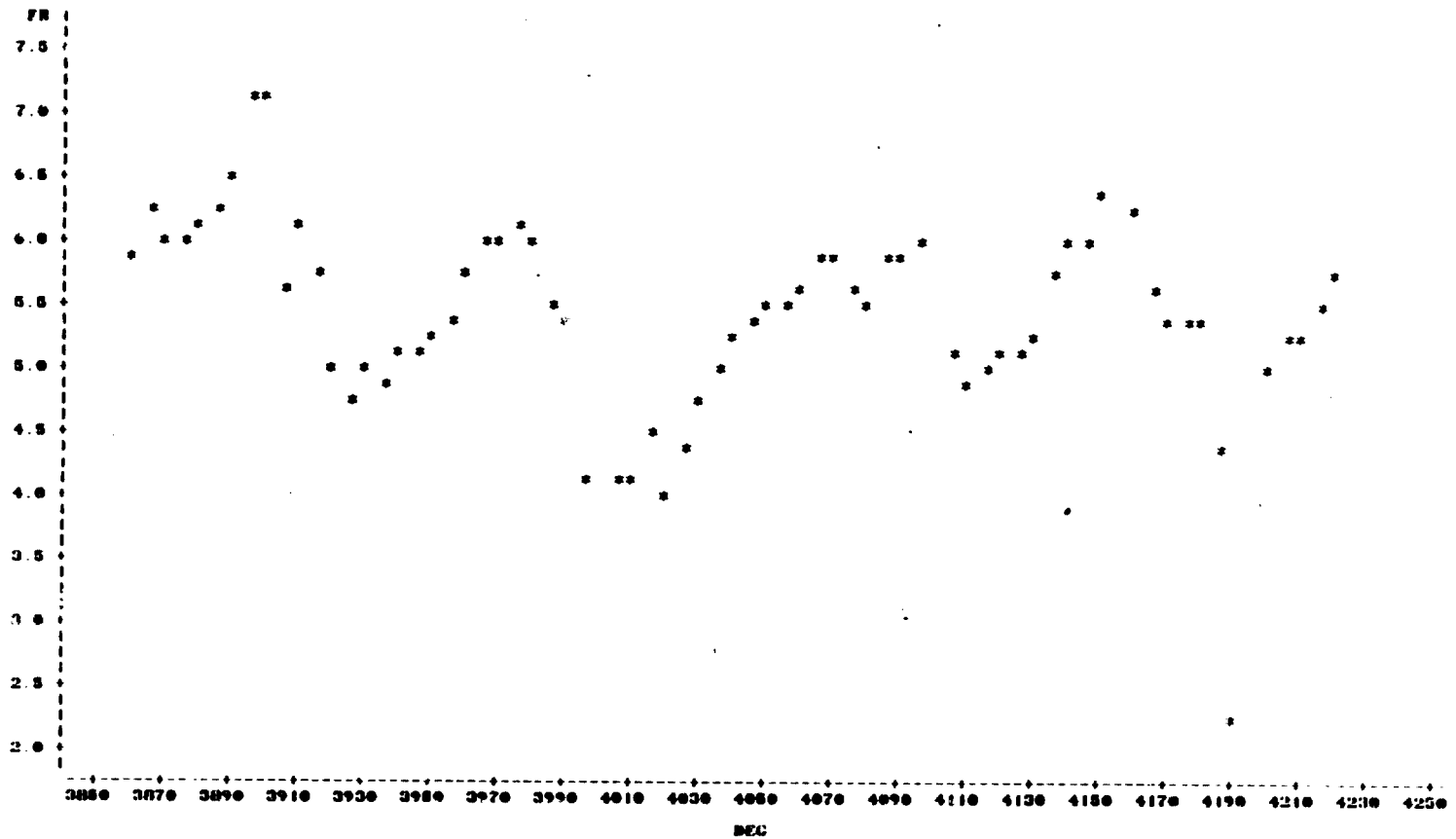

Figure I.7. Variation of Normal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

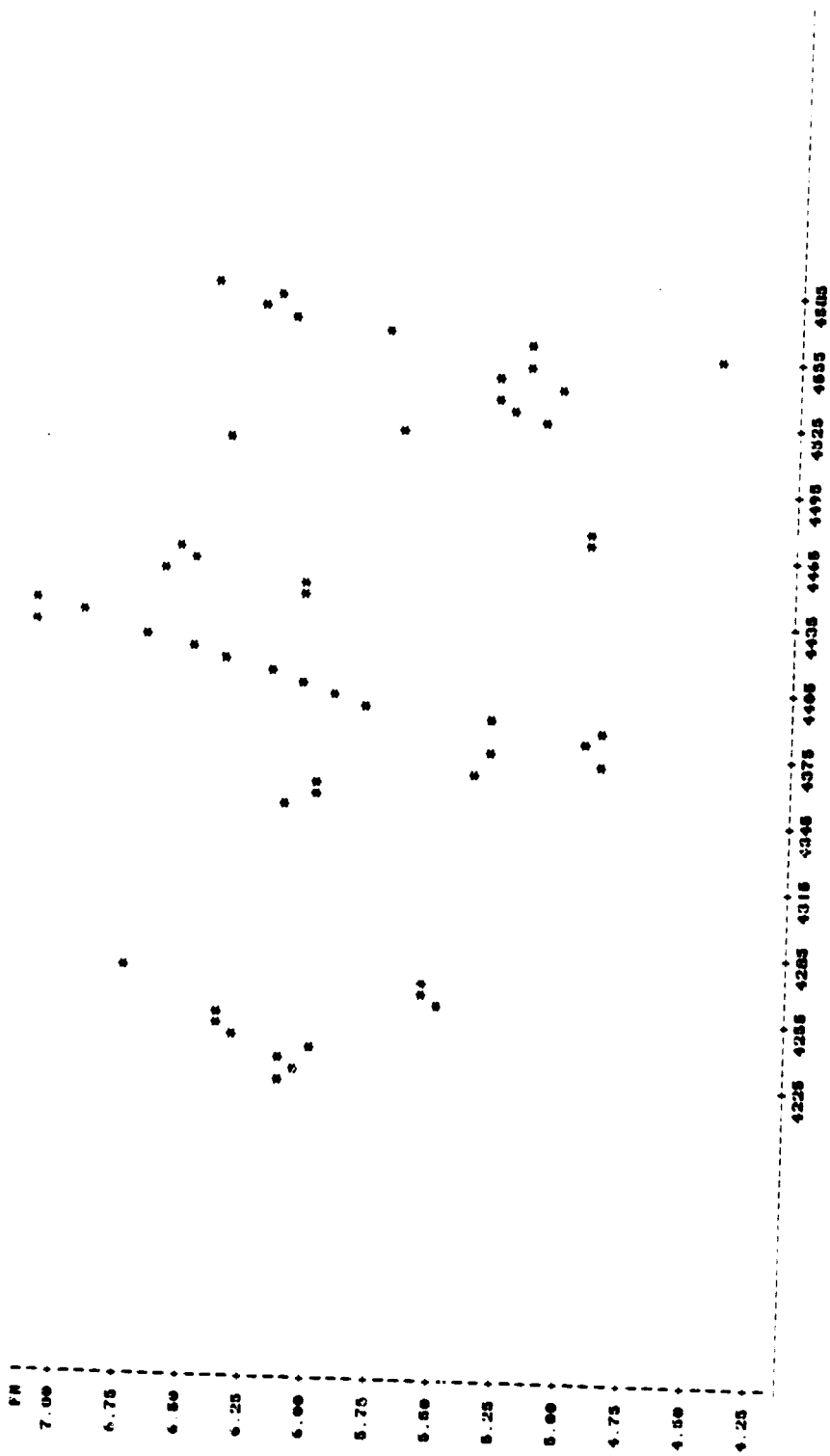

Figure I.8. Variation of Normal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

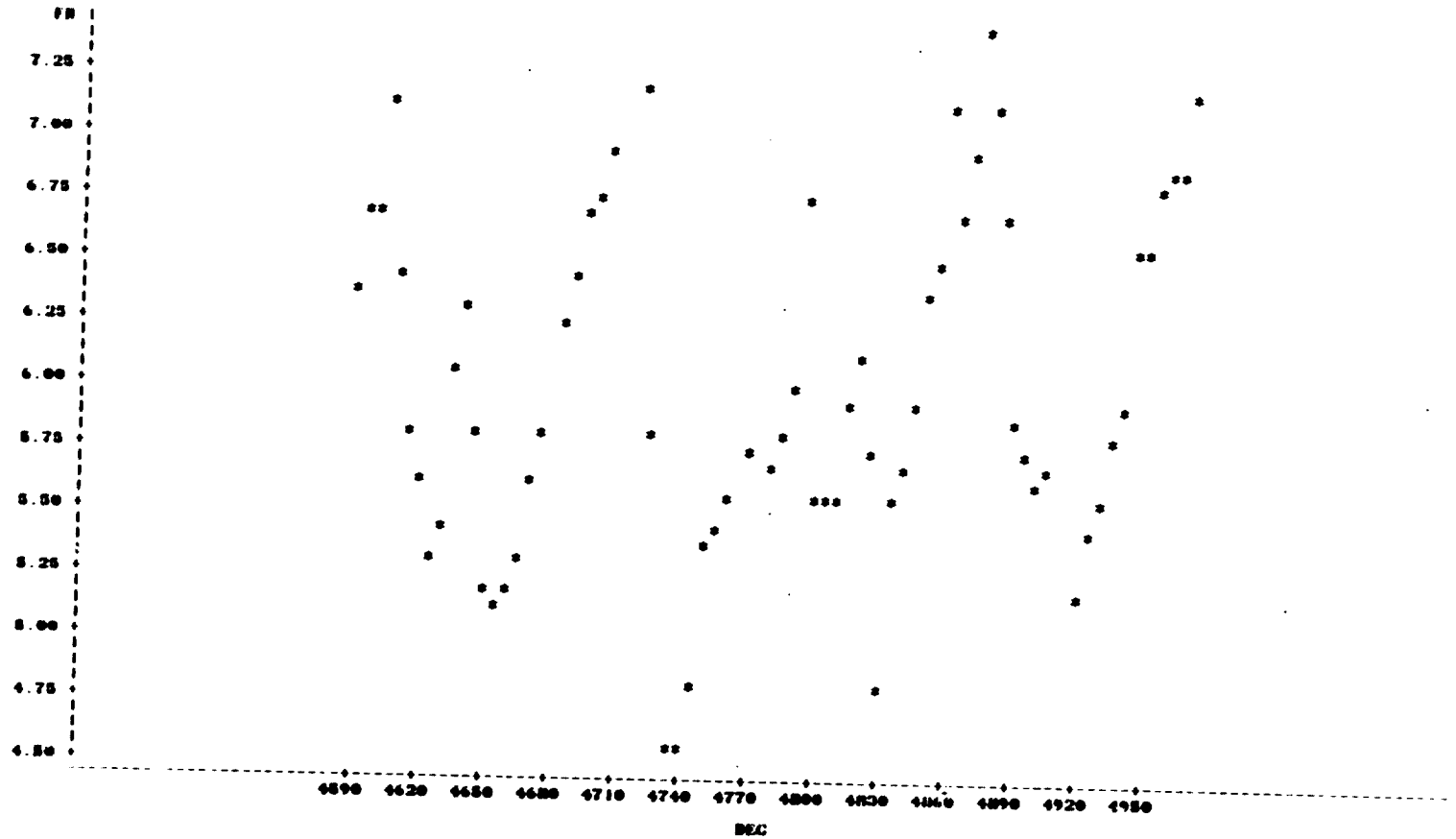

Figure I.9. Variation of Normal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

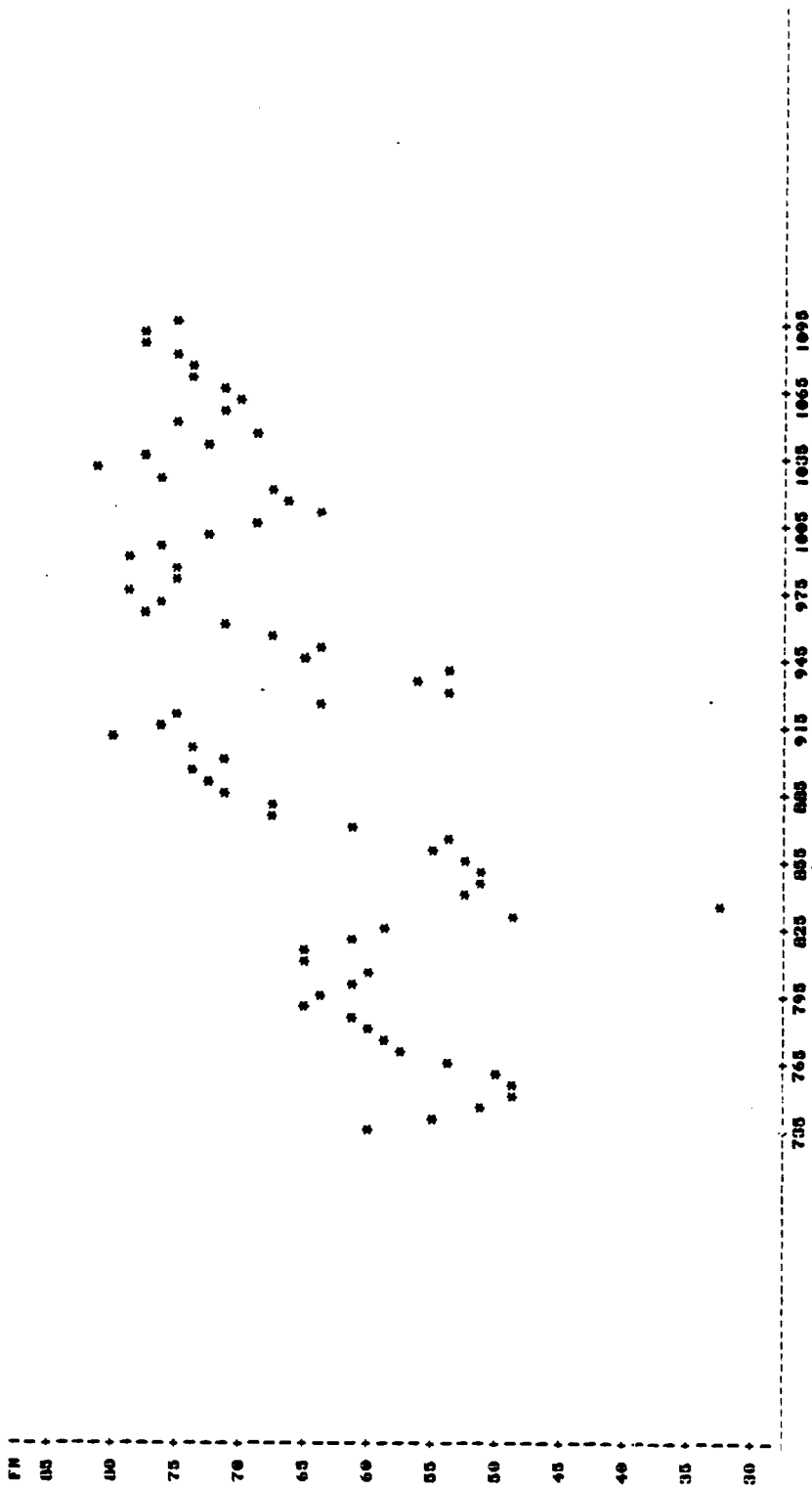

Figure I.10. Variation of Normal Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

C-3

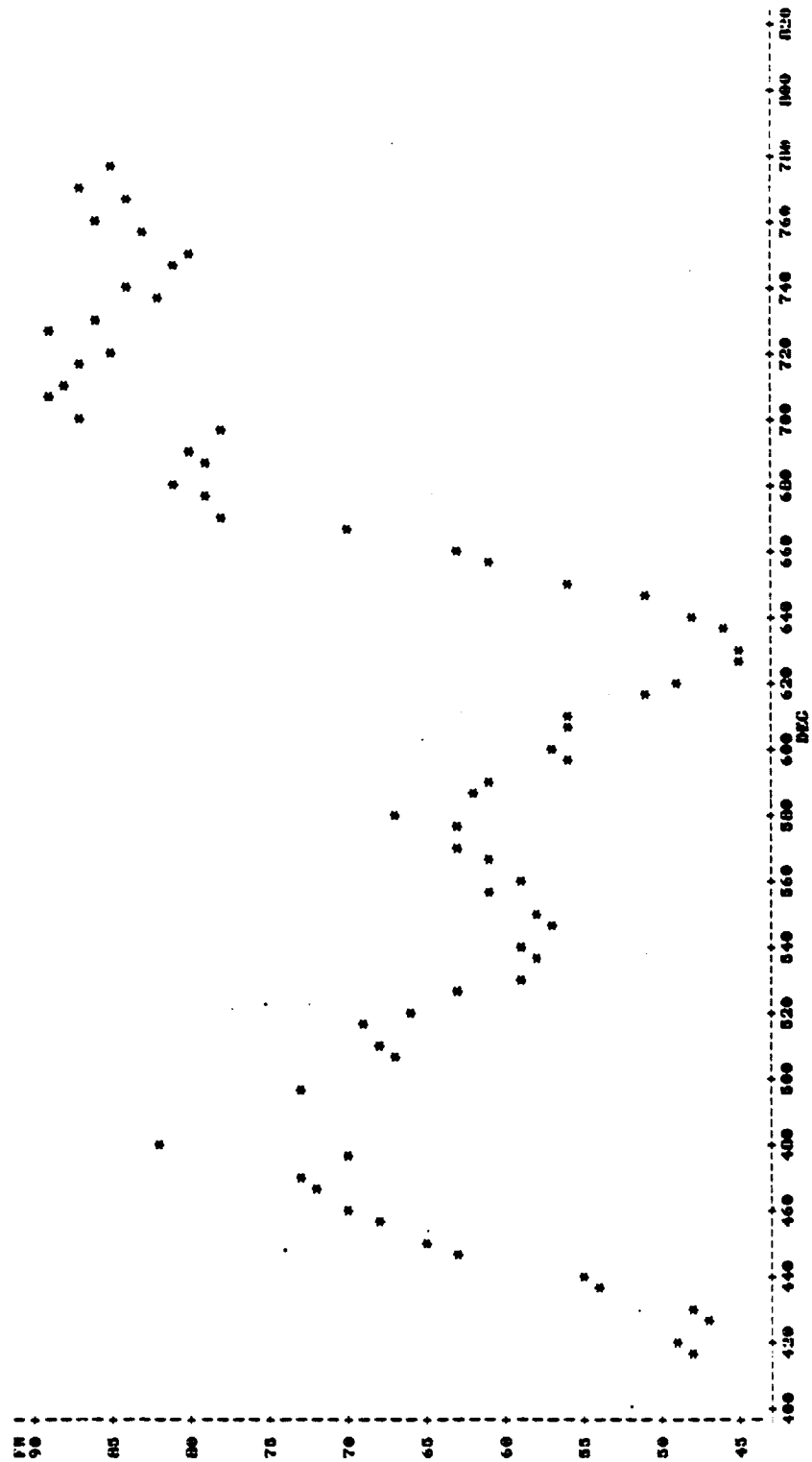

Figure I.11. Variation of Normal Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

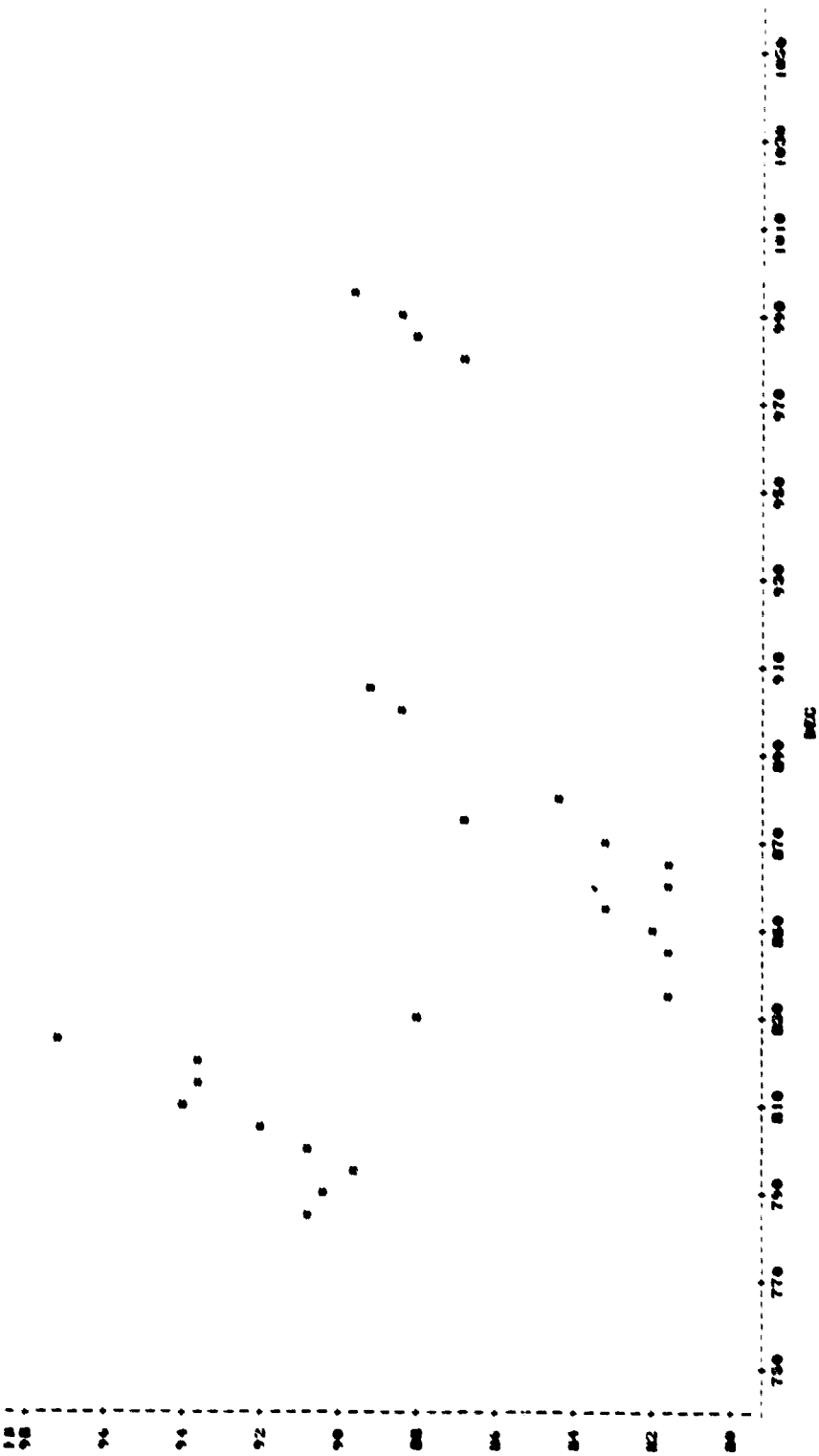

Figure I.12. Variation of Normal Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

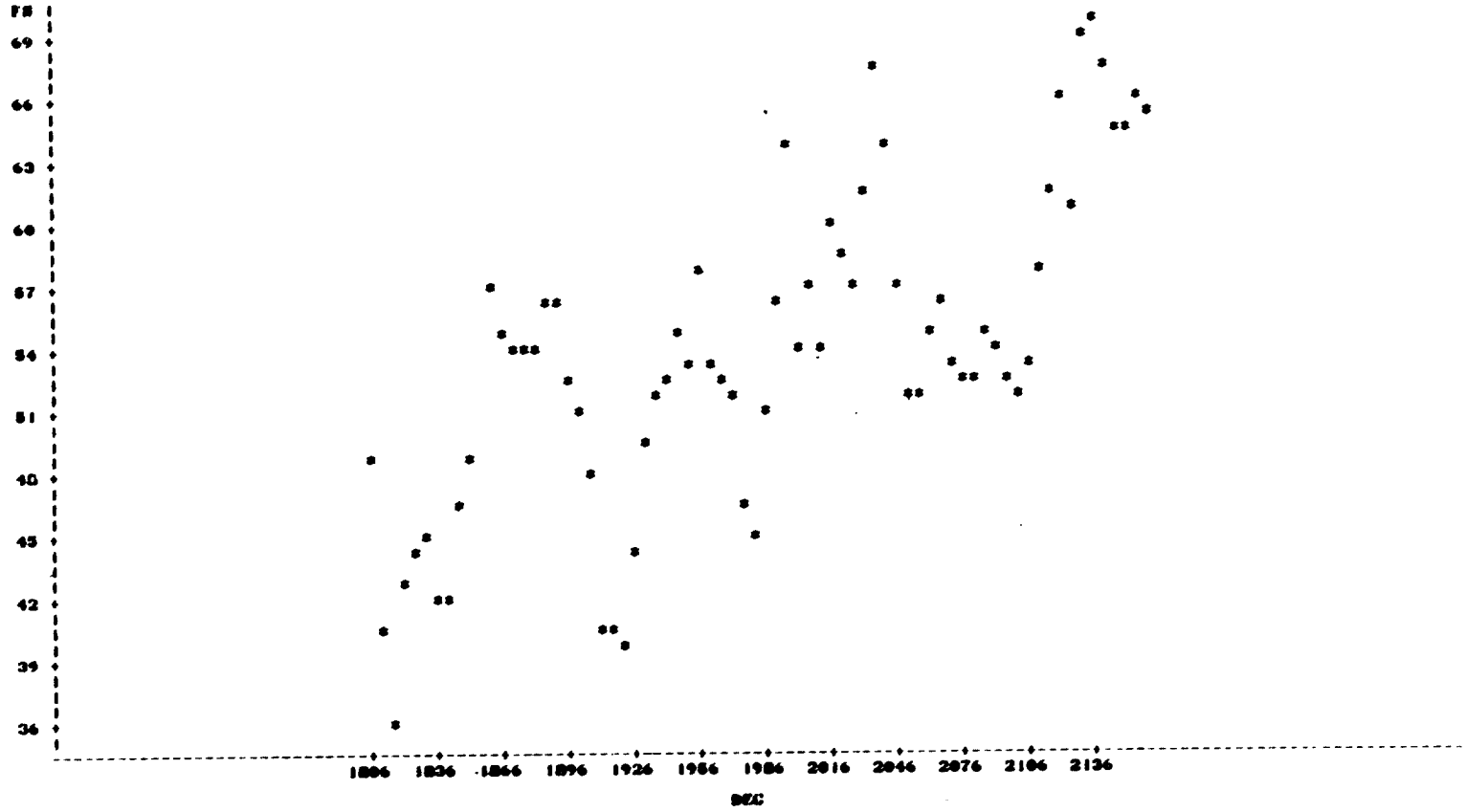

Figure I.13. Variation of Normal Force With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX J

Variation of Friction Force

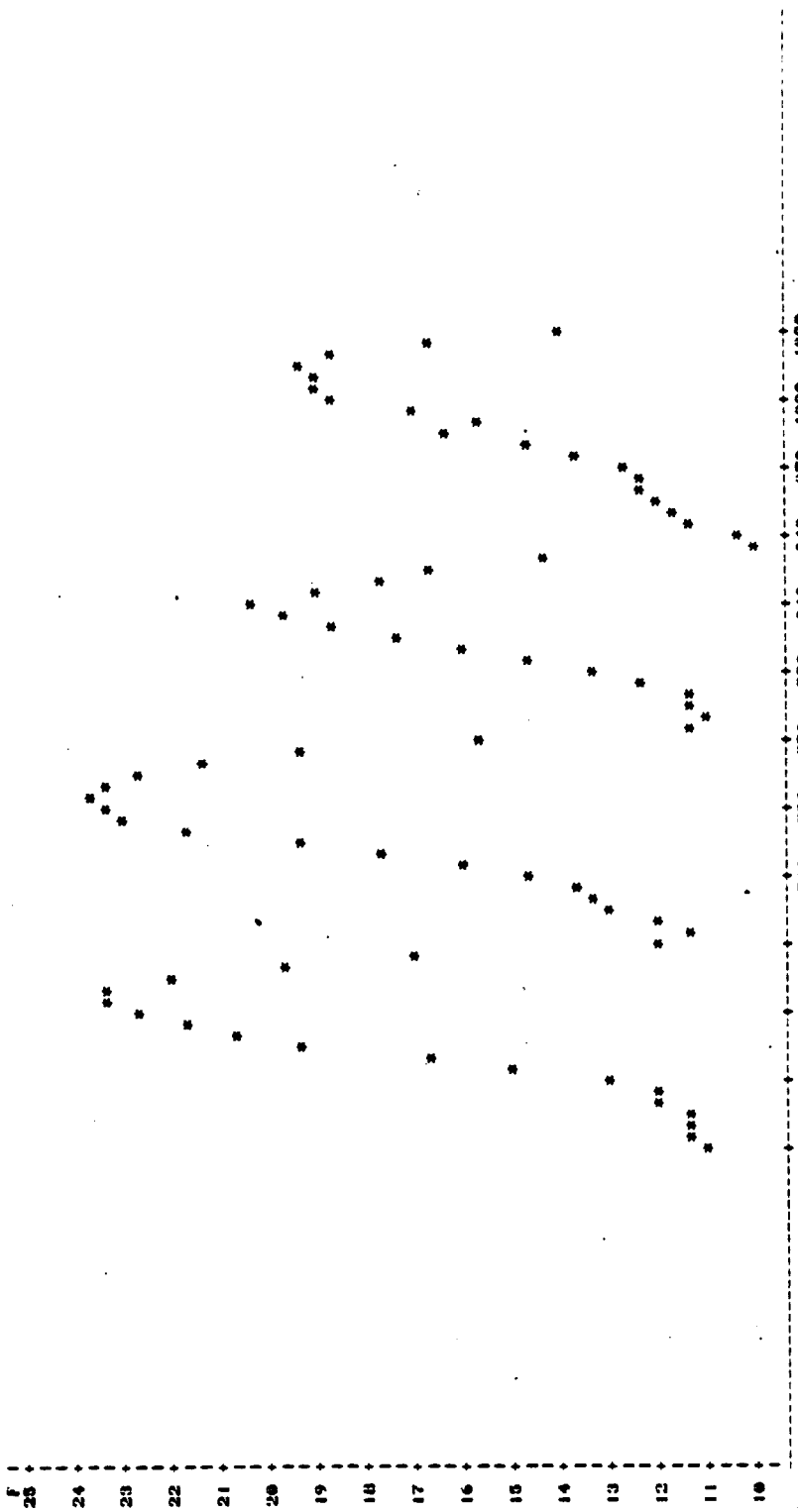

Figure J.1. Variation of Friction Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

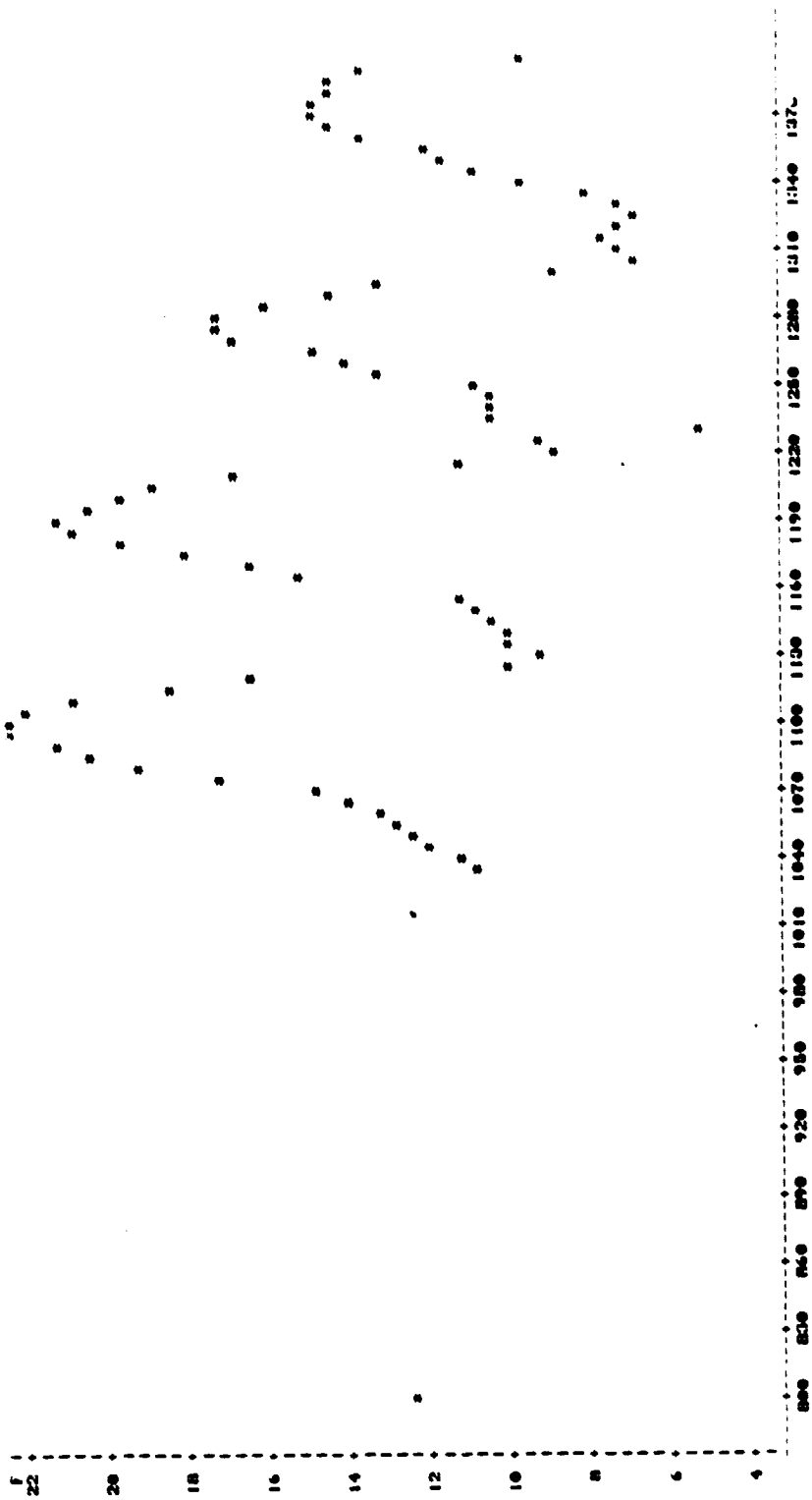

Figure J.2. Variation of Friction Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

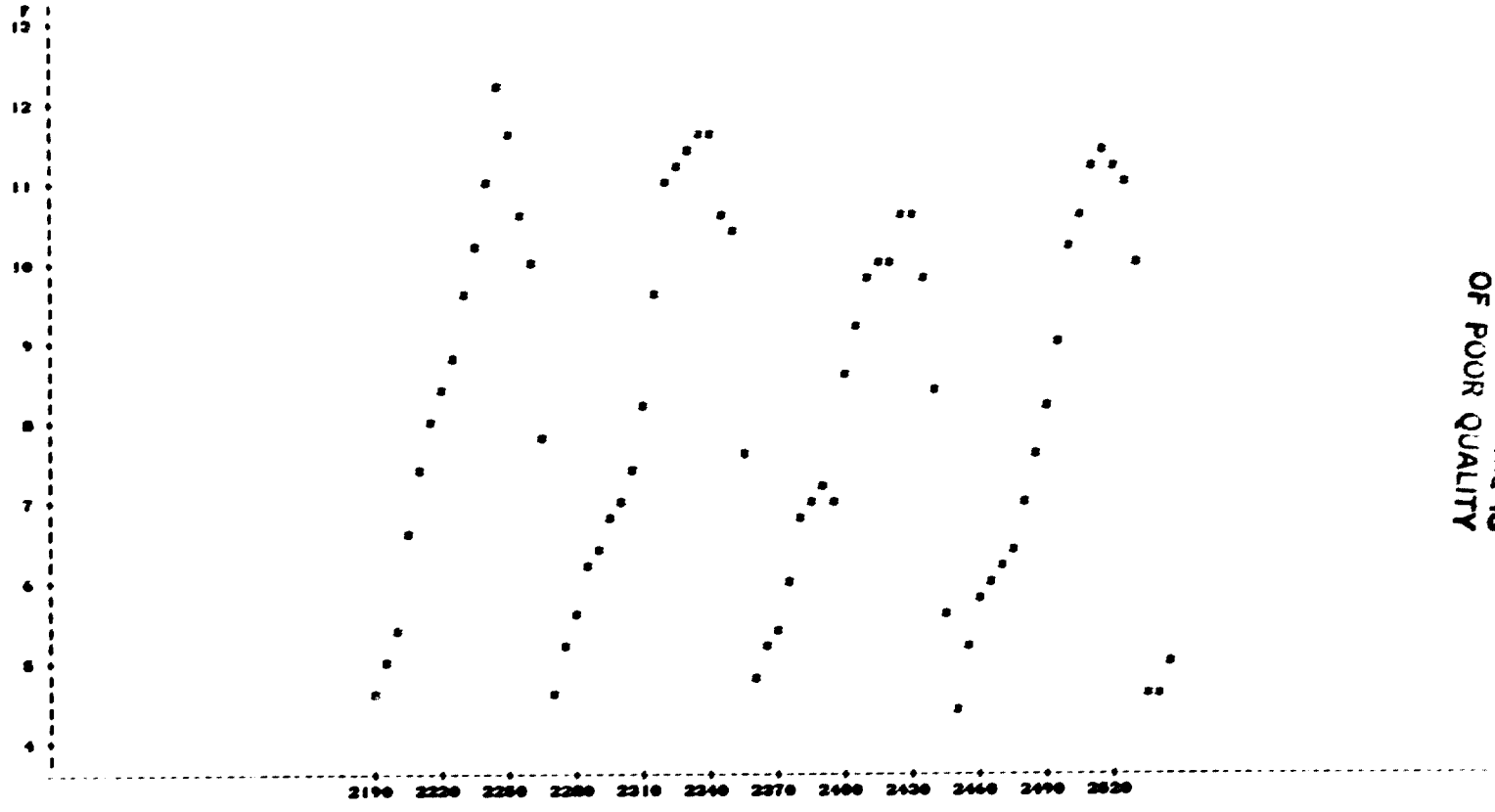

Figure J.3. Variation of Friction Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

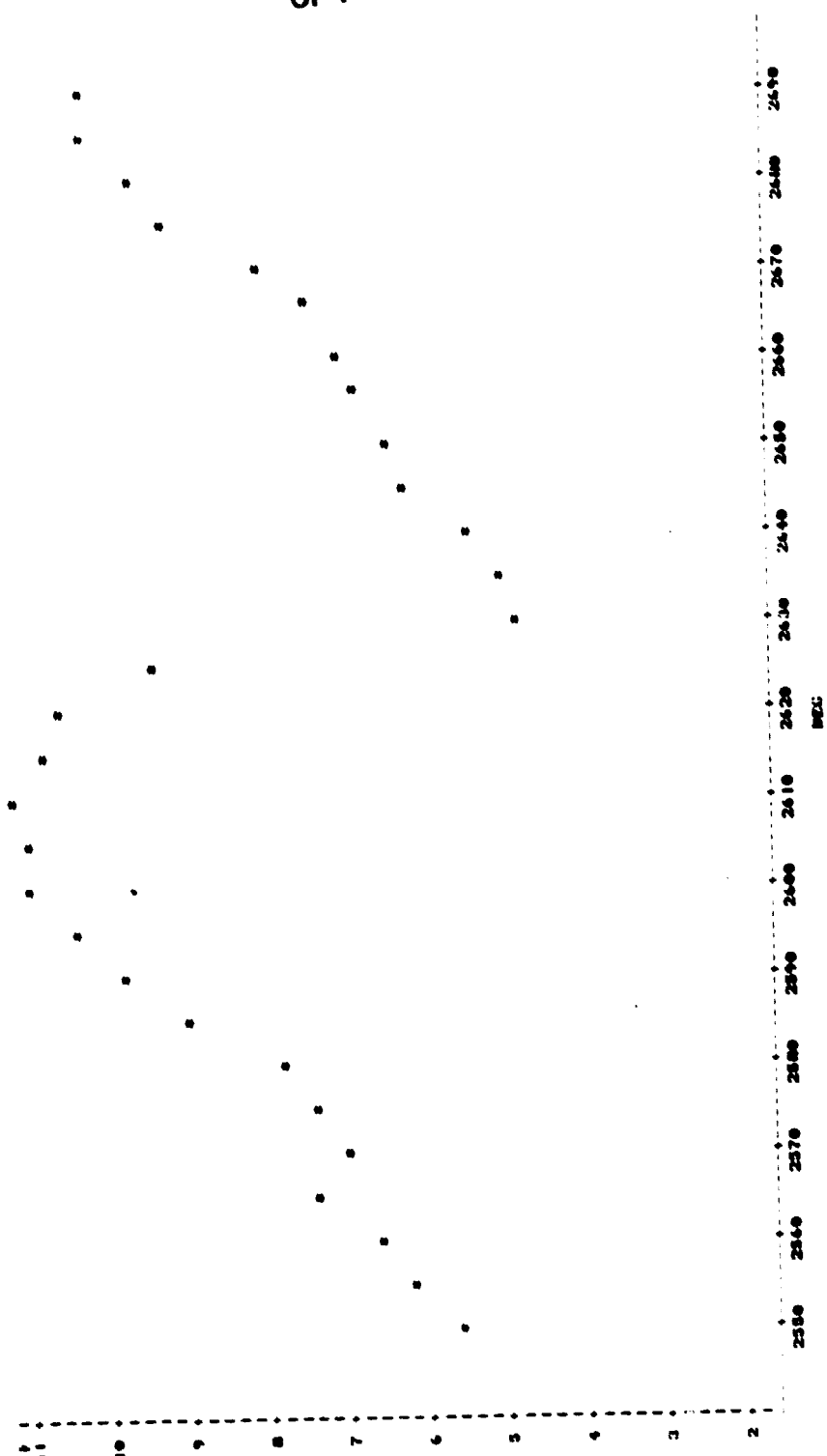

Figure J.4. Variation of Friction Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

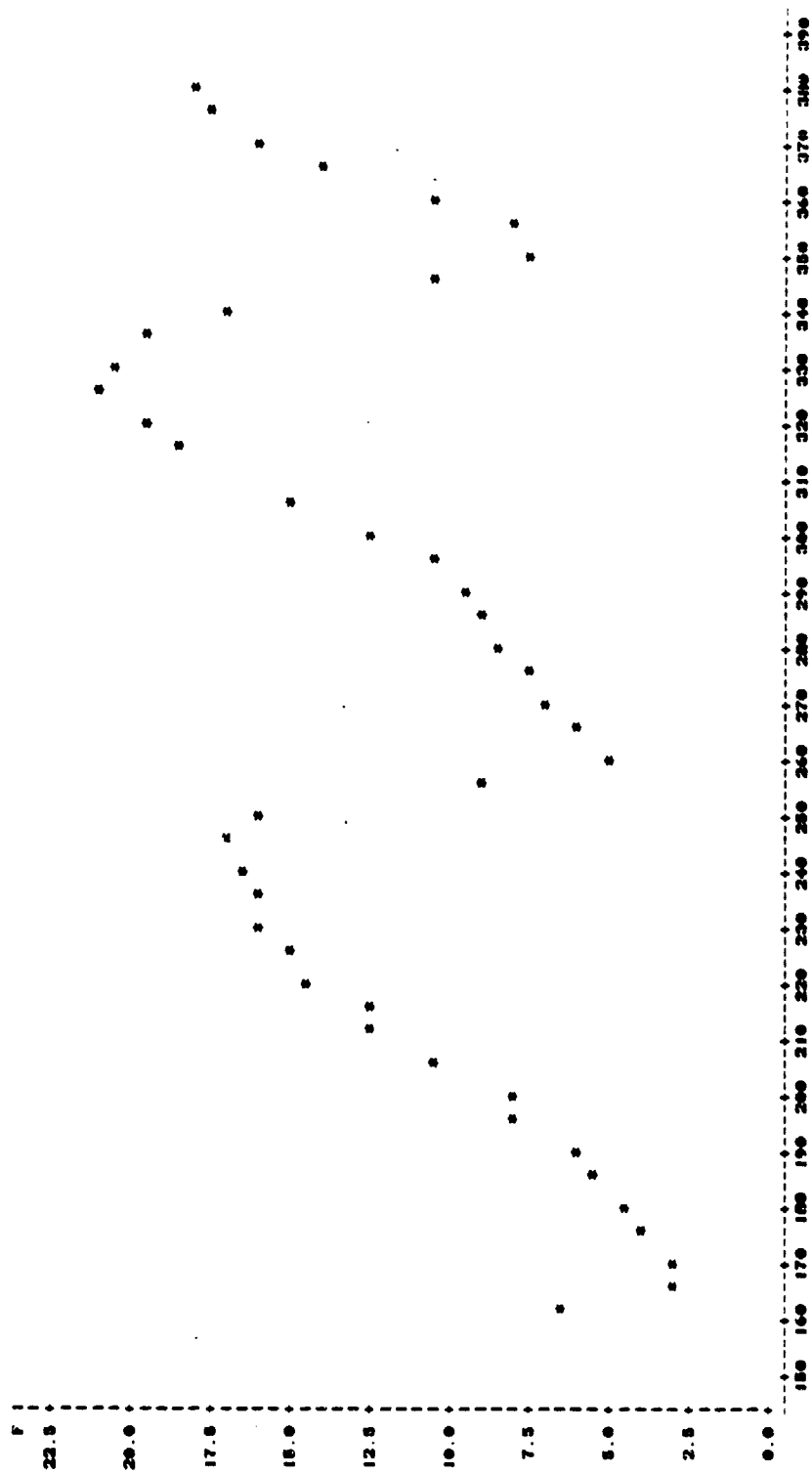

Figure J.5. Variation of Friction Force With Orientation for Aluminum With 40° Tool, Test Al 03

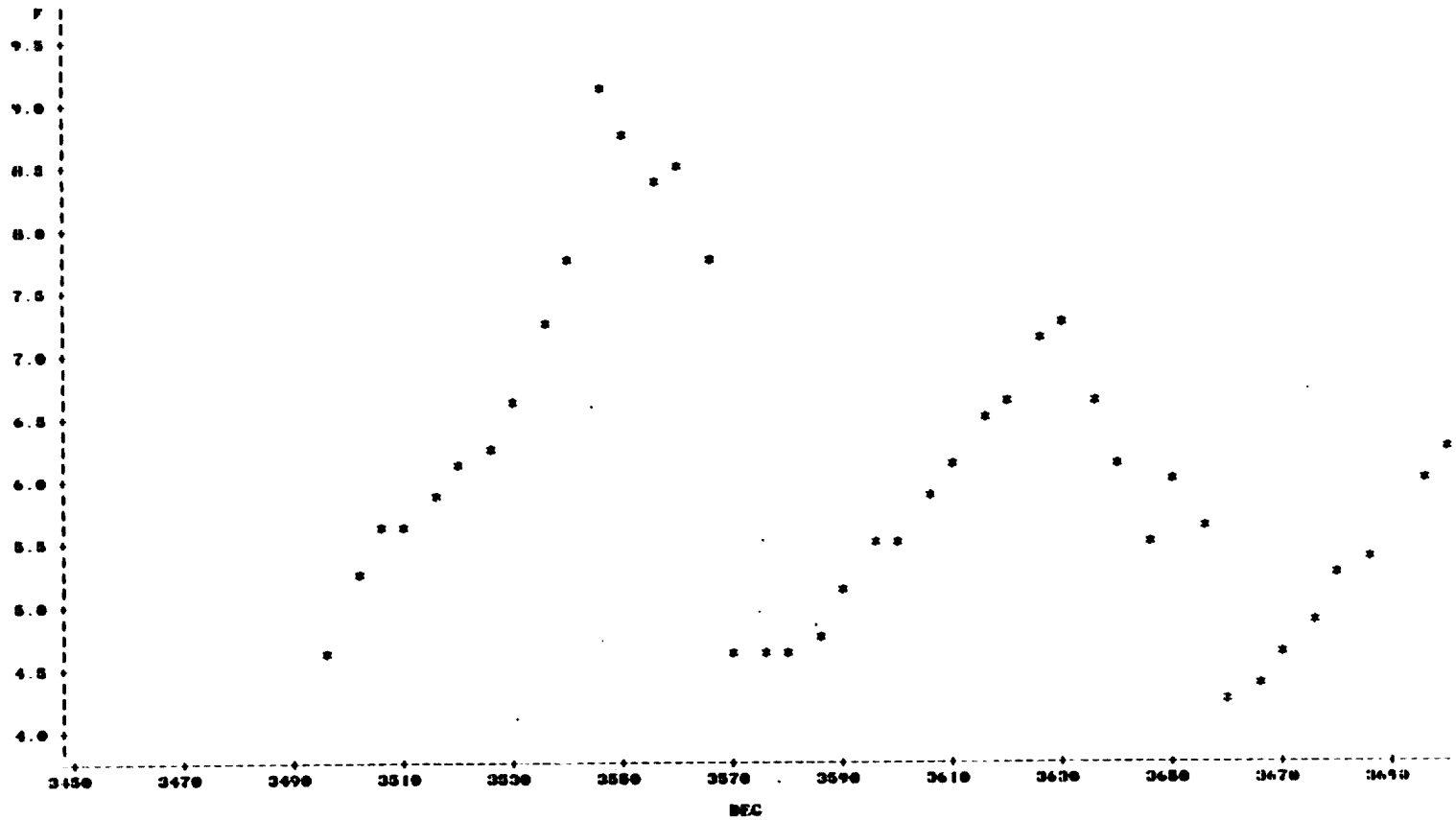

Figure J.6. Variation of Friction Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

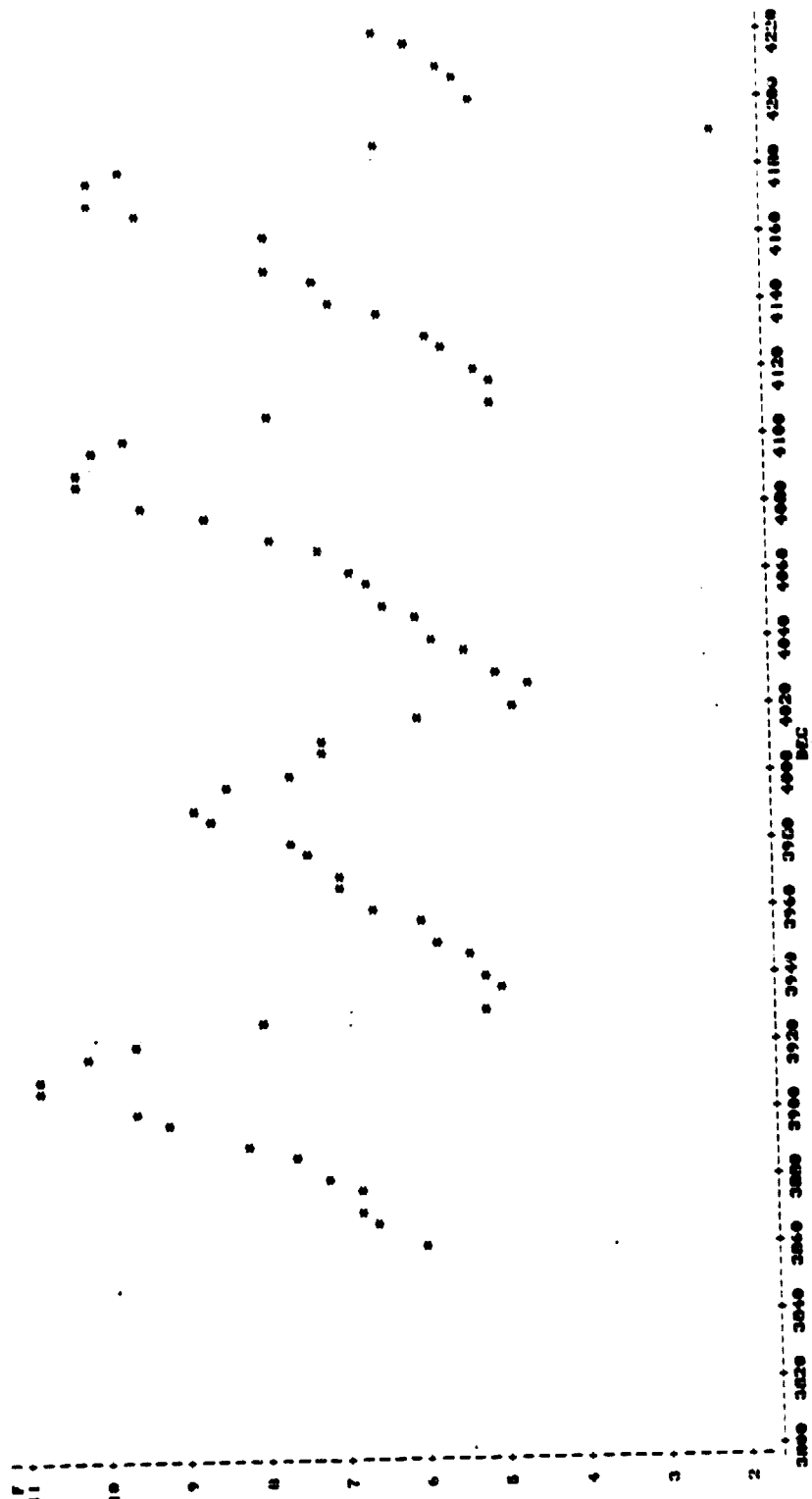

Figure J.7. Variation of Friction Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

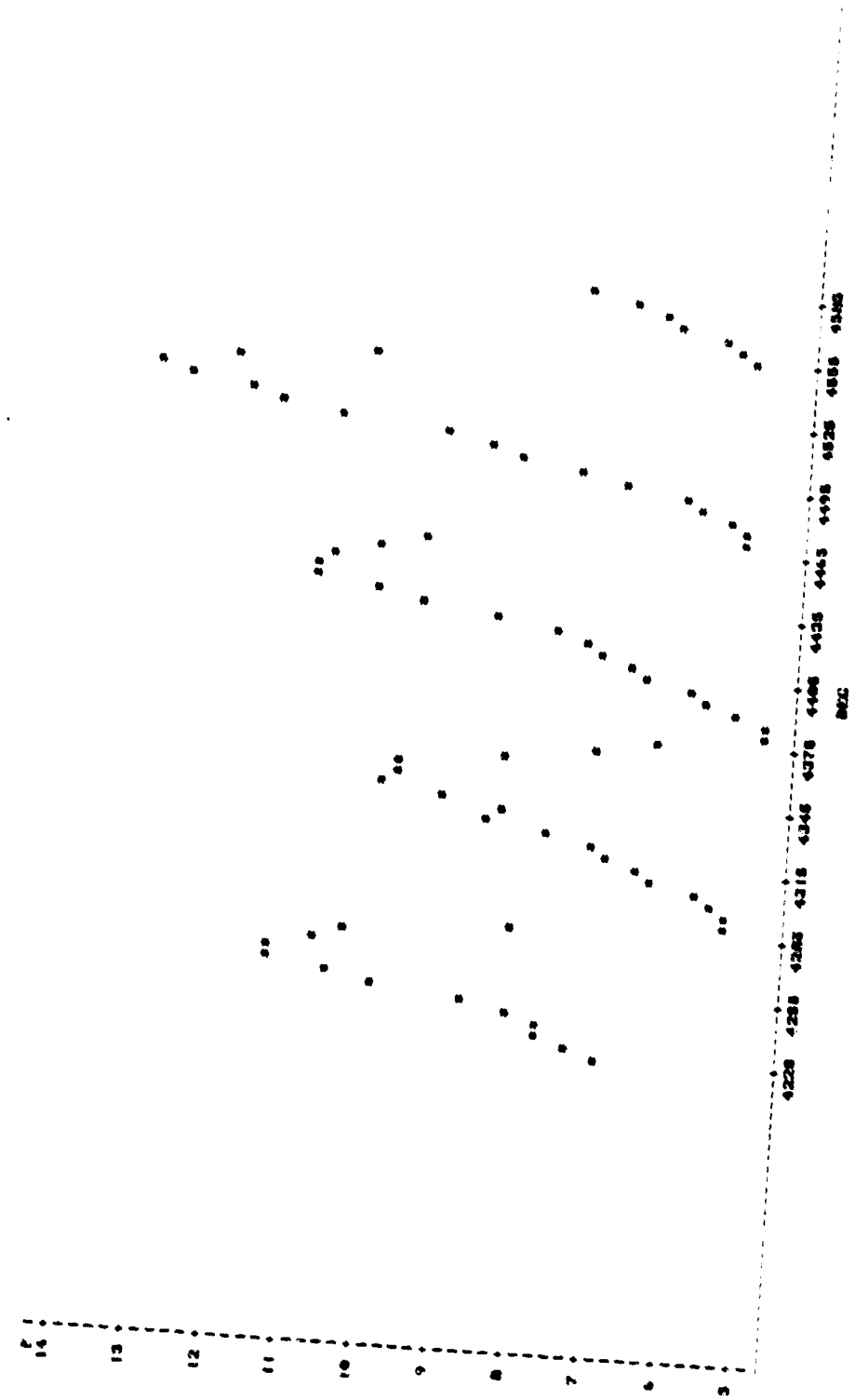

Figure J.8. Variation of Friction Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

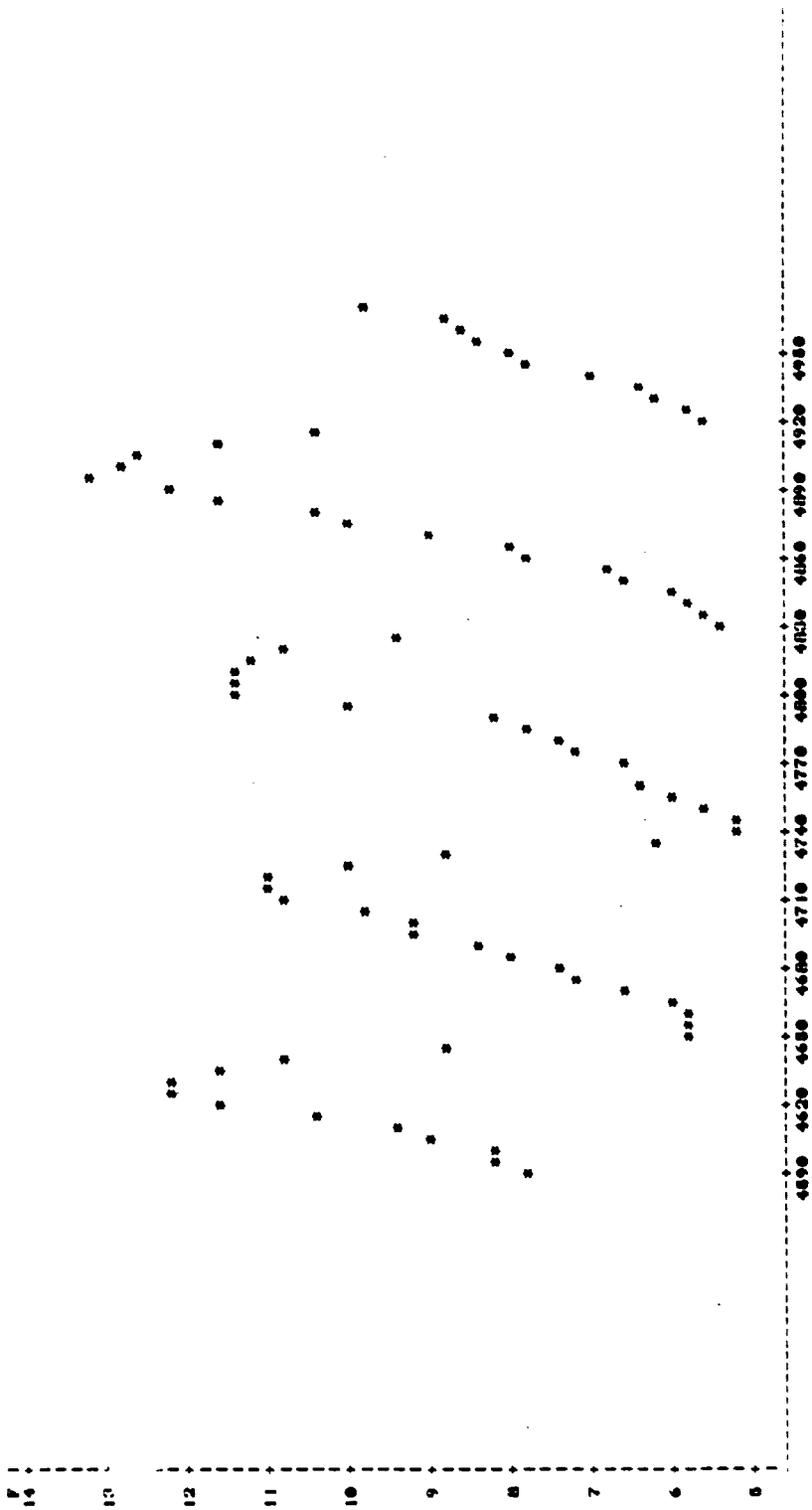

Figure J 9. Variation of Friction Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

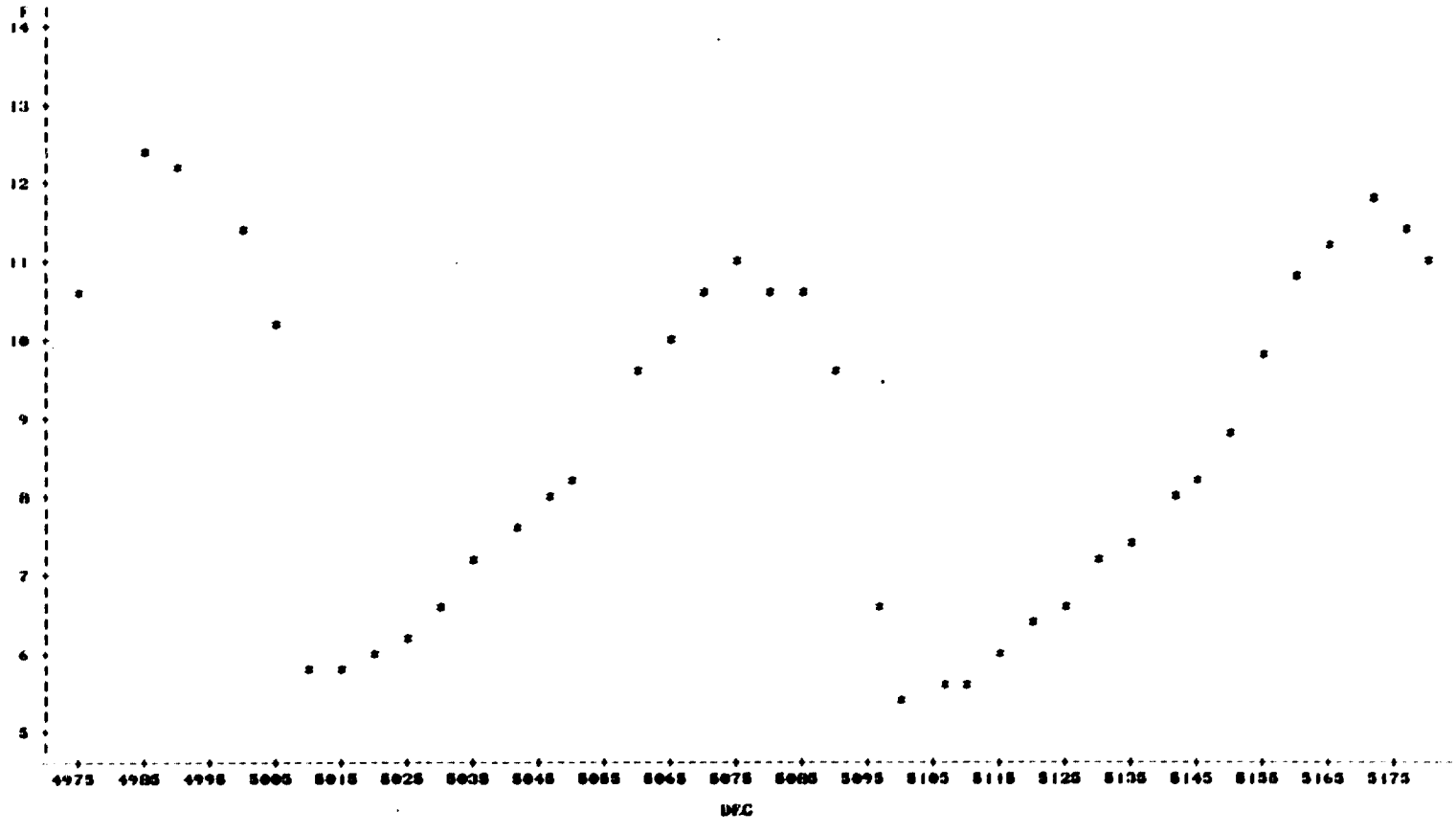

Figure J.10. Variation of Friction Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

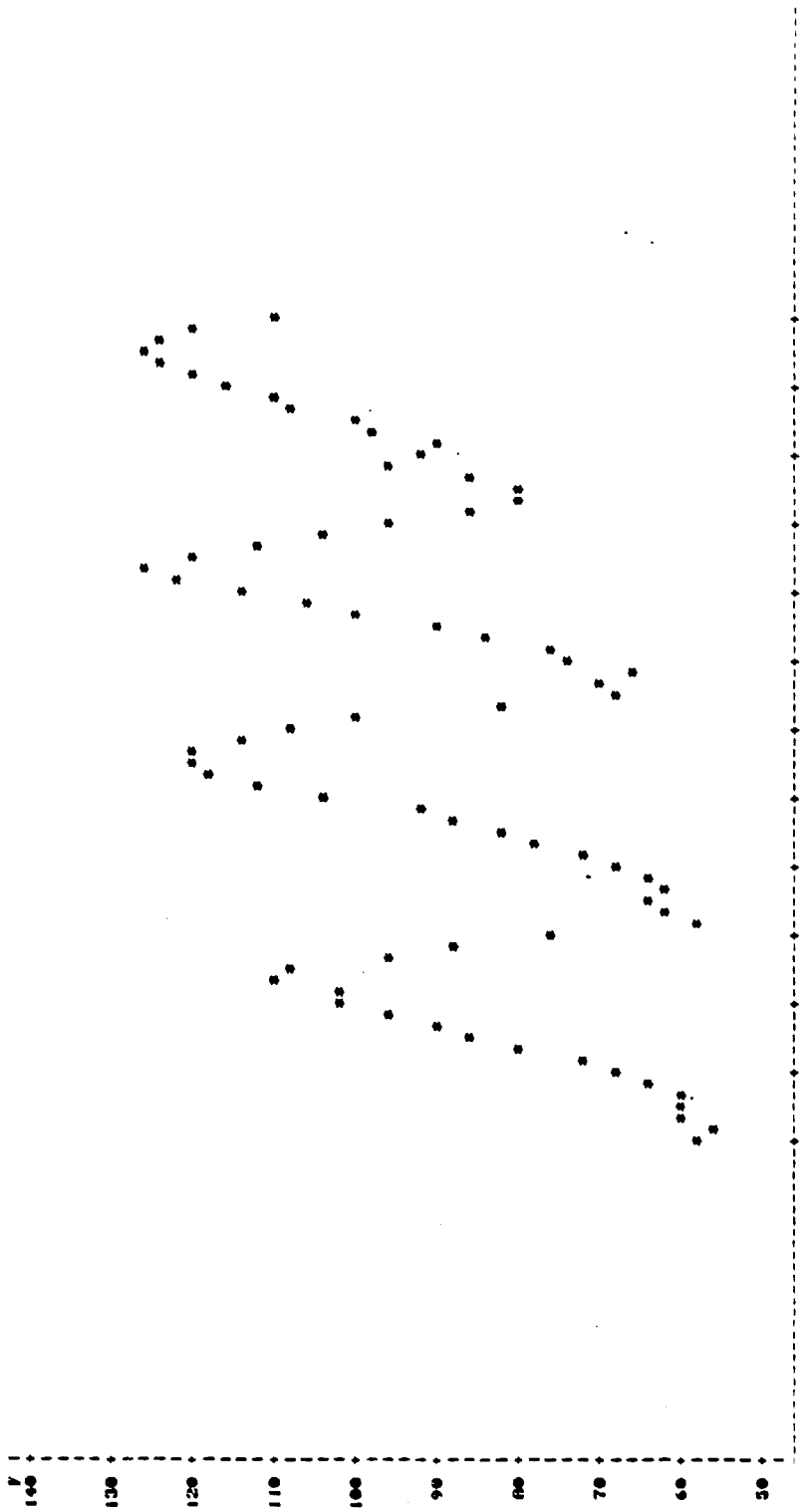

Figure J.11. Variation of Friction Force With Orientation for Copper With 20° Tool, TEst Cu 06

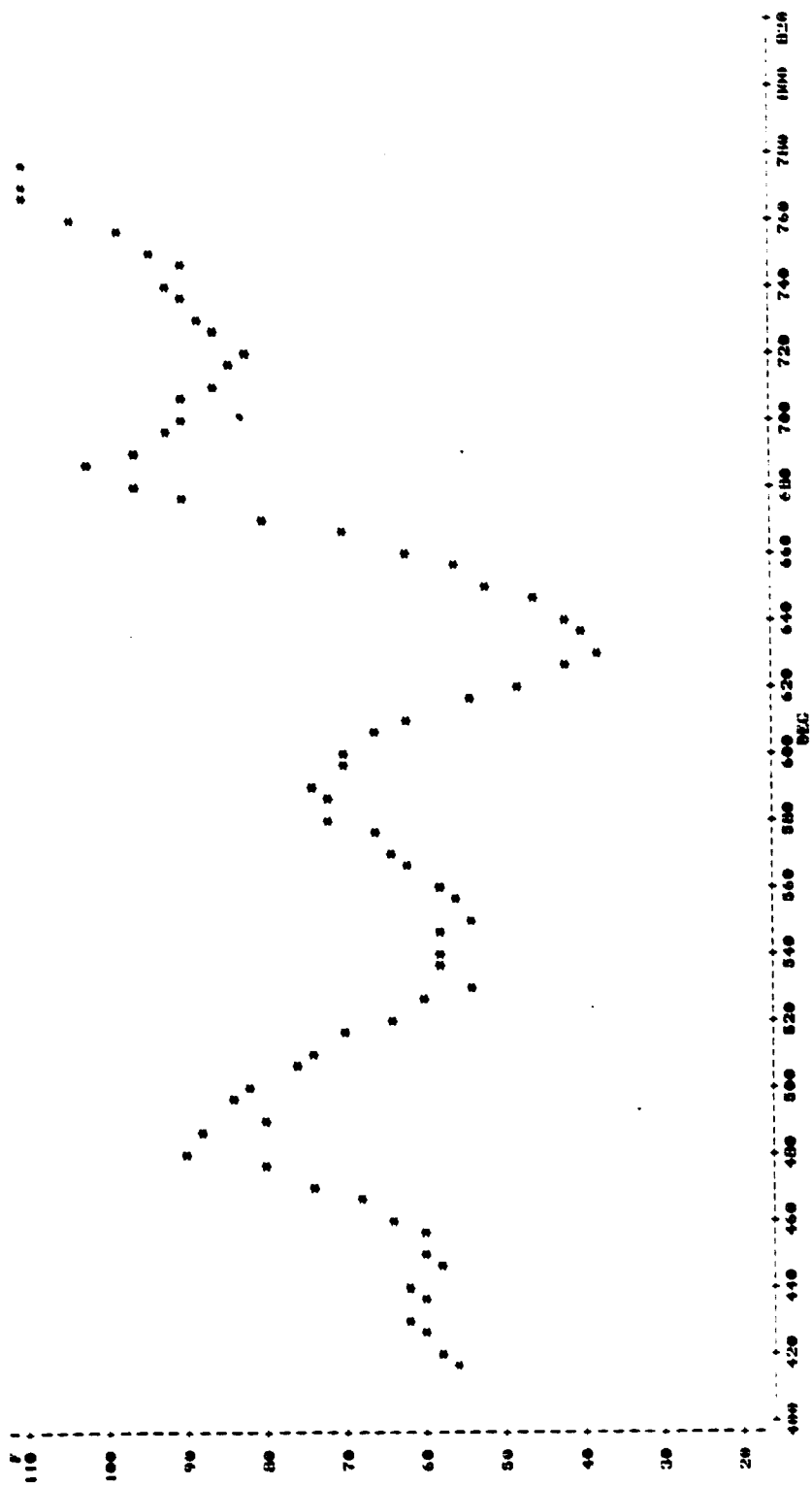

Figure J.12. Variation of Friction Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

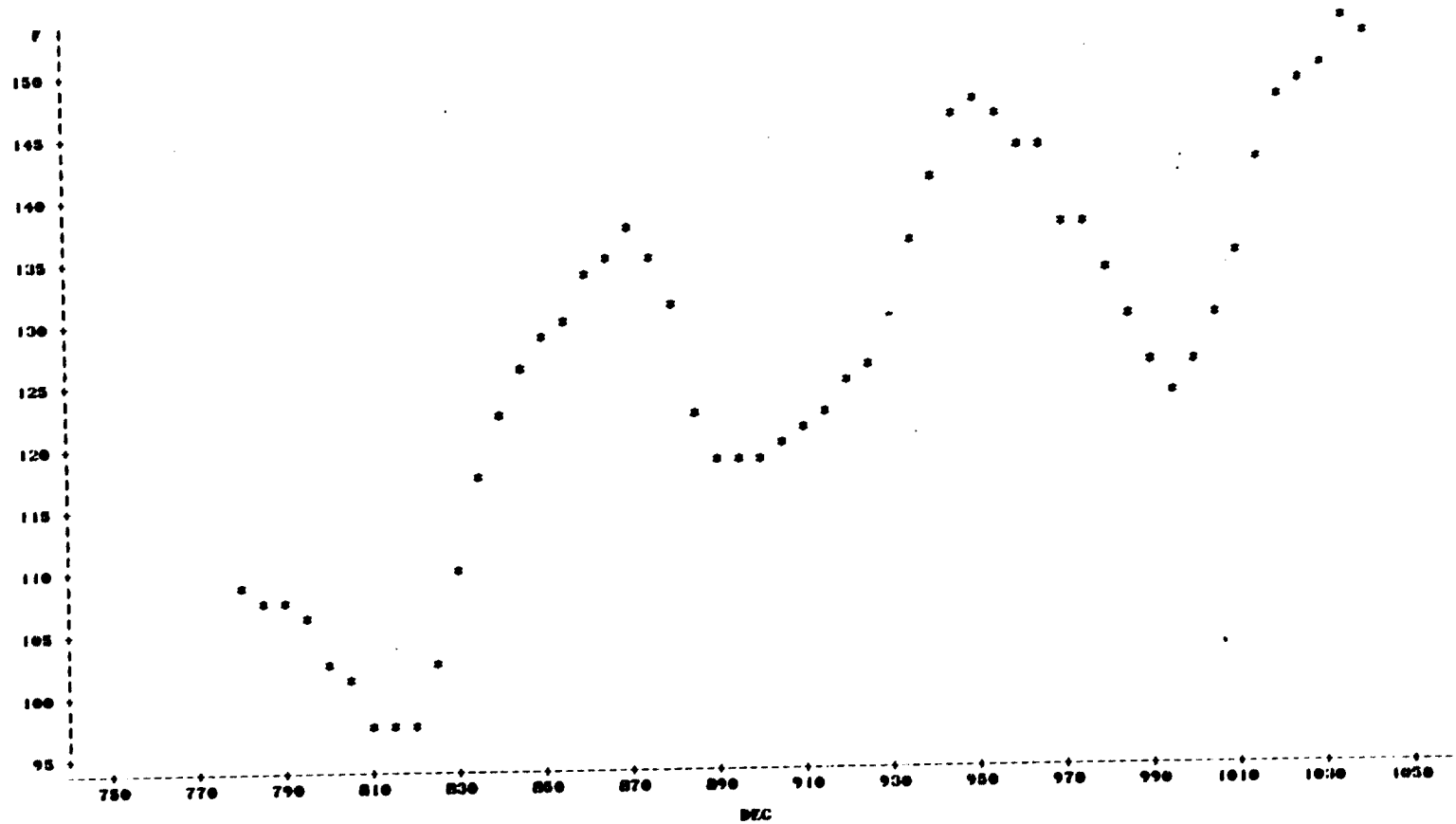

Figure J.13. Variation of Friction Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

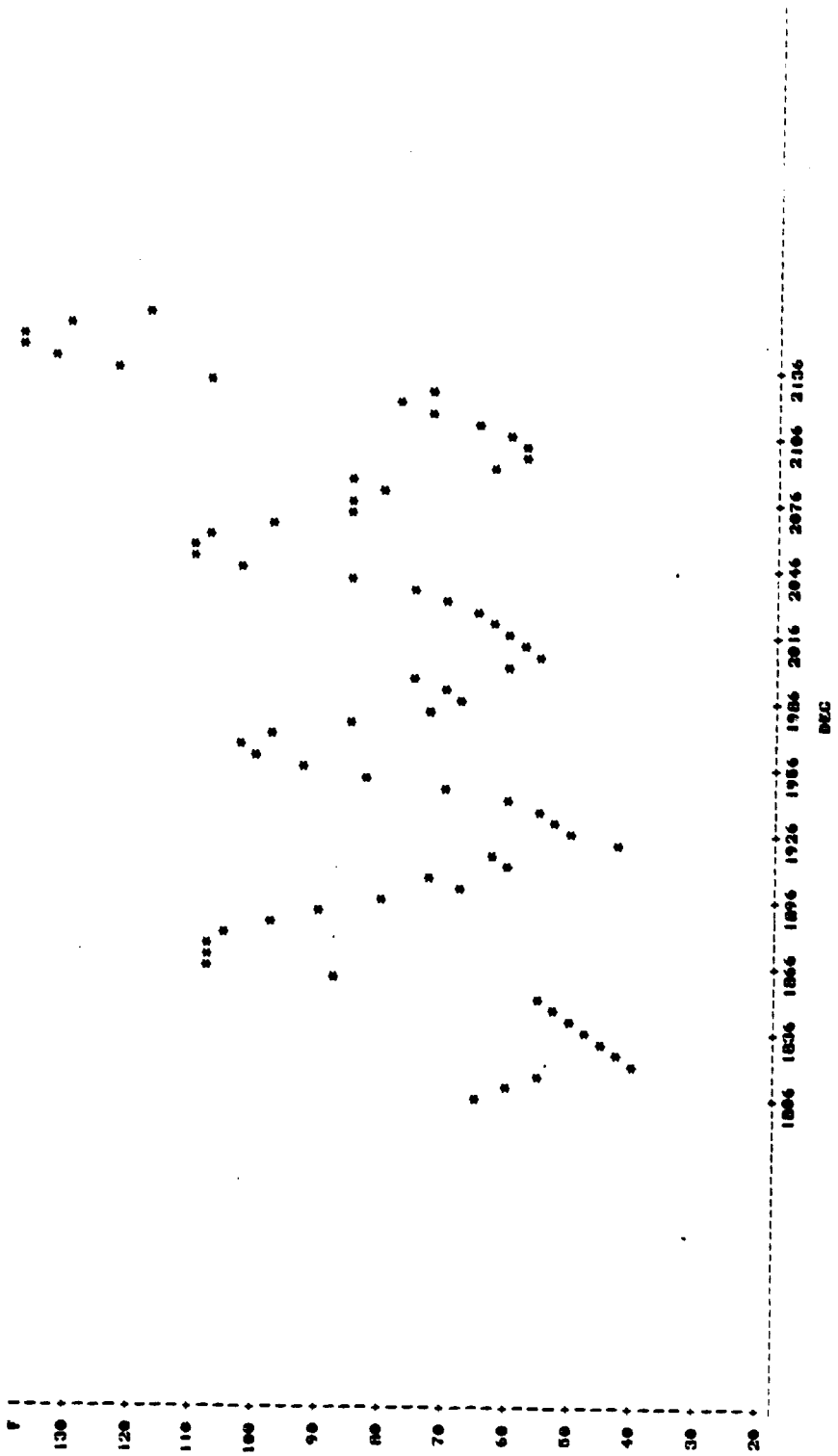

Figure J.14. Variation of Friction Force With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX K

