BAB VI

KESIMPULAN DAN SARAN

VI.1. Kesimpulan

Kesimpulan yang dapat diambil dari penulisan tugas akhir ini adalah:

1. Bahwa dengan menggunakan program komputer untuk merencanakan balok beton prategang akan jauh lebih efisien dari segi waktu yang dikeluarkan dan ketelitian pada saat menghitung dibanding perhitungan manual. Terlebih jika ingin merencanakan beberapa jenis penampang balok untuk suatu data tertentu, maka dengan menggunakan perhitungan manual akan memakan waktu yang banyak.
2. Hasil yang diperoleh dari perencanaan dengan menggunakan program komputer sangat mendekati hasil yang didapat dari perencanaan manual.
3. Dalam program komputer juga dapat dicek apabila terjadi kesalahan dalam memasukkan data-data perancanaan, Karena akan ada pemberitahuan dari program tersebut, Bahwa kita salah memasukkan data-data. Karena kadang-kadang dalam perhitungan manual kita dapat salah memasukkan data-data, Bisa akibat kesalahan kita. Tetapi dalam program kita dapat mengetahui apabila ada kesalahan memasukkan data-data. Sehingga pemakaian program komputer dapat lebih terpercaya perhitungannya.

Oleh karena itu program komputer terasa sekali untuk membantu perhitungan dalam perencanaan balok beton prategang.

VI.2. Saran

Saran yang dapat penulis berikan adalah:

1. Untuk perencanaan balok beton prategang dengan program komputer beirkutnya diharapkan dalam program tersebut terdapat lebih dari tiga jenis pilihan penampang (type rectangular, type T, dan type I), agar pemakai program dapat memilih jenis penampang yang lain untuk menentukan pilihannya.
2. Untuk nilai f'c hendaknya ada batasan f'c minimum sehingga pemakai program tidak memakai beton mutu rendah. Kehilangan tegangan juga dapat dimasukkan kedalam perhitungan agar didapat nilai kehilangan tegangan yang lebih akurat.
3. Untuk Analisa berikutnya dapat menganalisis balok statis tak tentu dan balok menerus.

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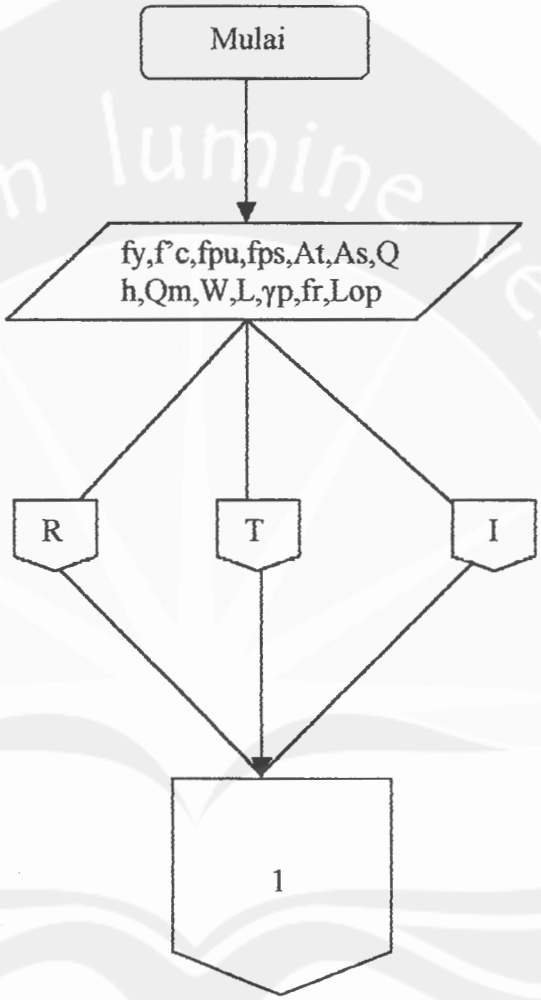
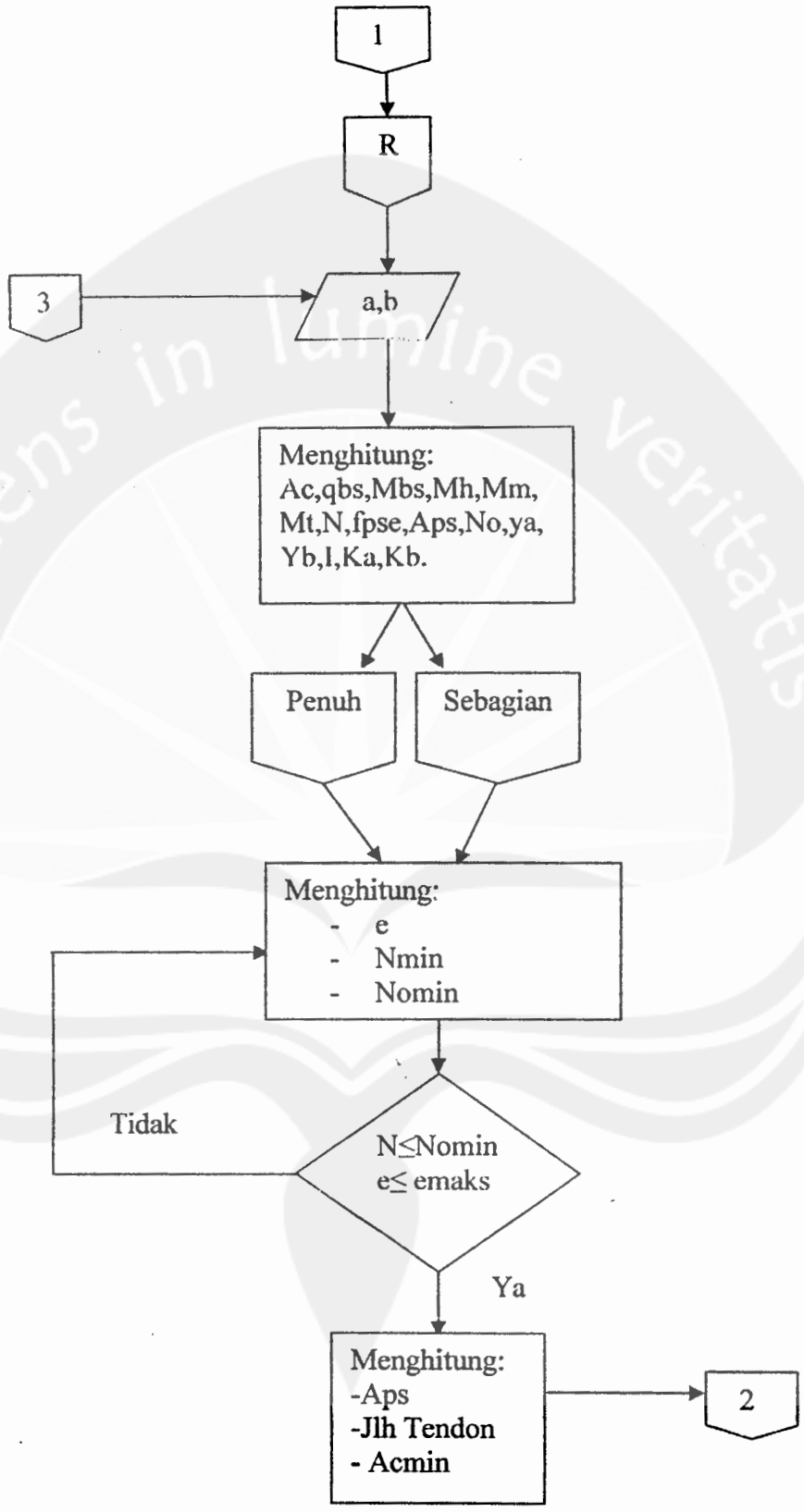
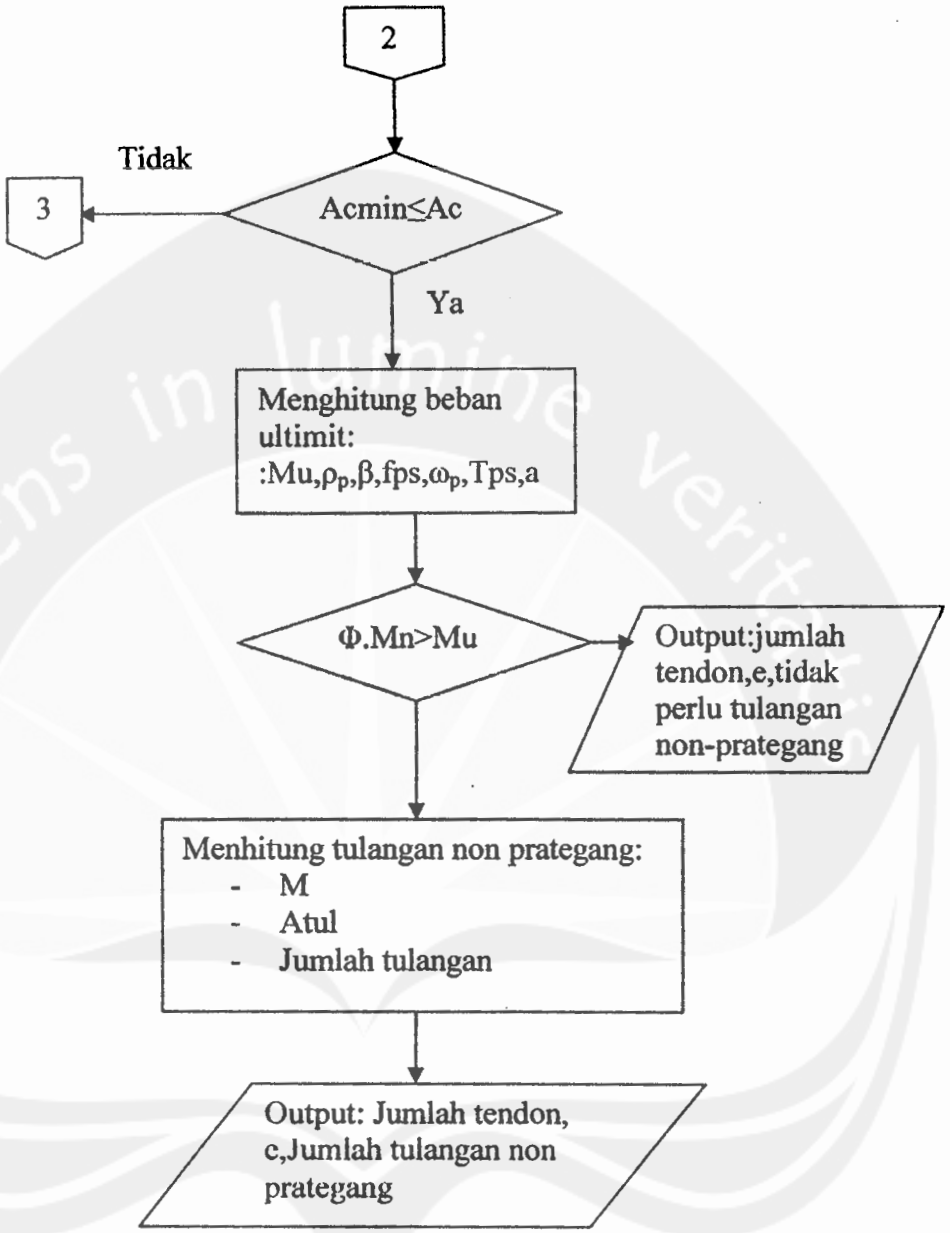
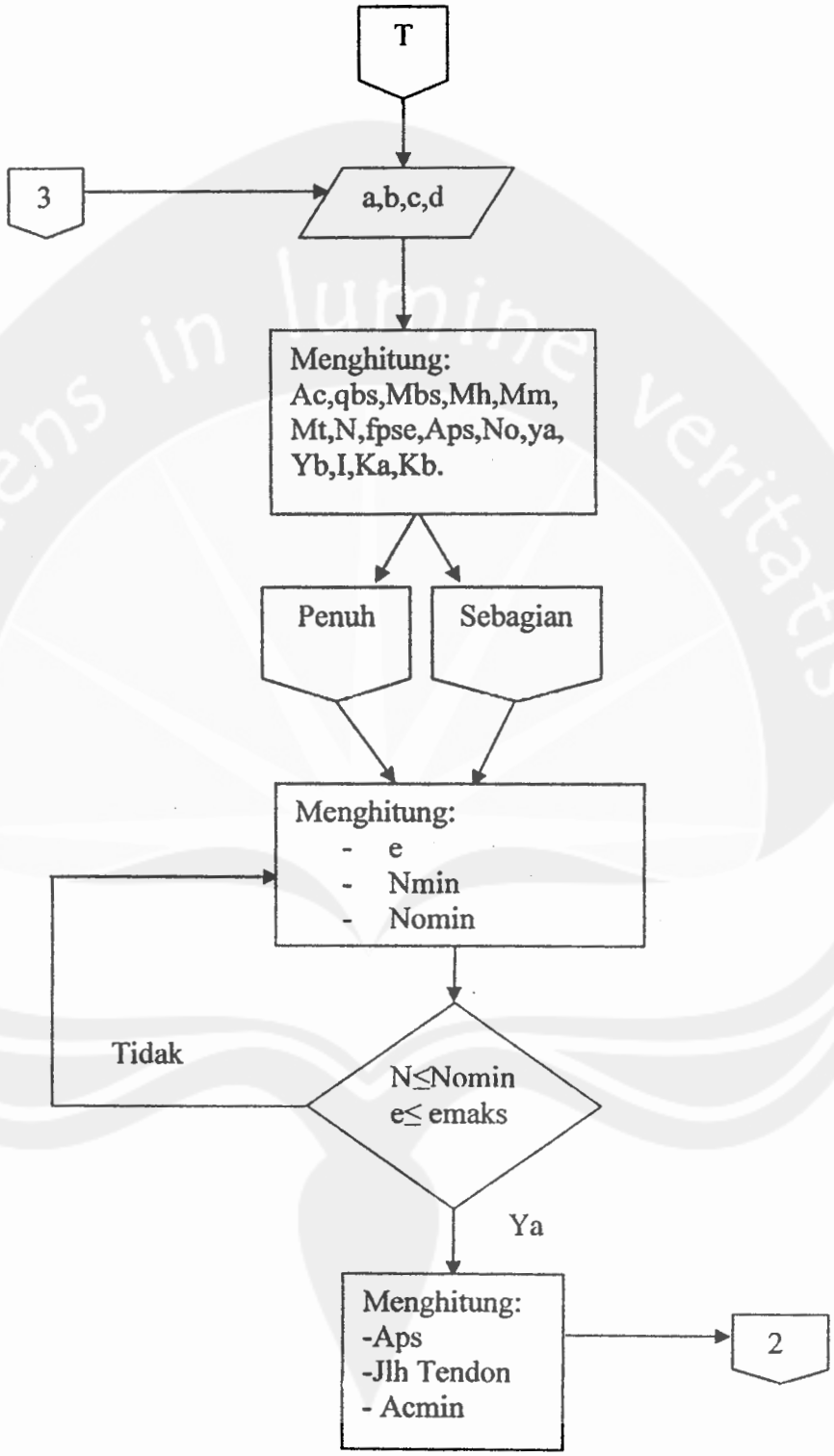
LAMPIRAN

