" *God is the greatest mathematican* "

Albert Einstein

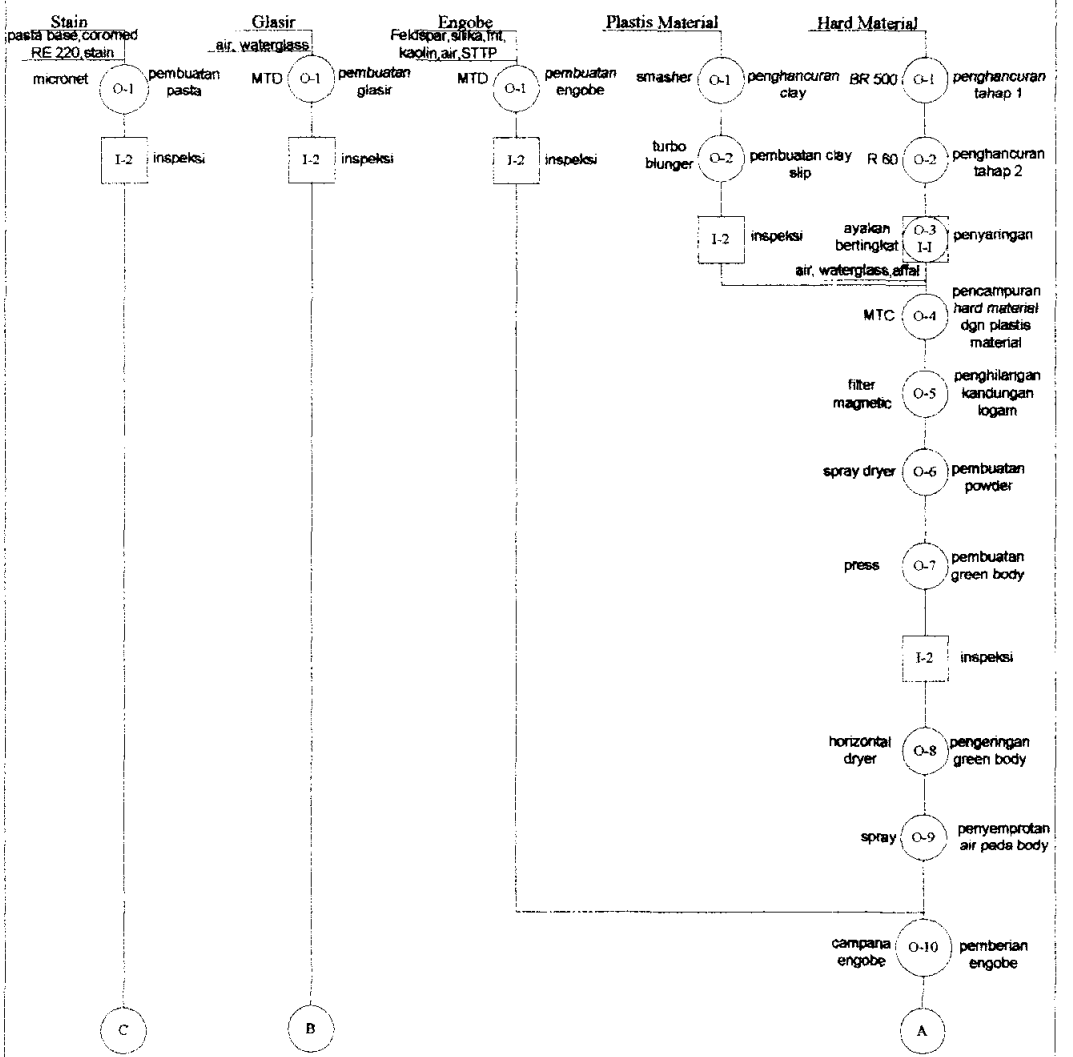
Anda tidak bisa memilih bagaimana dan kapan anda akan mati.
Anda hanya bisa memutuskan bagaimana anda akan hidup.

Joan Baez

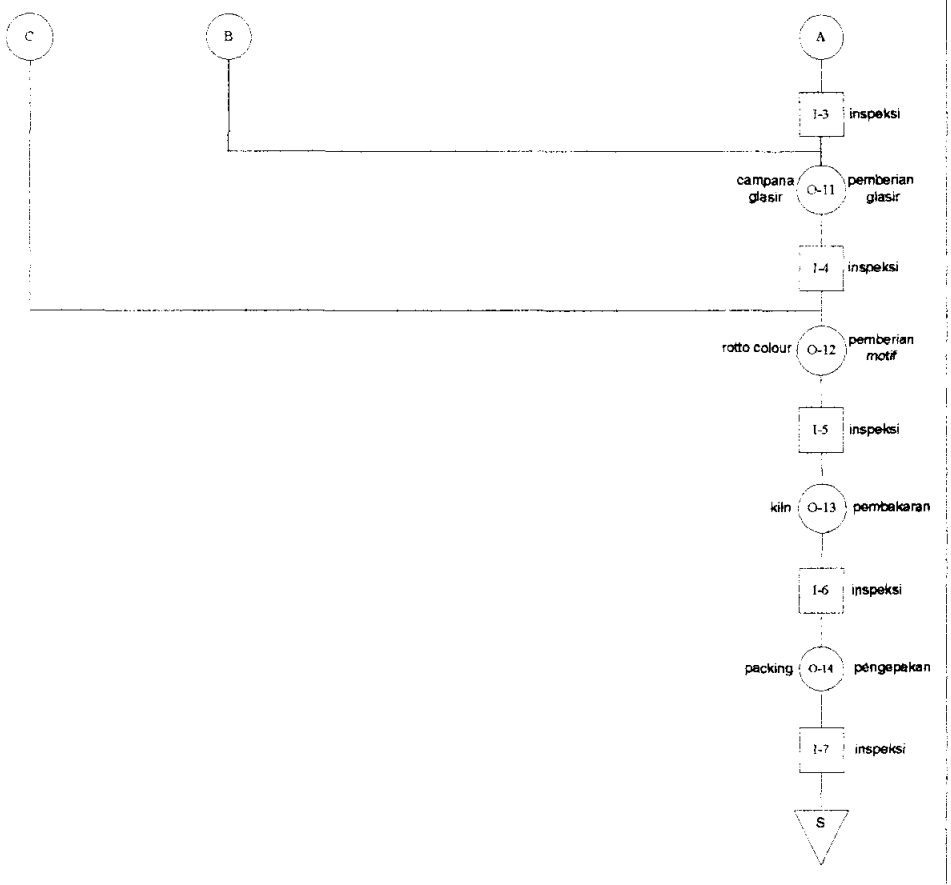
LAMPIRAN

Lampiran A1. *Operation Process Chart*

OPERATION PROSES CHART		WORKER/MATERIAL/ EQUIPMENT TYPE
CHART NO.1	SHEET NO. 1	OF 2
SUBJECT CHARTED: Pembuatan ubin keramik		
ACTIVITY: Pembuatan ubin keramik		
METHOD: PRESENT LOCATION: DEPT. PRODUKSI		
OPERATIVE(S) NO: 52 ORANG	CLOCK: 07.30 - 15.30	
CHARTED BY: RENATA	DATE: 21-10-2002	
APPROVED BY: HUI FENG	DATE: 22-10-2002	



