Lampiran – 1

Satuan dan Besaran Magnet

Tabel L.1. Satuan dan Besaran Magnet, (Sheriff, R.E., 1973)

Term.	SI (MKS System)		CGS System	
	Unit	Symbol	Unit	Symbol
Magnetics field strenght magnetic intensity magnetic induction magnetic flix density	1 tesla = 1 weber/m^2 = 1 N/ampere-m	$B = \mu_o(H+M)$ $= \Phi$ / area	$= 10^4$ gauss $= 10^9$ gamma	$B = H+4\pi I$
Dipole moment	1 ampere-m^2	md	$= 10^{10}$ pole-cm	md
Magnetic pole	1 ampere –meter	m	$= 10^8$ unit poles	m
Magnetic flux	1 weber	Φ	$= 10^4$ maxwells	Φ
Magnetic potensial Magnetomotive force	1 ampere-turn	mmf	$= 0.4\pi$ gilbert = 1.26 gilbert	mmf
Magnetizing force	1 ampere-turn/m	$H = B / \mu\,\mu_o$	$= 4\pi\ 10^{-3}$ oersted = 0.0126 oersted $= 4\pi\ 10^{-3}$ gilbert/cm	$H = B / \mu\,\mu_o$
Magnetization, magnetic dipole per unit volume, magnetic polarisation, magnnetization intensity	1 ampere-m^2/ m^3	M = k H = md / V		I = k' H
Magnetic permiability			1 gauss/oersted	
Relative permiability	Dimensionless	$\mu = \|B\| / \mu_o \|H\|$	Dimensionless	$\mu = \|\mu'\|$
Magnetic suseptibility	Dimensionless k_{SI}	k = |M| / |H|	Dimensionless k_{cgs}	k' = |I| / |H|
Reluctance	1 A-turn/weber	R = mmf / Φ	$= 4\pi\ 10^{-7}$ gilbert / maxwell	R = mm / Φ
Inductance	1 henry 1 weber/ampere	L		

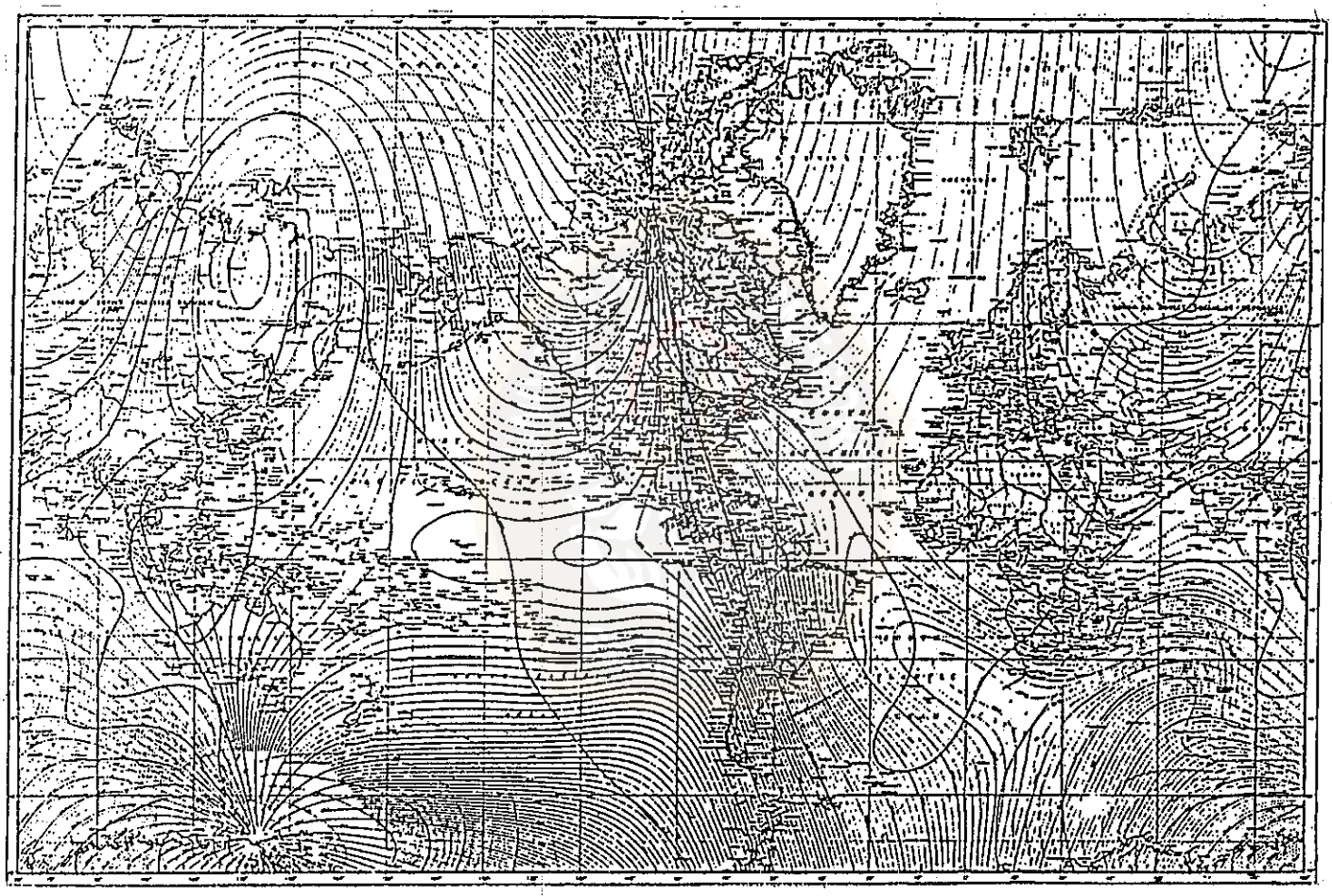
μ_o : permeabilitas of free space $= 4\pi\ 10^{-7}$ weber /ampere-meter
$= 12.57 \times 10^{-7}$ weber/ampere-meter
$= 12.57 \times 10^{-7}$ henry/meter
= 1 gauss/oersted

Lampiran – 2

Peta Intensitas Magnet, Inklinasi, dan Deklinasi Dunia

L.2.1. Peta Intensitas Magnet

Peta ini menggambarkan intensitas medan magnet total secara global di seluruh dunia, variasin, dan perubahannya setiap tahun.

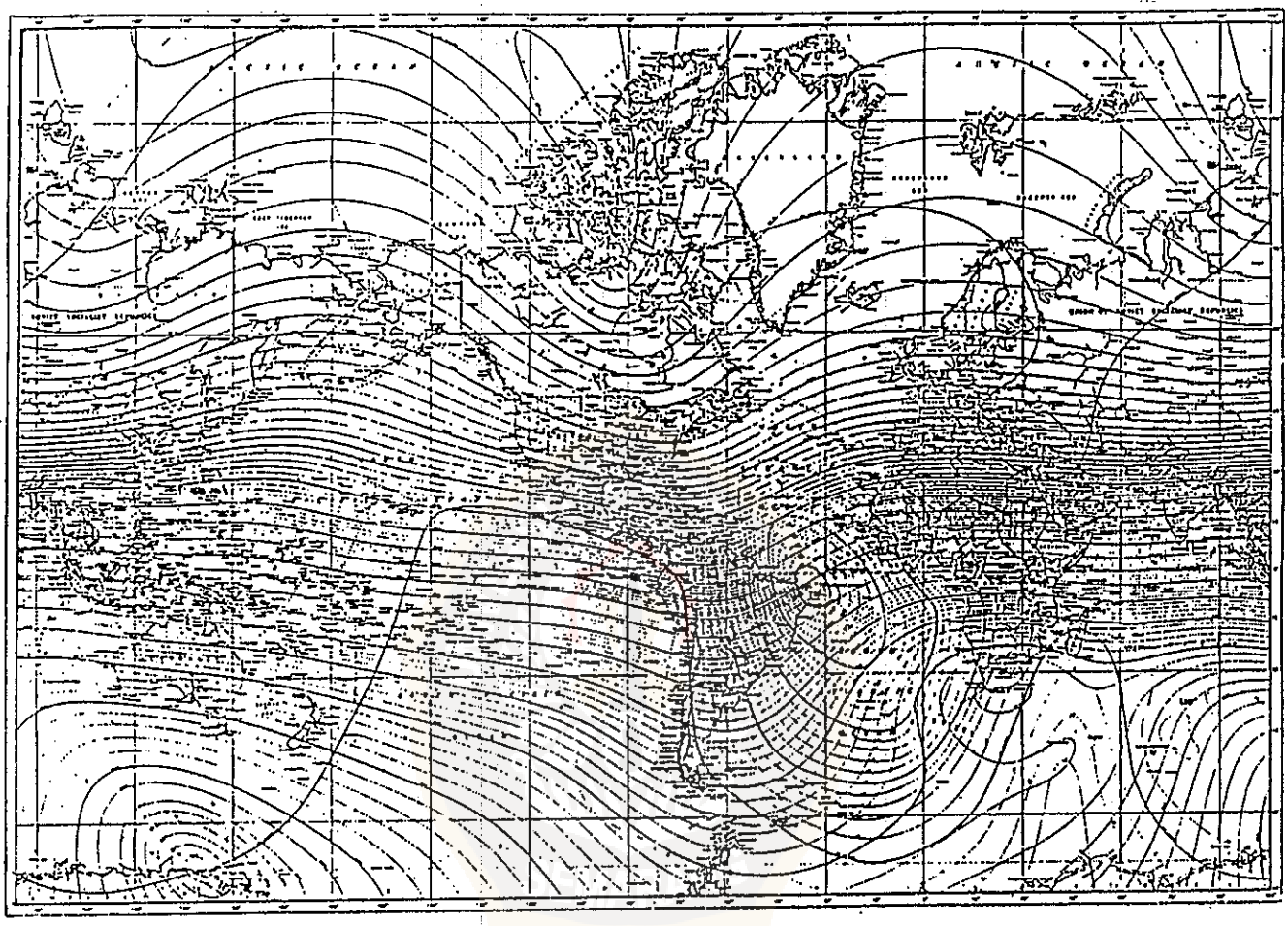


Gambar L.2.1. Peta Intensitas Magnet Total Dunia
(US Naval Oceanografi, 1966)

Ket : garis tegas dengan interval 0.01 gauss dan garis putus-putus menerangkan perubahan gamma tiap tahun.

L.2.2. Peta Inklinasi Dunia

Peta inklinasi dunia memberikan informasi tentang nilai inklinasi magnetik secara global di seluruh dunia serta perubahannya tiap menit per tahun.

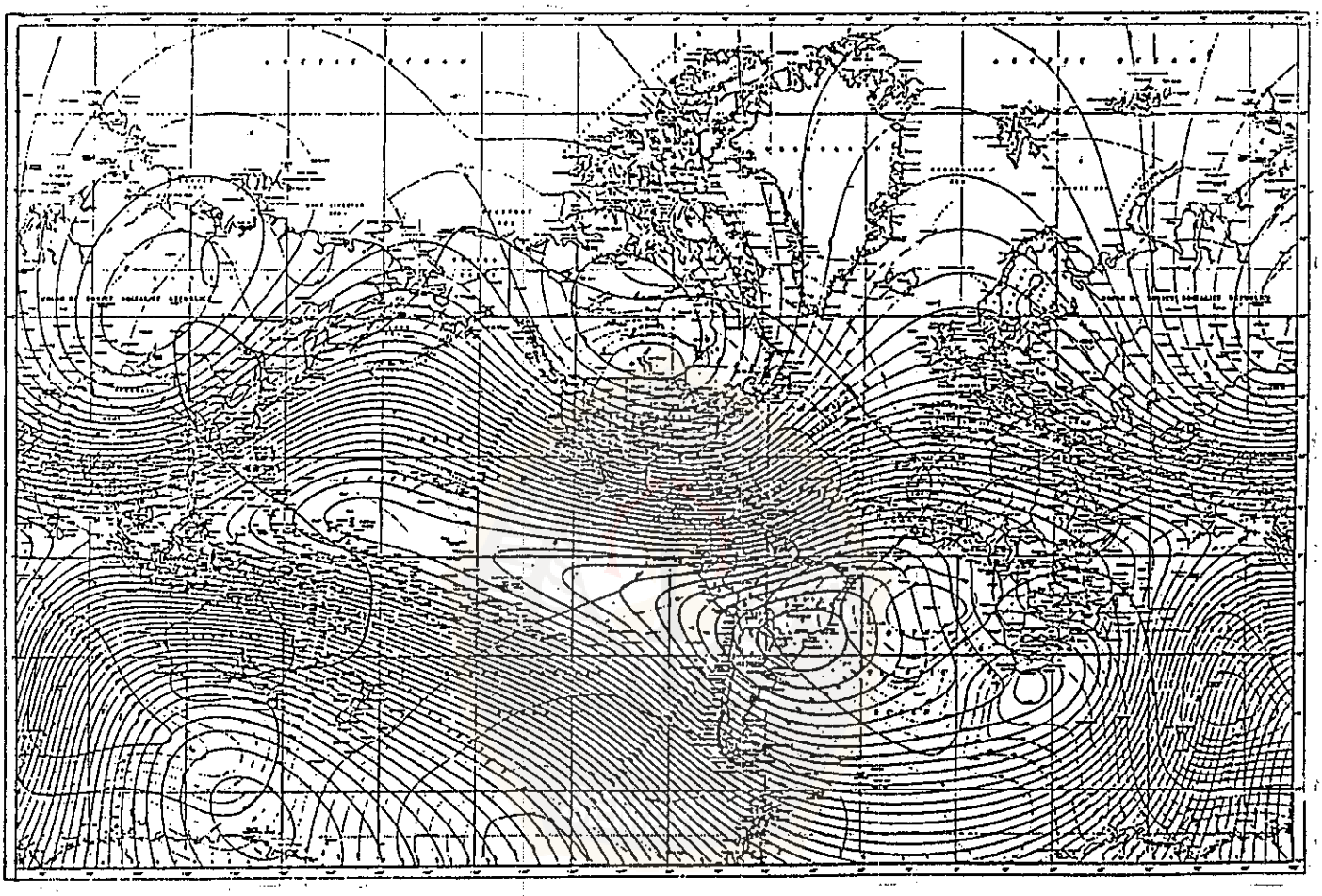


Gambar L.2.2. Peta Inklinasi Dunia
(US Naval Oceanografi, 1966)

Ket : garis tegas dengan interval kontur 2°, dan garis putus-putus menerangkan perubahan inklinasi tiap menit per tahun.

L.2.3. Peta Deklinasi Dunia

Peta deklinasi dunia memberikan informasi tentang nilai inklinasi magnetik secara global di seluruh dunia serta perubahannya tiap tahun.