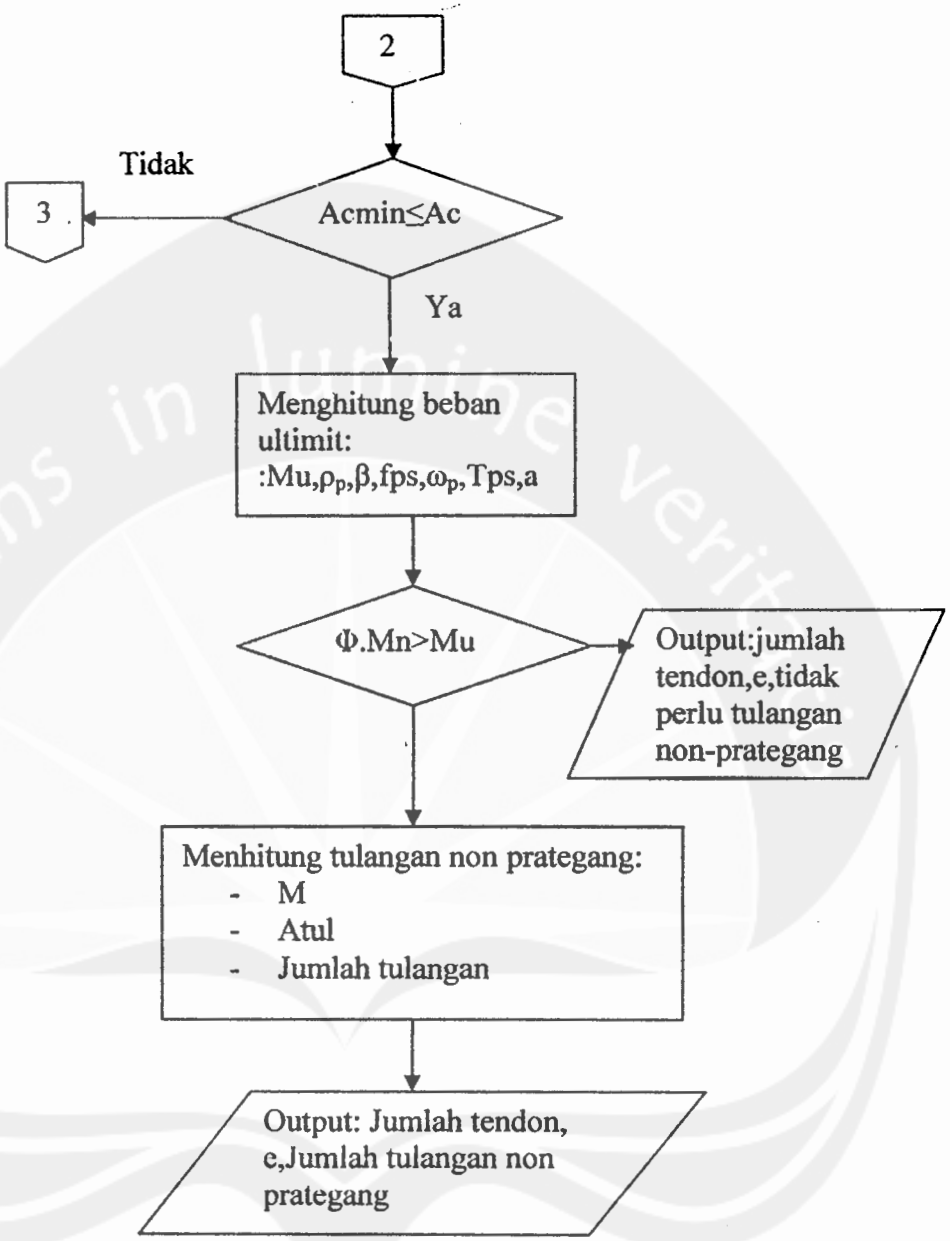
FLOW CHART

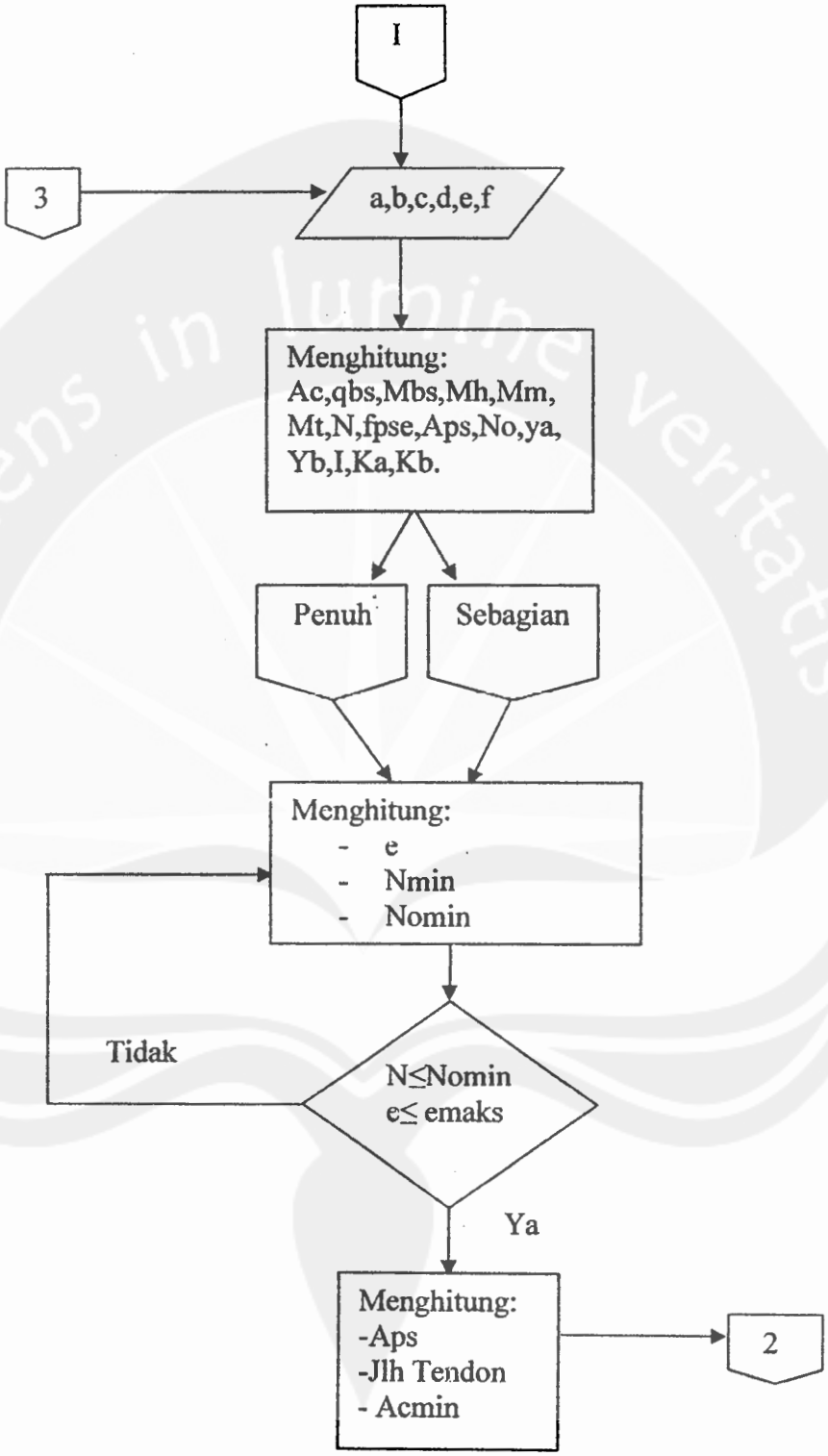


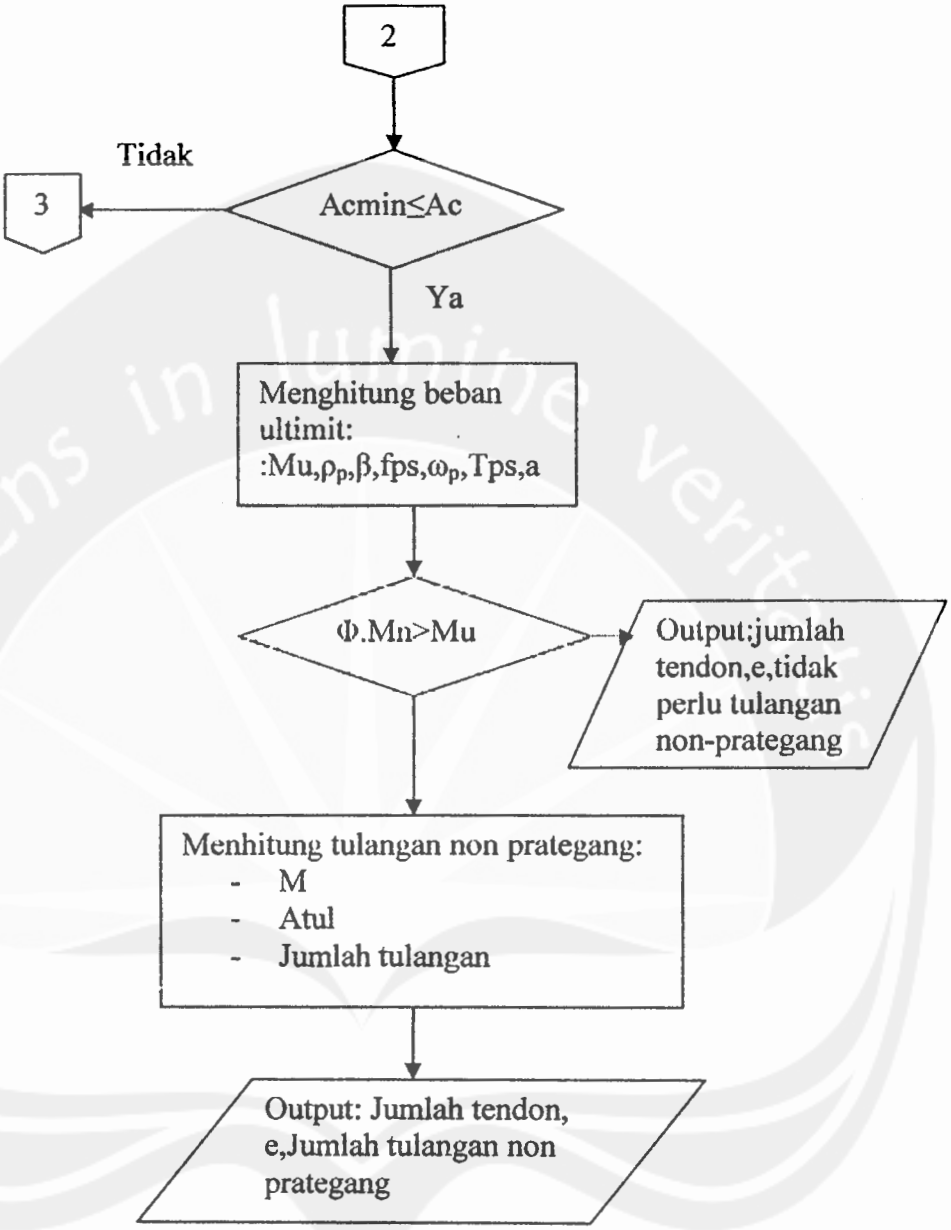

1
R
3
a,b
Menghitung:
Ac,qbs,Mbs,Mh,Mm,
Mt,N,fpse,Aps,No,ya,
Yb,I,Ka,Kb.
Penuh
Sebagian
Menghitung:
- e
- Nmin
- Nomin
Tidak
N≤Nomin
e≤ emaks
Ya
Menghitung:
-Aps
-Jlh Tendon
- Acmin
2

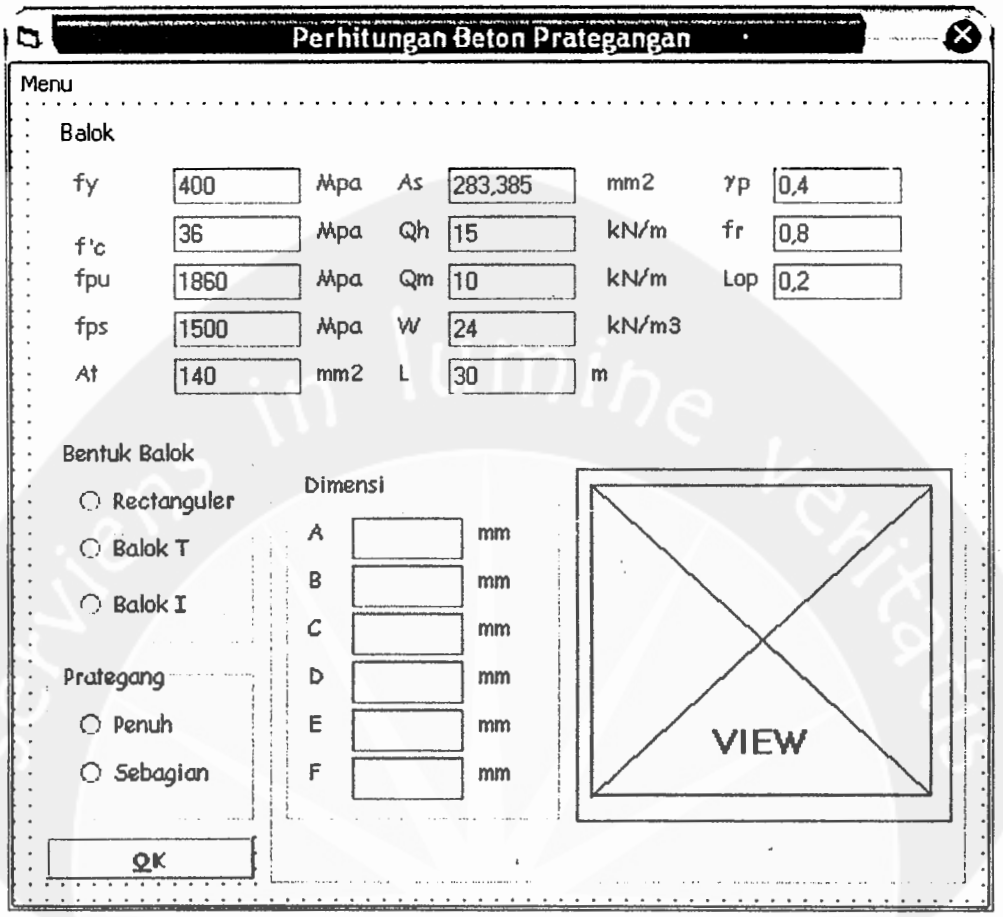

2
Tidak
3
Acmin≤Ac
Ya
Menghitung beban ultimit:
:Mu,ρp,β,fps,ωp,Tps,a
Φ.Mn>Mu
Output:jumlah tendon,e,tidak perlu tulangan non-prategang
Menhitung tulangan non prategang:
- M
- Atul
- Jumlah tulangan
Output: Jumlah tendon, c,Jumlah tulangan non prategang