OPERATION PROSES CHART		~~WORKER/~~MATERIAL/ ~~EQUIPMENT~~ TYPE
CHART NO.1	SHEET NO. 2	OF 2
SUBJECT CHARTED: Pembuatan ubin keramik		
ACTIVITY: Pembuatan ubin keramik		
METHOD: PRESENT LOCATION: DEPT. PRODUKSI		
OPERATIVE(S) NO: 52 ORANG	CLOCK: 07.30 - 15.30	
CHARTED BY: RENATA	DATE: 21-10-2002	
APPROVED BY: *HUI FENG*	DATE: 22-10-2002	



Lampiran A2. Data Jumlah Produk Cacat Bulan September 2002						
No	Visual Kw B	Visual Kw C	Ukuran Kw B	Ukuran Kw C	Planar Kw B	Planar Kw C
1	954	488	159	264	0	0
2	1680	684	31	19	2	5
3	1169	477	148	139	0	0
4	1189	1120	143	253	3	1
5	2650	1439	166	23	0	0
6	945	741	50	22	9	1
7	92	938	68	39	13	10
8	1052	2275	520	112	9	2
9	91	570	43	63	0	0
10	624	1911	12	17	1	2
11	58	857	44	11	28	12
12	1006	685	173	65	3	1
13	423	141	60	361	0	0
14	7	628	175	885	4	0
15	206	1163	109	135	5	0
16	220	540	43	31	9	1
17	126	98	2	0	0	0
18	1716	478	118	67	10	2
19	664	259	252	71	19	2
20	52	130	46	47	0	0
21	1005	429	19	33	0	1
22	2517	1500	84	79	4	0
23	568	389	4	1	0	0
24	78	1161	99	290	7	2
25	125	630	72	164	0	0
26	646	1488	89	26	3	0
27	31	813	3	6	2	1
28	483	76	19	18	2	0
29	574	955	51	55	0	0
30	55	1243	56	79	2	2
31	267	1195	253	138	3	1
32	1896	172	100	3	0	0
33	506	1182	142	361	40	8
34	1698	1053	71	31	3	0
35	1313	1521	70	46	53	30
36	213	282	73	10	1	0

37	763	913	131	512	13	12
38	18	295	35	70	0	0
39	306	1789	140	409	14	0
40	1386	956	145	509	24	2
41	92	33	0	4	0	0
42	558	1642	13	27	14	2
43	62	650	35	28	24	4
44	101	559	13	2	1	0
45	3336	1045	316	147	1	2
46	830	513	47	10	2	0
47	197	246	170	39	1	1
48	624	808	152	83	2	1
49	502	114	128	169	3	1
50	100	463	6	11	0	0
51	408	16	0	24	0	0
52	659	647	41	26	0	0
53	346	468	135	15	0	1
54	932	807	60	35	0	1
55	4	832	52	40	0	0
56	13	797	22	15	0	1
57	518	807	51	44	3	5
58	191	568	11	20	0	1
59	1249	1505	58	29	3	0
60	1015	1370	152	38	5	0
61	410	448	29	22	9	1
62	2617	1808	384	33	1	1
63	392	746	177	79	1	0
64	783	2692	68	51	1	1
65	214	648	212	28	7	1
66	280	1751	207	628	16	5
67	371	383	105	23	0	0
68	677	250	87	90	1	0
69	13	295	9	2	0	0
70	894	831	108	35	0	1
71	400	2884	349	186	20	2
72	931	214	101	56	1	0
73	1889	1543	253	149	1	4
74	21	253	13	34	0	0

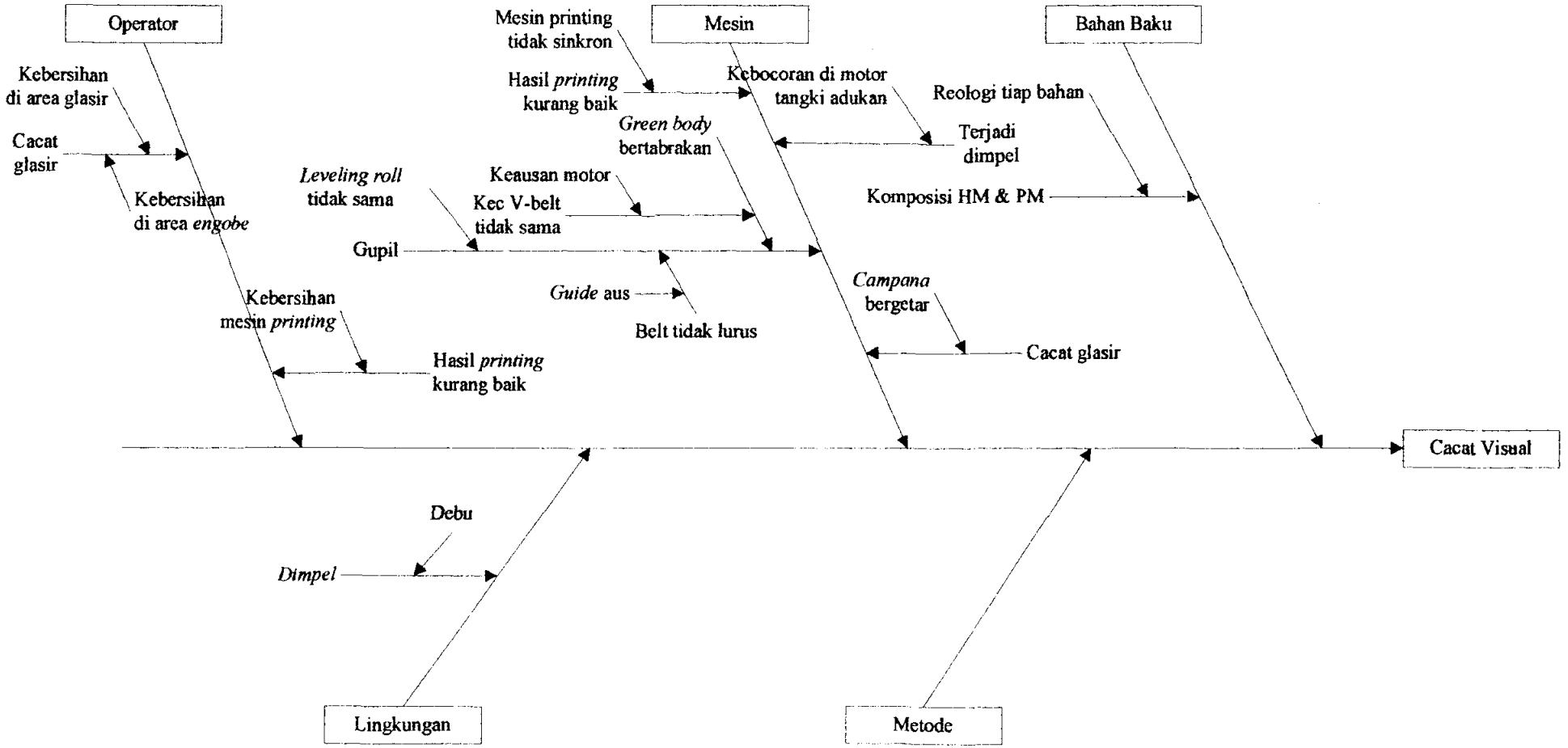
75	389	1270	113	54	34	1
76	61	196	7	6	1	1
77	161	461	37	28	1	0
78	371	177	16	7	1	0
79	2212	1156	528	404	0	3
80	935	662	132	24	0	0
81	270	832	128	11	1	0
82	193	877	64	63	2	3
83	1	365	1	5	0	0
84	5	1205	278	11	1	1
85	239	1160	83	63	3	0
86	716	244	59	2	0	0
87	2	155	72	8	0	1
88	63	733	95	135	20	2
89	328	256	169	241	2	1
90	41	969	885	90	7	0
91	490	1227	21	27	1	0
92	1061	1149	282	76	1	1
93	119	81	20	16	0	0
94	1372	1288	127	118	1	0
95	299	148	686	12	0	0
96	1746	1556	1680	1611	43	6
97	299	354	64	43	0	2
98	686	502	5	17	0	0
99	1508	1099	272	48	1	1
100	137	1507	14	9	0	0
101	1235	941	120	94	1	1
102	41	608	84	27	1	0
103	42	1813	130	23	0	0
104	77	1699	90	61	1	0
105	439	287	54	47	0	0
106	1392	1046	77	64	0	3
107	555	355	60	31	0	2
108	3600	439	73	20	0	0
109	974	501	77	41	1	0
110	1464	32	54	61	0	0
111	723	351	16	10	0	0
112	468	995	105	107	0	0