Gambar L.2.2. Peta Deklinasi Dunia
(US Naval Oceanografi, 1966)

Ket : garis tegas dengan interval kontur 1°, dan garis putus-putus menerangkan perubahan deklinasi tiap tahun.

Lampiran – 3

Nilai Suseptibilitas Batuan dan Mineral

Tabel L.3.1. Suseptibilitas Magnetik Variasi Batuan
(Telford, W.M., dkk., 1976)

Tipe	Suseptibilitas x 10^{-6} (emu)	
	Range	Average
Sedimen		
Dolomit	0-75	10
Limestones	2-280	25
Sandstones	0-1660	30
Shales	5-1480	50
Av.Var.Send (48)	0-4000	75
Metamorf		
Amphibolite		60
Schist	25-240	120
Phyllite		130
Gneiss	10-2000	
Quartsite		350
Serpentine	250-1400	
Slate	0-3000	500
Av.Var.Met (61)	0-5800	350

Tipe	Suseptibilitas x 10^{-6} (emu)	
	Range	Average
Igneous		
Granite	0-4000	200
Rhyolite	20-3000	
Dolerite	100-3000	1400
Augite-syenite	2700-3600	
Olivine-diabase		2000
Diabase	50-13000	4500
Porphyry	20-16000	5000
Gabbro	80-7200	6000
Basalts	20-14500	6000
Diorite	50-10000	7000
Phyroxerite		10500
Peridolite	7600-15000	13000
Andesite		13700
Av.acid.Ign.	3-6530	650
Av.basic.Ign	44-9710	2600

Tabel L.3.2. Suseptibilitas Magnetik Variasi Mineral
(Telford, W.M., dkk., 1976)

Tipe	Suseptibilitas x 10^{-6} (emu)	
	Range	Average
Graphite		- 8
Quarts		-1
Roct salt		-1
Anhydrite,Gypsum		-1
Calcite	(-0.6)- (-1)	
Coal		2
Clays		20
Chalcophyrite		32
Sphalerite		60
Cassiterite		90

Tipe	Suseptibilitas x 10^{-6} (emu)	
	Range	Average
Siderite	100-310	
Phyrite	4-420	130
Limonite		220
Arsenopyrite		240
Hematite	40-3000	550
Chromite	240-940	600
Franklinite		36000
Pyrrhotite	10^2-5 x 10^5	125000
Ilimenite	2.5 x 10^4-3 x 10^5	1.5 x 10^5
Magnetite	10^5-1.6 x 10^6	5 x 10^5

Lampiran – 4

Data Lapangan

L .1. Data Anomali Medan Magnet Total dan Interval Lintasan

Cross Section AB		
No.	**Interval Data (*km*)**	**Anomali Total (*gamma*)**
1	-7	945
2	-6	950
3	-5	965
4	-4	980
5	-3	1030
6	-2	1110
7	-1	1120
8	0	1035
9	1	900
10	2	870
11	3	870
12	4	870

Cross Section BC		
No.	**Interval Data (*km*)**	**Anomali Total (*gamma*)**
1	-7	1020
2	-6	950
3	-5	870
4	-4	810
5	-3	760
6	-2	780
7	-1	820
8	0	985
9	1	1150
10	2	1220
11	3	1130
12	4	1020
13	5	940
14	6	885
15	7	870
16	8	880

Cross section CD

No.	Interval Data (*km*)	Anomali Total (*gamma*)
1	-7	680
2	-6	690
3	-5	700
4	-4	745
5	-3	840
6	-2	890
7	-1	925
8	0	955
9	1	990
10	2	1020
11	3	1075
12	4	1160
13	5	1220
14	6	1120
15	7	1075
16	8	1050

Cross section DE

No.	Interval Data (*km*)	Anomali Total (*gamma*)
1	-3	860
2	-2	850
3	-1	895
4	0	1005
5	1	1170
6	2	1155
7	3	1160
8	4	1155
9	5	1152
10	6	1150
11	7	1147
12	8	1145
13	9	1135
14	10	1040
15	11	1030
16	12	950
17	13	940

Cross section EF

No.	Interval Data (*km*)	Anomali Total (*gamma*)
1	-9	820
2	-8	810
3	-7	825
4	-6	890
5	-5	1140
6	-4	1330
7	-3	1350
8	-2	1300
9	-1	1155
10	0	1080
11	1	960
12	2	900
13	3	860
14	4	830
15	5	790

Cross section FG

No.	Interval Data (*km*)	Anomali Total (*gamma*)
1	-9	940
2	-8	920
3	-7	950
4	-6	1000
5	-5	1050
6	-4	1150
7	-3	1220
8	-2	1145
9	-1	1040
10	0	885
11	1	740
12	2	630
13	3	560
14	4	550
15	5	635
16	6	745

Lampiran - 5

Hasil Pengalahan Data

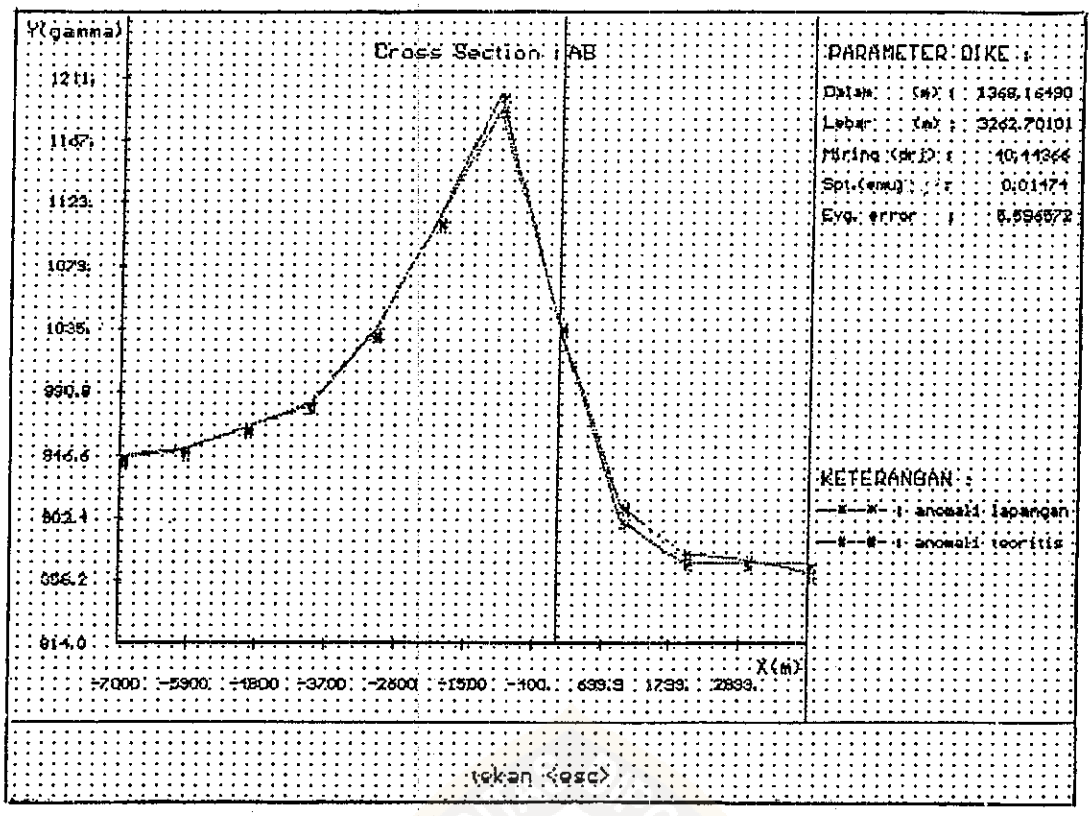
Tabel. L.5.1. Anomali Pengamatan & Teoritis Dike Cross Section-AB

KOORDINAT (m)	PENGAMATAN (gamma)	TEORITIS (gamma)	SELISIH ANOMALI
-7000.000000	945.000000	942.361557	-2.638443
-6000.000000	950.000000	948.517506	-1.482494
-5000.000000	965.000000	964.432503	-0.567497
-4000.000000	980.000000	981.507463	1.507463
-3000.000000	1030.000000	1031.604421	1.604421
-2000.000000	1110.000000	1108.582527	-1.417473
-1000.000000	1200.000000	1187.961388	-12.038612
0.000000	1035.000000	1035.776554	0.776554
1000.000000	900.000000	910.139285	10.139285
2000.000000	870.000000	877.372001	7.372001
3000.000000	870.000000	871.793987	1.793987
4000.000000	870.000000	862.677347	-7.322653

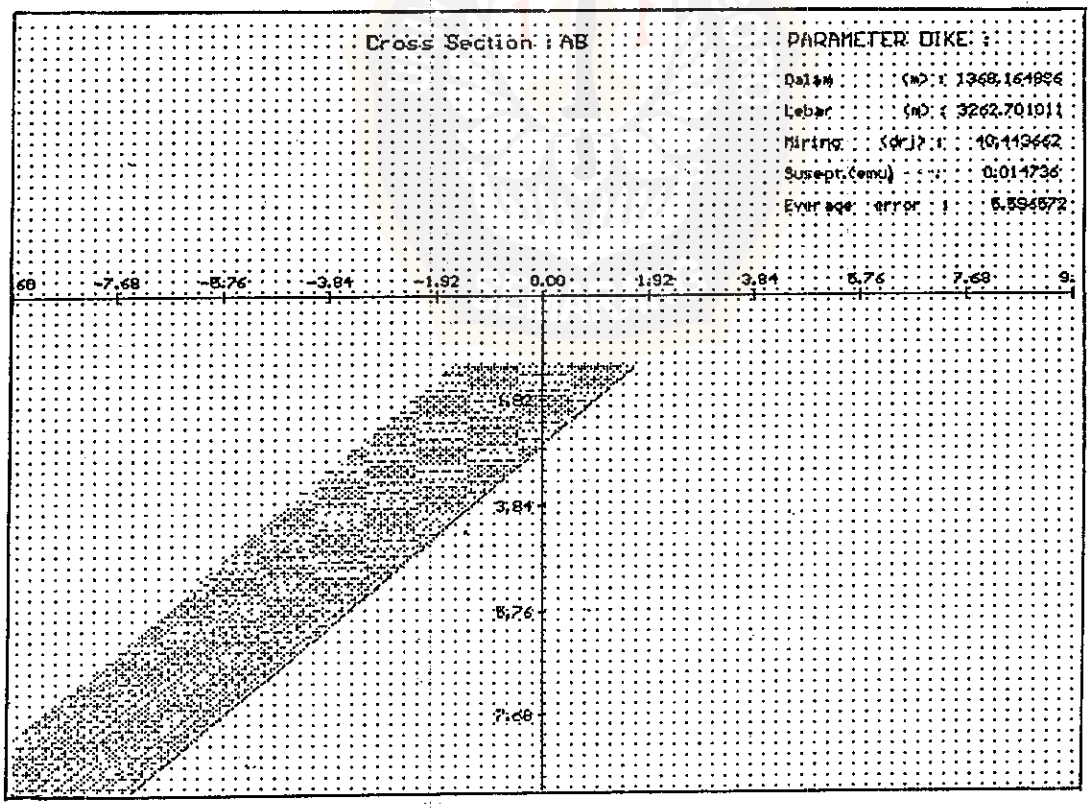
Tabel. L.5.2. Parameter Dike Cross Section-AB

PARAMETER DIKE		MODEL AWAL	MODEL AKHIR
Kedalaman dike	(m)	1100.000000	1368.164896
Lebar dike	(m)	3300.000000	3262.701011
Kemiringan dike	(derajat)	44.000000	40.443662
Suscpt. dike	(emu)	0.013000	0.014736

Selisih anomali rata-rata : 5.596572
Jumlah iterasi : 20



Gambar. L.5.1. Grafik Anomali Pengamatan & Teoritis Cross Section-AB



Gambar. L.5.2. Model Dike Cross Section-AB

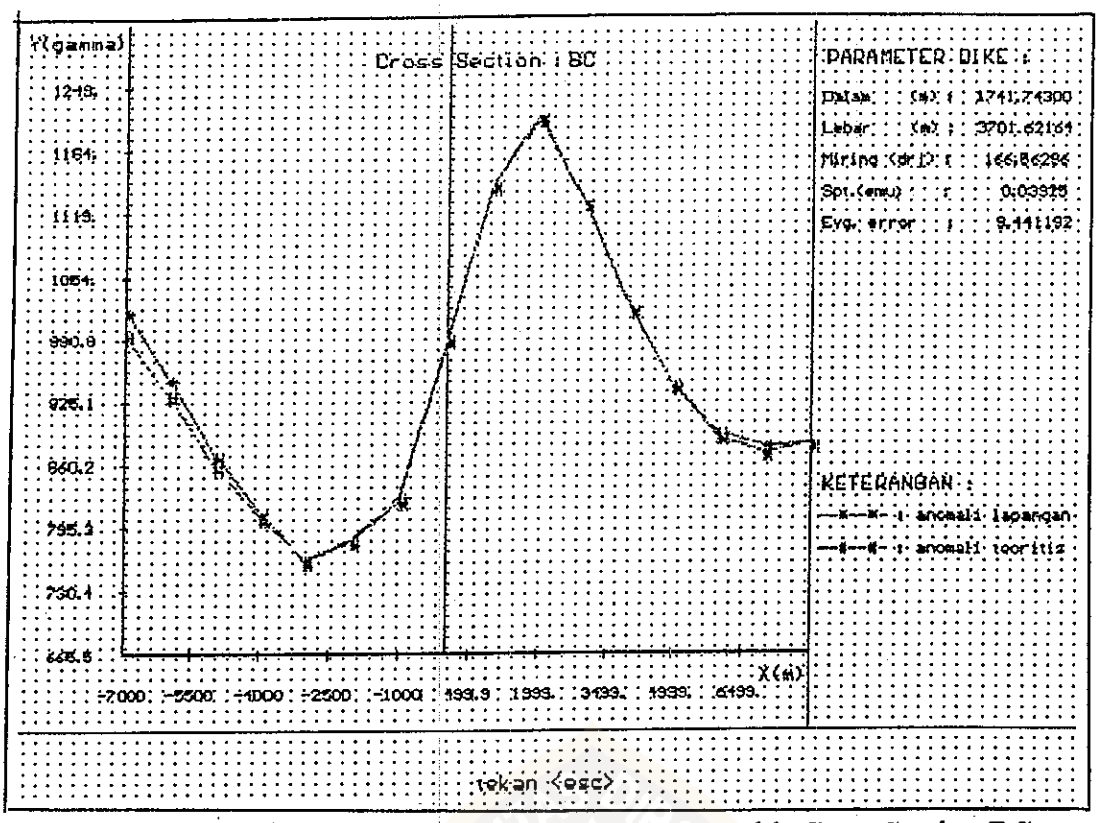
Tabel. L.5.3. Anomali Pengamatan & Teoritis Dike Cross Section-BC