T
3
a,b,c,d
Menghitung:
Ac,qbs,Mbs,Mh,Mm,
Mt,N,fpse,Aps,No,ya,
Yb,I,Ka,Kb.
Penuh
Sebagian
Menghitung:
- e
- Nmin
- Nomin
Tidak
N≤Nomin
e≤ emaks
Ya
Menghitung:
-Aps
-Jlh Tendon
- Acmin
2


2
Tidak
3
Acmin≤Ac
Ya
Menghitung beban ultimit:
:Mu,ρp,β,fps,ωp,Tps,a
Φ.Mn>Mu
Output:jumlah tendon,e,tidak perlu tulangan non-prategang
Menhitung tulangan non prategang:
- M
- Atul
- Jumlah tulangan
Output: Jumlah tendon, e,Jumlah tulangan non prategang


I
3
a,b,c,d,e,f
Menghitung:
Ac,qbs,Mbs,Mh,Mm,
Mt,N,fpse,Aps,No,ya,
Yb,I,Ka,Kb.
Penuh
Sebagian
Menghitung:
- e
- Nmin
- Nomin
Tidak
N≤Nomin
e≤ emaks
Ya
Menghitung:
-Aps
-Jlh Tendon
- Acmin
2

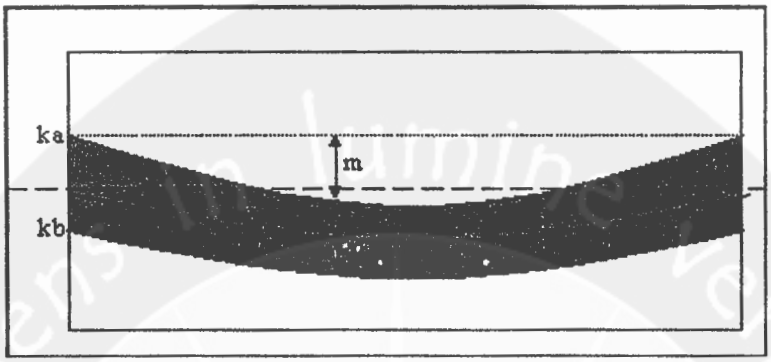

2
Tidak
3
Acmin≤Ac
Ya
Menghitung beban ultimit: :Mu,ρp,β,fps,ωp,Tps,a
Φ.Mn>Mu
Output:jumlah tendon,e,tidak perlu tulangan non-prategang
Menhitung tulangan non prategang:
- M
- Atul
- Jumlah tulangan
Output: Jumlah tendon, e,Jumlah tulangan non prategang


Perhitungan Beton Prategangan
Menu
Balok
fy
400
Mpa
As
283,385
mm2
γp
0,4
f'c
36
Mpa
Qh
15
kN/m
fr
0,8
fpu
1860
Mpa
Qm
10
kN/m
Lop
0,2
fps
1500
Mpa
W
24
kN/m3
At
140
mm2
L
30
m
Bentuk Balok
Rectanguler
Balok T
Balok I
Prategang
Penuh
Sebagian
OK
Dimensi
A
B
C
D
E
F
mm
VIEW

Hasil

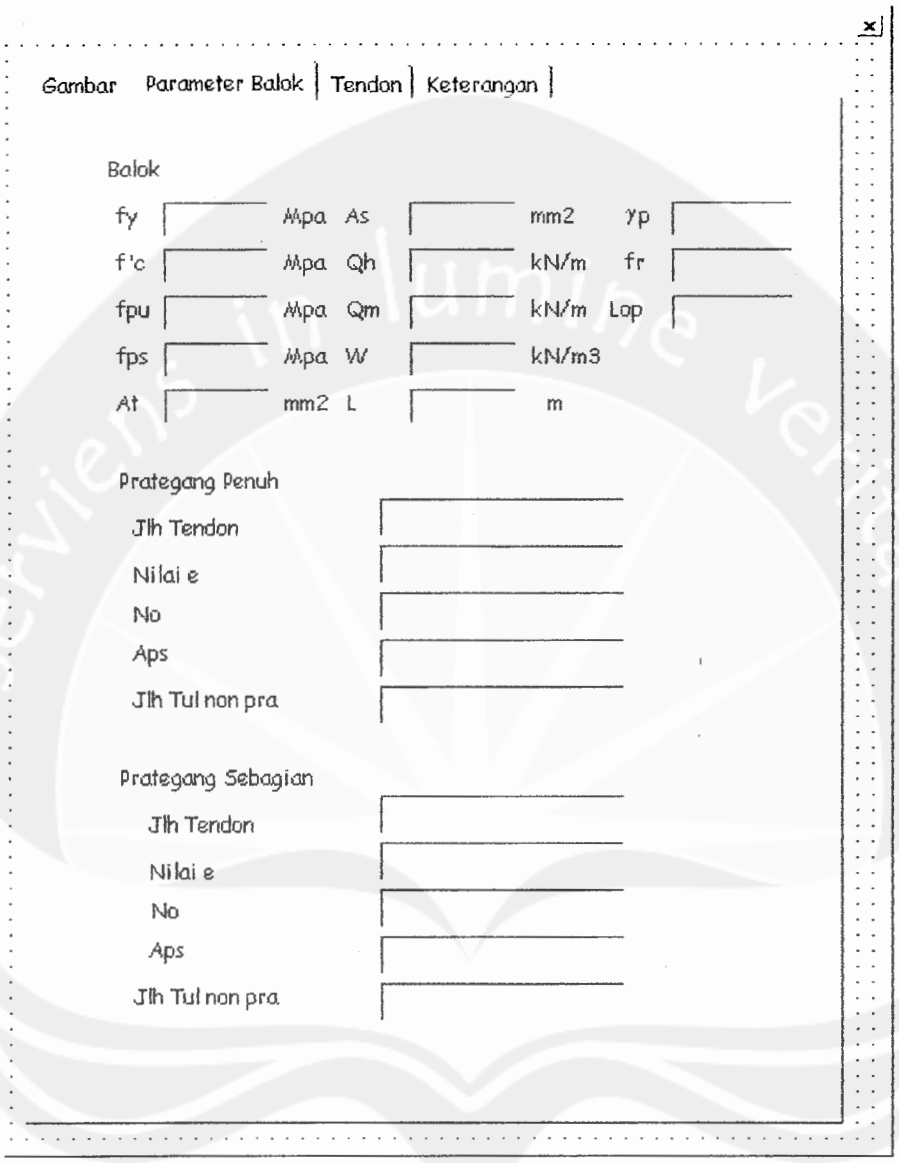
Gambar | Parameter Balok | Tendon | Keterangan |