Variation of Normal to Friction Force

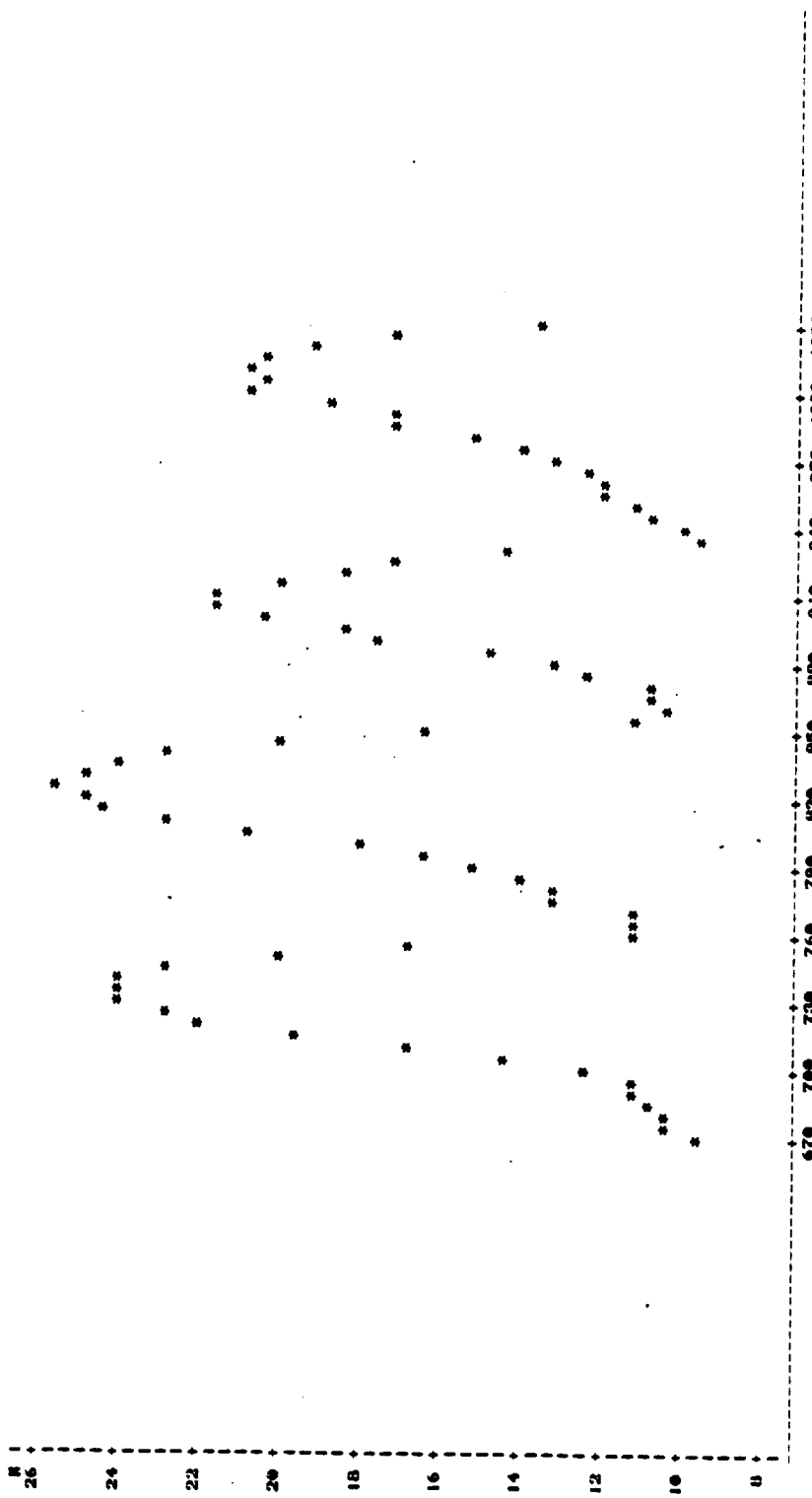

Figure K.1. Variation of Force Normal to Friction With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

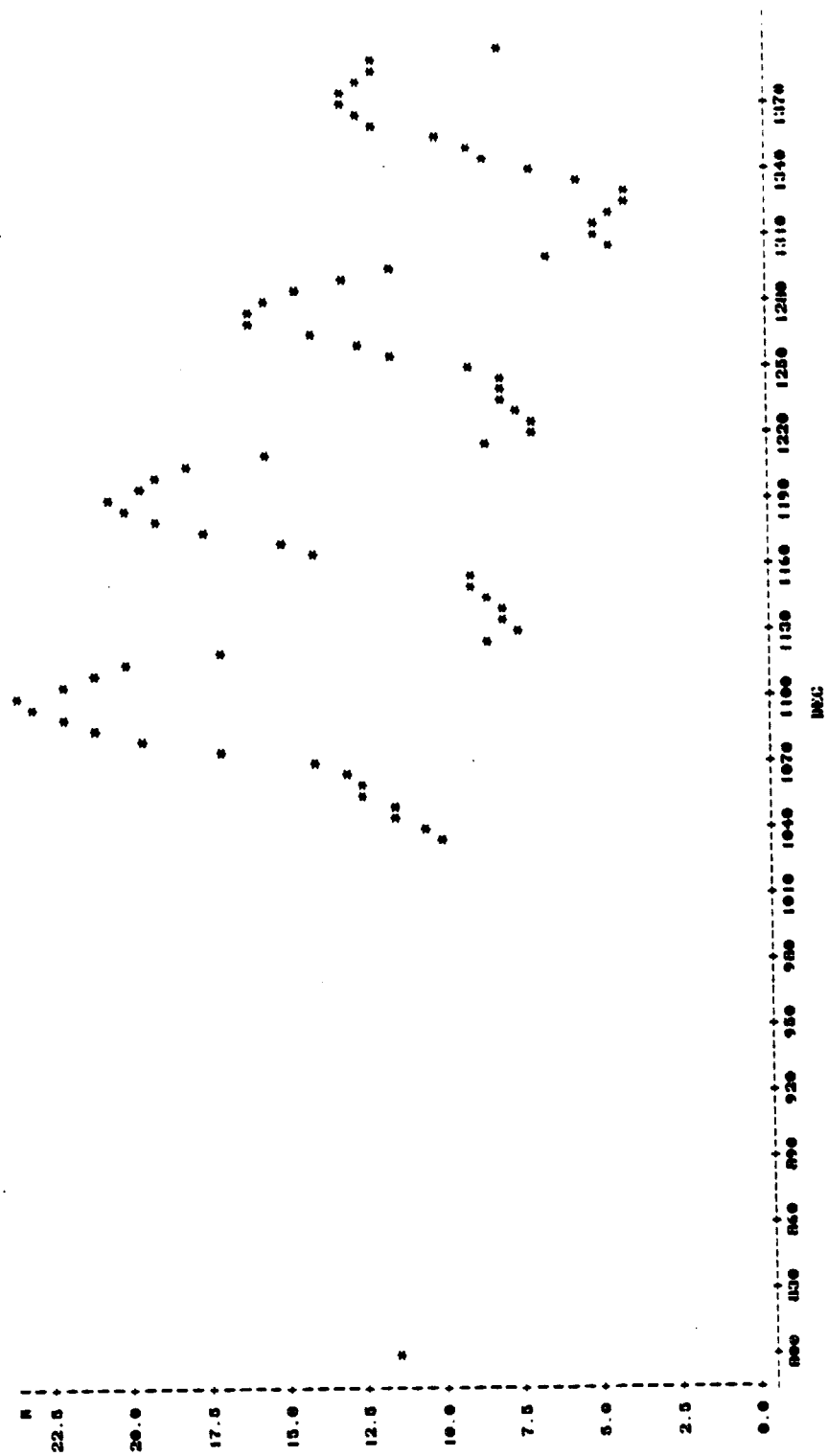

Figure K.2. Variation of Force Normal to Friction With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

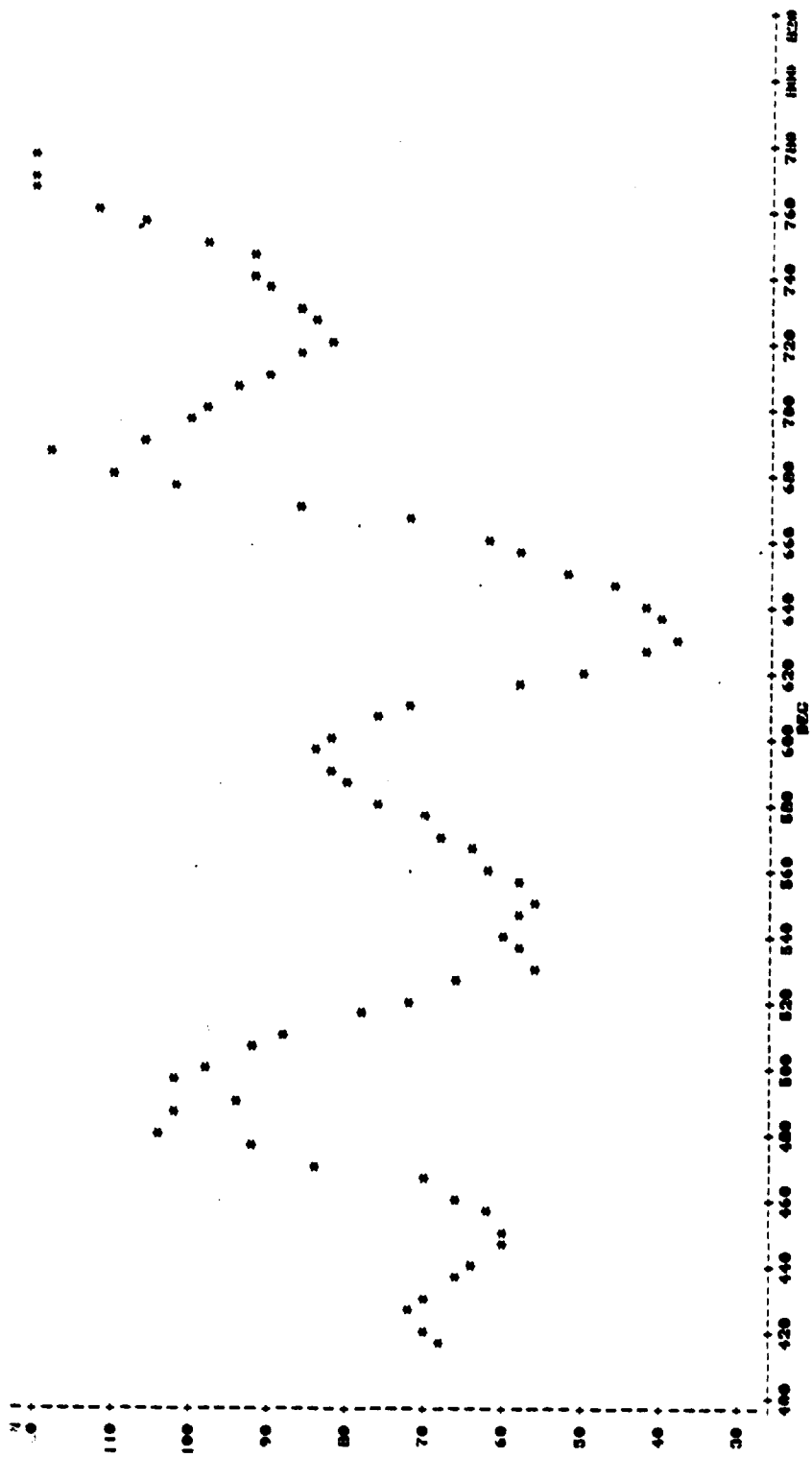

Figure K.3. Variation of Force Normal to Friction With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

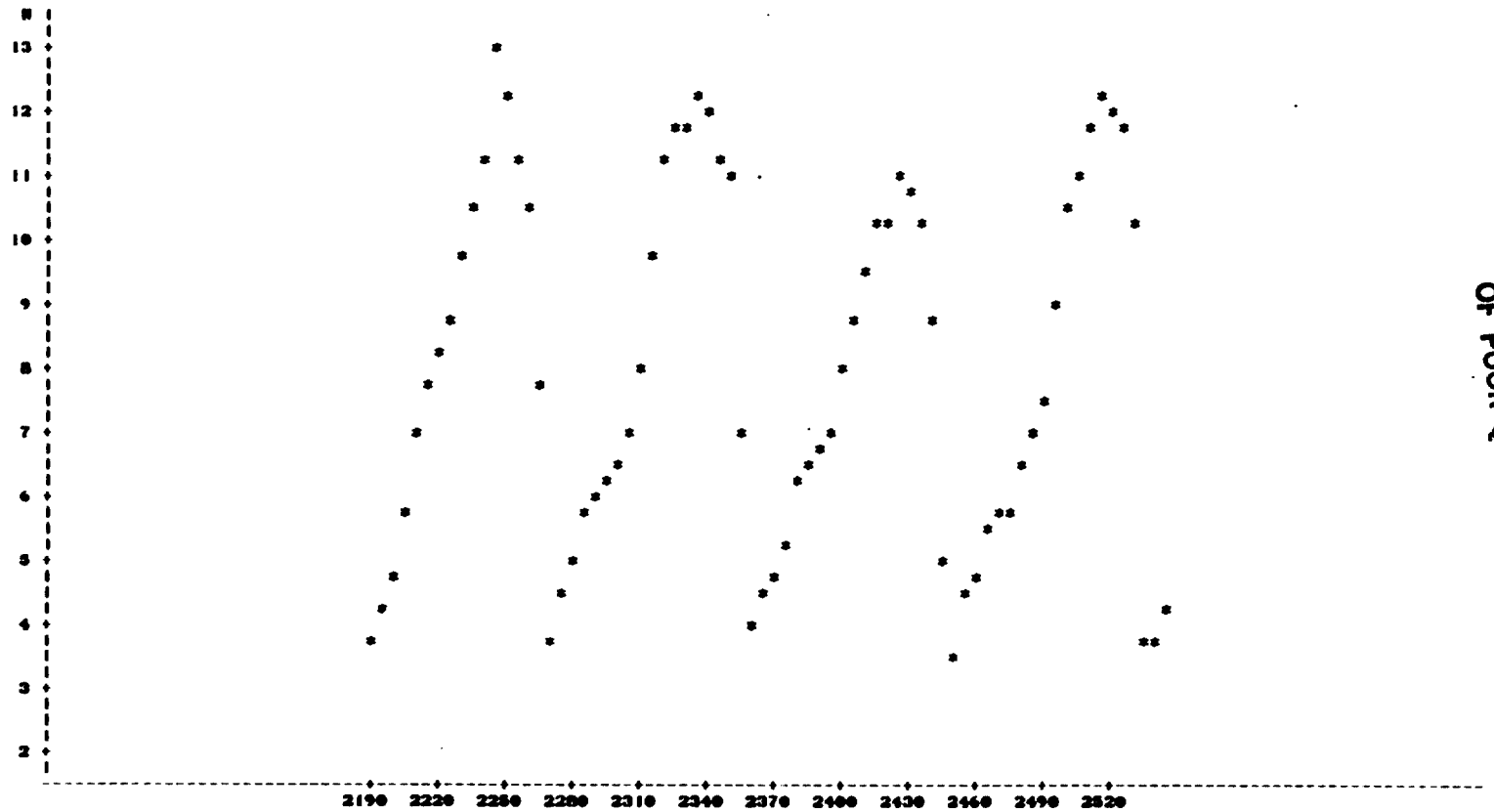

Figure K.4. Variation of Force Normal to Friction With Orientation for Aluminum With 40° Tool, Test Al 63, Revolution 3

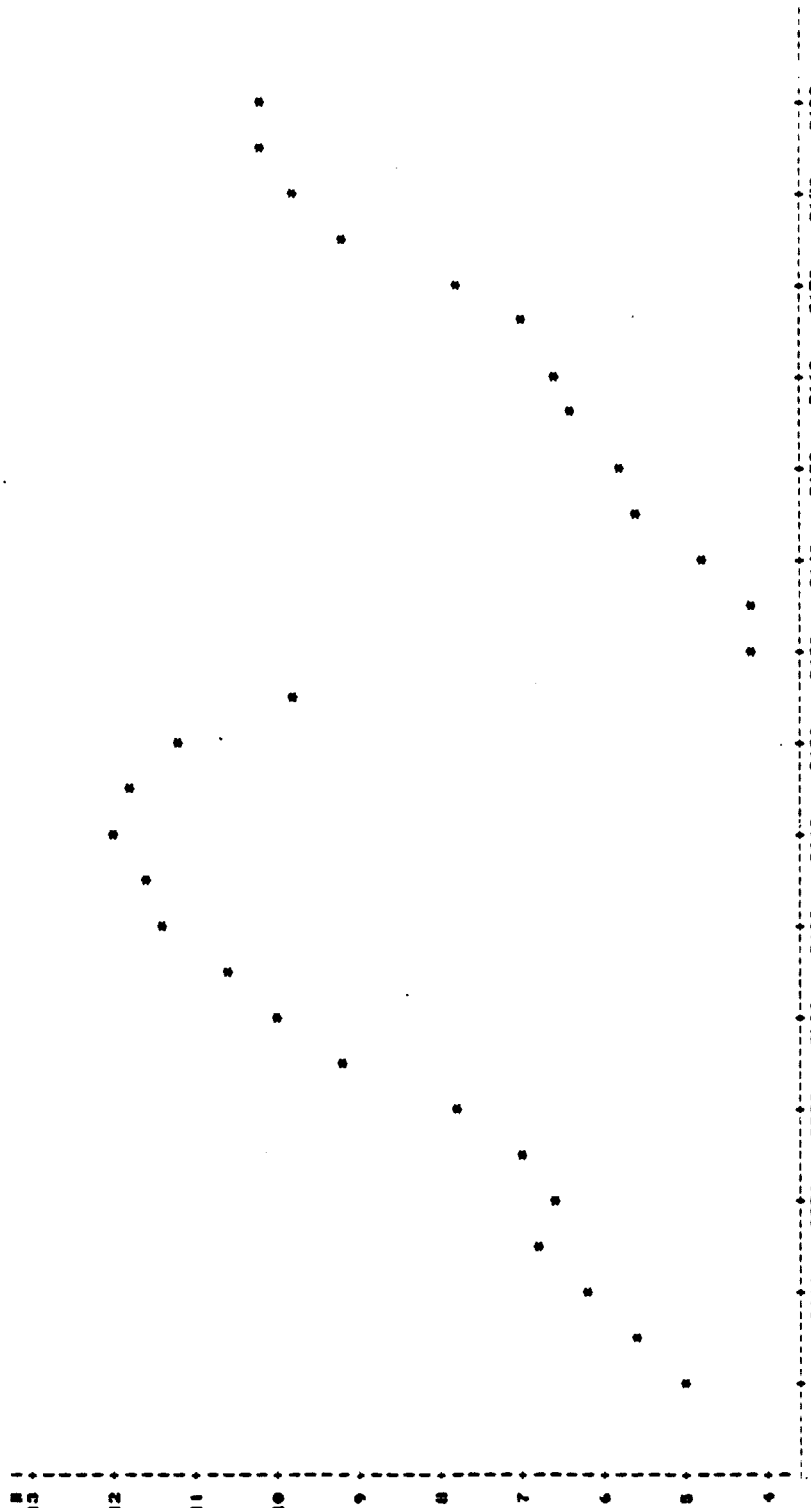

Figure K.5. Variation of Force Normal to Friction With Orientation for Aluminum With 40° Tool, Test Al 03

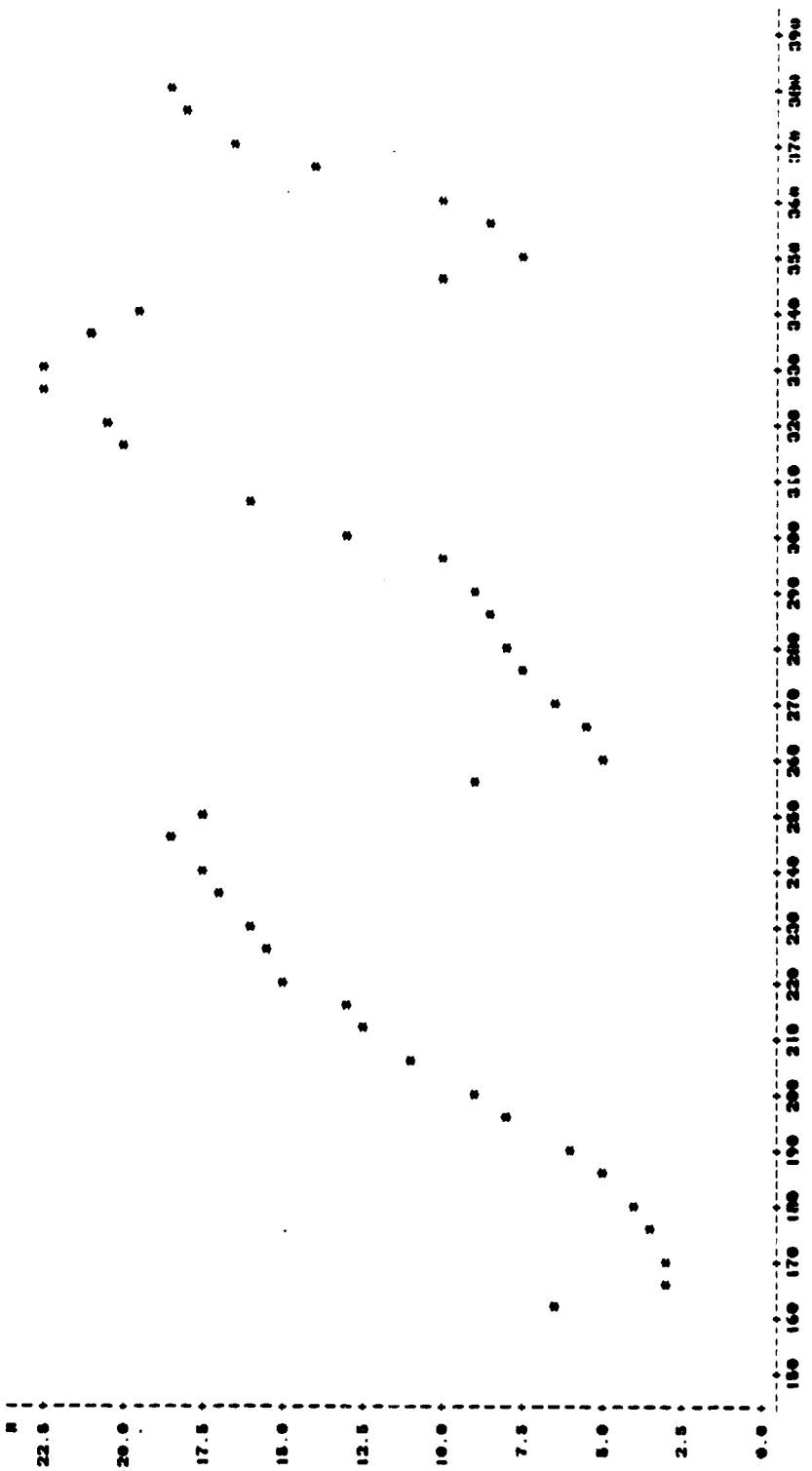

Figure K.6. Variation of Force Normal to Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

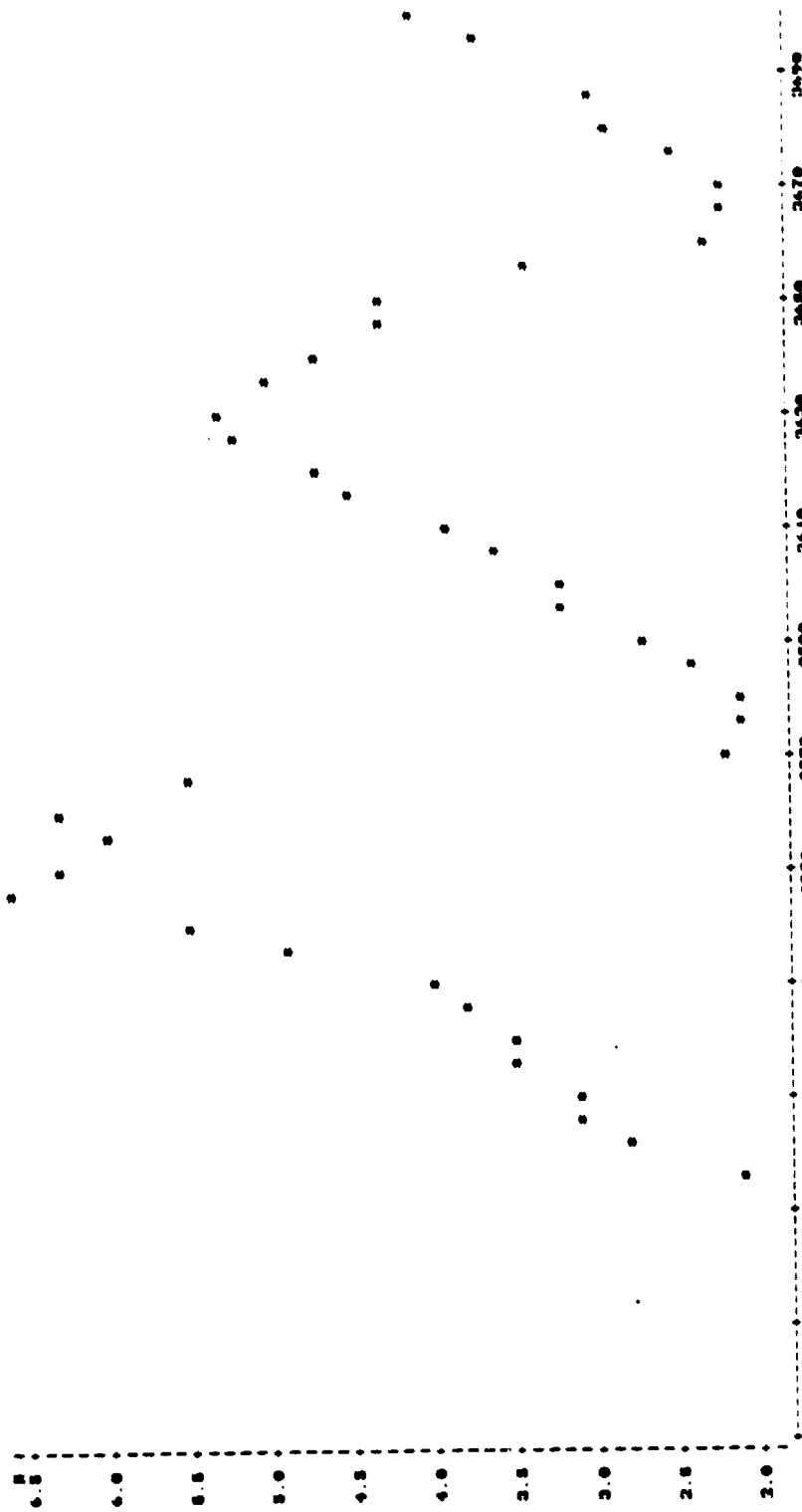

Figure K.7. Variation of Force Normal to Friction With Orientation for Aluminum With 50° Tool, TEst Al 57, Revolution 2

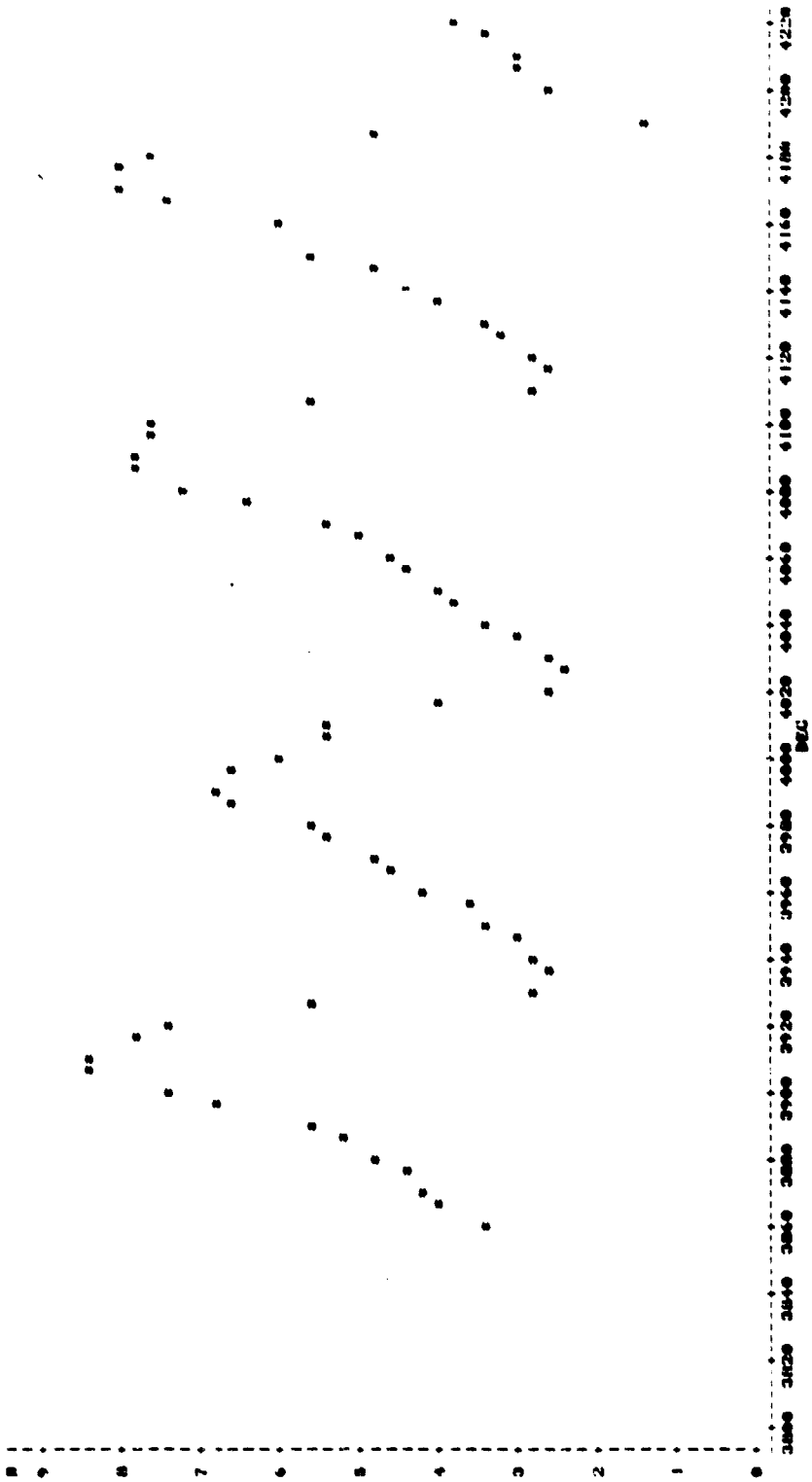

Figure K.8. Variation of Force Normal to Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

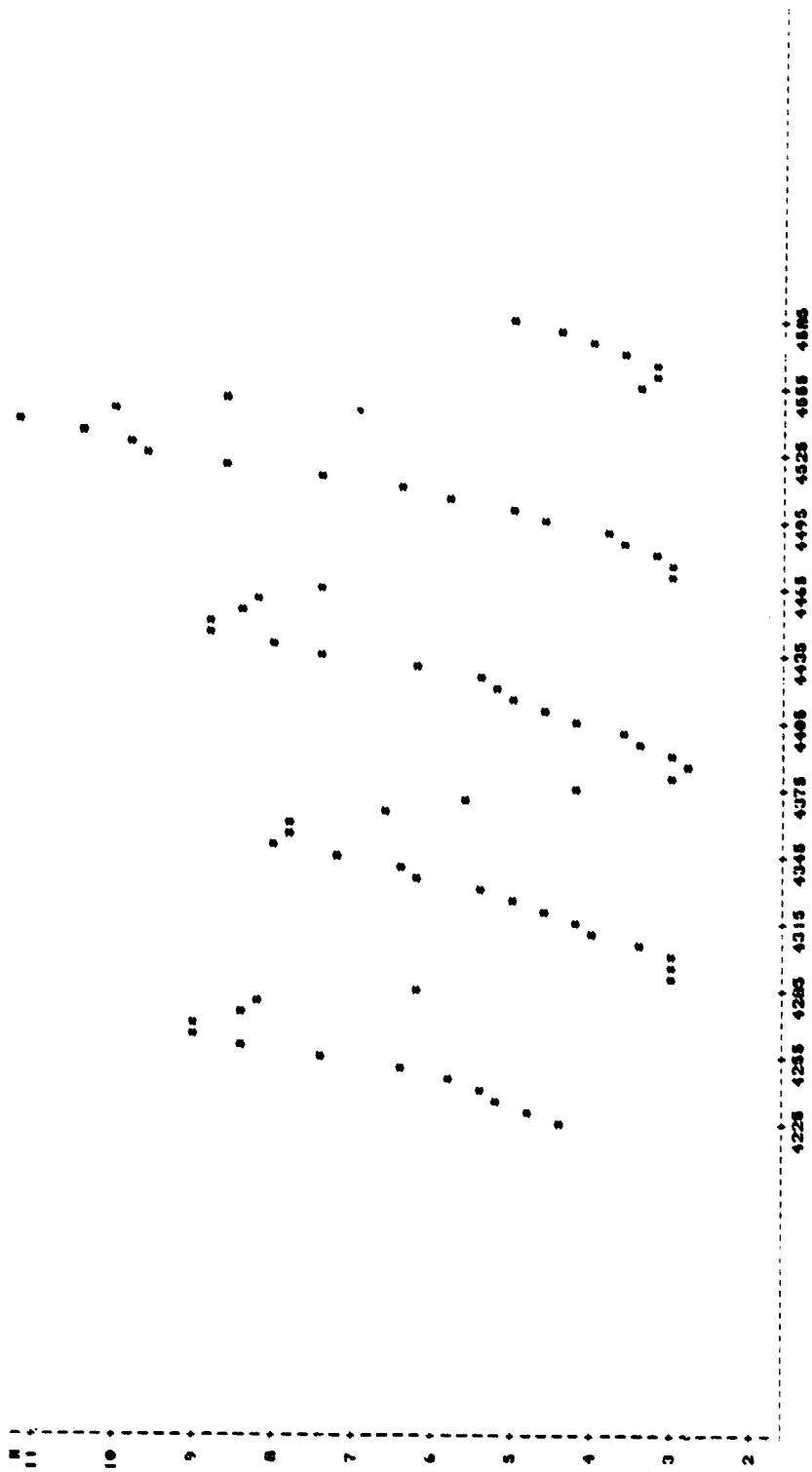

Figure K.9. Variation of Force Normal to Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

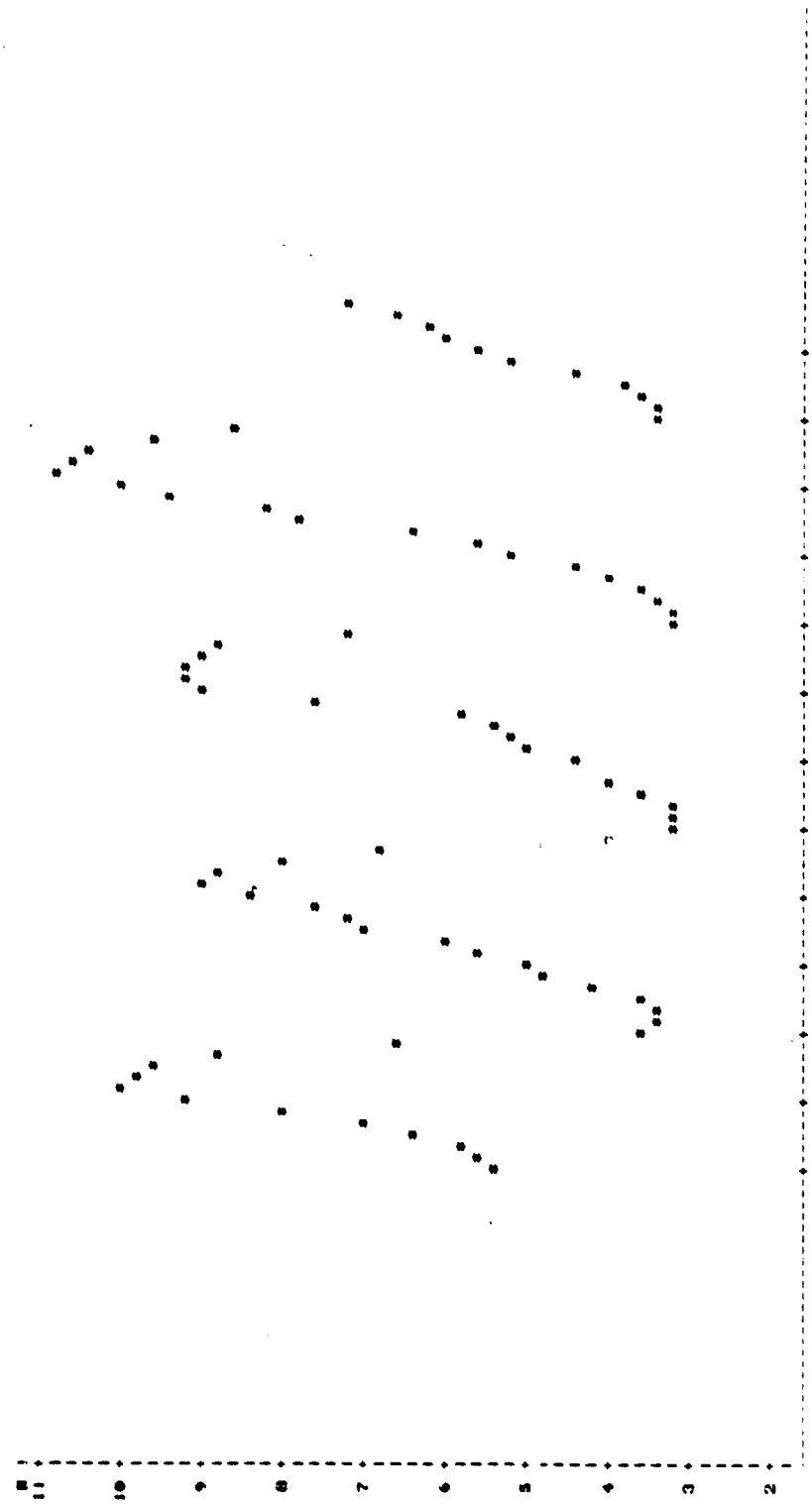

Figure K.10. Variation of Force Normal to Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

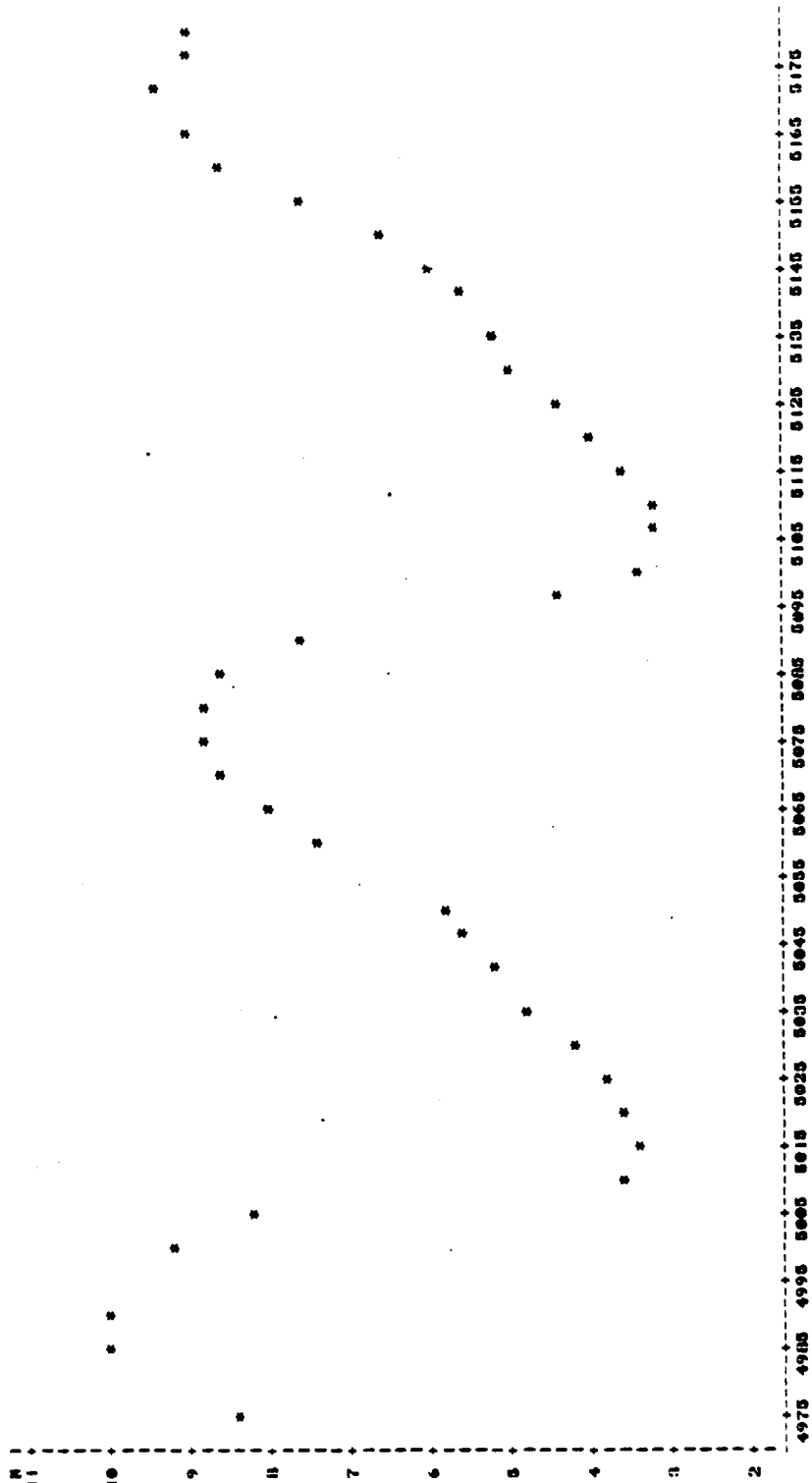

Figure K.11. Variation of Force Normal to Friction With Orientation for Copper With 20° Tool, Test Cu 06

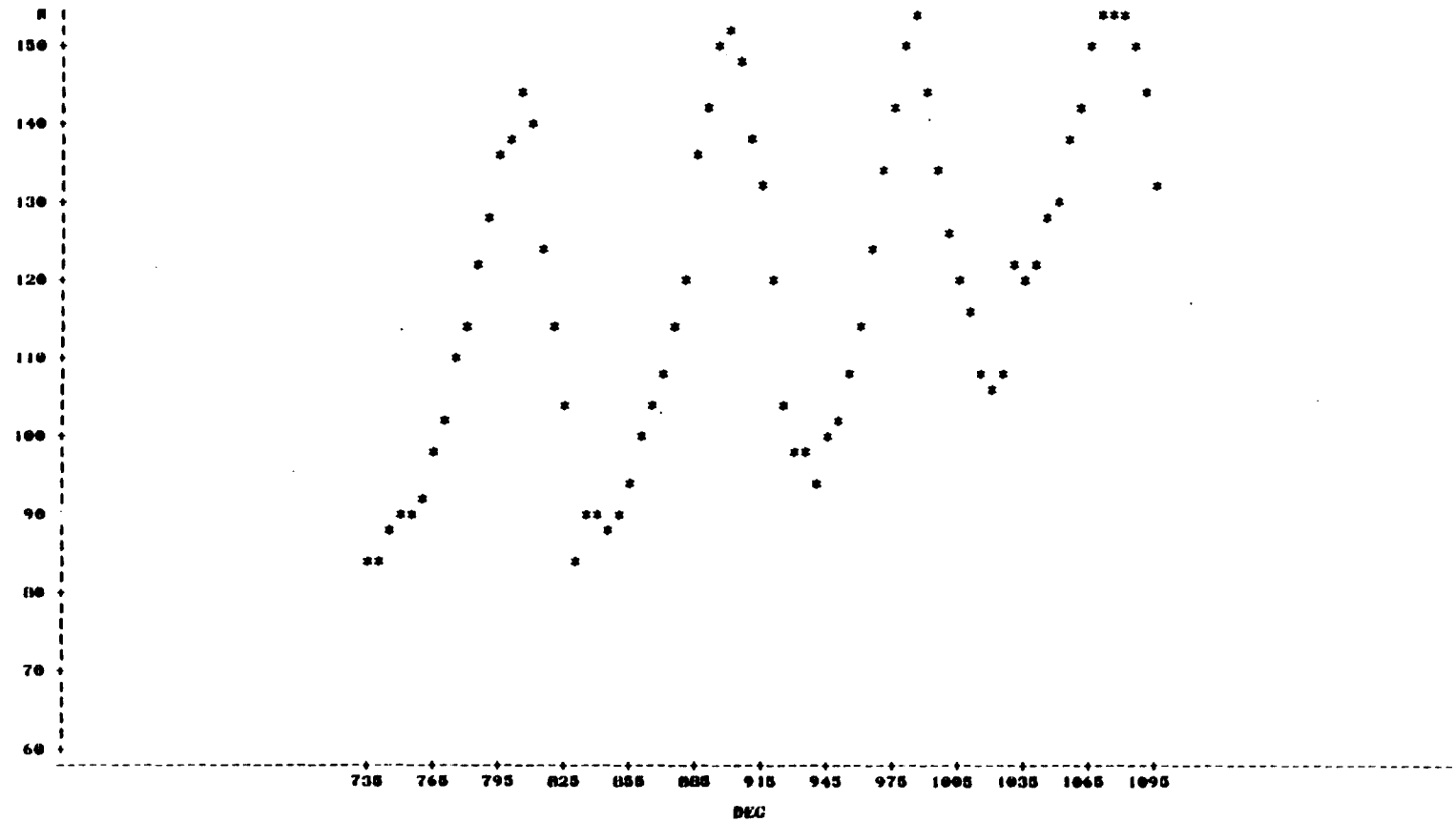

Figure K.12. Variation of Force Normal to Friction With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

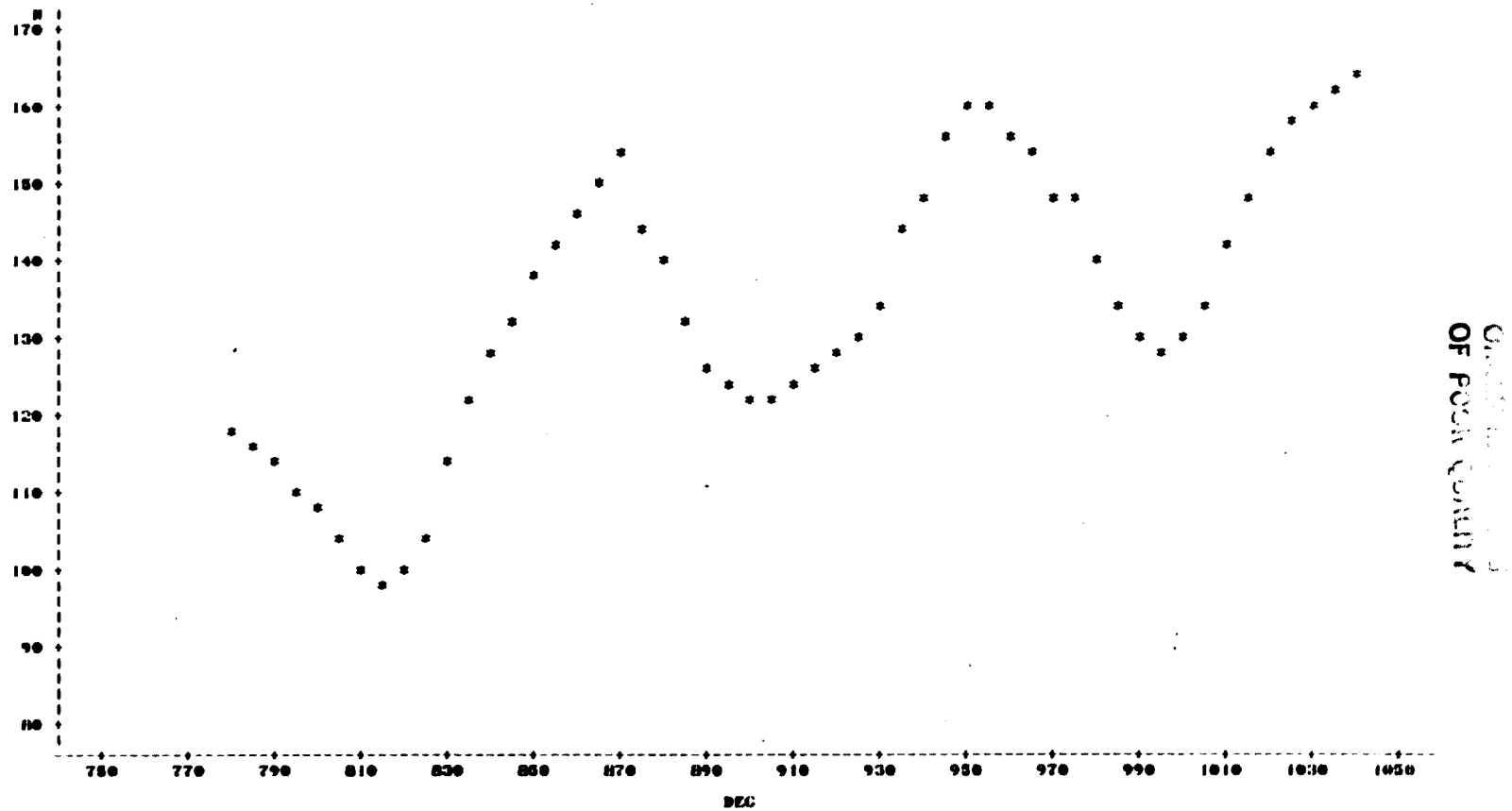

Figure K.13. Variation of Force Normal to Friction With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

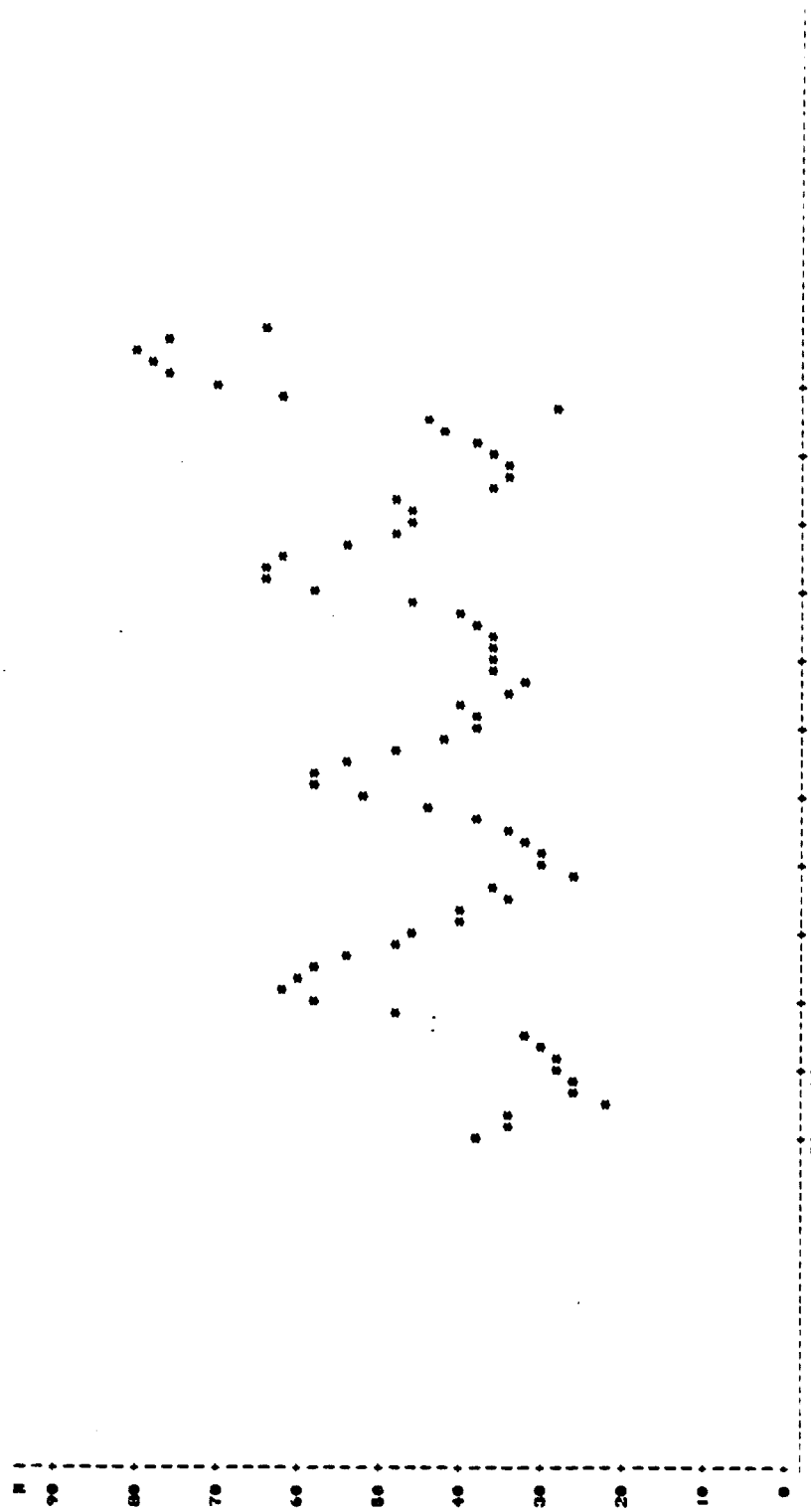

Figure K.14. Variation of Force Normal to Friction With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX L

Variation of Dynamic Shear Stress

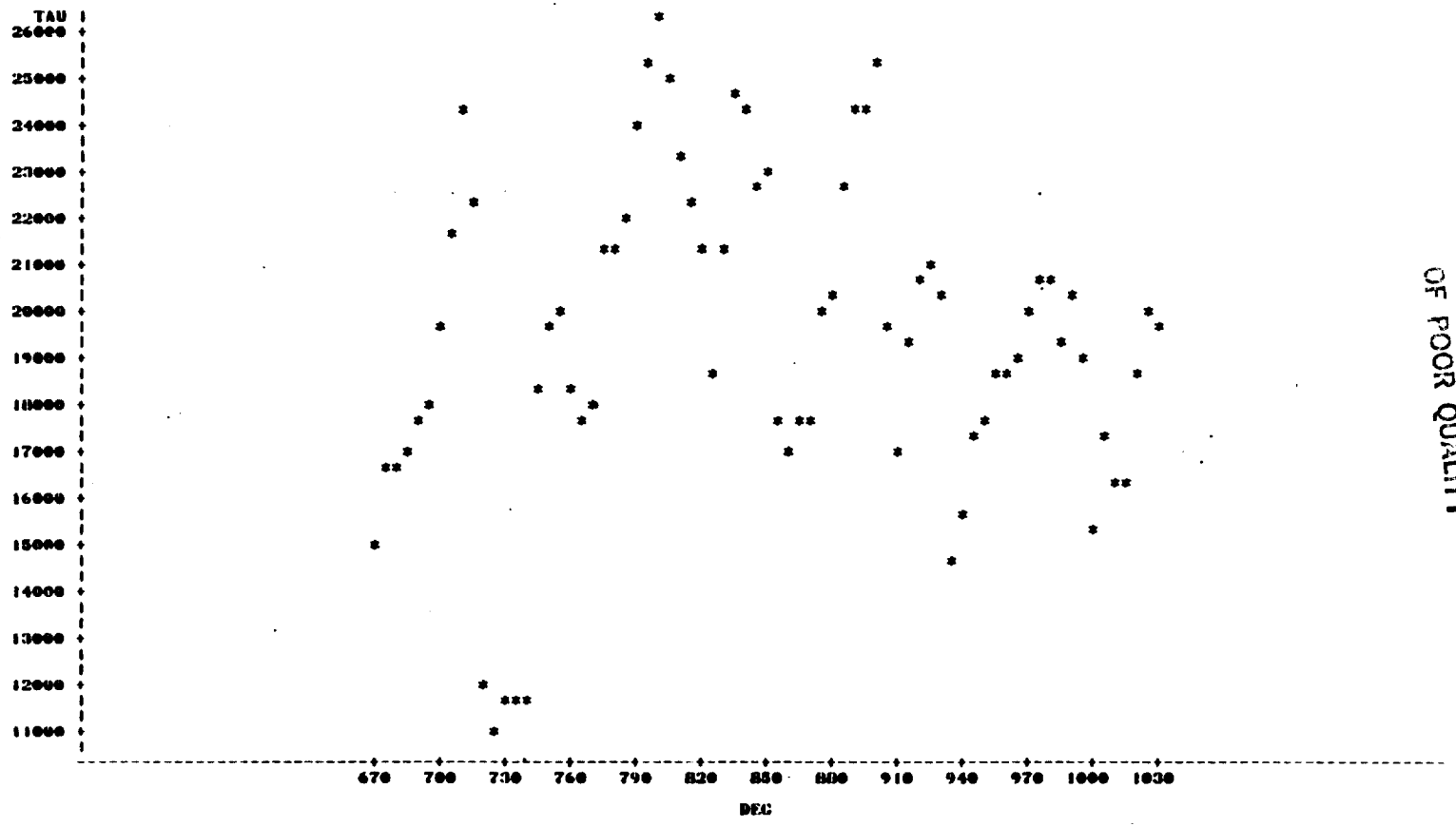

Figure L.1. Variation of Flow Stress With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

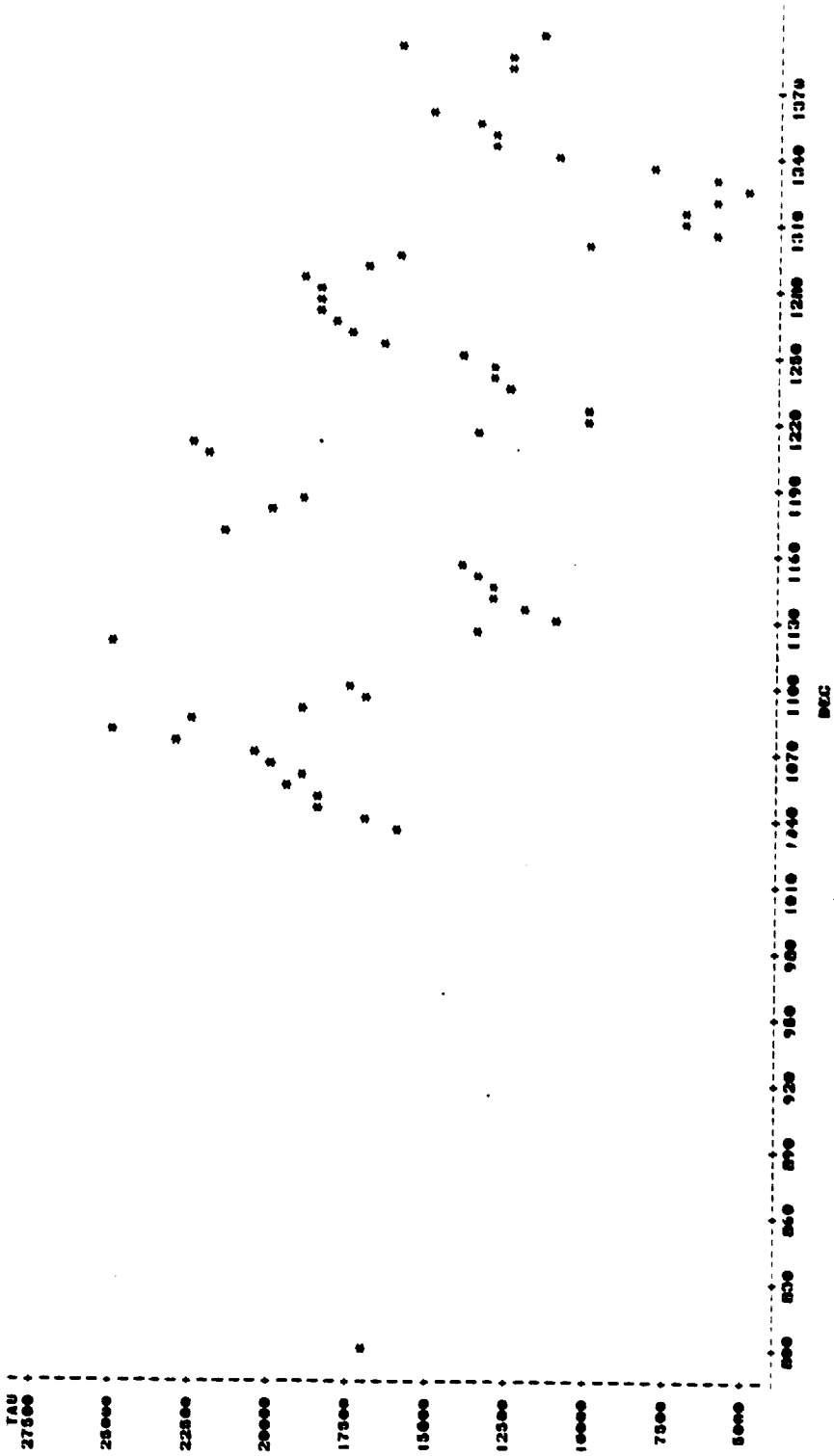

Figure L.2. Variation of Flow Stress With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

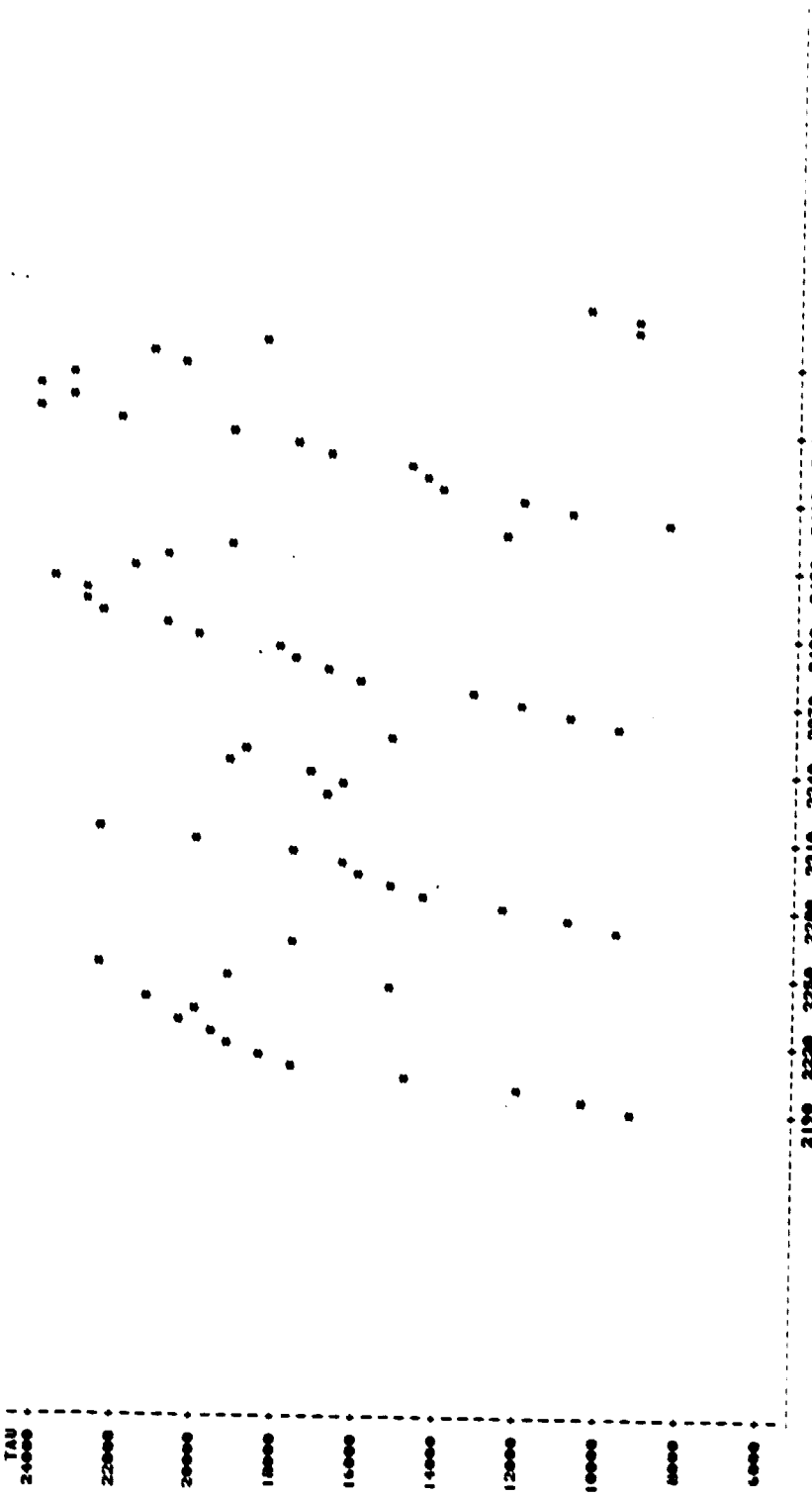

Figure L.3. Variation of Flow Stress With Orientation for Aluminum With 40° Tool, TEst Al 56, Revolution 2

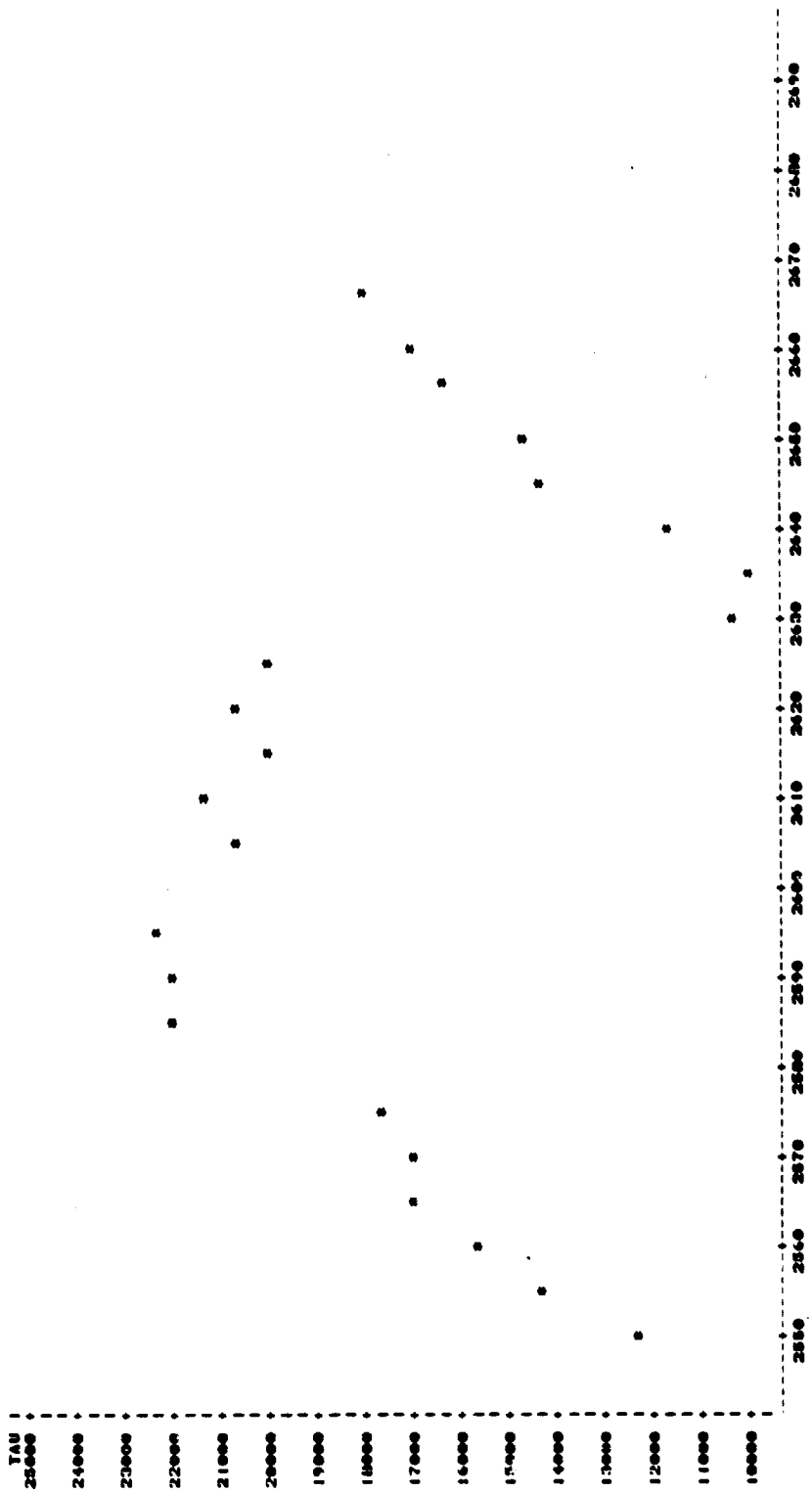

Figure L.4. Variation of Flow Stress With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

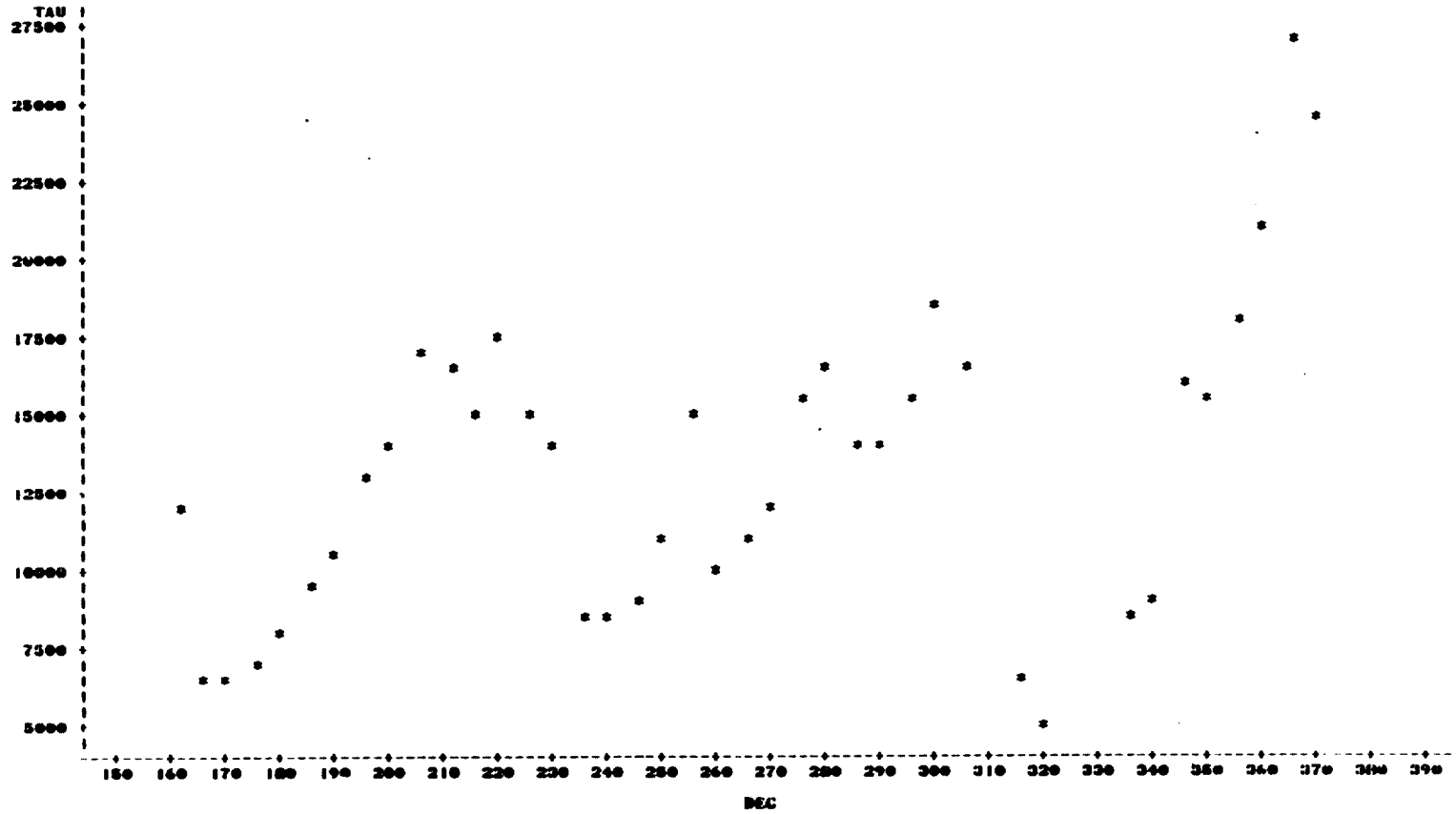

Figure L.5. Variation of Flow STress With Orientation for Aluminum With 40° Tool, Tes: Al 03

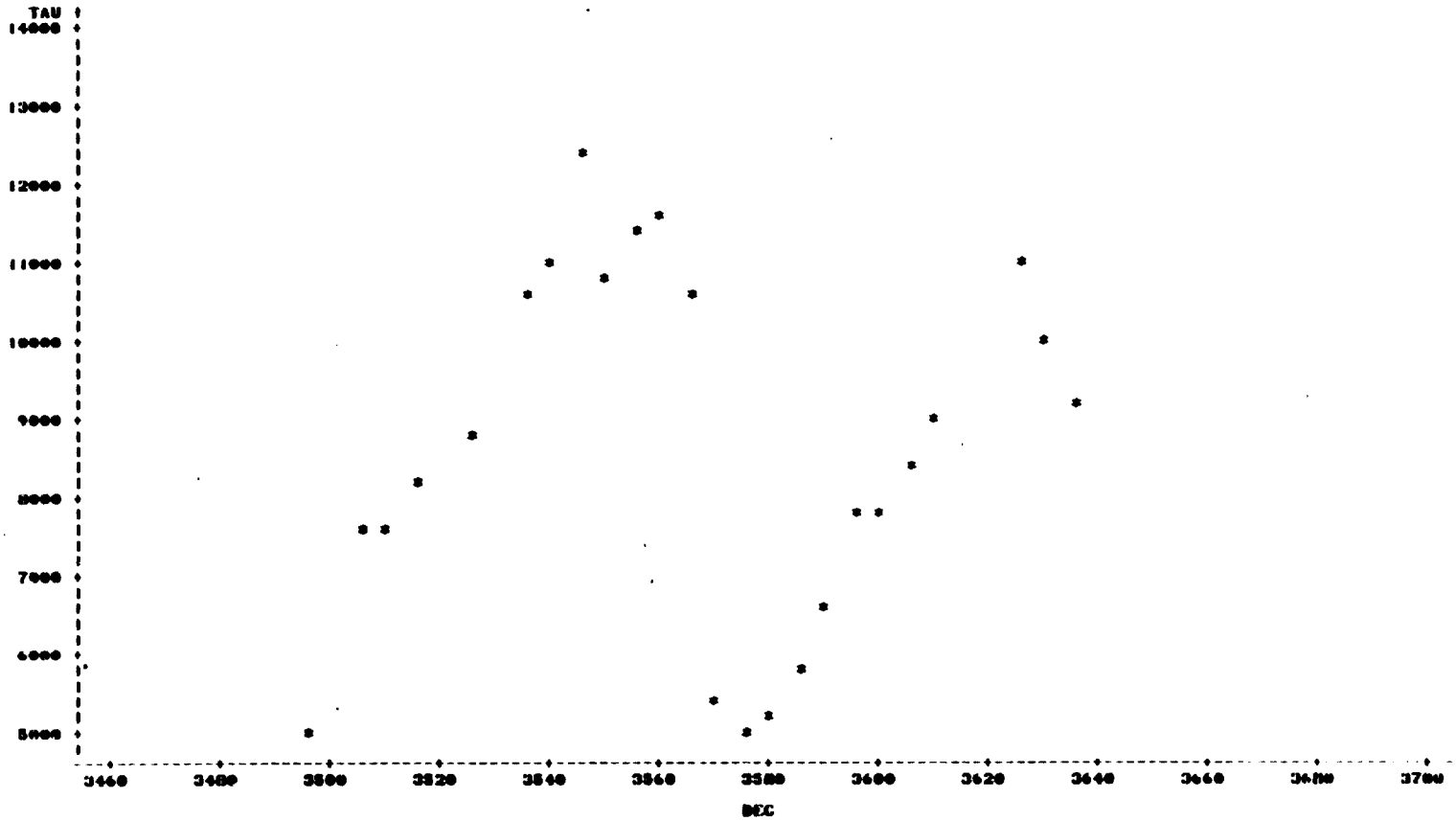

Figure L.6. Variation of Flow Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

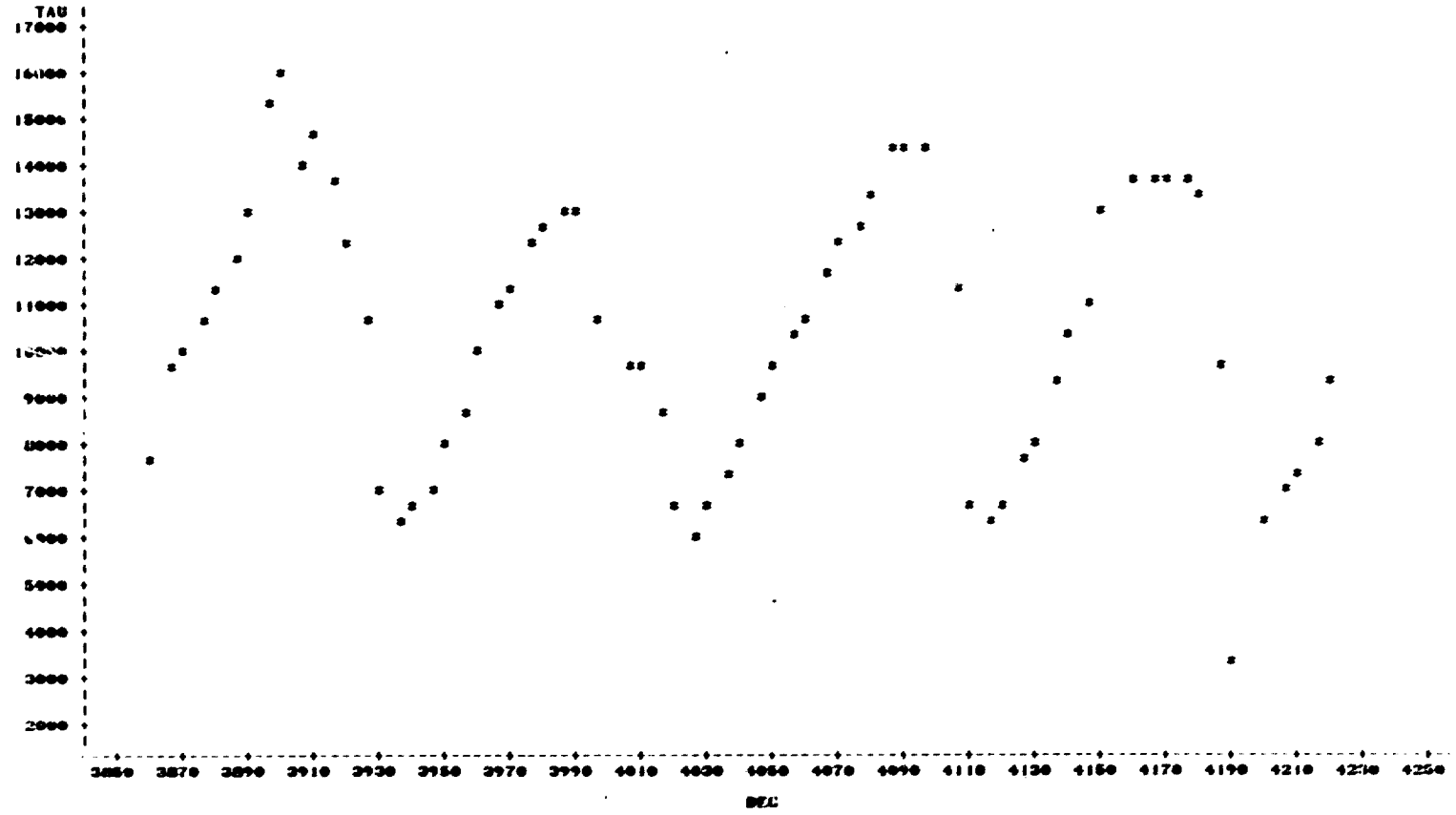

Figure L.7. Variation of Flow Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