KOORDINAT (m)	PENGAMATAN (gamma)	TEORITIS (gamma)	SELISIH ANOMALI
-7000.000000	1020.000000	992.923659	-27.076341
-6000.000000	950.000000	929.974060	-20.025940
-5000.000000	870.000000	858.194239	-11.805761
-4000.000000	810.000000	804.759193	-5.240807
-3000.000000	760.000000	761.047480	1.047480
-2000.000000	780.000000	781.976858	1.976858
-1000.000000	820.000000	824.958595	4.958595
0.000000	985.000000	987.586220	2.586220
1000.000000	1150.000000	1148.376283	-1.623717
2000.000000	1220.000000	1214.886941	-5.113059
3000.000000	1130.000000	1129.298556	-0.701444
4000.000000	1020.000000	1018.615405	-1.384595
5000.000000	940.000000	939.853827	-0.146173
6000.000000	885.000000	889.708656	4.708656
7000.000000	870.000000	875.680750	5.680750
8000.000000	880.000000	878.201346	-1.798654

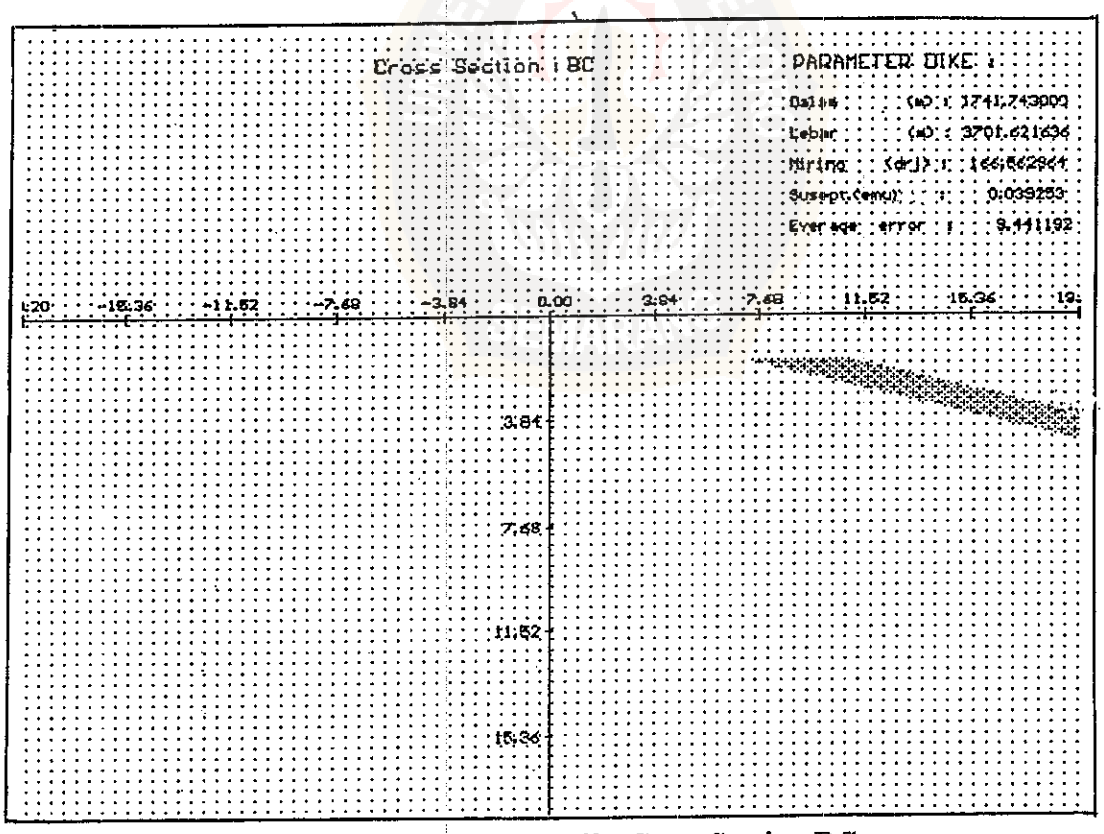
Tabel. L.5.4. Parameter Dike Cross Section-BC

PARAMETER DIKE		MODEL AWAL	MODEL AKHIR
Kedalaman dike	(m)	2000.000000	1741.743000
Lebar dike	(m)	4000.000000	3701.621636
Kemiringan dike	(derajat)	165.000000	166.562964
Suscept. dike	(emu)	0.013000	0.039253

Selisih anomali rata-rata : 9.441192
Jumlah iterasi : 24



Gambar. L.5.3. Grafik Anomali Pengamatan & Teoritis Cross Section-BC



Gambar. L.5.4. Model Dike Cross Section-BC

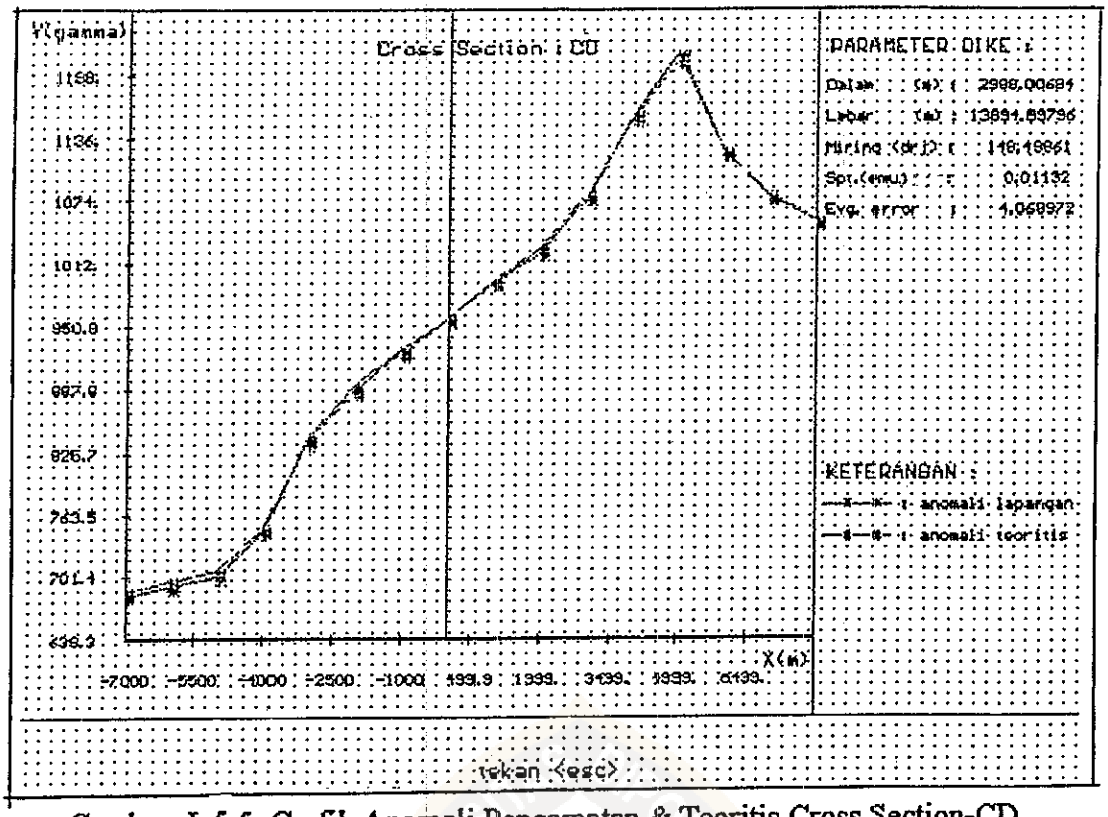
Tabel. L.5.5. Anomali Pengamatan & Teoritis Dike Cross Section-CD

KOORDINAT (m)	PENGAMATAN (gamma)	TEORITIS (gamma)	SELISIH ANOMALI
-7000.000000	680.000000	685.296967	5.296967
-6000.000000	690.000000	695.459718	5.459718
-5000.000000	700.000000	705.966358	5.966358
-4000.000000	745.000000	748.459465	3.459465
-3000.000000	840.000000	836.652003	-3.347997
-2000.000000	890.000000	885.328507	-4.671493
-1000.000000	925.000000	921.717889	-3.282111
0.000000	955.000000	954.590995	-0.409005
1000.000000	990.000000	992.032761	2.032761
2000.000000	1020.000000	1024.168719	4.168719
3000.000000	1075.000000	1077.664697	2.664697
4000.000000	1160.000000	1156.753662	-3.246338
5000.000000	1220.000000	1211.450161	-8.549839
6000.000000	1120.000000	1120.084964	0.084964
7000.000000	1075.000000	1076.716381	1.716381
8000.000000	1050.000000	1050.546564	0.546564

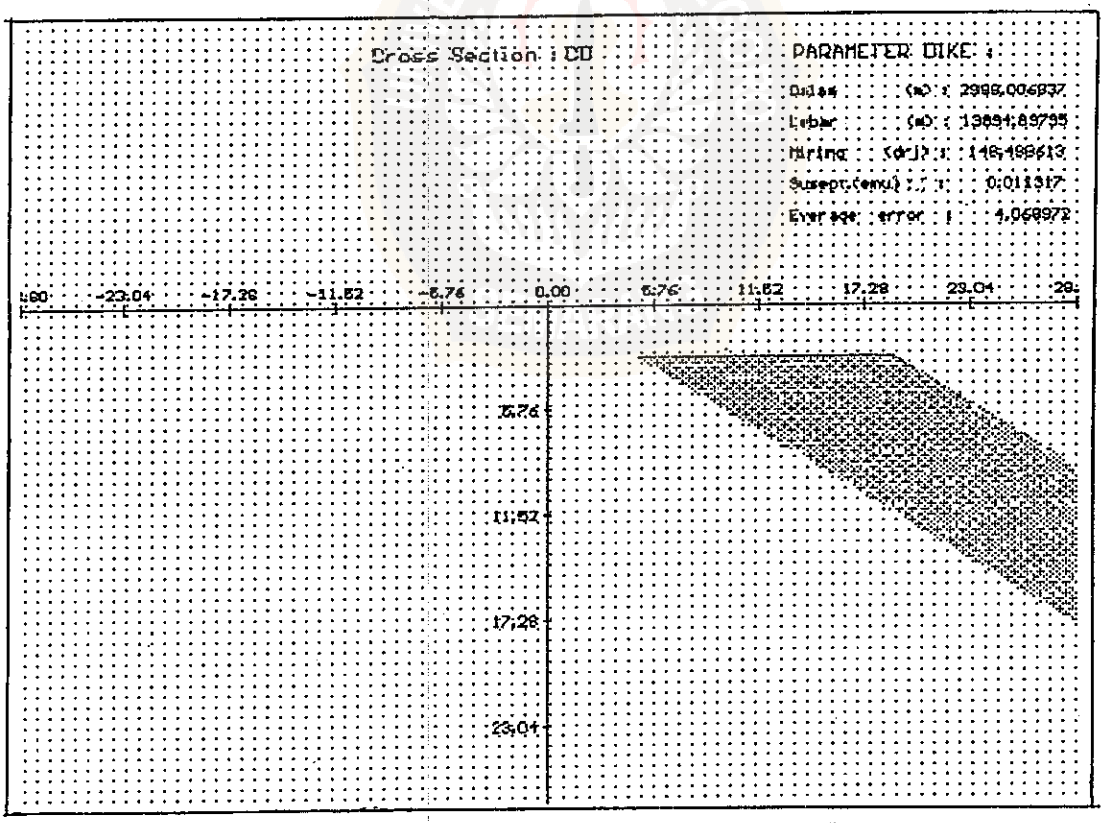
Tabel. L.5.6. Parameter Dike Cross Section-CD

PARAMETER DIKE	MODEL AWAL	MODEL AKHIR
Kedalaman dike (m)	2000.000000	2988.006837
Lebar dike (m)	9900.000000	13894.897959
Kemiringan dike (derajat)	110.000000	148.498613
Suscept. dike (emu)	0.013000	0.011317

Selisih anomali rata-rata : 4.068972
Jumlah iterasi : 23



Gambar. L.5.5. Grafik Anomali Pengamatan & Teoritis Cross Section-CD



Gambar. L.5.6. Model Dike Cross Section-CD

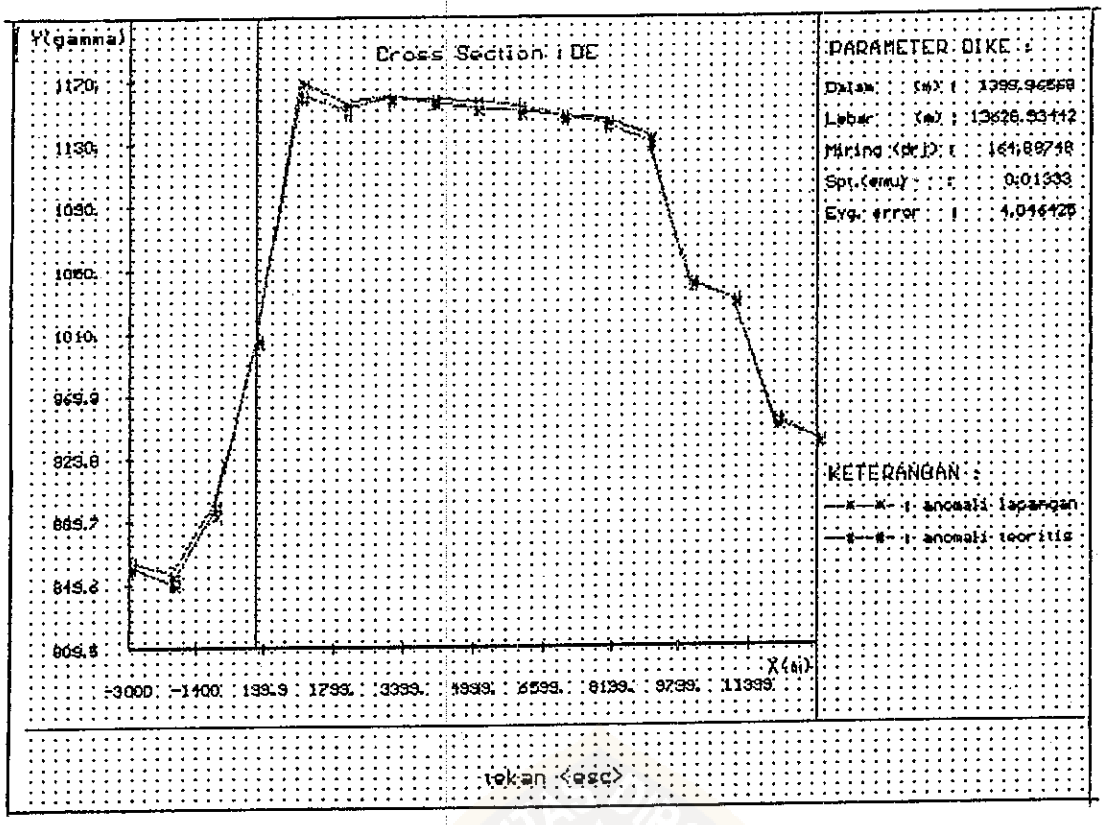
Tabel. L.5.7. Anomali Pengamatan & Teoritis Dike Cross Section-DE