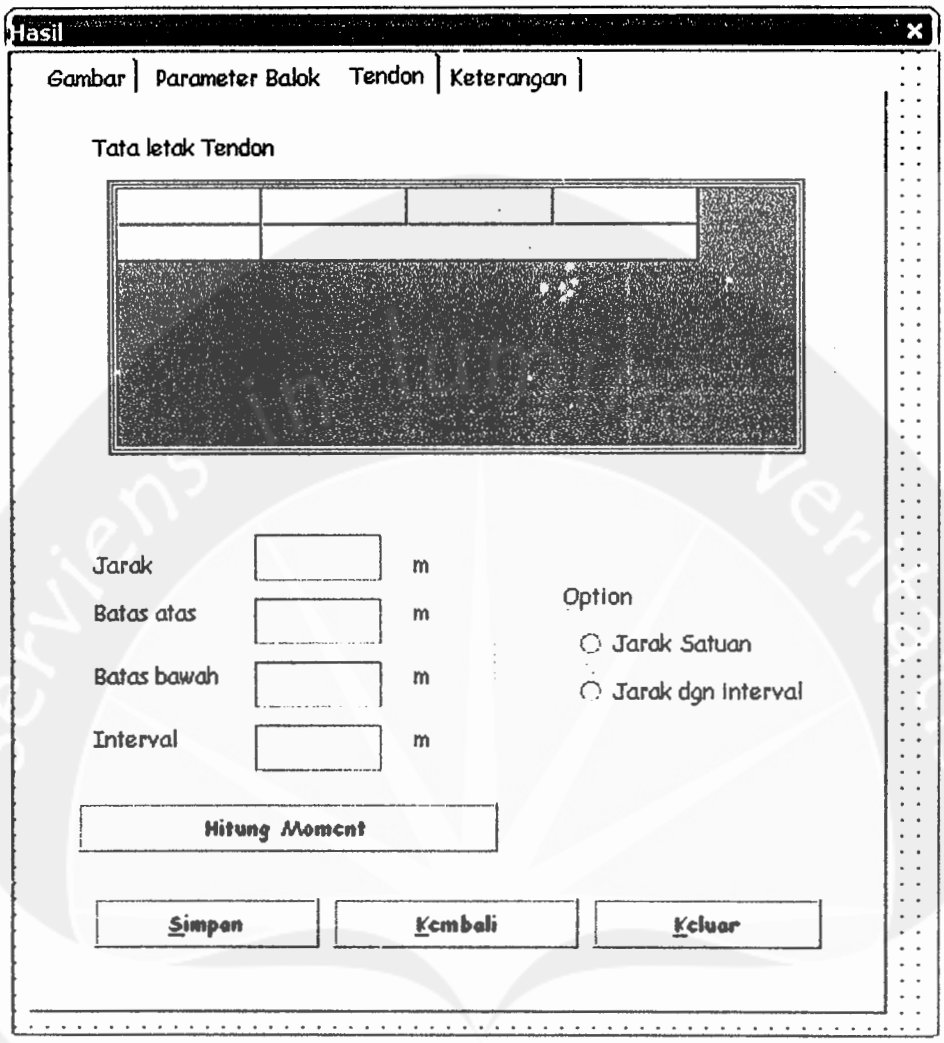
Gambar Letak Tendon

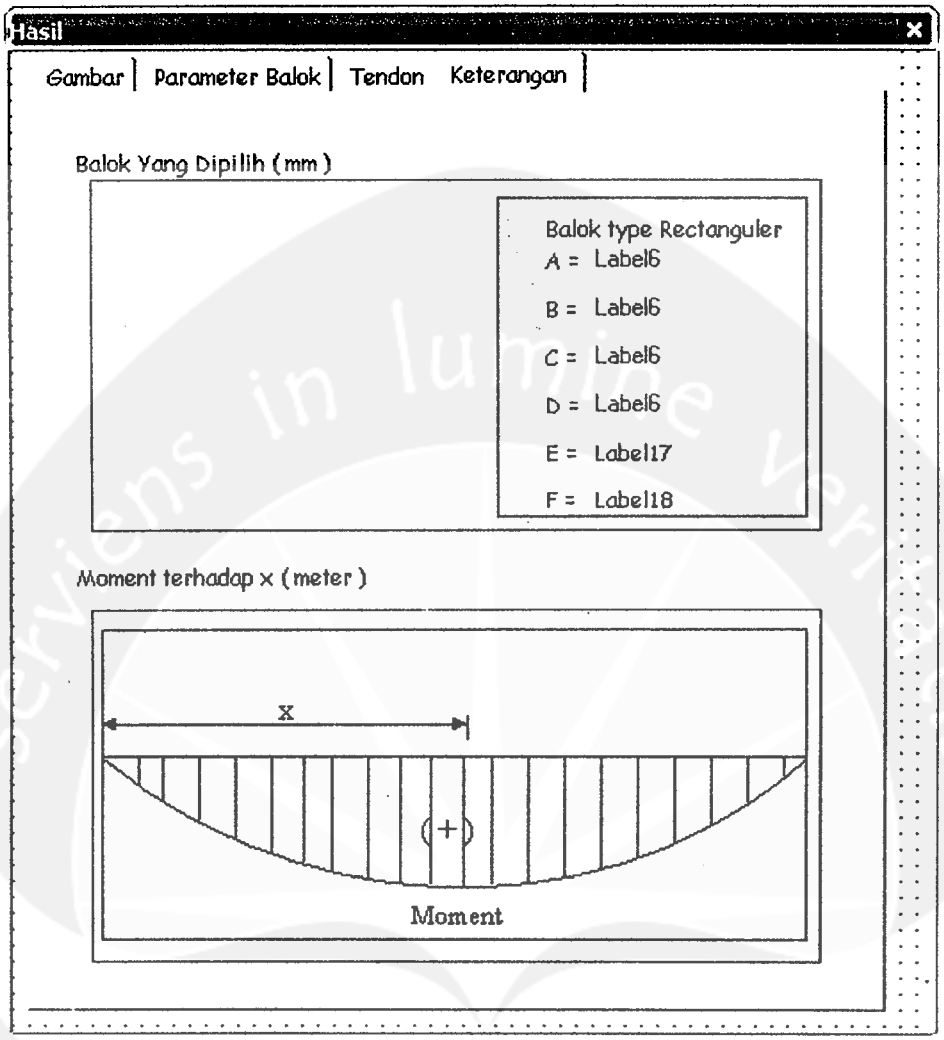


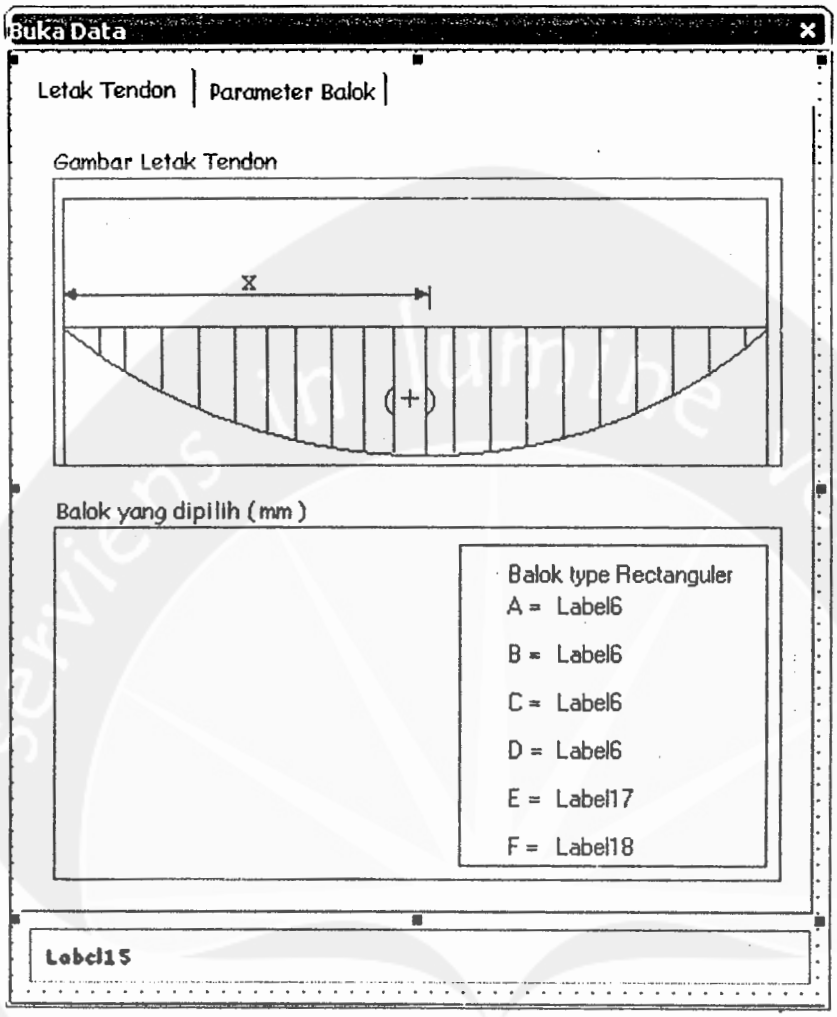
Keterangan Gambar

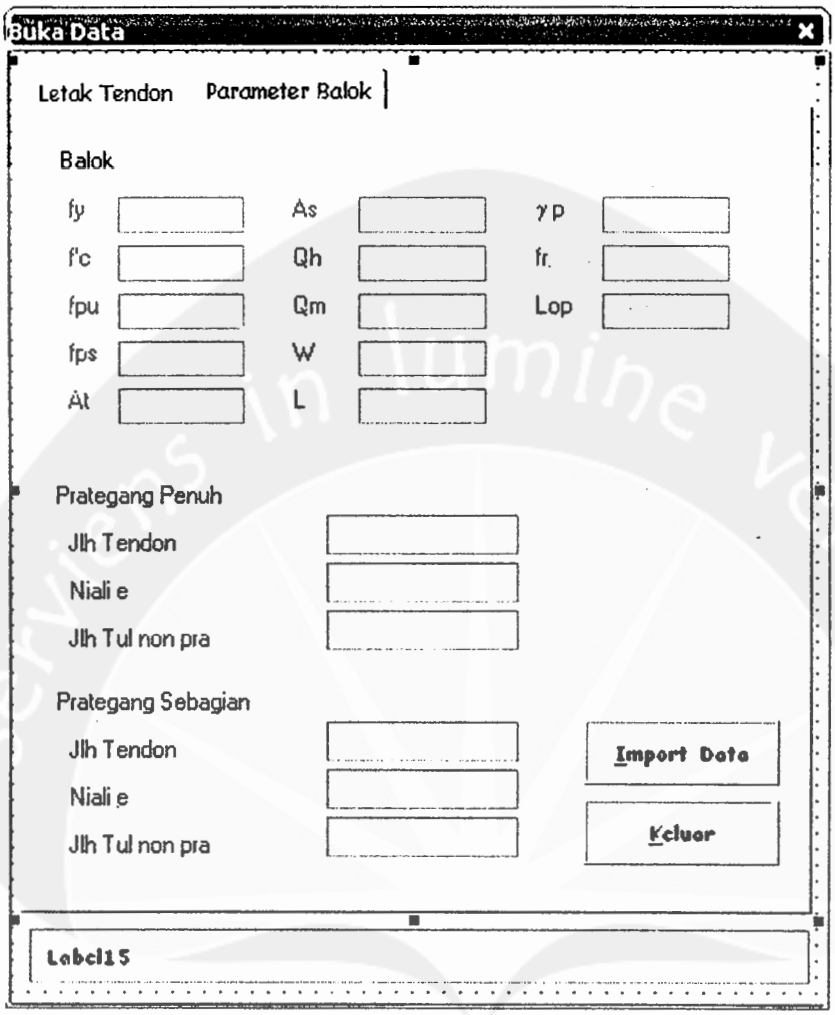
b	=	Batas atas bila tidak diijinkan adanya tegangan tarik
d	=	Batas bawah bila diijinkan adanya tegangan tarik tarik
m	=	Jarak tendon diukur dari ka bila tidak ada tegangan tarik
n	=	Jarak tendon diukur dari kb bila tidak ada tegangan tarik