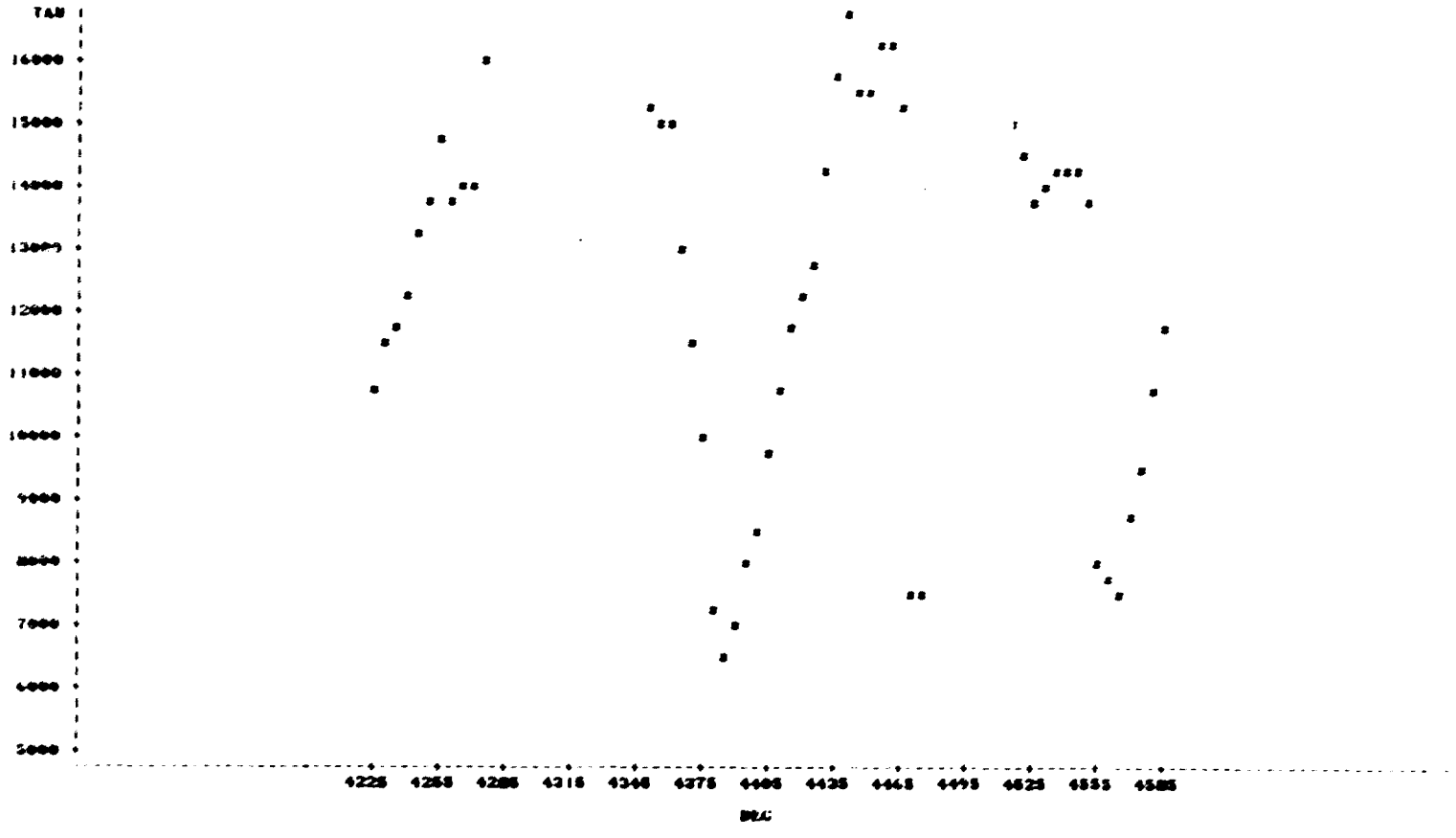

Figure L.8. Variation of Flow Stress With Orientation for Aluminum With 50° Tool, Test A1 57, Revolution 3

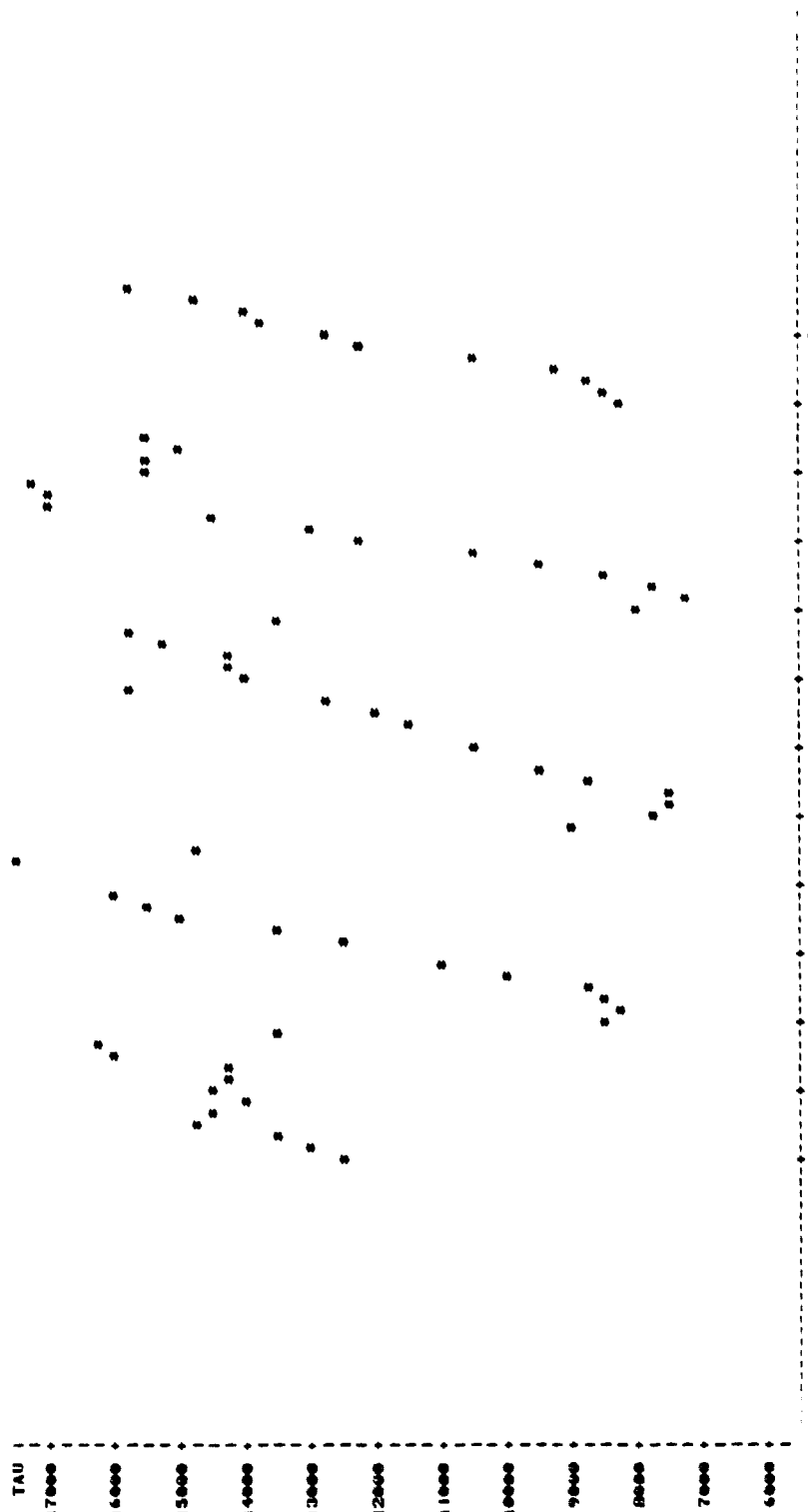

Figure L.9. Variation of Flow Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

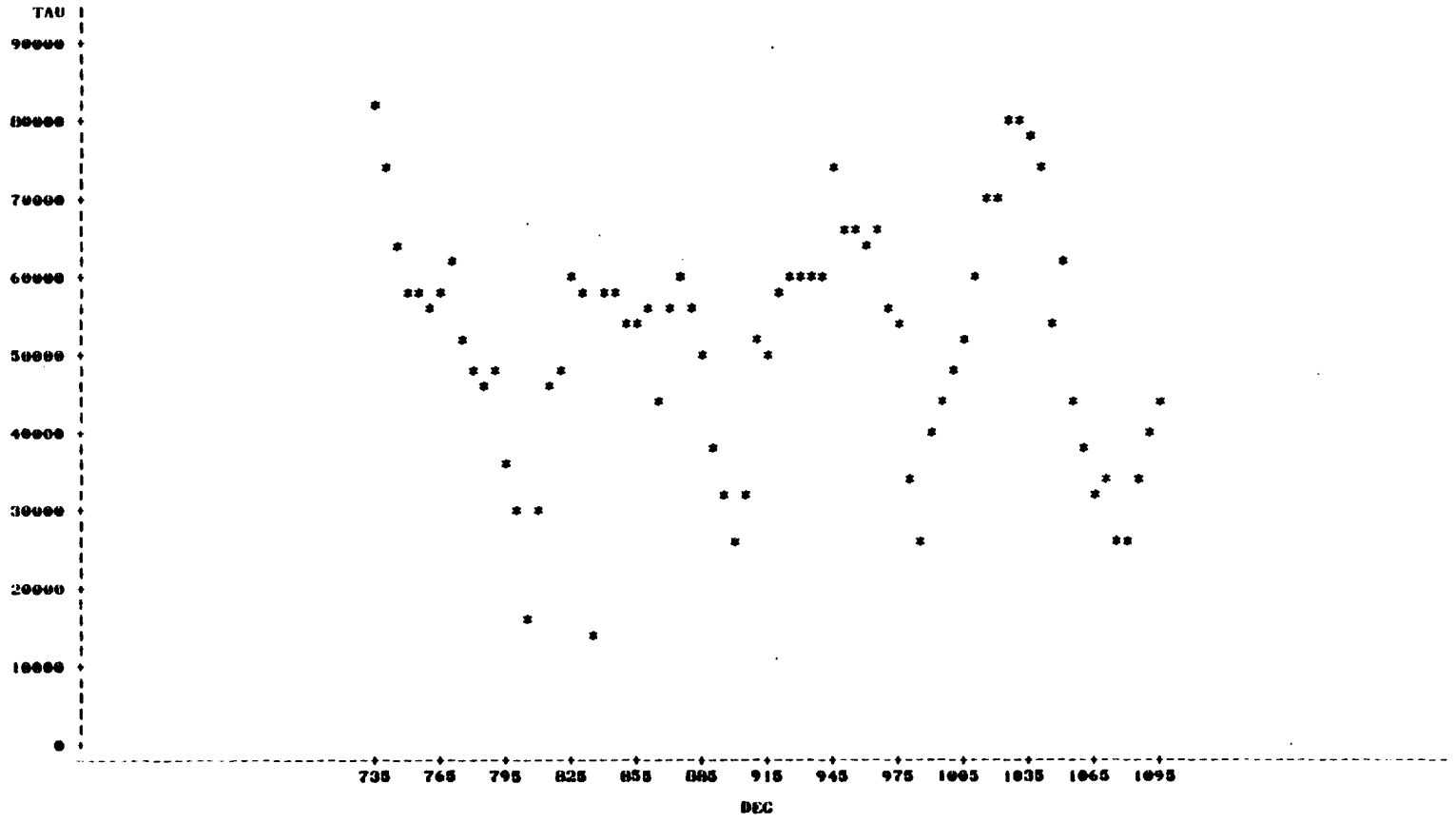

Figure L.10. Variation of Flow Stress With Orientation for Copper With 20° Tool, Test Cu 06

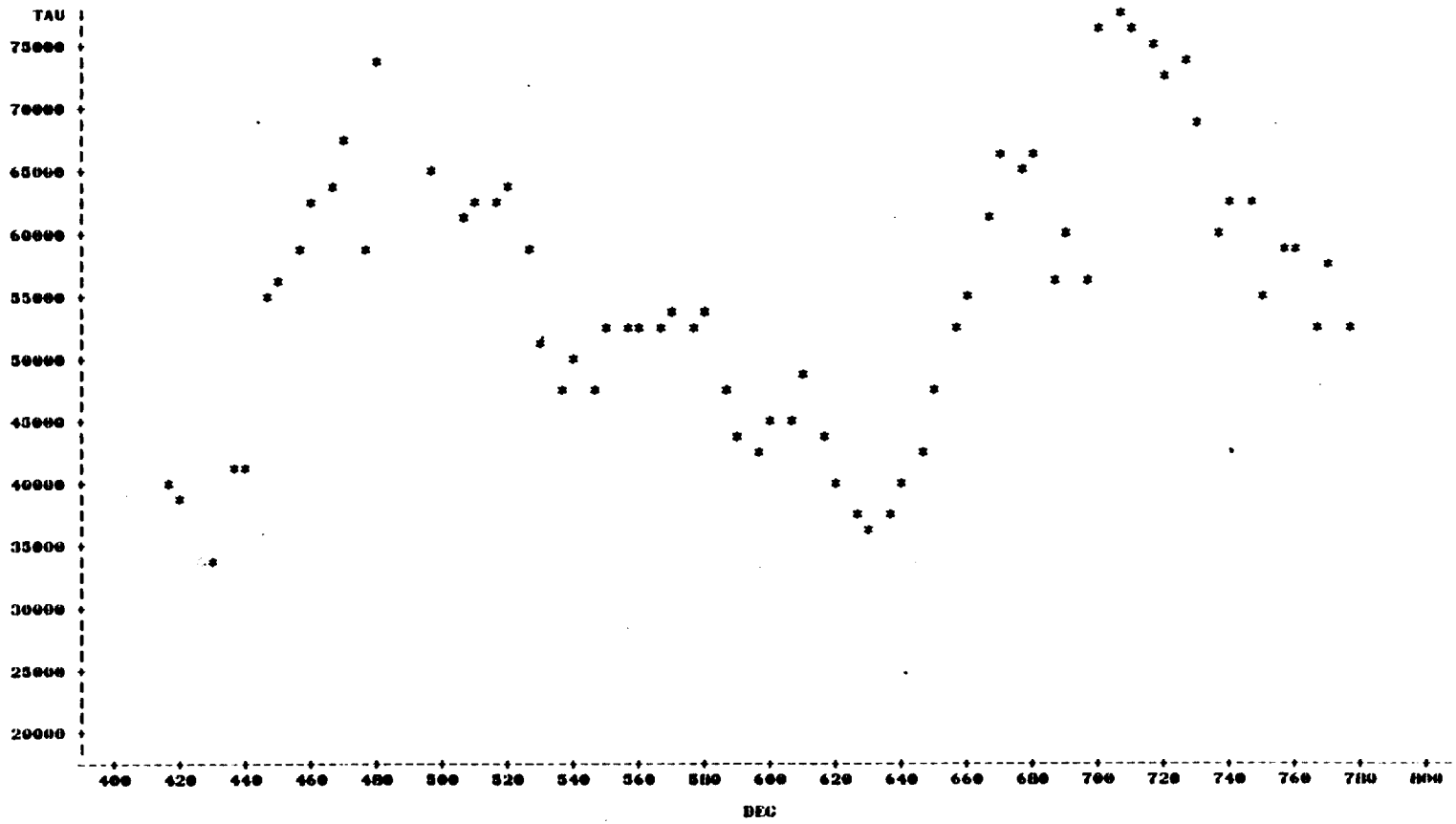

Figure L.11. Variation of Flow Stress With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

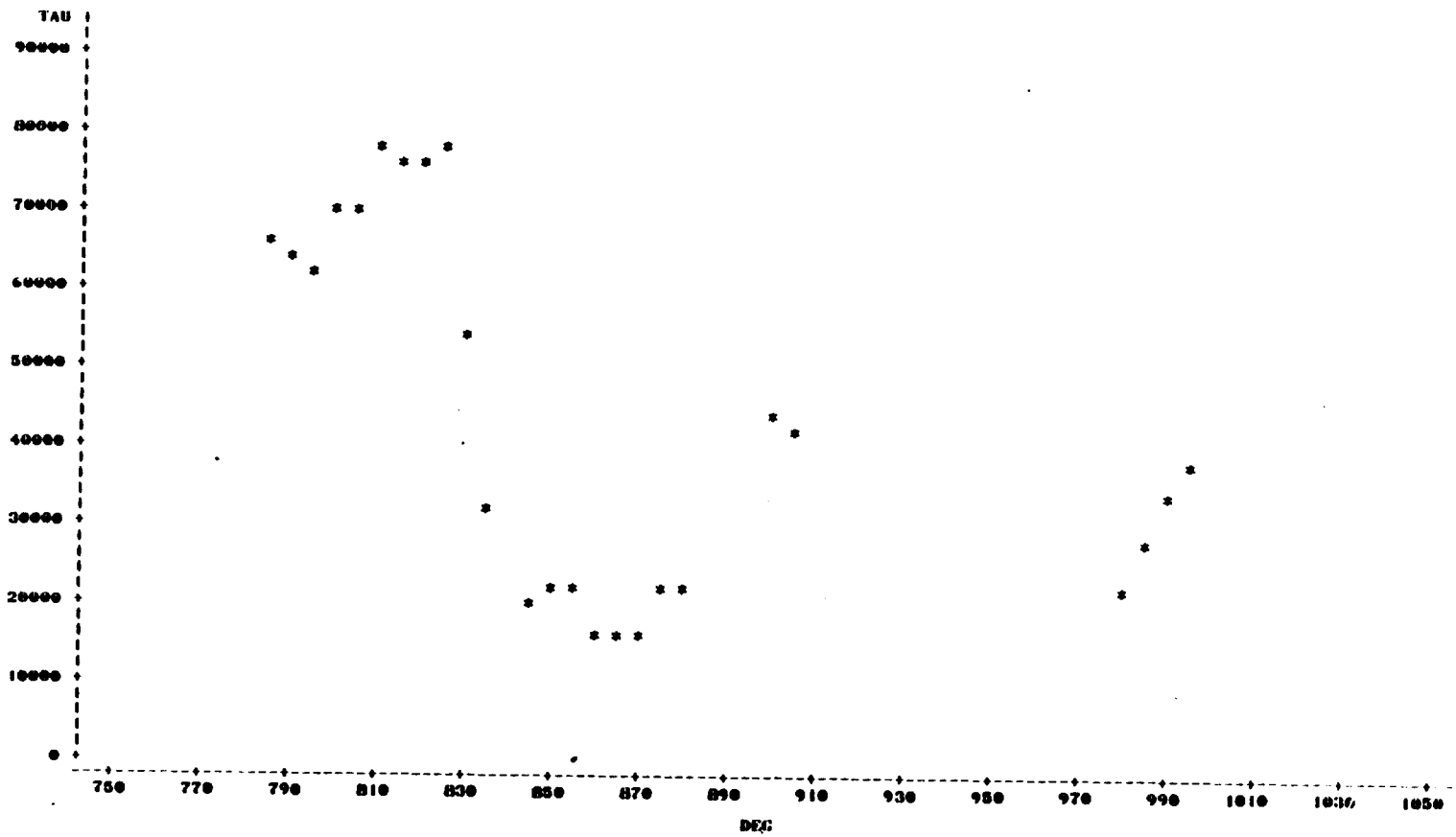

Figure L.12. Variation of Flow Stress With Orientation for Copper With 20° Tool, TEst Cu 33, Revolution 2

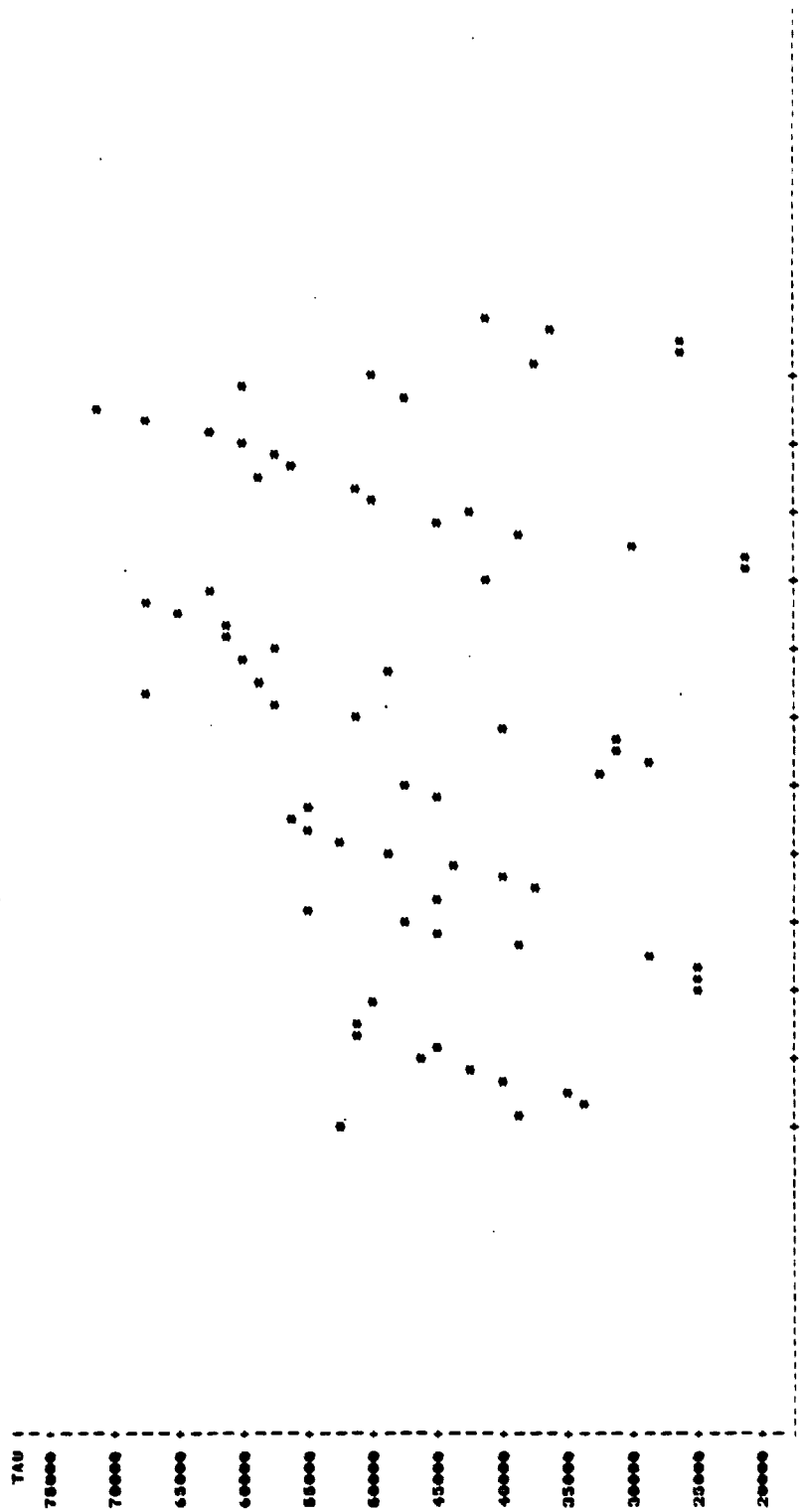

Figure L.13. Variation of Flow Stress With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX M

Variation of Normal Stress

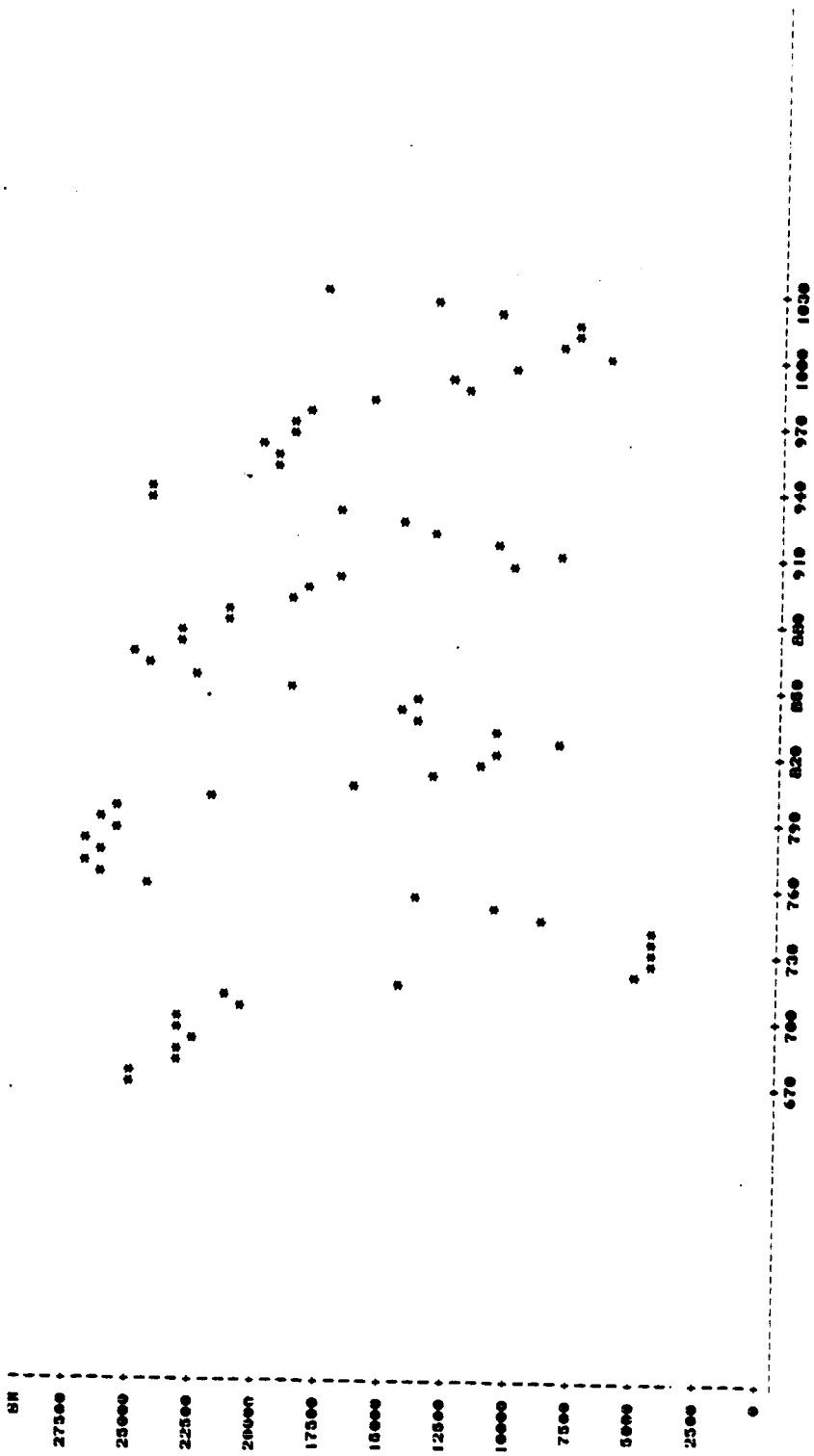

Figure M.1. Variation in Normal Stress With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

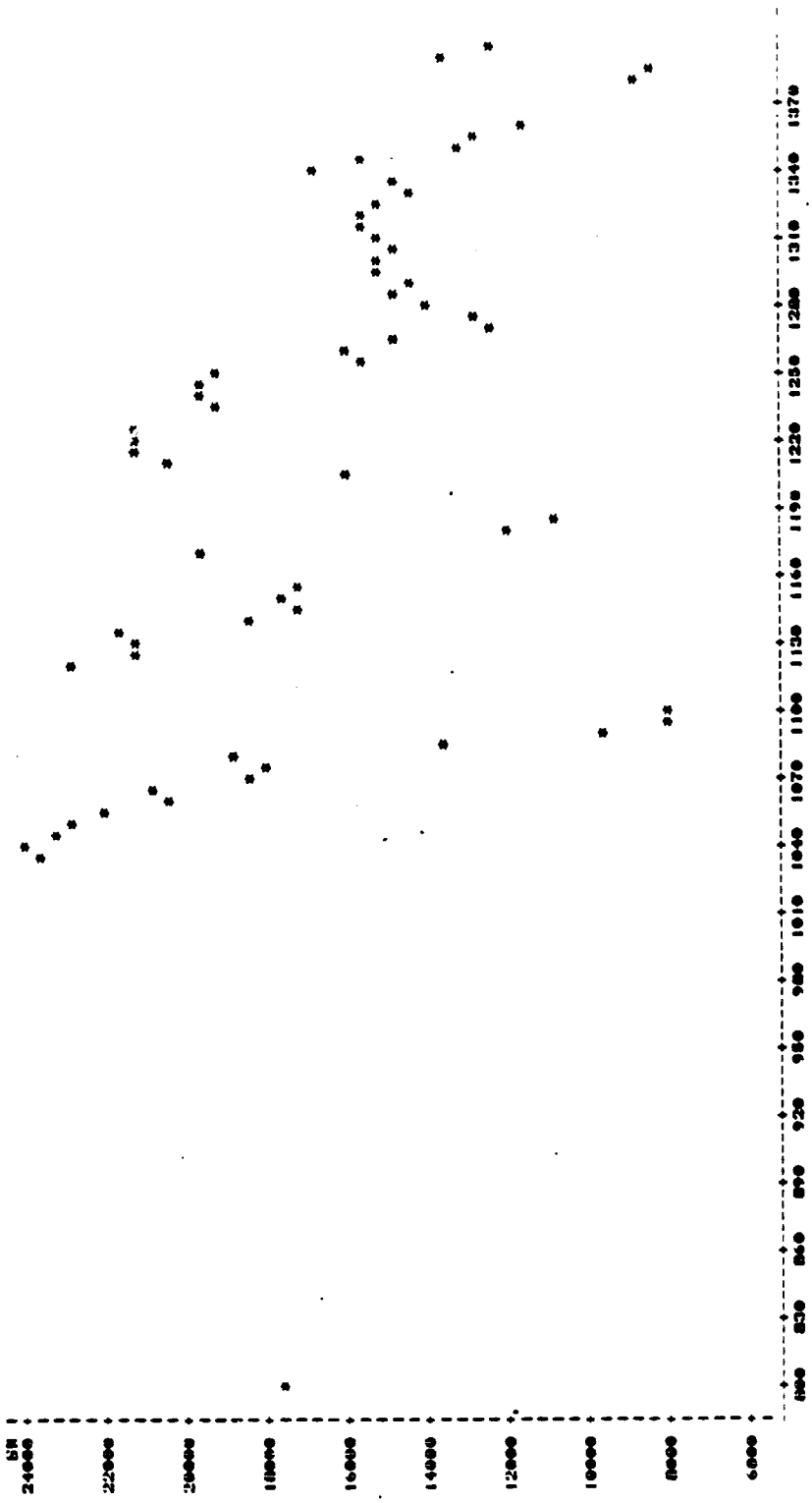

Figure M.2. Variation in Normal Stress With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

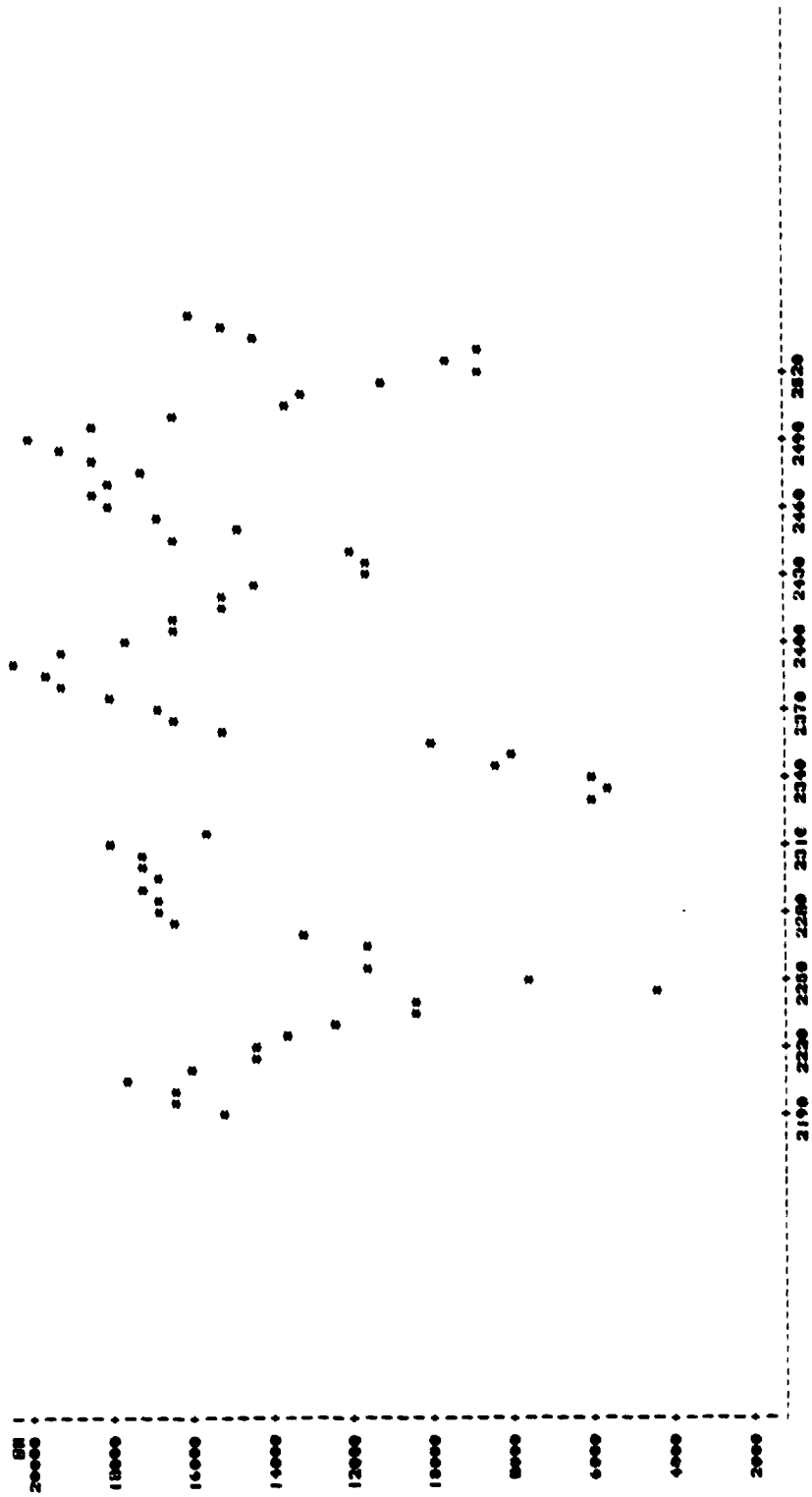

Figure M.3. Variation in Normal Stress With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

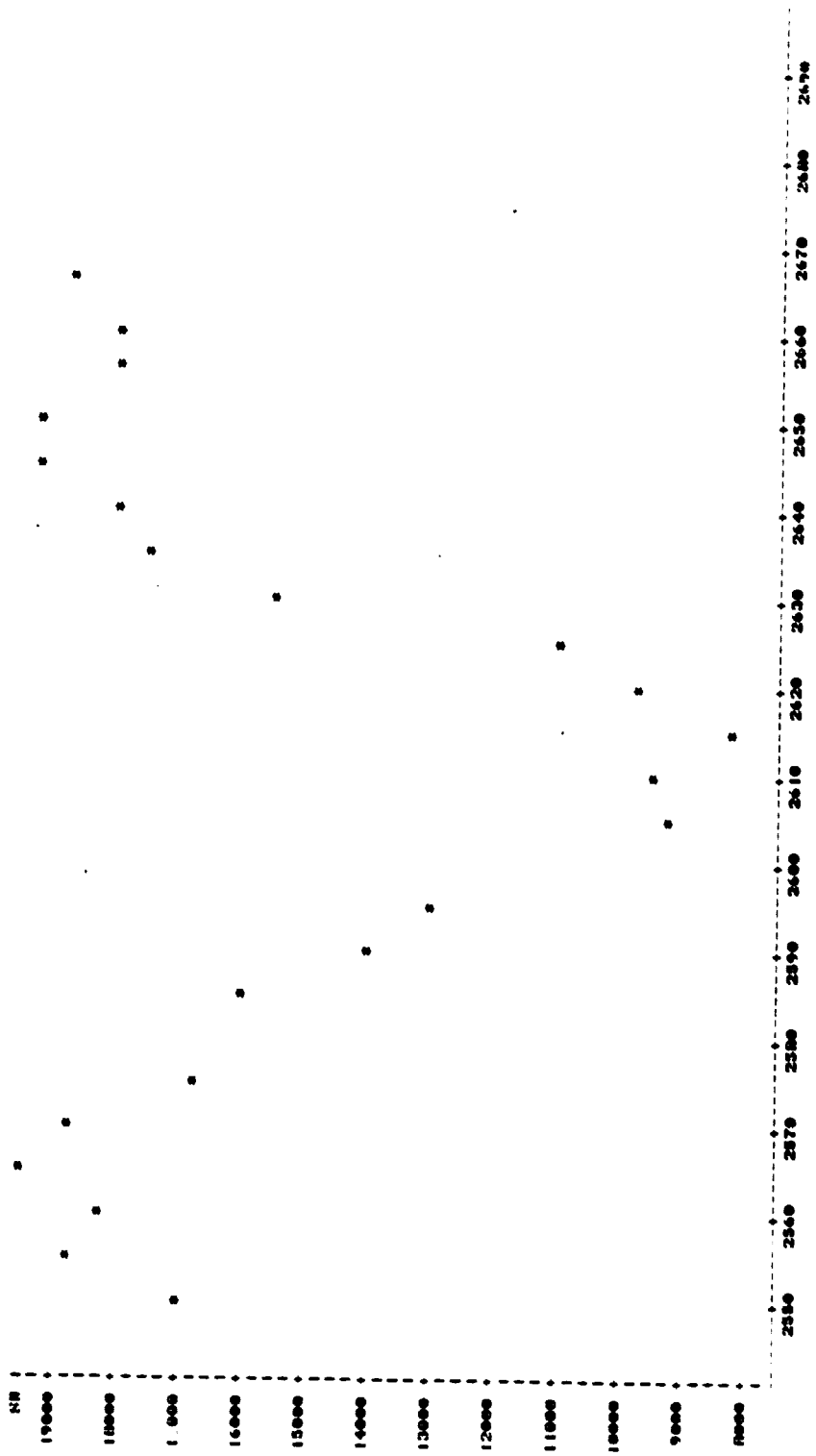

Figure M.4. Variation in Normal Stress With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

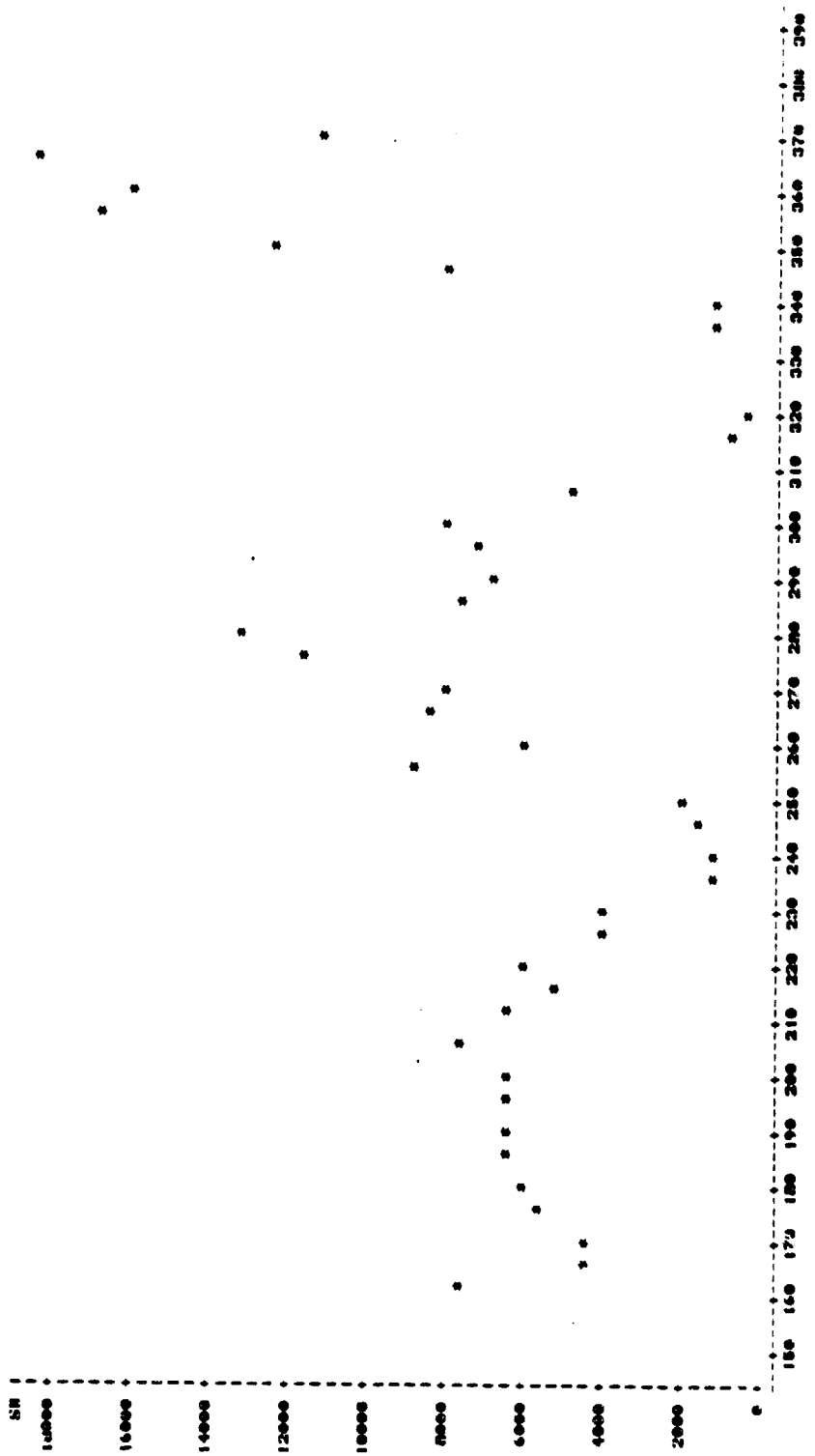

Figure M.5. Variation in Normal Stress With Orientation for Aluminum With 40° Tool, Test Al 03

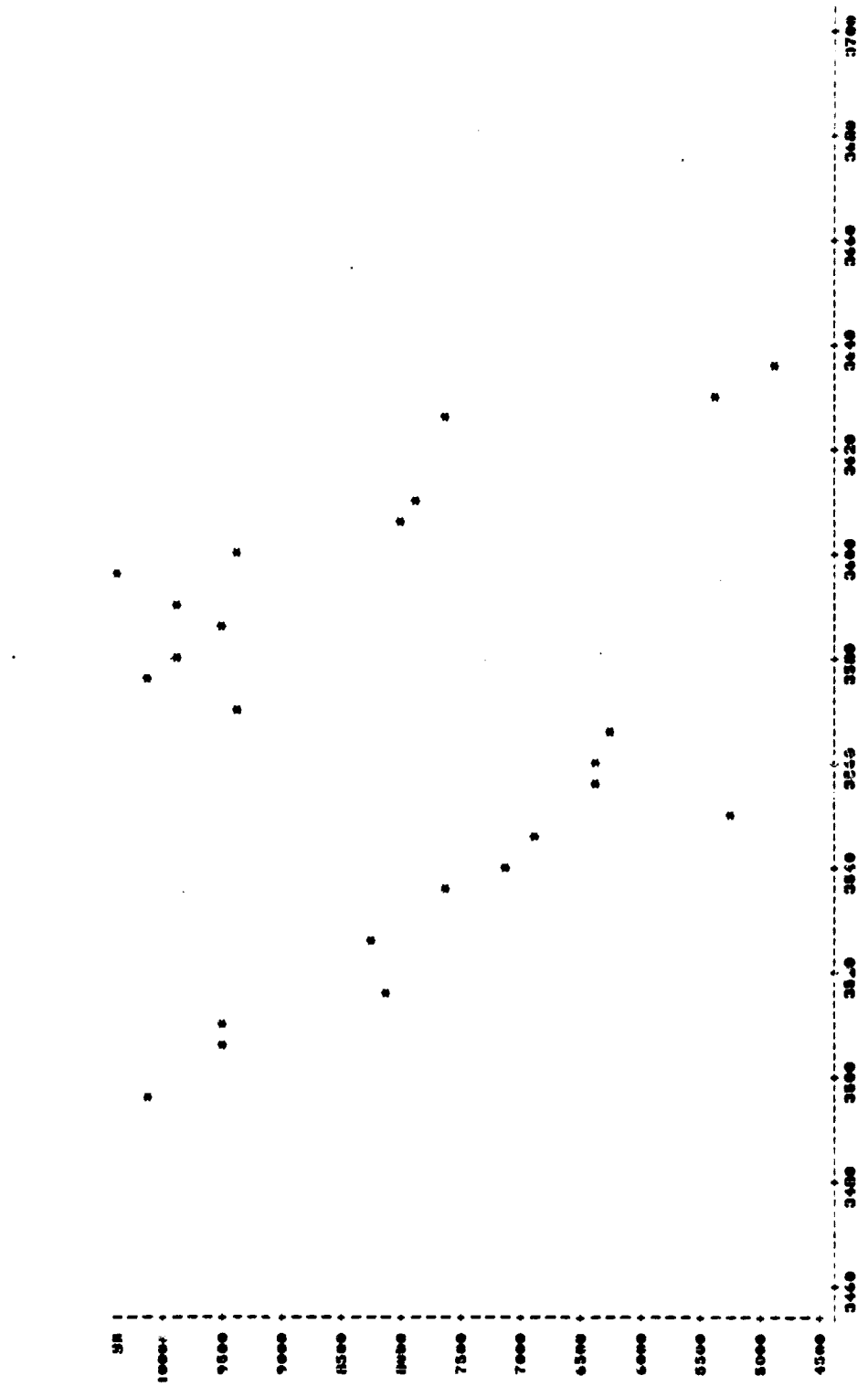

Figure M.6. Variation in Normal Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

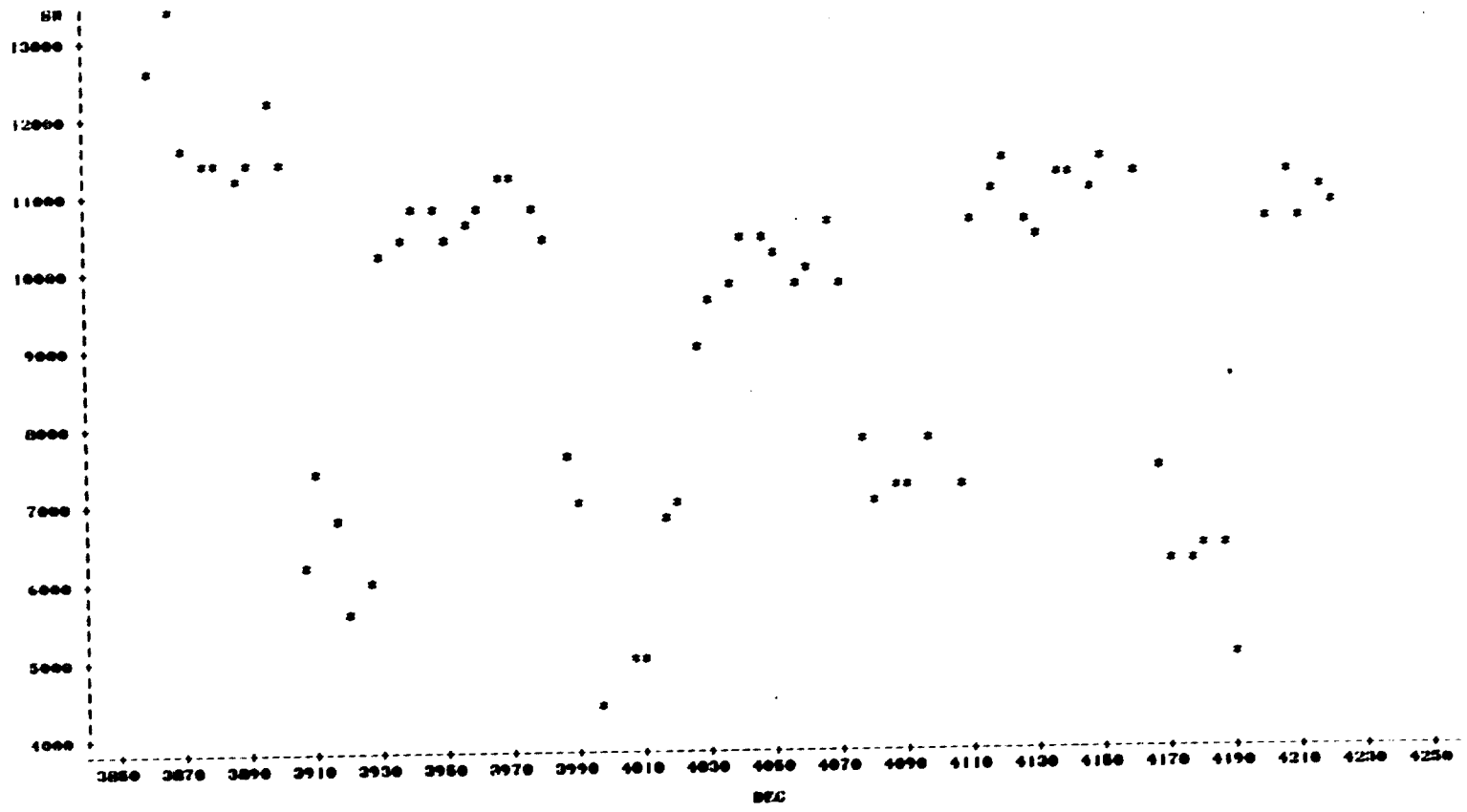

Figure M.7. Variation in Normal Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

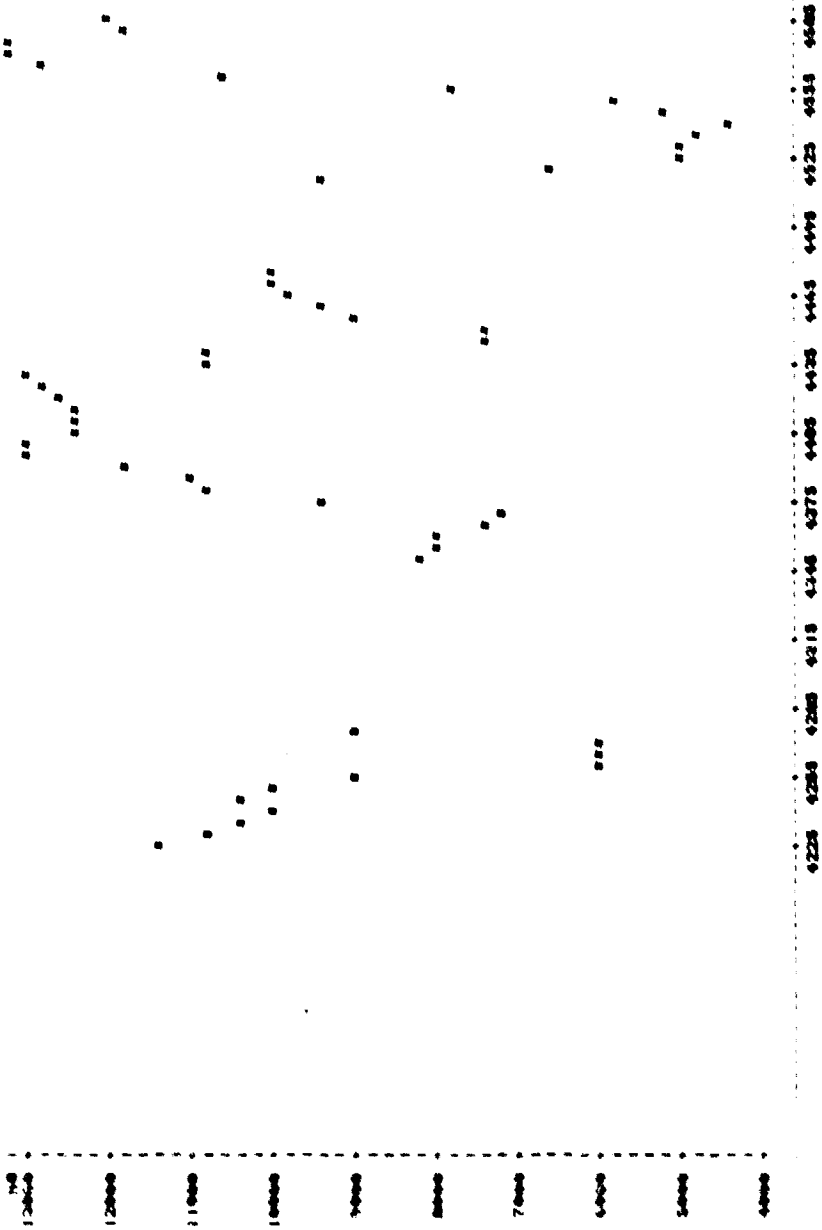

Figure M.8. Variation in Normal Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

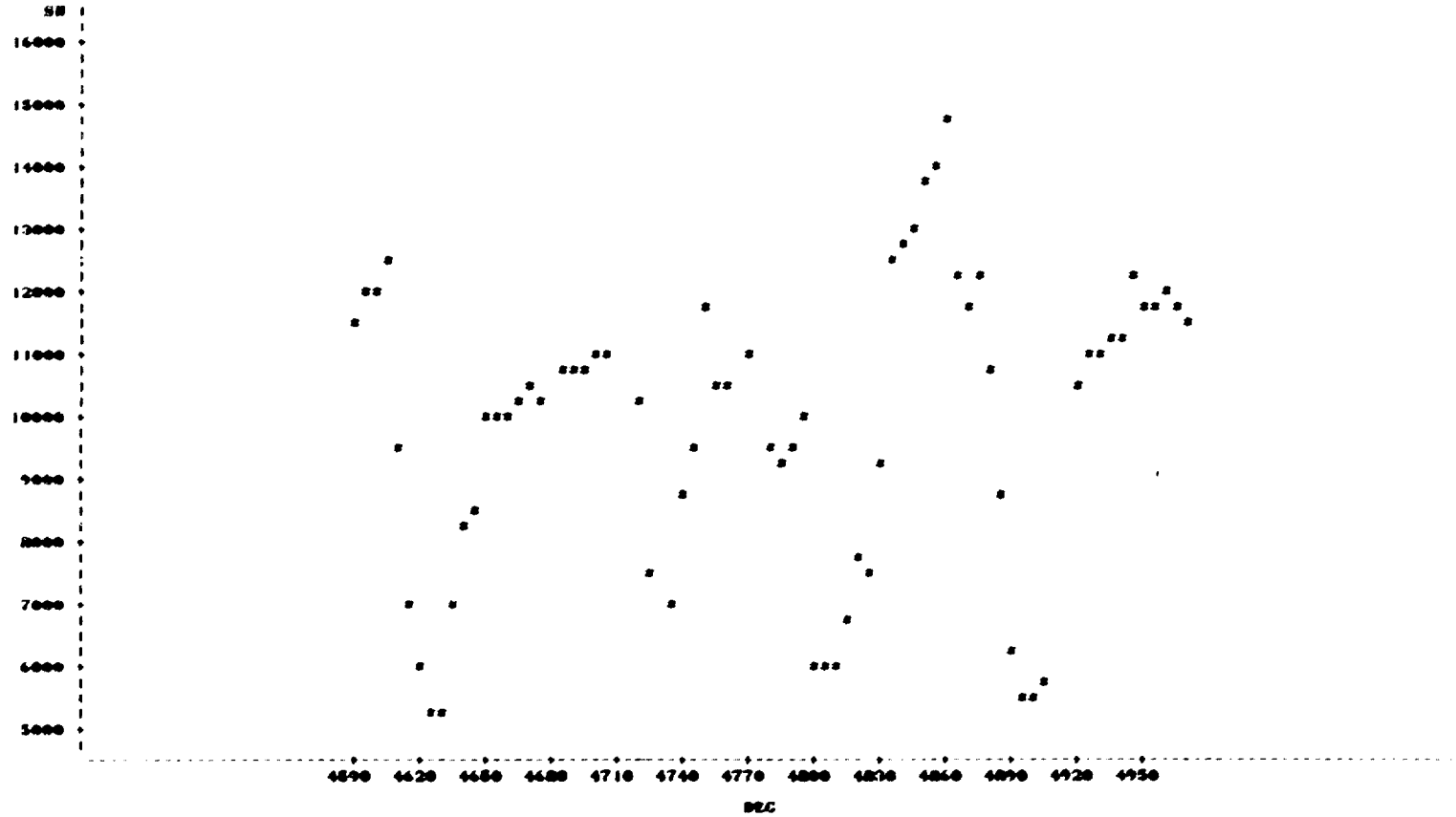

Figure M.9. Variation in Normal Stress With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

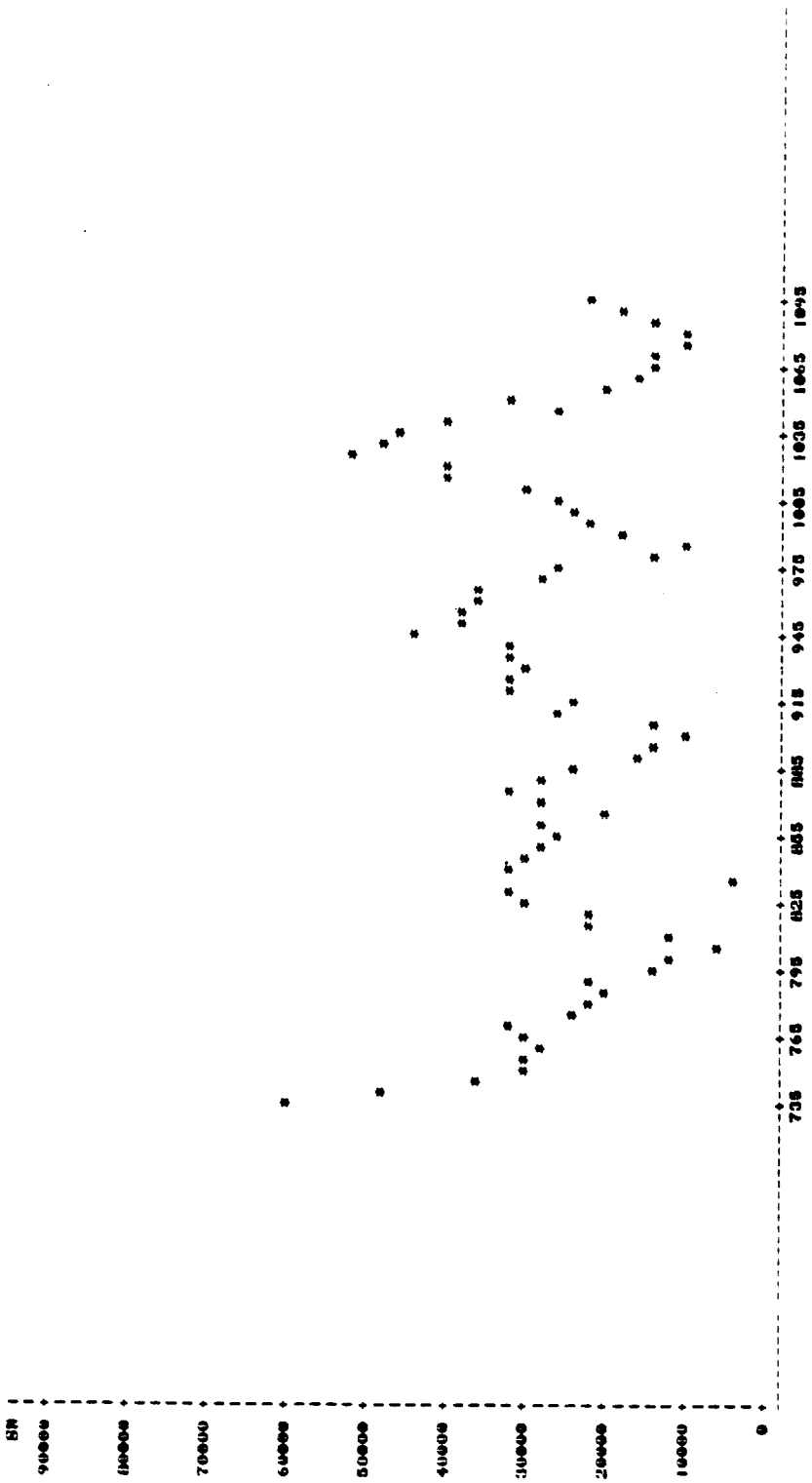

Figure M.10. Variation in Normal Stress With Orientation for Copper With 20° Tool, Test Cu 06

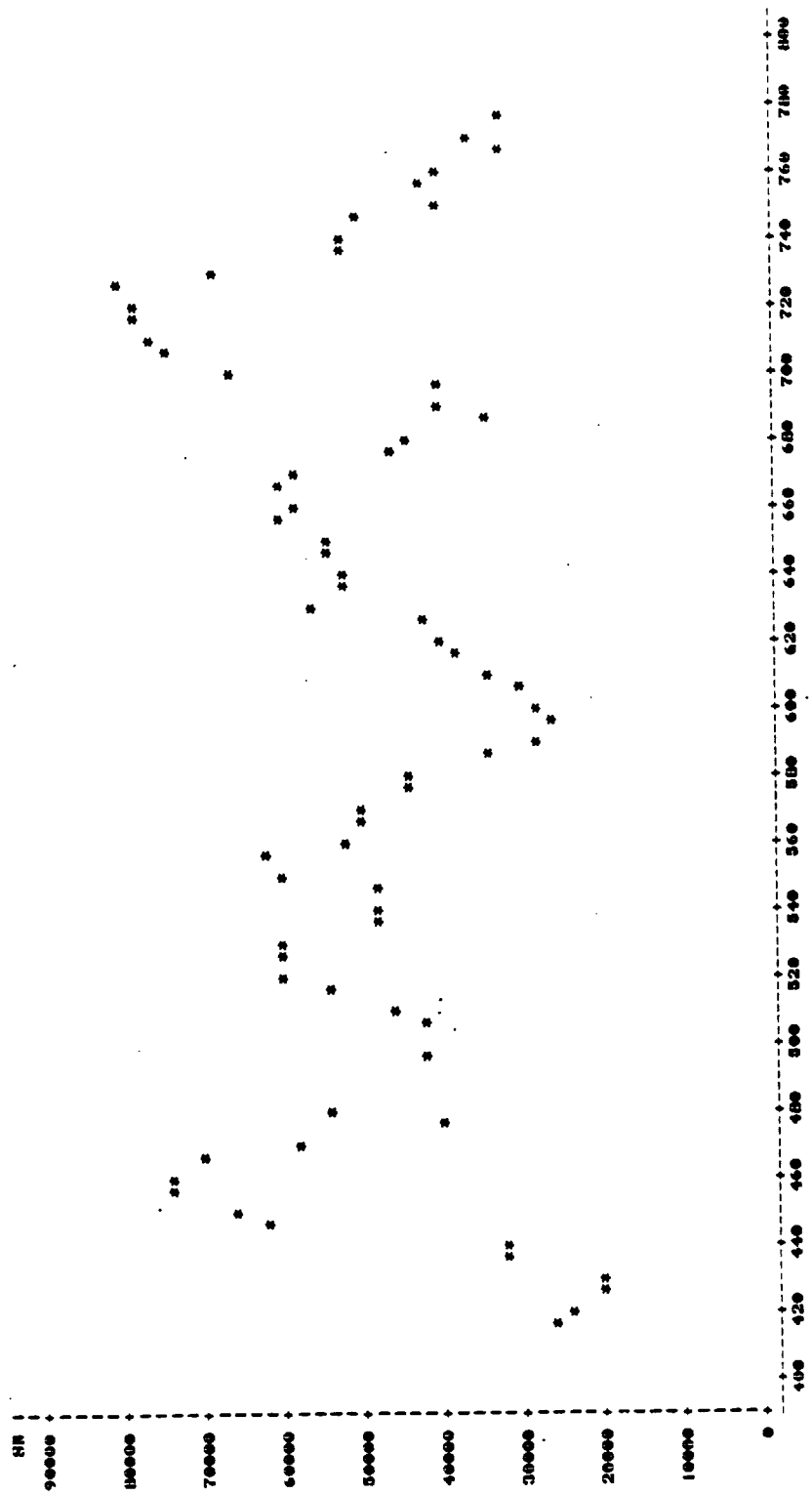

Figure M.11. Variation in Normal Stress With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

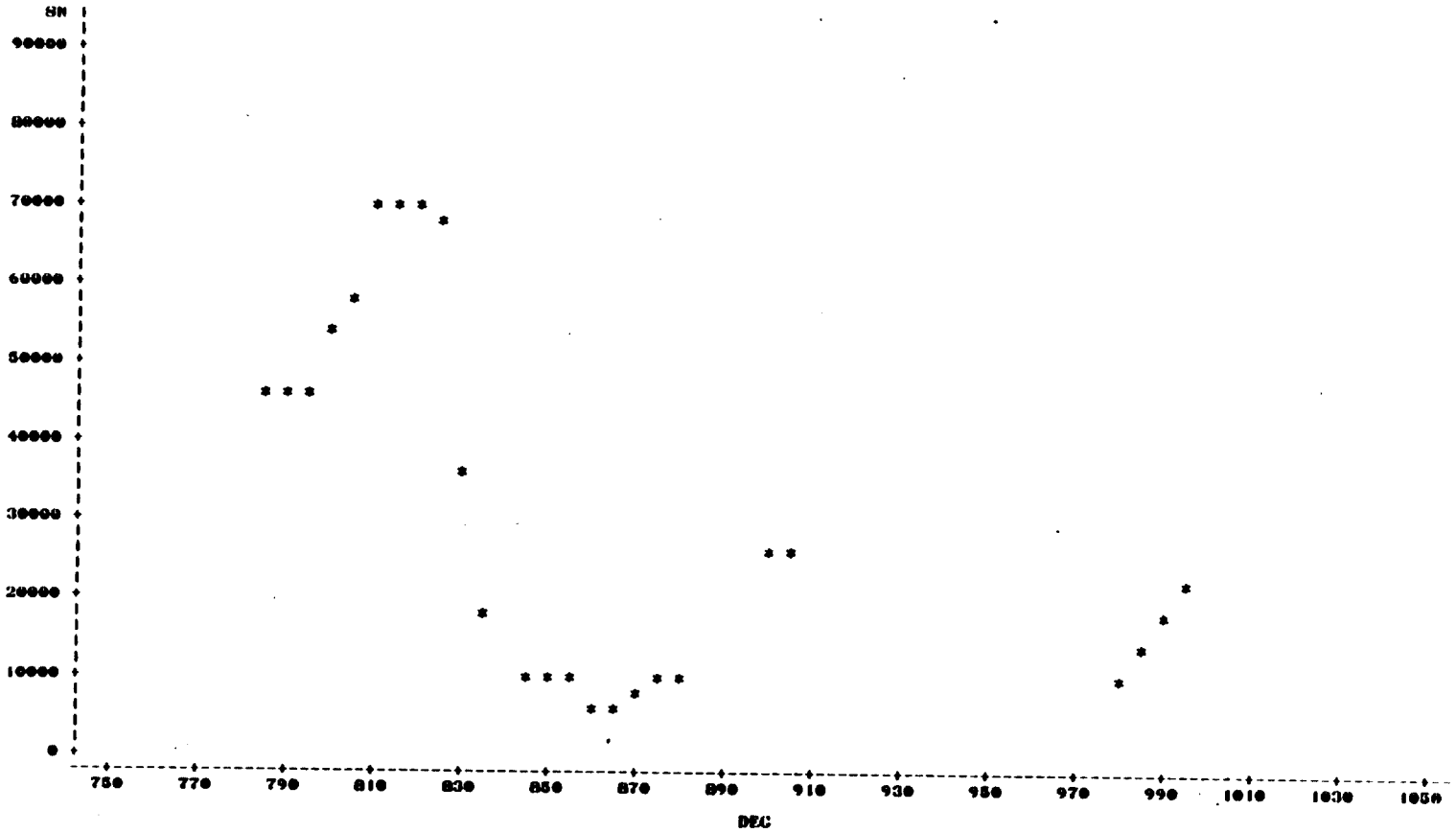

Figure M.12. Variation in Normal Stress With Orientation for Copper With 20° Tool, TEst Cu 33, Revolution 2

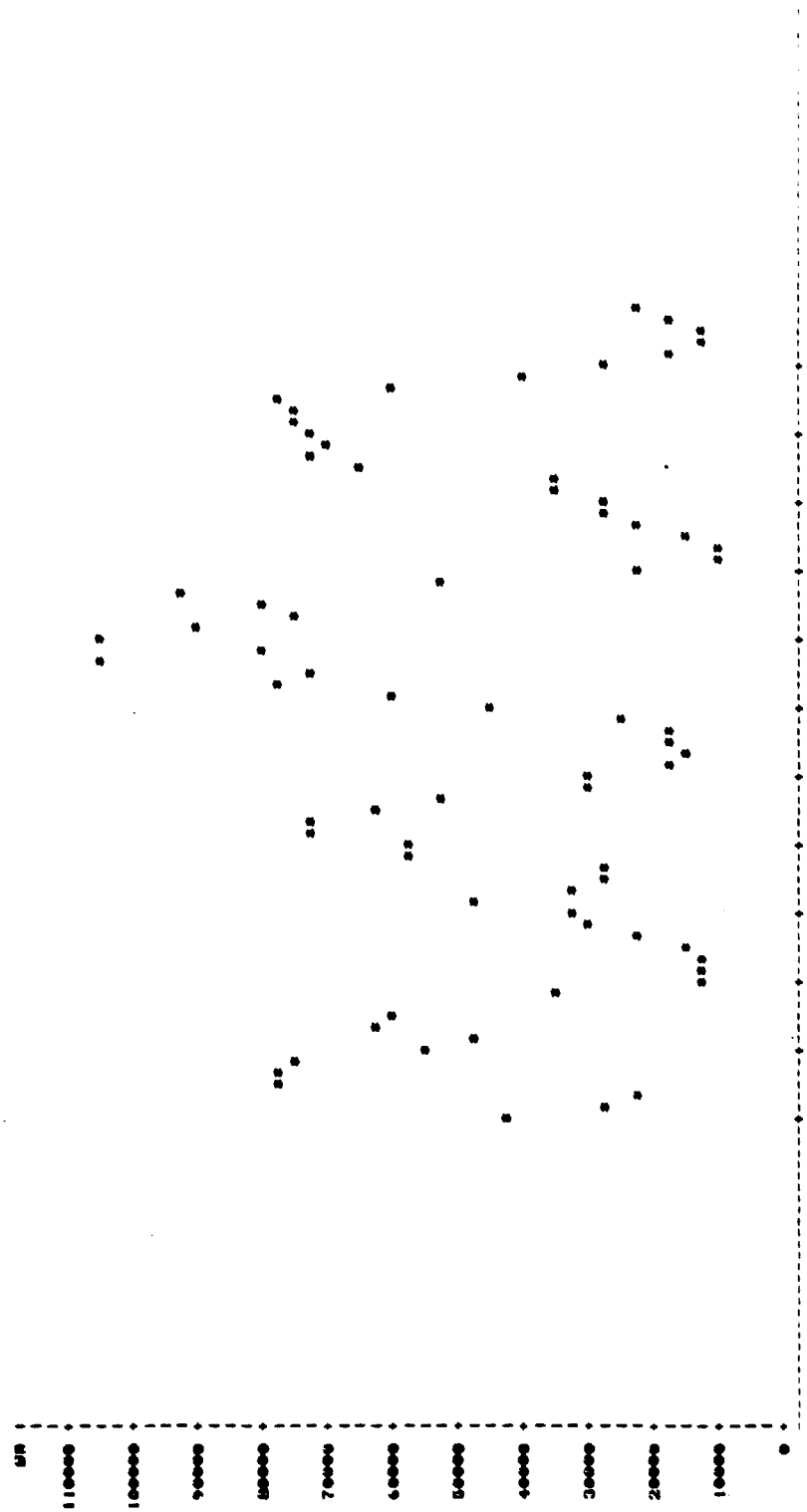

Figure M.13. Variation in Normal Stress With Orientation for Copper With 40° Tool, TEst Cu 01

APPENDIX N

Variation of Specific Horsepower

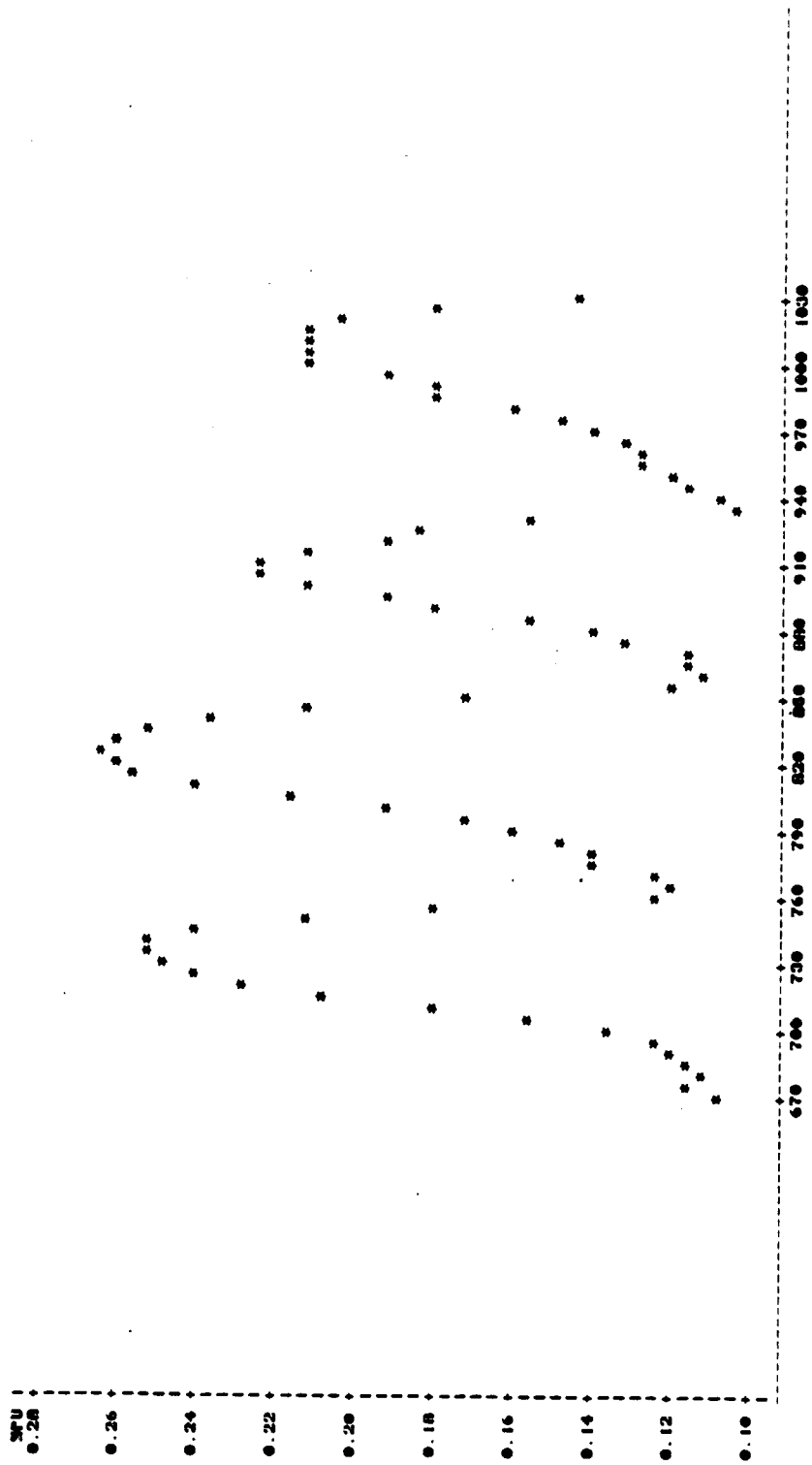

Figure N.1. Variation of Specific Horsepower With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

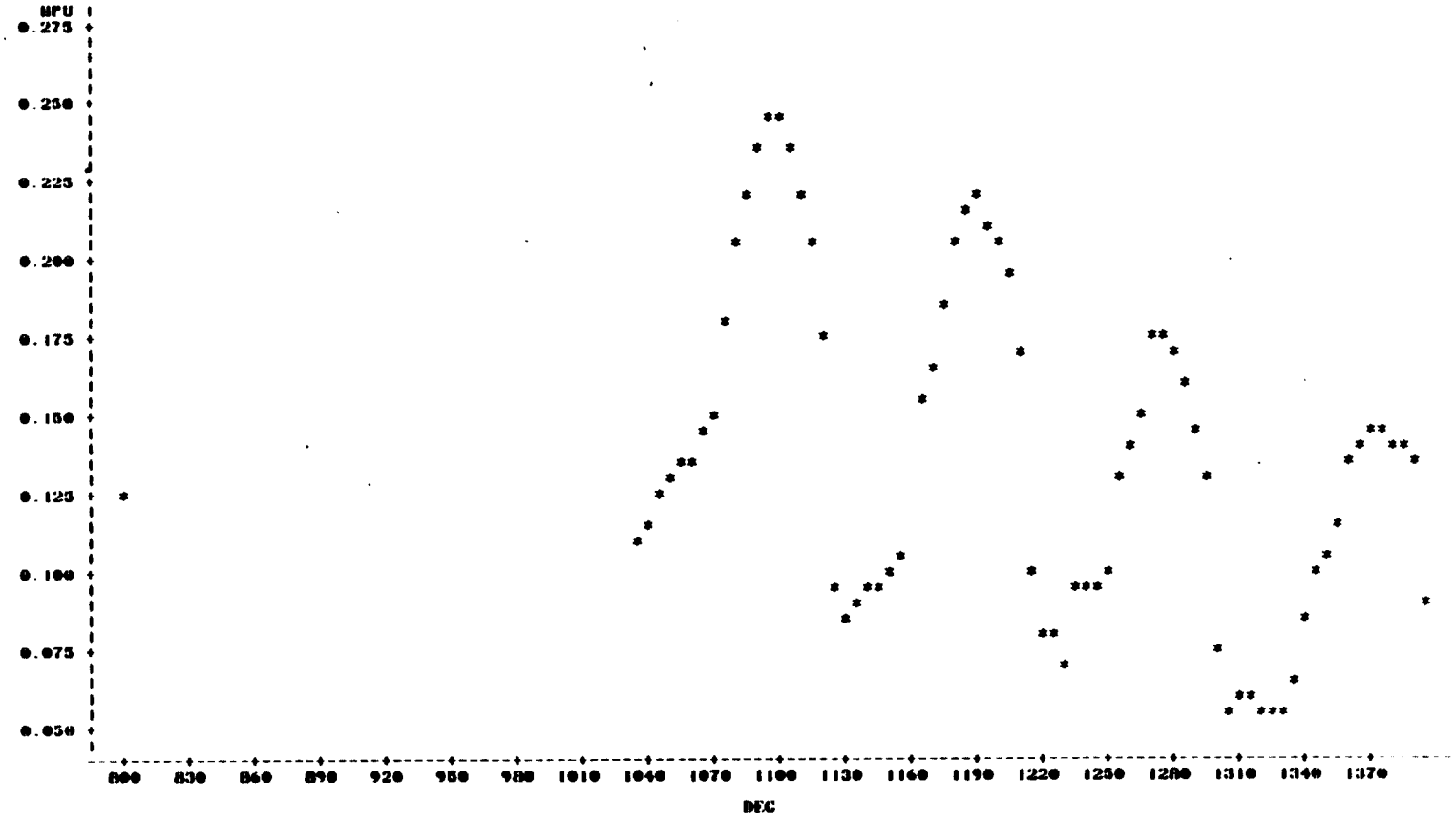

Figure H.2. Variation of Specific Horsepower With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

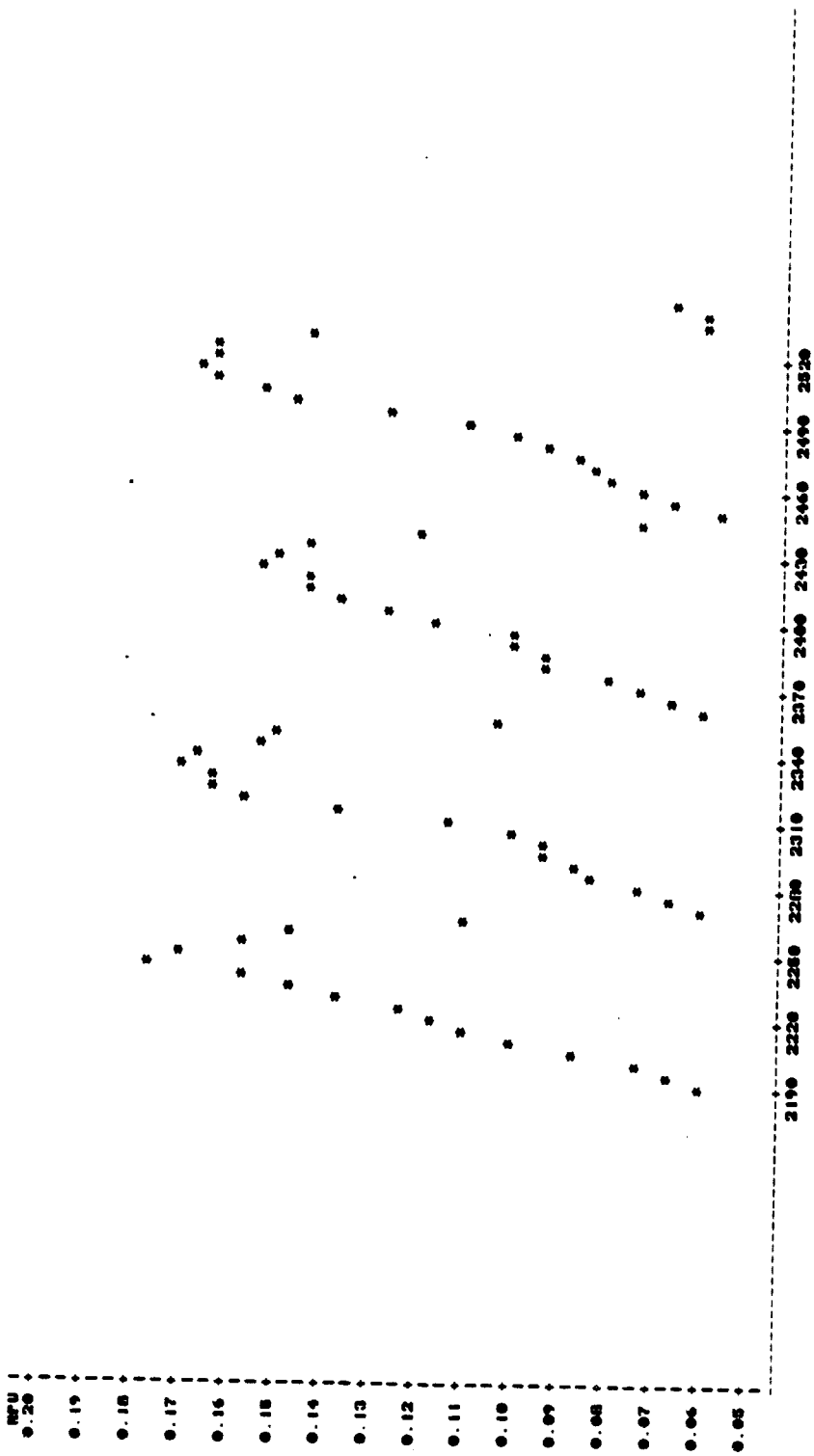

Figure N.3. Variation of Specific Horsepower With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