KOORDINAT (m)	PENGAMATAN (gamma)	TEORITIS (gamma)	SELISIH ANOMALI
-3000.000000	860.000000	863.127435	3.127435
-2000.000000	850.000000	856.043557	6.043557
-1000.000000	895.000000	900.067023	5.067023
0.000000	1005.000000	1005.347299	0.347299
1000.000000	1170.000000	1160.245970	-9.754030
2000.000000	1155.000000	1150.961233	-4.038767
3000.000000	1160.000000	1158.782050	-1.217950
4000.000000	1155.000000	1157.473695	2.473695
5000.000000	1152.000000	1156.908067	4.908067
6000.000000	1150.000000	1153.548578	3.548578
7000.000000	1147.000000	1147.302625	0.302625
8000.000000	1145.000000	1142.086935	-2.913065
9000.000000	1135.000000	1130.009672	-4.990328
10000.000000	1040.000000	1041.565098	1.565098
11000.000000	1030.000000	1029.438664	-0.561336
12000.000000	950.000000	953.562517	3.562517
13000.000000	940.000000	938.744703	-1.255297

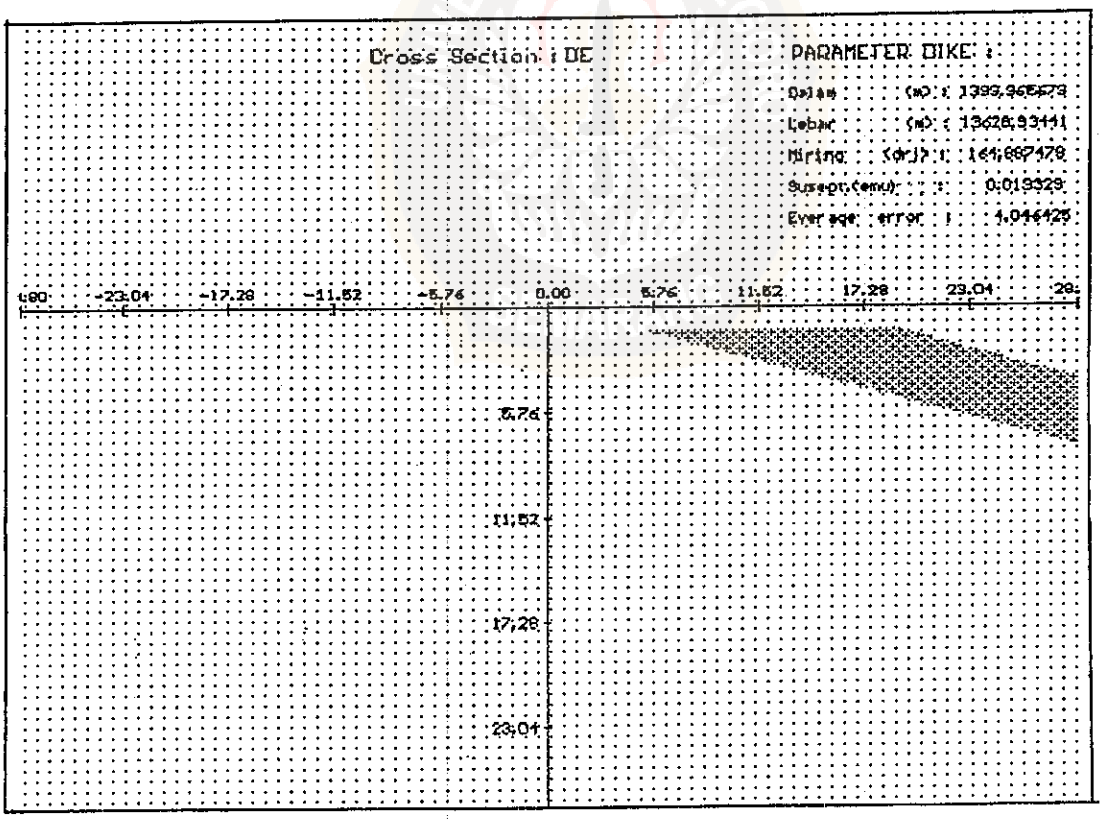
Tabel. L.5.8. Parameter Dike Cross Section-DE

PARAMETER DIKE		MODEL AWAL	MODEL AKHIR
Kedalaman dike	(m)	1600.000000	1399.965679
Lebar dike	(m)	8000.000000	13628.934418
Kemiringan dike	(derajat)	150.000000	164.887479
Suscept. dike	(emu)	0.013000	0.013329

Selisih anomali rata-rata : 4.046425
Jumlah iterasi : 23



Gambar. L.5.7. Grafik Anomali Pengamatan & Teoritis Cross Section-DE



Gambar. L.5.8. Model Dike Cross Section-DE

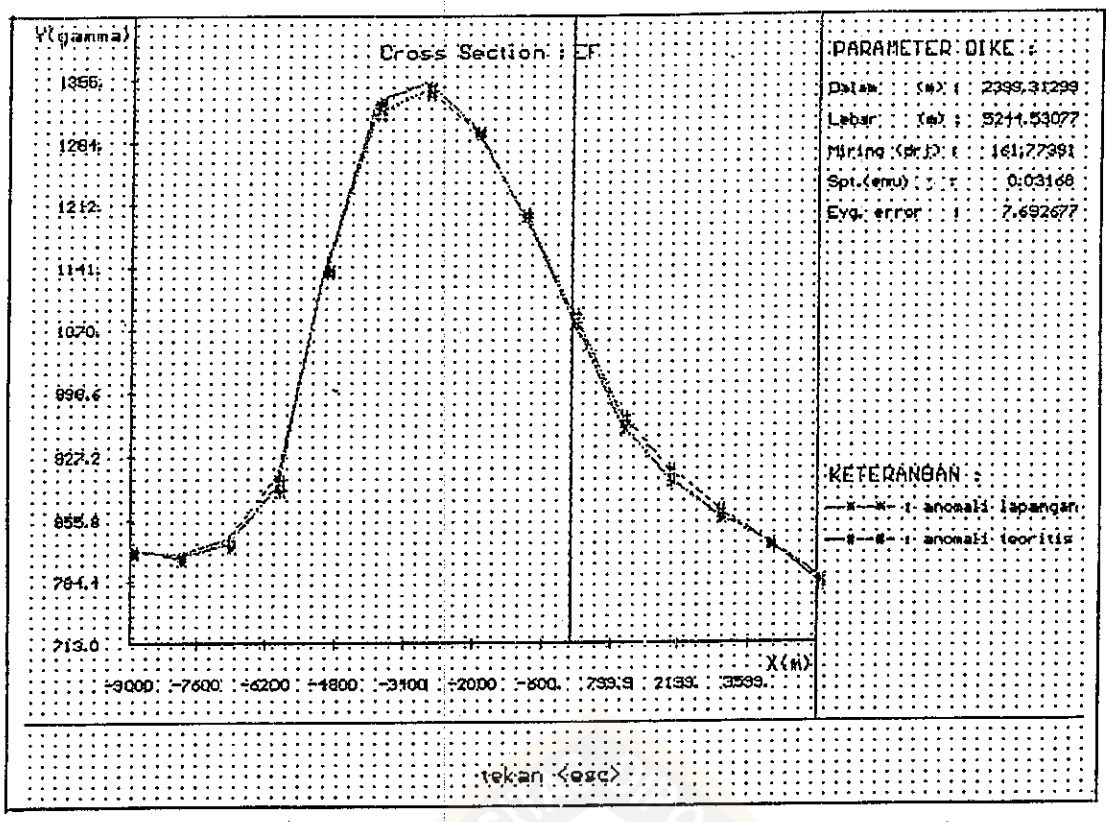
Tabel. L.5.9. Anomali Pengamatan & Teoritis Dike Cross Section-EF

KOORDINAT (m)	PENGAMATAN (gamma)	TEORITIS (gamma)	SELISIH ANOMALI
-9000.000000	820.000000	819.943411	-0.056589
-8000.000000	810.000000	813.753919	3.753919
-7000.000000	825.000000	832.336760	7.336760
-6000.000000	890.000000	899.640076	9.640076
-5000.000000	1140.000000	1136.246226	-3.753774
-4000.000000	1330.000000	1316.536237	-13.463763
-3000.000000	1350.000000	1339.401072	-10.598928
-2000.000000	1300.000000	1295.379920	-4.620080
-1000.000000	1200.000000	1202.167597	2.167597
0.000000	1080.000000	1086.970097	6.970097
1000.000000	960.000000	971.594994	11.594994
2000.000000	900.000000	911.116118	11.116118
3000.000000	860.000000	866.937371	6.937371
4000.000000	830.000000	830.027285	0.027285
5000.000000	790.000000	783.808200	-6.191800

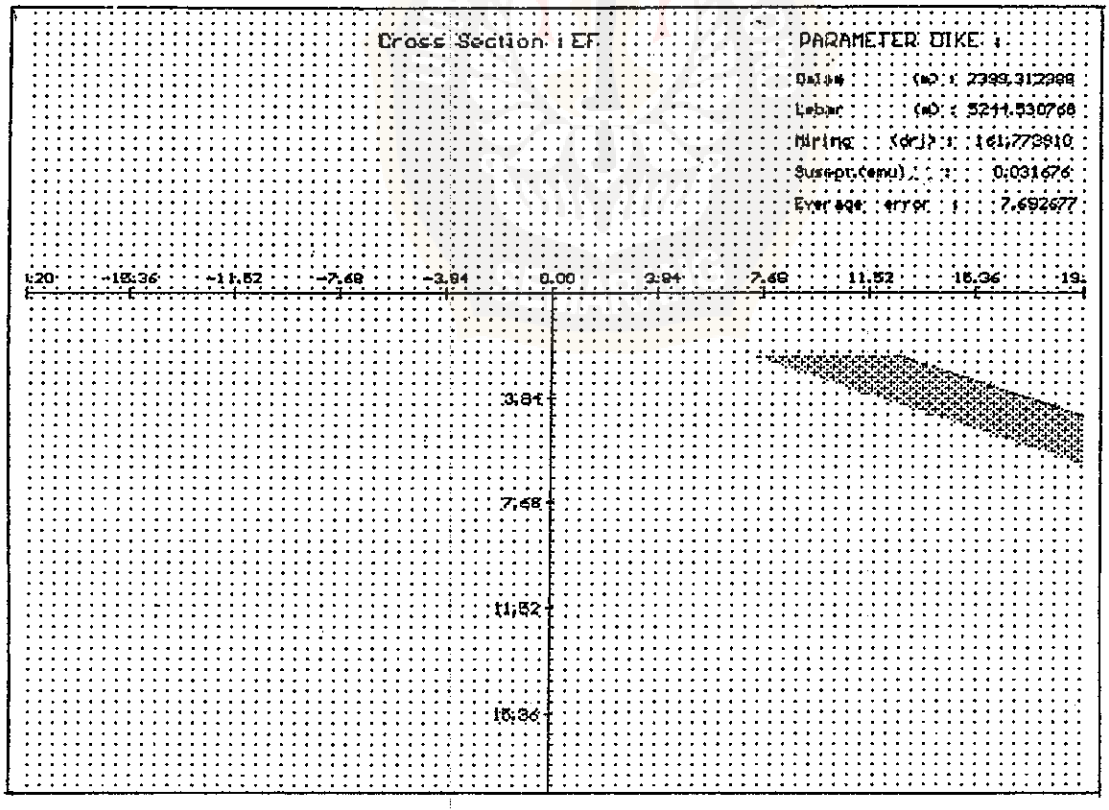
Tabel. L.5.10. Parameter Dike Cross Section-EF

PARAMETER DIKE		MODEL AWAL	MODEL AKHIR
Kedalaman dike	(m)	3600.000000	2399.312988
Lebar dike	(m)	5000.000000	5244.530768
Kemiringan dike	(derajat)	130.000000	161.773910
Suscept. dike	(emu)	0.013000	0.031676

Selisih anomali rata-rata : 7.692677
Jumlah iterasi : 58



Gambar. L.5.9. Grafik Anomali Pengamatan & Teoritis Cross Section-EF



Gambar. L.5.10. Model Dike Cross Section-EF

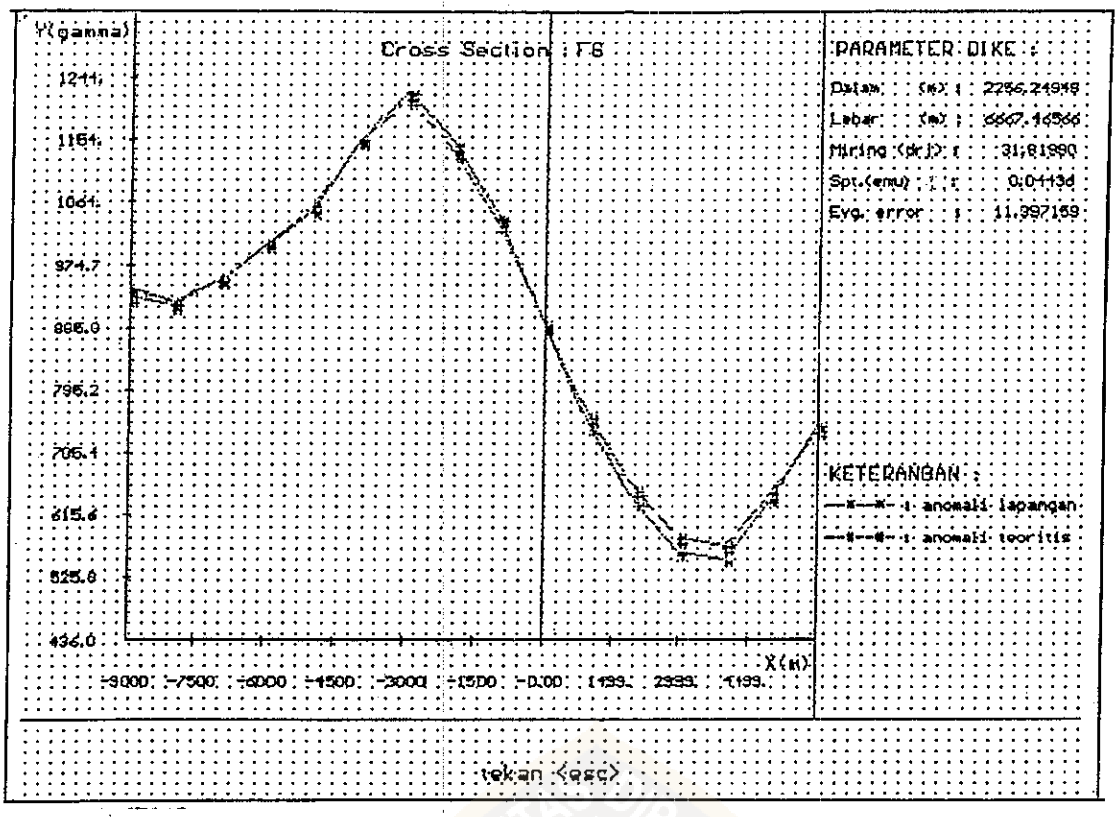
Tabel. L.5.11. Anomali Pengamatan & Teoritis Dike Cross Section-FG