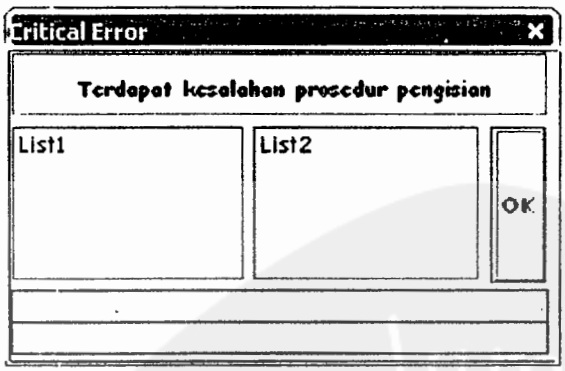

Gambar
Parameter Balok
Tendon
Keterangan
Balok
fy
Mpa
As
mm2
γp
f'c
Mpa
Qh
kN/m
fr
fpu
Mpa
Qm
kN/m
Lop
fps
Mpa
W
kN/m3
At
mm2
L
m
Prategang Penuh
Jlh Tendon
Nilai e
No
Aps
Jlh Tul non pra
Prategang Sebagian
Jlh Tendon
Nilai e
No
Aps
Jlh Tul non pra


Hasil
Gambar
Parameter Balok
Tendon
Keterangan
Tata letak Tendon
Jarak
m
Batas atas
m
Batas bawah
m
Interval
m
Option
Jarak Satuan
Jarak dgn Interval
Hitung Momcnt
Simpan
Kembali
Keluar


Hasil
Gambar
Parameter Balok
Tendon
Keterangan
Balok Yang Dipilih (mm)
Balok type Rectanguler
A = Label6
B = Label6
C = Label6
D = Label6
E = Label17
F = Label18
Moment terhadap x (meter)
x
+
Moment


Buka Data
Letak Tendon
Parameter Balok
Gambar Letak Tendon
X
Balok yang dipilih (mm)
Balok type Rectanguler
A = Label6
B = Label6
C = Label6
D = Label6
E = Label17
F = Label18
Label15


Buka Data
Letak Tendon
Parameter Balok
Balok
fy
f'c
fpu
fps
At
As
Qh
Qm
W
L
γ p
fr.
Lop
Prategang Penuh
Jlh Tendon
Niali e
Jlh Tul non pra
Prategang Sebagian
Jlh Tendon
Niali e
Jlh Tul non pra
Import Data
Kcluar
Labcl15