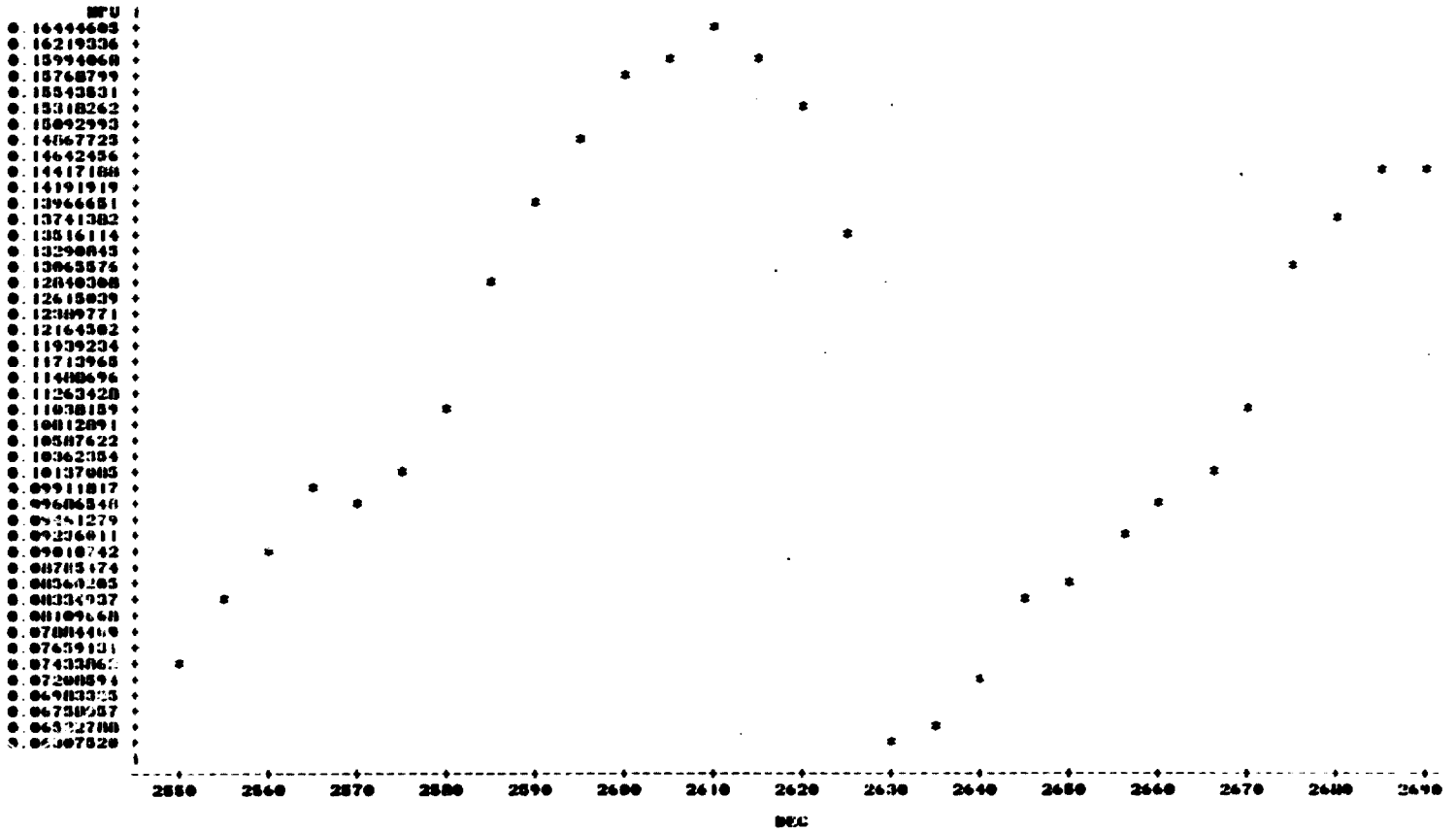

Figure N.4. Variation of Specific Horsepower With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

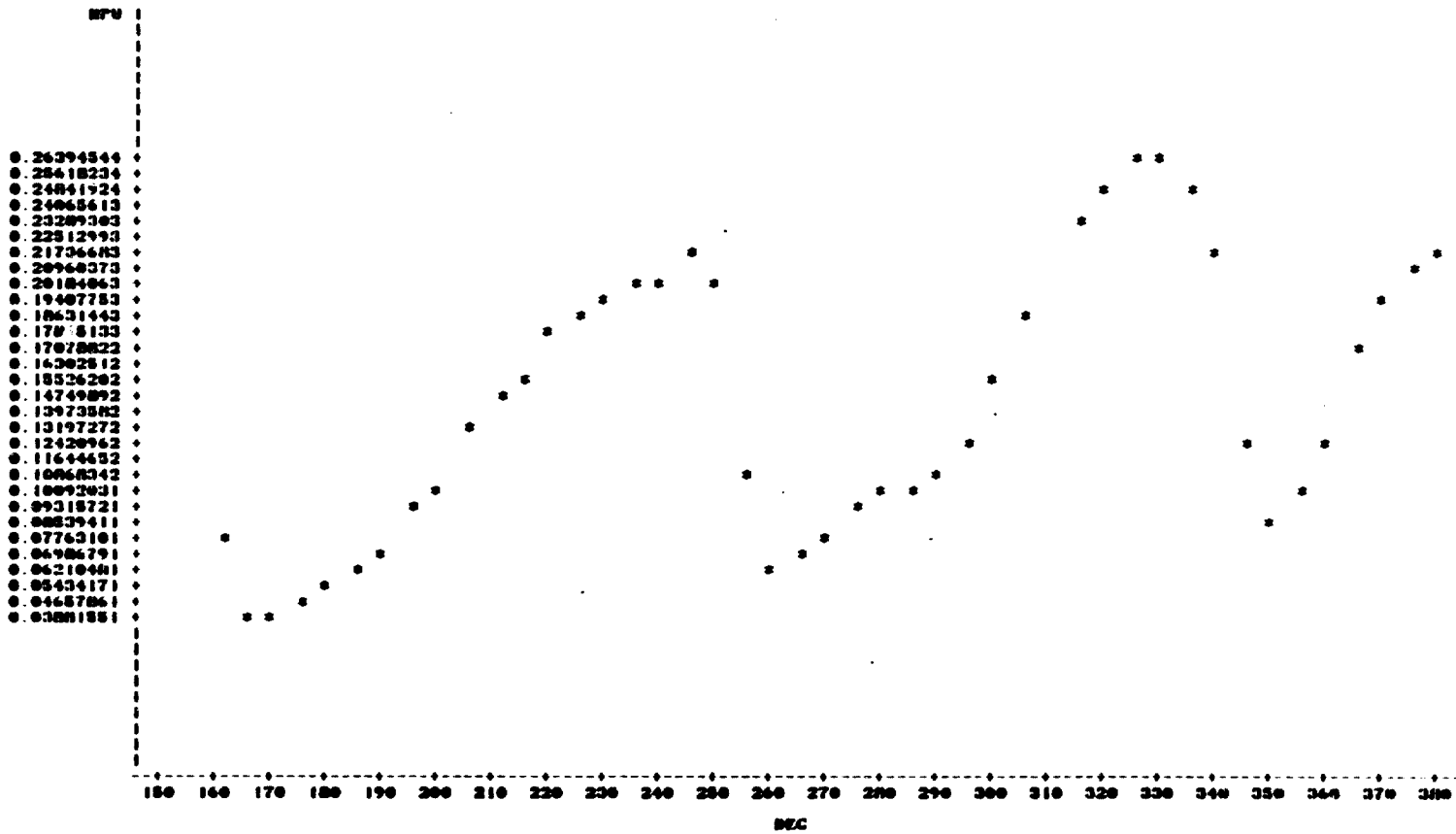

Figure N.5. Variation of Specific Horsepower With Orientation for Aluminum With 40° Tool, Test Al 03

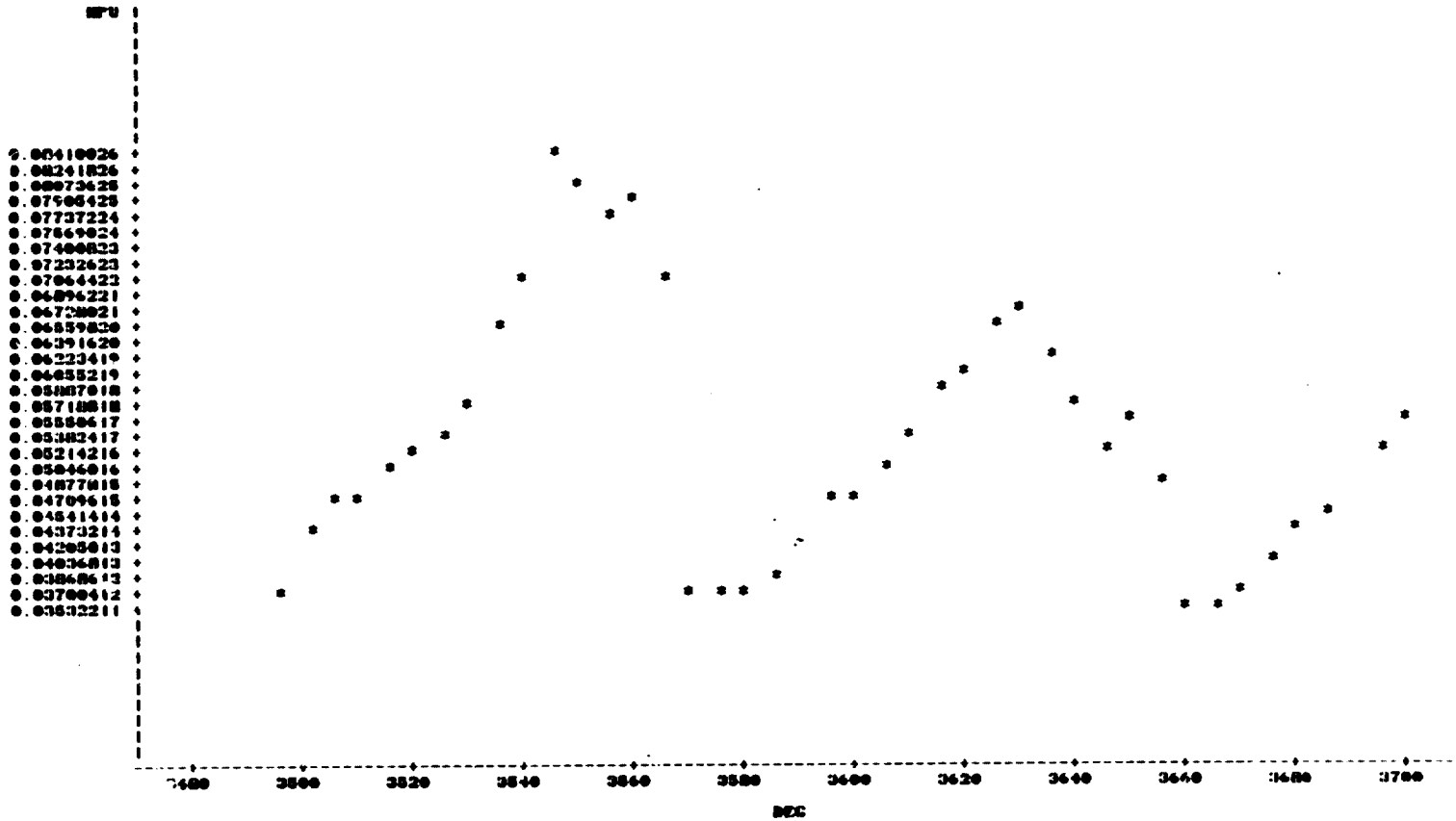

Figure N.6. Variation of Specific Horsepower With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

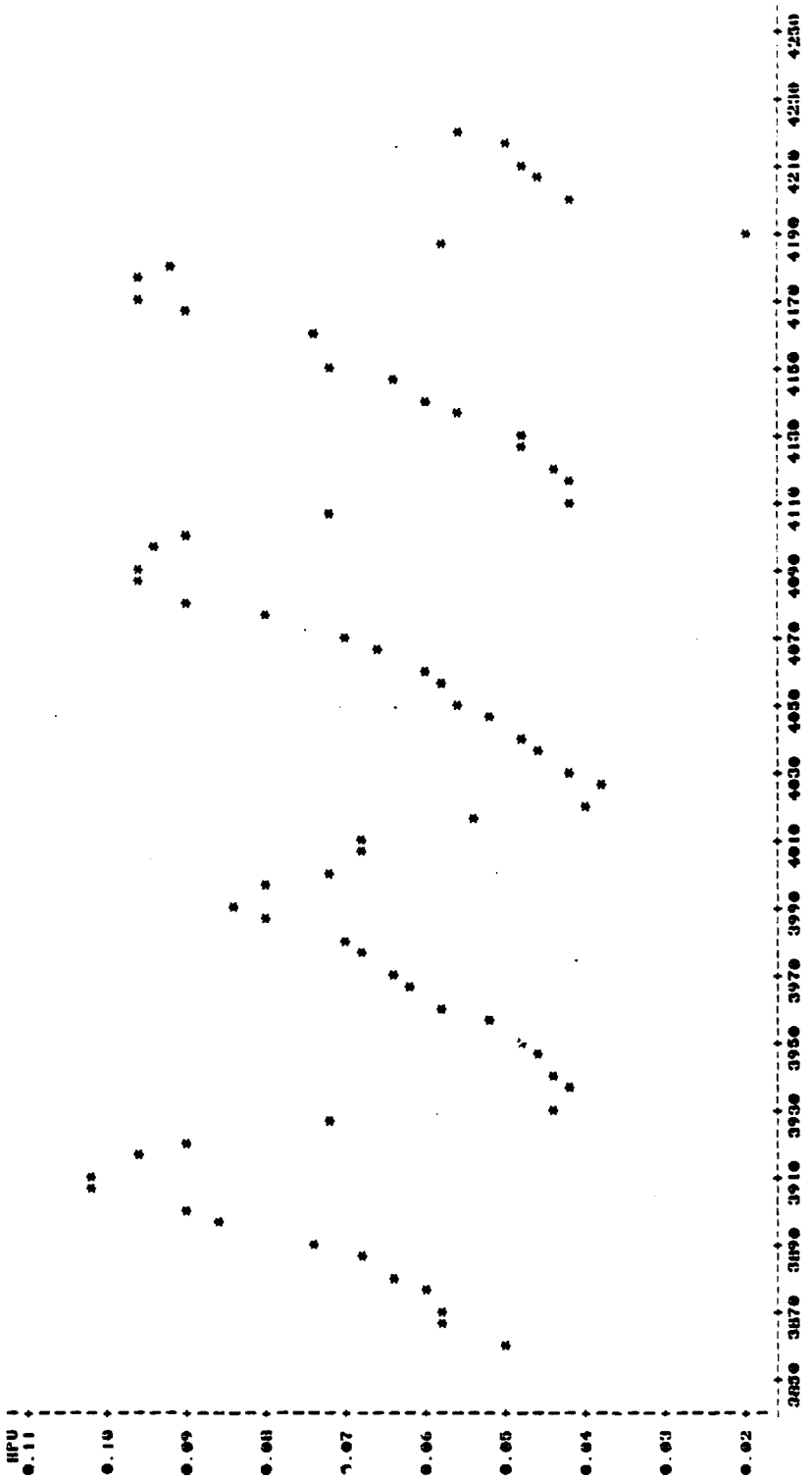

Figure N.7. Variation of Specific Horsepower With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

Figure N.8. Variation of Specific Horsepower With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

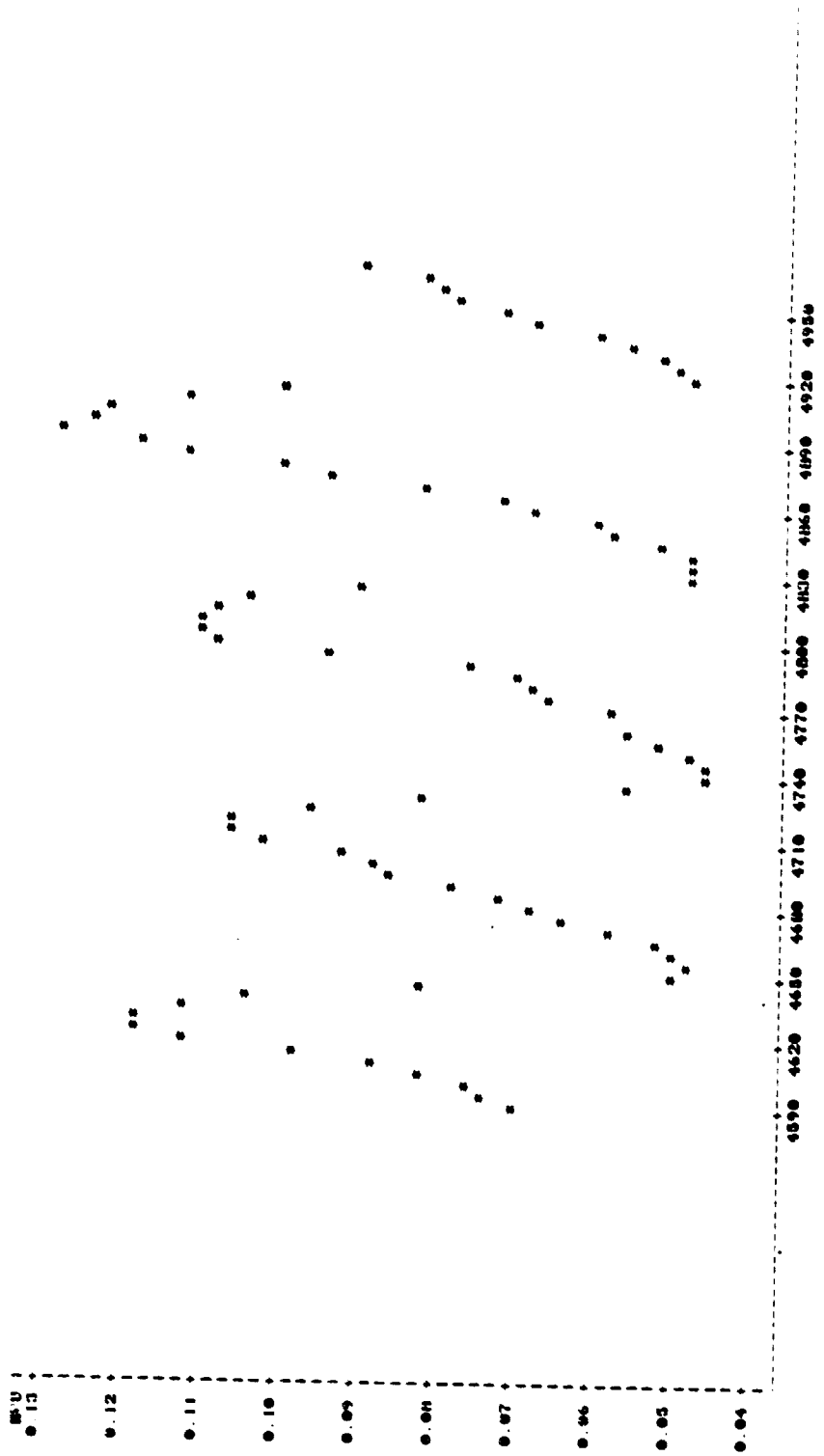

Figure N.9. Variation of Specific Horsepower With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

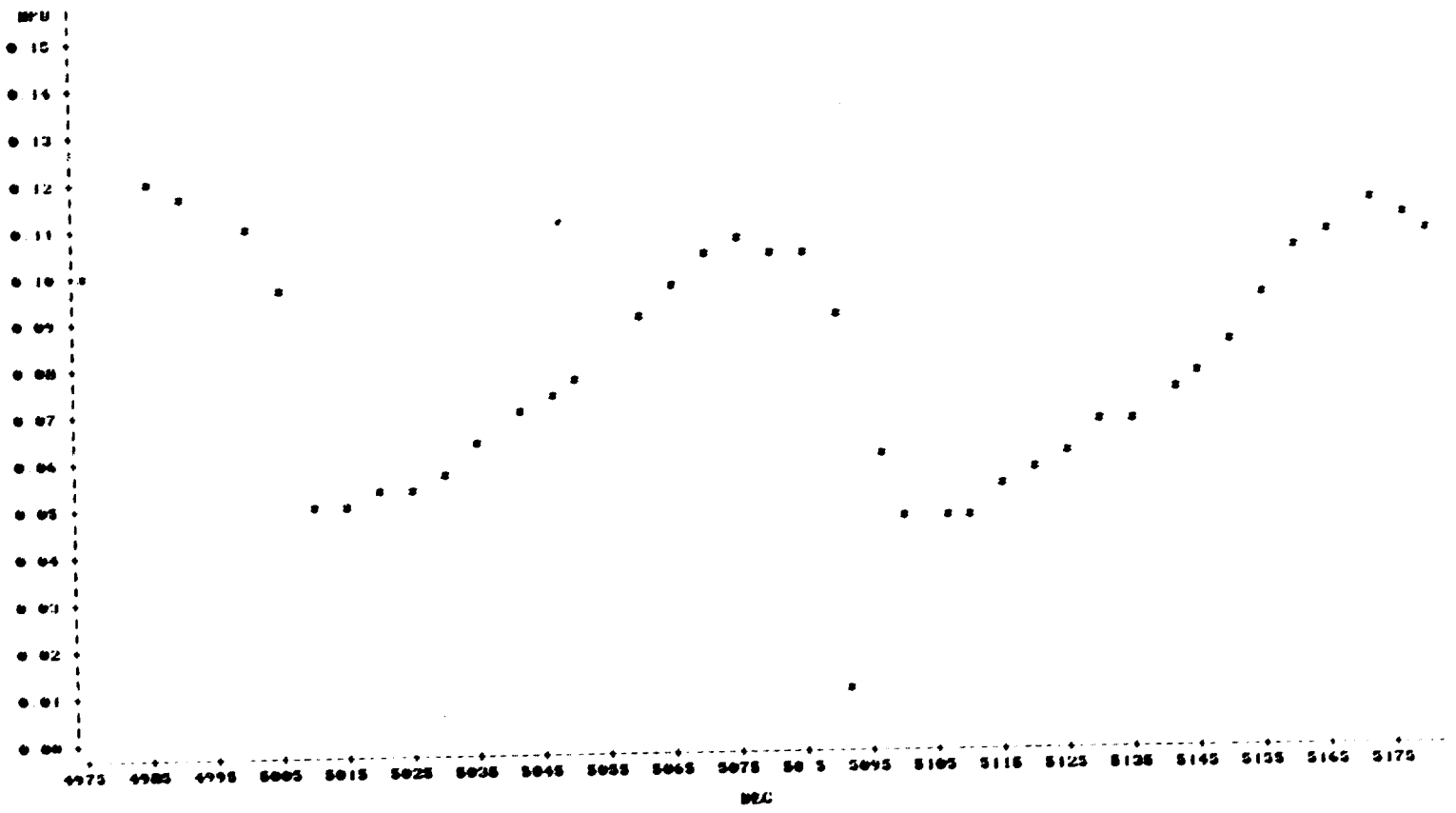

Figure N.10. Variation of Specific Horsepower With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

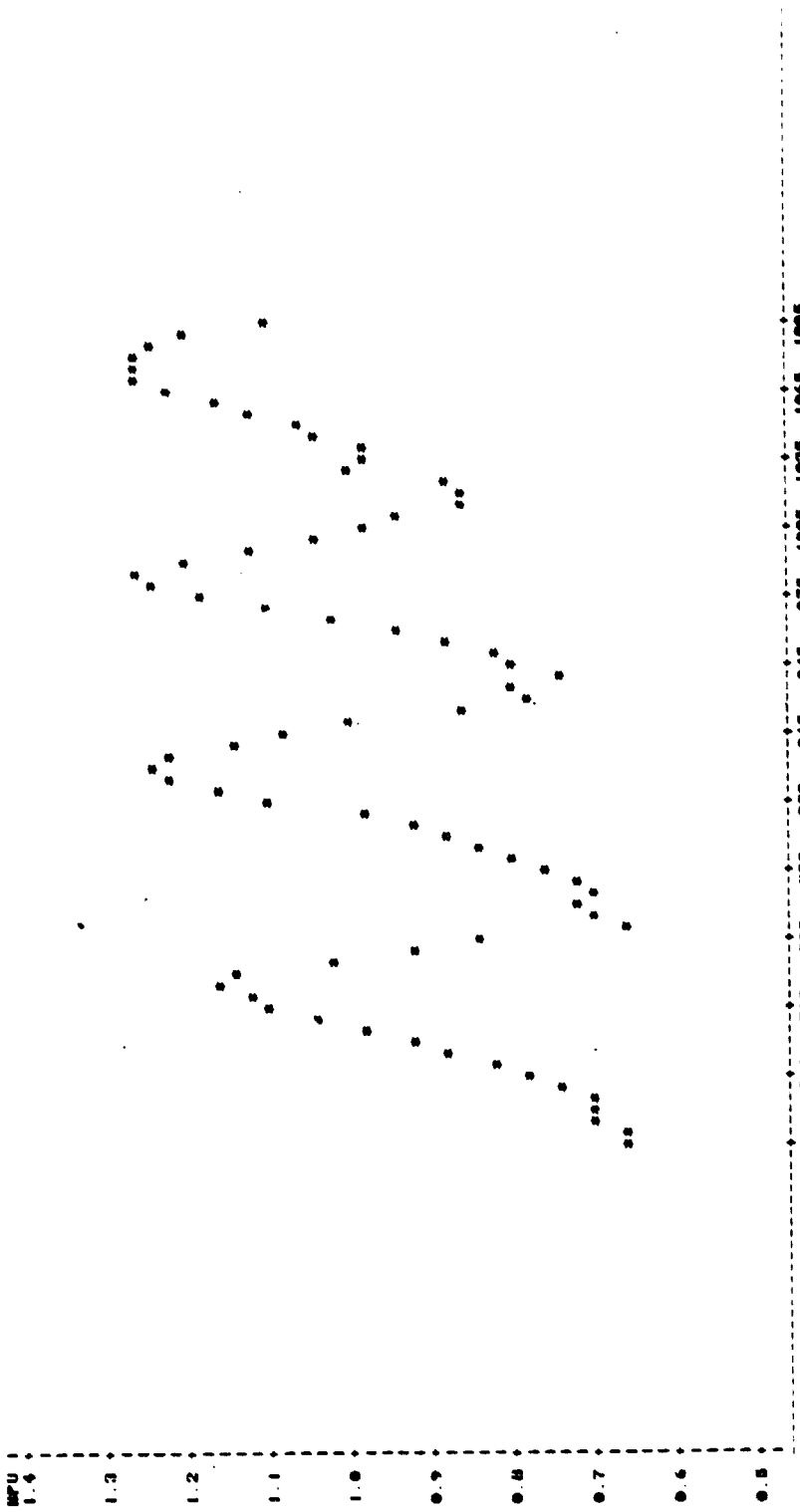

Figure N.11. Variation of Specific Horsepower With Orientation for Copper With 20° Tool, Test Cu 06

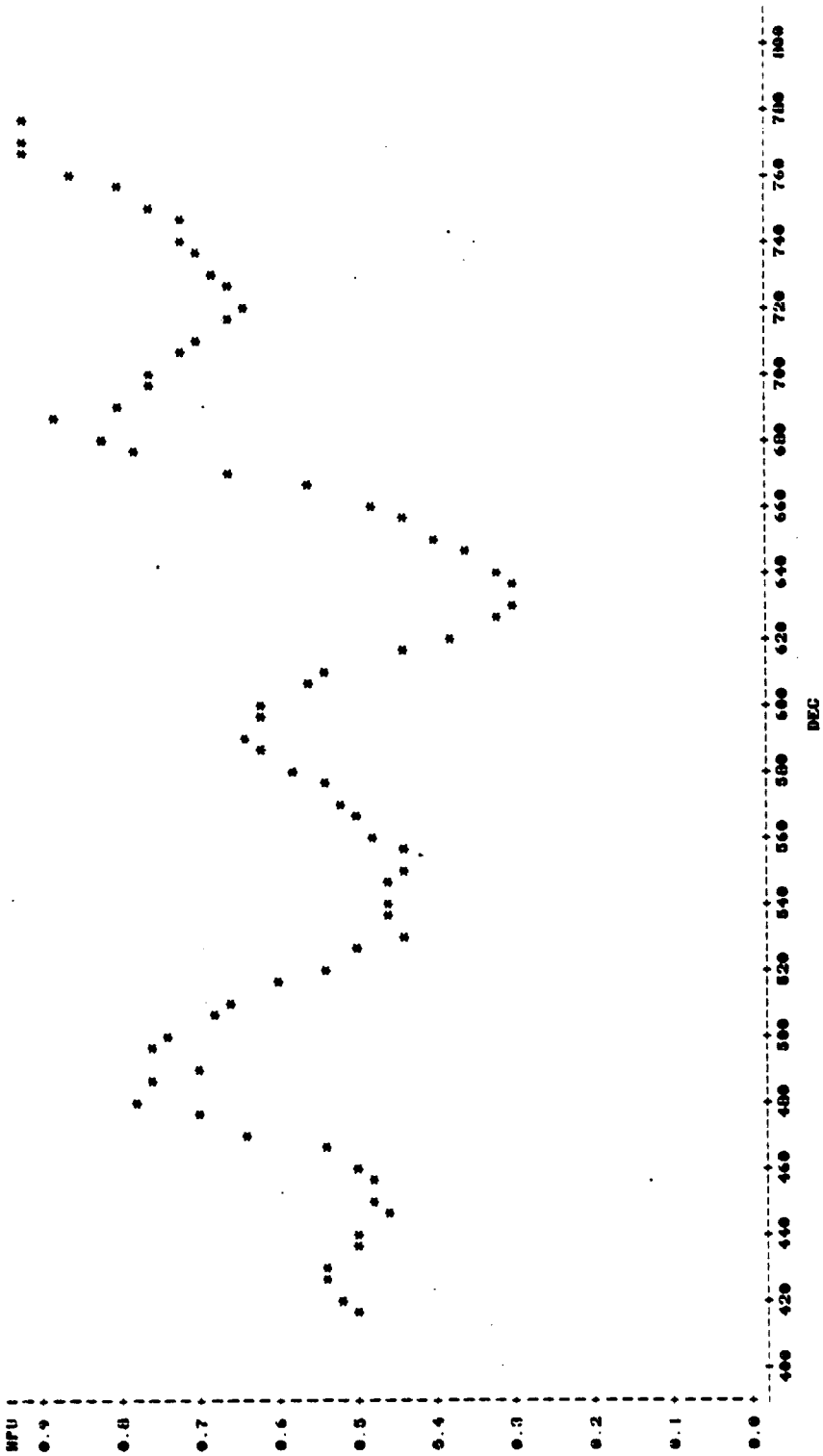

Figure N.12. Variation of Specific Horsepower With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

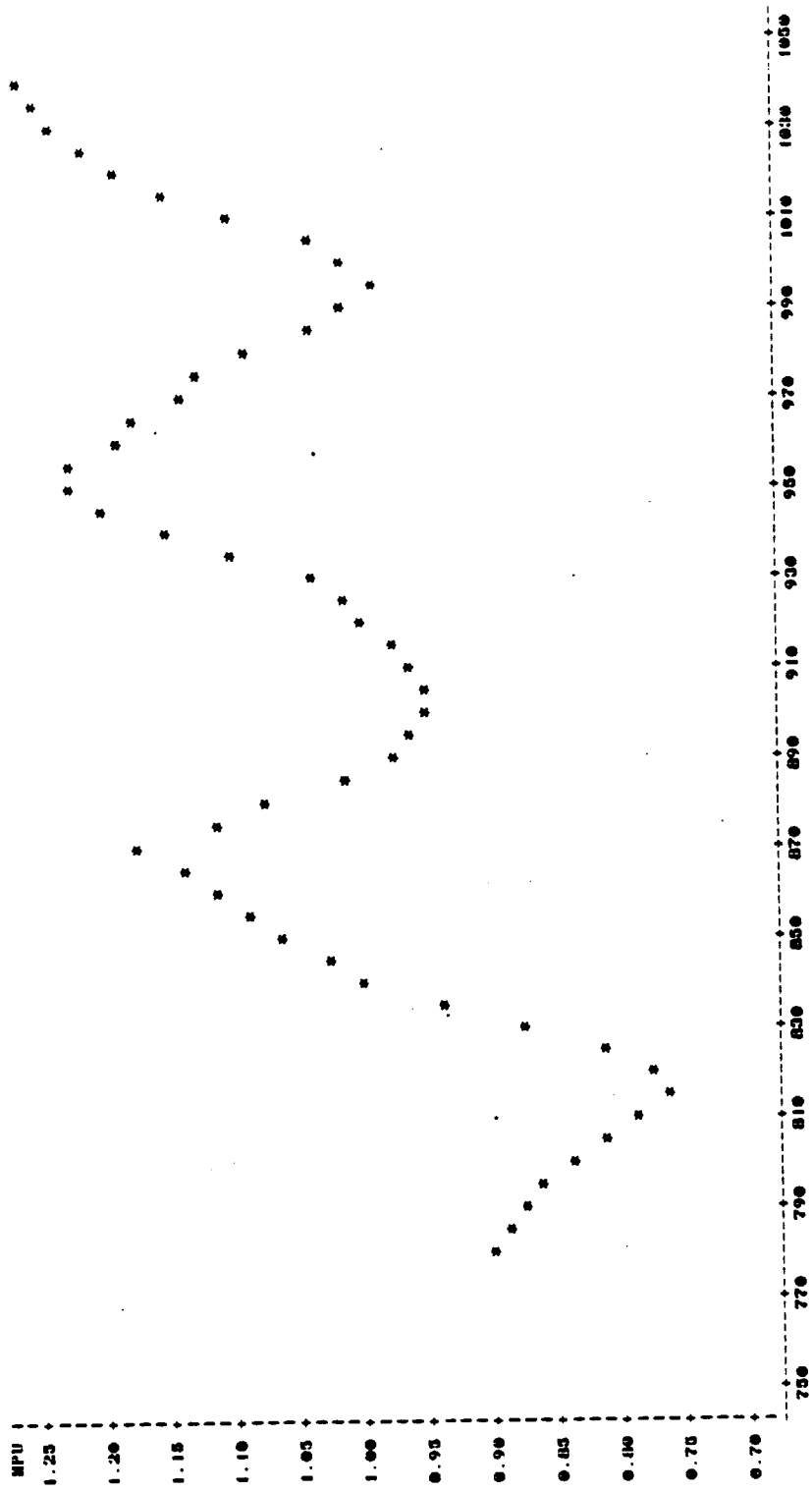

Figure N.13. Variation of Specific Horsepower With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

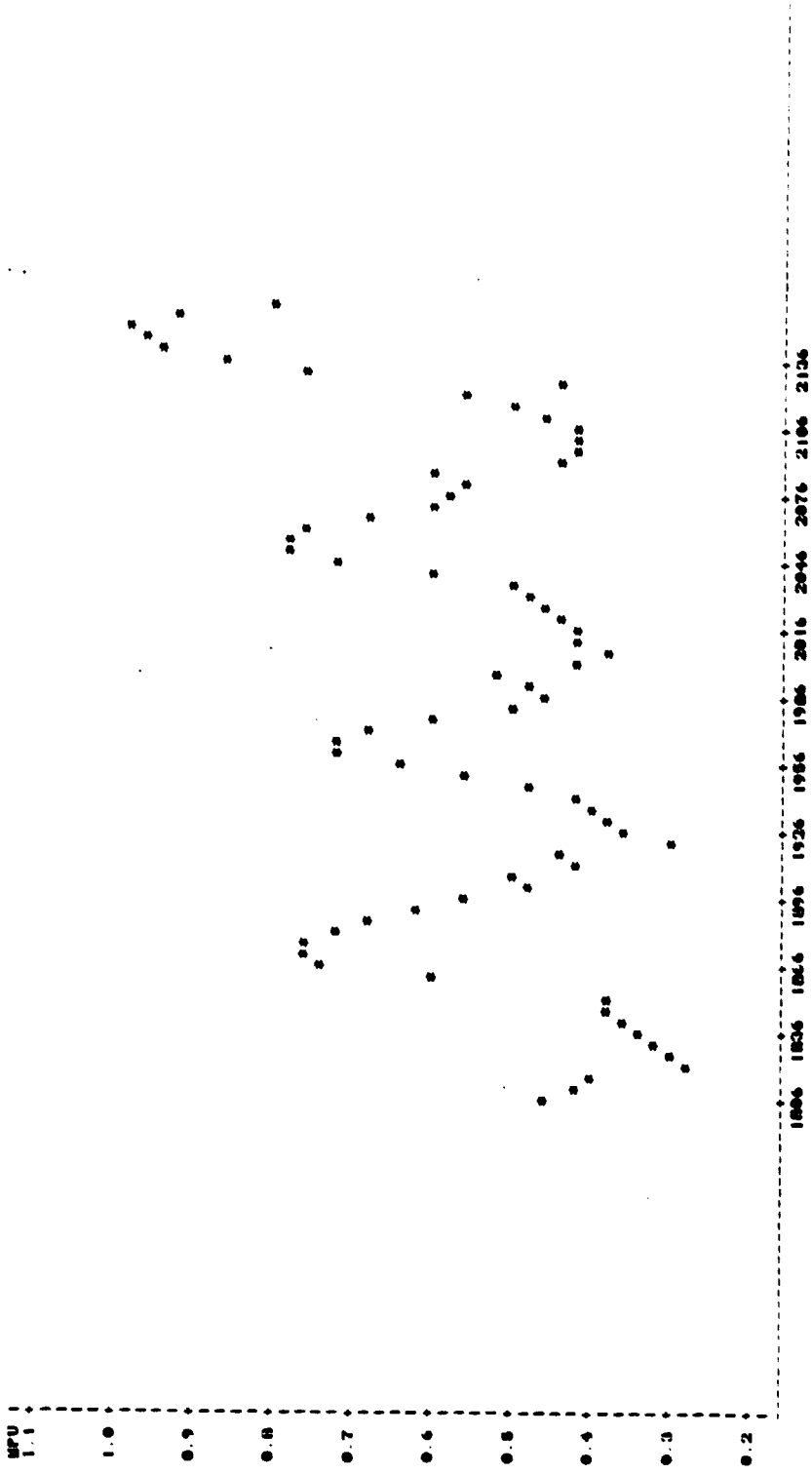

Figure N.14. Variation of Specific Horsepower With Orientation for Copper With 40° Tool, Test Cu 01

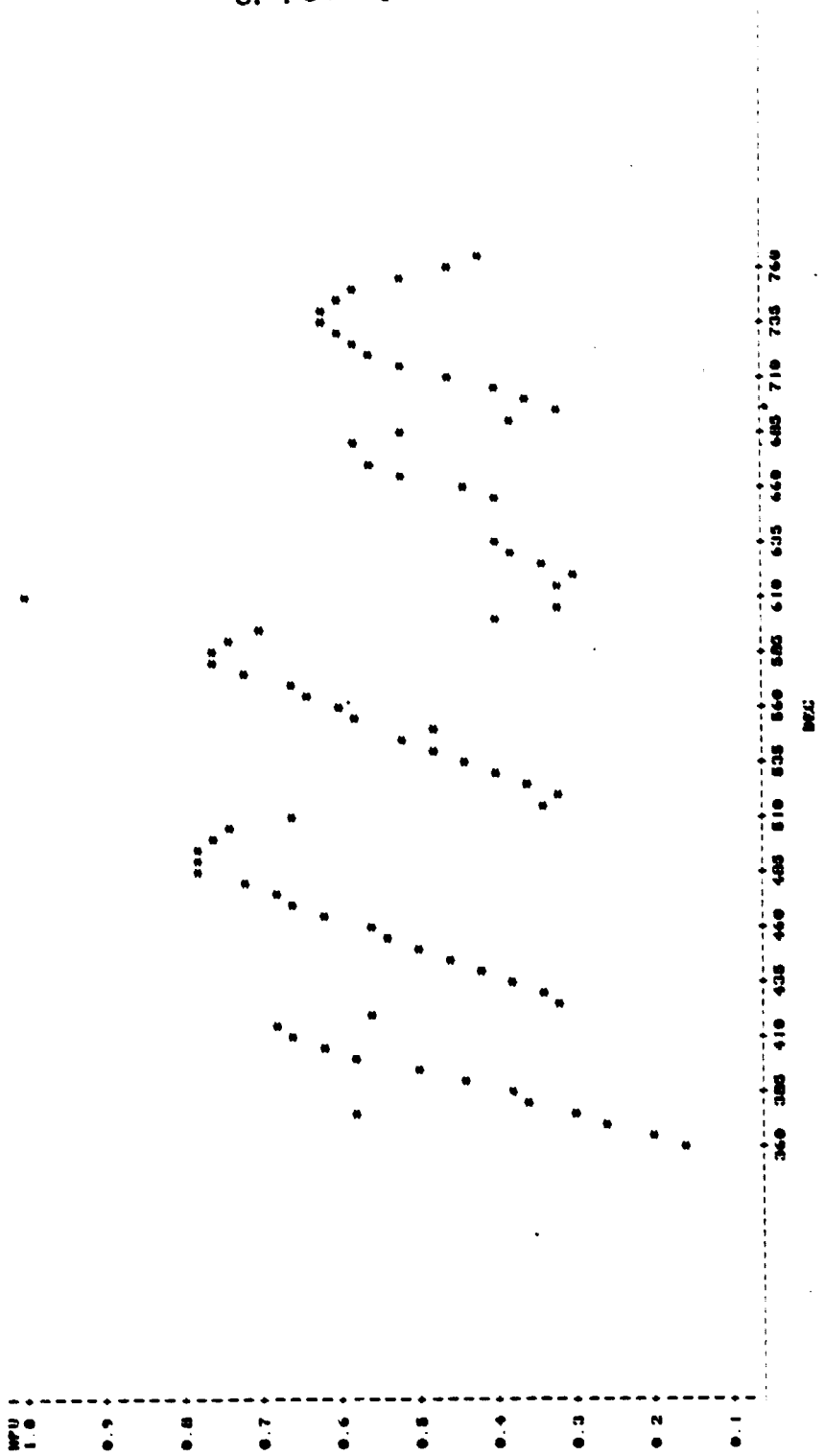

Figure N.15. Variation of Specific Horsepower With Orientation for Copper With 40° Tool, Test 32

APPENDIX O

Variation of Proportion of Energy in Shear

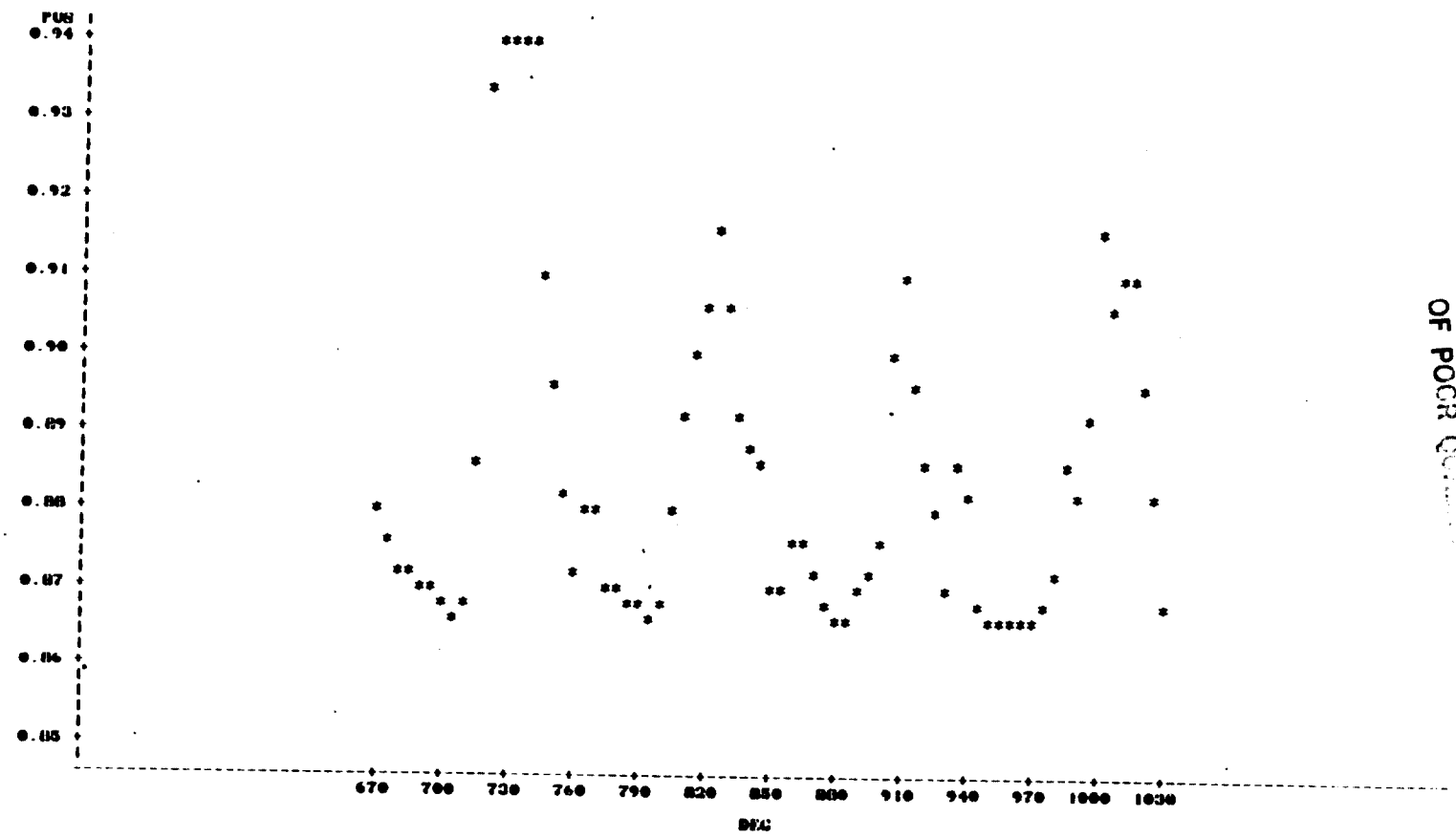

Figure O.1. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

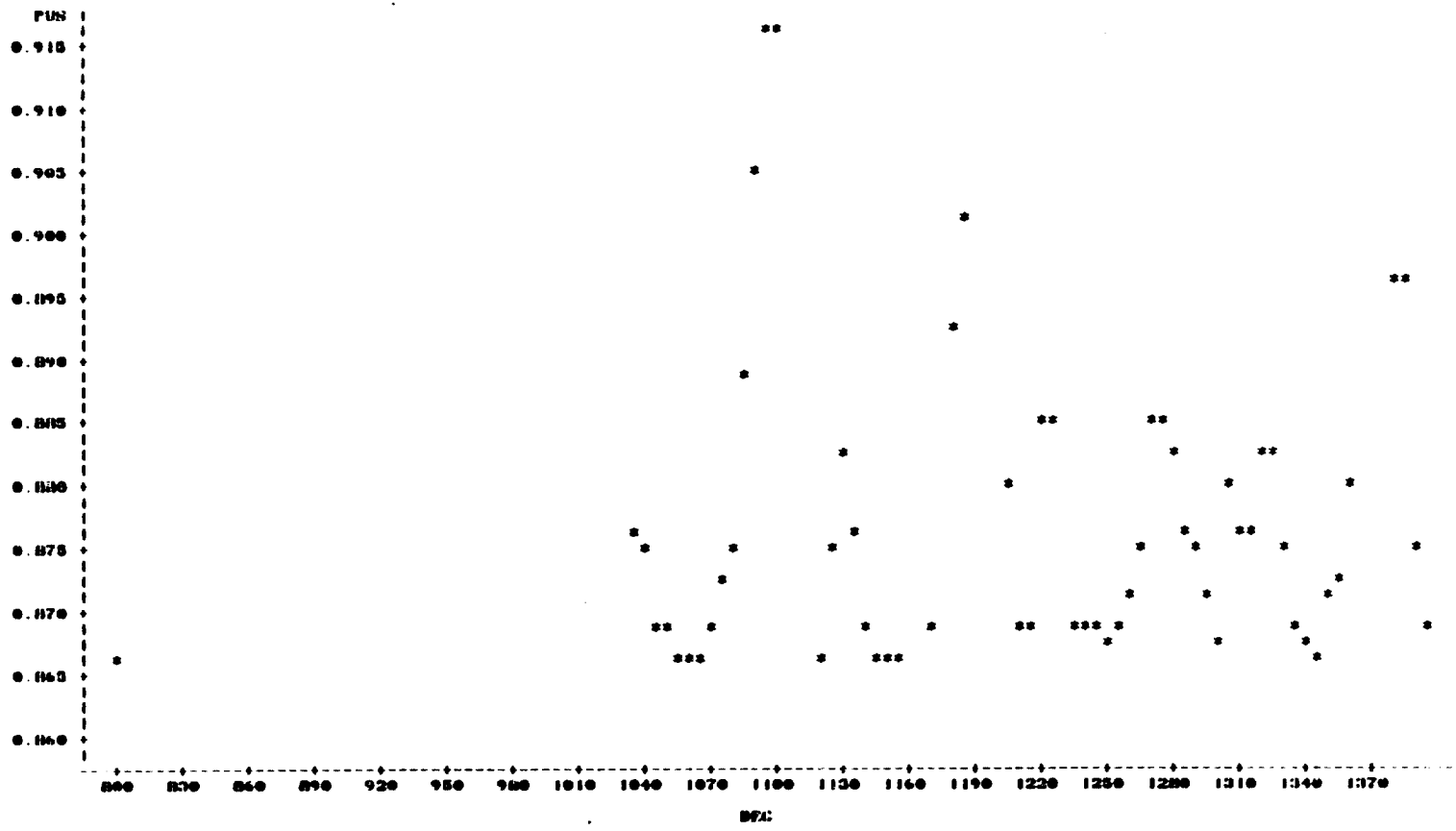

Figure 0.2. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

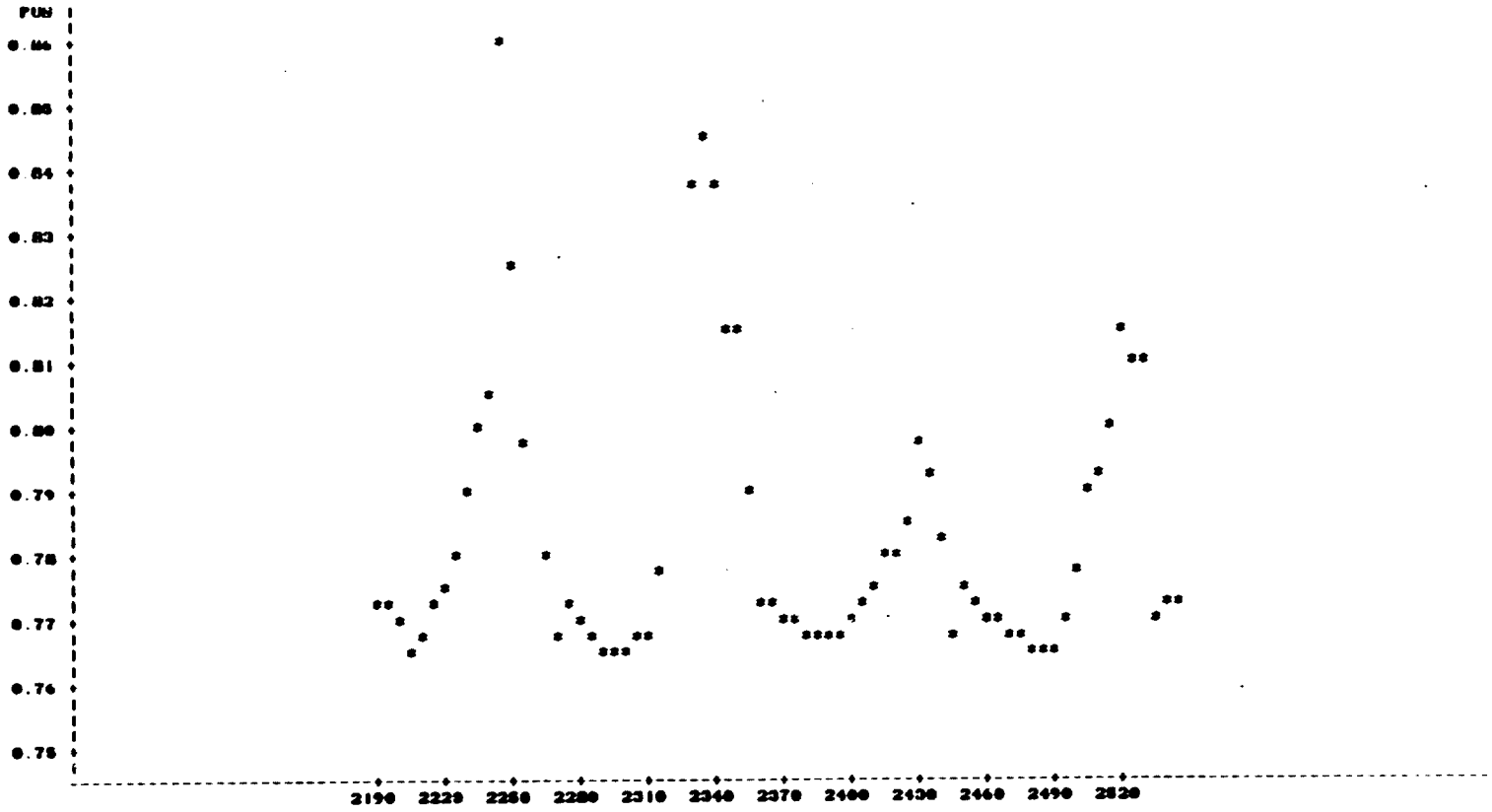

Figure 0.3. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

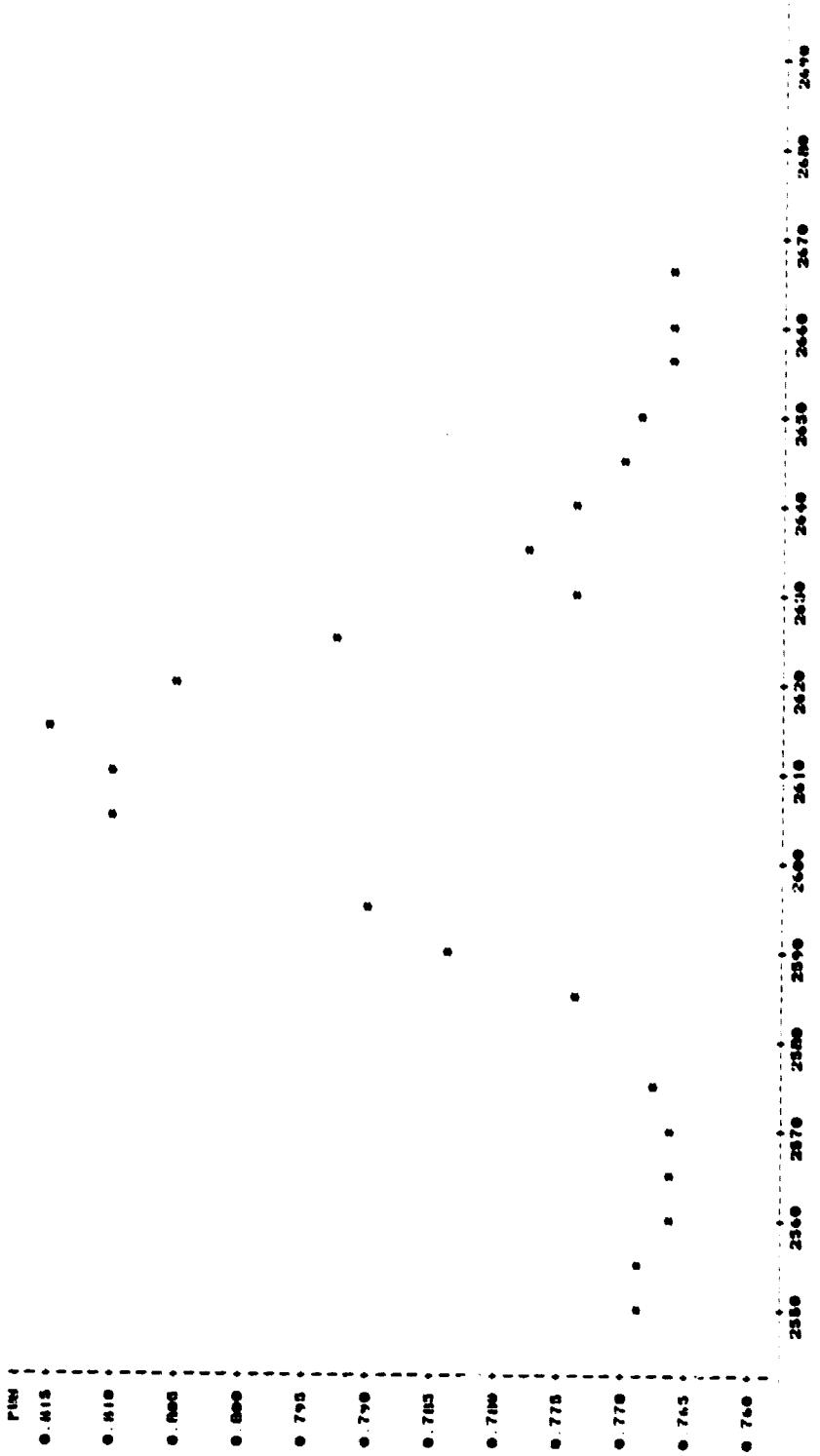

Figure 0.4. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

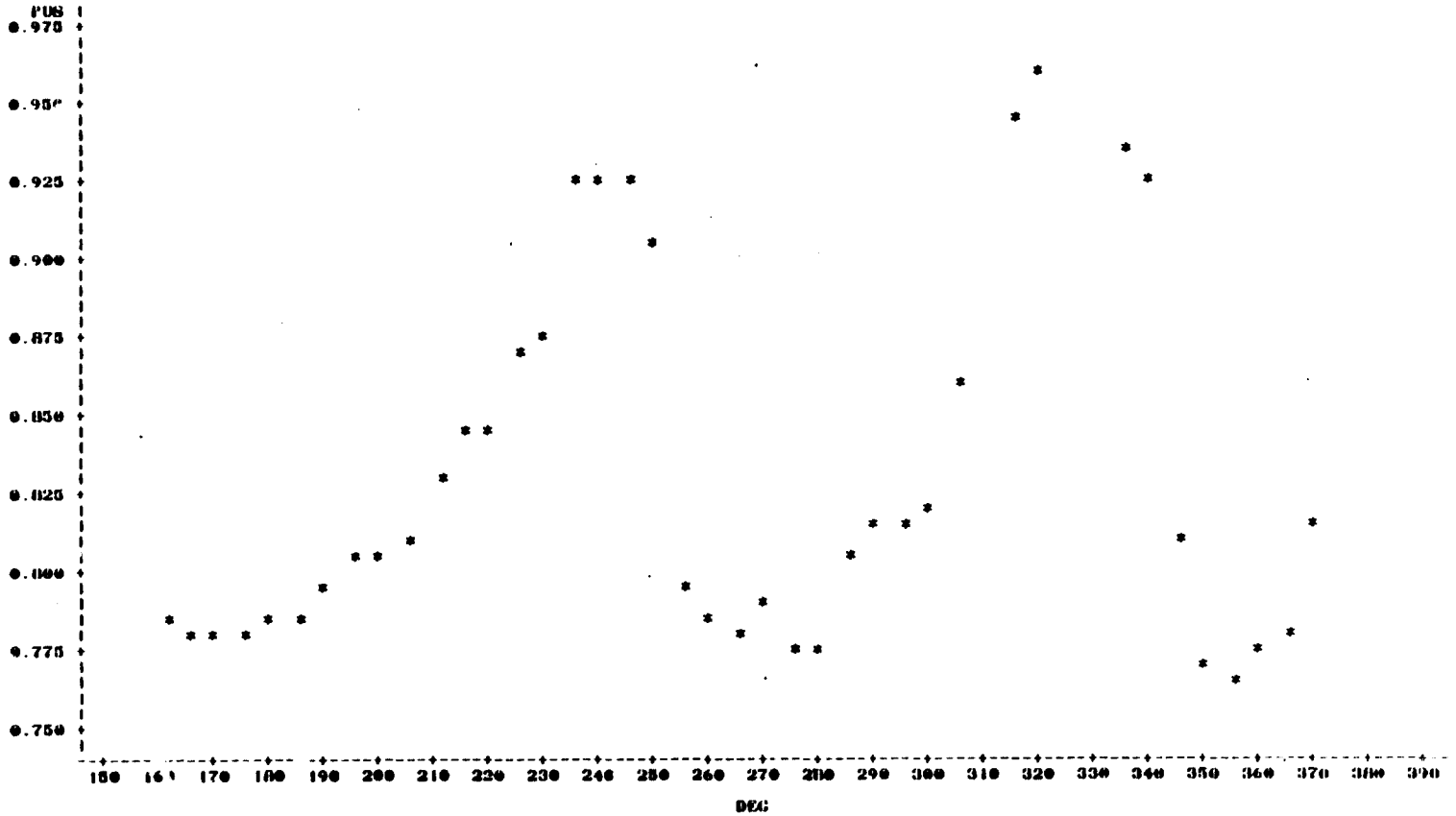

Figure 0.5. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 40° Tool, Test Al 03

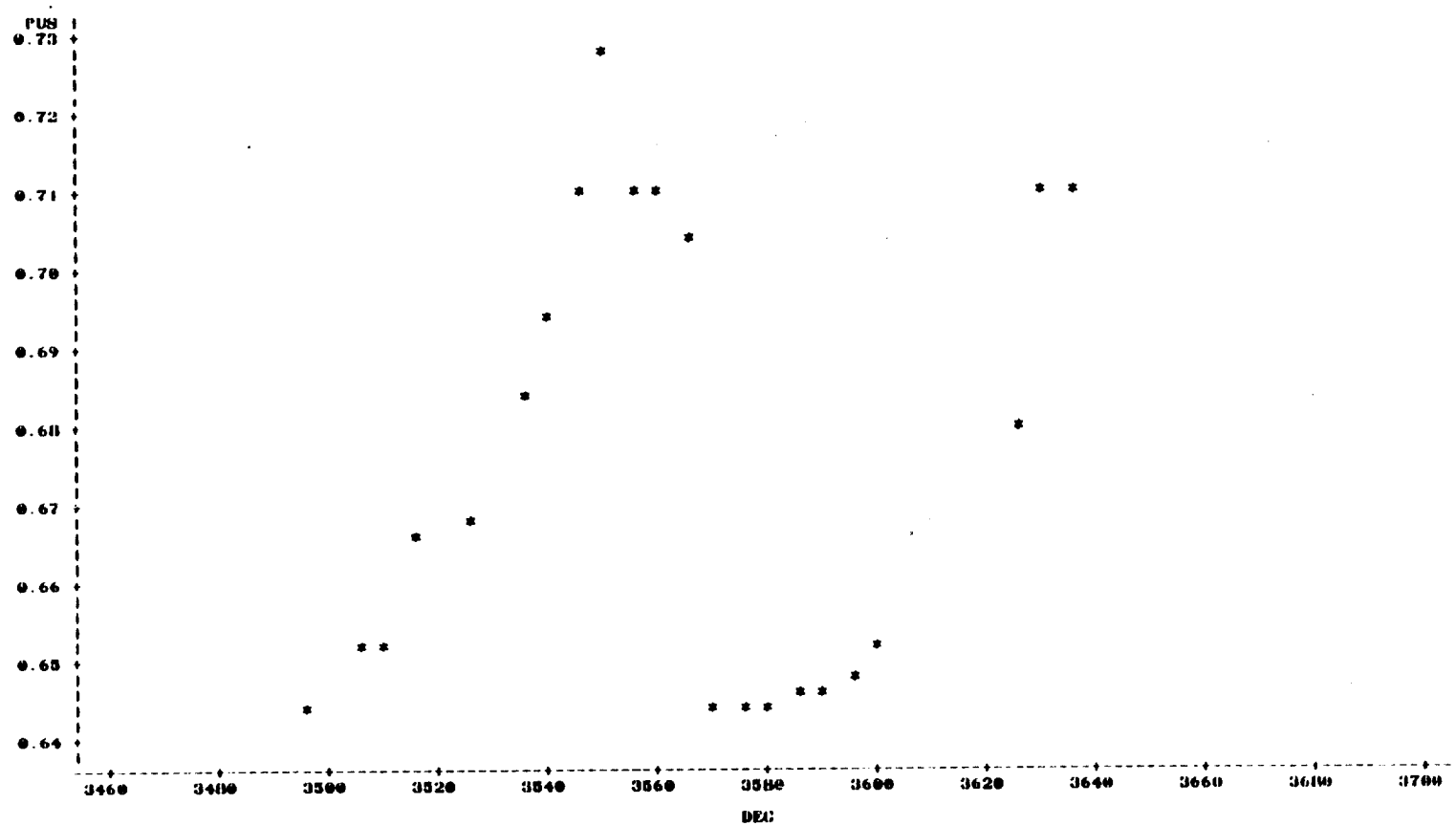

Figure 0.6. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

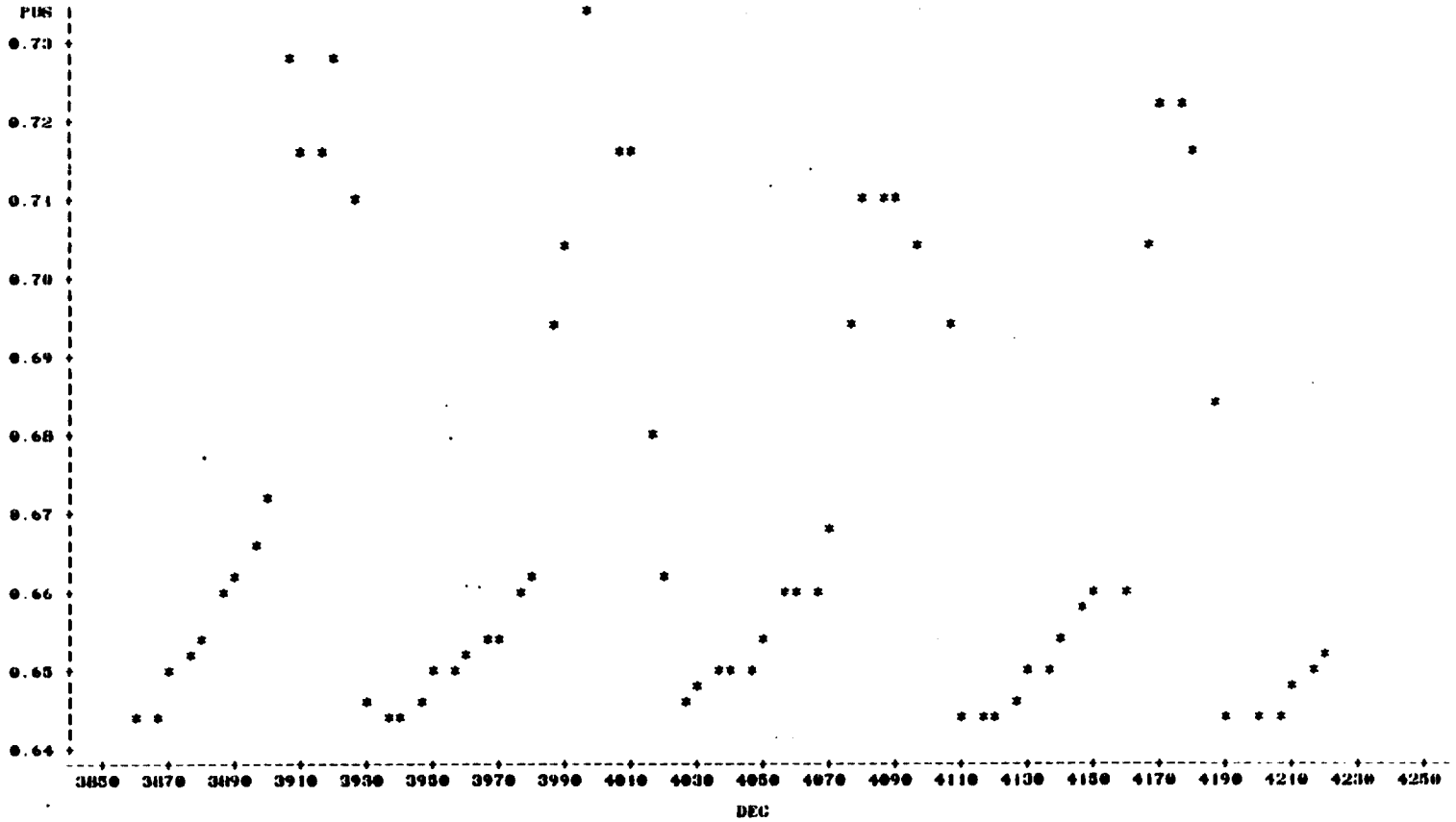

Figure 0.7. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

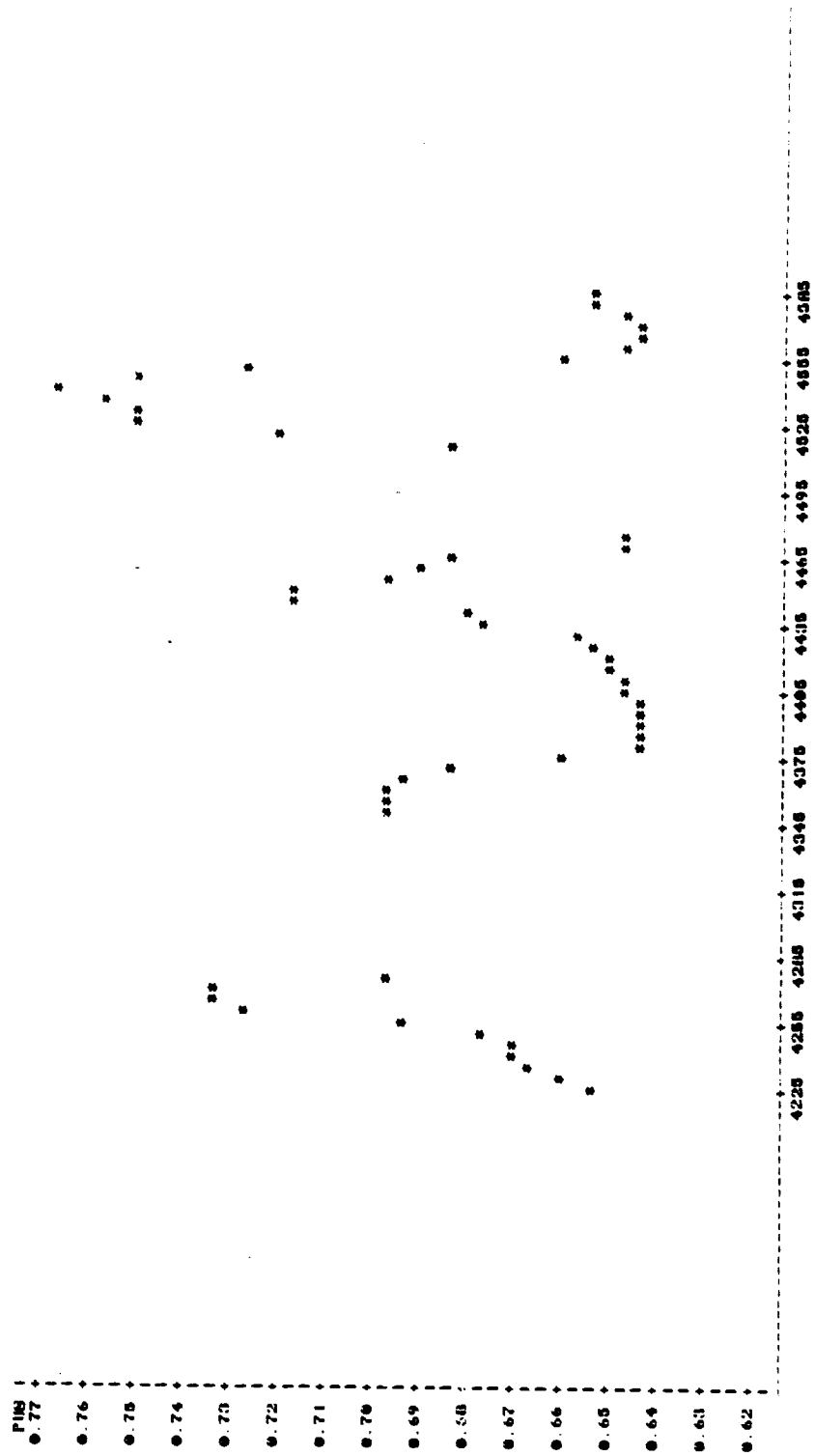

Figure 0.8. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

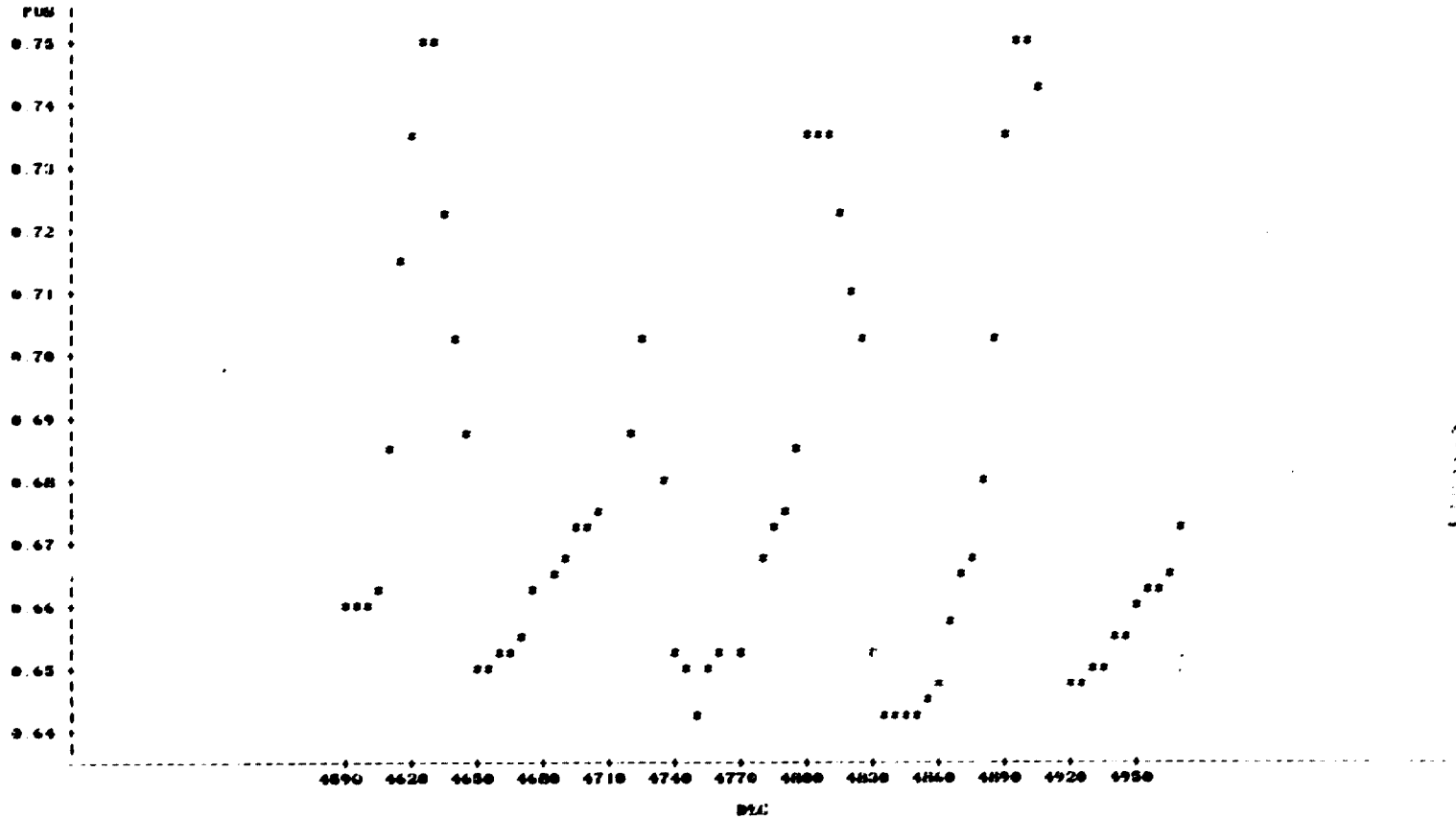

Figure 0.9. Variation of Proportion of Energy in Shear With Orientation for Aluminum With 50° Tool, TEst Al 57, Revolution 4

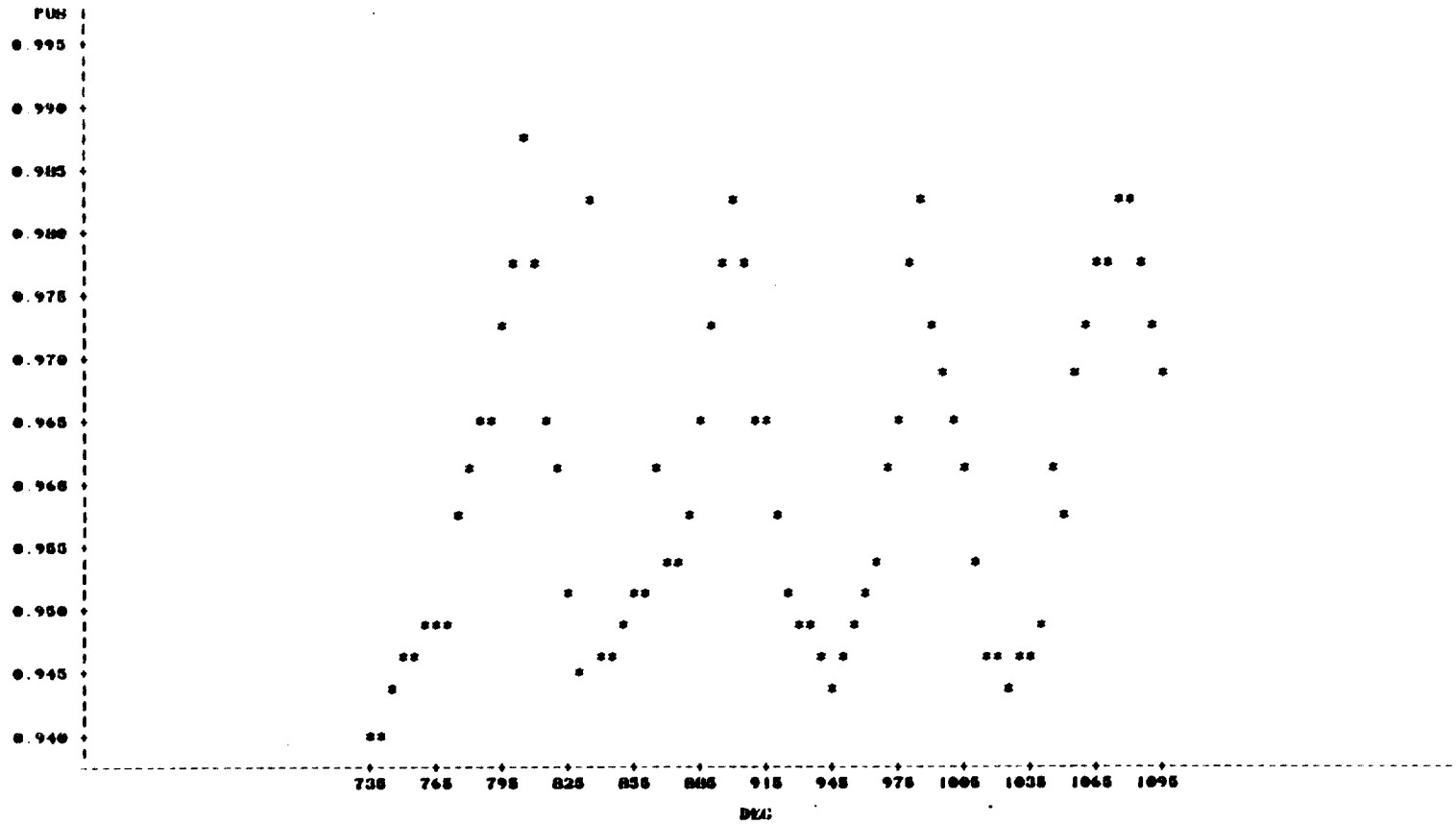

Figure 0.10. Variation of Proportion of Energy in Shear With Orientation for Copper With 20° Tool, Test Cu 06