KOORDINAT (m)	PENGAMATAN (gamma)	TEORITIS (gamma)	SELISIH ANOMALI
-9000.000000	940.000000	928.175993	-11.824007
-8000.000000	920.000000	915.727911	-4.272089
-7000.000000	950.000000	949.598602	-0.401398
-6000.000000	1000.000000	1002.759665	2.759665
-5000.000000	1050.000000	1056.092543	6.092543
-4000.000000	1150.000000	1150.687655	0.687655
-3000.000000	1220.000000	1209.517645	-10.482355
-2000.000000	1145.000000	1131.649125	-13.350875
-1000.000000	1040.000000	1028.739419	-11.260581
0.000000	885.000000	886.807480	1.807480
1000.000000	740.000000	754.731094	14.731094
2000.000000	630.000000	649.219053	19.219053
3000.000000	560.000000	579.181525	19.181525
4000.000000	550.000000	568.092663	18.092663
5000.000000	635.000000	643.300553	8.300553
6000.000000	745.000000	734.696981	-10.303019

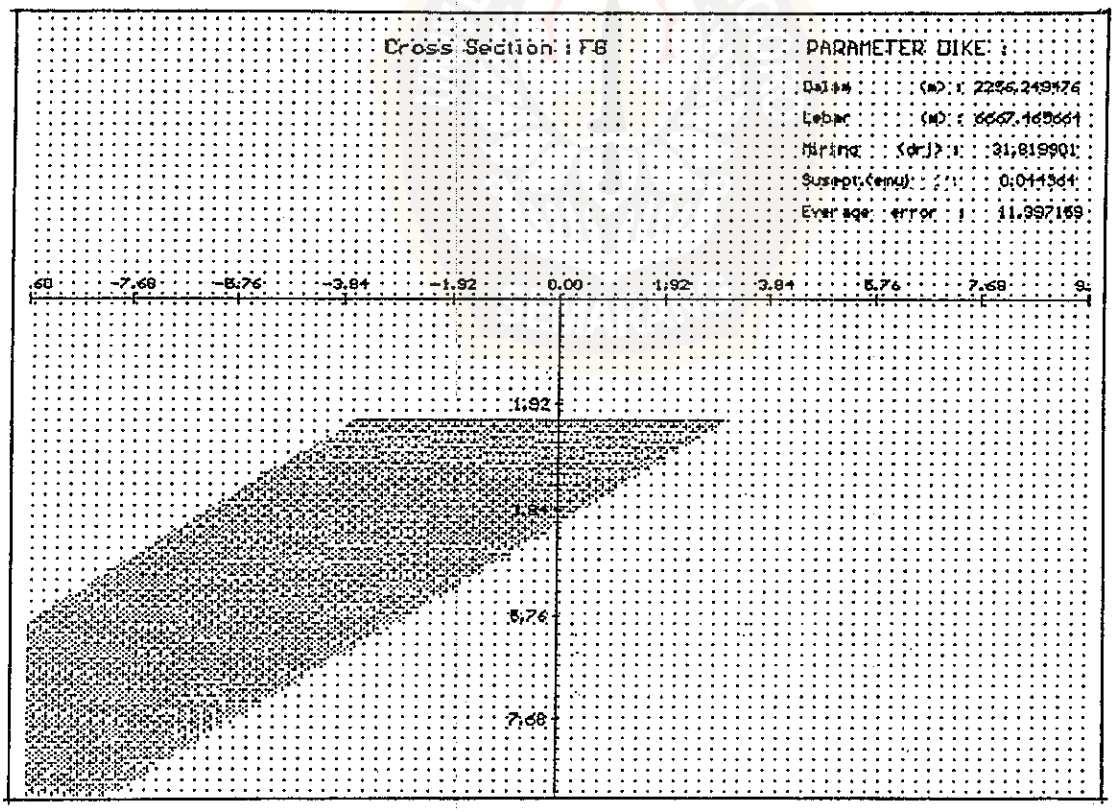
Tabel. L.5.12. Parameter Dike Cross Section-FG

PARAMETER DIKE		MODEL AWAL	MODEL AKHIR
Kedalaman dike	(m)	1600.000000	2256.249476
Lebar dike	(m)	6000.000000	6667.465664
Kemiringan dike	(derajat)	30.000000	31.819901
Susept. dike	(emu)	0.013000	0.044364

Selisih anomali rata-rata : 11.397159
Jumlah iterasi : 21



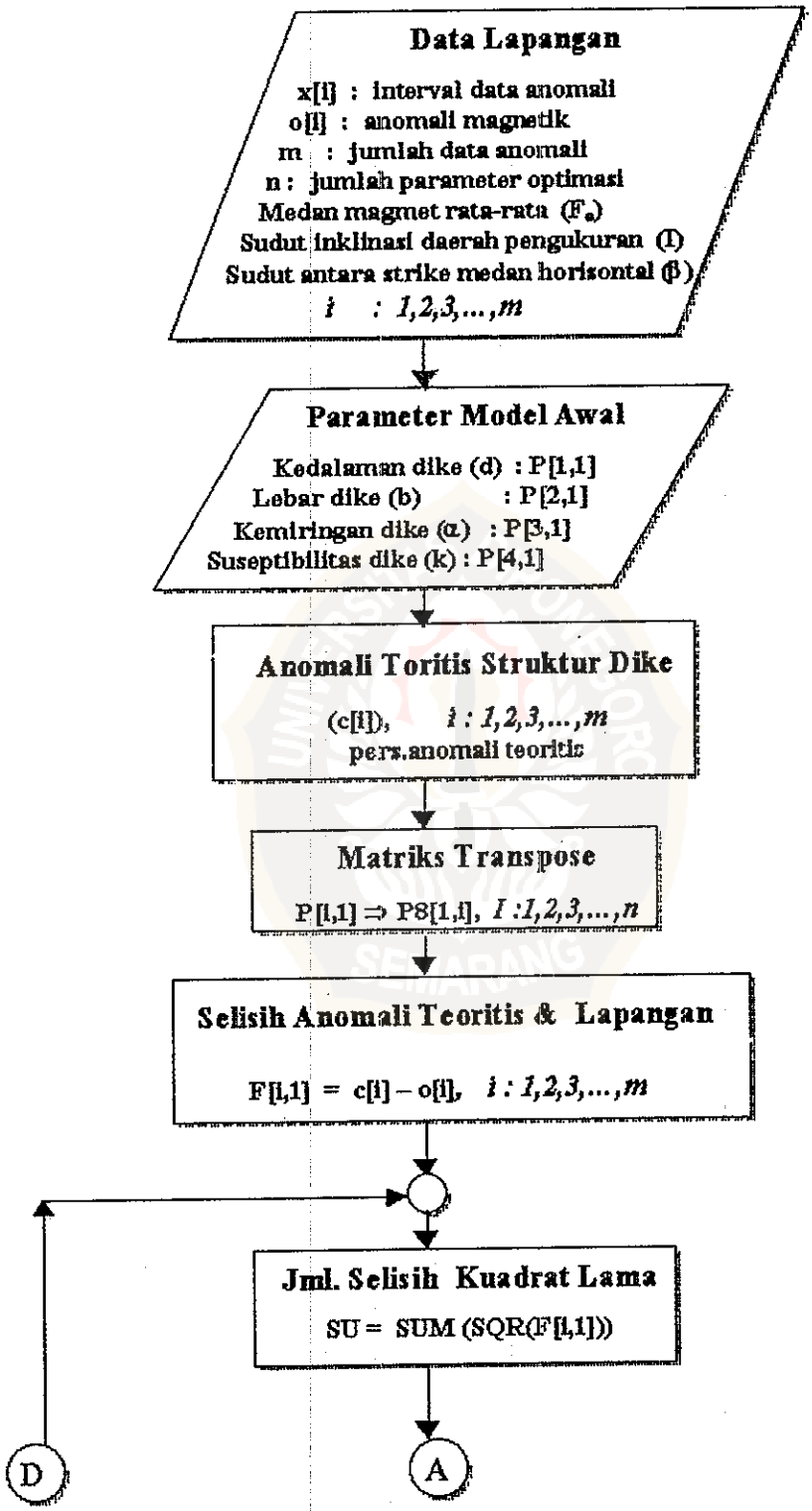
Gambar. L.5.11. Grafik Anomali Pengamatan & Teoritis Cross Section-FG