113	80	385	82	437	3	0
114	250	298	135	40	0	0
115	560	291	54	24	0	0
116	21	383	194	10	0	0
117	3127	1118	68	53	0	0
118	833	46	65	170	3	0
119	212	104	67	74	1	0
120	36	259	10	0	0	0
121	1374	373	174	331	3	0
122	196	2668	947	1559	40	7
123	770	247	305	18	0	0
124	10	59	28	69	0	0
125	381	66	54	60	0	0
126	188	1983	1760	368	0	0
127	390	563	501	34	0	0
128	1904	41	555	479	0	0
129	558	625	36	37	1	0
130	65	333	47	36	0	0
131	428	674	307	111	0	0
132	1457	1566	379	719	3	4
133	0	186	100	21	0	0
134	27	1506	246	17	1	0
135	73	772	306	55	13	6
136	829	478	248	29	0	0
137	52	757	62	39	1	1
138	7	946	520	486	1	1
139	293	288	130	28	2	0
140	714	214	115	12	0	0
141	1108	184	159	114	1	1
142	583	97	106	38	0	1
143	203	395	6	7	0	1
144	331	42	101	109	0	0
145	1323	2830	41	13	16	0
146	43	1109	70	273	1	1
147	0	532	3	9	0	2
148	0	310	0	2	0	0
149	3	937	135	58	0	0
150	4	678	142	130	0	2

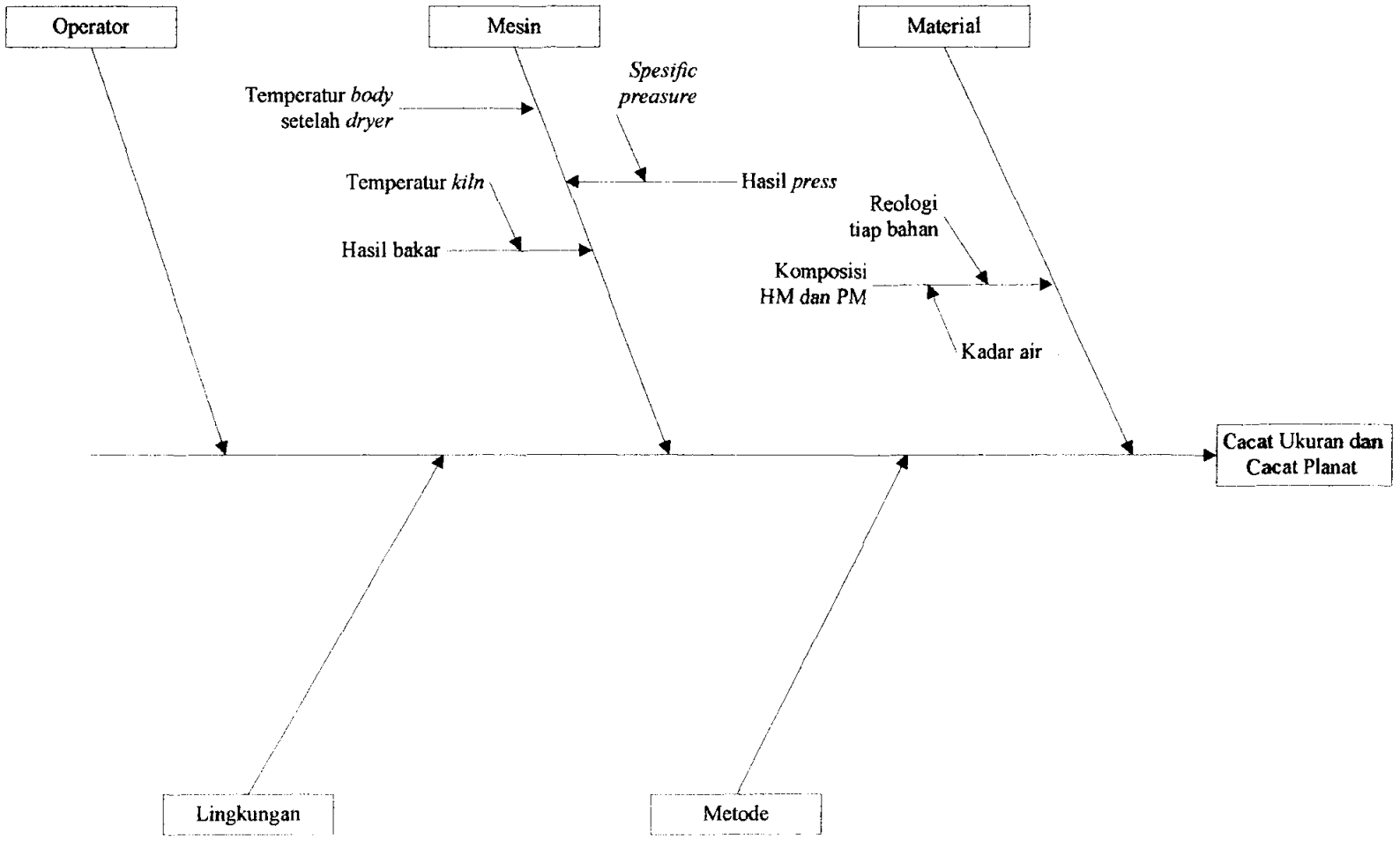
151	27	282	5	21	3	4
152	166	653	81	93	0	0
153	17	28	7	4	0	0
154	15	685	321	133	1	2
155	1281	302	71	25	0	0
156	12	429	85	46	0	0
157	331	544	130	146	0	0
158	0	952	281	112	0	1
159	40	1404	300	62	0	1
160	23	477	75	91	0	2
161	30	1267	251	283	1	0
162	417	843	210	65	2	0
163	177	792	5	9	1	1
164	18	1367	135	109	0	0
165	471	871	135	158	1	0
166	510	318	116	15	0	1
167	1139	1158	321	57	2	1
168	18	463	125	8	0	1
169	78	159	70	9	0	0
170	730	3468	335	50	0	2
171	606	345	12	7	0	0
172	584	442	149	34	0	0
173	612	1421	312	169	1	0
174	38	154	0	5	0	0
175	6	574	233	55	0	0
176	19	723	359	176	2	1
177	161	601	925	1056	3	1
178	0	282	114	41	1	0
179	130	1422	410	332	0	0
180	83	1475	291	20	3	1
181	93	1873	234	121	4	4
182	2	1568	156	249	3	0
183	791	509	296	512	1	0
184	87	748	326	726	0	0
185	2	2064	281	77	2	0
186	11	515	23	12	0	0
187	451	928	530	496	1	0
188	11	703	262	172	1	1