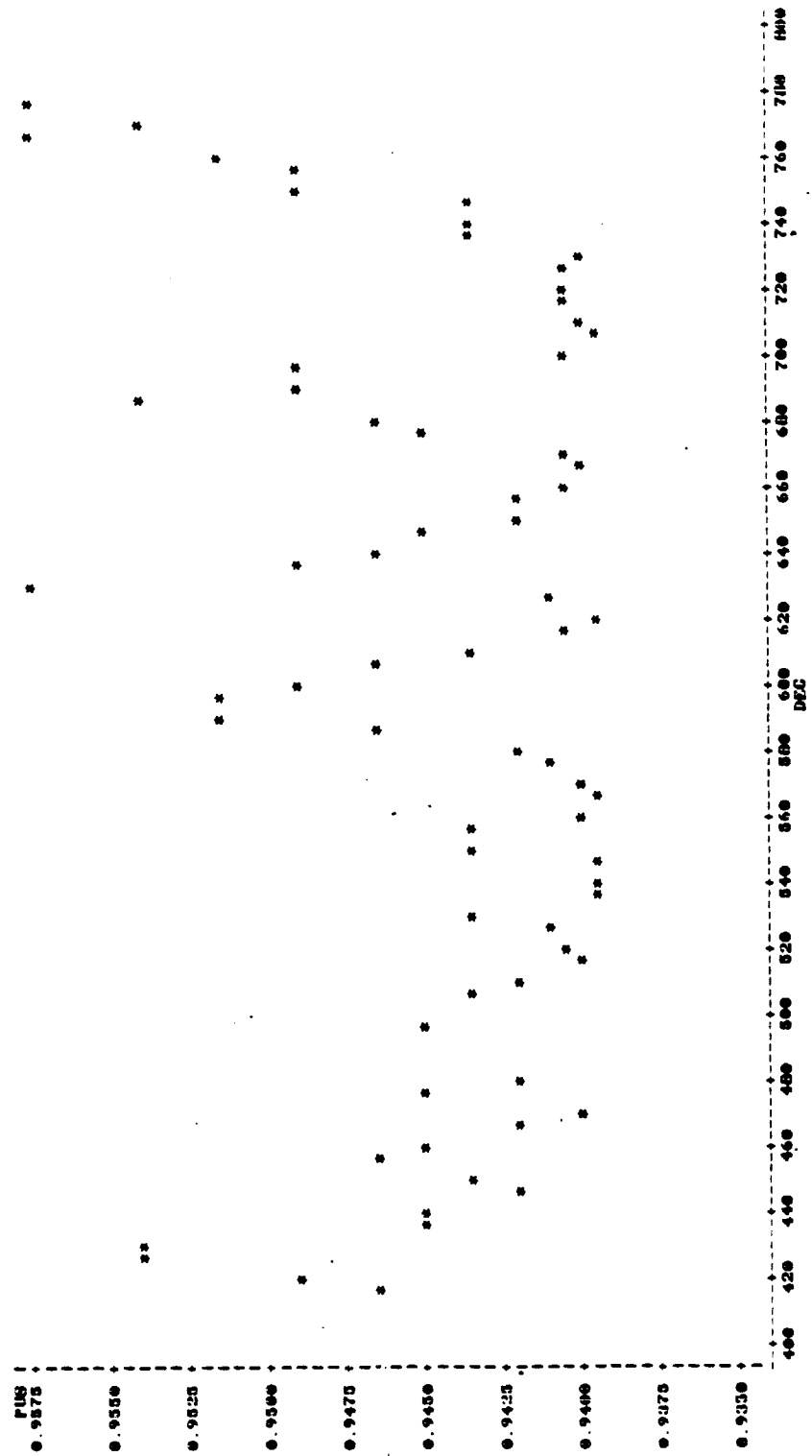

Figure 0.11. Variation of Proportion of Energy in Shear With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

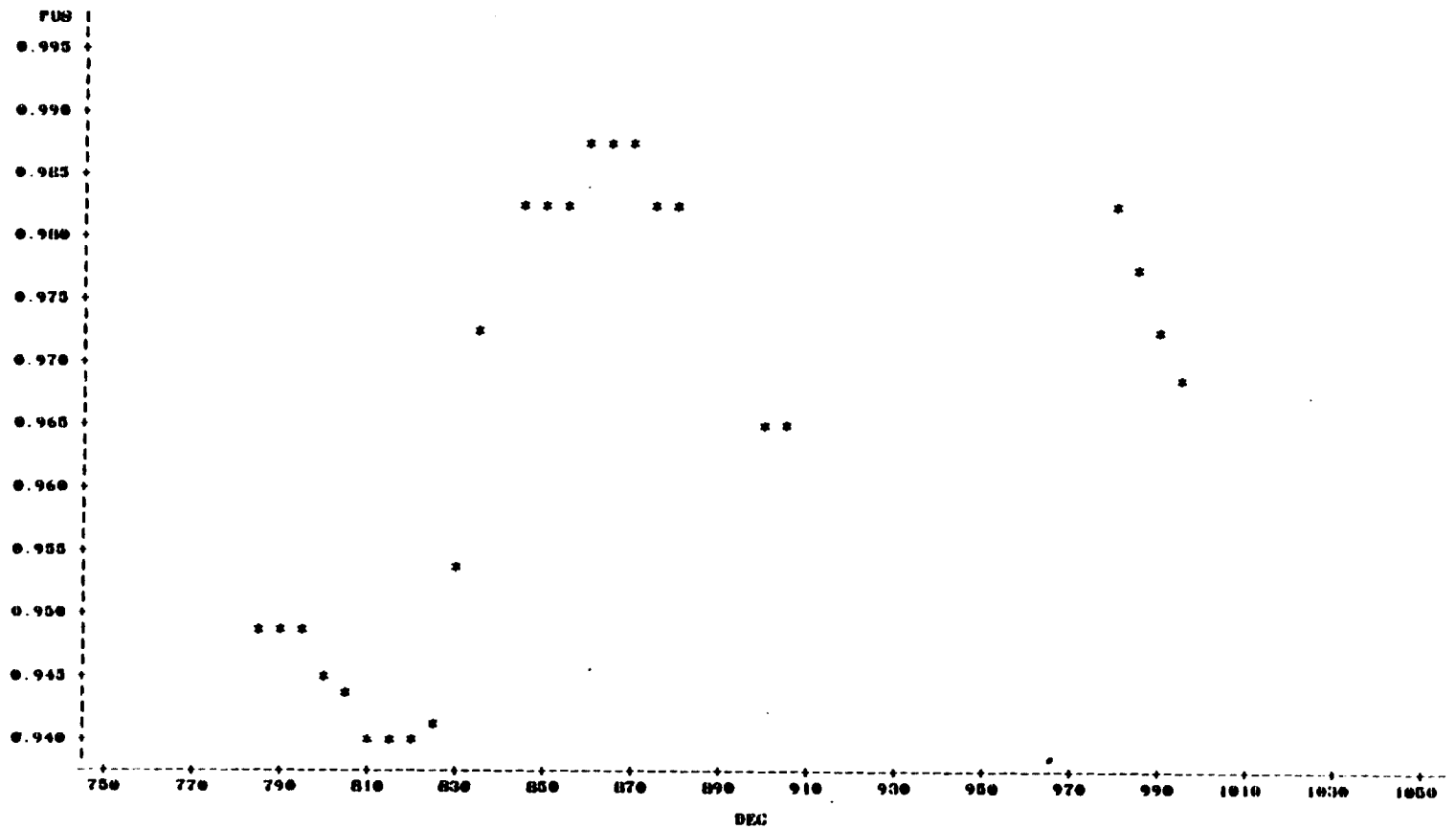

Figure O.12. Variation of Proportion of Energy in Shear With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

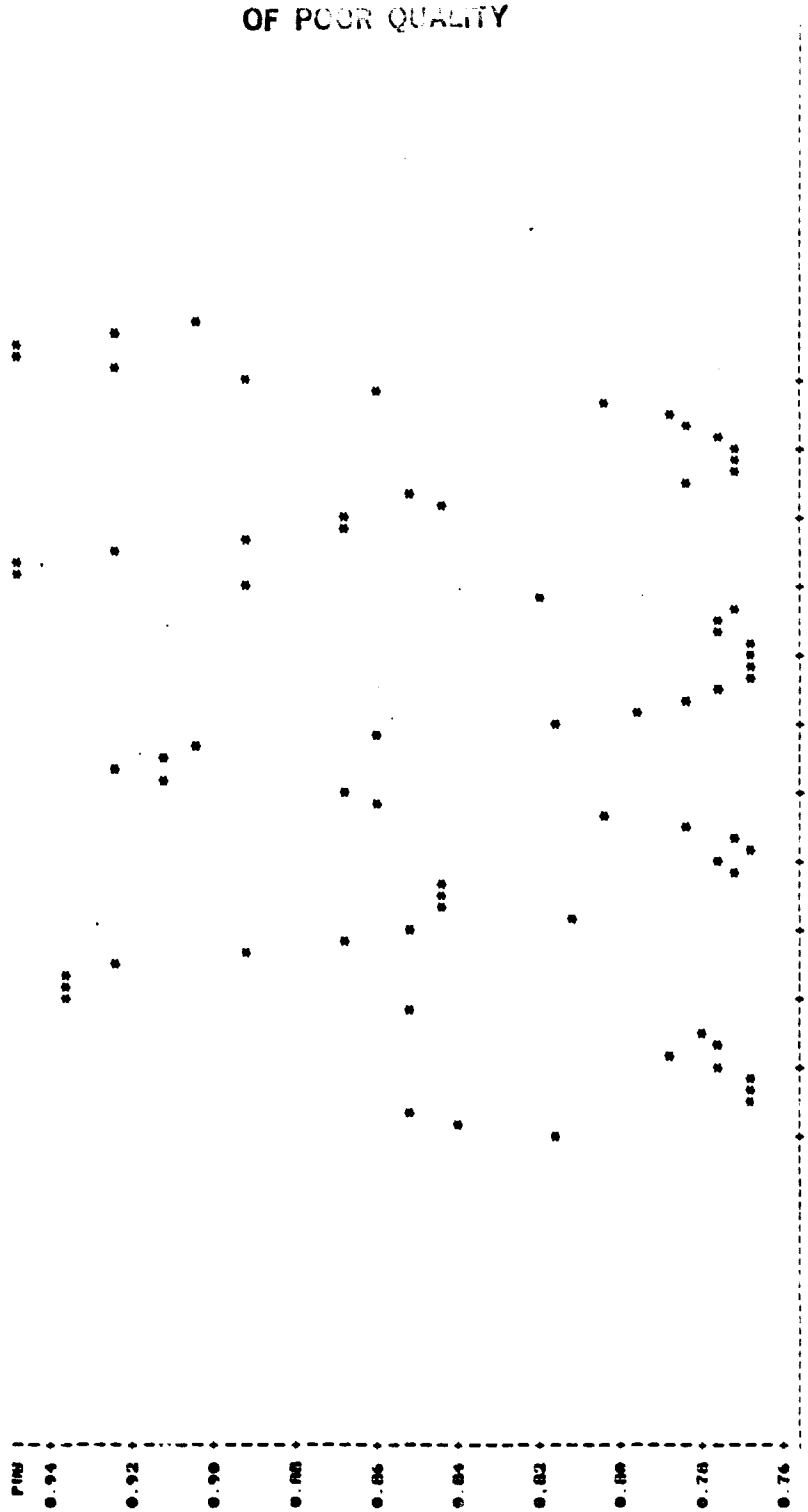

Figure 0.13. Variation of Proportion of Energy in Shear With Orientation for Copper With 40° Tool, Test Cu 01

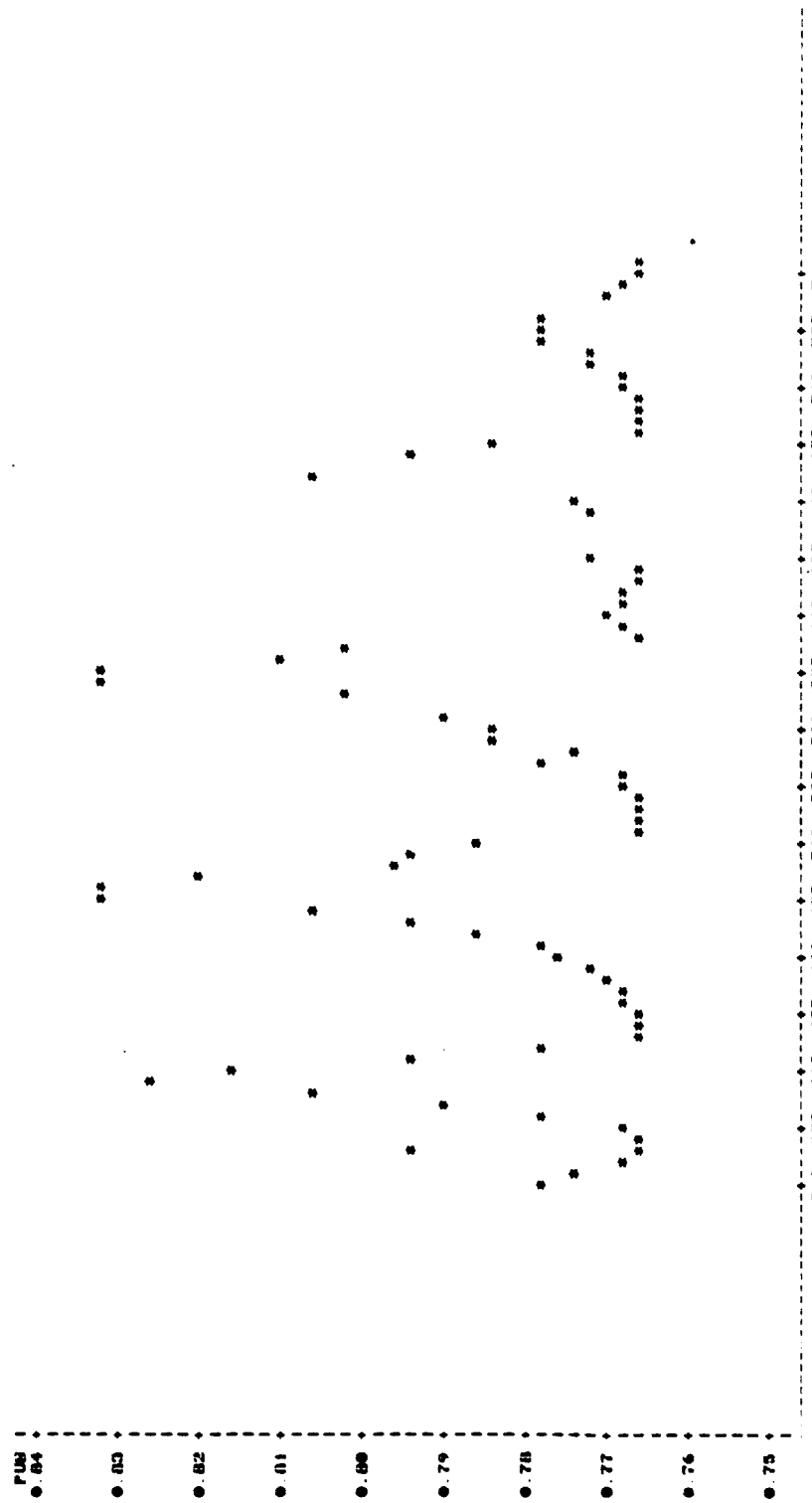

Figure 0.14. Variation of Proportion of Energy in Shear With Orientation for Copper With 40° Tool, Test Cu 32

APPENDIX P

Variation of Coefficient of Friction

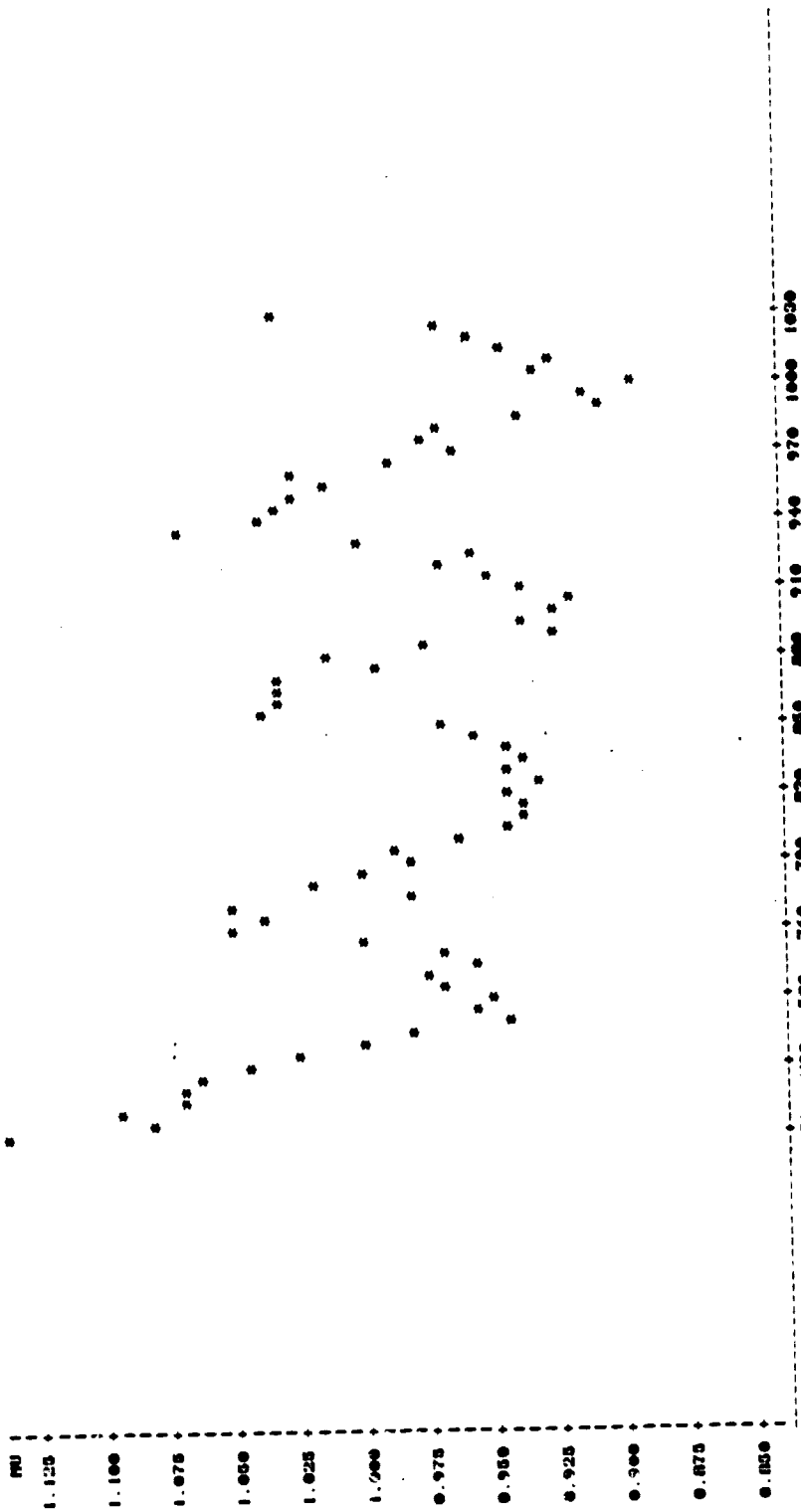

Figure P.1. Variation of Coefficient of Friction With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

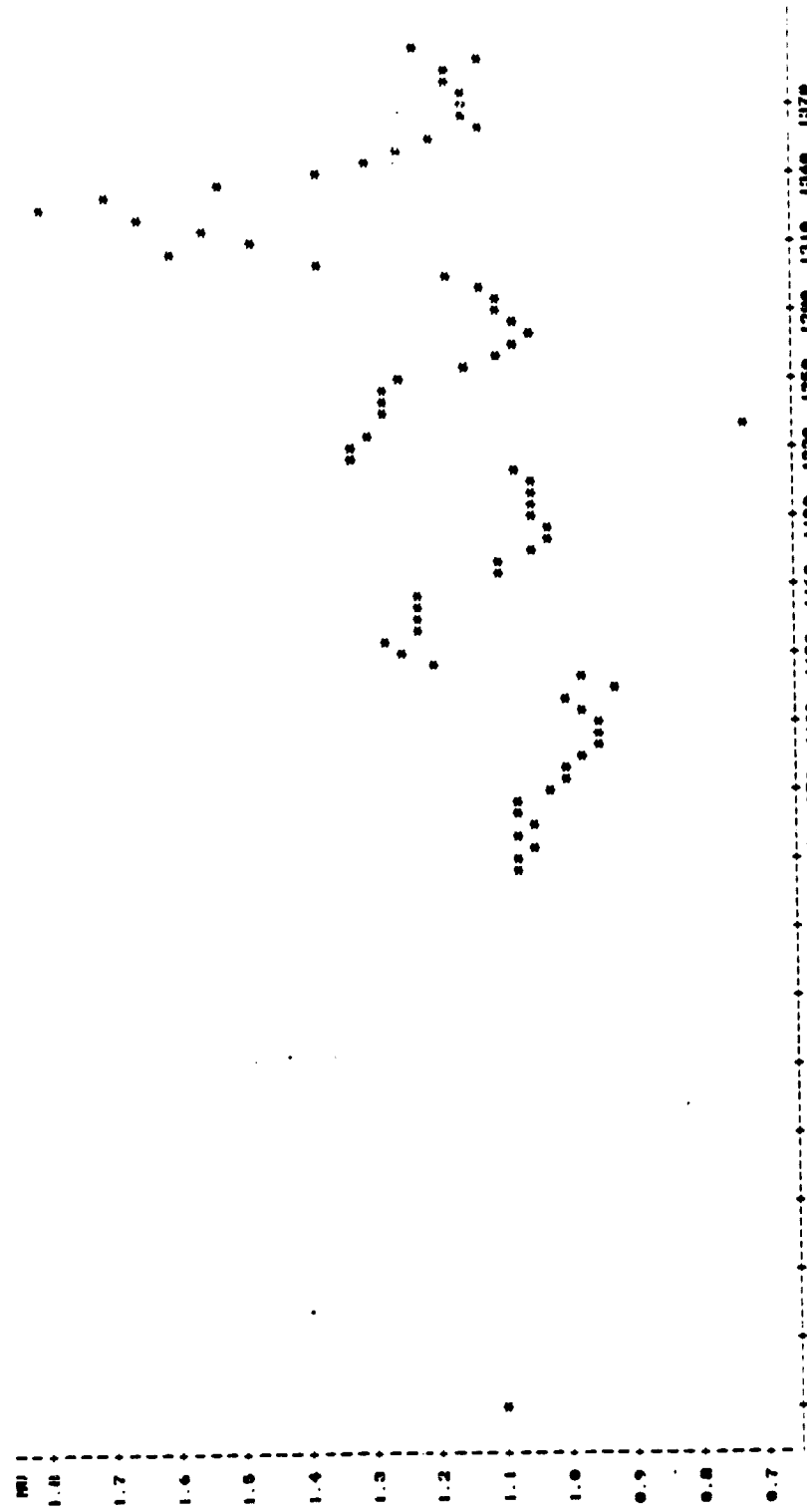

Figure P.2. Variation of Coefficient of Friction With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

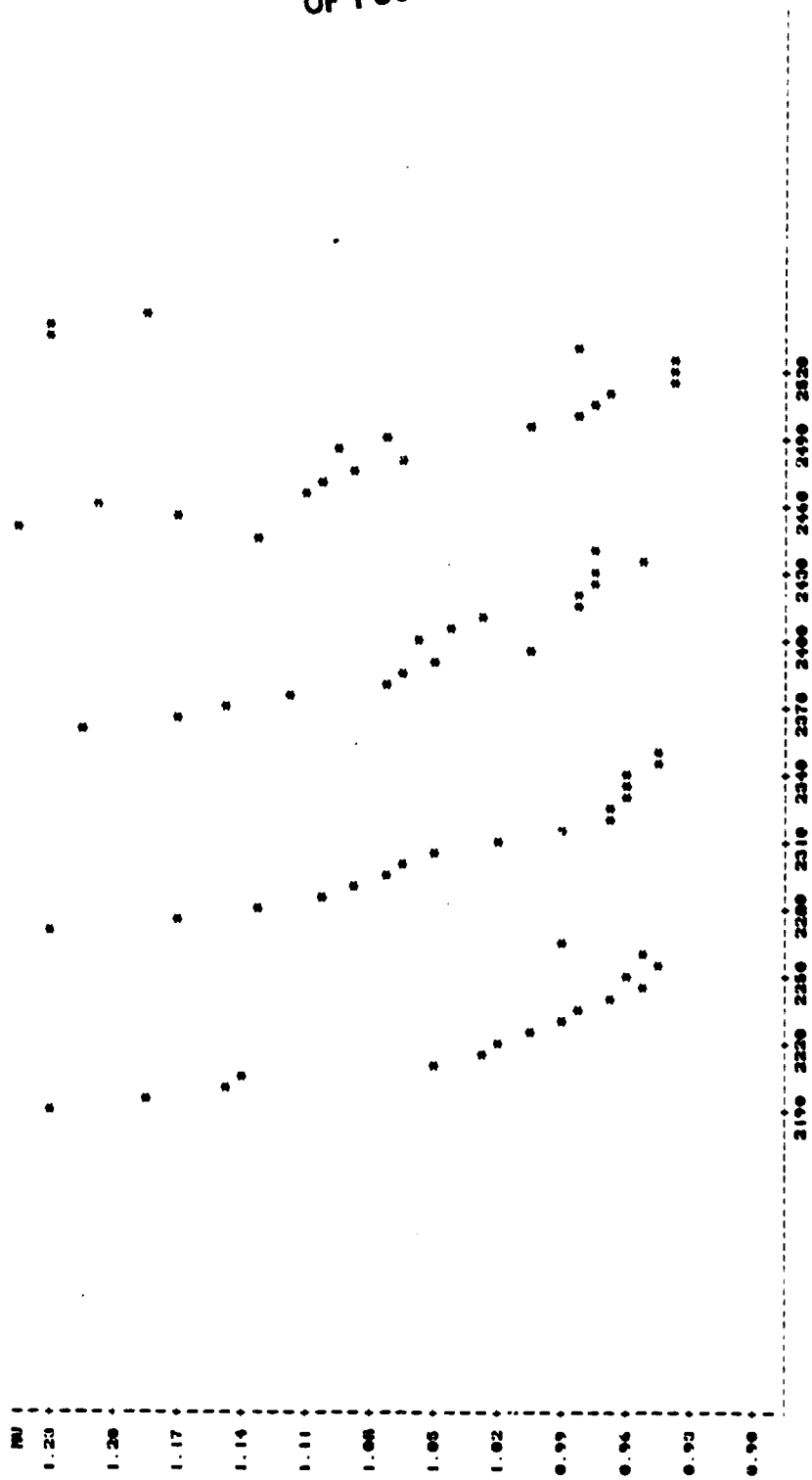

Figure P.3. Variation of Coefficient of Friction With Orientation for Aluminum With 40° Tool, TEst Al 56, Revolution 2

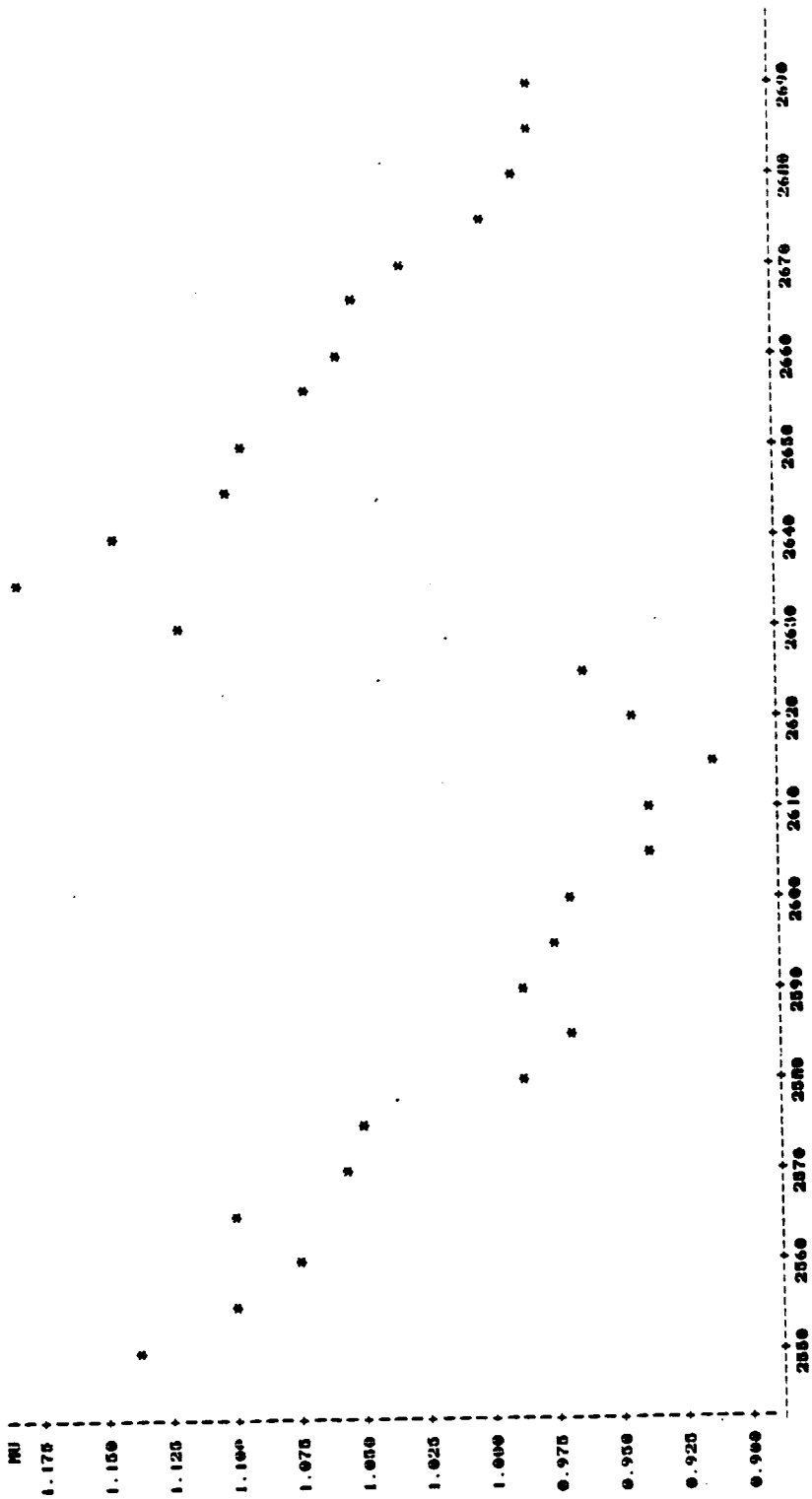

Figure P.4. Variation of Coefficient of Friction With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

C-4

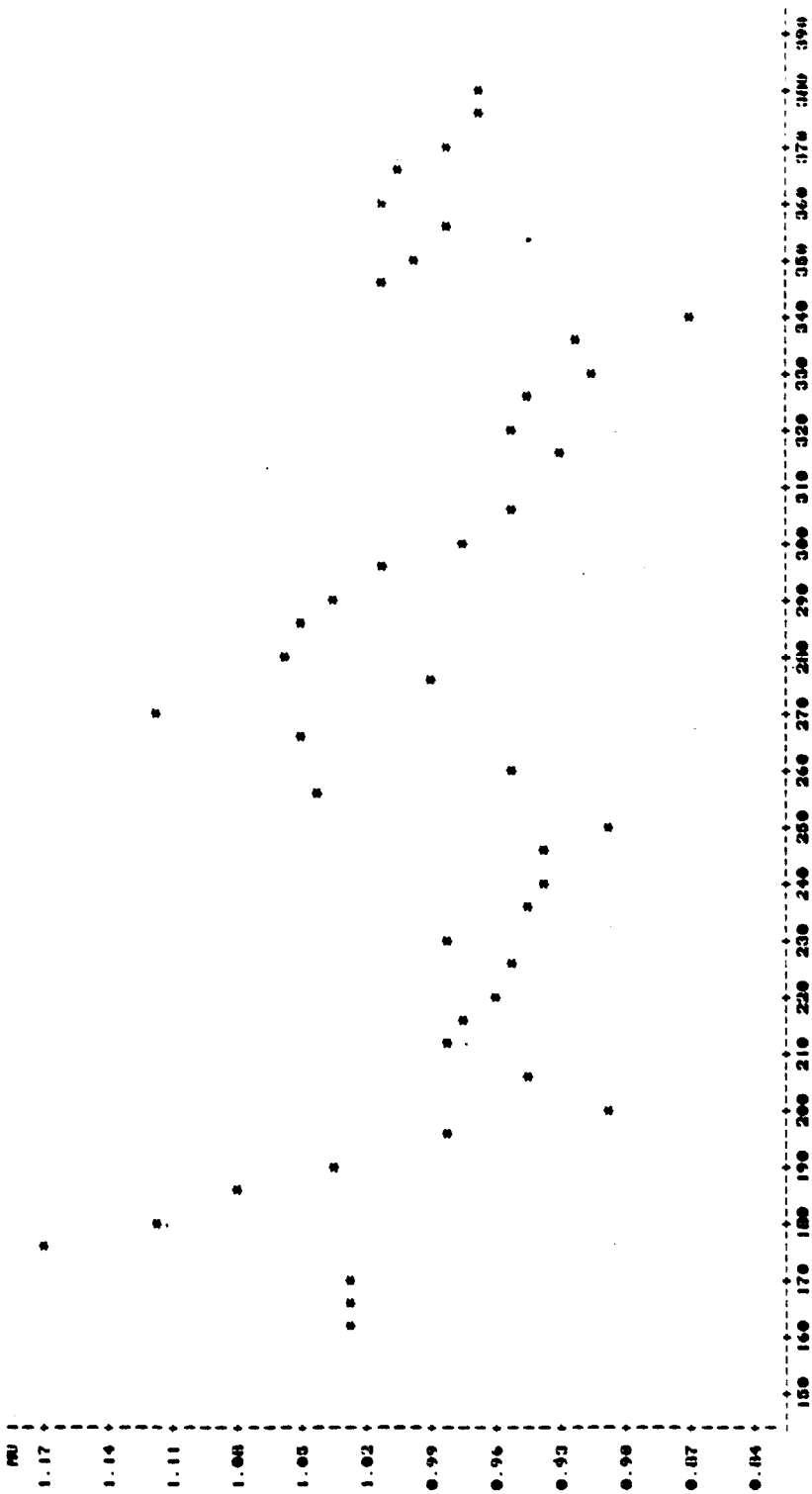

Figure P.5. Variation of Coefficient of Friction With Orientation for Aluminum With 40° Tool, Test Al 03

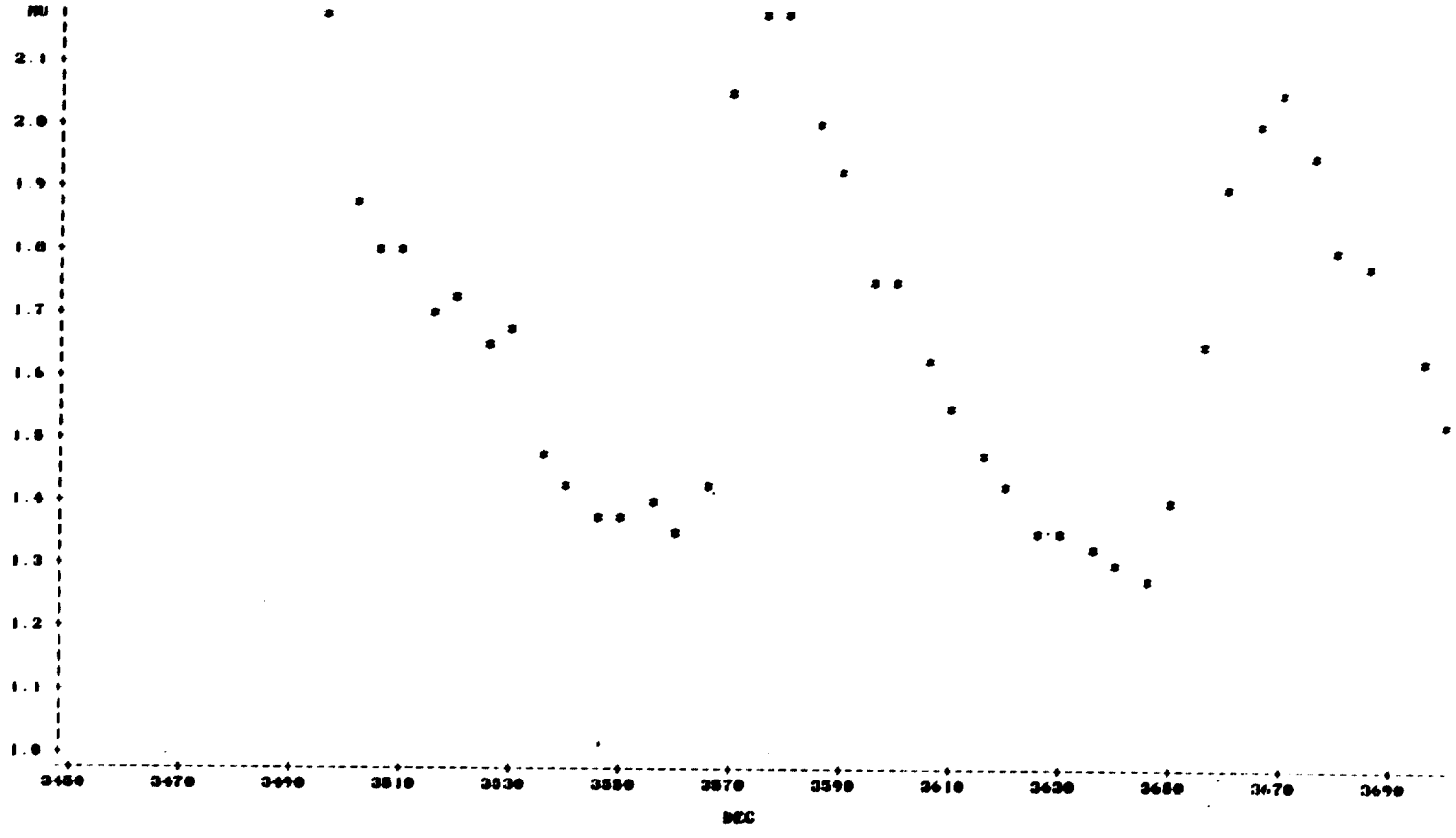

Figure P.6. Variation of Coefficient of Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

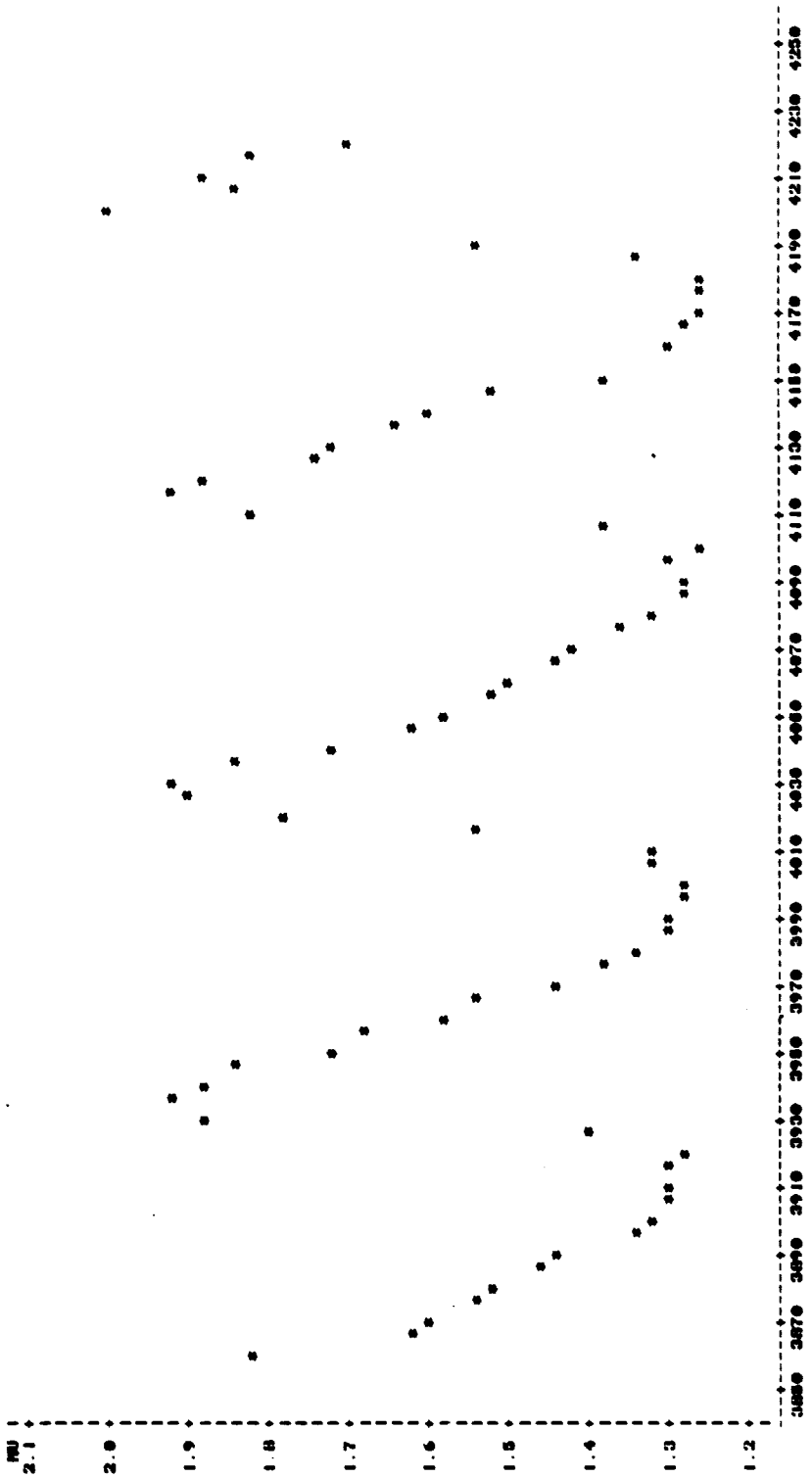

Figure P.7. Variation of Coefficient of Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

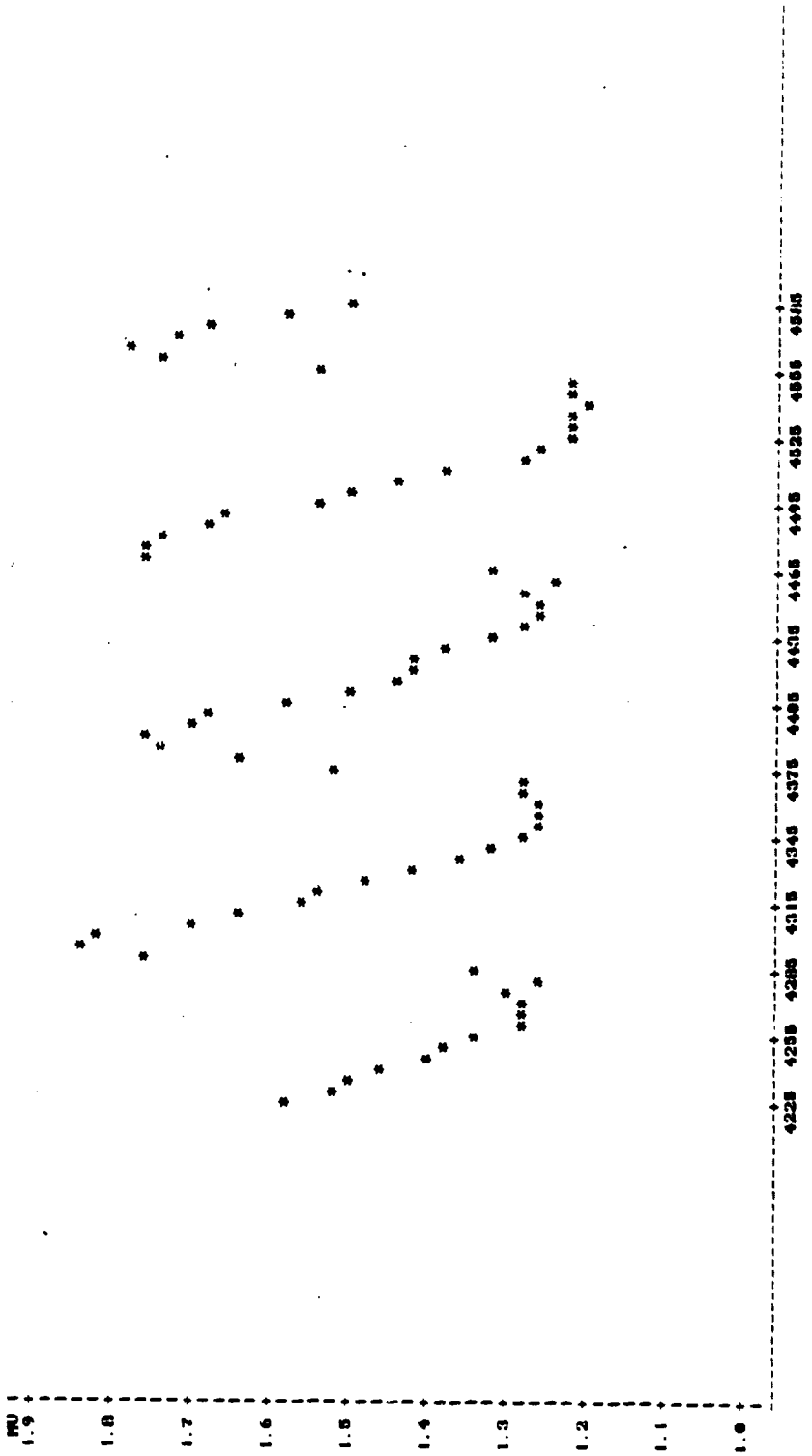

Figure P.8. Variation of Coefficient of Friction With Orientation for Aluminum With 50° Tool, TEst Al 57, Revolution 3

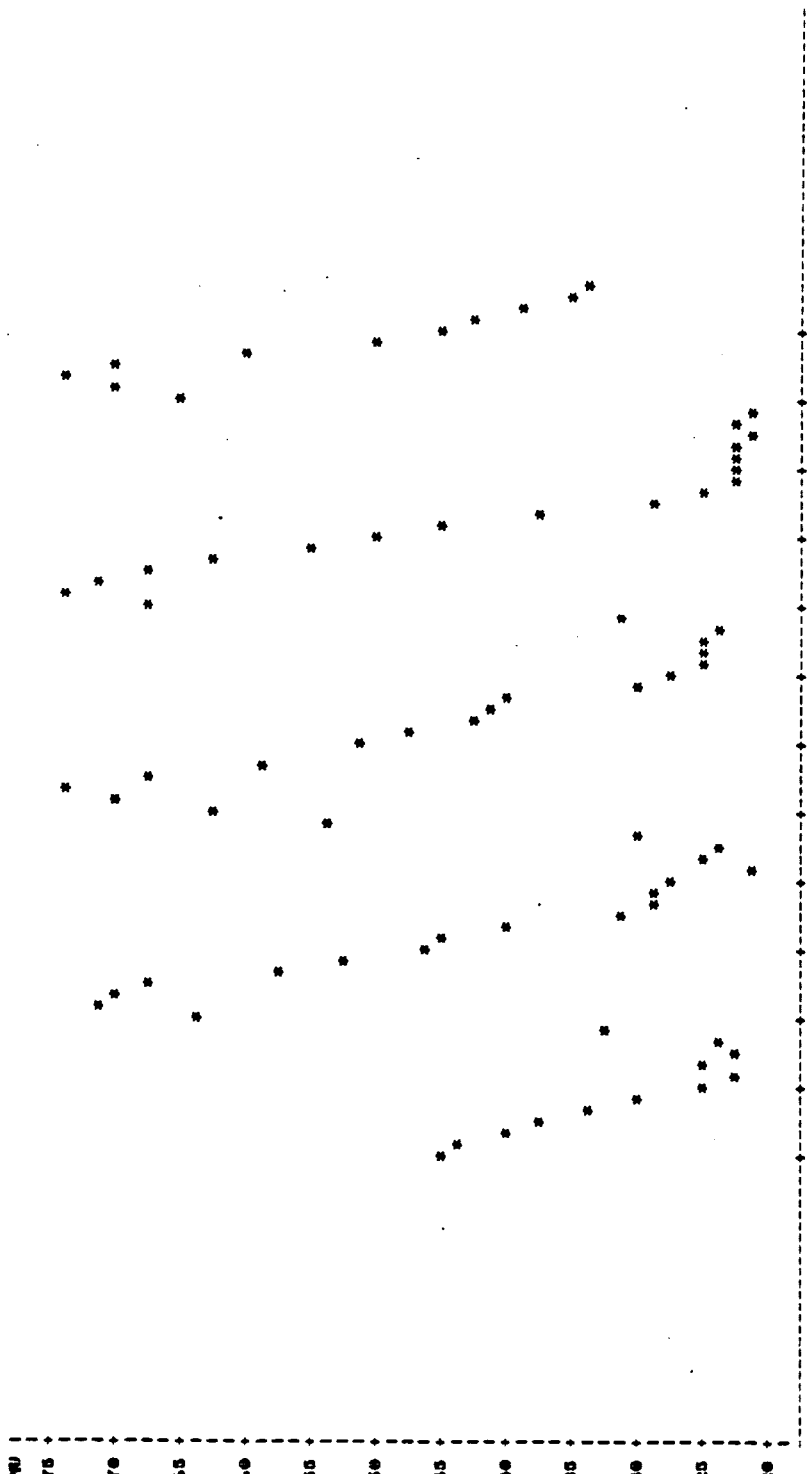

Figure P.9. Variation of Coefficient of Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

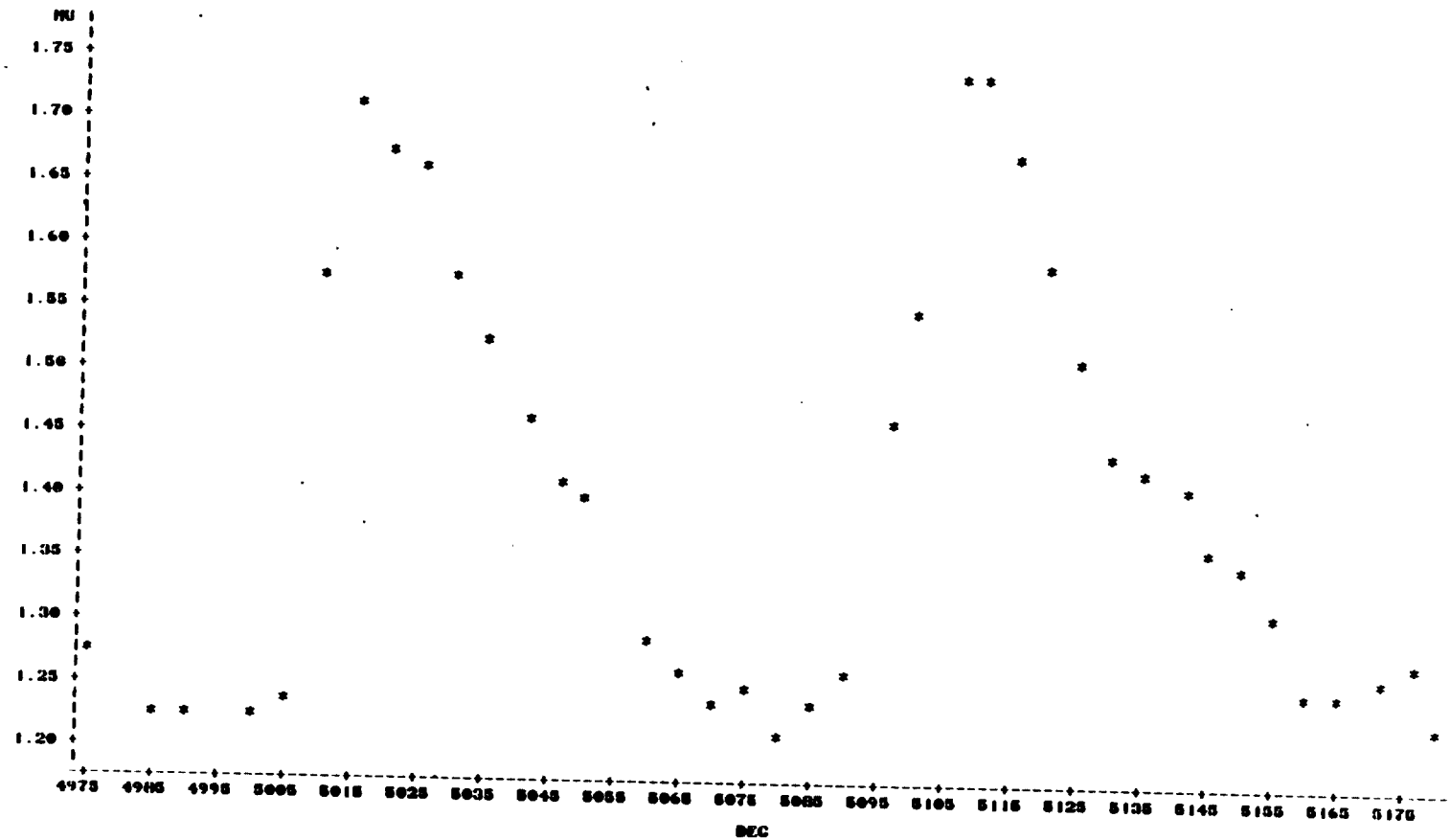

Figure P.10. Variation of Coefficient of Friction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

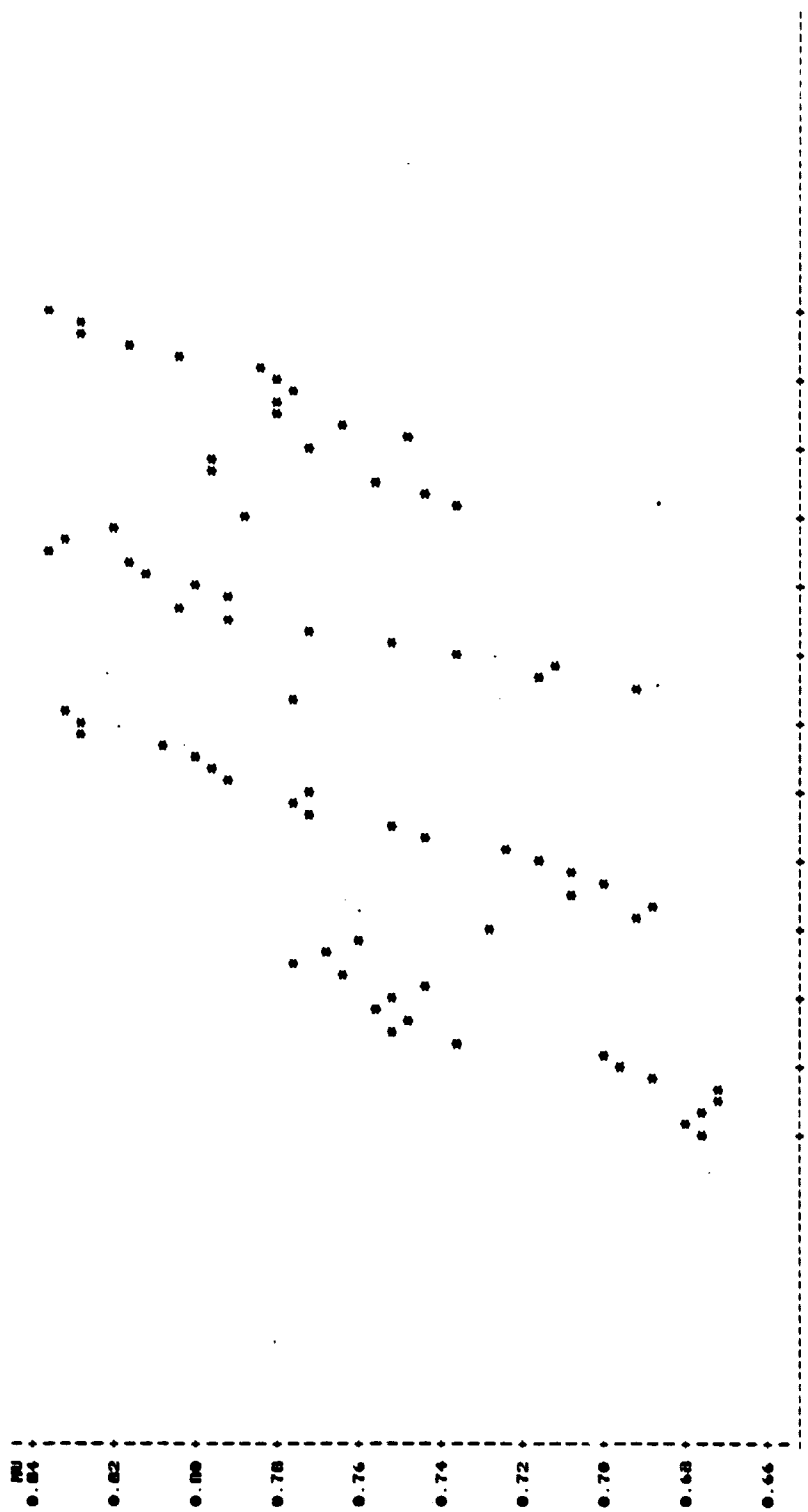

Figure P.11. Variation of Coefficient of Friction With Orientation for Copper With 20° Tool, TEst Cu 06

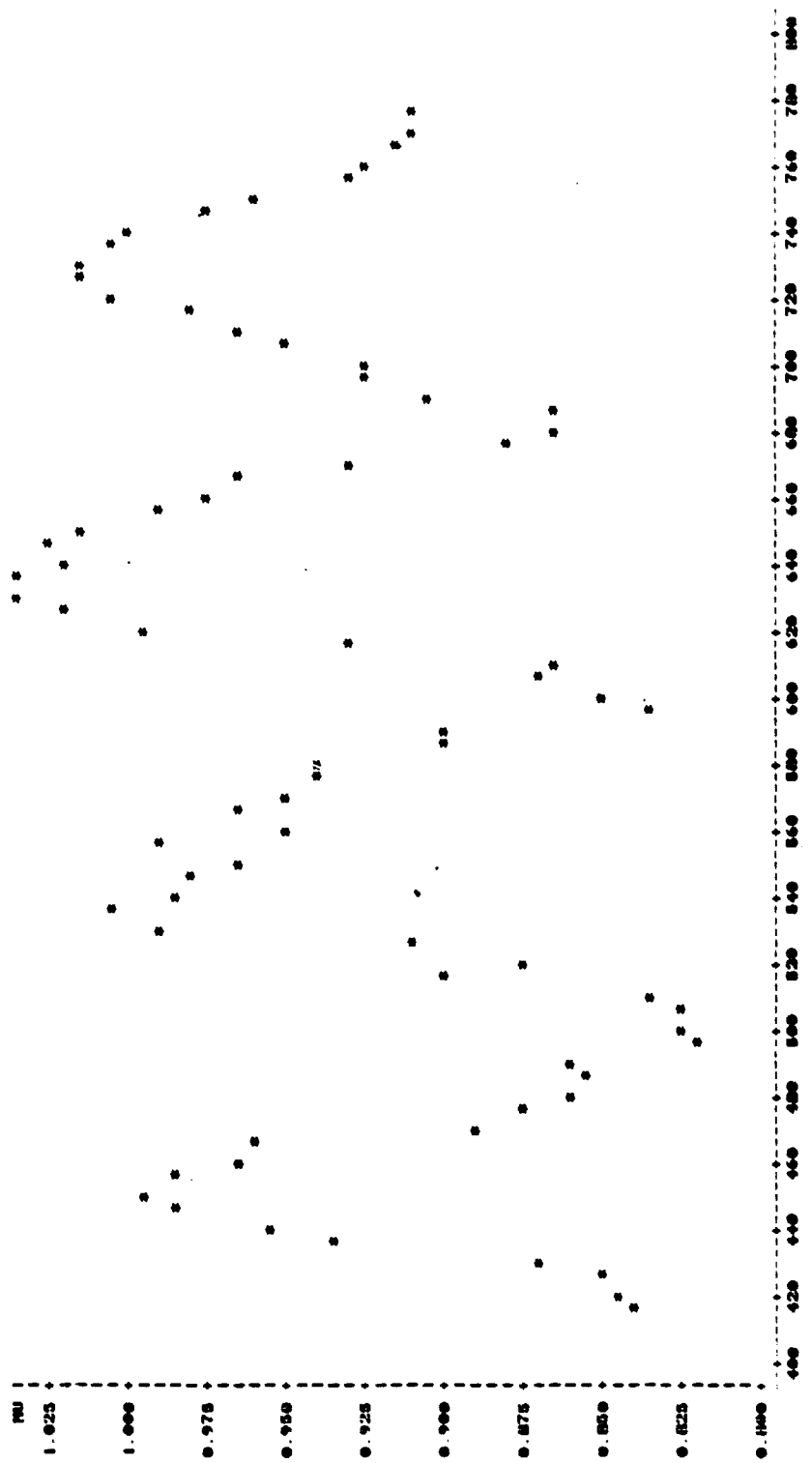

Figure P.12. Variation of Coefficient of Friction With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

Figure P.13. Variation of Coefficient of Friction with Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

Figure P.14. Variation of Coefficient of Friction With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX Q

Variation of Shear Strain

Figure Q.1. Variation of Shear Strain With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

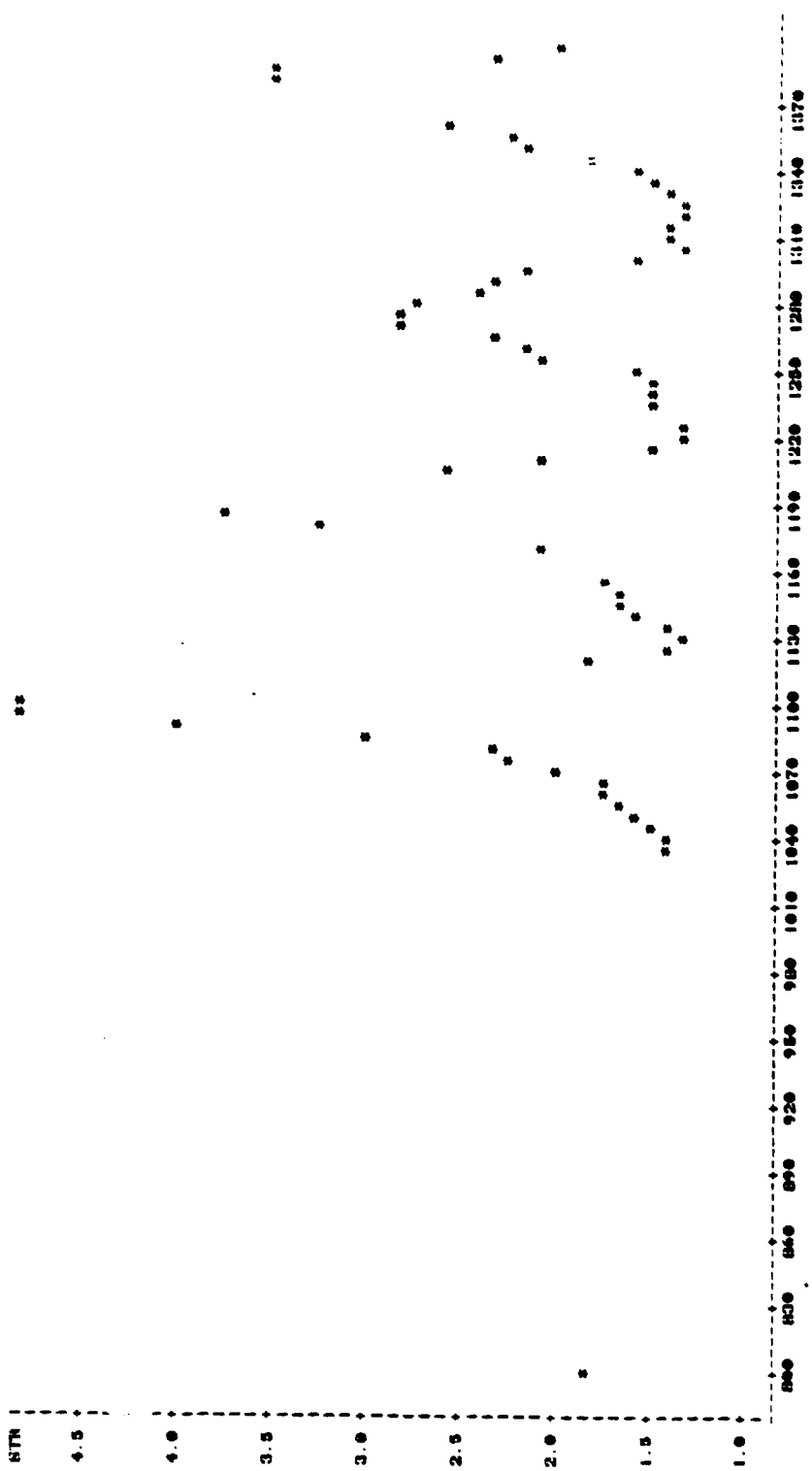

Figure Q.2. Variation of Shear Strain With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

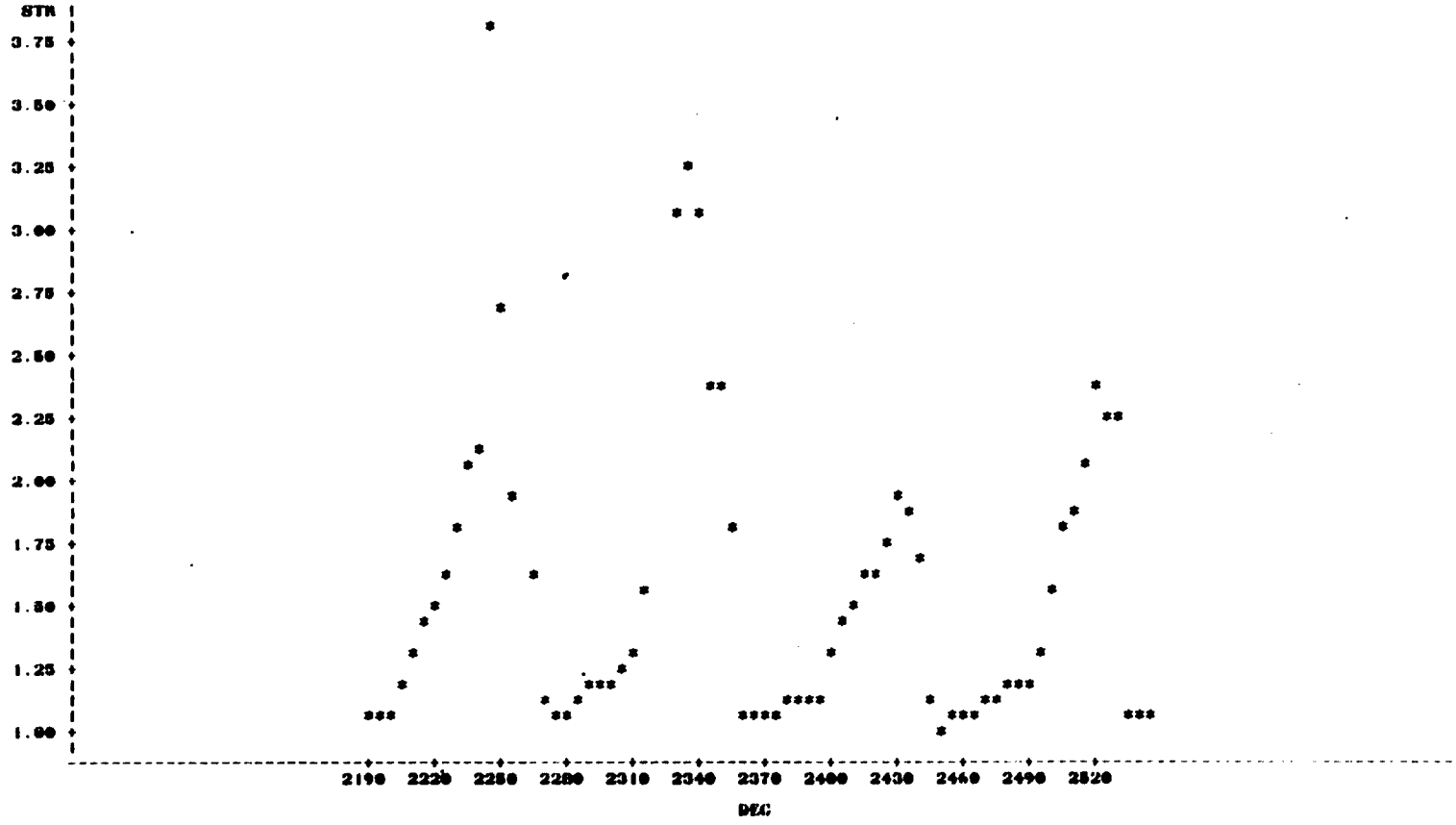

Figure Q.3. Variation of Shear Strain With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

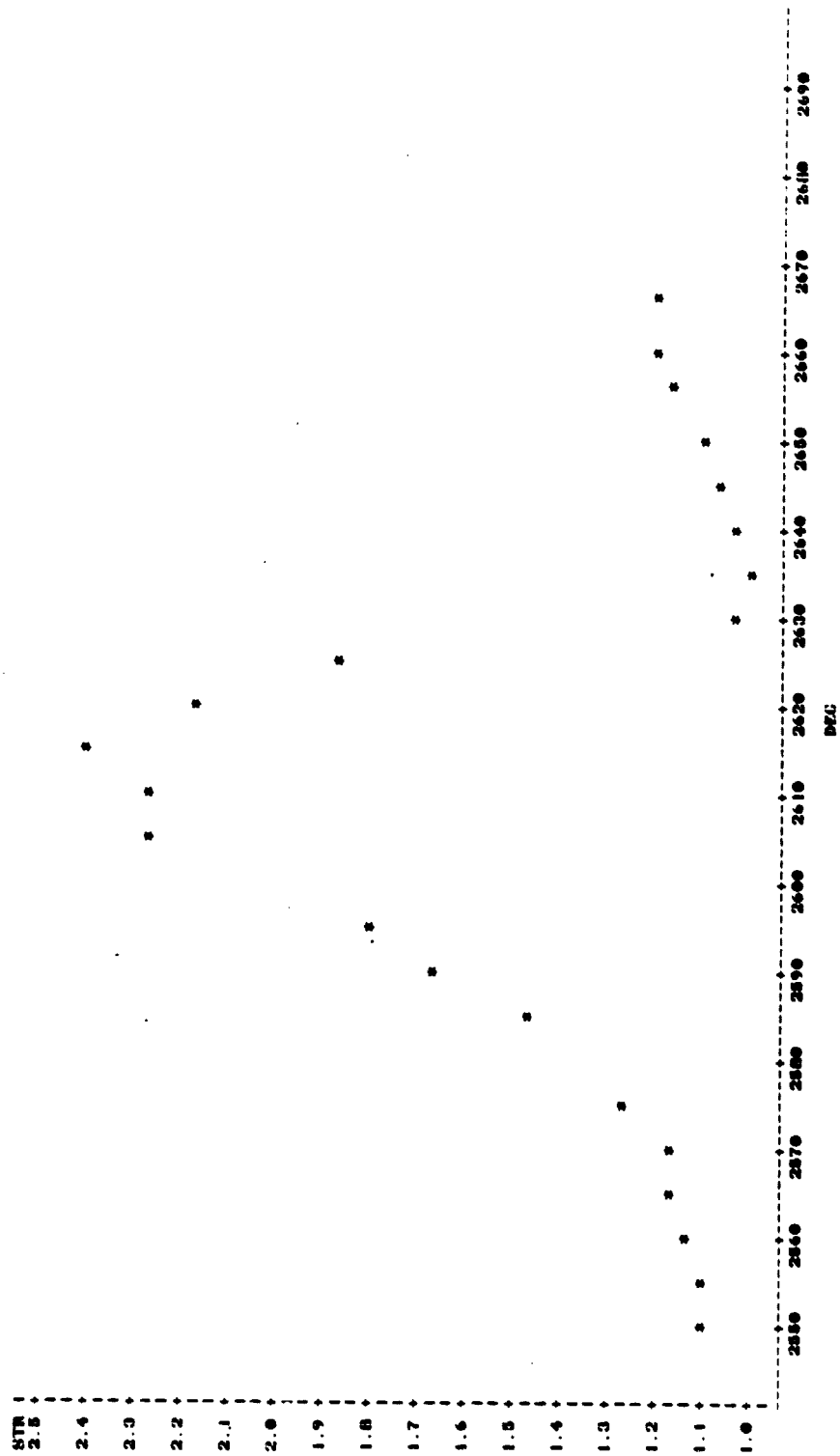

Figure Q.4. Variation of Shear Strain With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

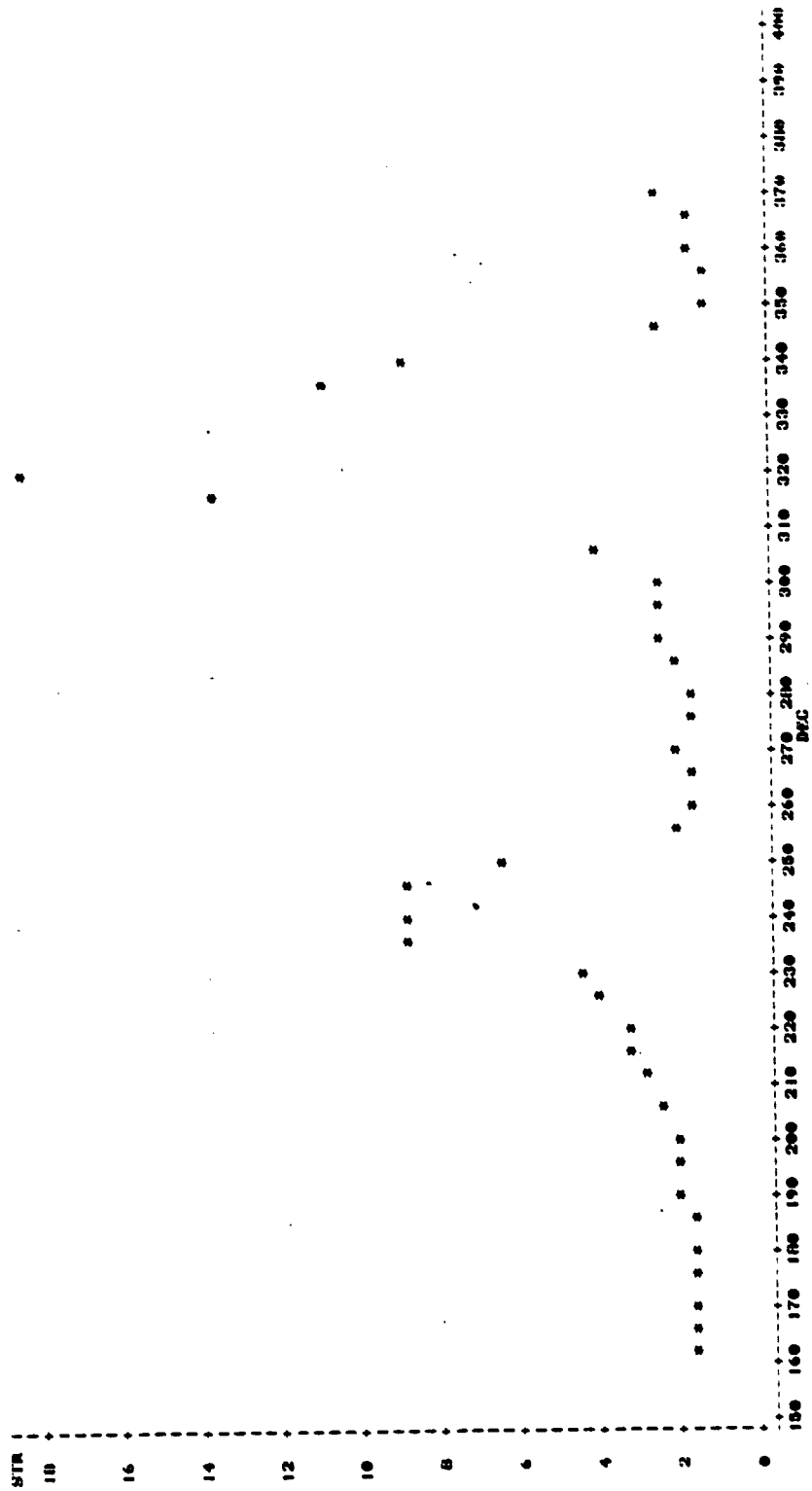

Figure Q.5. Variation of Shear Strain With Orientation for Aluminum With 40° Tool, Test Al 03

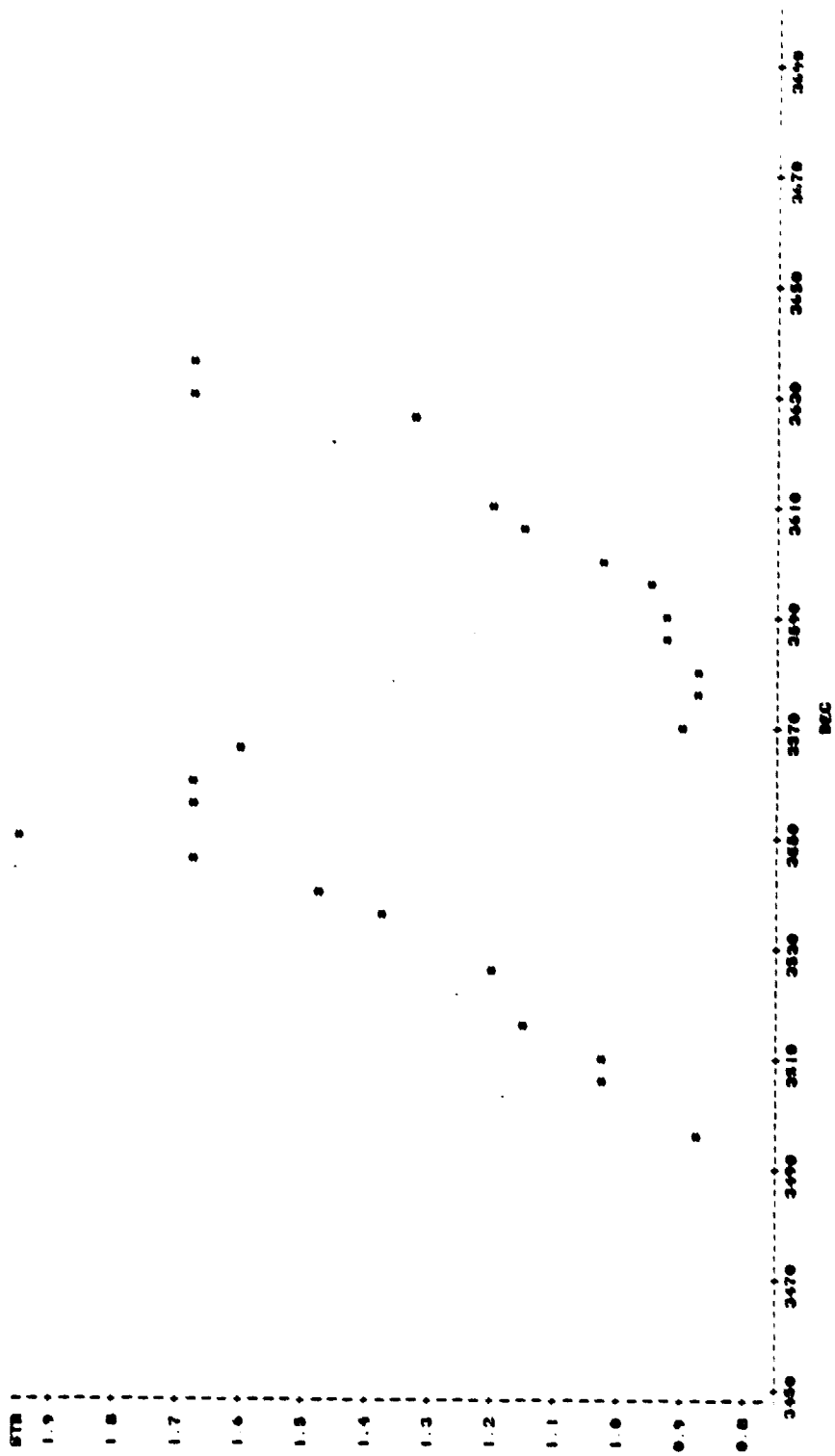

Figure Q.6. Variation of Shear Strain With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