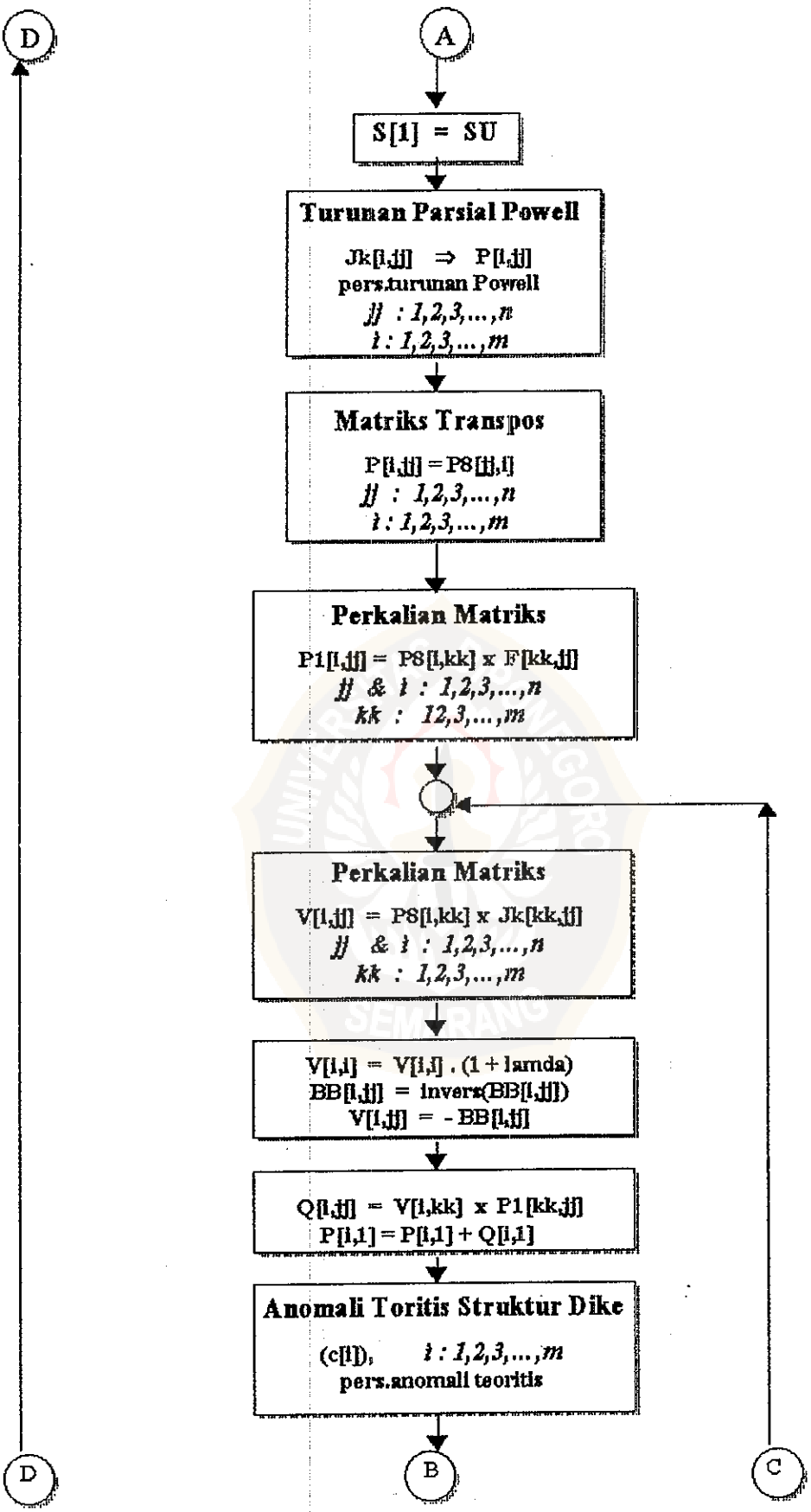


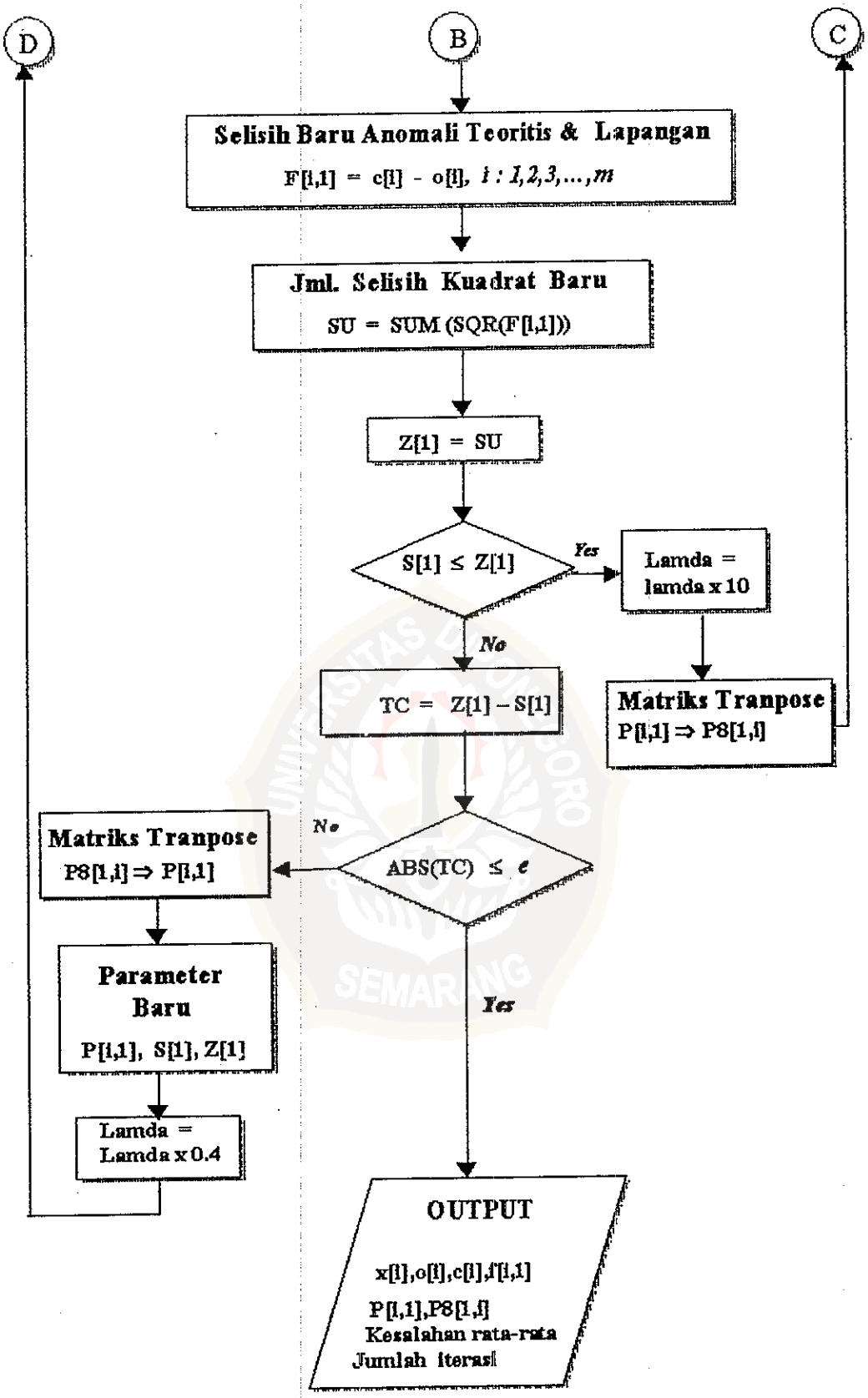
Gambar. L.5.12. Model Dike Cross Section-FG