Critical Error
Terdapat kesalahan prosedur pengisian
List1
List2
OK

```
Sub matikan()
TT1(0).Enabled = False
TT1(0).BackColor = &H8000000F
TT1(1).Enabled = False
TT1(1).BackColor = &H8000000F
TT1(2).Enabled = False
TT1(2).BackColor = &H8000000F
TT1(3).Enabled = False
TT1(3).BackColor = &H8000000F
TT1(4).Enabled = False
TT1(4).BackColor = &H8000000F
TT1(5).Enabled = False
TT1(5).BackColor = &H8000000F
Picture1.Visible = False
Picture2.Visible = False
Picture3.Visible = False
Picture4.Visible = False
Opp1.Value = False
Opp2.Value = False
End Sub
Private Sub Command1_Click()
  For Index = 0 To 12
    If Not IsNumeric(T1(Index).Text) Then
    Load F5
    F5.Top = 0
    F5.Left = 0
    F5.Show
    F5.List1.AddItem "Kolom ke-" & Index
    F5.Label2.Caption = "Anda belum mengisi Parameter balok"
    End If
  Next Index
  If (OP1.Value = False And OP2.Value = False And OP3.Value = False) Then
  Load F5
  F5.Show
  F5.Label1.Caption = "Anda belum memilih/mengisi bentuk penampang"
  End If

  If OP1.Value = True Then
    For Index = 0 To 1
    If Not IsNumeric(F1.TT1(Index).Text) Then
    Load F5
    F5.Top = 0
    F5.Left = 0
    F5.Show
    F5.List2.AddItem "Kolom ke-" & Index
    F5.Label1.Caption = "Anda belum memilih/mengisi bentuk penampang"
    End If
    Next Index
      If F5.List2.ListCount = 0 And F5.List1.ListCount = 0 Then
      Load F2
      F2.Show
      Else
      Exit Sub
      End If
  ElseIf OP2.Value = True Then
```

```
For Index = 0 To 3
If Not IsNumeric(F1.TT1(Index).Text) Then
 Load F5
 F5.Top = 0
 F5.Left = 0
 F5.Show
 F5.List2.AddItem "Kolom ke-" & Index
 F5.Label1.Caption = "Anda belum memilih/mengisi bentuk penampang"
End If
Next Index
   If F5.List2.ListCount = 0 And F5.List1.ListCount = 0 Then
   Load F2
   F2.Show
   Else
   Exit Sub
   End If

ElseIf OP3.Value = True Then
   For Index = 0 To 5
   If Not IsNumeric(F1.TT1(Index).Text) Then
   Load F5
   F5.Top = 0
   F5.Left = 0
   F5.Show
   F5.List2.AddItem "Kolom ke-" & Index
   F5.Label1.Caption = "Anda belum memilih/mengisi bentuk penampang"
   End If
   Next Index
      If F5.List2.ListCount = 0 And F5.List1.ListCount = 0 Then
      Load F2
      F2.Show
      Else
      Exit Sub
      End If

End If

If (OP1.Value = False And OP2.Value = False And OP3.Value = False) Then
   Exit Sub
   Load F2
   F2.Hide
Else: F2.Show
  If OP1.Value = True Then
  F2.Picture2 = F1.Picture2
  F2.Label1.Caption = "Balok type Rectanguler"
  F2.LH1.Caption = TT1(0).Text
  F2.LH2.Caption = TT1(1).Text
  F2.LH3.Caption = "-"
  F2.LH4.Caption = "-"
  F2.LH5.Caption = "-"
  F2.LH6.Caption = "-"

  ElseIf OP2.Value = True Then
  F2.Picture2 = F1.Picture1
  F2.Label1.Caption = "Balok type T"
```

```
    F2.LH1.Caption = TT1(0).Text
    F2.LH2.Caption = TT1(1).Text
    F2.LH3.Caption = TT1(2).Text
    F2.LH4.Caption = TT1(3).Text
    F2.LH5.Caption = "-"
    F2.LH6.Caption = "-"

    ElseIf OP3.Value = True Then
    F2.Picture2 = F1.Picture3
    F2.Label1.Caption = "Balok type I"
    F2.LH1.Caption = TT1(0).Text
    F2.LH2.Caption = TT1(1).Text
    F2.LH3.Caption = TT1(2).Text
    F2.LH4.Caption = TT1(3).Text
    F2.LH5.Caption = TT1(4).Text
    F2.LH6.Caption = TT1(5).Text
    End If
F1.Hide
End If
    If F1.OP1.Value = True Then
     Rectanguler
    ElseIf F1.OP2.Value = True Then
     TampangT
    ElseIf F1.OP3.Value = True Then
     TampangI
    End If
End Sub
Private Sub Form_Load()
Me.Top = 0
F4.Show
matikan
Picture4.Visible = True

End Sub

Private Sub mnubaru_Click()
For I = 0 To 12
T1(I).Text = ""
Next I
OP1.Value = False
OP2.Value = False
OP3.Value = False
For I = 0 To 5
TT1(I).Text = ""
TT1(I).Enabled = False
TT1(I).BackColor = &H8000000F
Next I
T1(0).SetFocus
End Sub

Private Sub mnudata_Click()
'Unload Me
CM1.DialogTitle = "Buka data"
CM1.Filter = "Prategang(*.Pra)|*.Pra"
CM1.ShowOpen
```

```
    If Len(CM1.FileName) = 0 Then
    Exit Sub
    End If
Load F3
F3.Show
Me.Hide
Open F1.CM1.FileName For Binary As #1 Len = Len(Data)
Felix = LOF(1) / Len(F1.CM1.FileName)
If Felix > 0 Then
Felix = 1
Else
Felix = Felix
End If
Get #1, Felix, Data
With Data
For I = 0 To 12
   F3.T1(I).Text = Trim(.lina(I))
Next I

F3.Label1.Caption = Trim(.lix)
   If .ix = 1 Then
      F3.LH1.Caption = Trim(.A)
      F3.LH2.Caption = Trim(.B)
      F3.Picture2.Picture = F1.Picture2.Picture
      F3.LH3.Caption = "-"
      F3.LH4.Caption = "-"
      F3.LH5.Caption = "-"
      F3.LH6.Caption = "-"
   ElseIf .ix = 2 Then
      F3.LH1.Caption = Trim(.A)
      F3.LH2.Caption = Trim(.B)
      F3.LH3.Caption = Trim(.C)
      F3.LH4.Caption = Trim(.D)
      F3.Picture2.Picture = F1.Picture1.Picture
      F3.LH5.Caption = "-"
      F3.LH6.Caption = "-"
   ElseIf .ix = 3 Then
      F3.LH1.Caption = Trim(.A)
      F3.LH2.Caption = Trim(.B)
      F3.LH3.Caption = Trim(.C)
      F3.LH4.Caption = Trim(.D)
      F3.LH5.Caption = Trim(.E)
      F3.LH6.Caption = Trim(.F)
      F3.Picture2.Picture = F1.Picture3.Picture
   End If

      If .iy = 1 Then
      F3.Text1.Text = Trim(.jlht)
      F3.Text2.Text = Trim(.nile)
      F3.Text3.Text = Trim(.jlhnon)

      ElseIf .iy = 2 Then
      F3.Text4.Text = Trim(.jlht)
      F3.Text5.Text = Trim(.nile)
      F3.Text6.Text = Trim(.jlhnon)
```

```
    End If
End With
Close #1

F3.Label10 = F1.CM1.FileName
End Sub

Private Sub mnukeluar_Click()
End
End Sub
Private Sub OP1_Click()
matikan
TT1(0).Text = ""
TT1(1).Text = ""
TT1(2).Text = ""
TT1(3).Text = ""
TT1(4).Text = ""
TT1(5).Text = ""
Picture2.Visible = True
TT1(0).Enabled = True
TT1(0).SetFocus
TT1(0).BackColor = &H80000005
TT1(1).Enabled = True
TT1(1).BackColor = &H80000005
End Sub
Private Sub OP2_Click()
matikan
TT1(0).Text = ""
TT1(1).Text = ""
TT1(2).Text = ""
TT1(3).Text = ""
TT1(4).Text = ""
TT1(5).Text = ""
Picture1.Visible = True
TT1(0).Enabled = True
TT1(0).SetFocus
TT1(0).BackColor = &H80000005
TT1(1).Enabled = True
TT1(1).BackColor = &H80000005
TT1(2).Enabled = True
TT1(2).BackColor = &H80000005
TT1(3).Enabled = True
TT1(3).BackColor = &H80000005

End Sub
Private Sub OP3_Click()
matikan
TT1(0).Text = ""
TT1(1).Text = ""
TT1(2).Text = ""
TT1(3).Text = ""
TT1(4).Text = ""
TT1(5).Text = ""
Picture3.Visible = True
TT1(0).Enabled = True
```

```
TT1(0).SetFocus
TT1(0).BackColor = &H80000005