189	290	2054	205	395	4	0
190	240	1017	340	4	1	0
191	7	158	60	15	0	0
192	12	2634	1200	21	2	3
193	19	1213	148	19	0	0
194	497	701	4	1	0	0
195	504	2918	1659	87	0	0
196	585	773	58	31	0	0
197	1080	59	186	115	0	0
198	29	975	7	3	1	0
199	490	1863	220	148	14	3
200	0	1307	252	90	0	0
201	2	478	77	34	0	3
202	11	3065	121	37	1	1
203	207	107	4	0	0	0
204	404	5811	330	267	62	9
205	1748	368	4	2	0	0
206	526	772	57	77	2	0
207	28	220	101	169	8	0
208	7	157	222	17	3	0
209	114	155	135	70	1	1
210	0	87	3	3	1	0
211	1733	1475	45	3	23	0
212	2323	207	620	111	225	3
213	437	148	110	7	41	11
214	1863	311	5	4	3	0
215	1260	780	150	50	13	2
216	2065	1213	258	87	14	2
217	176	261	37	5	15	1
218	209	1803	395	61	2	1
219	173	372	24	14	0	0
220	2996	109	149	21	59	0
221	390	342	150	15	81	8
222	8	810	53	8	0	0
223	573	2029	109	3	0	0
224	3	3105	46	83	0	2
225	12	1526	74	47	0	2
226	26	632	104	6	0	0

227	800	843	42	47	2	1
228	11	1022	238	167	0	0
229	2	385	118	8	0	0
230	64	1469	66	52	2	2
231	583	63	6	4	0	0
232	12	1916	31	3	0	0
233	2860	229	455	46	2	0
234	217	26	111	102	0	0
235	373	274	35	39	14	1
236	18	503	164	5	1	0
237	214	161	8	16	1	0
238	219	617	119	50	1	1
239	2	426	279	113	3	0
240	5	1457	148	255	0	0
Total	129762	199554	40132	26263	1252	271



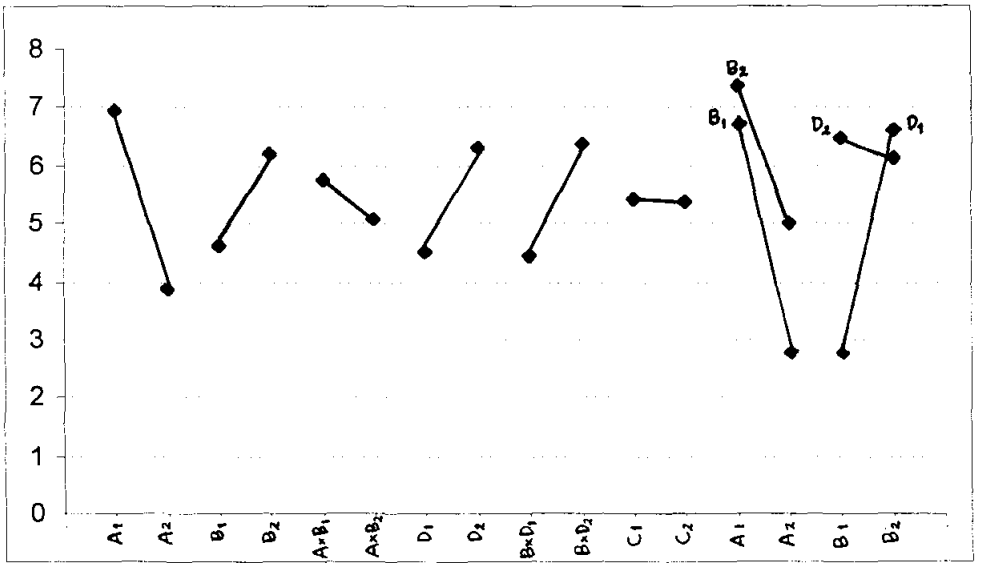
Lampiran B1. Diagram Ishikawa untuk Cacat Visual



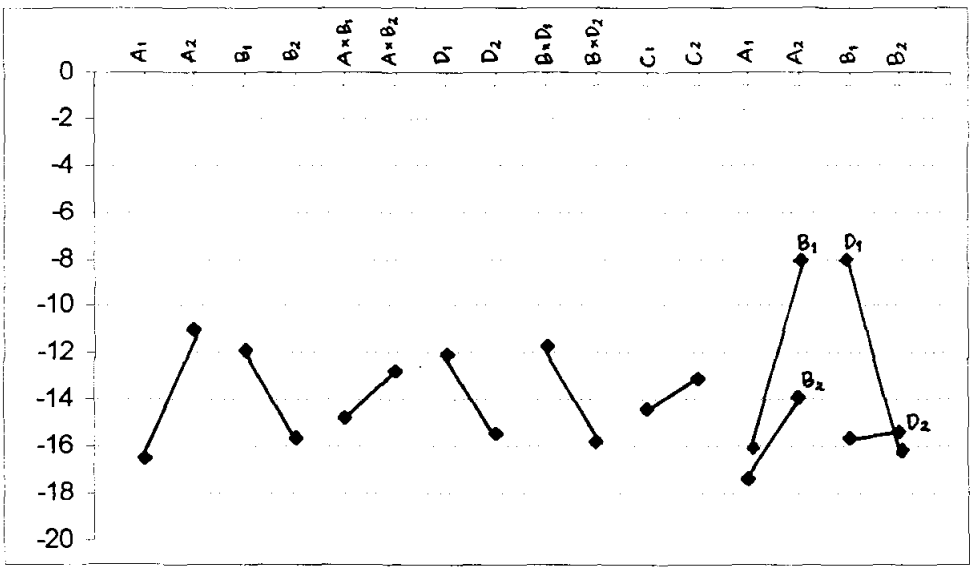
Lampiran B2. Diagram Ishikawa untuk Cacat Ukuran dan Cacat *Planar*