Lampiran – 6

Diagram Alur Program







Lampiran – 7

Listing Program Optimasi Powell

```
PROGRAM OPTIMASI_POWEL;

USES
  crt,view,printer,graph,halpgm,menur;

CONST
  max = 18;
  h1  = 0.00001;

TYPE
  matriks = array[1..max,1..max] of real;
  vektor1 = array[1..max] of real;
  vektor2 = array[1..max] of integer;

VAR
  gd,gm,errorcode : integer;
  p,p1,p8,v,q,bb,f,e,jk,t,p2,p3,ks : matriks;
  z1,s,z,o,c,x,cc : vektor1;
  l,k : vektor2;
  m1,aa,i,jj,j,h,n,mr,lm,kk,m,kp,ndata : integer;
  a,b,su,tc,po,tm,bo,sw,dd,v1,v2,k1,k2,k3,k4,
  k5,k6,k7,k8,dal,dad,dah,day,dby,dbh,a1,a2,konst,lamda,
  k9,k10,k11,k12,k13,k14,k15,k16,k17,k18,k19,avg_error,r1,
  li,er,kt,Bt,r3,Q1,Q3,Fo,Ink,ah,az,y,
  pa1,pb1,pc1,xxx,xxx1,pa,pb,pc,del,x1,x2,y1,y2,
  xmax,xmin,ymax,ymin,dxmax,dxmin,dymax,dymin:real;
  pilih1,pilih2,pilih3,pilih4,pilih5,pilih6 : char;
  key1,key2 : boolean;
  dtx,crs,namafile1,namafile2 : string;
  fil : text;
  pw1,pw,u,g,w1,w,skl,iterasi : integer;
  pilih : char;

LABEL  5,10,20,30;


procedure input_data;
begin
  graf4;
  setcolor(14);
```

```
textcolor(15);
settextstyle(0,horizdir,1);
settextstyle(0,0,1);
gotoxy(34,2);outtextxy(267,24,'...');readln(m);
setcolor(14);

for i := 1 to m do
begin
 gotoxy(15,5+i);outtextxy(120,70+i*16,'...'); readln(x[i]);
end;

Dxmax:=x[1];
Dxmin:=x[1];
for i:=2 to m do
 begin
  if Dxmax<x[i] then Dxmax:=x[i];
  if Dxmin>x[i] then Dxmin:=x[i];
 end;

for i := 1 to m do
begin
 gotoxy(27,5+i);outtextxy(217,70+i*16,'...');readln(o[i]);
end;

Dymax:=o[1];
Dymin:=o[1];
for i:=2 to m do
begin
 if Dymax<o[i] then Dymax:=o[i];
 if Dymin>o[i] then Dymin:=o[i];
end;

gotoxy(63,4);outtextxy(497,58,'...');readln(crs);
gotoxy(61,5);outtextxy(484,73,'...');readln(n);
gotoxy(61,6);outtextxy(484,88,'...');readln(bt);
gotoxy(61,7);outtextxy(484,103,'...');readln(ink);
gotoxy(61,8);outtextxy(484,117,'...');readln(fo);
gotoxy(66,13);outtextxy(522,201,'...');readln(p[1,1]);
gotoxy(66,14);outtextxy(522,216,'...');readln(p[2,1]);
gotoxy(66,15);outtextxy(522,231,'...');readln(p[3,1]);
gotoxy(66,16);outtextxy(522,247,'...');readln(P[4,1]);

for i := 1 to 4 do p3[i,1] := p[i,1];
p[3,1] := p[3,1] * pi/180;
Bt := Bt * pi/180;
nk := ink * pi/180;
```

```
  lamda := 0.0004;
end;


function ahm(kc:integer;ho:real;xx:real):real;
begin
  if kc = 1 then p[1,1] := p[1,1] + ho;
  if kc = 2 then p[2,1] := p[2,1] + ho;
  if kc = 3 then p[3,1] := p[3,1] + ho;
  if kc = 4 then p[4,1] := p[4,1] + ho;
  k1 := (xx+(p[1,1]*(cos(p[3,1])/sin(p[3,1]))));
  k2 := (p[1,1]/k1);
  k3 := (p[1,1]/(k1-p[2,1]));
  k4 := sqr(p[1,1])+sqr(k1);
  k5 := sqr(p[1,1])+sqr(k1-p[2,1]);
  r1 := sqrt(k4);
  r3 := sqrt(k5);
  q1 := arctan(p[1,1]/k1);
  q3 := arctan(p[1,1]/(k1-p[2,1]));
  ahm := 2*p[1,4]*Fo*sin(p[3,1])*
       ((sin(ink)*cos(ink)*(1+sin(bt))*(ln(r3/r1)/ln(10))+
       (sqr(sin(ink))-sqr(cos(ink))*sin(bt))*(q3-q1)));
end;


procedure anomali_perhitungan;
begin
  for i := 1 to m do c[i] := Ahm (5,0,x[i]);
end;


procedure tranpose;
begin
  for i := 1 to n do
  begin
    p8[1,i] := p[i,1];
  end;
  for i := 1 to m do
  begin
    f[i,1] := c[i] - o[i];
  end;
end;

procedure jacobian;
var
  i,jj : integer;
```

```
begin
 for i := 1 to  m do
 begin
  for jj := 1 to n do
  begin
    Jk[i,jj] := (Ammt(jj,h1,x[i])-Ammt(jj,-h1,x[i]))/(h1);
  end;
 end;
end;


procedure output_to_screen;
begin
 setfillstyle(1,7);
 bar(0,0,getmaxx,getmaxy);
 setfillstyle(1,8);
 bar(45,10,getmaxx-90,getmaxy-7);
 setfillstyle(1,4);
 bar(32,0,getmaxx-100,getmaxy-15);
 rectangle(32,-5,getmaxx-100,getmaxy-15);

 i:=0;
 repeat
 begin
  setfillstyle(1,3);
  bar(110,4,530,8+i);
  i:=i+10;
 end;
 until i>=311;

 i:=0;
 repeat
 begin
  setfillstyle(1,5);
  bar(110,323,530,326+i);
  i:=i+2;
 end;
 until  i>=87;

 i:=0;
 repeat
 begin
  setfillstyle(1,1);
  bar(110,420,530,429+i);
  i:=i+1;
```

```
end;
until  i>=24;

setcolor(15);
rectangle(110,4,530,318);
rectangle(110,323,530,415);
rectangle(110,420,530,452);
settextstyle(7,0,2);
setfillstyle(1,8);
bar(getmaxx-70,60,getmaxx-11,83);
bar(getmaxx-70,15,getmaxx-11,37);
setfillstyle(1,4);
bar(getmaxx-75,10,getmaxx-16,32);
bar(getmaxx-75,55,getmaxx-16,78);
setcolor(14);
settextjustify(lefttext,righttext);
outtextxy(getmaxx-65,8,' ack');
outtextxy(getmaxx-65,54,' ext');
setcolor(10);
outtextxy(getmaxx-70,8,'B  ');
outtextxy(getmaxx-70,54,'N  ');
settextstyle(0,0,1);
setcolor(11);
outtextxy(110,11,'                ANOMLIA      ANOMALI    SELISIH');
outtextxy(110,21,' KOORDINAT PENGAMATAN TEORITIS   ANOMALI');
outtextxy(110,31,'       (m)      (gamma)      (gamma)     (gamma)');
setcolor(15);
line(340,420,340,452);
line(110,43,530,43);
line(110,45,530,45);
line(430,4,430,318);
line(210,4,210,318);
line(208,4,208,318);
line(320,4,320,318);
line(318,4,318,318);

for i := 1 to m do
begin
  str(x[i]:11:6,dtx);
  outtextxy(100,37+15*i,'  '+dtx);
  str(o[i]:11:6,dtx);
  outtextxy(210,37+15*i,'  '+dtx);
  str(c[i]:11:6,dtx);
  outtextxy(320,37+15*i,'  '+dtx);
  str(f[i,1]:11:6,dtx);
  outtextxy(430,37+15*i,'  '+dtx);
```

```
  cc[i] := c[i];
end;

setcolor(11);
outtextxy(110,327,'  PARAMETER        MODEL       MODEL');
outtextxy(110,337,'  DIKE              AWAL        AKHIR');
setcolor(15);
line(110,350,530,350);
line(298,324,298,415);
line(300,324,300,415);
line(417,324,417,415);
line(415,324,415,415);
str(p3[1,1]:11:6,dtx);
outtextxy(120,357,'Kedalaman Dike (m)      '+dtx);
str(p3[2,1]:11:6,dtx);
outtextxy(120,372,'Lebar Dike (m)          '+dtx);
str((p3[3,1]):11:6,dtx);
outtextxy(120,387,'Kemiringan Dike (drj)   '+dtx);
str(p3[4,1]:11:6,dtx);
outtextxy(120,402,'Suscpt. Dike (emu   )   '+dtx);
str((p8[1,1]):11:6,dtx);
outtextxy(440,357,+dtx);
str((p8[1,2]):11:6,dtx);
outtextxy(440,372,+dtx);
str((p8[1,3]*180/pi):11:6,dtx);
outtextxy(440,387,+dtx);
str((p8[1,4]):11:6,dtx);
outtextxy(440,402,+dtx);
str(iterasi:3,dtx);
outtextxy(120,426,'Iterasi         :' +dtx);
str(sqrt(z[1]/m):11:6,dtx);
outtextxy(120,440,'Everage error  :' +dtx);
outtextxy(350,440,crs);
outtextxy(350,426,'Nama Cross Section');

i:=-497;
repeat
  setcolor(4);
  settextstyle(1,1,4);
  outtextxy(32,i,'TABEL  ANOMALI   MAGNETIK');
    outtextxy(67,i,'DAN PARAMETER MODEL DIKE');
    setcolor(14);
    outtextxy(32,2+i,'TABEL  ANOMALI   MAGNETIK');
    outtextxy(67,2+i,'DAN PARAMETER MODEL DIKE');
    i:=i+2;
until i>=0;
```

```
  setcolor(2);
  outtextxy(34,2,'TABEL  ANOMALI   MAGNETIK');
  outtextxy(68,2,'DAN PARAMETER MODEL DIKE');
  settextstyle(0,0,1);
end;


procedure output_to_printer;
begin
  textcolor(7);
  writeln(lst,' Anomali Pengamatan dan Anomali Teoritis Dike   ');
  writeln(lst,'        Cross Section-', crs);
  writeln(lst);
  writeln(lst,'|``````````````````|``````````````````|```````````````|``````````````|');
  writeln(lst,'| KOORDINAT  | PENGAMATAN | TEORITIS | SELISIH   |');
  writeln(lst,'|     (m)     |   (gamma)    | (gamma)  | ANOMALI |');
  writeln(lst,'|____________|______________|__________|_________|');

  for i := 1 to m do
  begin
   writeln(lst,'  |',x[i]:13:6,' |',   o[i]:11:6,' |',      c[i]:11:6,' |',f[i,1]:11:6,' |');
   cc[i] := c[i];
  end;

  writeln(lst,'|____________|______________|__________|_________|');
  writeln(lst);
  writeln(lst);
  writeln(lst);
  writeln(lst,'    Parameter Model Dike  Cross Section-', crs);
  writeln(lst);
  writeln(lst,'|```````````````````````|````````````|```````````|');
  textcolor(7);
  writeln(lst,'|   PARAMETER      | MODEL  | MODEL  |');
  writeln(lst,'|     DIKE              |  AWAL   |  AKHIR  |');
  textcolor(7);
  writeln(lst,'|-----------------------|------------|-----------|');

  write(lst, '| Kedalaman dike    (m)    | ');
  writeln(lst,p3[1,1]:11:6,' |',(p8[1,1])/100:11:6,'  |');
  write(lst, '| Lebar dike        (m)    | ');
  writeln(lst,p3[2,1]:11:6,' |',(p8[1,2])/100:11:6,' |');
  write(lst, '| Kemiringan dike (derajat)| ');
  writeln(lst,p3[3,1]:11:6,' |',(p8[1,3]*180/pi):11:6,'  |');
  write(lst, '| Susept. dike     (emu    )| ');
  writeln(lst,p3[4,1]:11:6,' |',(p8[1,4]):11:6,'  |');
```

```
  writeln(lst,'|_____|_____|_____|');
  textcolor(11);
  writeln(lst);
  write(lst,  ' Selisih anomali rata-rata : ');
  writeln(lst,sqrt(z[1]/m):10:6);
  write(lst,  'Jumlah iterasi          : ');
  writeln(lst,iterasi:3);
  textcolor(7);
end;


procedure jumlah_kuadrat;
begin
  su:=0;
  for i := 1 to m do
  begin
    su := su + sqr(F[i,1]);
  end;
  s[1] := su;
  jacobian;
  po := 1;
  for i:= 1 to m do
  begin
    for aa := 1 to n do
    begin
      t[aa,i] := jk[i,aa];
    end;
  end;
end;


procedure txf;
begin
  for i := 1 to n do
  begin
    for jj := 1 to 1 do
    begin
      p1[i,jj] := 0;
      for kk := 1 to m do
      begin
        p1[i,jj] := p1[i,jj] + t[i,kk]*f[kk,jj];
      end;
    end;
  end;
end;
```

```
procedure txj;
begin
 for i := 1 to n do
 begin
  for jj:= 1 to n do
  begin
   v[i,jj]:=0;
   for kk:= 1 to  m do
   begin
    v[i,jj]:= v[i,jj] + t[i,kk]*jk[kk,jj];
   end;
  end;
 end;
 begin
  for i := 1 to n do
  begin
   v[i,i] := v[i,i] * (1+lamda);
  end;
 end;
 for i:= 1 to n do
 begin
  k[i] :=0;
  l[i]:=0;
 end;
 mr := 1;
 for i := 1 to n do
 begin
  for jj := 1 to n do
  begin
   bb[i,jj] := v[i,jj];
  end;
 end;
 for h := 1 to n do
 begin
  tm:=0;
  for i := 1 to n do
  begin
   if l[i]<> 0 then
   else
   begin
    for jj := 1 to n do
    begin
     if k[jj] <> 0 then
     else
     if abs(bb[i,jj])>tm then
     begin
```

```
          tm := abs(bb[i,jj]);
          lm := i;
          kp := jj;
        end;
      end;
    end;
  end;
  if tm = 0 then mr := 0
  else
  begin
    l[lm] := kp;
    k[kp] := lm;
    bo := bb[lm,kp];
    for i := 1 to n do
    begin
      if i = lm then
      else
      begin
        for jj := 1 to n do
        begin
          if jj = kp then
          else
          begin
            konst := bb[i,kp]*bb[lm,jj]/bo;
            bb[i,jj] := bb[i,jj] - konst;
          end;
        end;
      end;
    end;
    for i := 1 to n do
    begin
      bb[lm,i] := -bb[lm,i]/bo;
      if i = kp then bb[lm,i] := 1/bo;
      if i = lm then else bb[i,kp] := bb[i,kp]/bo;
    end;
  end;
end;
for i := 1 to n do
begin
  for jj := 1 to n do
  begin
    bb[i,jj] := bb[l[i],k[jj]];
  end;
end;
for i := 1 to n do
begin
```

```
    for jj := 1 to n do
    begin
      v[i,jj] := -bb[i,jj];
    end;
  end;
end;


procedure vxp1;
begin
  for i := 1 to n do
  begin
    for jj := 1 to 1 do
    begin
      q[i,jj] := 0 ;
      for kk := 1 to n do
      begin
        q[i,jj] := q[i,jj] + v[i,kk] * p1[kk,jj];
      end;
    end;
  end;
  for i := 1 to n do
  begin
    p[i,1] := p[i,1] + q[i,1];
  end;
  anomali_perhitungan;
  for i := 1 to m do
  begin
    f[i,1] := c[i] - o[i];
  end;
end;


procedure wxf;
var
  dtx : string[10];
begin
  su := 0;
  for i := 1 to m do
  begin
    su := su + sqr(f[i,1]);
  end;
  z[1] := su;
  if (z[1] >= s[1]) or (z[1] >= 5) then
  begin
    iterasi := iterasi +1;
```

```
    lamda := lamda*10;
    repeat
    pilih2 := chr(32);
    until pilih2 in [chr(32),chr(31)];
    if pilih2 = chr(32) then
    begin
     for i := 1 to n do
     begin
      p[i,1] := p8[1,i];
     end;
     key1 := false;
    end
    else
    begin
     key1 := true;
     key2 := true;
    end;
  end
  else
  begin
   tc :=z[1]-s[1];
   if abs(tc) <= 0.0000001    then
   begin
     key1 := true;
     key2 := True;
   end
   else
   begin
     for i := 1 to n do
     begin
     p8[1,i]:=p[i,1];
   end;
   iterasi:=iterasi+1;
   lamda := lamda*0.4;
   key1 := True;
   key2 := false;
  end;
 end;
end;


procedure grafik;
begin
  xmax :=x[m];
  xmin :=(x[1]-0.001);
  er:=(sqrt(z[1]/m));
```

```
ymax :=(dymax+3*er);
ymin :=(dymin-3*er);

kerangka3;
sumbu_koordinat(xmin,ymin,xmax,ymax);
skala(xmin,ymin,xmax,ymax);

setcolor(white);
settextstyle(0,horizdir,1);
settextjustify(lefttext,centertext);
outtextxy(75+2*getmaxx div 5, getmaxy div 23,crs);
settextjustify(centertext,centertext);
settextjustify(lefttext,centertext);
outtextxy(-10+3*getmaxx div 9,getmaxy div 23,'Cross Section :');
outtextxy(17+3*getmaxx div 4,22 ,' PARAMETER DIKE');
settextstyle(2,horizdir,4);
settextjustify(centertext,centertext);
settextjustify(lefttext,centertext);
str((p8[1,1])/100:11:5,dtx);
outtextxy(3*getmaxx div 4, getmaxy div 18+1*getmaxy div 25,' Dalam    (m)
  :'+dtx);
str((p8[1,2])/100:11:5,dtx);
outtextxy(3*getmaxx div 4, getmaxy div 18+2*getmaxy div 25,' Lebar    (m)
  :'+dtx);
str((p8[1,3]*180/pi):11:6,dtx);
outtextxy(3*getmaxx div 4, getmaxy div 18+3*getmaxy div 25,' Miring (drj)
  :'+dtx);
str((p8[1,4]):11:7,dtx);
outtextxy(3*getmaxx div 4, getmaxy div 18+4*getmaxy div 25,' Spt.(emu    )
  :'+dtx);
str(er*10000:11:6,dtx);
outtextxy(3*getmaxx div 4, getmaxy div 18+6*getmaxy div 25,' Evg. error
  :'+dtx);
str(iterasi:3,dtx);
outtextxy(3*getmaxx div 4, getmaxy div 18+7*getmaxy div 25,'  Iterasi
  :'+dtx);
setcolor(14);
outtextxy(3*getmaxx div 4, getmaxy-240,' -*--*- : anomali lapangan');
setcolor(11);
outtextxy(3*getmaxx div 4, getmaxy-260,' -#--#- : anomali teoritis');
setcolor(15);
settextstyle(2,horizdir,5);
outtextxy(3*getmaxx div 4, getmaxy-280,' KETERANGAN : ');

for i:=2 to m-1 do
begin
```

```
 transformasi(xmin,ymin,xmax,ymax,x[i],o[i],x1,y1);
 setcolor(14);
 outtextxy(trunc(x1),trunc(y1),'*');
end;

for i:=1 to m do
begin
 transformasi(xmin,ymin,xmax,ymax,x[i],o[i],x1,y1);
 transformasi(xmin,ymin,xmax,ymax,x[i+1],o[i+1],x2,y2);
 setcolor(14);
 if (i+1)<=m then
 begin
  line(trunc(x1),trunc(y1),trunc(x2),trunc(y2));
 end
 else
  putpixel(trunc(x1),trunc(y1),red);
end;
 for i:=2 to m-1 do
 begin
  transformasi(xmin,ymin,xmax,ymax,x[i],c[i],x1,y1);
  setcolor(11);
  outtextxy(trunc(x1),trunc(y1),'#');
 end;

 for i:=1 to m do
 begin
  transformasi(xmin,ymin,xmax,ymax,x[i],c[i],x1,y1);
  transformasi(xmin,ymin,xmax,ymax,x[i+1],c[i+1],x2,y2);
  setcolor(11);
  if (i+1)<=m then
  begin
   line(trunc(x1),trunc(y1),trunc(x2),trunc(y2));
  end
  else
   putpixel(trunc(x1),trunc(y1),red);
 end;
 settextstyle(0,0,1);
 setcolor(14);
 outtextxy(0,10 ,'Y(gamma)');
 outtextxy(-30+3*getmaxx div 4, getmaxy-87,'X(m)');
 i:=0;
 repeat
  repeat
   setcolor(0);
   settextstyle(1,0,2);
```

```
        outtextxy(0+i,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
              TEORITIS');
        outtextxy(0+i+2,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
              TEORITIS');
        setcolor(12);
        outtextxy(i+3,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
              TEORITIS');
        setcolor(14);