TT1(1).Enabled = True
TT1(1).BackColor = &H80000005
TT1(2).Enabled = True
TT1(2).BackColor = &H80000005
TT1(3).Enabled = True
TT1(3).BackColor = &H80000005
TT1(4).Enabled = True
TT1(4).BackColor = &H80000005
TT1(5).Enabled = True
TT1(5).BackColor = &H80000005
End Sub

Private Sub T1_KeyPress(Index As Integer, KeyAscii As Integer)
If KeyAscii <> 13 Then Exit Sub
If IsNumeric(T1(Index)) Then
Index = Index + 1
If Index > 12 Then Exit Sub
T1(Index).SetFocus
Else
MsgBox "Anda Harus Mengisi Bilangan", vbCritical, "Maaf"
T1(Index).SelStart = 0
T1(Index).SelLength = Len(T1(Index))
End If
End Sub

Private Sub TT1_KeyPress(Index As Integer, KeyAscii As Integer)
If KeyAscii <> 13 Then Exit Sub
If IsNumeric(TT1(Index)) Then
Index = Index + 1
   If OP1.Value = True Then
   If Index > 1 Then Exit Sub
   TT1(Index).SetFocus
   ElseIf OP2.Value = True Then
   If Index > 3 Then Exit Sub
   TT1(Index).SetFocus
   ElseIf OP3.Value = True Then
   If Index > 5 Then Exit Sub
   TT1(Index).SetFocus
   End If
Else
MsgBox "Anda Harus Mengisi Bilangan", vbCritical, "Maaf"
TT1(Index).SelStart = 0
TT1(Index).SelLength = Len(TT1(Index))
End If
End Sub
```

```
Private Sub cmdkeluar_Click()
End
End Sub
Private Sub cmdsimpan_Click()

'menyimpan file'
F1.CM1.Filter = "Prategang(*.Pra)|*.Pra"
F1.CM1.ShowSave
   If Len(F1.CM1.FileName) = 0 Then
   Exit Sub
   End If

'membaca data menjadi index array'
With Data
   For I = 0 To 12
   .lina(I) = F1.T1(I).Text
   Next I
.lix = F2.Label1.Caption
   If F1.OP1.Value = True Then
      .ix = 1
      .A = F2.LH1.Caption
      .B = F2.LH2.Caption
   ElseIf F1.OP2.Value = True Then
      .ix = 2
      .A = F2.LH1.Caption
      .B = F2.LH2.Caption
      .C = F2.LH3.Caption
      .D = F2.LH4.Caption
   ElseIf F1.OP3.Value = True Then
      .ix = 3
      .A = F2.LH1.Caption
      .B = F2.LH2.Caption
      .C = F2.LH3.Caption
      .D = F2.LH4.Caption
      .E = F2.LH5.Caption
      .F = F2.LH6.Caption
   End If
   If F1.OPP1.Value = True Then
   .iy = 1
   .jlht = F2.Text1.Text
   .nile = F2.Text2.Text
   .jlhnon = F2.Text3.Text

   ElseIf F1.OPP2.Value = True Then
   .iy = 2
   .jlht = F2.Text4.Text
   .nile = F2.Text5.Text
   .jlhnon = F2.Text6.Text
   End If
End With

'mengaktifkan file yang akan disimpan'
Open F1.CM1.FileName For Binary As #1 Len = Len(Data)

'membuat index data yang akan dicetak ke file'
```

```
Felix = LOF(1) / Len(Data)

   If Felix = 0 Then
   Felix = Felix + 1
   End If

'mencetak data ke file'
Put #1, Felix, Data
Close #1

End Sub
Private Sub cmdulang_Click()
F2.Hide
F1.Show
F1.T1(0).SetFocus
End Sub

Private Sub Command2_Click()
'MsgBox ("jarak= " + F2.JR.Text + " panjang bentang= " + F1.T1(9).Text)
hitungmoment
End Sub

Private Sub Form  Activate()
If F1.OPP1.Value Then
      F2.Label4(0).Visible = False
      F2.Label5(0).Visible = False
      F2.Label6(0).Visible = False
      F2.Label4(1).Visible = True
      F2.Label5(1).Visible = True
      F2.Label6(1).Visible = True
      F2.Label4(2).Visible = True
      F2.Label5(2).Visible = True
      F2.Label6(2).Visible = True
      F2.Label4(3).Visible = False
      F2.Label5(3).Visible = False
      F2.Label6(3).Visible = False
      F2.Picture1(1).Visible = True
      F2.Picture1(2).Visible = True
      F2.m.Caption = "m"
      F2.ket.Caption = "Jarak Tendon diukur dari Ka bila tidak ada tegangan tarik"
      F2.n.Caption = "n"
      F2.kett.Caption = "Jarak Tendon diukur dari Kb bila tidak ada tegangan tarik"
With F2.MSG1
      .Row = 0
      .Col = 2
      .Text = "m"
      .CellAlignment = 4
      .Row = 0
      .Col = 3
      .Text = "n"
      .CellAlignment = 4
End With

With F2.MSG1
.Row = 1
```

```
.Col = 0
.Text = ""
.CellAlignment = 4
.Col = 1
.Text = ""
.CellAlignment = 4
.Col = 2
.Text = ""
.CellAlignment = 4
.Col = 3
.Text = ""
.CellAlignment = 4
.Rows = 2
End With
F2.Command2.Enabled = True
End If

If F1.OPP2.Value Then
    F2.Label4(0).Visible = True
    F2.Label5(0).Visible = True
    F2.Label6(0).Visible = True
    F2.Label4(1).Visible = False
    F2.Label5(1).Visible = False
    F2.Label6(1).Visible = False
    F2.Label4(2).Visible = False
    F2.Label5(2).Visible = False
    F2.Label6(2).Visible = False
    F2.Label4(3).Visible = True
    F2.Label5(3).Visible = True
    F2.Label6(3).Visible = True
    F2.Picture1(1).Visible = True
    F2.Picture1(2).Visible = False
    F2.m.Caption = "q"
    F2.ket.Caption = "Jarak Tendon diukur dari Ka bila ada tegangan tarik"
    F2.n.Caption = "r"
    F2.kett.Caption = "Jarak Tendon diukur dari Kb bila ada tegangan tarik"
    With F2.MSG1
      .Row = 0
      .Col = 2
      .Text = "q"
      .CellAlignment = 4
      .Row = 0
      .Col = 3
      .Text = "r"
      .CellAlignment = 4
    End With

With F2.MSG1
.Row = 1
.Col = 0
.Text = ""
.CellAlignment = 4
.Col = 1
.Text = ""
.CellAlignment = 4
```

```
.Col = 2
.Text = ""
.CellAlignment = 4
.Col = 3
.Text = ""
.CellAlignment = 4
.Rows = 2
End With
F2.Command2.Enabled = True
End If
End Sub

Private Sub Form_Load()
Me.Top = 0
For I = 0 To 12
F2.OPP1.Value = False
F2.OPP2.Value = False
F2.T1(I).Text = F1.T1(I).Text
Next I
F2.Picture1(1).Visible = False
F2.Picture1(2).Visible = False
With MSG1
.Row = 0
.Col = 0
.ColWidth(0) = 900
.Text = "Jarak(x)"
.CellAlignment = 4
.Col = 1
.ColWidth(1) = 1200
.Text = "Moment"
.CellAlignment = 4
.Col = 2
.ColWidth(2) = 1480
.Text = ""
.CellAlignment = 4
.Col = 3
.ColWidth(3) = 1480
.Text = ""
.CellAlignment = 4
End With
If F2.OPP1.Value = False And F2.OPP2.Value = False Then F2.Command2.Enabled = False


End Sub


Private Sub OPP1_Click()
JR.BackColor = &H80000005
JR.Enabled = True
JR.SetFocus
BA.Enabled = False
BA.Text = ""
BA.BackColor = &H8000000F
BB.Enabled = False
BB.Text = ""
```

```
BB.BackColor = &H8000000F
ITV.Enabled = False
ITV.Text = ""
ITV.BackColor = &H8000000F

With F2.MSG1
.Row = 1
.Col = 0
.Text = ""
.CellAlignment = 4
.Col = 1
.Text = ""
.CellAlignment = 4
.Col = 2
.Text = ""
.CellAlignment = 4
.Col = 3
.Text = ""
.CellAlignment = 4
.Rows = 2
End With


End Sub

Private Sub OPP2_Click()
JR.Text = ""
JR.Enabled = False
JR.BackColor = &H8000000F
BA.Enabled = True
BA.SetFocus
BA.BackColor = &H80000005
BB.Enabled = True
BB.BackColor = &H80000005
ITV.Enabled = True