Lampiran C. Grafik Respon

Grafik Respon Untuk Rata-Rata Jumlah Produk Cacat



Grafik Respon Untuk Variabilitas Jumlah Produk Cacat



Lampiran D1. *Orthogonal Array*

L_4 (2^3)

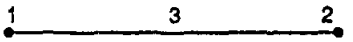
No.	1	2	3
1	1	1	1
2	1	2	2
3	2	1	2
4	2	2	1

L_8 (2^7)

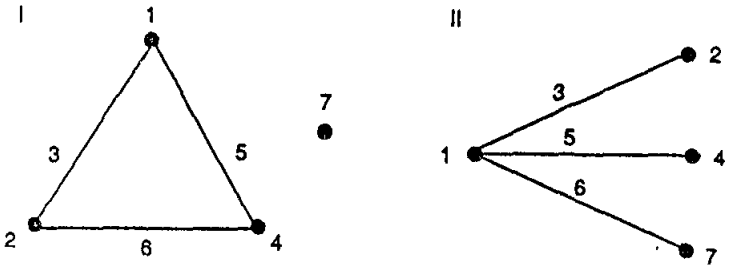
No.	1	2	3	4	5	6	7
1	1	1	1	1	1	1	1
2	1	1	1	2	2	2	2
3	1	2	2	1	1	2	2
4	1	2	2	2	2	1	1
5	2	1	2	1	2	1	2
6	2	1	2	2	1	2	1
7	2	2	1	1	2	2	1
8	2	2	1	2	1	1	2

Lampiran D2. *Linear Graphs*

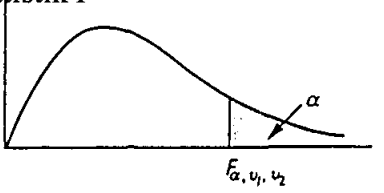
Linear Graph for L_4 (2^3)



Linear Graphs for L_8 (2^7)



Lampiran E. Tabel Statistik F



Values of F for a specified right tail area

		υ_1 = Degrees of Freedom for Numerator								
υ_2	α	1	2	3	4	5	6	7	8	9
	.100	39.9	49.5	53.6	55.8	57.2	58.2	58.9	59.4	59.9
	.050	161.4	199.5	215.7	224.6	230.2	234.0	236.8	238.4	240.5
1	.025	647.8	799.5	864.2	899.6	921.8	937.1	948.2	956.7	963.3
	.010	4052.2	4999.5	5403.4	5624.6	5763.6	5859.0	5928.4	5981.1	6022.5
	.001	40600.	50000.	54000.	56200.	57600.	58600.	59300.	59800.	60200.
	.100	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38
	.050	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38
2	.025	38.51	39.00	39.17	39.25	39.25	39.33	39.36	39.37	39.39
	.010	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39
	.001	998.50	999.00	999.17	999.30	999.30	999.36	999.36	999.37	999.39
	.100	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24
	.050	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81
3	.025	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47
	.010	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35
	.001	167.03	148.50	141.11	137.10	134.58	132.85	131.58	130.62	129.86
	.100	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94
	.050	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00
4	.025	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90
	.010	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66
	.001	74.14	61.25	56.18	53.44	51.71	50.53	49.66	49.00	48.47
	.100	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32
	.050	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77
5	.025	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68
	.010	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16
	.001	47.18	37.12	33.20	31.09	29.75	28.83	28.16	27.65	27.24
	.100	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96
	.050	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10
6	.025	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52
	.010	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98
	.001	35.51	27.00	23.70	21.92	20.80	20.03	19.46	19.03	18.69
	.100	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72
	.050	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68
7	.025	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82
	.010	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72
	.001	29.25	21.69	18.77	17.20	16.21	15.52	15.02	14.63	14.33
	.100	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56
	.050	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39
8	.025	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36
	.010	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91
	.001	25.41	18.49	15.83	14.39	13.48	12.86	12.40	12.05	11.77
	.100	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44
	.050	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18
9	.025	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03
	.010	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35
	.001	22.86	16.39	13.90	12.56	11.71	11.13	10.70	10.37	10.11
	.100	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35
	.050	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02
10	.025	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78
	.010	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94
	.001	21.04	14.91	12.55	11.28	10.48	9.93	9.52	9.20	8.96
	.100	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27
	.050	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90
11	.025	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59
	.010	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63
	.001	19.69	13.81	11.56	10.35	9.58	9.05	8.66	8.35	8.12

Source: Jerry Banks and Russell G. Meikes, *Handbook of Tables and Graphs for the Industrial Engineer and Manager*, © 1984, pp. 66–71. Reprinted by permission of Prentice Hall, Englewood Cliffs, New Jersey.

		ν_1 = Degrees of Freedom for Numerator								
ν_2	α	1	2	3	4	5	6	7	8	9
	.100	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21
	.050	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80
12	.025	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44
	.010	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39
	.001	18.64	12.97	10.80	9.63	8.89	8.38	8.00	7.71	7.48
	.100	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09
	.050	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59
15	.025	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12
	.010	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89
	.001	16.59	11.34	9.34	8.25	7.57	7.09	6.74	6.47	6.26
	.100	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00
	.050	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46
18	.025	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93
	.010	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60
	.001	15.38	10.39	8.49	7.46	6.81	6.35	6.02	5.76	5.56
	.100	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96
	.050	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39
20	.025	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84
	.010	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46
	.001	14.82	9.95	8.10	7.10	6.46	6.02	5.69	5.44	5.24
	.100	2.92	2.53	2.32	2.18	2.09	2.02	1.97	1.93	1.89
	.050	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28
25	.025	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68
	.010	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22
	.001	13.88	9.22	7.45	6.49	5.89	5.46	5.15	4.91	4.71
	.100	2.88	2.49	2.28	2.14	2.05	1.98	1.93	1.88	1.85
	.050	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21
30	.025	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57
	.010	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07
	.001	13.29	8.77	7.05	6.12	5.53	5.12	4.82	4.58	4.39
	.100	2.84	2.44	2.23	2.09	2.00	1.93	1.87	1.83	1.79
	.050	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12
40	.025	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45
	.010	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89
	.001	12.61	8.25	6.59	5.70	5.13	4.73	4.44	4.21	4.02
	.100	2.81	2.41	2.20	2.06	1.97	1.90	1.84	1.80	1.76
	.050	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07
50	.025	5.34	3.97	3.39	3.05	2.83	2.67	2.55	2.46	2.38
	.010	7.17	5.06	4.20	3.72	3.41	3.19	3.02	2.89	2.78
	.001	12.22	7.96	6.34	5.46	4.90	4.51	4.22	4.00	3.82
	.100	2.79	2.39	2.18	2.04	1.95	1.87	1.82	1.77	1.74
	.050	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04
60	.025	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33
	.010	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72
	.001	11.97	7.77	6.17	5.31	4.76	4.37	4.09	3.86	3.69
	.100	2.77	2.37	2.15	2.02	1.92	1.85	1.79	1.75	1.71
	.050	3.96	3.11	2.72	2.49	2.33	2.21	2.13	2.06	2.00
80	.025	5.22	3.86	3.28	2.95	2.73	2.57	2.45	2.35	2.28
	.010	6.96	4.88	4.04	3.56	3.26	3.04	2.87	2.74	2.64
	.001	11.67	7.54	5.97	5.12	4.58	4.20	3.92	3.70	3.53
	.100	2.76	2.36	2.15	2.01	1.91	1.84	1.78	1.74	1.70
	.050	3.95	3.10	2.71	2.47	2.32	2.20	2.11	2.04	1.99
90	.025	5.20	3.84	3.26	2.93	2.71	2.55	2.43	2.34	2.26
	.010	6.93	4.85	4.01	3.53	3.23	3.01	2.84	2.72	2.61
	.001	11.57	7.47	5.91	5.06	4.53	4.15	3.87	3.65	3.48