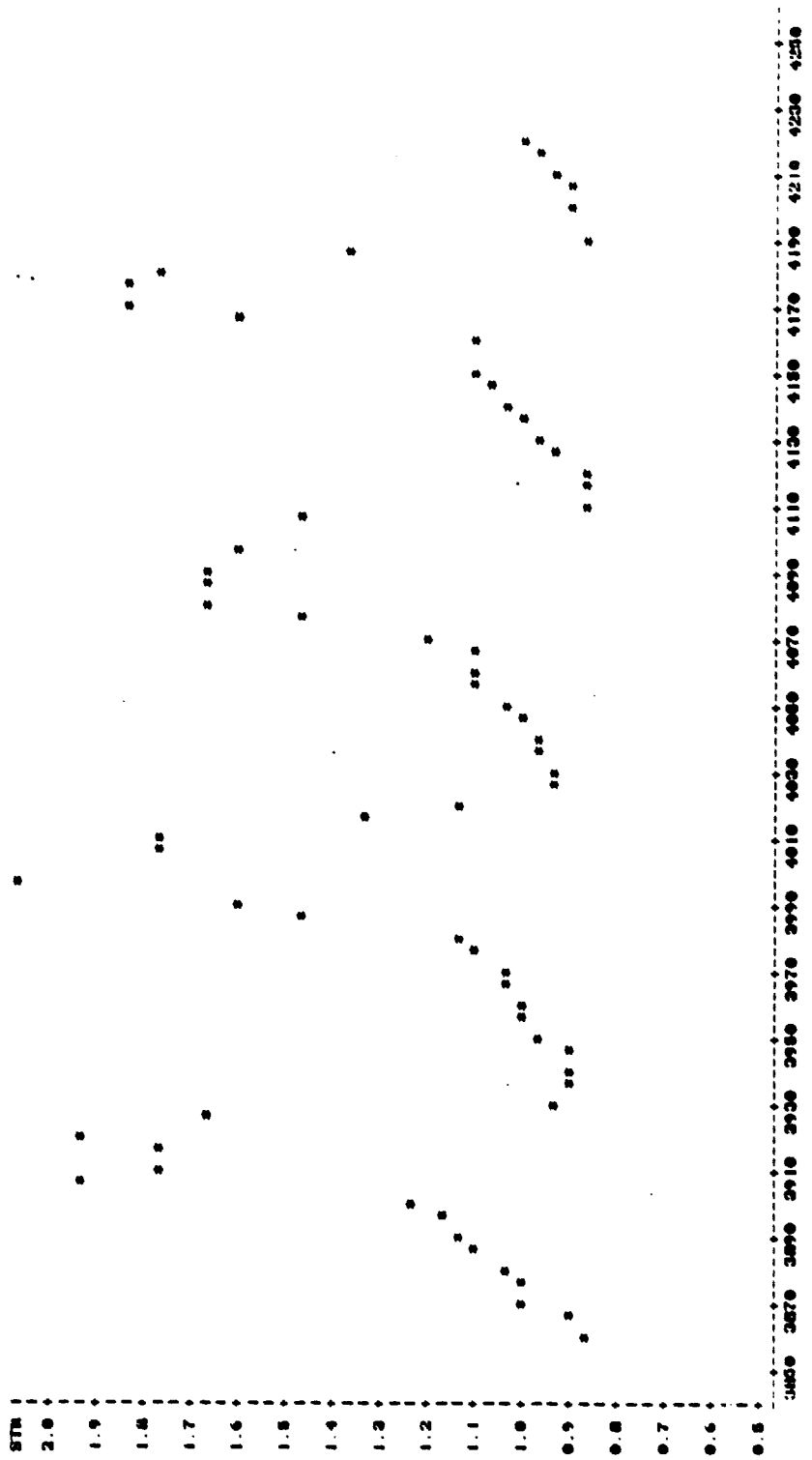

Figure Q.7. Variation of Shear Strain With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

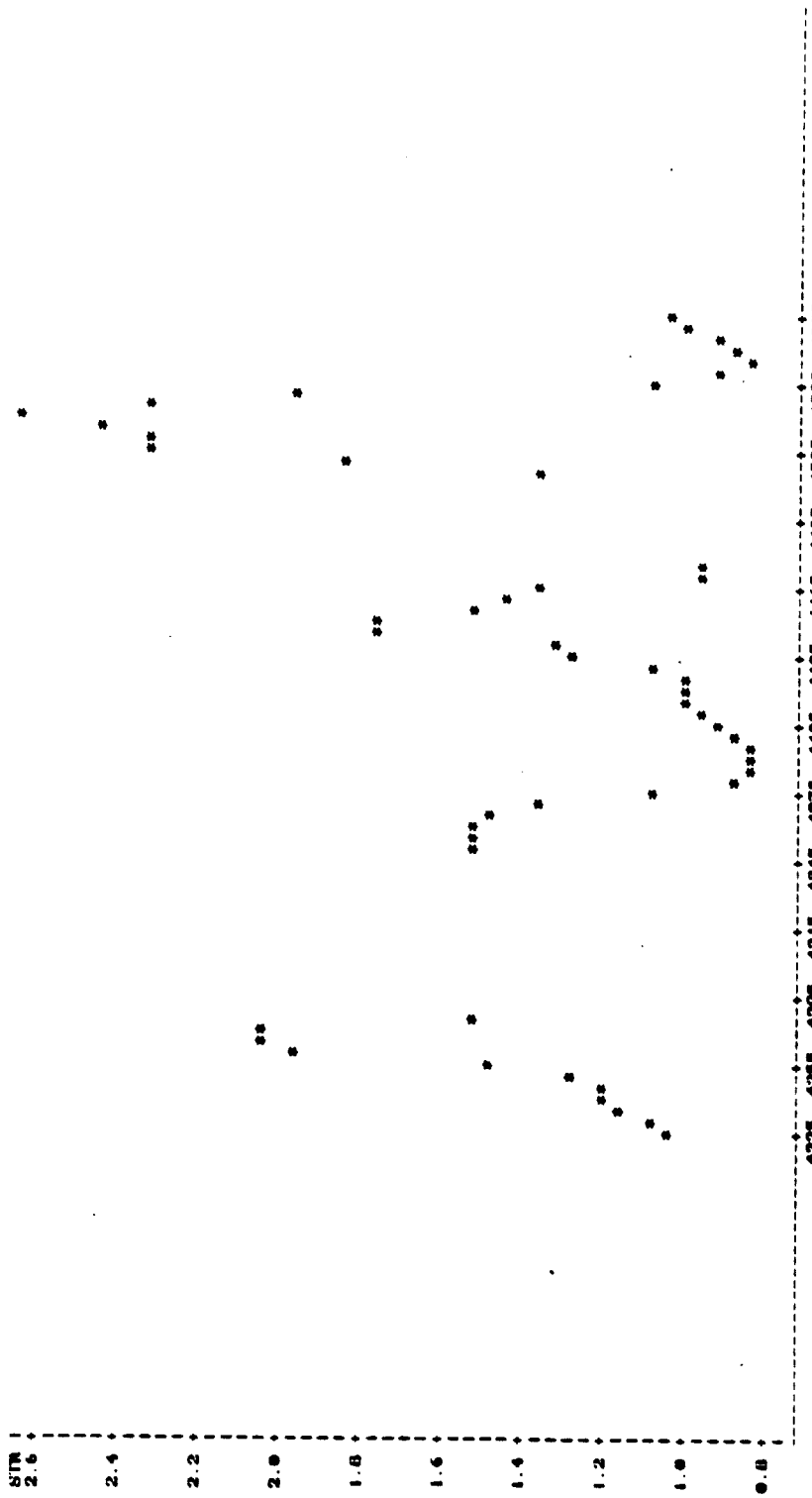

Figure Q.8. Variation of Shear Strain With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

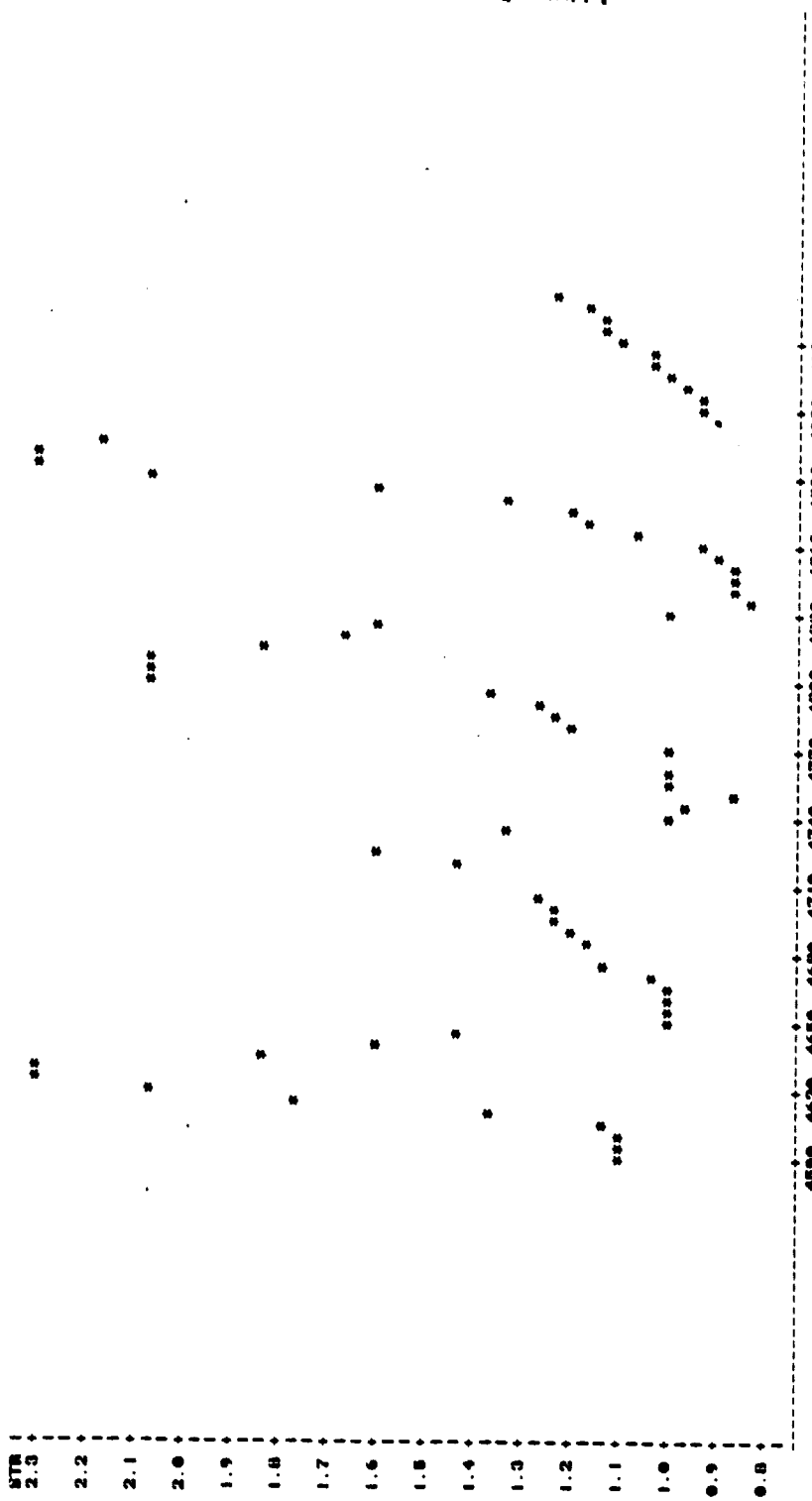

Figure Q.9. Variation of Shear Strain With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

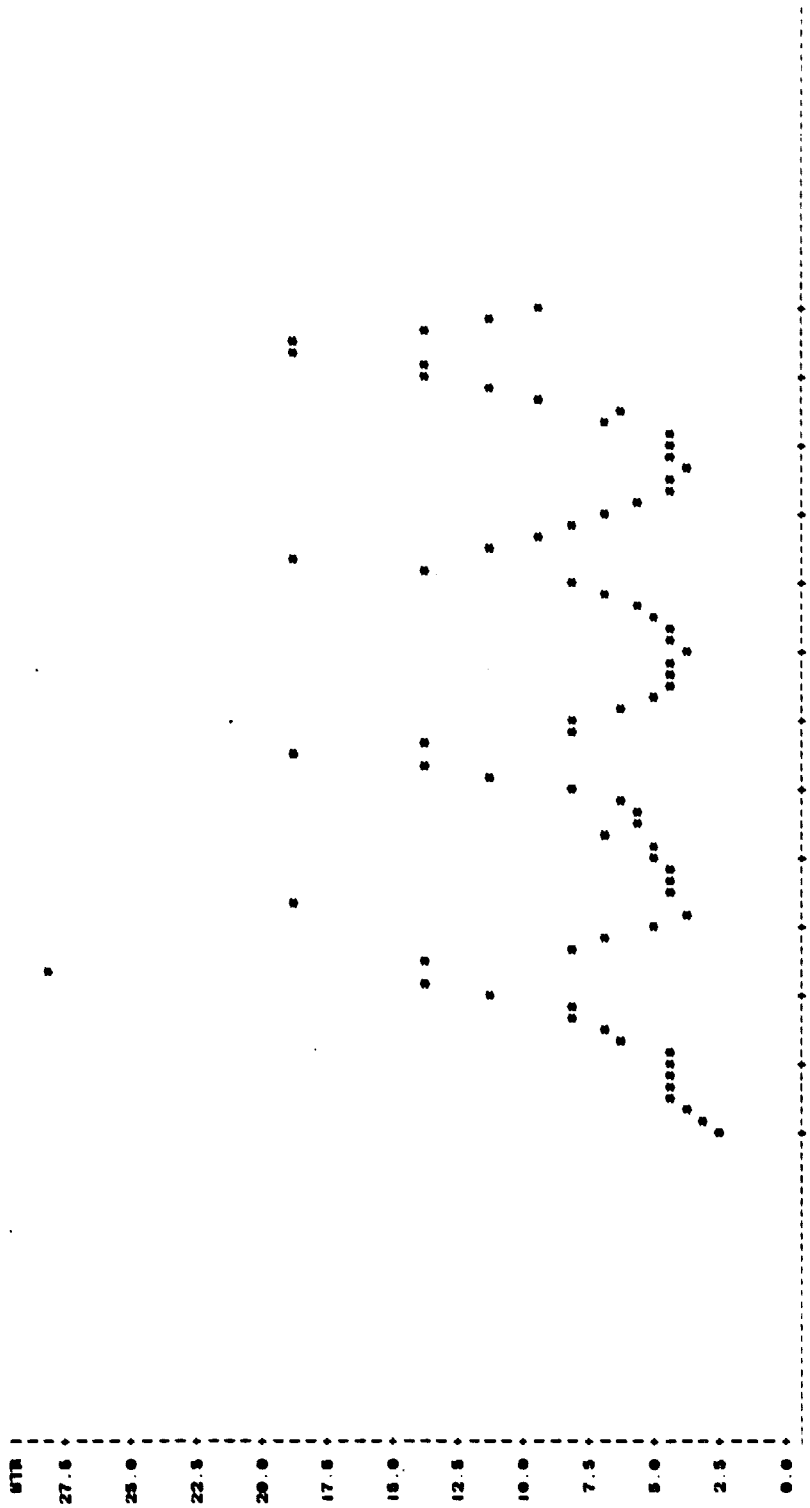

Figure Q.10. Variation of Shear Strain With Orientation for Copper With 20° Tool, Test Cu 06

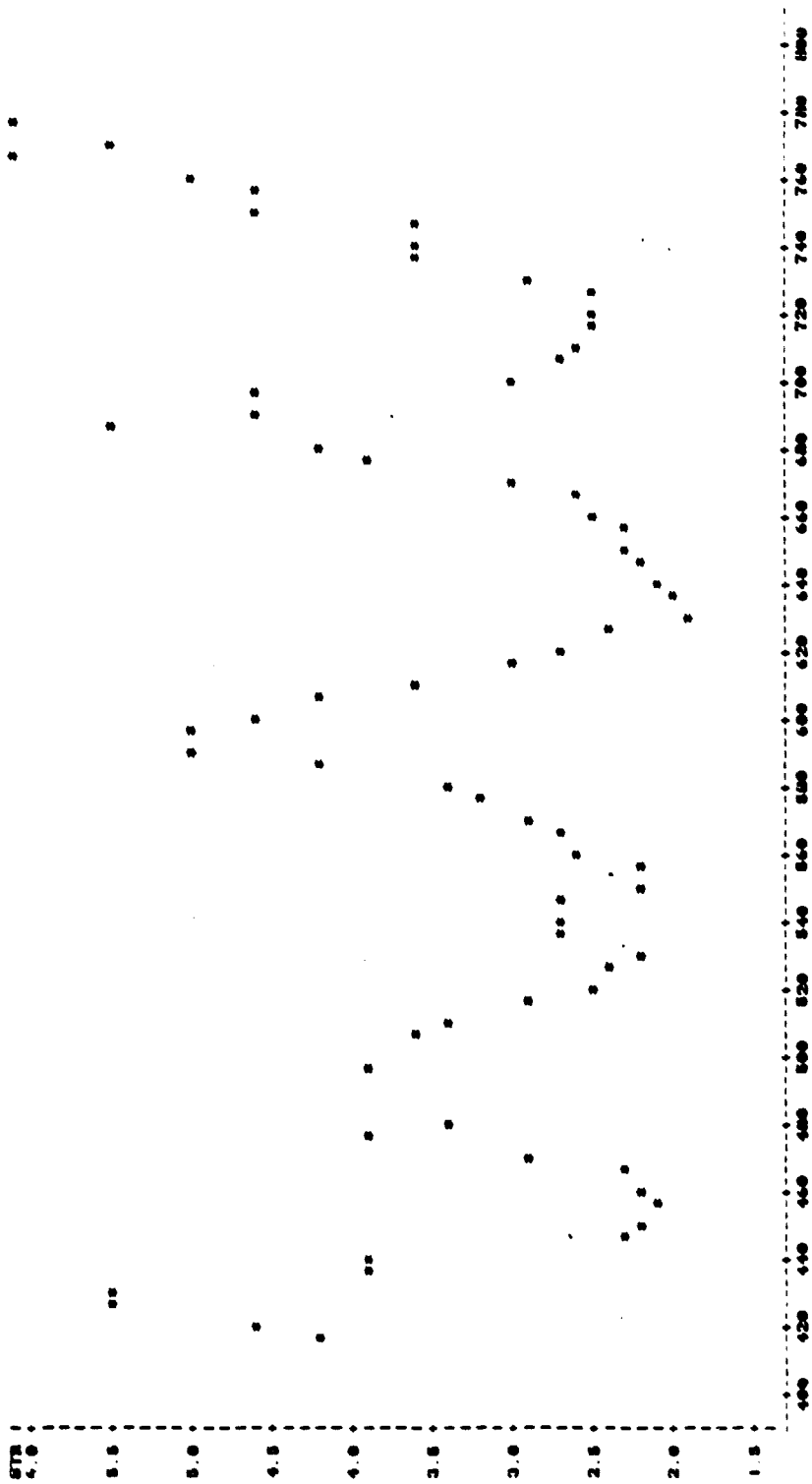

Figure Q.11. Variation of Shear Strain With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

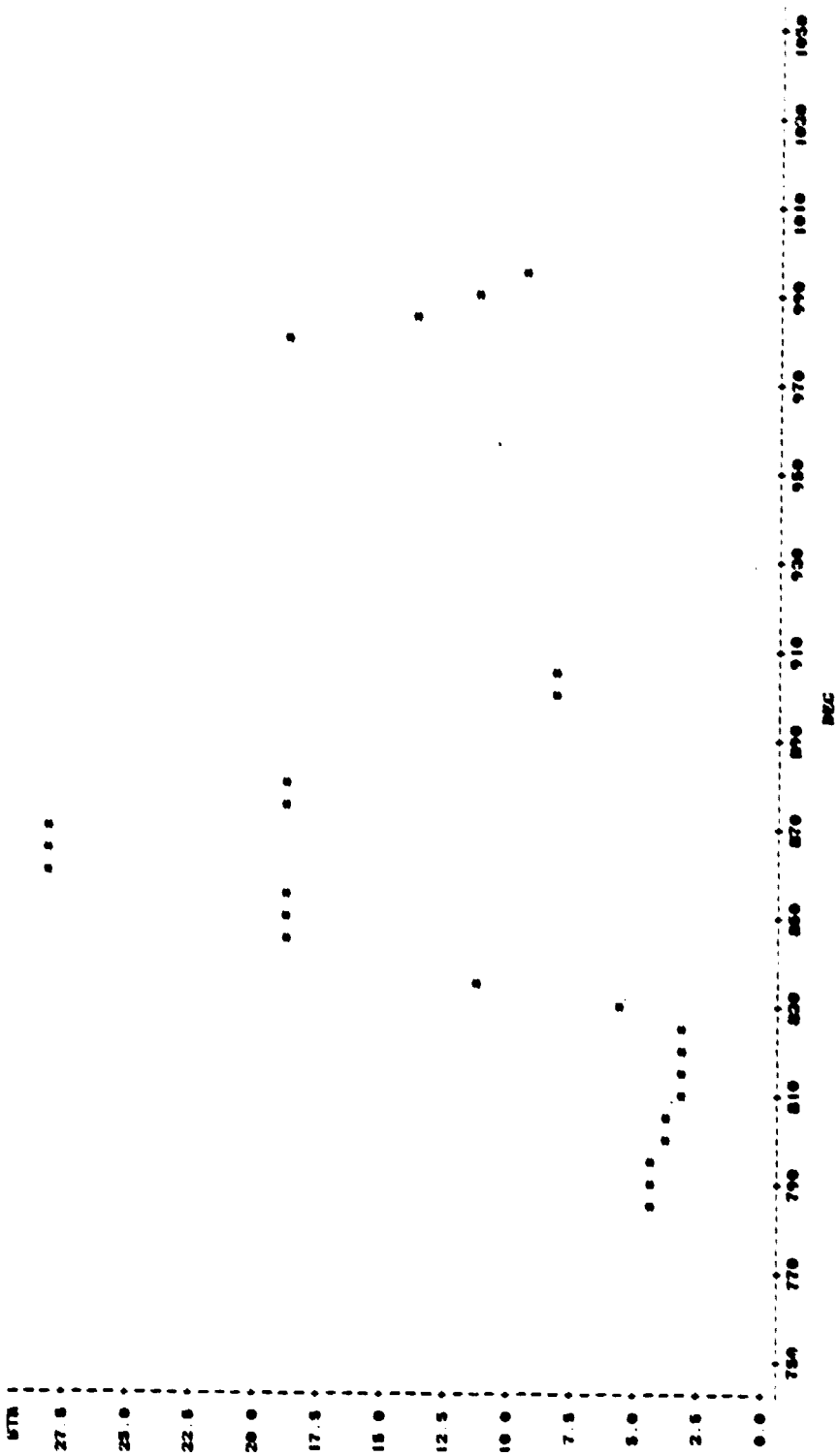

Figure Q.12. Variation of Shear Strain With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

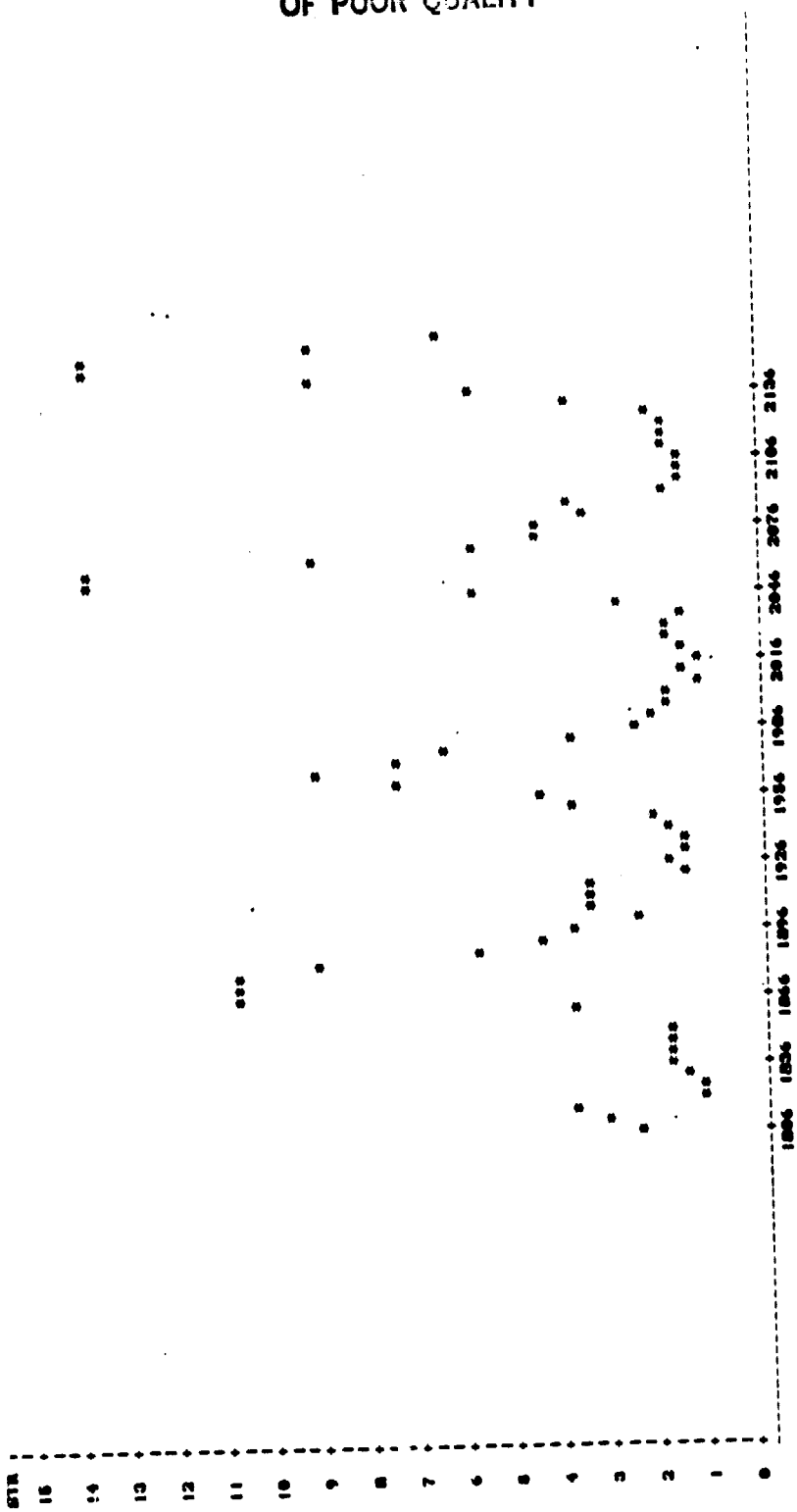

Figure Q.13. Variation of Shear Strain With Orientation for Copper With 40° Tool, Test Cu 01.

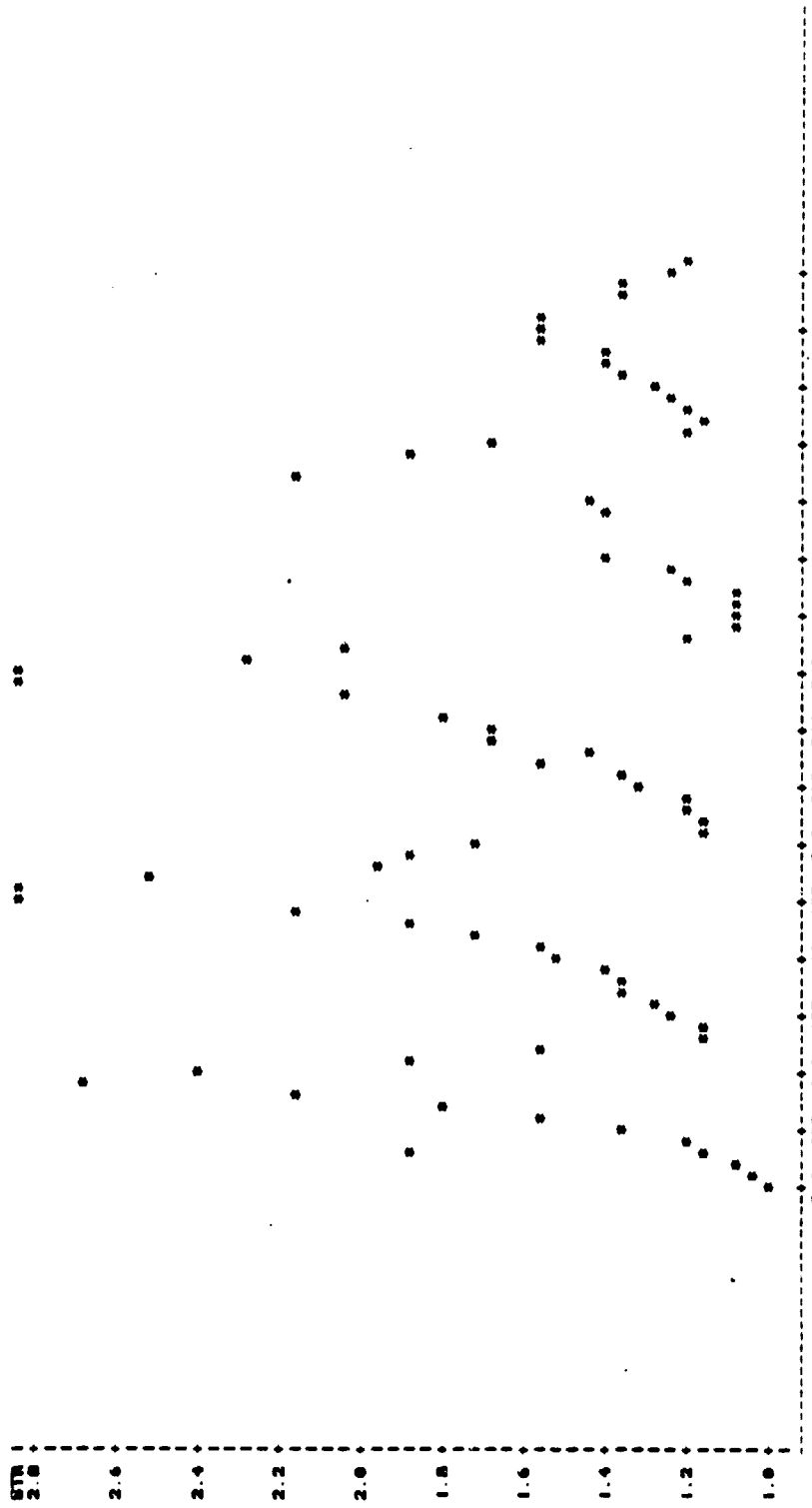

Figure Q.14. Variation of Shear Strain With Orientation for Copper With 40° Tool, Test Cu 32

APPENDIX R

Correlation Between Shear Angle and Normal Stress

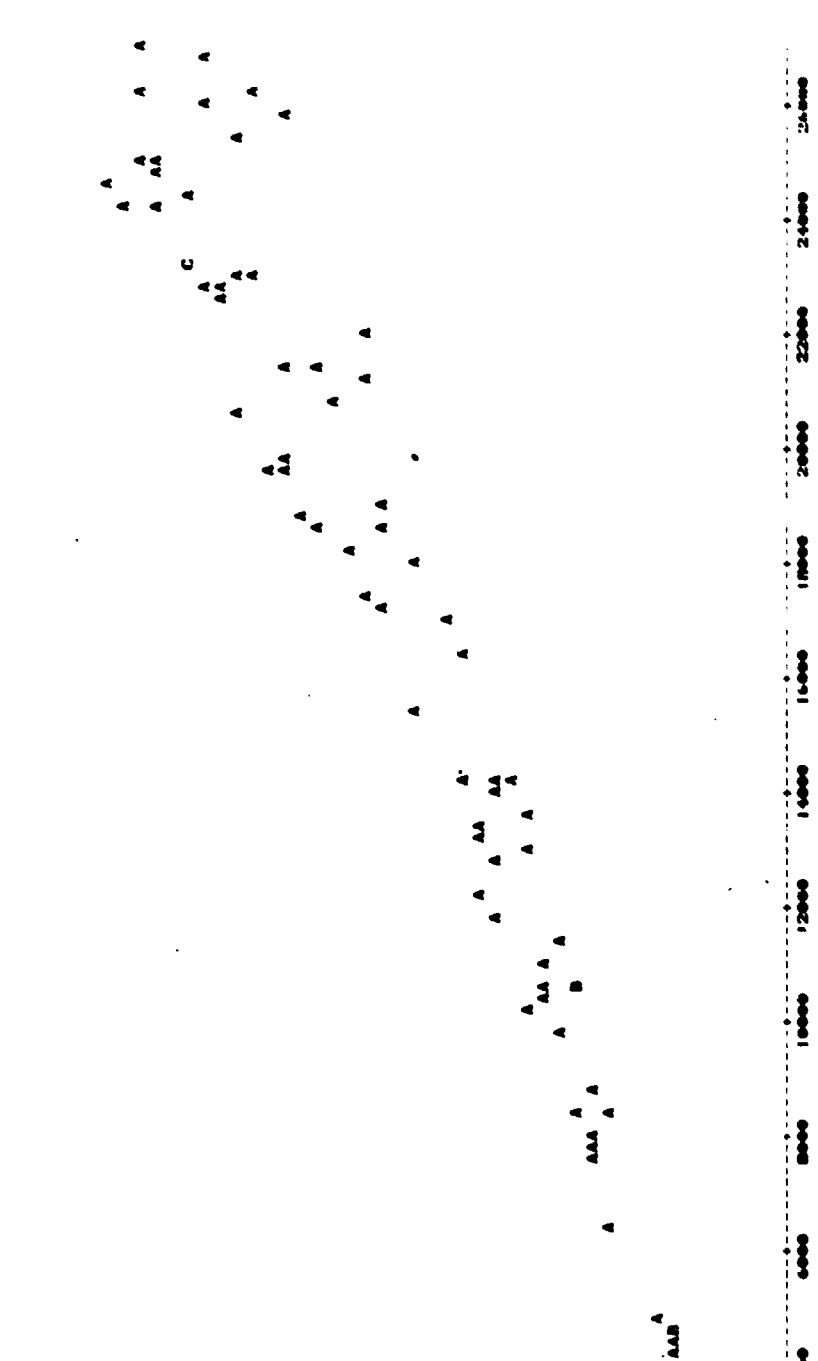

Figure R.1. Correlation Between Shear Angle and Normal Stress for Aluminum With 30° Tool, Test Al 63, Revolution 1

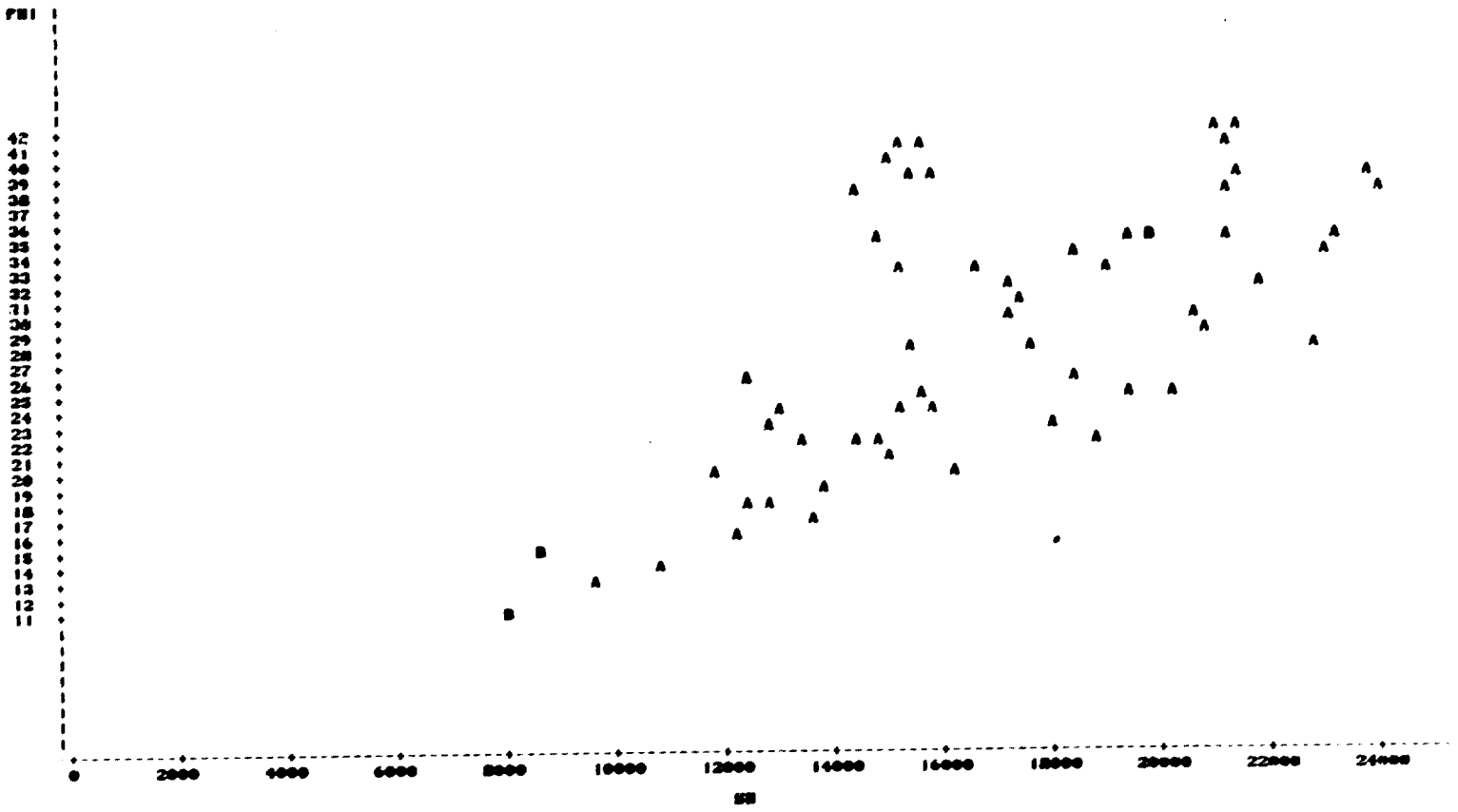

Figure R.2. Correlation Between Shear Angle and Normal Stress for Aluminum With 30° Tool, Test Al 63, Revolution 2

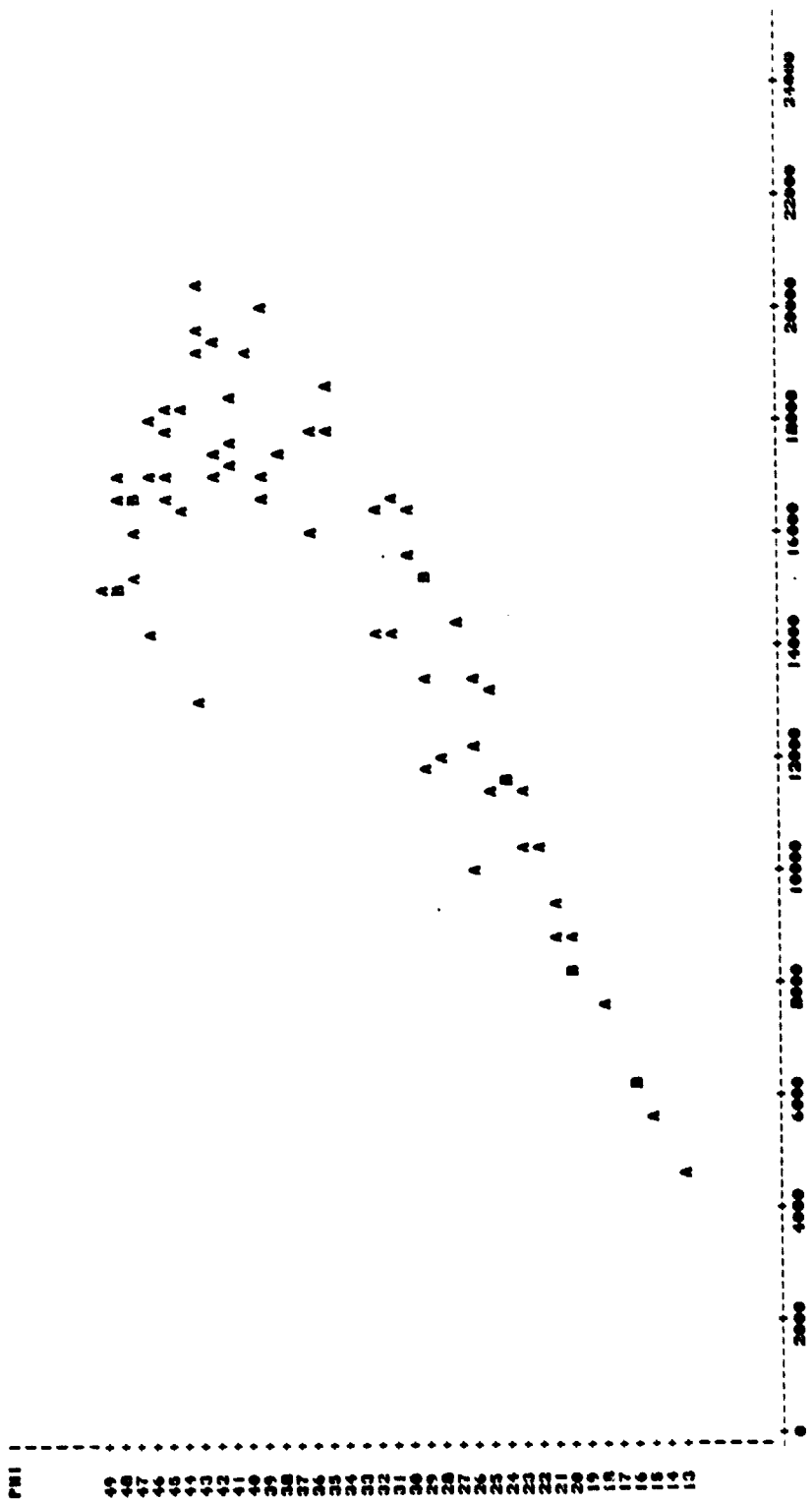

Figure R.3. Correlation Between Shear Angle and Normal Stress for Aluminum With 40° Tool, Test Al 56, Revolution 2

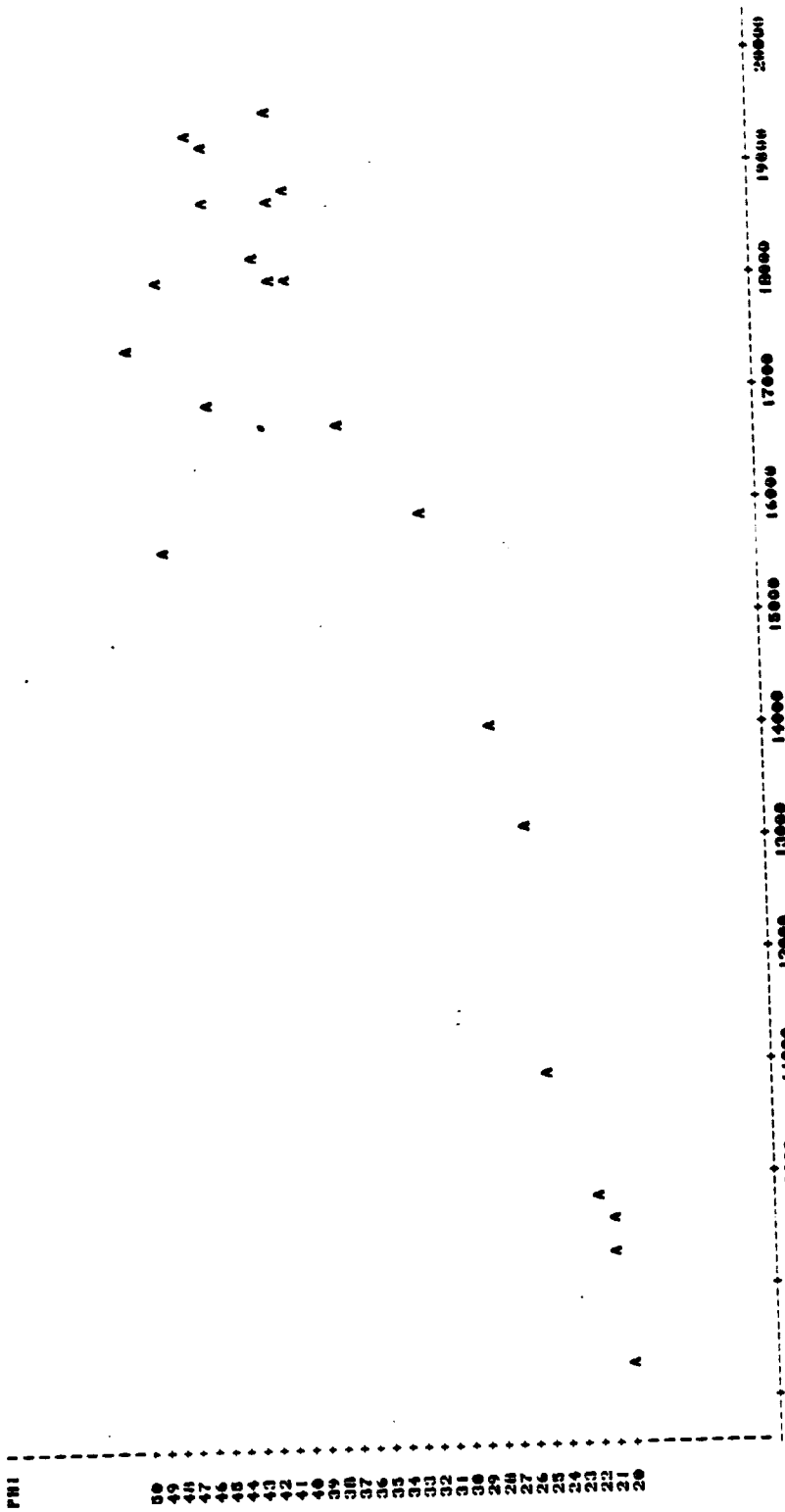

Figure R.4. Correlation Between Shear Angle and Normal Stress for Aluminum With 40° Tool, Test Al 56, Revolution 3

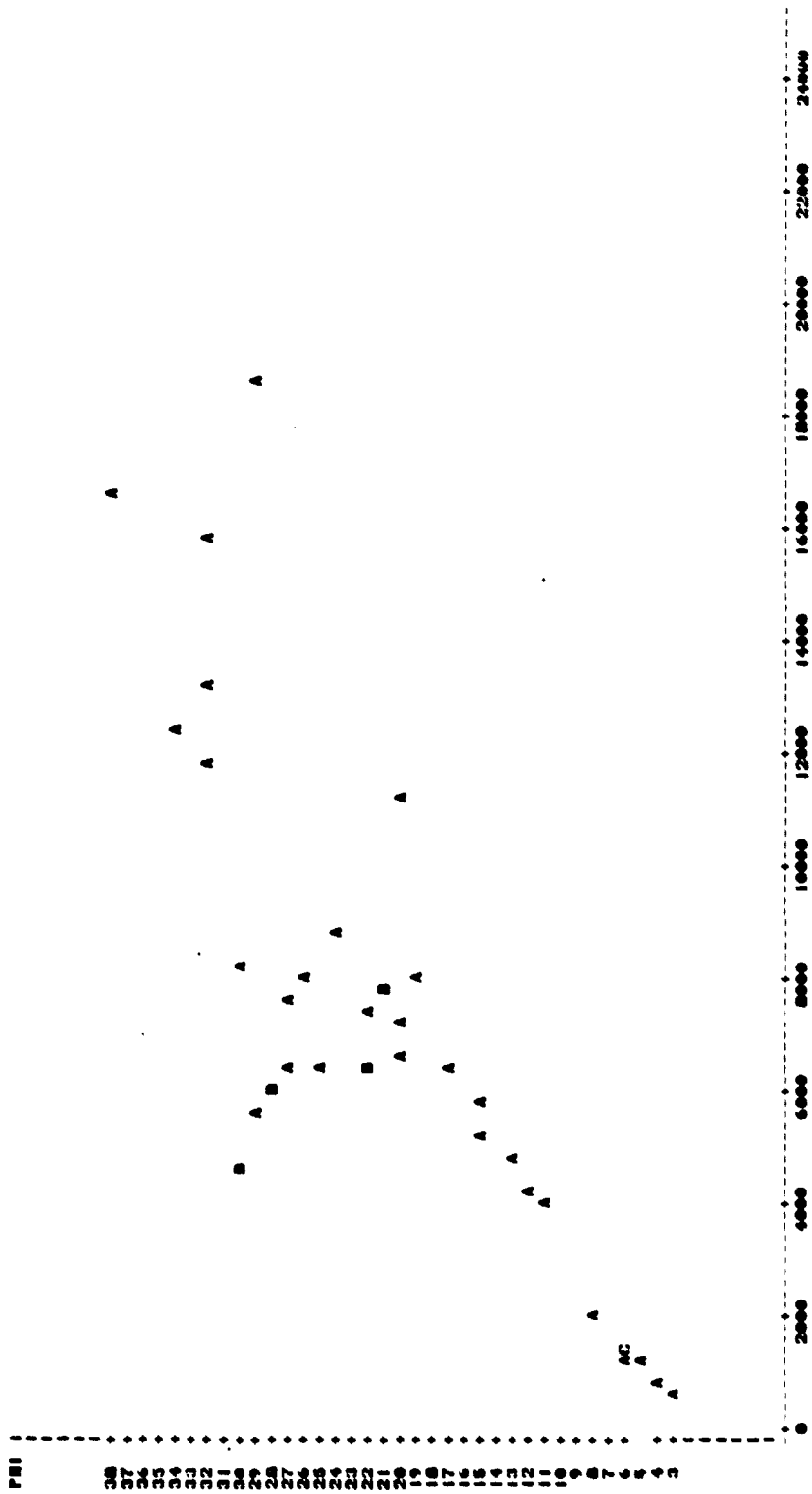

Figure R.5. Correlation Between Shear Angle and Normal Stress for Aluminum With 40° Tool, Test Al 03

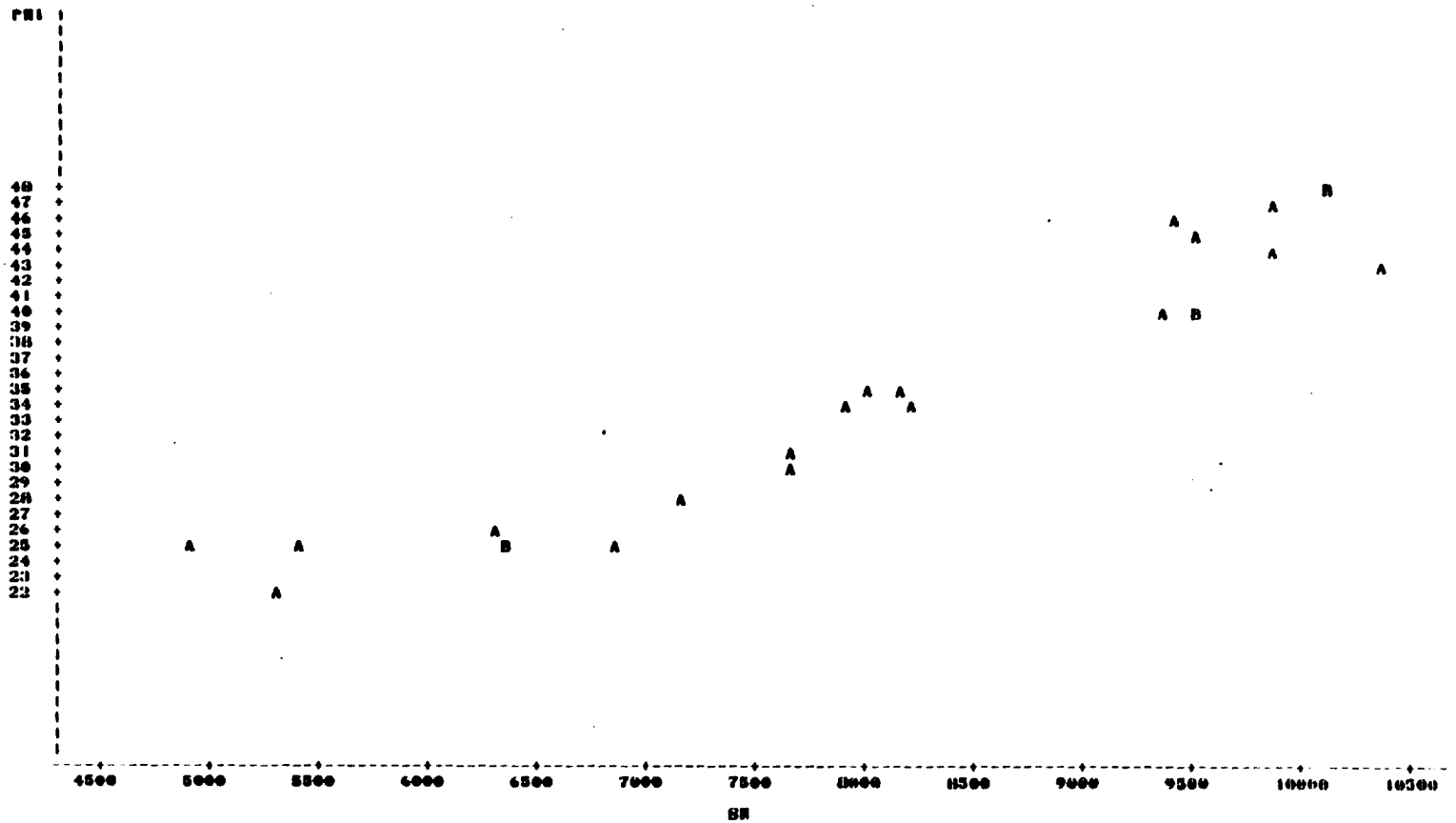

Figure R.6. Correlation Between Shear Angle and Normal Stress for Aluminum With 50° Tool, Test Al 57, Revolution 1

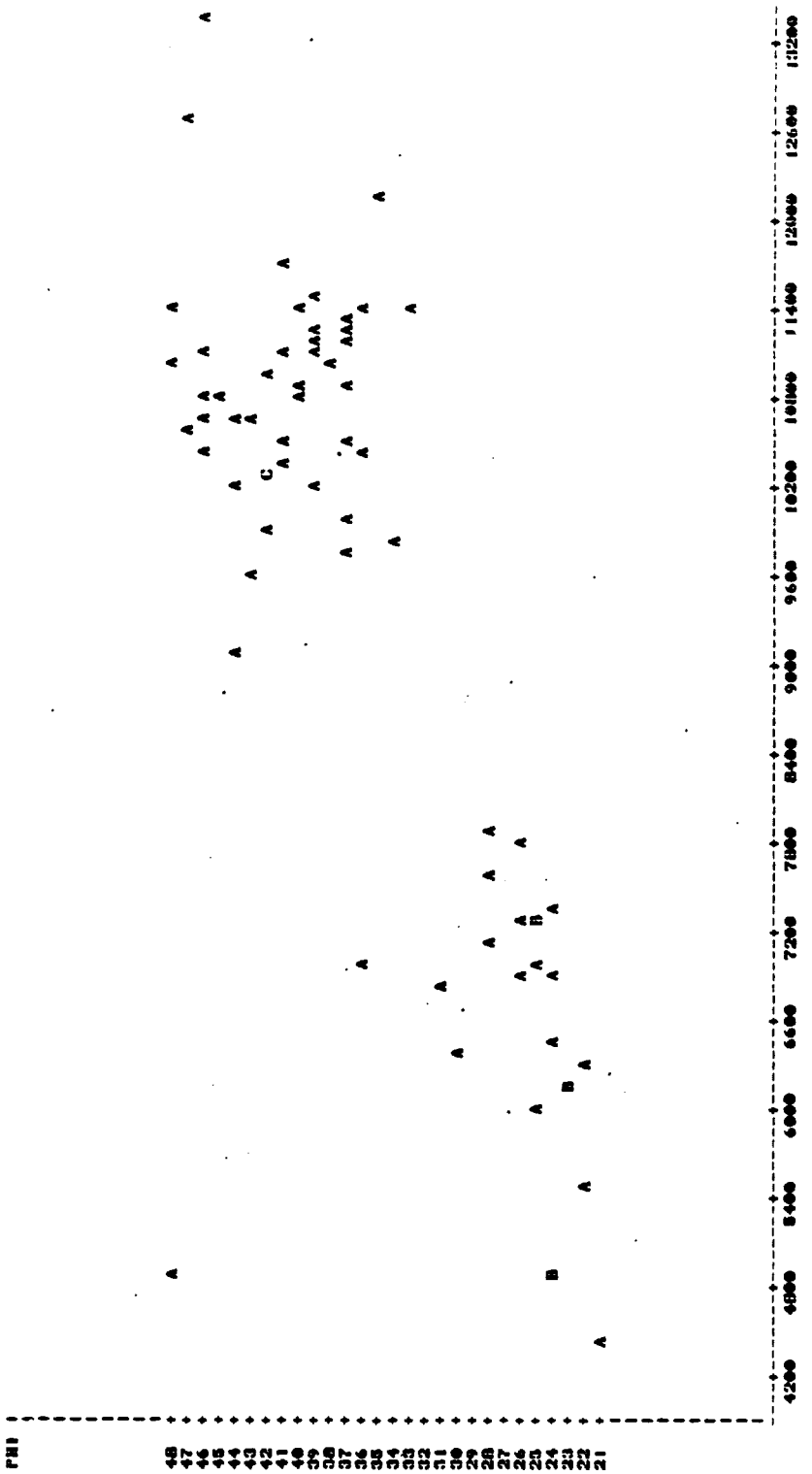

Figure R.7. Correlation Between Shear Angle and Normal Stress for Aluminum With 50° Tool, Test Al 57, Revolution 2

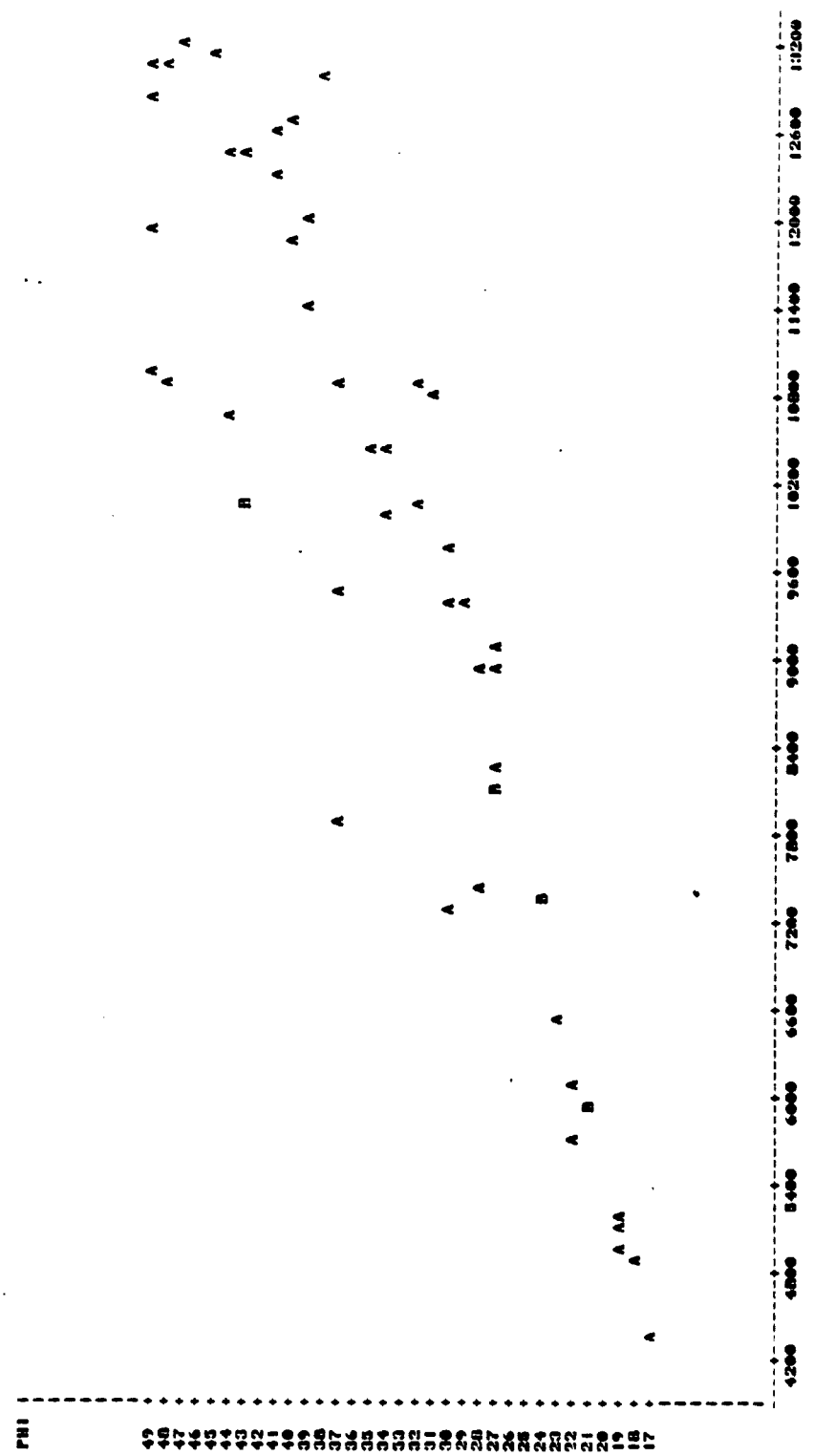

Figure R.8. Correlation Between Shear Angle and Normal Stress for Aluminum With 50° Tool, Test Al 57, Revolution 3

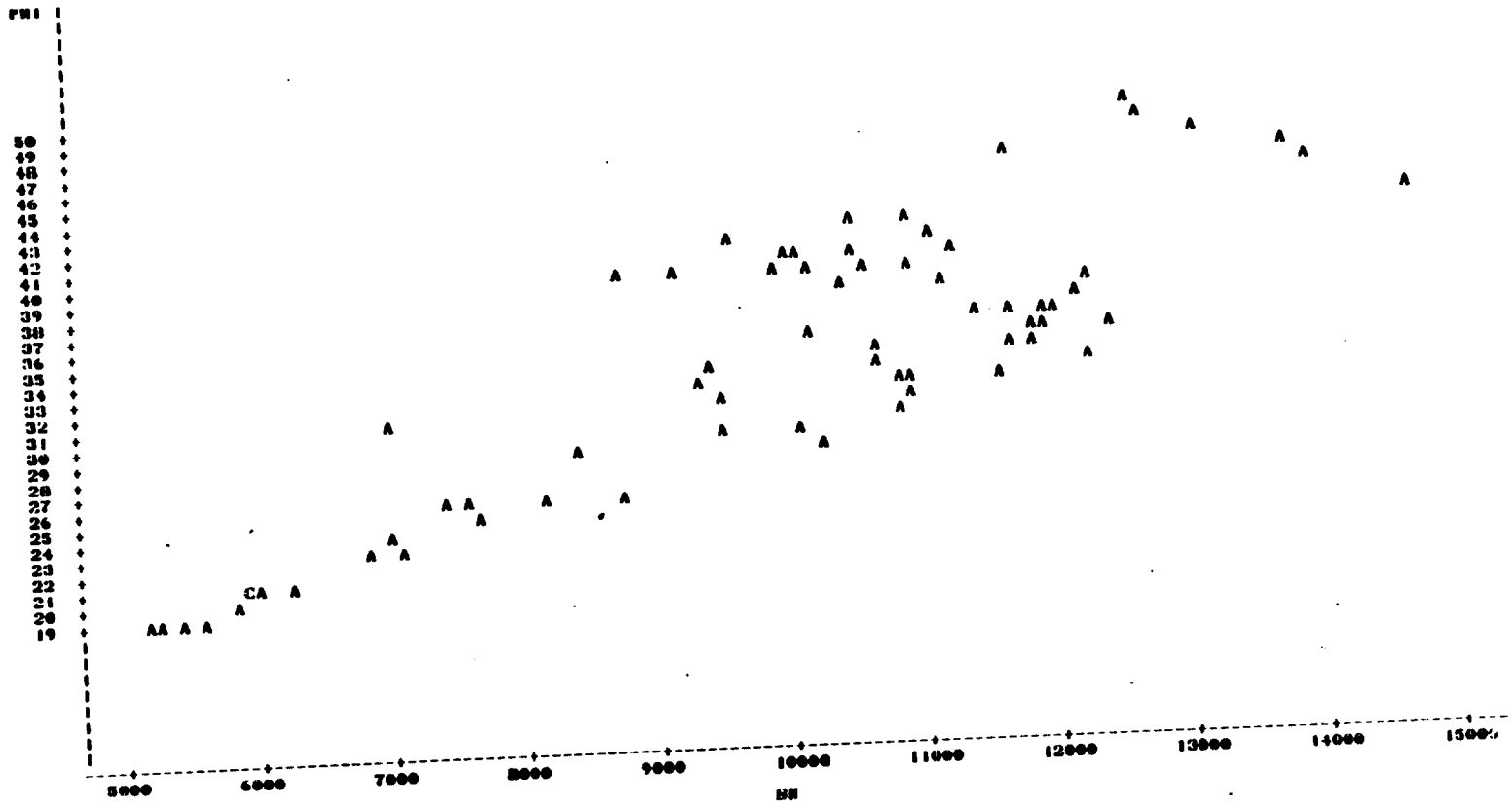

Figure R.9. Correlation Between Shear Angle and Normal Stress for Aluminum With 50° Tool, Test Al 57, Revolution 4

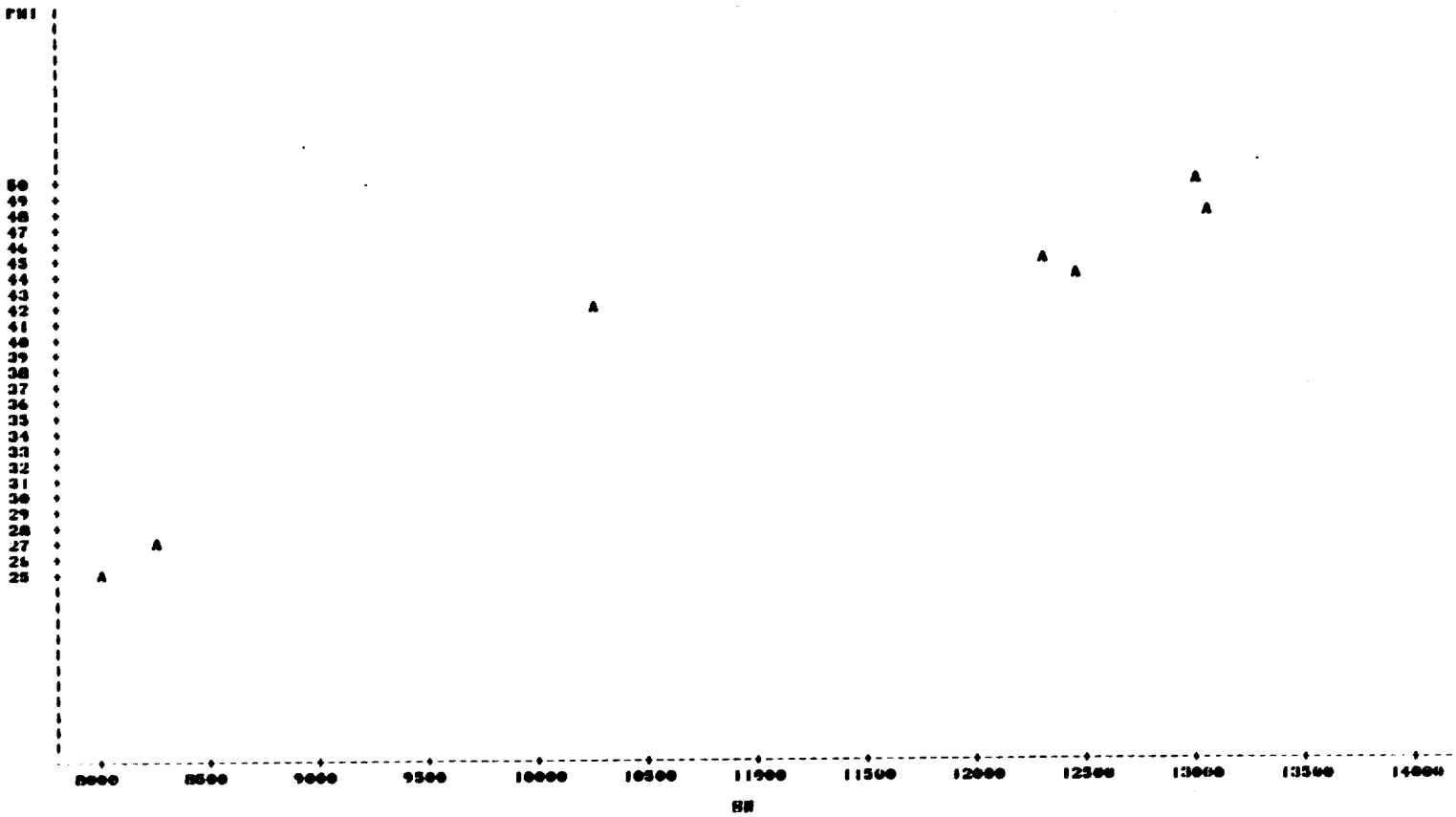

Figure R.10. Correlation Between Shear Angle and Normal Stress for Aluminum With 50° Tool, Test Al 57, Revolution 5

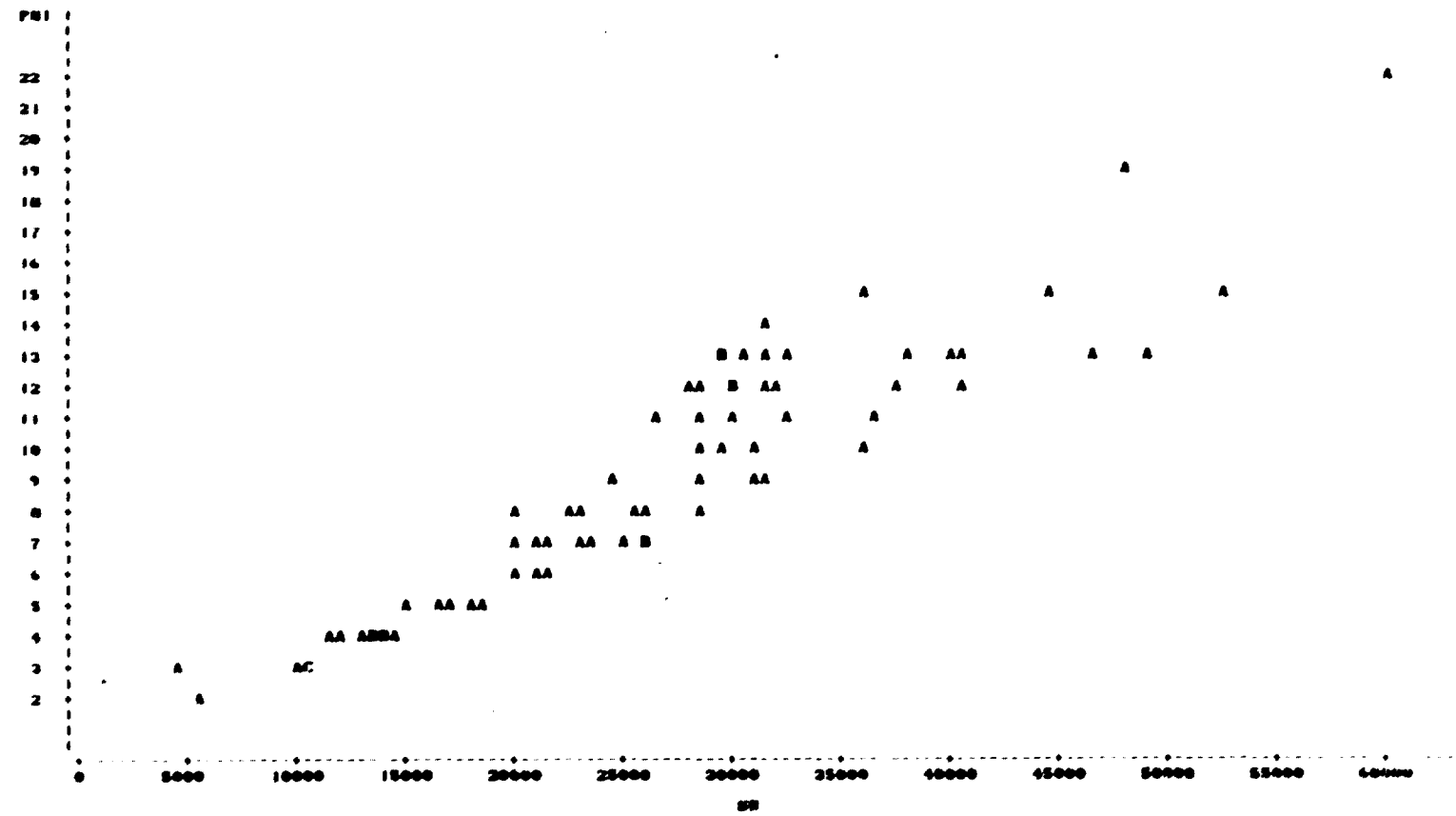

Figure R.11. Correlation Between Shear Angle and Normal Stress for Copper With 20° Tool, TEst Cu 06

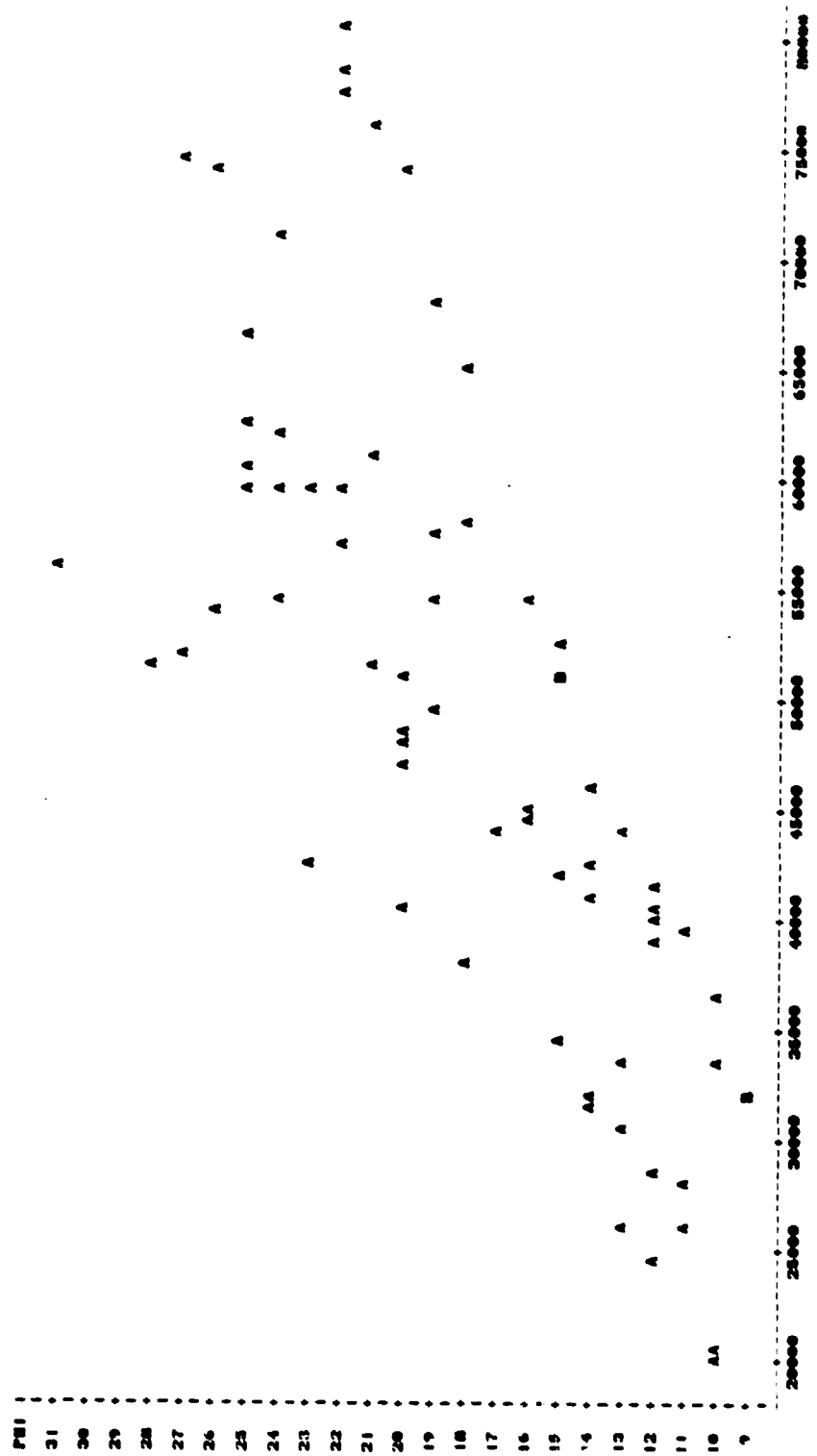

Figure R.12. Correlation Between Shear Angle and Normal Stress for Copper With 20° Tool, Test Cu 33, Revolution 1

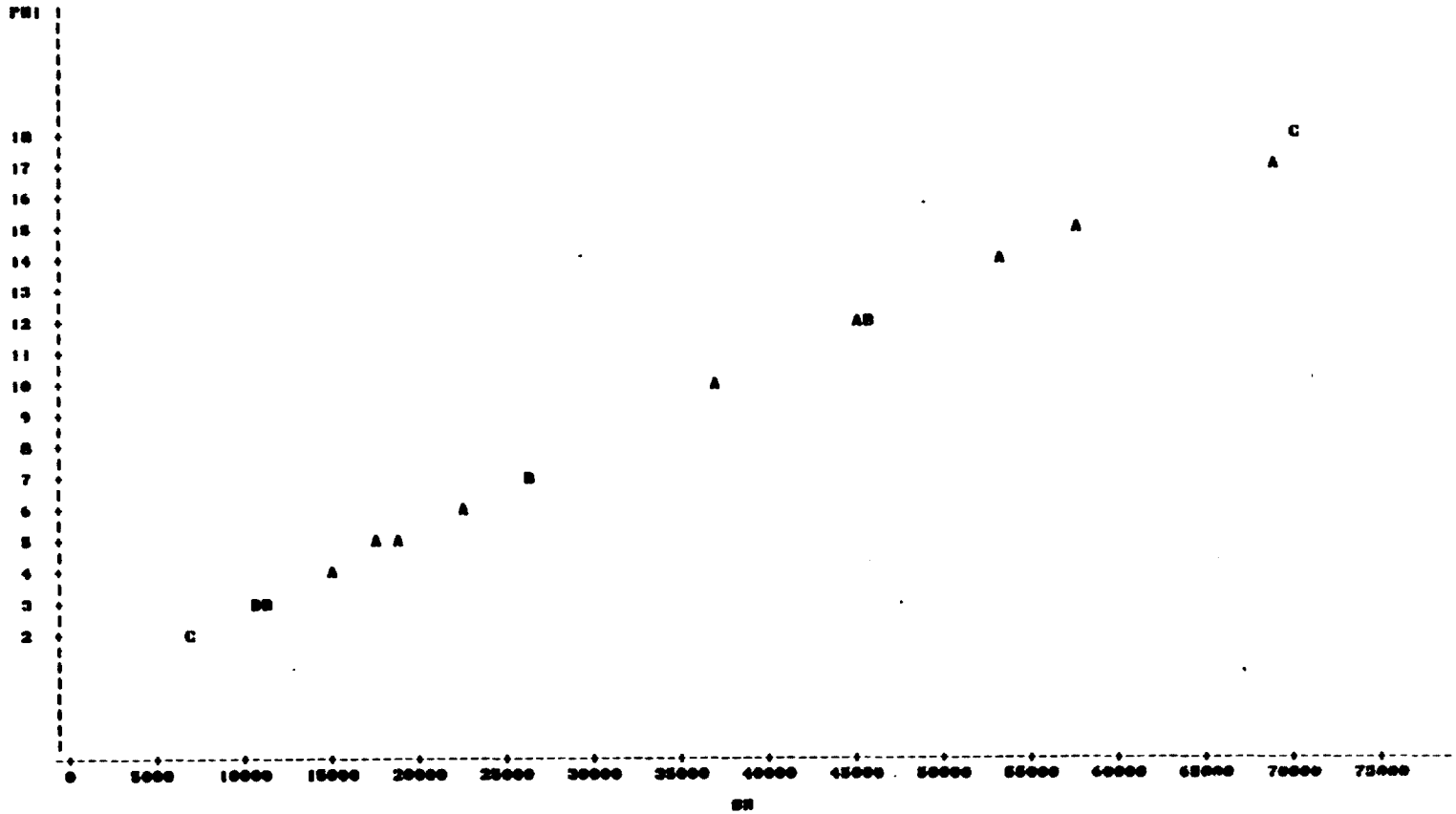

Figure R.13. Correlation Between Shear Angle and Normal Stress for Copper With 20° Tool, Test Cu 33, Revolution 2