        outtextxy(i+3+2,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
              TEORITIS');
        i:=i+3;
      until i>=255;
      i:=255;
      repeat
        setcolor(0);
        settextstyle(1,0,2);
        outtextxy(i,getmaxy-25,'GRAFIK ANOMALI LAPANGAN & TEORITIS');
        outtextxy(i+2,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
        TEORITIS');
        setcolor(9);
        outtextxy(i-3,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
        TEORITIS');
        setcolor(14);
        outtextxy(i-3+2,getmaxy-25,'GRAFIK ANOMALI LAPANGAN &
        TEORITIS');
        i:=i-3;
      until i<=-3;
    until keypressed;
end;


procedure model;
begin
  kerangka1;

  setcolor(14);
  settextstyle(1,horizdir,1);
  settextjustify(lefttext,centertext);
  outtextxy(340,8,crs);
  outtextxy(198,8 ,'Cross Section :');
  outtextxy(472,8 ,' PARAMETER DIKE');
  setcolor(15);
  settextstyle(2,horizdir,4);
  settextjustify(lefttext,centertext);
  str((p8[1,1])/100:11:6,dtx);
  outtextxy(475,32,' Dalam    (m) : '+dtx);
```

```
str((p8[1,2])/100:11:6,dtx);
outtextxy(475,45,' Lebar    (m) : '+dtx);
str((p8[1,3]*180/pi):11:6,dtx);
outtextxy(475,58,' Miring (drj) : '+dtx);
str((p8[1,4]):11:7,dtx);
outtextxy(475,71,' Spt.(emu    ) : '+dtx);
str(10000*sqrt(z[1]/m):11:6,dtx);
outtextxy(475,84,' Evg. error   : '+dtx);
str(iterasi:11,dtx);
outtextxy(475,97,' Iterasi     : '+dtx);

xmax:=xmax;
if xmax<=638 then xmax:=640;
ymax:=getmaxy ;
xmin:=0;
ymin:=175;
x1:=-xmax;
x2:=getmaxx/2 ;
x1:=3*skl*trunc(xmax/getmaxx);
m1:=trunc(xmax/x2)*10;
del := 2*(xmax-xmin)/m1;
pa:=p8[1,1]/300;
pb:=p8[1,2]/300;
pc:=p8[1,3];
xxx:=pa*(cos(pc)/sin(pc));
pa1:=(ymax)-pa;
xxx1:=pa1*(cos(pc)/sin(pc));

i:=0;
repeat
begin
  setcolor(5);
  line(trunc(x2-xxx/skl)+i,trunc(ymin+pa/skl),trunc(x2-xxx-
      xxx1)+i,trunc((ymax+ymin)));
  setfillstyle(1,8);
  bar(0,getmaxy-40,getmaxx,getmaxy);
  i:=(2+i);
end;
until i>=pb/skl;
setcolor(11);
settextstyle(smallfont,horizdir,4);
settextjustify(centertext,centertext);

for i := 1 to 1+m1 do
begin
  if i = 1+m1 then    else
```

```
 begin
   str(((xmin+x1*del*(i-1))/1000):5:2,dtx);
   outtextxy(trunc(getmaxx/2+del*(i-1)),trunc(ymin-9)+20,dtx);
   str(((xmin-x1*del*(i-1))/1000):5:2,dtx);
   outtextxy(trunc(getmaxx/2-del*(i-1)),trunc(ymin-9)+20,dtx);
   if i <> 0 then
   outtextxy(trunc(getmaxx/2+del*(i-1)),trunc(ymin)+3,'|');
   outtextxy(trunc(getmaxx/2-del*(i-1)),trunc(ymin)+3,'|');
 end;
end;

for i := 1 to m1+1 do
begin
 if i = m1+1 then    else
 begin
   str(((xmin+x1*del*(i))/1000):5:2,dtx);
   outtextxy(trunc(x2-20),trunc(ymin+del*(i)),dtx);
   if i <> 1 then
   outtextxy(trunc(x2),trunc(ymin+del*(i-1)),'-');
 end;
end;

setfillstyle(1,8);
bar(getmaxx-80,getmaxy-115,getmaxx-25,getmaxy-95);
bar(getmaxx-80,getmaxy-75,getmaxx-25,getmaxy-55);
setfillstyle(1,4);
bar(getmaxx-75,getmaxy-120,getmaxx-20,getmaxy-100);
bar(getmaxx-75,getmaxy-80,getmaxx-20,getmaxy-60);
setcolor(14);
settextjustify(centertext,centertext);
settextstyle(7,0,2);
setfillstyle(1,3);
outtextxy(getmaxx-46,366,' ack');
outtextxy(getmaxx-46,406,' ext');
setcolor(11);
outtextxy(getmaxx-50,366,'B   ');
outtextxy(getmaxx-47,406,'N   ');

repeat
 w1:=0;
 repeat
   setcolor(8);
   settextstyle(1,0,5);
   outtextxy(155+w1,getmaxy-25,'MODEL DIKE 2D');
   outtextxy(155+w1+2,getmaxy-25,'MODEL DIKE 2D');
   setcolor(11);
```

```
      outtextxy(155+w1+5,getmaxy-25,'MODEL DIKE 2D');
      setcolor(14);
      outtextxy(155+w1+5+2,getmaxy-25,'MODEL DIKE 2D');
      w1:=w1+5;
    until w1>=330;
    w1:=330;
    repeat
      setcolor(8);
      settextstyle(1,0,5);
      outtextxy(w1+155,getmaxy-25,'MODEL DIKE 2D');
      outtextxy(w1+2+155,getmaxy-25,'MODEL DIKE 2D');
      setcolor(9);
      outtextxy(w1-5+155,getmaxy-25,'MODEL DIKE 2D');
      setcolor(14);
      outtextxy(w1-5+2+155,getmaxy-25,'MODEL DIKE 2D');
      w1:=w1-5;
    until w1<=0;
 until keypressed;
end;


procedure visual;
begin
 setfillstyle(1,7);
 bar(0,0,getmaxx,getmaxy);
 p8[1,1]:=abs(p8[1,1]);
 p8[1,2]:=abs(p8[1,2]);
 p8[1,3]:=abs(p8[1,3]);
 p8[1,4]:=abs(p8[1,4]);
 setfillstyle(1,8);
 bar(160,40,510,350);
 setfillstyle(1,1);
 bar(140,20,490,330);
 setfillstyle(1,4);
 bar(140,90,490,100);
 setcolor(15);
 rectangle(140,20,490,330);

 w1:=0;
 repeat
   setcolor(3);
   ellipse(185,125+w1,0,360,12,12);
   setfillstyle(1,3);
   floodfill(186,126+w1,3);
   w1:=w1+40;
   delay(15);
```

```
until w1>=200;

setcolor(10);
line(80,150,149,390);
line(82,152,152,392);
line(110,255,150,90);
line(50,150,100,210);
line(140,360,50,200);
line(143,360,150,260);
line(120,40,80,150);
line(120,42,82,152);
line(80,150,65,100);
line(82,152,67,102);
settextjustify(lefttext,righttext);
settextstyle(3,horizdir,20);
outtextxy(100,-40,'*');
outtextxy(70,-20,'*');
outtextxy(130,-20,'*');
outtextxy(100,0,'*');
outtextxy(30,130,'*');
outtextxy(125,40,'*');
setcolor(10);
outtextxy(75,45,'');
outtextxy(122,210,'');
outtextxy(65,95,'');
outtextxy(70,160,'');
outtextxy(93,200,'');
outtextxy(95,120,'');
outtextxy(133,250,'');
settextstyle(3,1,20);
outtextxy(72,80,'');
outtextxy(60,140,'');
outtextxy(-3,210,'');
outtextxy(65,105,'');
outtextxy(-3,90,'');
outtextxy(33,210,'');
outtextxy(43,290,'');
outtextxy(17,245,'');
settextstyle(3,horizdir,5);
setcolor(10);
outtextxy(114,330,'~');
outtextxy(142,330,'~');
setcolor(12);
outtextxy(112,115,'~');
outtextxy(45,190,'*');
outtextxy(40,176,'**');
```

```
outtextxy(30,160,'**');
outtextxy(100,10,'**');
outtextxy(90,20,'**');
outtextxy(130,20,'*');
outtextxy(140,75,'*');
outtextxy(135,90,'**');
outtextxy(125,85,'**');
outtextxy(100,40,'**');
outtextxy(110,5,'*');
outtextxy(120,25,'**');
outtextxy(150,40,'*');
outtextxy(130,50,'*');
outtextxy(110,40,'**');
outtextxy(80,35,'**');
outtextxy(130,20,'*');
outtextxy(100,30,'**');
setcolor(10);
settextstyle(3,1,6);
outtextxy(129,290,' ');
outtextxy(118,274,'');
outtextxy(131,260,'');
setcolor(12);
outtextxy(107,132,'~');
setcolor(11);
settextstyle(5,horizdir,1);
outtextxy(getmaxx-230,360,'Pilih nomor  !');
settextjustify(lefttext,centertext);
settextstyle(1,horizdir,2);
setcolor(7);
outtextxy(182,124,'1  Output table to printer');
delay(20);
outtextxy(182,164,'2  Output anomalies table ');
delay(20);
outtextxy(182,204,'3  Output anomalies curve');
delay(20);
outtextxy(182,244,'4  Output dike mode');
delay(20);
outtextxy(182,284,'5  Go to exit');
setcolor(14);
settextstyle(1,horizdir,2);
outtextxy(180,122,'1  Output table to printer');
delay(20);
outtextxy(180,162,'2  Output anomalies table');
delay(20);
outtextxy(180,202,'3  Output anomalies curve');
delay(20);
```

```
outtextxy(180,242,'4  Output dike mode');
delay(20);
outtextxy(180,282,'5  Go to exit');
 settextjustify(lefttext,centertext);
 settextstyle(1,horizdir,5);

 repeat
   setcolor(12);
   outtextxy(174,54,'OUTPUT MENU');
   delay(5);
   setcolor(11);
   outtextxy(174,54,'OUTPUT MENU');
 until keypressed;

repeat
  pilih :=readkey;
  until pilih in [chr(49),chr(50),chr(51),chr(52),chr(53)];

  if pilih = chr(49) then
  begin
    setbkcolor(0);
    output_to_printer;
    membuka_grafik;
    visual;
  end;

  if pilih = chr(50) then
  begin
        output_to_screen;
        repeat
          pilih :=readkey;
        until pilih in ['B','b','N','n'];
        if pilih in ['B','b'] then
        begin
        visual;
       end
  else
  end;

  if pilih = chr(51) then
        begin
          grafig;
          repeat
          pilih :=readkey;
        until pilih in ['B','b','N','n'];
        if pilih in ['B','b'] then
```

```
        begin
        visual;
        end
        else
        end;

if pilih = chr(52) then
begin
  setfillstyle(1,7);
  bar(0,0,getmaxx,getmaxy);
  settextjustify(lefttext,righttext);
  setfillstyle(1,8);
  bar(getmaxx div 2-140,getmaxy div 2-170,getmaxx div 2+170,getmaxy div
  2+10);
  setfillstyle(1,4);
  bar(getmaxx div 2-160,getmaxy div 2-190,getmaxx div 2+150,getmaxy div 2-
  43);
  setfillstyle(1,1);
  bar(getmaxx div 2-160,getmaxy div 2-37,getmaxx div 2+150,getmaxy div 2-
  10);
  setcolor(15);
  rectangle(getmaxx div 2-160,getmaxy div 2-190,getmaxx div 2+150,getmaxy
  div 2-10);
   setcolor(10);
  line(getmaxx div 2-150,getmaxy div 2 -167,getmaxx div 2-32,getmaxy div 2-
  167);
  line(getmaxx div 2-150,getmaxy div 2 -169,getmaxx div 2-32,getmaxy div 2-
  169);
  setcolor(15);
  settextstyle(0,0,1);
  outtextxy(getmaxx div 2-150,getmaxy div 2-150,'* Isikan skala model  dike
  dengan');
  outtextxy(getmaxx div 2-150,getmaxy div 2-130,'  bilangan bulat antara 1
  sampai 10.');
  outtextxy(getmaxx div 2-150,getmaxy div 2-110,'* Bila gambar dike belum
  kelihatan');
  outtextxy(getmaxx div 2-150,getmaxy div 2-90,'  isi dengan  bilangan  bulat
  yang ');
  outtextxy(getmaxx div 2-150,getmaxy div 2-70,'  lebih besar hingga dike
  kelihatan.');
  textcolor(14);
  setcolor(11);
  settextstyle(7,0,1);
  outtextxy(getmaxx div 2-150,getmaxy div 2-190,'PERHATIAN');
  settextstyle(1,0,1);
  gotoxy(49,14);
```

```
      setcolor(14);
      outtextxy(getmaxx div 2-110,getmaxy div 2-37,'skala model = 1 :  ');

      repeat
        setcolor(14);
        outtextxy(getmaxx div 2+60,getmaxy div 2-39,'_');
        delay(100);
        setcolor(1);
        outtextxy(getmaxx div 2+60,getmaxy div 2-39,'_');
        delay(100);
      until keypressed;

      readln(skl);
      model;
      repeat
        pilih :=readkey;
      until pilih in ['B','b','N','n'];
        if pilih in ['B','b'] then
        begin
          visual;
        end
        else
    end;

    if pilih = chr(53) then
    begin
    end;
end;


procedure proses;
begin
     membuka_grafik;
    setbkcolor(7);
    sound(1000);
    setfillstyle(1,1);
    bar(150,170,495,233);
    setcolor(14);
    rectangle(147,167,498,236);
    rectangle(150,170,495,233);
    setcolor(11);
    settextjustify(lefttext,righttext);
    settextstyle(7,0,3);
    outtextxy(160,170,'       SABAR . . . !');
    outtextxy(160,200,'proses sedang berlangsung');
    nosound;
end;
```

```
procedure ganti;
begin
  setbkcolor(1);
  setfillstyle(1,7);
  bar(0,0,getmaxx,getmaxy);
  i:=0;
  repeat
    setfillstyle(1,8);
    bar(getmaxx-i,55,280+getmaxx-i,400);
    setfillstyle(1,7);
    bar(280+getmaxx-i,55,800,400);
    i:=i+3;
  until i>=445;

  i:=0;
  repeat
    setfillstyle(1,14);
    bar(-280+i,40,i,385);
    setfillstyle(1,7);
    bar(-280+i,40,-280+i-280,395);
    i:=i+3;
  until i>=460;

  setfillstyle(1,1);
  bar(190,50,getmaxx-190,getmaxy-315);
  bar(190,getmaxy-215,getmaxx-190,getmaxy-105);
  setfillstyle(1,1);
  bar(13,40,130,385);
  line(13,60,130,60);
  line(40,60,40,385);
  line(getmaxx div 2,getmaxy-225,200,getmaxy-285);
  line(getmaxx div 2,getmaxy-225,getmaxx-200,getmaxy-285);
  line(200,getmaxy-285,230,getmaxy-285);
  line(getmaxx-230,getmaxy-285,getmaxx-200,getmaxy-285);
  line(230,getmaxy-285,230,getmaxy-305);
  line(getmaxx-230,getmaxy-285,getmaxx-230,getmaxy-305);
  line(230,getmaxy-305,getmaxx-230,getmaxy-305);
  settextjustify(lefttext,centertext);
  settextstyle(0,0,1);
  setcolor(11);
  outtextxy(219,62,'PARAMETER MODEL AWAL DIKE');
  textcolor(14);
  setcolor(14);
  str(abs(p3[1,1]):11:6,dtx);
  outtextxy(210,87,' Dalam    (m) : '+dtx);
  str(abs(p3[2,1]):11:6,dtx);
```

```
outtextxy(210,102,' Lebar    (m) : '+dtx);
str(abs(p3[3,1]):11:6,dtx);
outtextxy(210,117,' Miring (drj) : '+dtx);
str(abs(p3[4,1]):11:7,dtx);
outtextxy(210,132,' Spt.(emu    ) : '+dtx);
z1[pw]:=10000*sqrt(z[1]/m);
str(z1[pw]:11:6,dtx);
outtextxy(210,147,' Evg.error    : '+dtx);

pw1:=0;
repeat
  settextstyle(0,0,1);
  setcolor(11);
  outtextxy(32,51,'ERROR MODEL');
    setcolor(10);
    str(pw1:2,dtx);
    outtextxy(20,70+20*pw1,+dtx);
    setcolor(14);
    str(z1[pw-pw1]:10:6,dtx);
    outtextxy(45,70+20*pw1,+dtx);
    pw1:=pw1+1;
until pw1>=16;

settextstyle(0,0,1);
setcolor(11);
outtextxy(203,278,'PARAMETER MODEL AWAL PERBAIKAN');
setcolor(14);
outtextxy(210,314,' Dalam    (m) : ');
outtextxy(210,330,' Lebar    (m) : ');
outtextxy(210,346,' Miring (drj) : ');
outtextxy(210,360,' Spt.(emu    ) : ');
setfillstyle(1,4);
floodfill(getmaxx div 2,getmaxy-235,11);
delay(600);
setfillstyle(1,2);
floodfill(getmaxx div 2,getmaxy-250,11);

repeat
  setcolor(1);
  outtextxy(336,314,'_');
  delay(100);
  setcolor(14);
  outtextxy(336,314,'_');
  delay(100);
until keypressed;
```

```
gotoxy(43,20);outtextxy(336,314,'_');readln(p[1,1]);
gotoxy(43,21);outtextxy(336,330,'_');readln(p[2,1]);
gotoxy(43,22);outtextxy(336,346,'_');readln(p[3,1]);
gotoxy(43,23);outtextxy(336,360,'_');readln(p[4,1]);

i:=460;
w1:=8;
repeat
  setfillstyle(1,14);
  bar(-280+i,40,i,385);
  if i=180 then w1:=7;
  setfillstyle(1,w1);
  bar(i,40,i+14,385);
  setcolor(14);
  settextstyle(6,0,1);
  outtextxy(210,70,'Anda telah mengganti  ');
  outtextxy(210,90,'parameter model awal dike');
    outtextxy(210,110,'dengan nilai yang baru.');
    outtextxy(210,150,'Proses selanjutnya akan');
    outtextxy(210,170,'mengunakan parameter model ');
    outtextxy(210,190,'awal dike yang baru dengan');
    outtextxy(210,210,'masih menggunakan data');
    outtextxy(210,230,'anomali magnetik lapangan dan');
    outtextxy(210,250,'parameter-parameter kostan');
    outtextxy(210,270,'yang masih sama.');
    settextstyle(0,0,1);
    outtextxy(210,320,'<Tekan ENTER>');
    settextstyle(3,0,5);
    outtextxy(210,360,'*');
    outtextxy(260,360,'*');
    outtextxy(310,360,'*');
    outtextxy(360,360,'*');
    i:=i-10;
 until i<=-20;

 readln;
setcolor(8);
settextstyle(0,0,3);

i:=445;
repeat
     setfillstyle(1,8);
     bar(getmaxx-i,40,280+getmaxx-i,400);
     setfillstyle(1,7);
     bar(getmaxx-i-280,40,getmaxx-i,400);
     i:=i-5;
```

```
until i<=-10;
for i := 1 to 4 do p3[i,1] := p[i,1];
p[3,1] := p[3,1] * pi/180;
lamda := 0.0004;
end;


BEGIN { prog utama }
 membuka_grafik;
 judul;
 sub_judul;
 halpg;
 5:input_data;
 pw:=0;
 10: iterasi:= 0;
 proses;
 anomali_perhitungan;
 tranpose;
 repeat
 begin
  jumlah_kuadrat;
  txf;
  repeat
  begin
   txj;
   vxp1;
   wxf;
  end;
  until key1 = true;
 end;
 until key2 = true;
 visual;
 30:menu_kembali;
 repeat
  pilih :=readkey;
 until pilih in [chr(49),chr(50),chr(51)];

 if pilih = chr(49) then
 begin
  goto 5;
 end;

 if pilih = chr(50) then
 begin
  pw:=pw+1;
```

```
    ganti;
    goto 10;
  end;

  if pilih = chr(51) then
  begin
    close;
    repeat
    pilih :=readkey;
    until pilih in ['N','n','Y','y'];
    if pilih in ['N','n'] then
    begin
      goto 30;
    end
    else
    end;
 the_end;
 menutup_grafik;
END.
```