ν_2	α	ν_1 = Degrees of Freedom for Numerator: 1	2	3	4	5	6	7	8	9
	.100	2.76	2.36	2.14	2.00	1.91	1.83	1.78	1.73	1.69
	.050	3.94	3.09	2.70	2.46	2.31	2.19	2.10	2.03	1.97
100	.025	5.18	3.83	3.25	2.92	2.70	2.54	2.42	2.32	2.24
	.010	6.90	4.82	3.98	3.51	3.21	2.99	2.82	2.69	2.59
	.001	11.50	7.41	5.86	5.02	4.48	4.11	3.83	3.61	3.44
	.100	2.71	2.30	2.08	1.95	1.85	1.77	1.72	1.67	1.63
	.050	3.84	3.00	2.61	2.37	2.21	2.10	2.01	1.94	1.88
∞	.025	5.02	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11
	.010	6.64	4.61	3.77	3.32	3.02	2.80	2.64	2.51	2.41
	.001	10.81	6.85	5.43	4.61	4.15	3.78	3.50	3.29	3.12

ν_2	α	ν_1 = Degrees of Freedom for Numerator: 10	15	20	25	30	50	75	100	∞
	.100	60.2	61.2	61.7	62.1	62.3	62.7	62.9	63.0	63.3
	.050	241.9	245.9	248.0	249.3	250.1	251.8	258.8	253.0	280.7
1	.025	968.6	984.9	993.1	998.1	1001.4	1008.1	1011.5	1013.2	1018.0
	.010	6055.8	6157.3	6208.7	6329.8	6260.6	6302.5	6323.6	6334.1	6366.0
	.001	60600.	61600.	62100.	62400.	62500.	63000.	63200.	63300.	63700.
	.100	9.39	9.42	9.44	9.45	9.46	9.47	9.48	9.48	9.49
	.050	19.40	19.43	19.45	19.46	19.46	19.48	19.48	19.49	19.51
2	.025	39.40	39.43	39.45	39.46	39.46	39.48	39.48	39.49	39.50
	.010	99.40	99.43	99.45	99.46	99.47	99.48	99.49	99.49	99.64
	.001	999.40	999.43	999.45	999.46	999.47	999.48	999.49	999.49	999.49
	.100	5.23	5.20	5.18	5.17	5.17	5.15	5.15	5.14	5.13
	.050	8.79	8.70	8.66	8.63	8.62	8.58	8.56	8.55	8.53
3	.025	14.42	14.25	14.17	14.12	14.08	14.01	13.97	13.96	13.90
	.010	27.23	26.87	26.69	26.58	26.50	26.35	26.28	26.24	26.14
	.001	129.25	127.37	126.42	125.84	125.45	124.66	124.27	124.07	124.00
	.100	3.92	3.87	3.84	3.83	3.82	3.80	3.78	3.78	3.76
	.050	5.96	5.86	5.80	5.77	5.75	5.70	5.68	5.66	5.63
4	.025	8.84	8.66	8.56	8.50	8.46	8.38	8.34	8.32	8.27
	.010	14.55	14.20	14.02	13.91	13.84	13.69	13.61	13.58	13.47
	.001	48.05	46.76	46.10	45.70	45.43	44.88	44.61	44.47	44.46
	.100	3.30	3.24	3.21	3.19	3.17	3.15	3.13	3.13	3.11
	.050	4.74	4.62	4.56	4.52	4.50	4.44	4.42	4.41	4.37
5	.025	6.62	6.43	6.33	6.27	6.23	6.14	6.10	6.08	6.02
	.010	10.05	9.72	9.55	9.45	9.38	9.24	9.17	9.13	9.04
	.001	26.92	25.91	25.39	25.08	24.87	24.44	24.22	24.12	23.98
	.100	2.94	2.87	2.84	2.81	2.80	2.77	2.75	2.75	2.72
	.050	4.06	3.94	3.87	3.83	3.81	3.75	3.73	3.71	3.67
6	.025	5.46	5.27	5.17	5.11	5.07	4.98	4.94	4.92	4.85
	.010	7.87	7.56	7.40	7.30	7.23	7.09	7.02	6.99	6.88
	.001	18.41	17.56	17.12	16.85	16.67	16.31	16.12	16.03	15.92
	.100	2.70	2.63	2.59	2.57	2.56	2.52	2.51	2.50	2.47
	.050	3.64	3.51	3.44	3.40	3.38	3.32	3.29	3.27	3.23
7	.025	4.76	4.57	4.47	4.40	4.36	4.28	4.23	4.21	4.15
	.010	6.62	6.31	6.16	6.06	5.99	5.86	5.79	5.75	5.66
	.001	14.08	13.32	12.93	12.69	12.53	12.20	12.04	11.95	11.72
	.100	2.54	2.46	2.42	2.40	2.38	2.35	2.33	2.32	2.29
	.050	3.35	3.22	3.15	3.11	3.08	3.02	2.99	2.97	2.93
8	.025	4.30	4.10	4.00	3.94	3.89	3.81	3.76	3.74	3.67
	.010	5.81	5.52	5.36	5.26	5.20	5.07	5.00	4.96	4.85
	.001	11.54	10.84	10.48	10.26	10.11	9.80	9.65	9.57	9.41