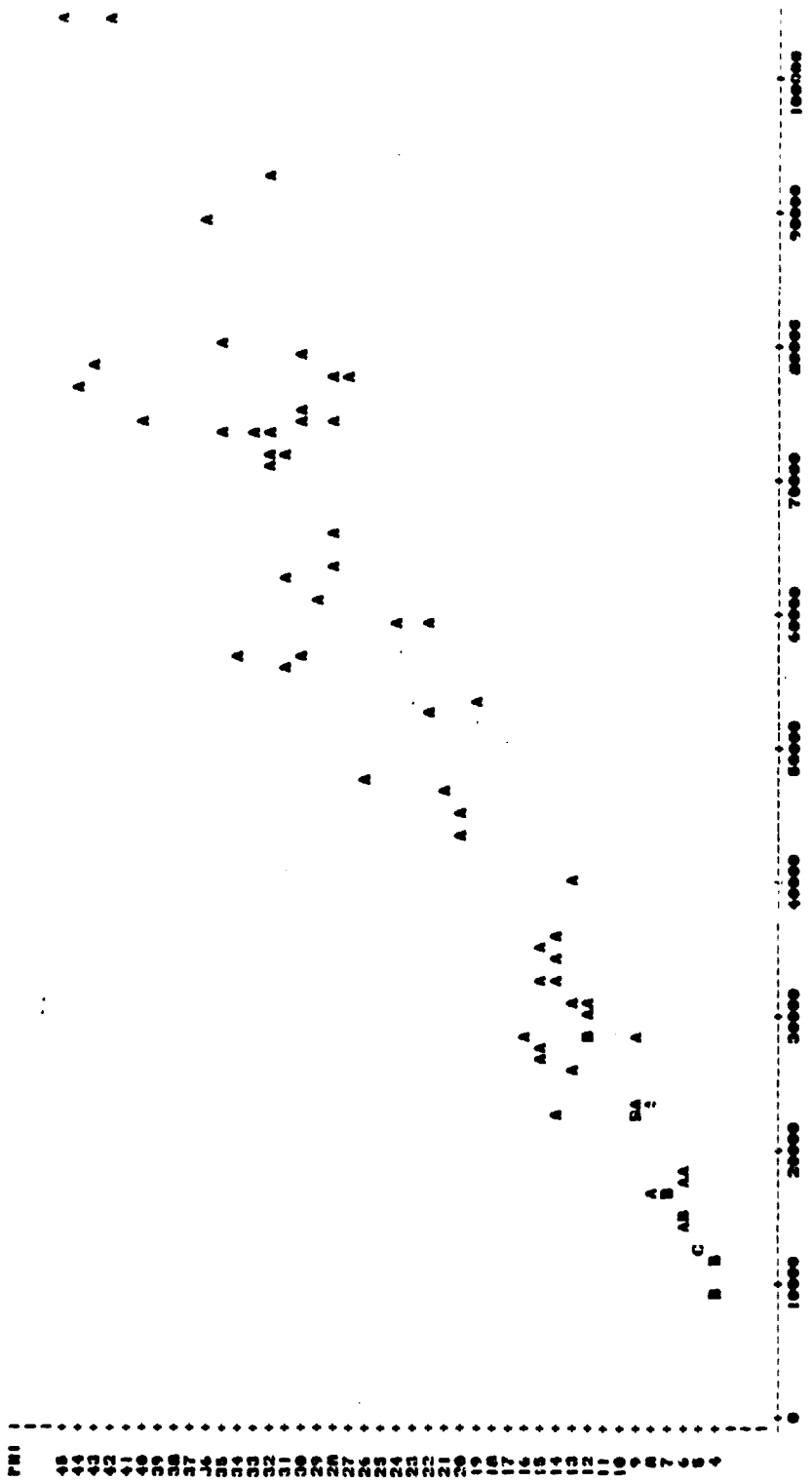

Figure R.14. Correlation Between Shear Angle and Normal Stress for Copper With 40° Tool, Test Cu 06

APPENDIX S

Correlation Between Proportion of Energy in Shear and Shear Angle

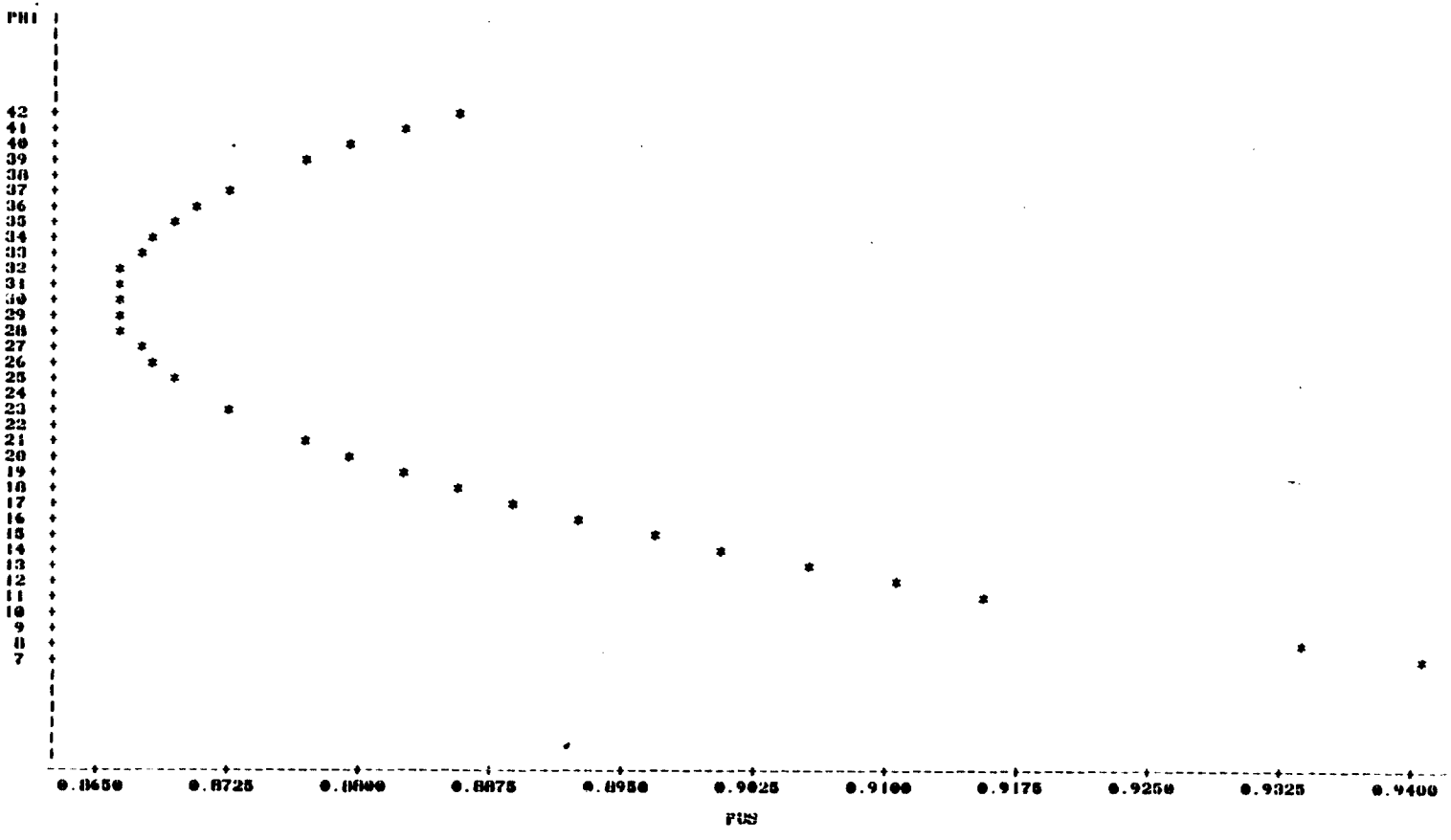

Figure S.1. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 30° Tool, Test A1 63, Revolution 1

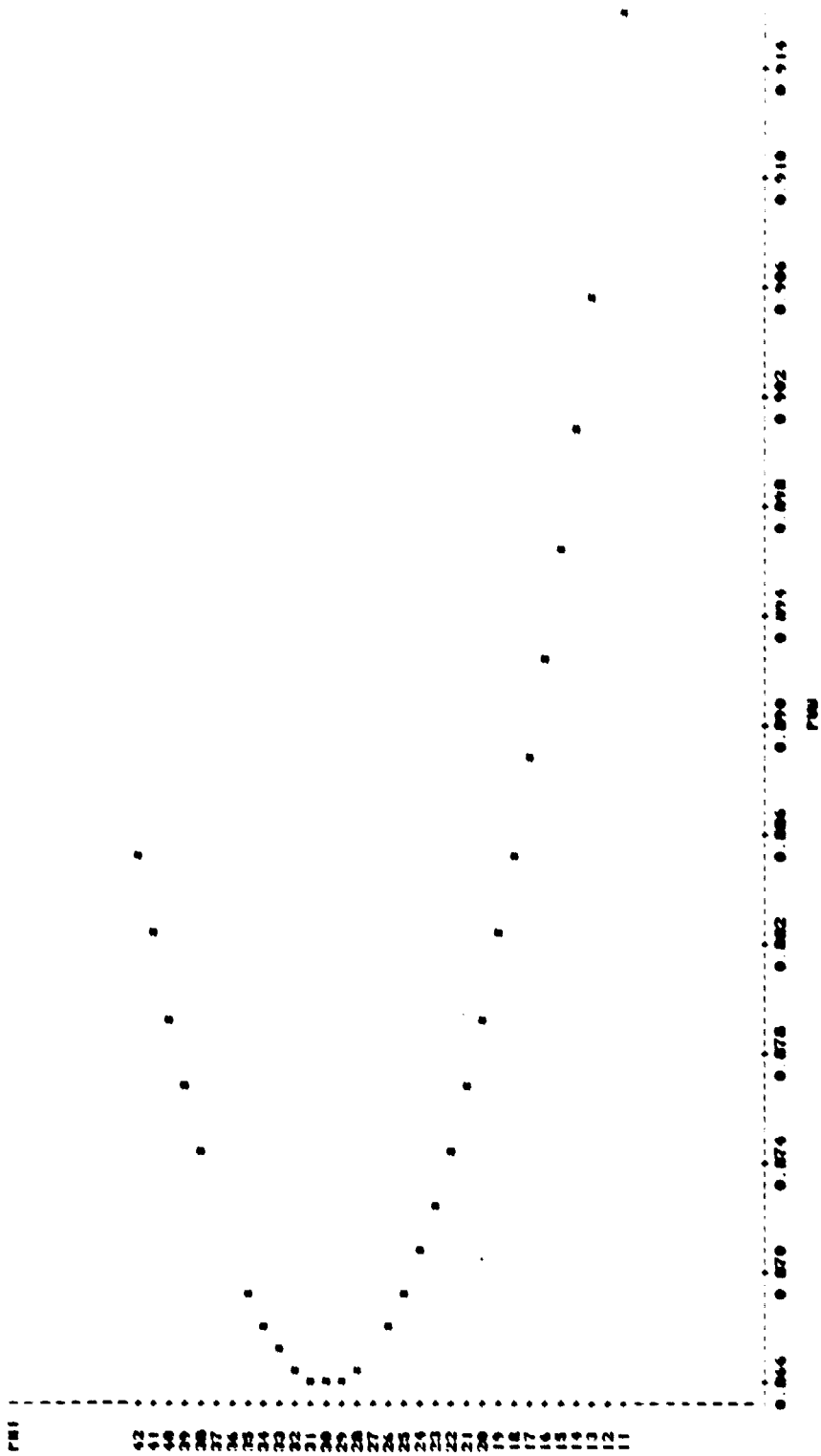

Figure S.2. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 30° Tool, Test Al 63, Revolution 2

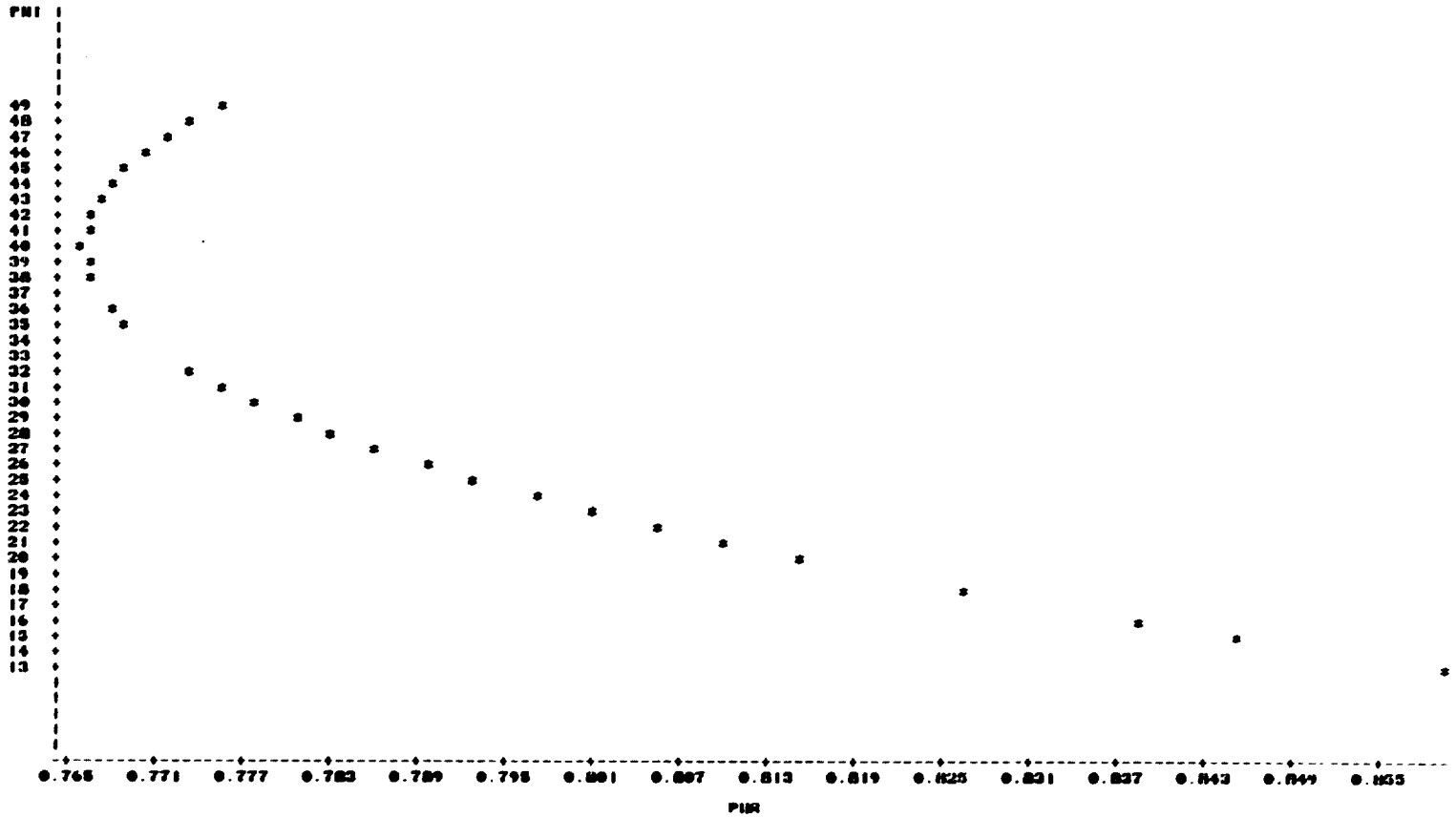

Figure S.3. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 40° Tool, Test Al 56, Revolution 2

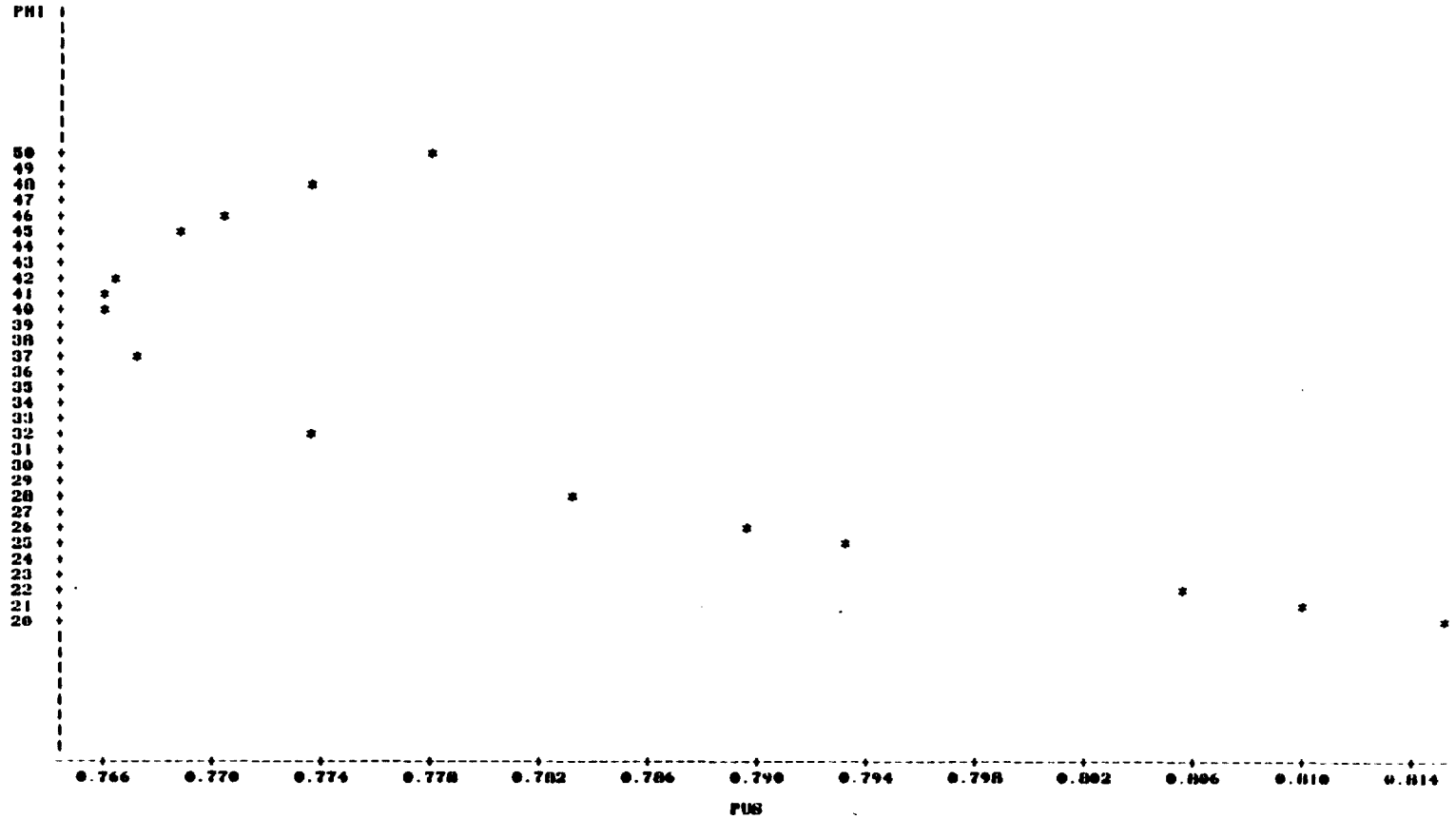

Figure S.4. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 40° Tool, Test Al 56, Revolution 3

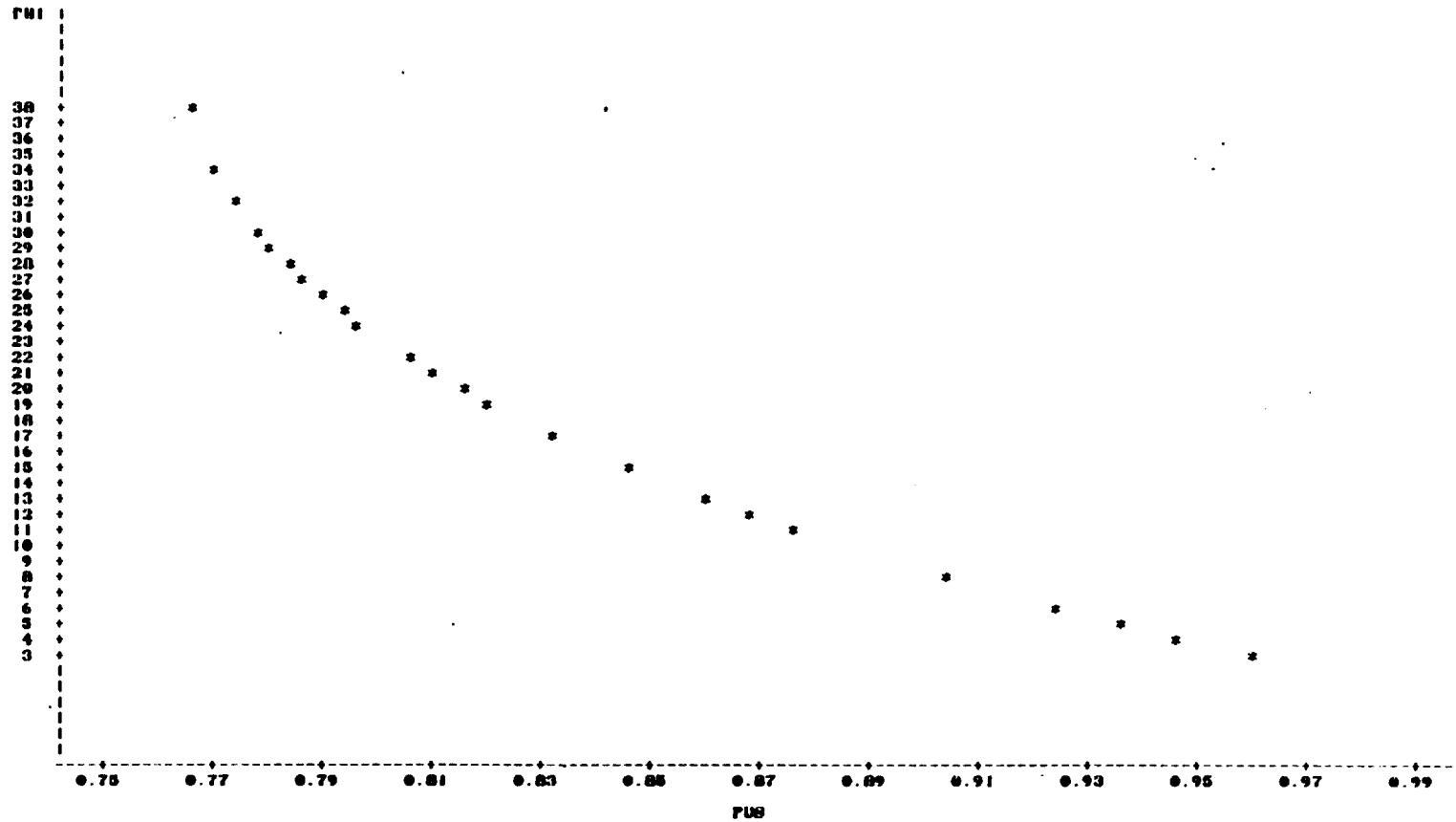

Figure S.5. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 40° Tool, Test Al 03

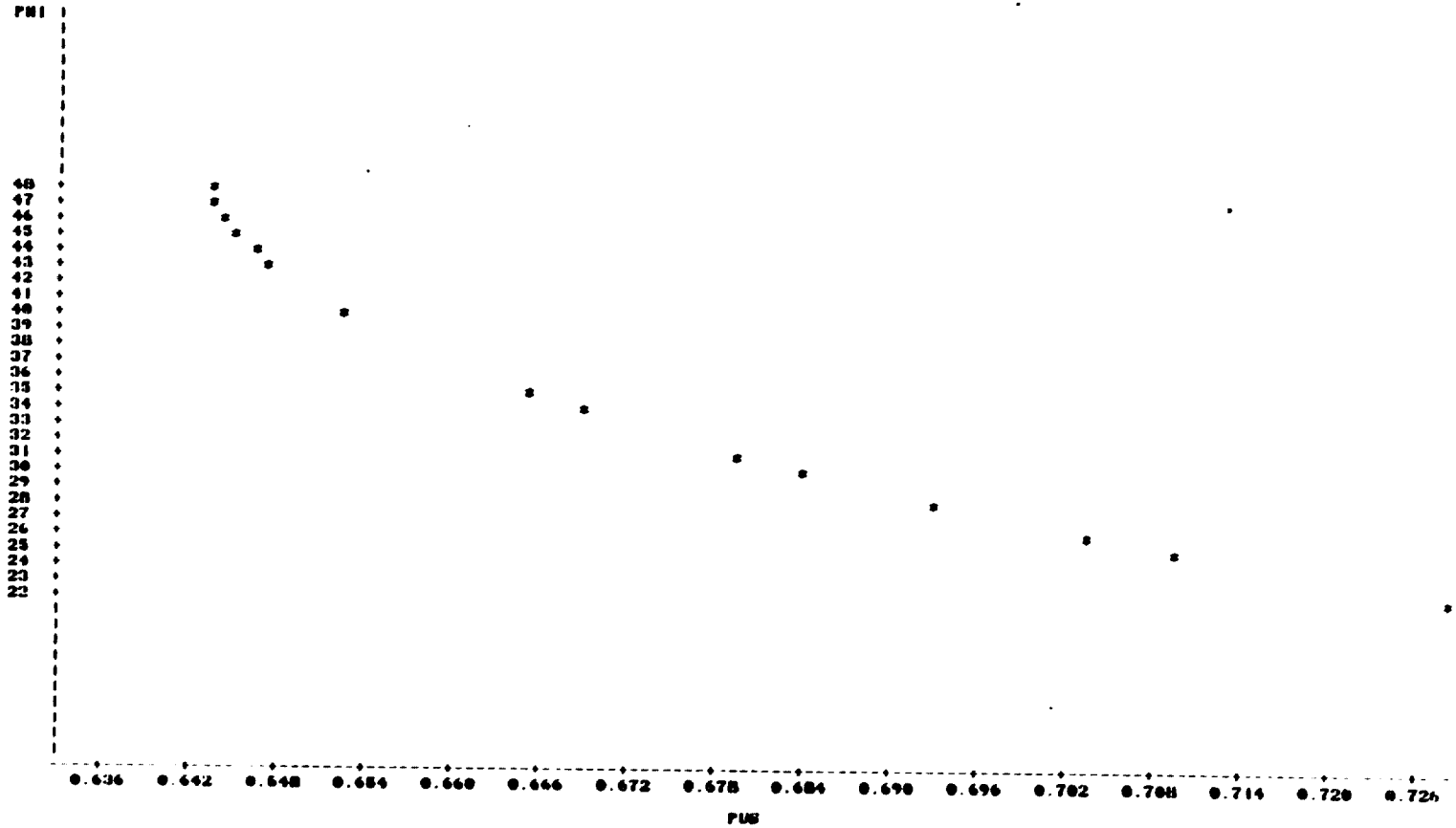

Figure S.6. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 50° Tool, Test Al 57, Revolution 1

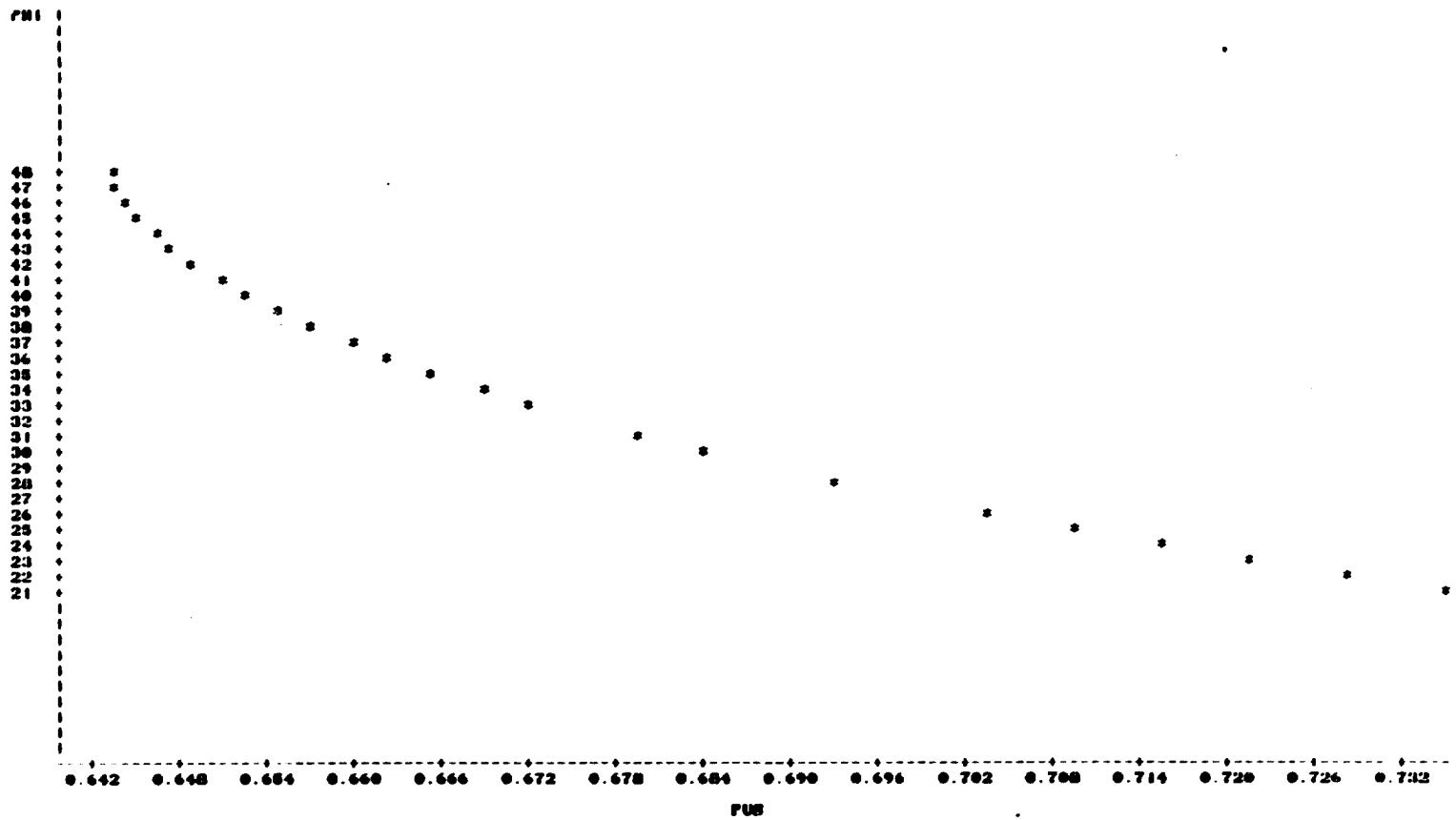

Figure S.7. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 50° Tool, Test Al 57, Revolution 2

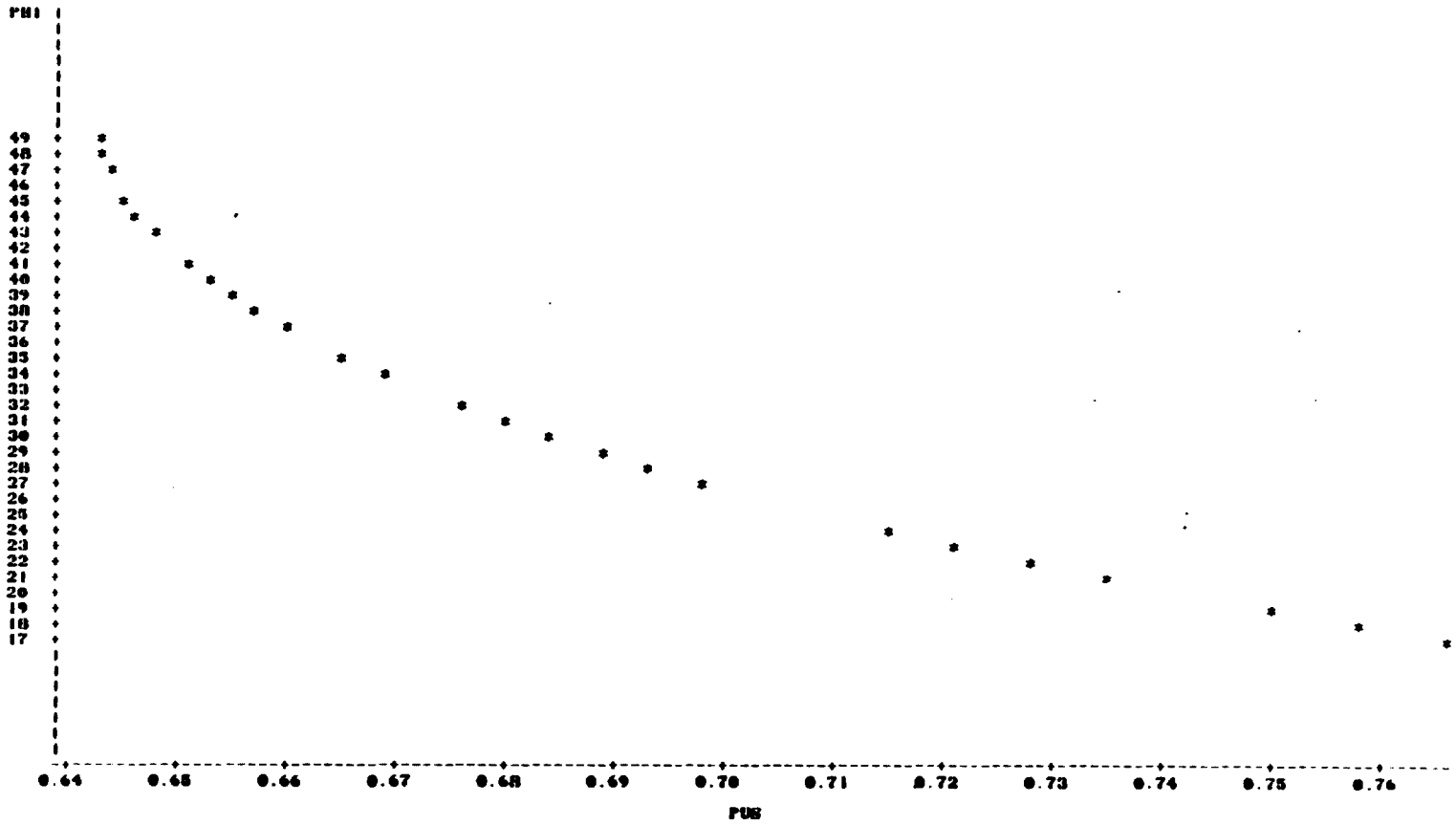

Figure S.8. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 50° Tool, Test Al 57, Revolution 3

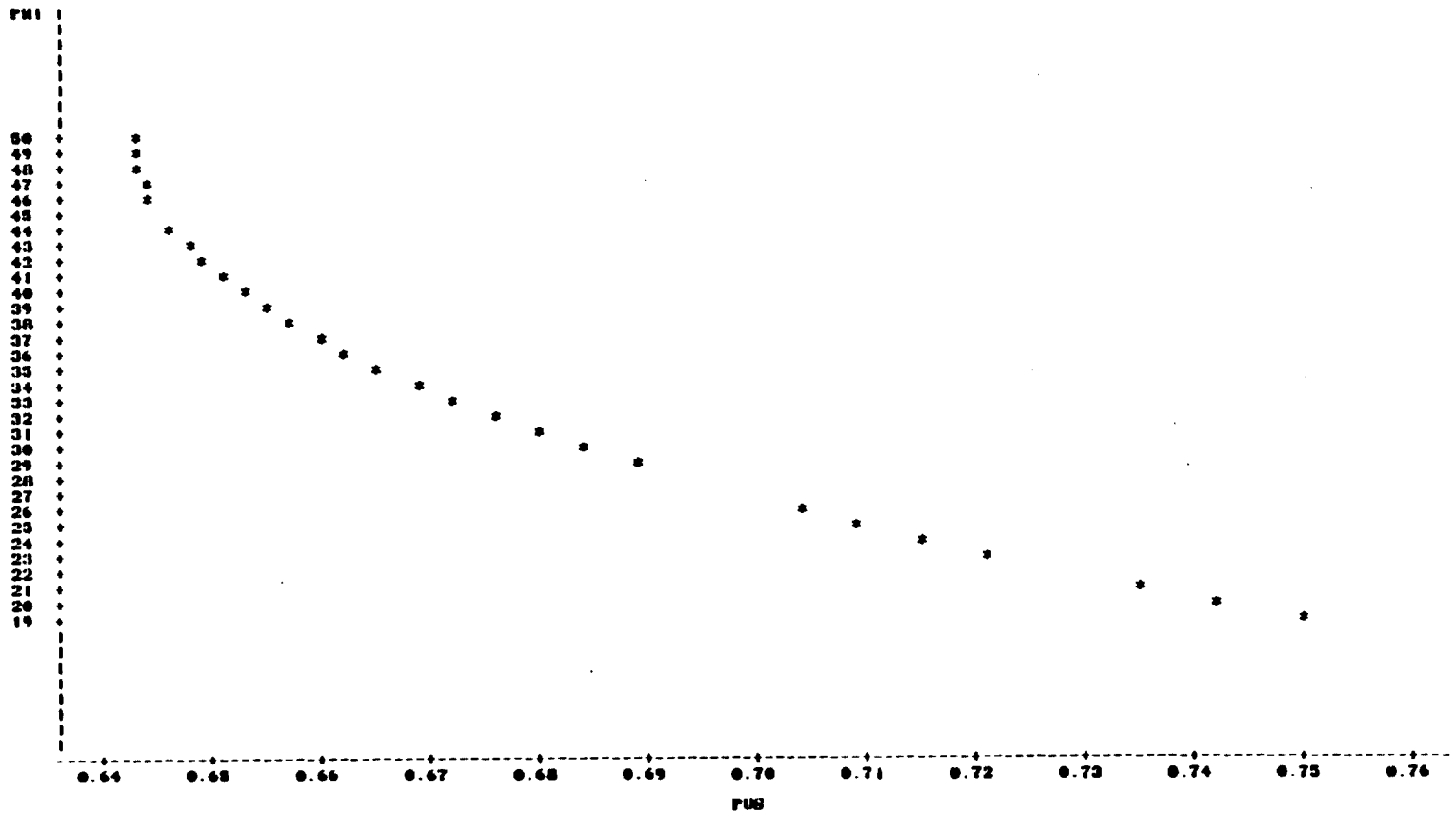

Figure S.9. Correlation Between Shear Angle and Proportion of Energy in Shear for Aluminum With 50° Tool, Test Al 57, Revolution 4

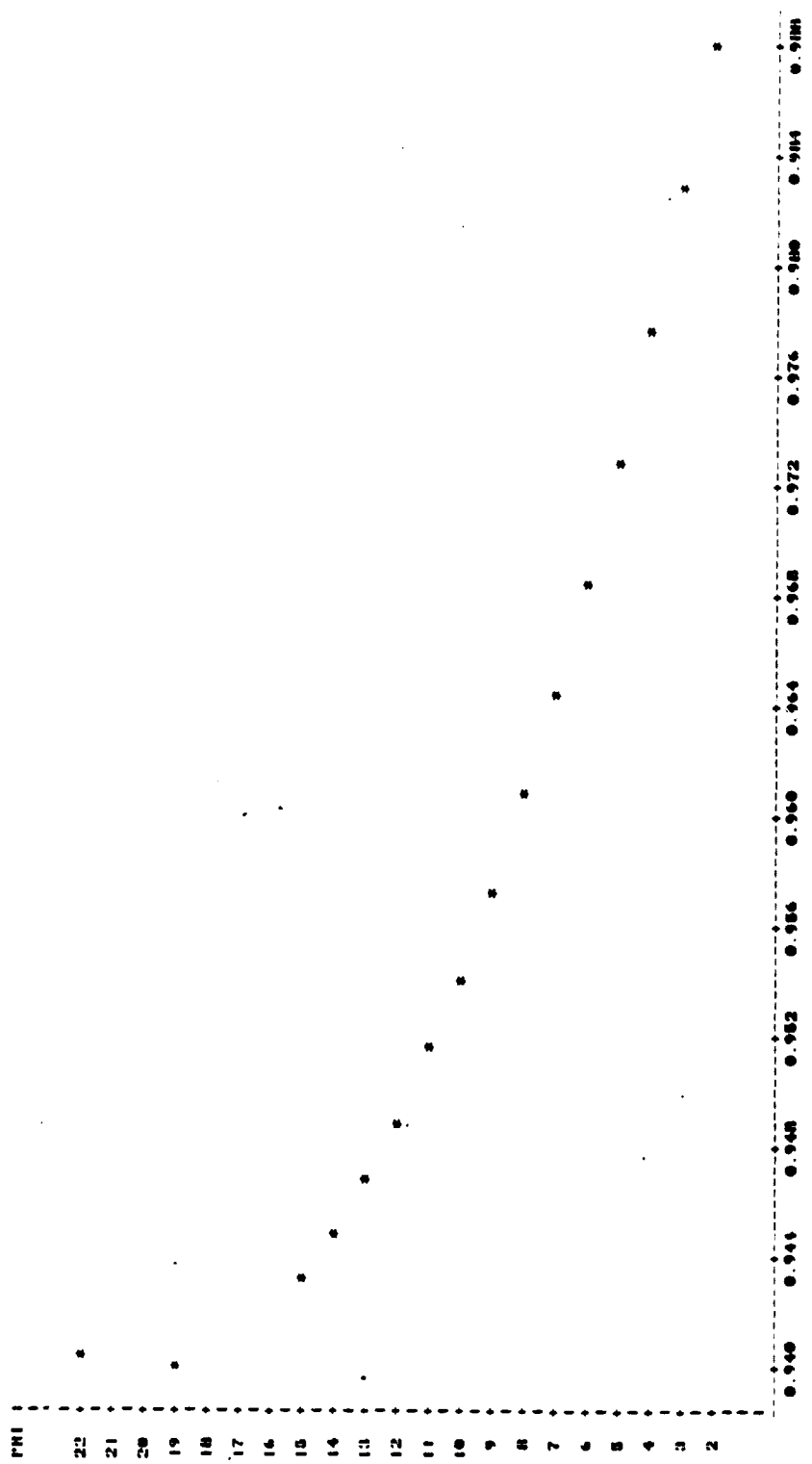

Figure S.10. Correlation Between Shear Angle and Proportion of Energy in Shear for Copper With 20° Tool, Test Cu 06

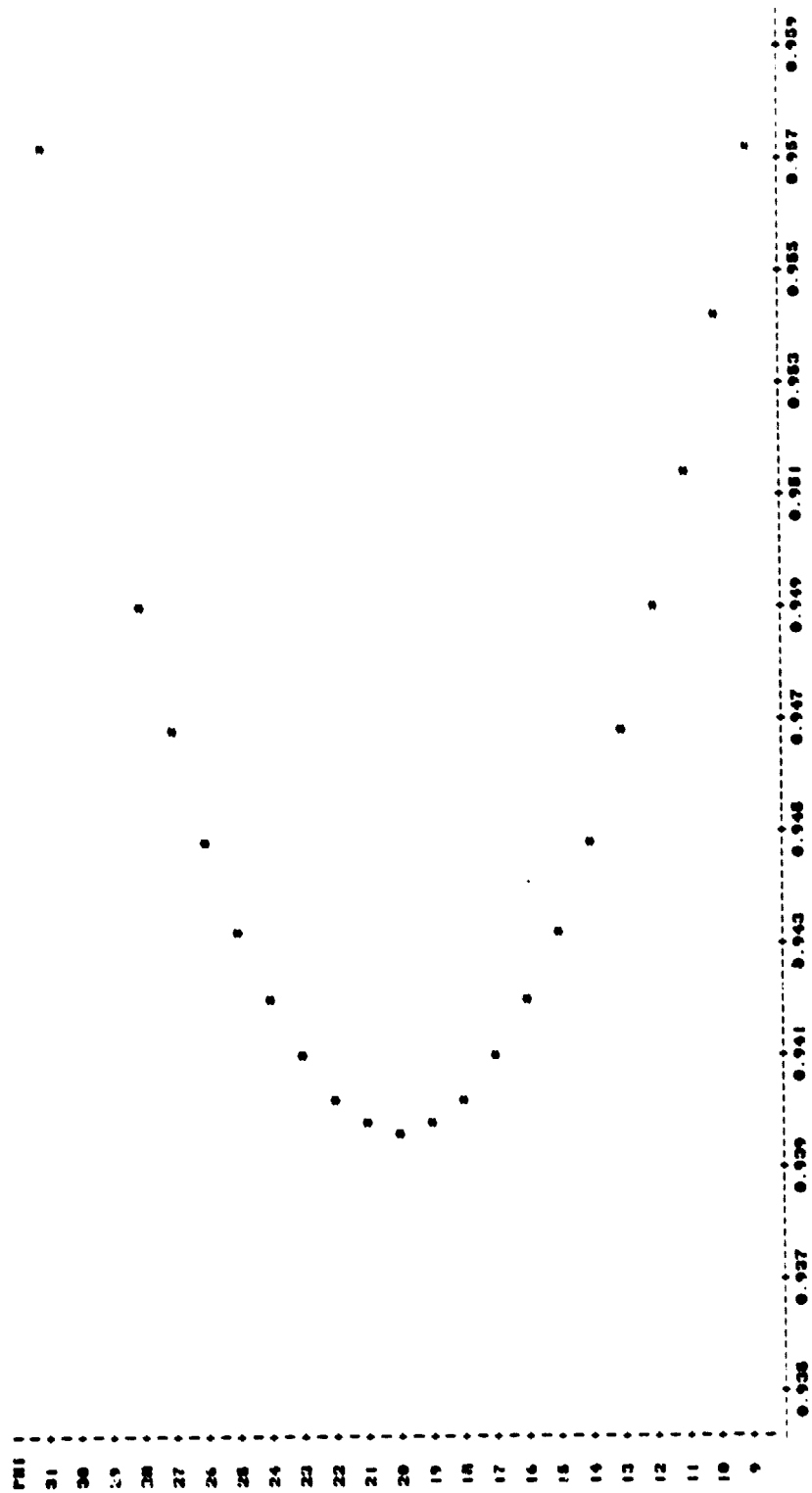

Figure S.11. Correlation Between Shear Angle and Proportion of Energy in Shear for Copper With 20° Tool, Test Cu 33, Revolution 1

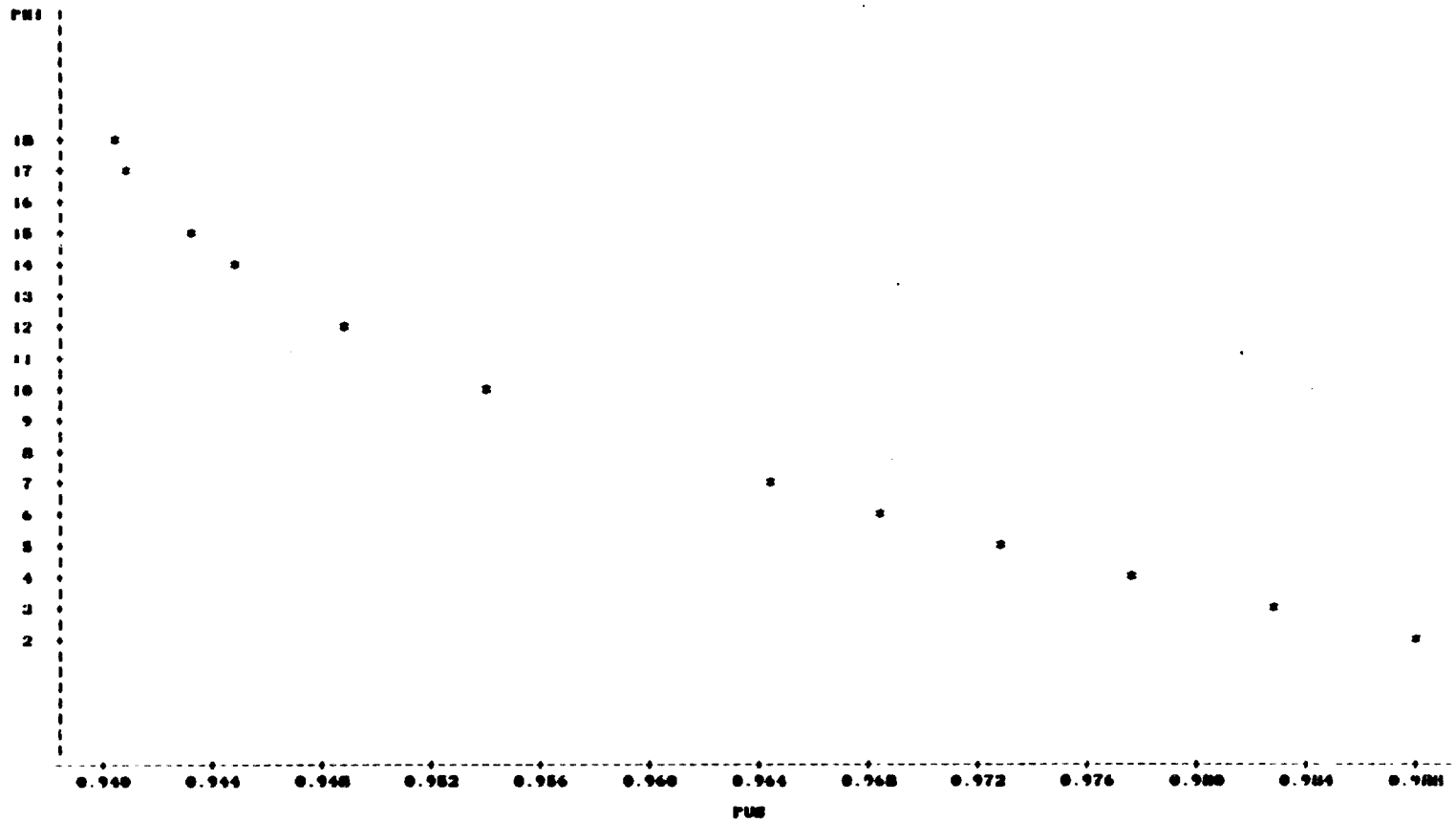

Figure S.12. Correlation Between Shear Angle and Proportion of Energy in Shear for Copper With 20° Tool, Test Cu 33, Revolution 2

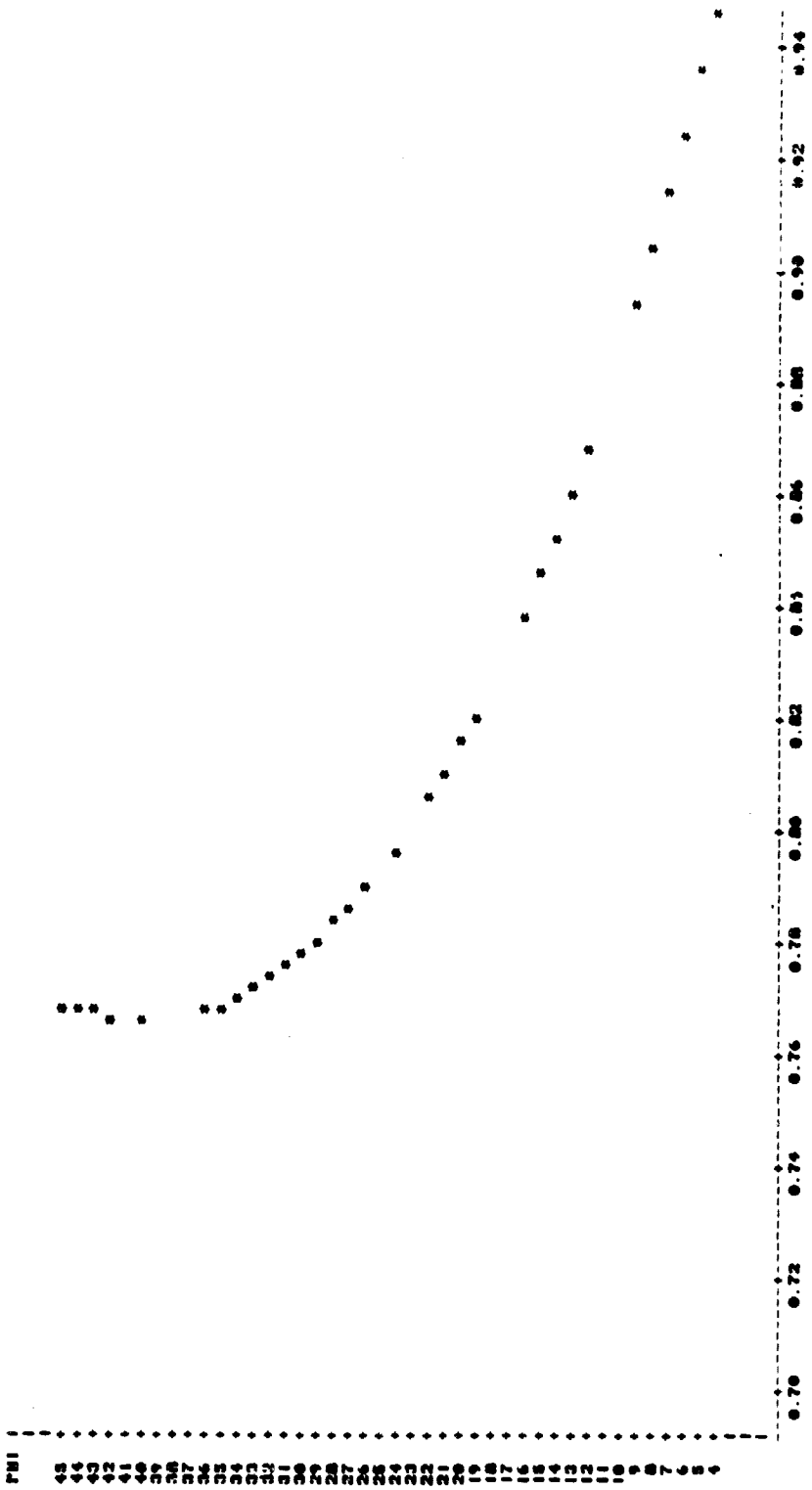

Figure S.13. Correlation Between Shear Angle and Proportion of Energy in Shear for Copper With 40° Tool, Test Cu 06

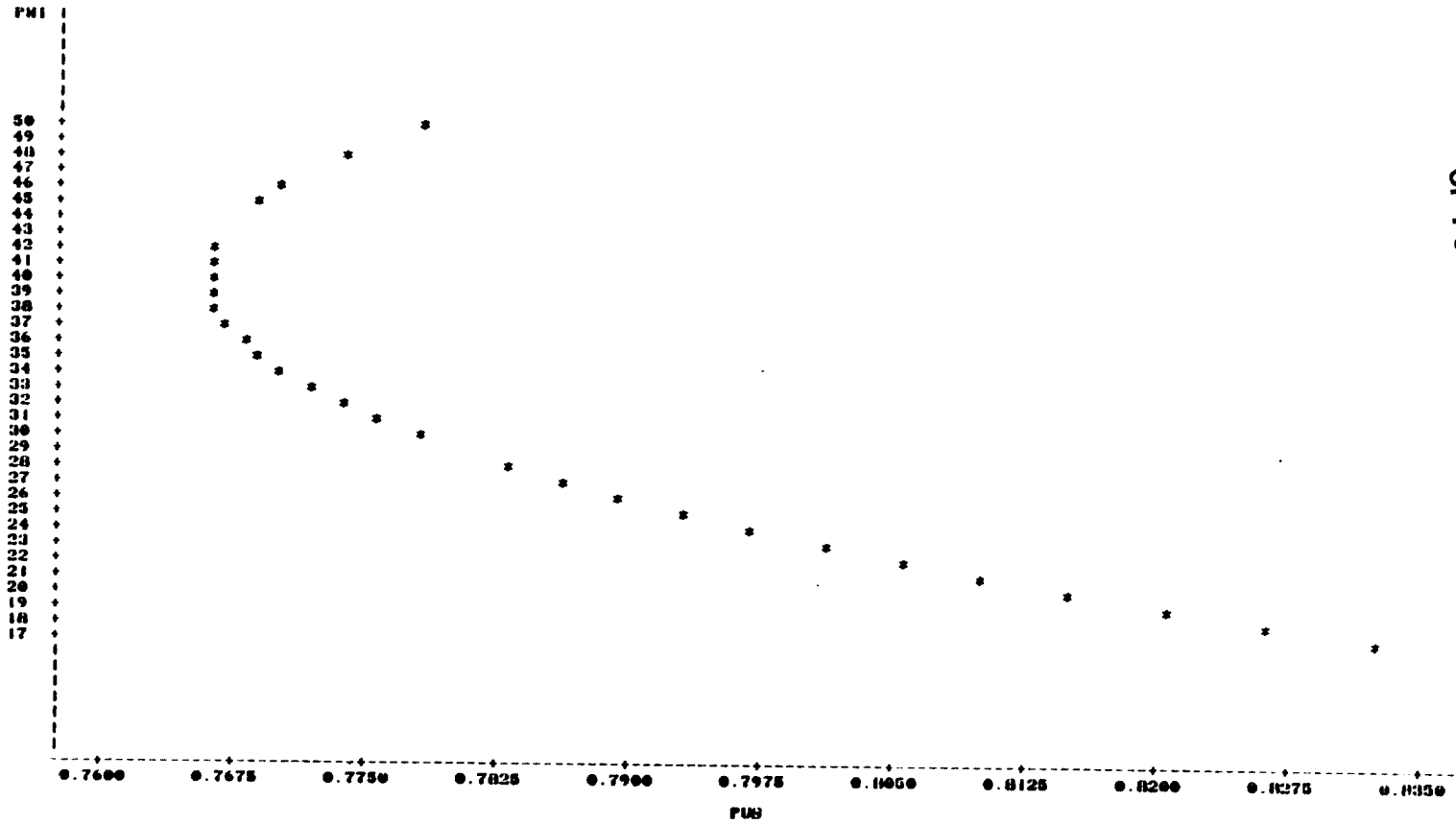

Figure S.14. Correlation Between Shear Angle and Proportion of Energy in Shear for Copper With 40° Tool, Test Cu 32

APPENDIX T

Variation of Resultant Force

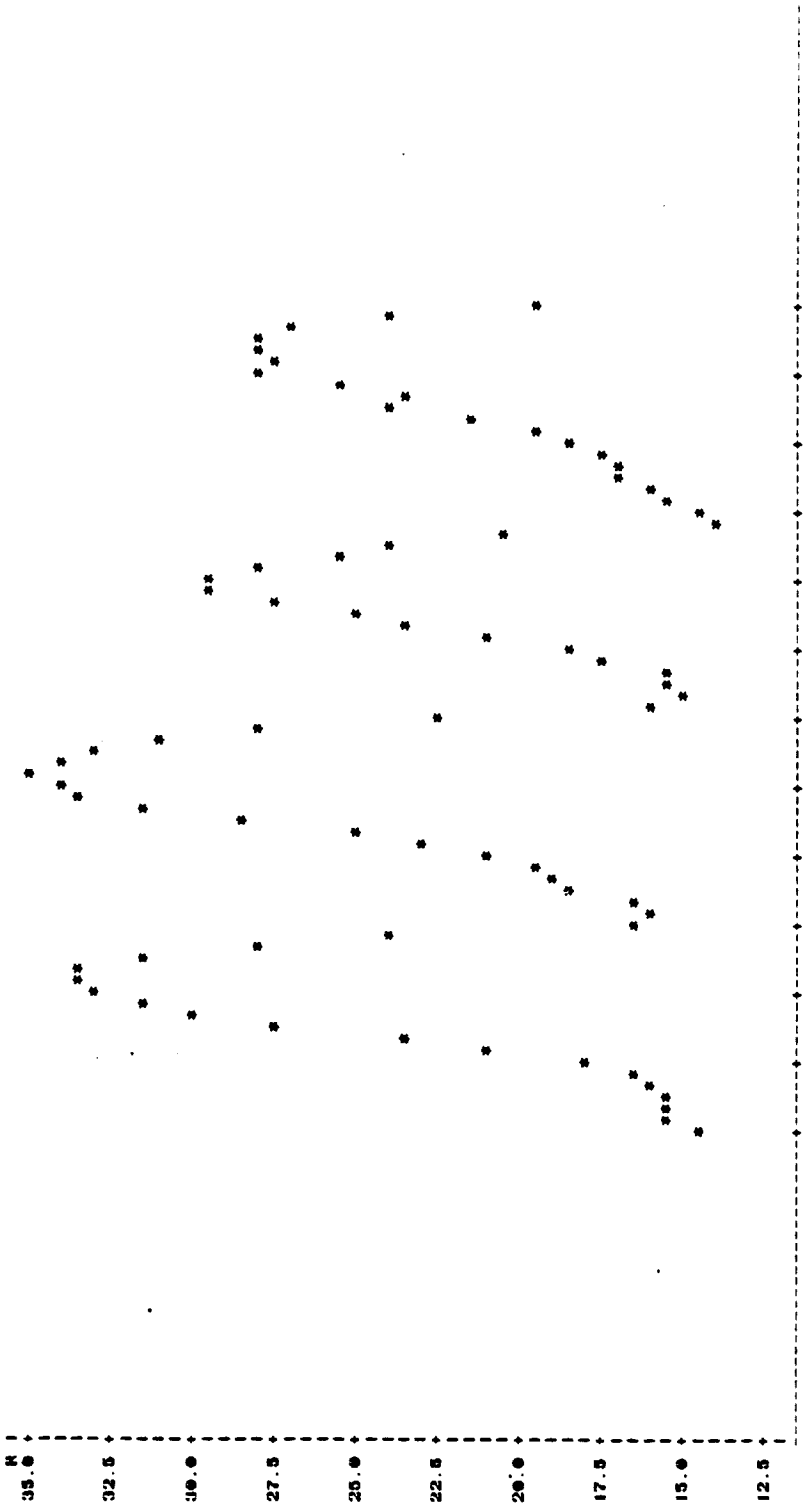

Figure T.1. Variation of Resultant Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

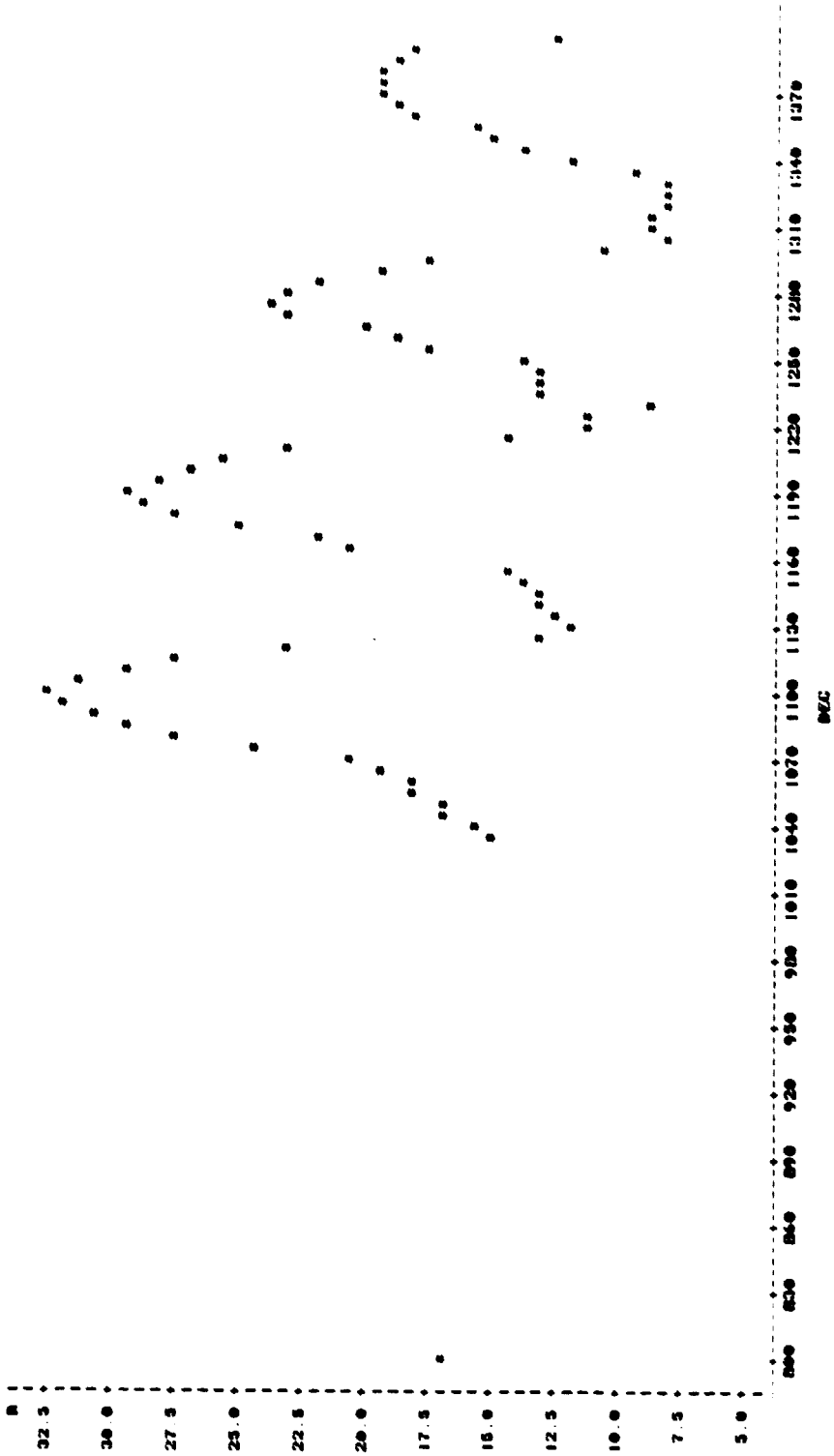

Figure T.2. Variation of Resultant Force With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

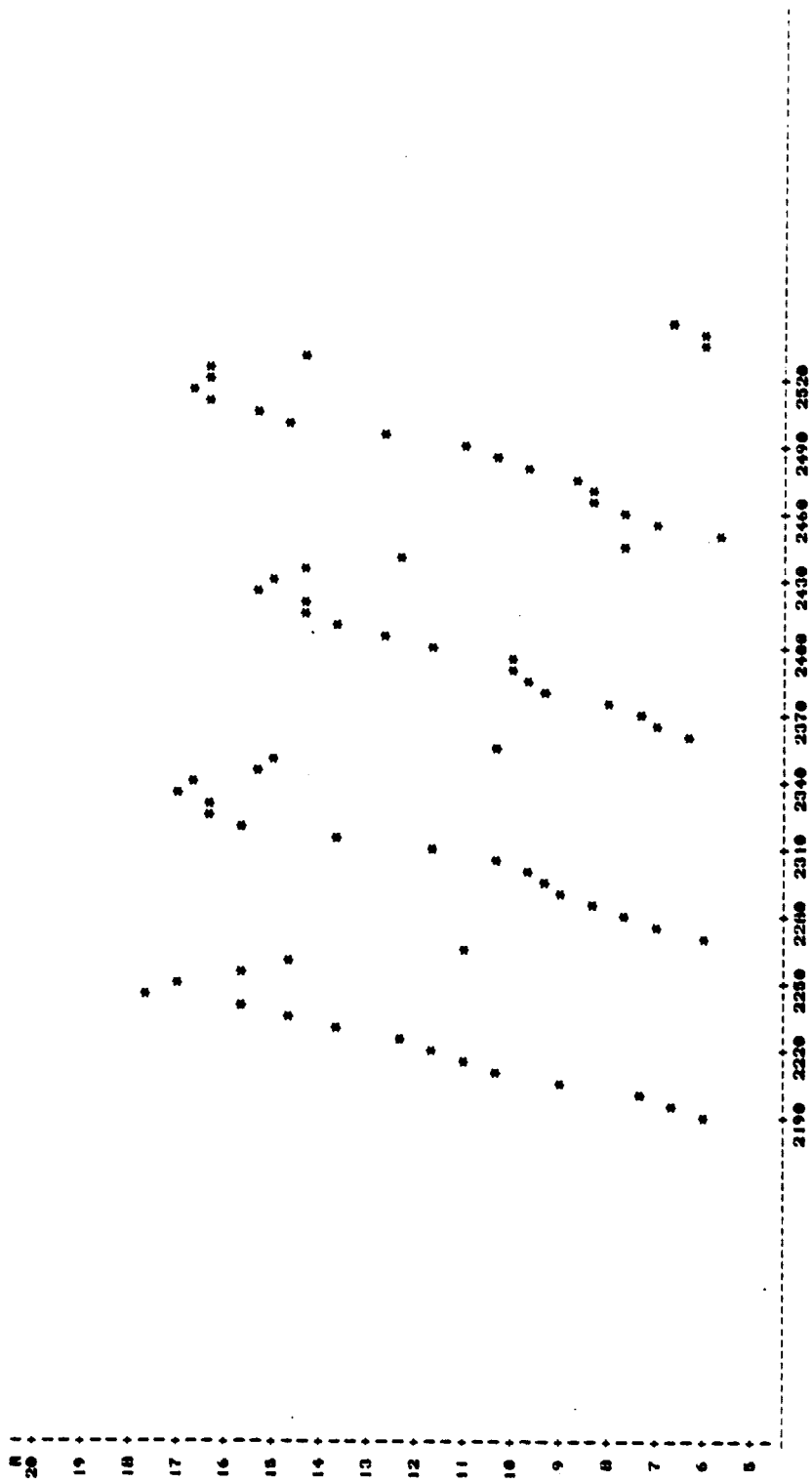

Figure T.3. Variation of Resultant Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 2

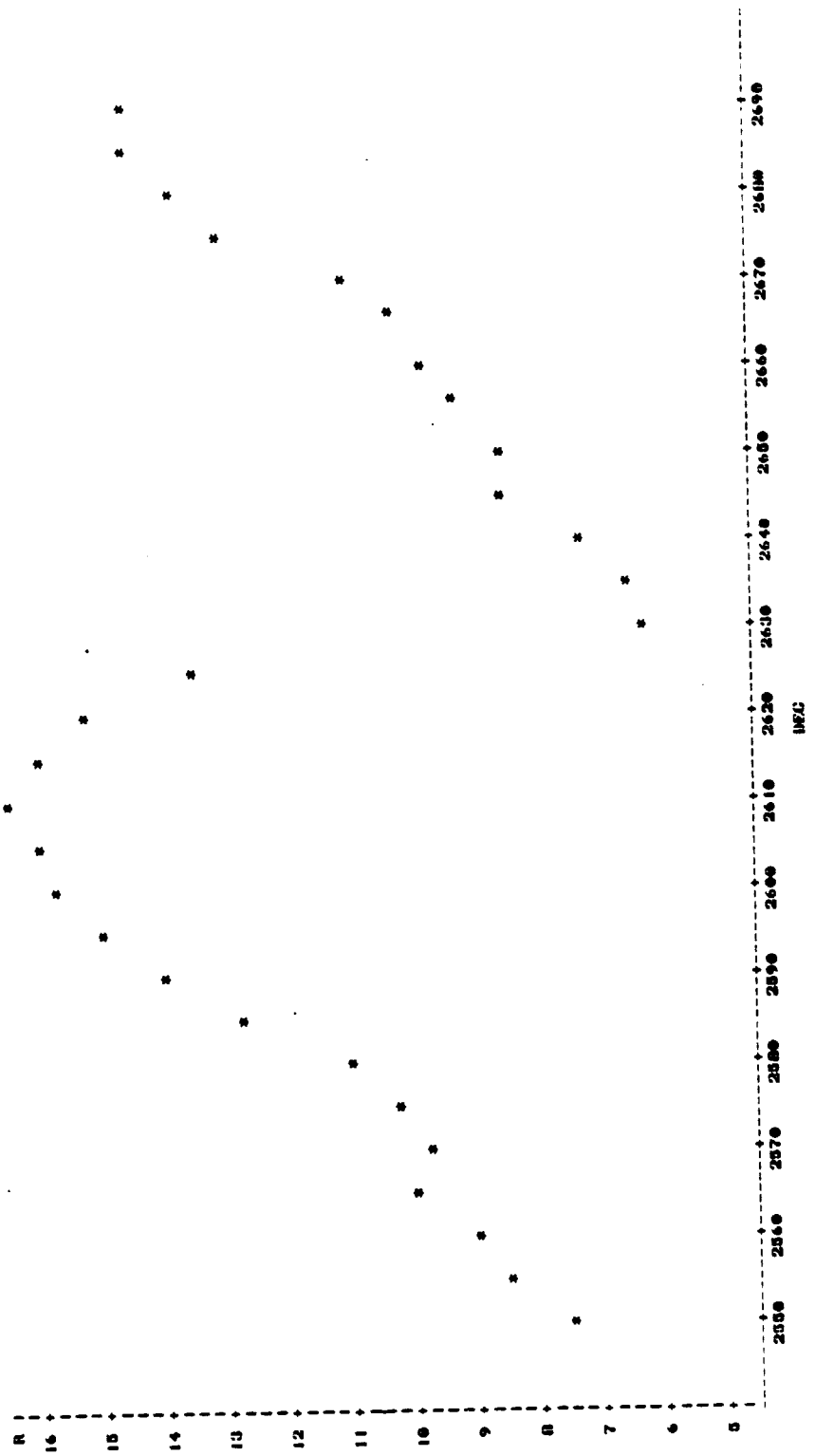

Figure T.4. Variation of Resultant Force With Orientation for Aluminum With 40° Tool, Test Al 56, Revolution 3

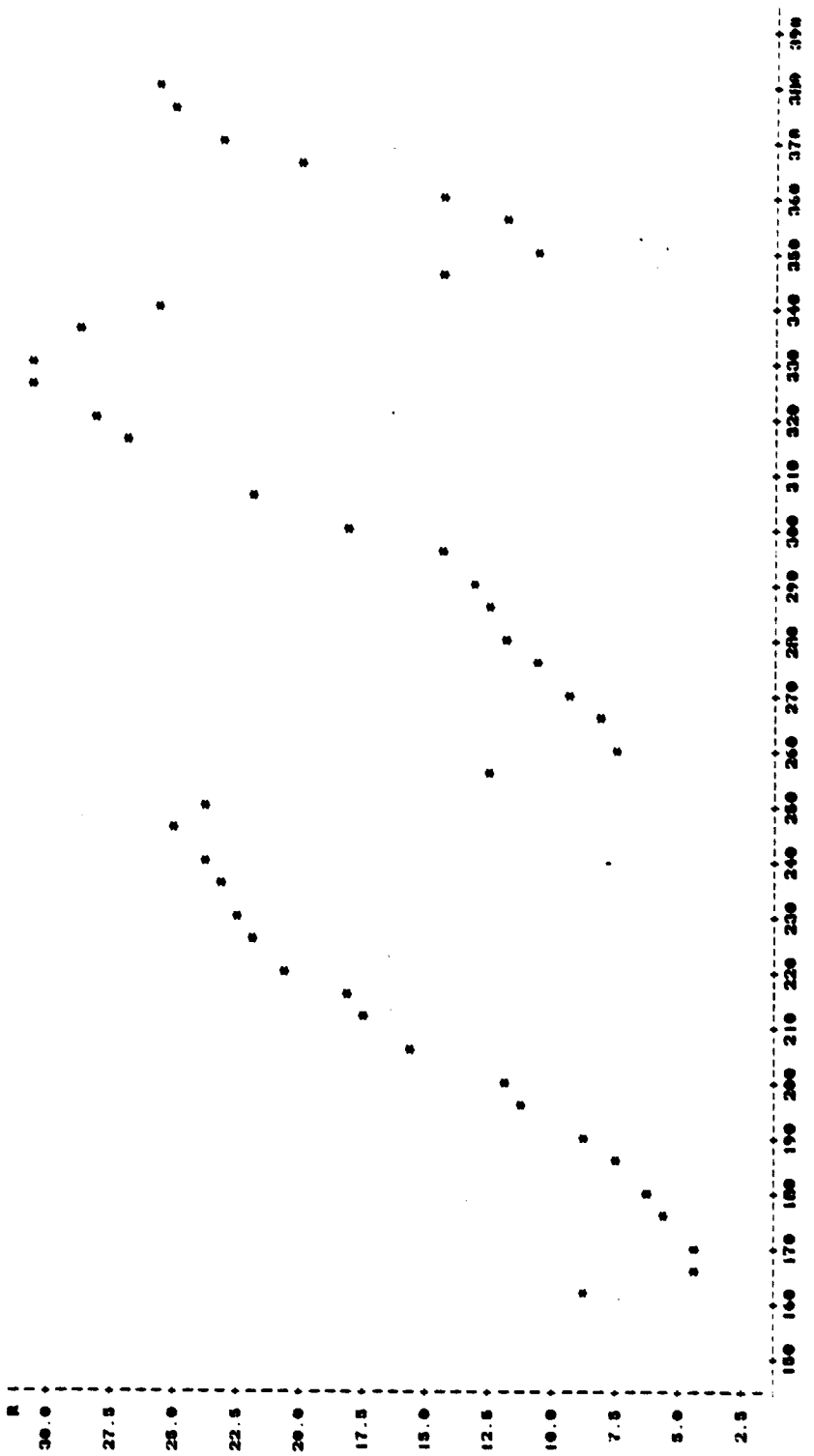

Figure T.5. Variation of Resultant Force With Orientation for Aluminum With 40° Tool, Test Al 03

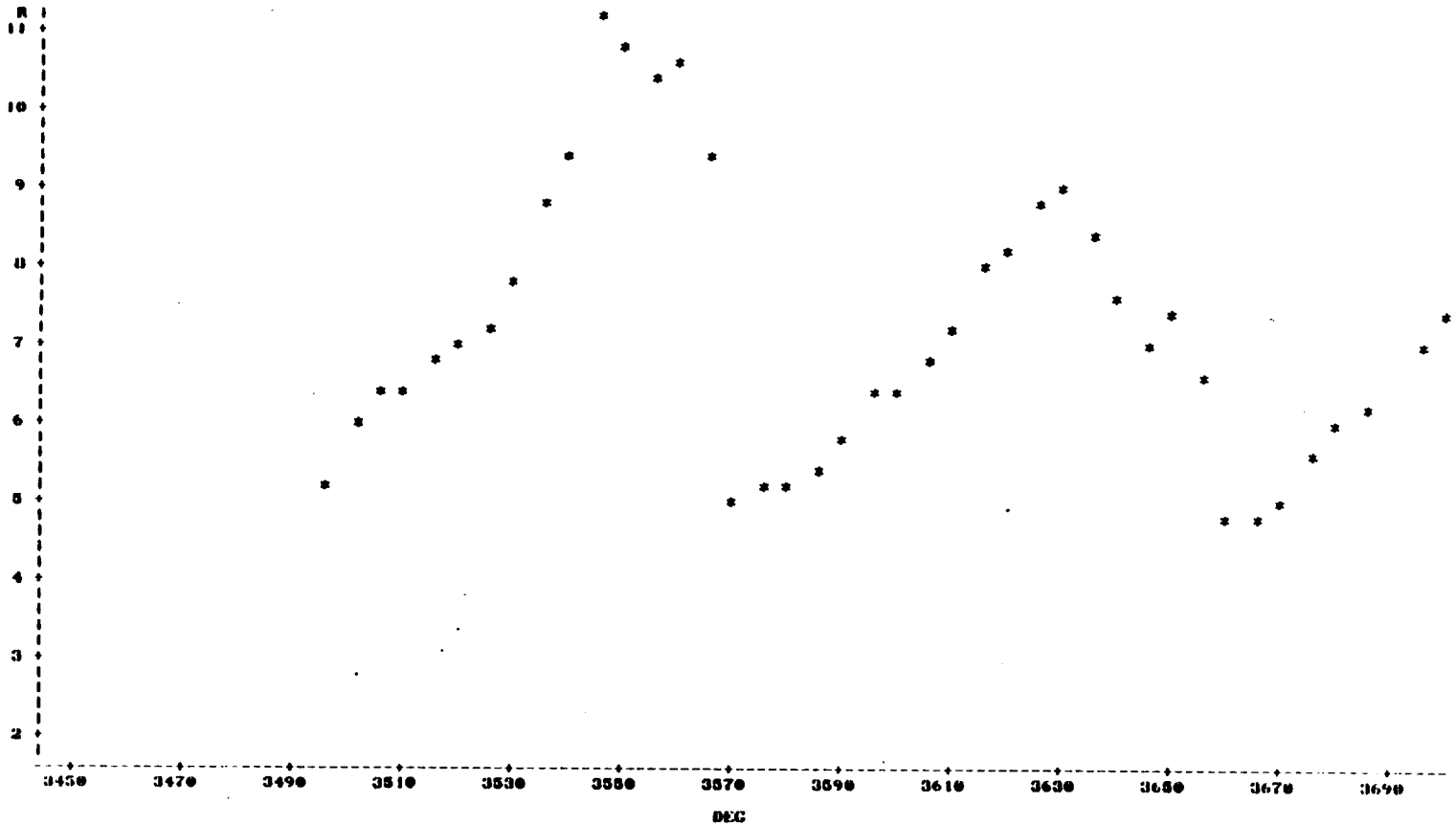

Figure T.6. Variation of Resultant Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