		ν_1 = Degrees of Freedom for Numerator								
ν_2	α	10	15	20	25	30	50	75	100	∞
	.100	2.42	2.34	2.30	2.27	2.25	2.22	2.20	2.19	2.16
	.050	3.14	3.01	2.94	2.89	2.86	2.80	2.77	2.76	2.71
9	.025	3.96	3.77	3.67	3.60	3.56	3.47	3.43	3.40	3.33
	.010	5.26	4.96	4.81	4.71	4.65	4.52	4.45	4.41	4.31
	.001	9.89	9.24	8.90	8.69	8.55	8.26	8.11	8.04	7.93
	.100	2.32	2.24	2.20	2.17	2.16	2.12	2.10	2.09	2.06
	.050	2.98	2.85	2.77	2.73	2.70	2.64	2.60	2.59	2.54
10	.025	3.72	3.52	3.42	3.35	3.31	3.22	3.18	3.15	3.08
	.010	4.85	4.56	4.41	4.31	4.25	4.12	4.05	4.01	3.91
	.001	8.75	8.13	7.80	7.60	7.47	7.19	7.05	6.98	6.92
	.100	2.25	2.17	2.12	2.10	2.08	2.04	2.02	2.01	1.97
	.050	2.85	2.72	2.65	2.60	2.57	2.51	2.47	2.46	2.40
11	.025	3.53	3.33	3.23	3.16	3.12	3.03	2.98	2.96	2.88
	.010	4.54	4.25	4.10	4.01	3.94	3.81	3.74	3.71	3.61
	.001	7.92	7.32	7.01	6.81	6.68	6.42	6.28	6.21	6.05
	.100	2.19	2.10	2.06	2.03	2.01	1.97	1.95	1.94	1.90
	.050	2.75	2.62	2.54	2.50	2.47	2.40	2.37	2.35	2.30
12	.025	3.37	3.18	3.07	3.01	2.96	2.87	2.82	2.80	2.73
	.010	4.30	4.01	3.86	3.76	3.70	3.57	3.50	3.47	3.36
	.001	7.29	6.71	6.40	6.22	6.09	5.83	5.70	5.63	5.48
	.100	2.06	1.97	1.92	1.89	1.87	1.83	1.80	1.79	1.76
	.050	2.54	2.40	2.33	2.28	2.25	2.18	2.14	2.12	2.07
15	.025	3.06	2.86	2.76	2.69	2.64	2.55	2.50	2.47	2.40
	.010	3.80	3.52	3.37	3.28	3.21	3.08	3.01	2.98	2.87
	.001	6.08	5.54	5.25	5.07	4.95	4.70	4.57	4.51	4.35
	.100	1.98	1.89	1.84	1.80	1.78	1.74	1.71	1.70	1.66
	.050	2.41	2.27	2.19	2.14	2.11	2.04	2.00	1.98	1.92
18	.025	2.87	2.67	2.56	2.49	2.44	2.35	2.30	2.27	2.19
	.010	3.51	3.23	3.08	2.98	2.92	2.78	2.71	2.68	2.57
	.001	5.39	4.87	4.59	4.42	4.30	4.06	3.93	3.87	3.70
	.100	1.94	1.84	1.79	1.76	1.74	1.69	1.66	1.65	1.61
	.050	2.35	2.20	2.12	2.07	2.04	1.97	1.93	1.91	1.84
20	.025	2.77	2.57	2.46	2.40	2.35	2.25	2.20	2.17	2.09
	.010	3.37	3.09	2.94	2.84	2.78	2.64	2.57	2.54	2.42
	.001	5.08	4.56	4.29	4.12	4.00	3.77	3.64	3.58	3.42
	.100	1.87	1.77	1.72	1.68	1.66	1.61	1.58	1.56	1.52
	.050	2.24	2.09	2.01	1.96	1.92	1.84	1.80	1.78	1.71
25	.025	2.61	2.41	2.30	2.23	2.18	2.08	2.02	2.00	1.91
	.010	3.13	2.85	2.70	2.60	2.54	2.40	2.33	2.29	2.17
	.001	4.56	4.06	3.79	3.63	3.52	3.28	3.15	3.09	2.92
	.100	1.82	1.72	1.67	1.63	1.61	1.55	1.52	1.51	1.46
	.050	2.16	2.01	1.93	1.88	1.84	1.76	1.72	1.70	1.62
30	.025	2.51	2.31	2.20	2.12	2.07	1.97	1.91	1.88	1.79
	.010	2.98	2.70	2.55	2.45	2.39	2.25	2.17	2.13	2.01
	.001	4.24	3.75	3.49	3.33	3.22	2.98	2.86	2.79	2.61
	.100	1.76	1.66	1.61	1.57	1.54	1.48	1.45	1.43	1.38
	.050	2.08	1.92	1.84	1.78	1.74	1.66	1.61	1.59	1.51
40	.025	2.39	2.18	2.07	1.99	1.94	1.83	1.77	1.74	1.64
	.010	2.80	2.52	2.37	2.27	2.20	2.06	1.98	1.94	1.81
	.001	3.87	3.40	3.14	2.98	2.87	2.64	2.51	2.44	2.24
	.100	1.73	1.63	1.57	1.53	1.50	1.44	1.41	1.39	1.33
	.050	2.03	1.87	1.78	1.73	1.69	1.60	1.55	1.52	1.41
50	.025	2.32	2.11	1.99	1.92	1.87	1.75	1.69	1.66	1.53
	.010	2.70	2.42	2.27	2.17	2.10	1.95	1.87	1.82	1.68
	.001	3.67	3.20	2.95	2.79	2.68	2.44	2.31	2.25	2.03

		ν_1 = Degrees of Freedom for Numerator								
ν_2	α	10	15	20	25	30	50	75	100	∞
	.100	1.71	1.60	1.54	1.50	1.48	1.41	1.38	1.36	1.29
	.050	1.99	1.84	1.75	1.69	1.65	1.56	1.51	1.48	1.39
60	.025	2.27	2.06	1.94	1.87	1.82	1.70	1.63	1.60	1.48
	.010	2.63	2.35	2.20	2.10	2.03	1.88	1.79	1.75	1.60
	.001	3.54	3.08	2.83	2.67	2.55	2.32	2.19	2.12	1.89
	.100	1.68	1.57	1.51	1.47	1.44	1.38	1.34	1.32	1.24
	.050	1.95	1.79	1.70	1.64	1.60	1.51	1.45	1.43	1.32
80	.025	2.21	2.00	1.88	1.81	1.75	1.63	1.56	1.53	1.40
	.010	2.55	2.27	2.12	2.01	1.94	1.79	1.70	1.65	1.49
	.001	3.39	2.93	2.68	2.52	2.41	2.16	2.03	1.96	1.72
	.100	1.67	1.56	1.50	1.46	1.43	1.36	1.33	1.30	1.23
	.050	1.94	1.78	1.69	1.63	1.59	1.49	1.44	1.41	1.30
90	.025	2.19	1.98	1.86	1.79	1.73	1.61	1.54	1.50	1.37
	.010	2.52	2.24	2.09	1.99	1.92	1.76	1.67	1.62	1.46
	.001	3.34	2.88	2.63	2.47	2.36	2.11	1.98	1.91	1.66
	.100	1.66	1.56	1.49	1.45	1.42	1.35	1.32	1.29	1.21
	050	1.93	1.77	1.68	1.62	1.57	1.48	1.42	1.39	1.28
100	.025	2.18	1.97	1.85	1.77	1.71	1.59	1.52	1.48	1.35
	.010	2.50	2.22	2.07	1.97	1.89	1.74	1.65	1.60	1.43
	.001	3.30	2.84	2.59	2.43	2.32	2.08	1.94	1.87	1.62
	.100	1.60	1.49	1.42	1.38	1.34	1.26	1.21	1.18	1.00
	.050	1.83	1.67	1.57	1.51	1.46	1.35	1.28	1.24	1.00
∞	025	2.05	1.83	1.71	1.63	1.57	1.43	1.34	1.30	1.00
	.010	2.32	2.04	1.88	1.77	1.70	1.52	1.42	1.36	1.00
	.001	2.98	2.52	2.27	2.11	1.99	1.73	1.58	1.50	1.00

Lampiran F1. Hasil ANOVA Awal Untuk Rata-Rata Jumlah Produk Cacat

General Linear Model: Y versus A, B, C, D

Factor	Type	Levels	Values
A	fixed	2	1 2
B	fixed	2	1 2
C	fixed	2	1 2
D	fixed	2	1 2

Analysis of Variance for Y, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	75.031	75.031	75.031	64.61	0.000
B	1	19.531	19.531	19.531	16.82	0.000
C	1	0.031	0.031	0.031	0.03	0.871
D	1	26.281	26.281	26.281	22.63	0.000
A*B	1	3.781	3.781	3.781	3.26	0.083
B*D	1	30.031	30.031	30.031	25.86	0.000
Error	25	29.031	29.031	1.161		
Total	31	183.719				

Least Squares Means for Y

A	Mean	SE Mean
1	6.938	0.2694
2	3.875	0.2694
B		
1	4.625	0.2694
2	6.188	0.2694
C		
1	5.438	0.2694
2	5.375	0.2694
D		
1	4.500	0.2694
2	6.312	0.2694
A*B		
1 1	6.500	0.3810
1 2	7.375	0.3810
2 1	2.750	0.3810
2 2	5.000	0.3810
B*D		
1 1	2.750	0.3810
1 2	6.500	0.3810
2 1	6.250	0.3810
2 2	6.125	0.3810

Lampiran F2. Hasil ANOVA *Pooling* Untuk Rata-Rata Jumlah Produk Cacat

General Linear Model: Y versus A, B, D

Factor	Type	Levels	Values
A	fixed	2	1 2
B	fixed	2	1 2
D	fixed	2	1 2

Analysis of Variance for Y, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	75.031	75.031	75.031	67.12	0.000
B	1	19.531	19.531	19.531	17.47	0.000
D	1	26.281	26.281	26.281	23.51	0.000
A*B	1	3.781	3.781	3.781	3.38	0.077
B*D	1	30.031	30.031	30.031	26.87	0.000
Error	26	29.062	29.062	1.118		
Total	31	183.719				

Least Squares Means for Y

A	Mean	SE Mean
1	6,938	0,2643
2	3,875	0,2643
B		
1	4,625	0,2643
2	6,188	0,2643
D		
1	4,500	0,2643
2	6,313	0,2643
A*B		
1 1	6,500	0,3738
1 2	7,375	0,3738
2 1	2,750	0,3738
2 2	5,000	0,3738
B*D		
1 1	2,750	0,3738
1 2	6,500	0,3738
2 1	6,250	0,3738
2 2	6,125	0,3738

General Linear Model: Y versus A; B; D

Factor	Type	Levels	Values
A	fixed	2	1 2
B	fixed	2	1 2
D	fixed	2	1 2

Analysis of Variance for Y, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	75,031	75,031	75,031	61,68	0,000
B	1	19,531	19,531	19,531	16,06	0,000
D	1	26,281	26,281	26,281	21,61	0,000
B*D	1	30,031	30,031	30,031	24,69	0,000
Error	27	32,844	32,844	1,216		
Total	31	183,719				

Unusual Observations for Y

Obs	Y	Fit	SE Fit	Residual	St Resid
11	5,0000	7,7813	0,4360	-2,7813	-2,75R

R denotes an observation with a large standardized residual.

Least Squares Means for Y

	Mean	SE Mean
A		
1	6,938	0,2757
2	3,875	0,2757
B		
1	4,625	0,2757
2	6,188	0,2757
D		
1	4,500	0,2757
2	6,313	0,2757
B*D		
1 1	2,750	0,3899
1 2	6,500	0,3899
2 1	6,250	0,3899
2 2	6,125	0,3899

Lampiran G1. Hasil ANOVA Awal Untuk Variabilitas Jumlah Produk Cacat

General Linear Model: Y versus A; B; C; D

Factor	Type	Levels	Values
A	fixed	2	1 2
B	fixed	2	1 2
C	fixed	2	1 2
D	fixed	2	1 2

Analysis of Variance for Y, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	61,024	61,024	61,024	64,81	0,079
B	1	28,817	28,817	28,817	30,61	0,114
C	1	3,461	3,461	3,461	3,68	0,306
D	1	24,237	24,237	24,237	25,74	0,124
A*B	1	8,342	8,342	8,342	8,86	0,206
B*D	1	33,373	33,373	33,373	35,45	0,106
Error	1	0,942	0,942	0,942		
Total	7	160,196				

Least Squares Means for Y

	Mean	SE Mean
A		
1	-16,52	0,4852
2	-11,00	0,4852
B		
1	-11,86	0,4852
2	-15,66	0,4852
C		
1	-14,42	0,4852
2	-13,10	0,4852
D		
1	-12,02	0,4852
2	-15,50	0,4852
A*B		
1 1	-15,64	0,6861
1 2	-17,40	0,6861
2 1	-8,08	0,6861
2 2	-13,92	0,6861
B*D		
1 1	-8,08	0,6861
1 2	-15,64	0,6861
2 1	-15,96	0,6861
2 2	-15,35	0,6861

Lampiran G2. Hasil ANOVA *Pooling* Untuk Variabilitas Jumlah Produk Cacat

General Linear Model: Y versus A; B; D

Factor	Type	Levels	Values
A	fixed	2	1 2
B	fixed	2	1 2
D	fixed	2	1 2

Analysis of Variance for Y, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	61,024	61,024	61,024	27,72	0,034
B	1	28,817	28,817	28,817	13,09	0,069
D	1	24,237	24,237	24,237	11,01	0,080
A*B	1	8,342	8,342	8,342	3,79	0,191
B*D	1	33,373	33,373	33,373	15,16	0,060
Error	2	4,402	4,402	2,201		
Total	7	160,196				

Least Squares Means for Y

	Mean	SE Mean
A		
1	-16,52	0,7418
2	-11,00	0,7418
B		
1	-11,86	0,7418
2	-15,66	0,7418
D		
1	-12,02	0,7418
2	-15,50	0,7418
A*B		
1 1	-15,64	1,0491
1 2	-17,40	1,0491
2 1	-8,08	1,0491
2 2	-13,92	1,0491
B*D		
1 1	-8,08	1,0491
1 2	-15,64	1,0491
2 1	-15,96	1,0491
2 2	-15,35	1,0491

General Linear Model: Y versus A; B; D

Factor	Type	Levels	Values
A	fixed	2	1 2
B	fixed	2	1 2
D	fixed	2	1 2

Analysis of Variance for Y, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
A	1	61,024	61,024	61,024	14,36	0,032
B	1	28,817	28,817	28,817	6,78	0,080
D	1	24,237	24,237	24,237	5,71	0,097
B*D	1	33,373	33,373	33,373	7,86	0,068
Error	3	12,744	12,744	4,248		
Total	7	160,196				

Least Squares Means for Y

	Mean	SE Mean
A		
1	-16,52	1,031
2	-11,00	1,031
B		
1	-11,86	1,031
2	-15,66	1,031
D		
1	-12,02	1,031
2	-15,50	1,031
B*D		
1 1	-8,08	1,457
1 2	-15,64	1,457
2 1	-15,96	1,457
2 2	-15,35	1,457