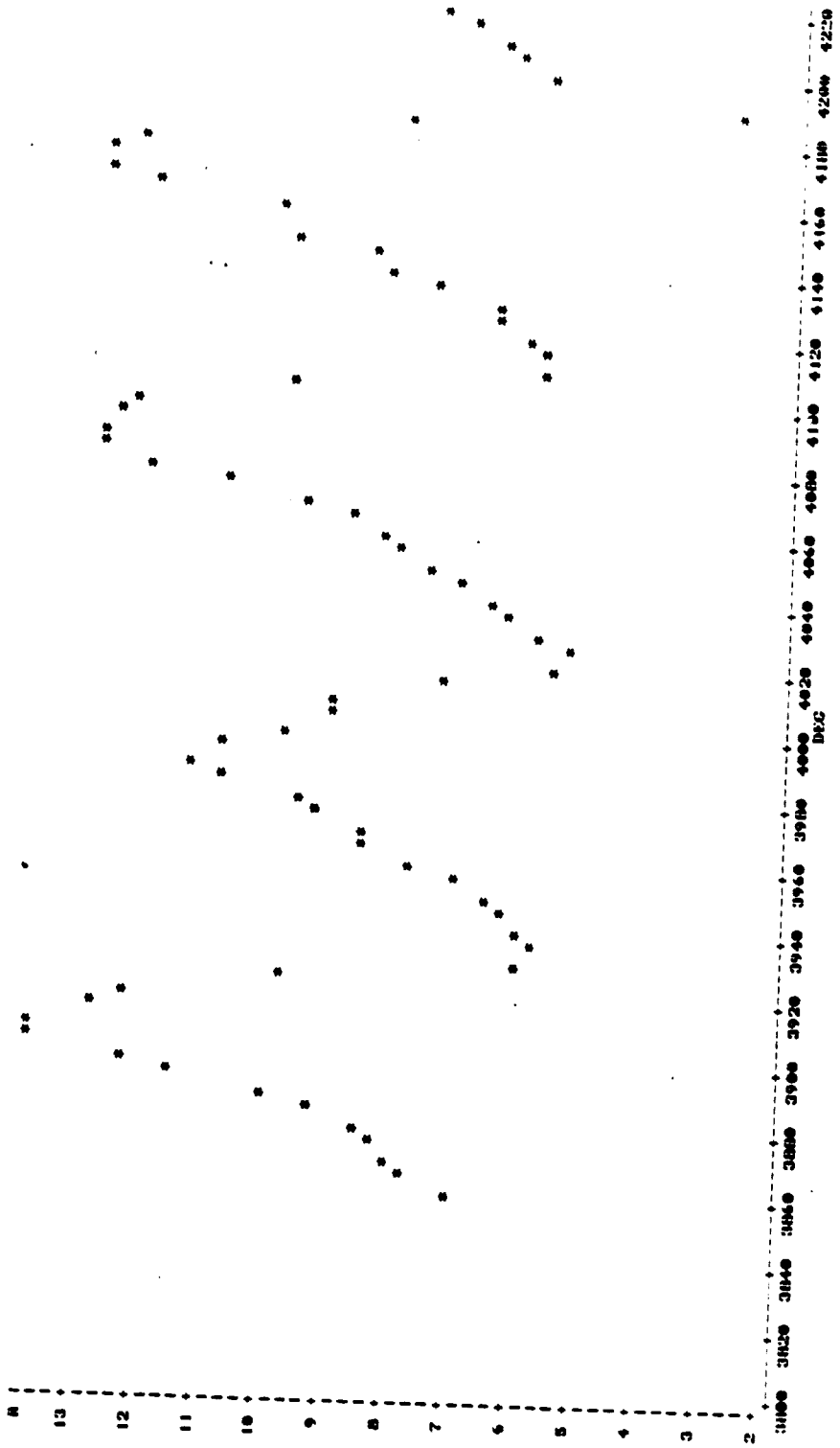

Figure T.7. Variation of Resultant Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

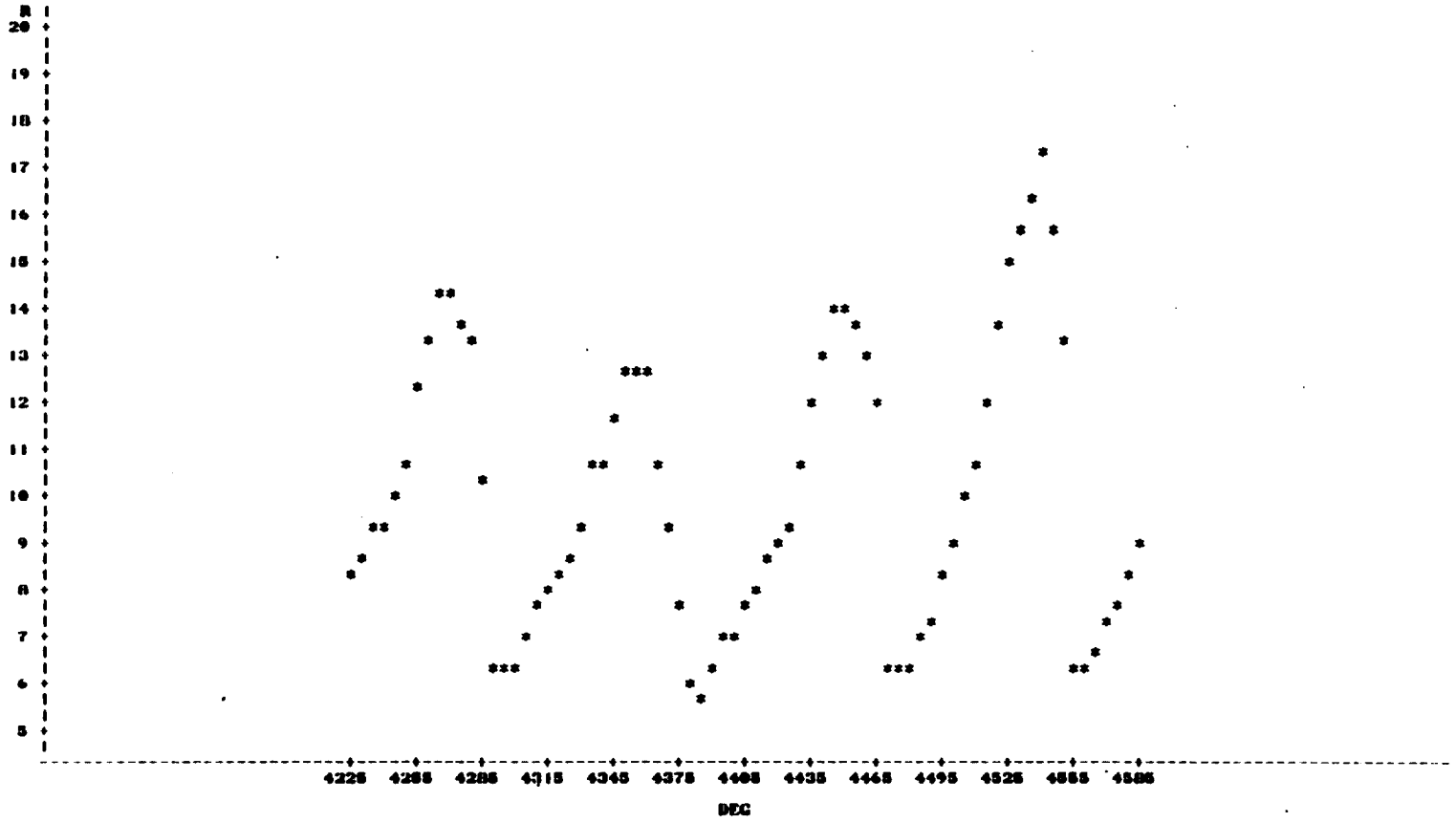

Figure T.8. Variation of Resultant Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

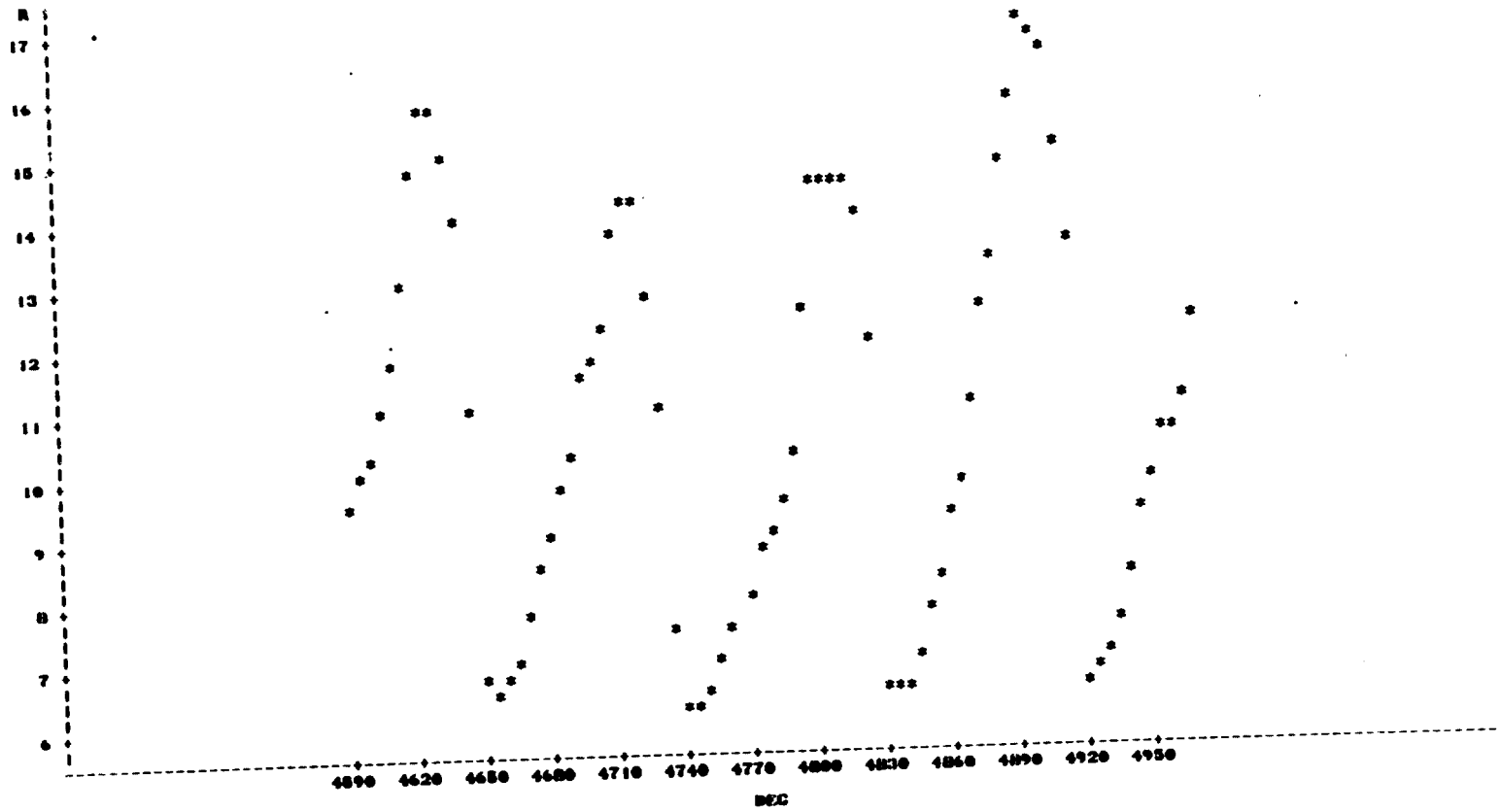

Figure T.9. Variation of Resultant Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

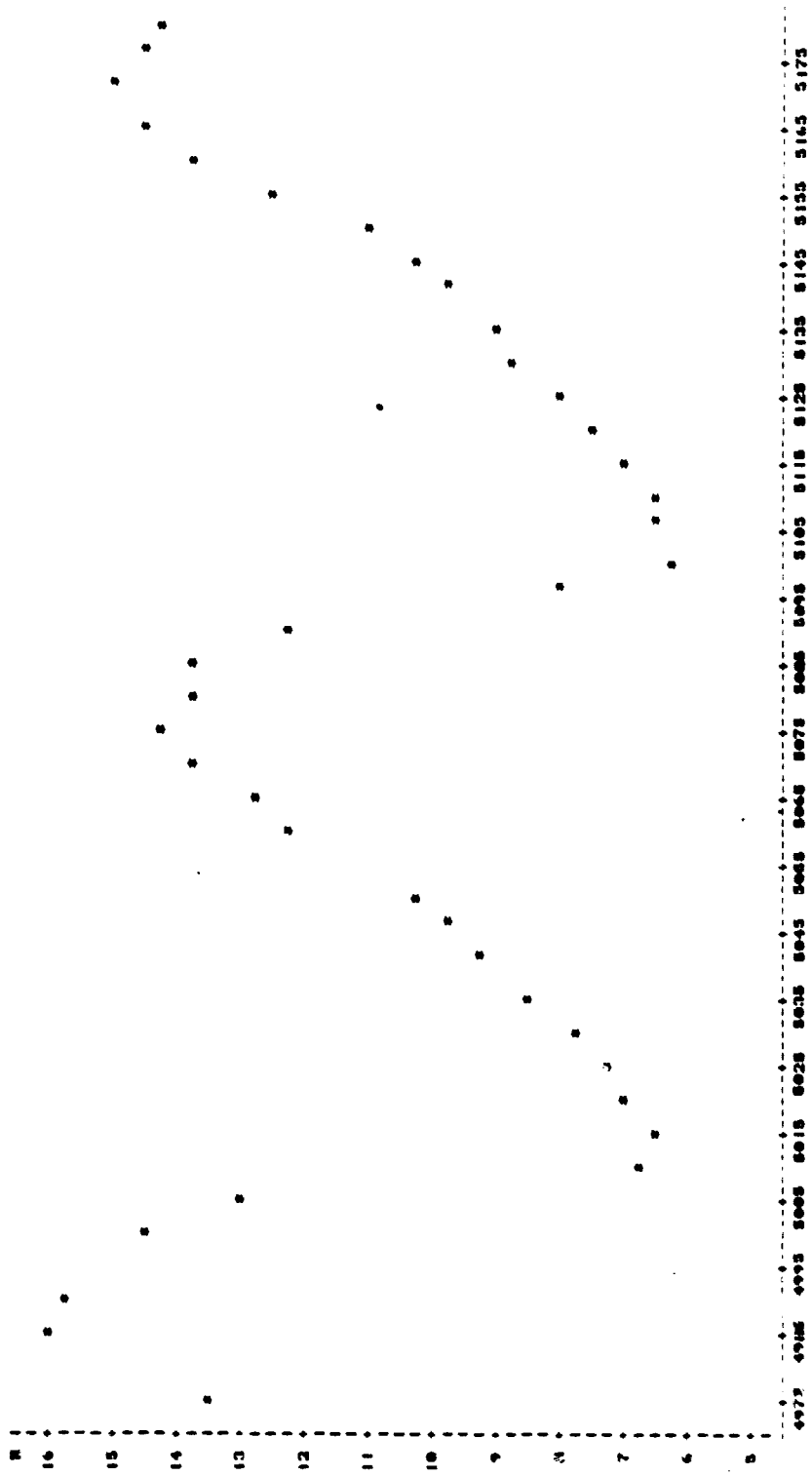

Figure T.10. Variation of Resultant Force With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

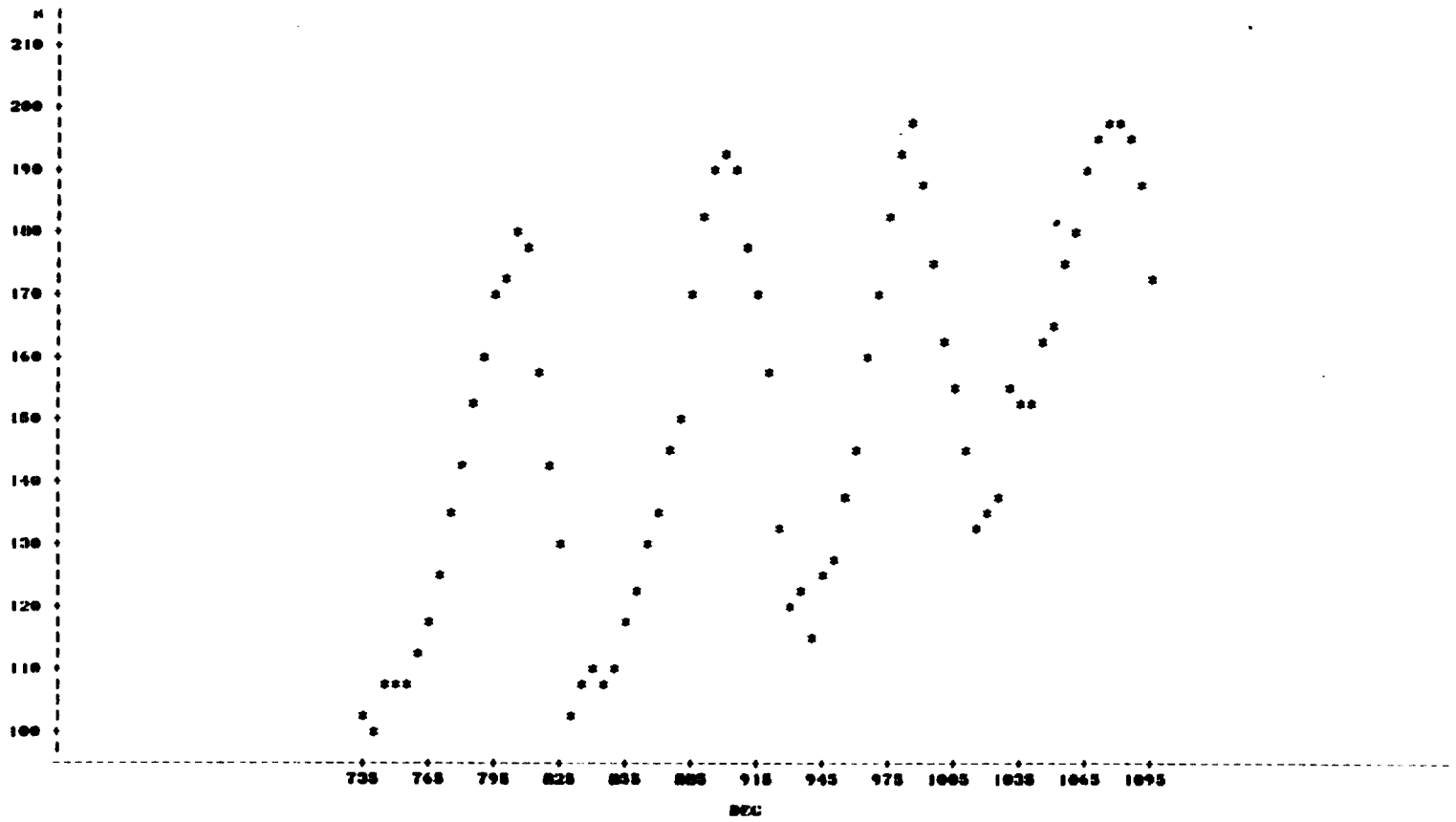

Figure T.11. Variation of Resultant Force With Orientation for Copper With 0° Tool, Test Cu 06

Figure T.12. Variation of Resultant Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

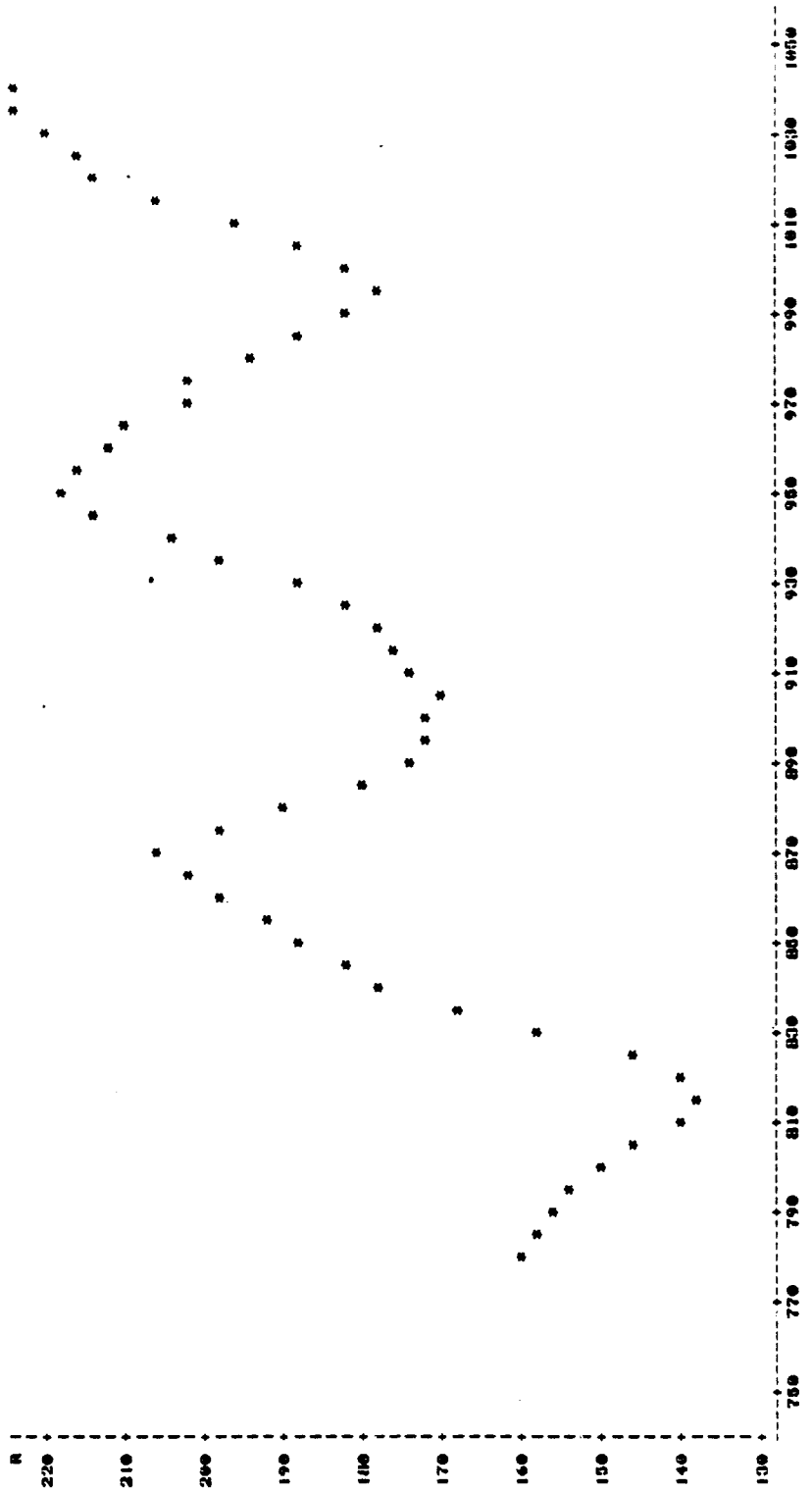

Figure T.13. Variation of Resultant Force With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

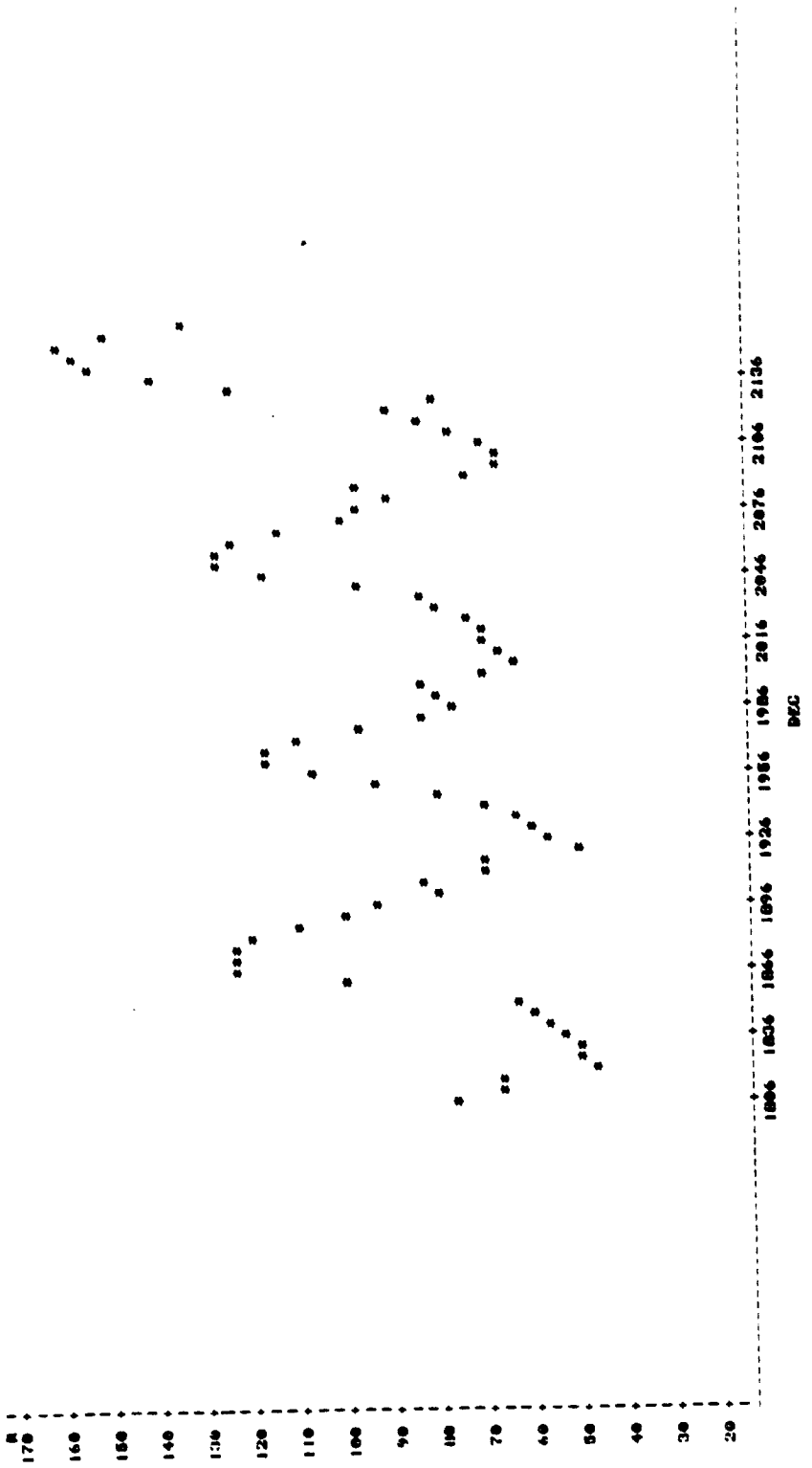

Figure T.14. Variation of Resultant Force With Orientation for Copper With 40° Tool, Test Cu 01

APPENDIX U

Variation of Resultant Direction

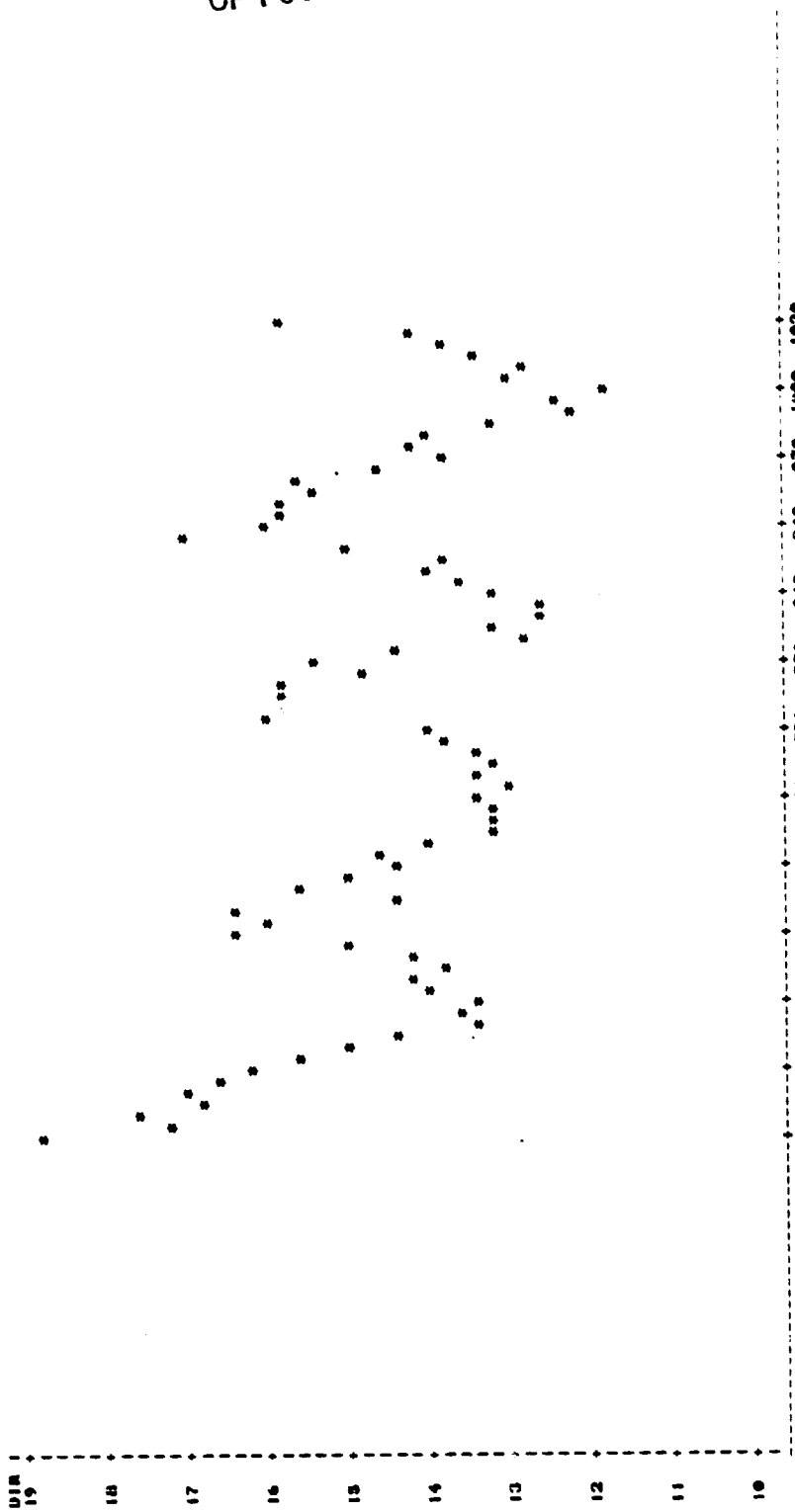

Figure U.1. Variation of Resultant Direction With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 1

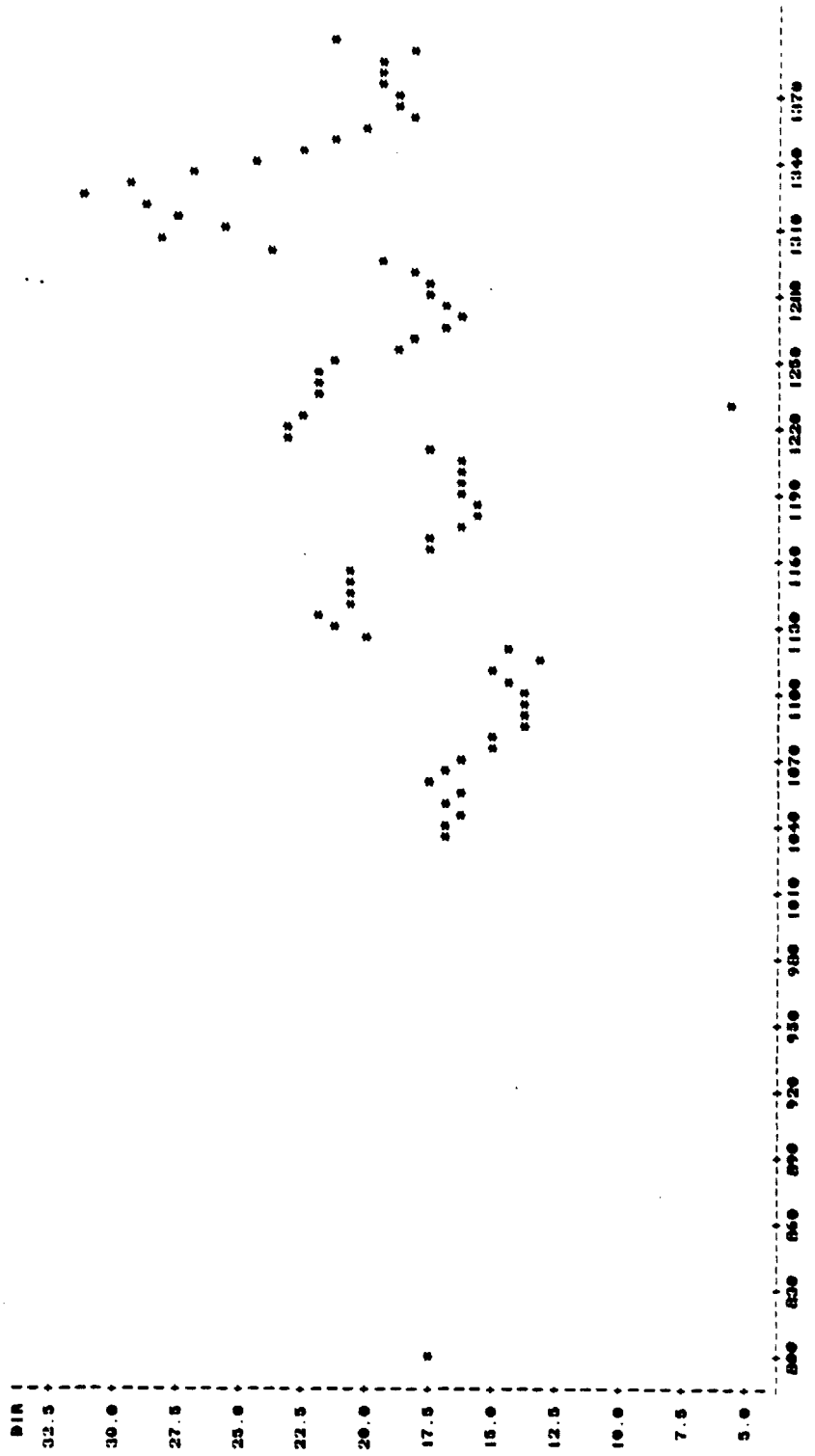

Figure U.2. Variation of Resultant Direction With Orientation for Aluminum With 30° Tool, Test Al 63, Revolution 2

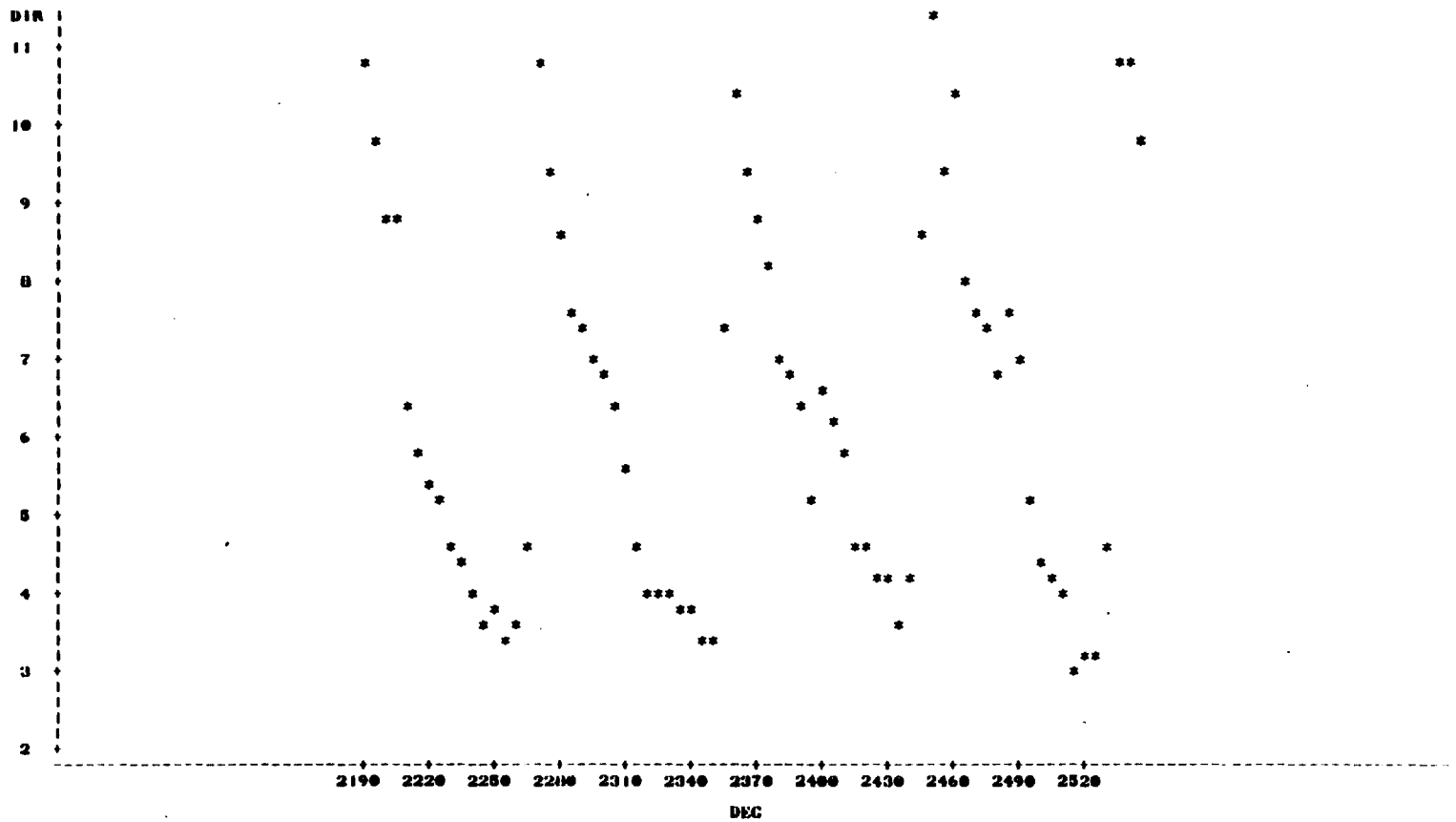

Figure U.3. Variation of Resultant Direction With Orientation for Aluminum With 40° Tool, Test A1 56, Revolution 2

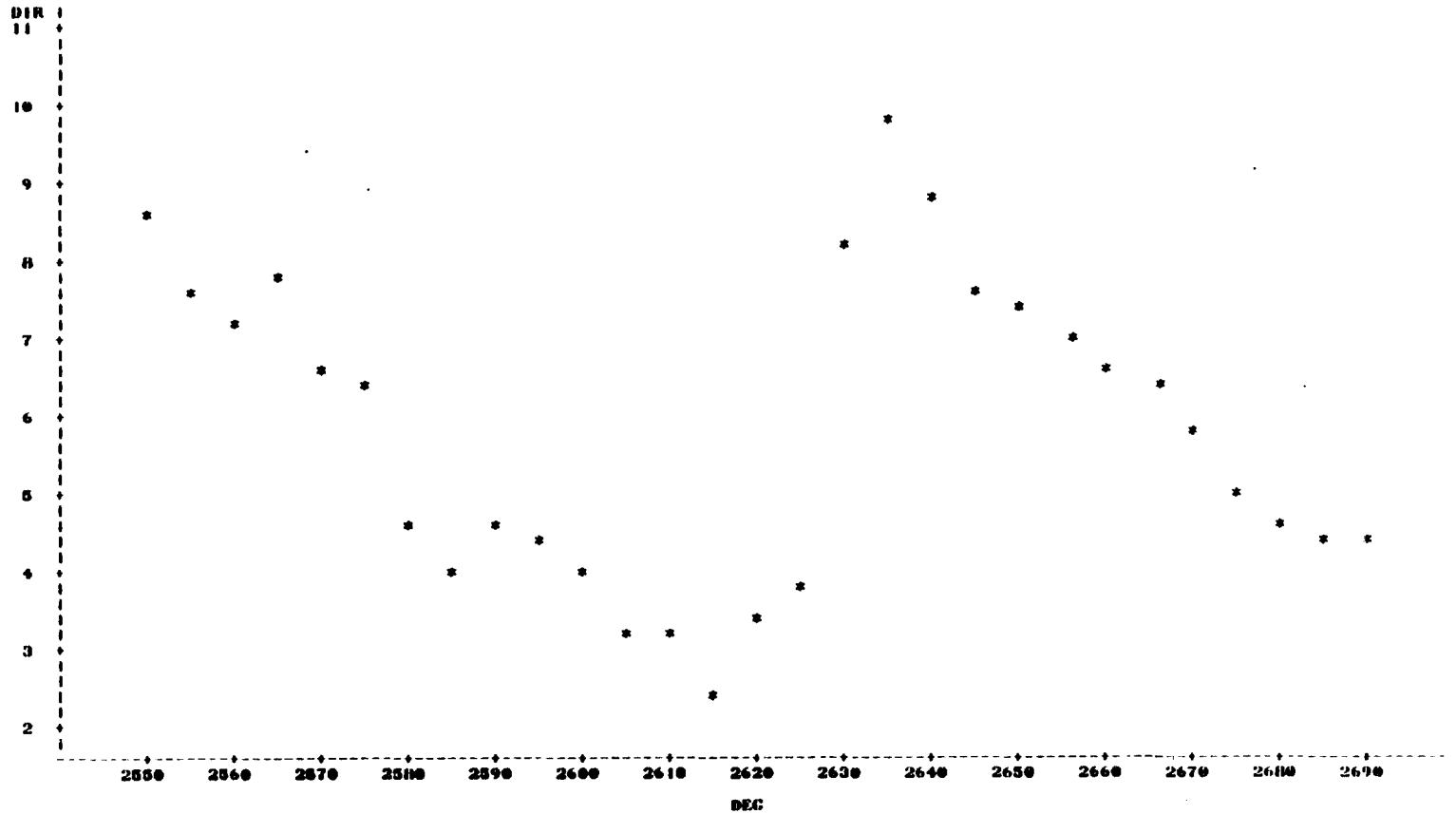

Figure U.4. Variation of Resultant Direction With Orientation for Aluminum With 40° Tool, Test A1 56, Revolution 3

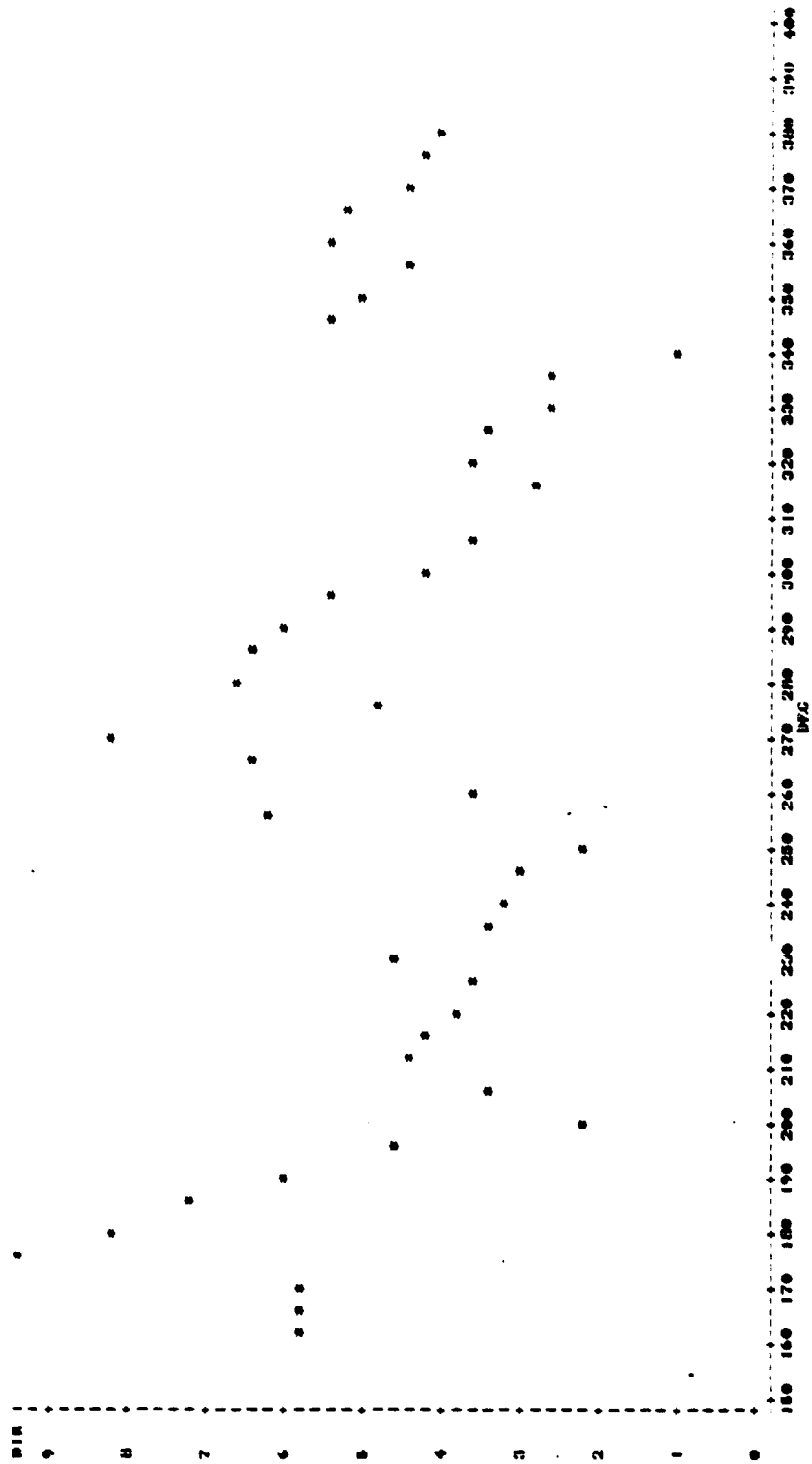

Figure U.5. Variation of Resultant Direction With Orientation for Aluminum With 40° Tool, Test Al 03

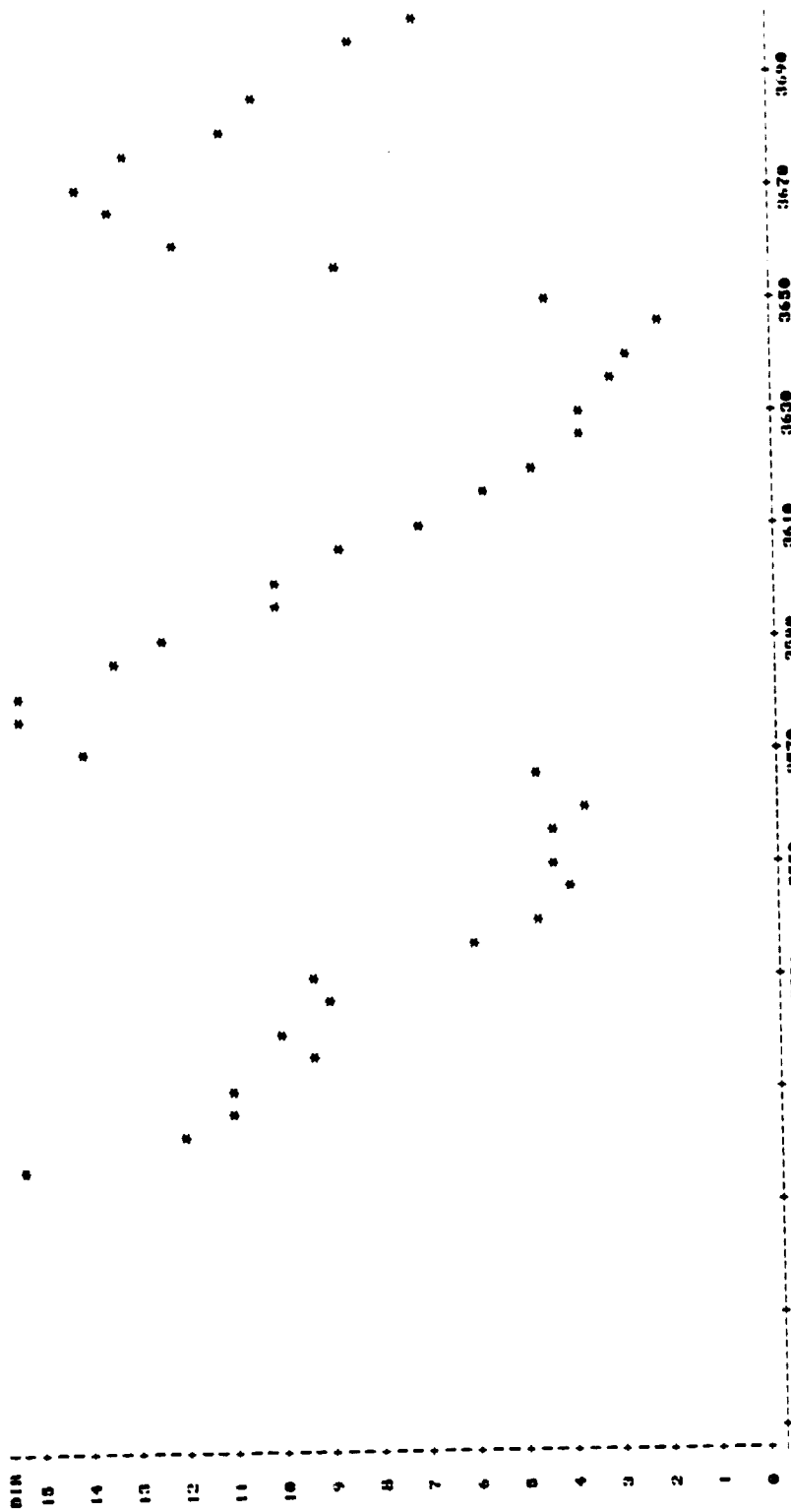

Figure U.6. Variation of Resultant Direction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 1

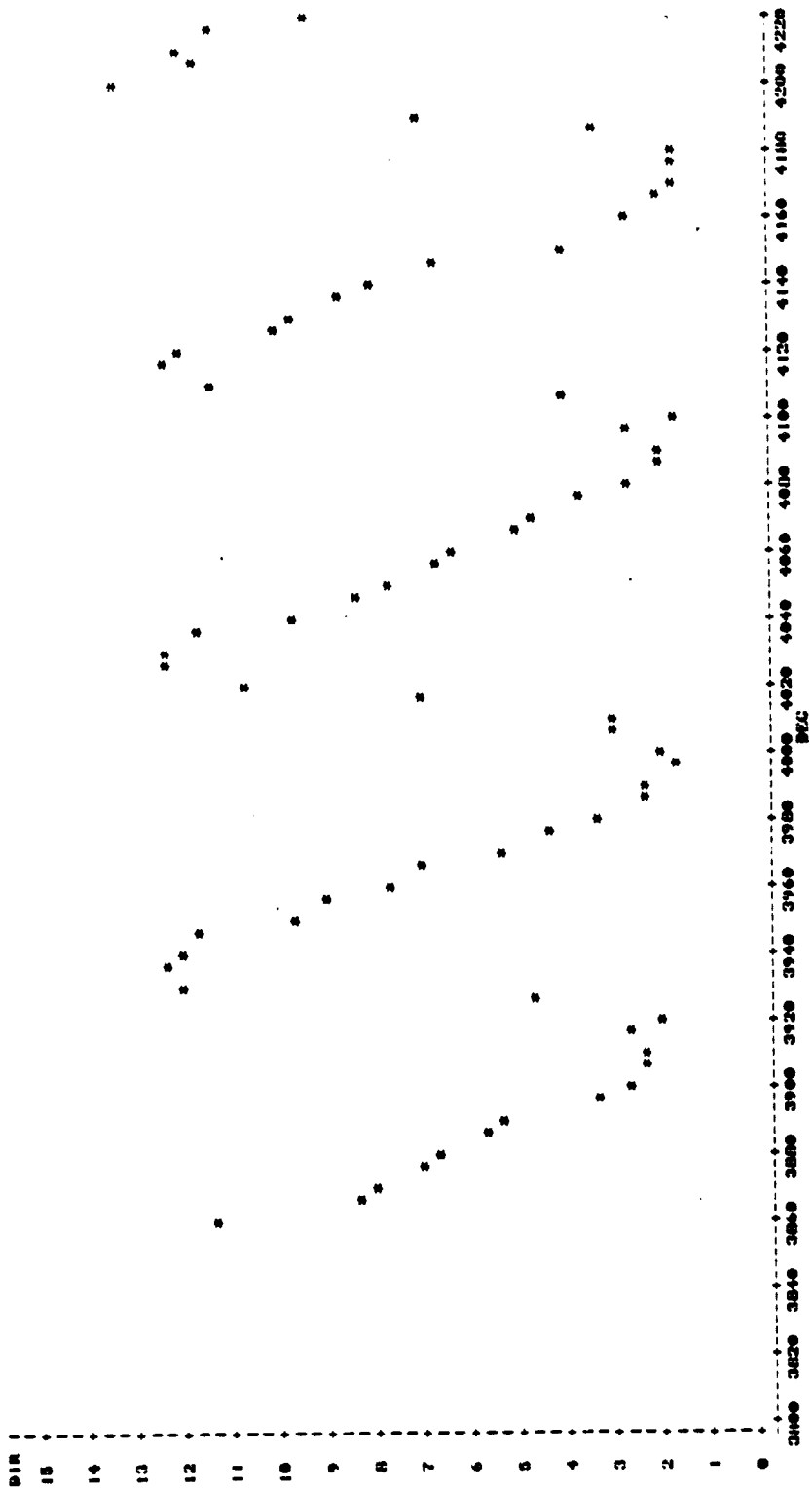

Figure U.7. Variation of Resultant Direction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 2

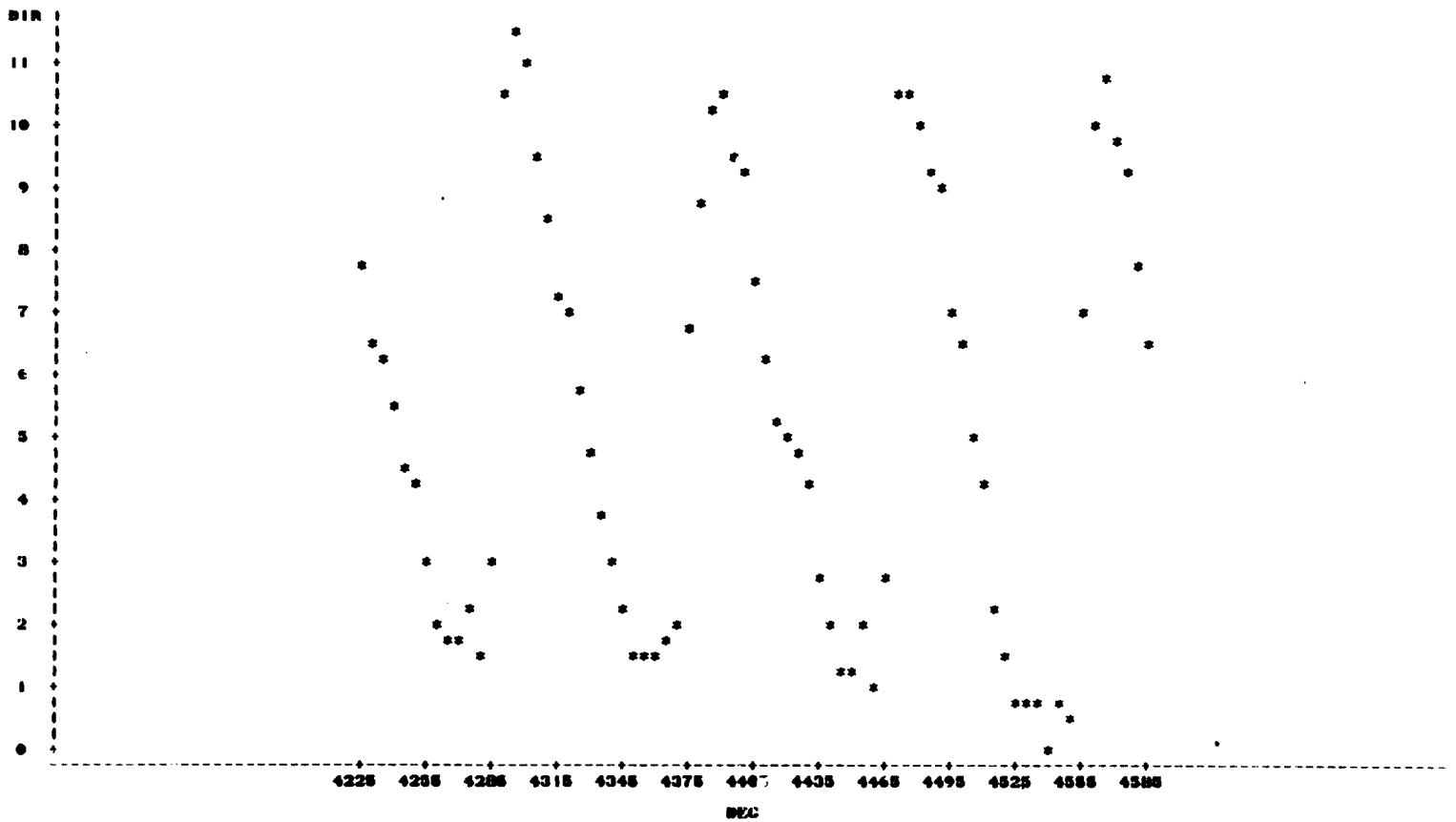

Figure U.8. Variations of Resultant Direction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 3

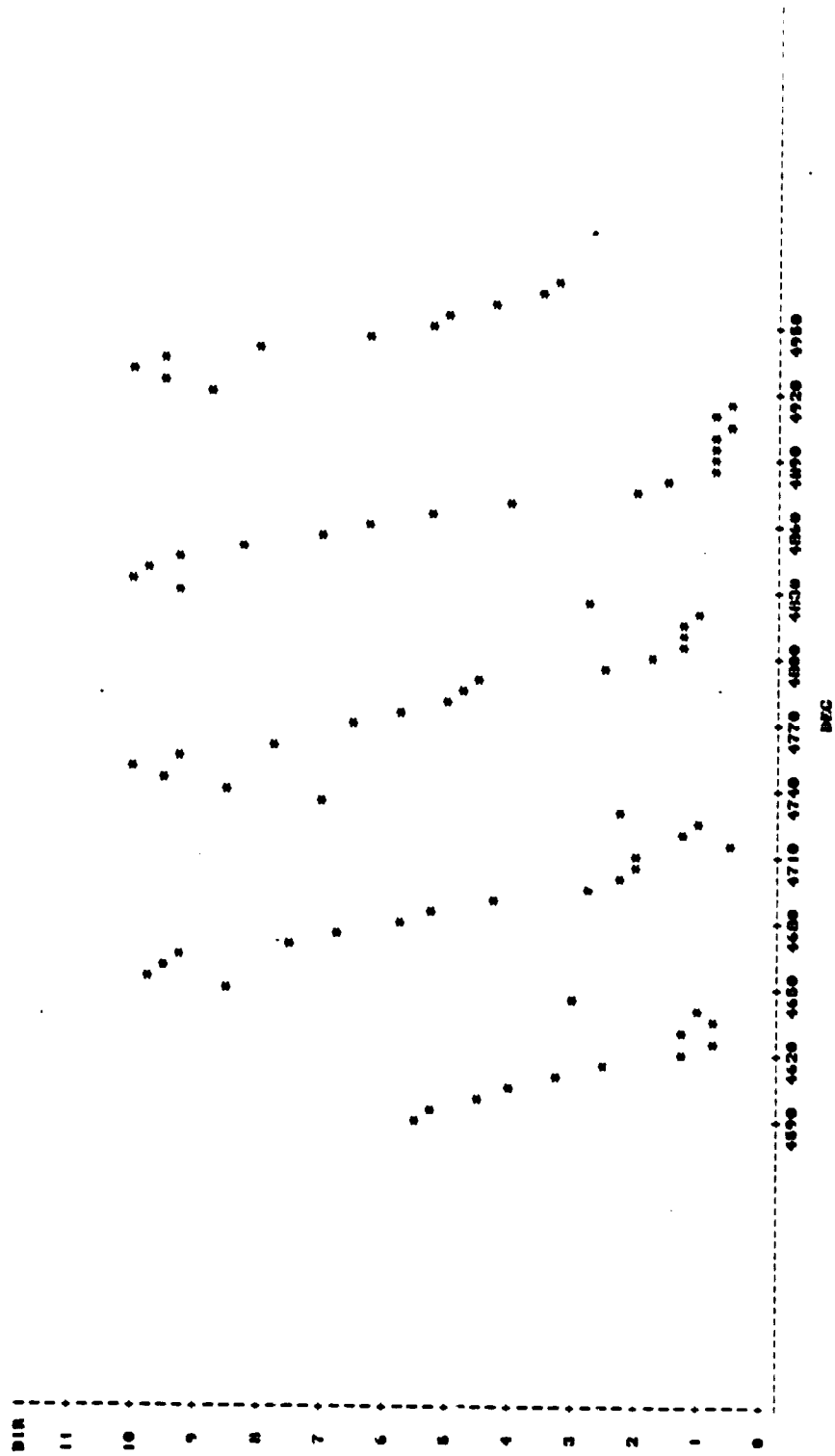

Figure U.9. Variation of Resultant Direction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 4

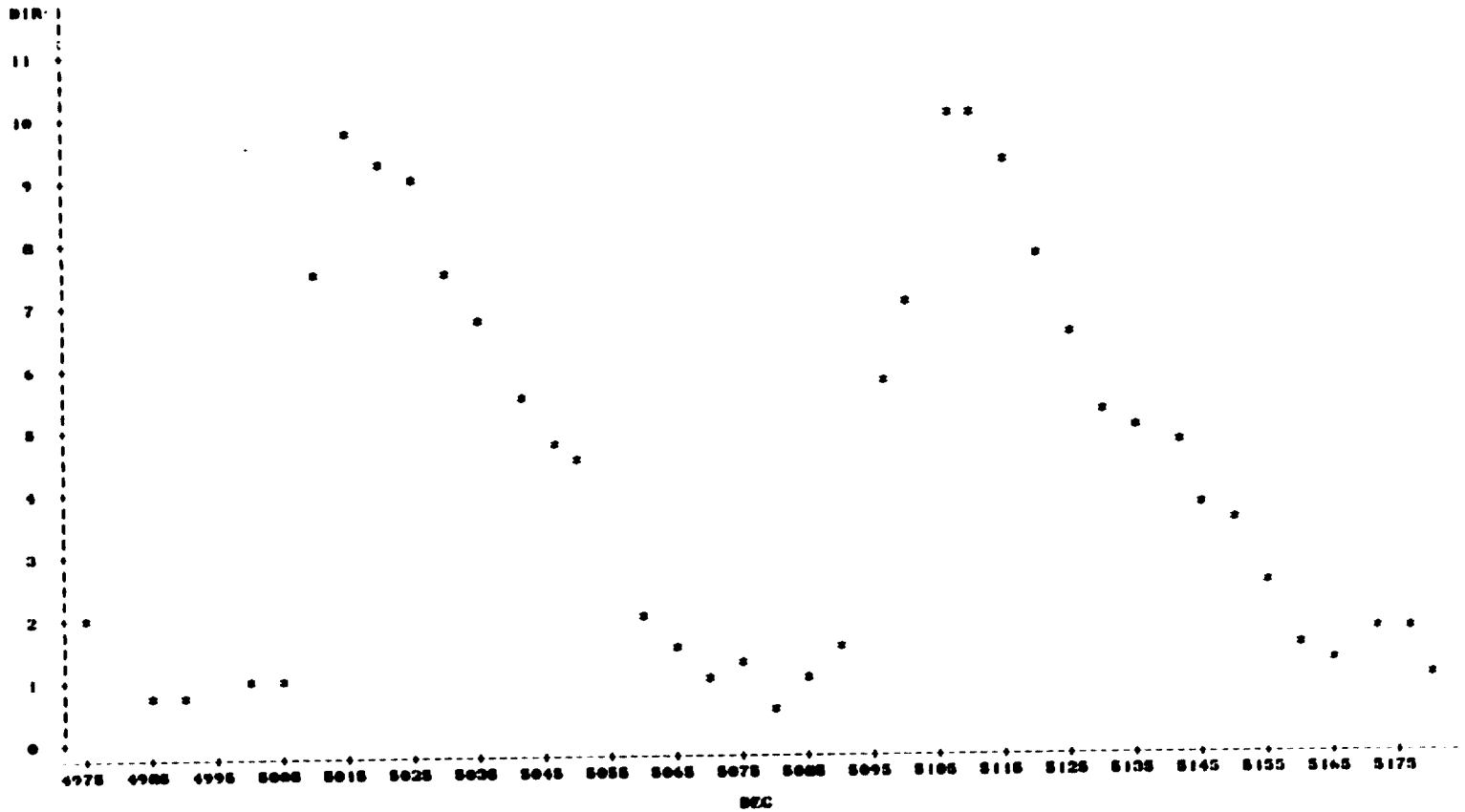

Figure U.10. Variation of Resultant Direction With Orientation for Aluminum With 50° Tool, Test Al 57, Revolution 5

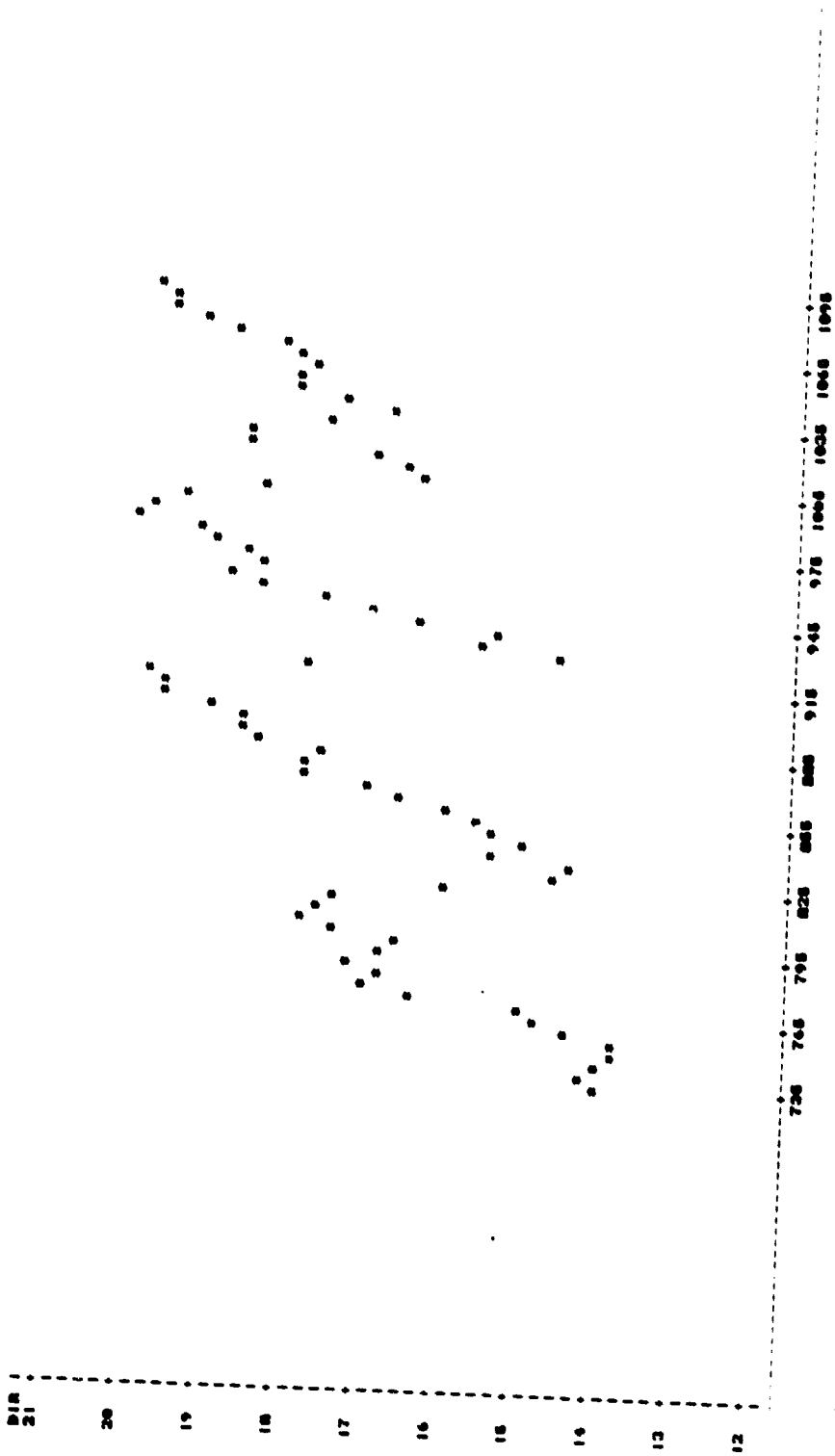

Figure U.11. Variation of Resultant Direction With Orientation for Copper With 20° Tool, Test Cu 06

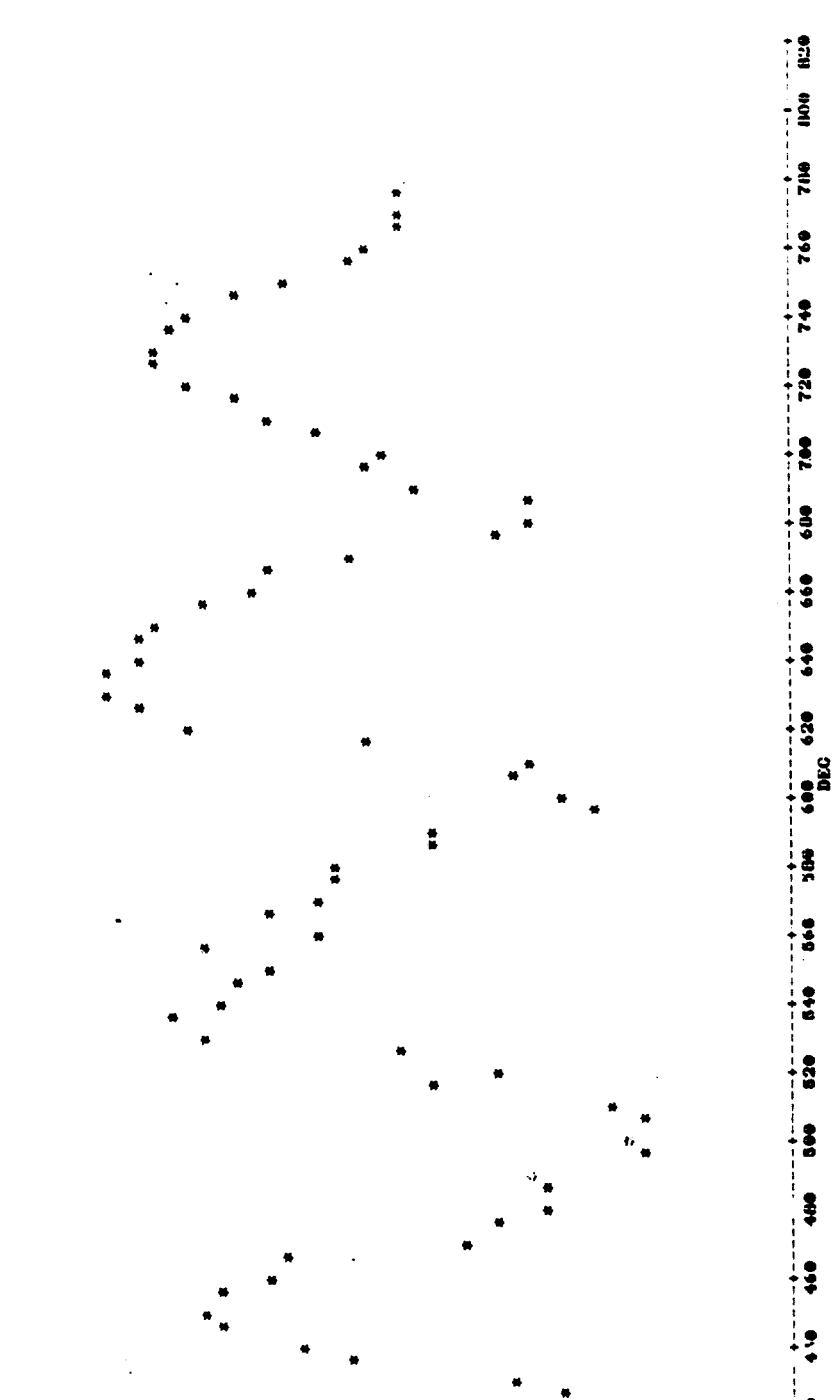

Figure U.12. Variation of Resultant Direction With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 1

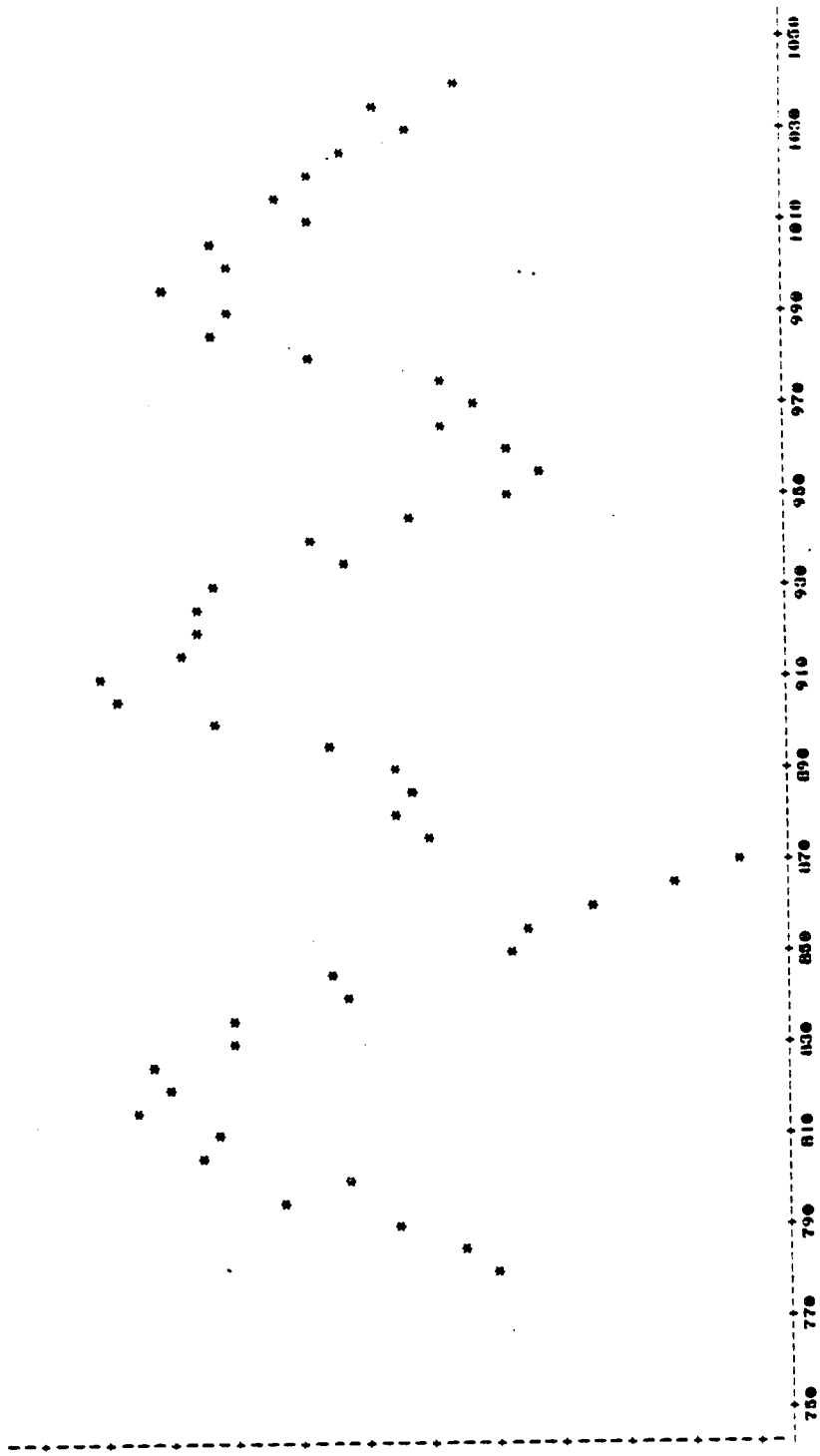

Figure U.13. Variation of Resultant Direction With Orientation for Copper With 20° Tool, Test Cu 33, Revolution 2

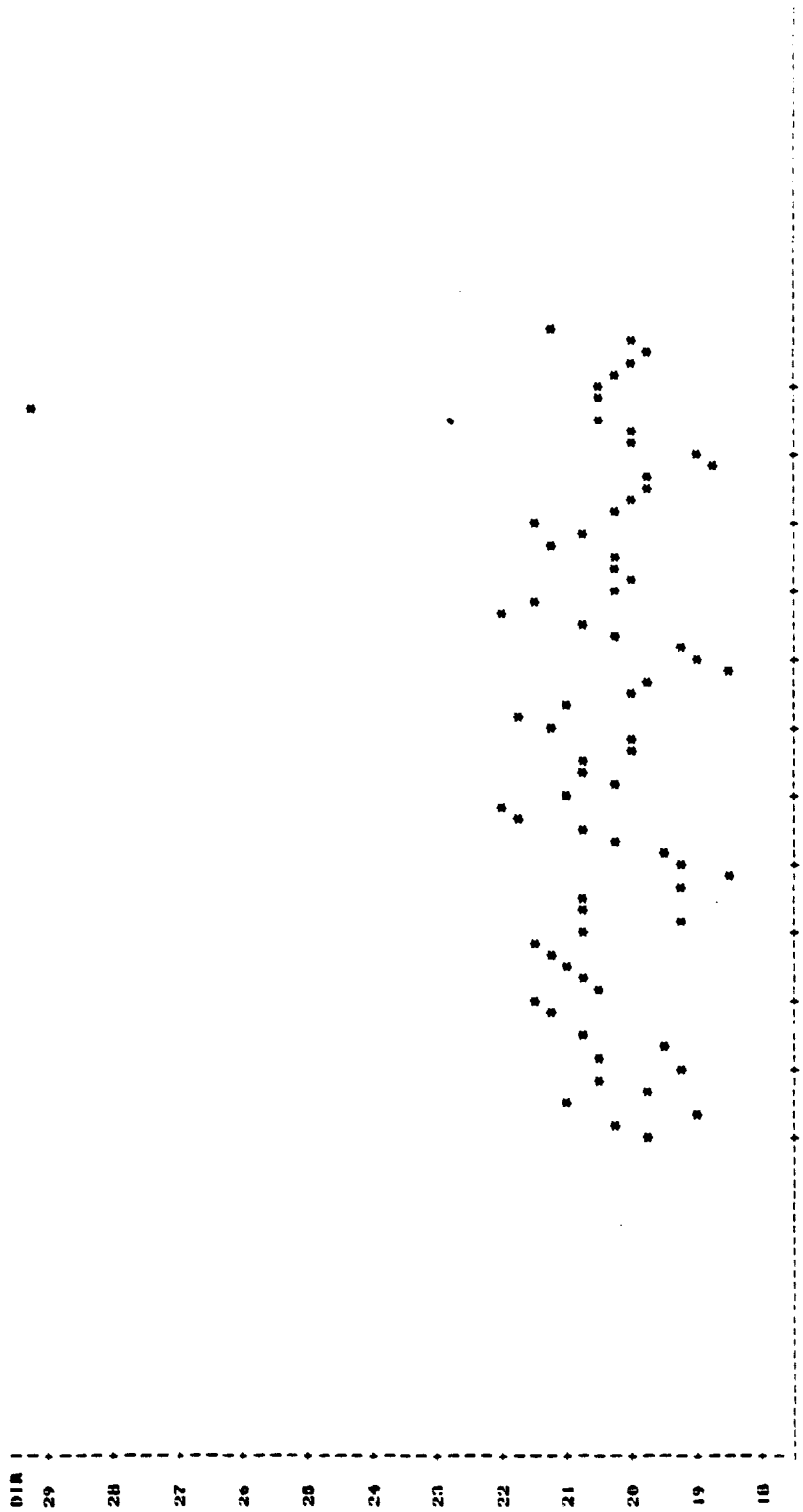

Figure U.14. Variation of Resultant Direction With Orientation for Copper With 40° Tool, Test Cu 01