ITV.BackColor = &H80000005

With F2.MSG1
.Row = 1
.Col = 0
.Text = ""
.CellAlignment = 4
.Col = 1
.Text = ""
.CellAlignment = 4
.Col = 2
.Text = ""
.CellAlignment = 4
.Col = 3
.Text = ""
.CellAlignment = 4
.Rows = 2
End With

End Sub
```

```
Private Sub Command1_Click()
Me.Hide
Unload F2
Load F1
F1.Show
For I = 0 To 12
F1.T1(I).Text = F3.T1(I).Text
Next I
With Data
   If .ix = 1 Then
      F1.OP1.Value = True
      F1.TT1(0).Text = F3.LH1.Caption
      F1.TT1(1).Text = F3.LH2.Caption

   ElseIf .ix = 2 Then
      F1.OP2.Value = True
      F1.TT1(0).Text = F3.LH1.Caption
      F1.TT1(1).Text = F3.LH2.Caption
      F1.TT1(2).Text = F3.LH3.Caption
      F1.TT1(3).Text = F3.LH4.Caption
   ElseIf .ix = 3 Then
      F1.OP3.Value = True
      F1.TT1(0).Text = F3.LH1.Caption
      F1.TT1(1).Text = F3.LH2.Caption
      F1.TT1(2).Text = F3.LH3.Caption
      F1.TT1(3).Text = F3.LH4.Caption
      F1.TT1(4).Text = F3.LH5.Caption
      F1.TT1(5).Text = F3.LH6.Caption
   End If
End With
Unload Me
End Sub

Private Sub Command2_Click()
F1.Show
Unload Me
F1.T1(0).SetFocus
End Sub

Private Sub Form_Load()
Me.Top = 0
End Sub
```

```
Private Sub Command1_Click()
Unload Me
refresslist

End Sub
Sub refresslist()
List1.Clear
List2.Clear
End Sub

Private Sub List1_Click()
Dim temp As String
Dim pos As String
Dim akh As String
temp = List1.Text
pos = Left(temp, 9)
akh = Right(temp, Len(temp) - Len(pos))
Index = akh
F1.TT1(Index).SetFocus
Unload Me
End Sub

Private Sub List1_KeyDown(KeyCode As Integer, Shift As Integer)
If KeyCode <> 46 Then Exit Sub
End Sub
Private Sub List2_Click()
Dim temp As String
Dim pos As String
Dim akh As String
temp = List2.Text
pos = Left(temp, 9)
akh = Right(temp, Len(temp) - Len(pos))
Index = akh
F1.TT1(Index).SetFocus
Unload Me
End Sub
```

```
Option Explicit
Type Datatype
lina(100) As String * 25
   lix As String * 25
   A As String * 25
   B As String * 25
   C As String * 25
   D As String * 25
   E As String * 25
   F As String * 25
   ix As String * 25
   iy As String * 25
   jlht As String * 25
   nile As String * 25
   jlhnon As String * 25
End Type

Public Data As Datatype
Dim Felix As String
Dim A As Single
Dim B As Single
Dim C As Single
Dim D As Single
Dim EE As Single
Dim EEE As Single
Dim F As Single
Const Tbl = 70
Dim ca As Single
Dim eb As Single
Dim Mx1 As Single
Dim Mx2 As Single
Dim NN1 As Single
Dim NN2 As Single
Dim momentt(100) As Single
Dim MM As Single
Dim fac As Single
Dim faci As Single
Dim L As Single
Dim fps As Single
Dim fpss As Single
Dim qm As Single
Dim qh As Single
Dim gammap As Single
Dim W As Single
Dim At As Single
Dim Ass As Single
Dim fr As Single
Dim fa As Single
Dim fb As Single
Dim fpu As Single
Dim fy As Single
Dim gp As Single
Dim Lop As Single
Dim Ac As Single
Dim qbs As Single
```

```
Dim Mbs As Single
Dim Mh As Single
Dim Mx As Single
Dim Mt As Single
Dim n As Single
Dim fpse As Single
Dim Aps As Single
Dim Noawal As Single
Dim Noawall As Single
Dim Ya As Single
Dim Yb As Single
Dim faa As Single
Dim fab As Single
Dim I As Single
Dim Ka As Single
Dim Kb As Single
Dim E As Single
Dim moment As Single
Dim ecoba(100) As Single
Dim Nmin As Single
'Dim Nomin(100) As Single
Dim Nominc As Single
Dim Apsmin As Single
Dim jkabmin As Single
Dim Acmin1 As Single
Dim Acmin2 As Single
Dim dp As Single
Dim Mu As Single
Dim Rhop As Single
Dim Beta1 As Single
Dim Tps As Single
Dim aa As Single
Dim Omegap As Single
Dim Mn As Single
Dim m As Single
Dim Apra As Single
Dim jmltul As Single
Dim Ad1 As Single
Dim Ad2 As Single
Sub Parameter()
L = F1.T1(9).Text
fac = F1.T1(1).Text
faci = 0.75 * fac
gp = F1.T1(10).Text
qh = F1.T1(6).Text
qm = F1.T1(7).Text
fpu = F1.T1(2).Text
W = F1.T1(8).Text
At = F1.T1(4).Text
Ass = F1.T1(5).Text
fps = F1.T1(3).Text
fy = F1.T1(0).Text
fr = F1.T1(11).Text
l.op = F1.T1(12).Text
fa = (1 / 4) * ((faci) ^ (0.5))
```

```
fb = 0.5 * ((fac) ^ 0.5)
faa = 0.45 * fac
fab = 0.6 * faci
qbs = (Ac * 10 ^ -6) * W
Mbs = ((1 / 8) * qbs * (L ^ 2))
Mh = (1 / 8) * qh * (L ^ 2)
MM = (1 / 8) * qm * (L ^ 2)
Mt = (Mbs + Mh + MM) * 10 ^ 6
End Sub
Sub Rectanguler()
A = F1.TT1(0).Text
B = F1.TT1(1).Text
Ac = B * A
Parameter
n = Mt / (0.65 * A)
fpse = fps - (Lop * fps)
Aps = n / fpse
Noawal = Aps * fps
Noawall = Noawal
Ya = (0.5 * A)
Yb = Ya
I = (1 / 12) * B * (A ^ 3)
Ka = I / (Ac * Ya)
Kb = Ka
Prategang
End Sub
Sub TampangT()
A = F1.TT1(0).Text
B = F1.TT1(1).Text
C = F1.TT1(2).Text
D = F1.TT1(3).Text
Ac = (A * B) + (C * D)
Parameter
n = Mt / (0.65 * (B + C))
fpse = fps - (Lop * fps)
Aps = n / fpse
Noawal = Aps * fps
Noawall = Noawal
Ya = ((A * B * (0.5 * B)) + (C * D * C)) / ((A * B) + (C * D))
Yb = ((B + C) - Ya)
I = ((1 / 12) * A * (B ^ 3)) + ((1 / 12) * D * (C ^ 3)) + (A * B * ((C - Ya) ^ 2)) + (C * D * ((C -
Ya) ^ 2))
Kb = I / (Ac * Ya)
Ka = I / (Ac * Yb)
Prategang
End Sub
Sub TampangI()
A = F1.TT1(0).Text
B = F1.TT1(1).Text
C = F1.TT1(2).Text
D = F1.TT1(3).Text
EE = F1.TT1(4).Text
F = F1.TT1(5).Text
Ac = (A * D) + (C * F) + (B * EE)
Parameter
```

```
n = Mt / (0.65 * (B + C + D))
fpse = fps - (Lop * fps)
Aps = n / fpse
Noawal = Aps * fps
Noawall = Noawal
Ya = ((EE * B * (0.5 * B)) + (D * C * ((B + C) - (0.5 * C))) + (A * D * ((B + C + D) - (0.5 * D))))
/ ((A * D) + (C * F) + (B * EE))
Yb = ((B + C + D) - Ya)
I = (((1 / 12) * EE * (B ^ 3))) + ((1 / 12) * F * (C ^ 3)) + ((1 / 12) * A * (D ^ 3)) + ((EE * B * (Ya -
(0.5 * B)) ^ 2) + (F * C * ((Ya - (B + (0.5 * C))) ^ 2)) + (A * D * ((Yb - (0.5 * D)) ^ 2)))
Kb = I / (Ac * Ya)
Ka = I / (Ac * Yb)
Prategang
End Sub
Sub Prategpenuh()
Dim Nominc As Single
Dim El As Single
Dim ecoba As Single
Dim Nomin As Single
Dim e0 As Single
Dim Nomind As Single
Dim Nmine As Single
I = I
E = (Kb + (Mbs * 10 ^ 6 / Noawal))
El = Yb - Tbl
If E > El Then E = El
ecoba = E
c0 = E  'untuk menyimpan c yg terkecil sbg batasan
Nomin = Noawall
Do
 n = Nmin
 Noawall = Nomin
 E = ecoba
 Nmin = (Mt / (E + Ka))
 Nomin = Nmin / fr
 ecoba = Int(Kb + (Mbs * 10 ^ 6 / Nomin))
Loop Until Nomin <= Noawall
If Nomin <= Noawall Then
Nomind = Noawall
End If
If Nmin < n Then
Nmin = n
End If
If ecoba >= e0 Then
  E = c0
Else
  E = ecoba
End If
Nominc = Nomind
Apsmin = Nominc / fps
jkabmin = (Apsmin / At)
Acmin1 = (Nominc / fab) * (1 + ((E - (Mbs * 10 ^ 6 / Nominc)) / Ka))
Acmin2 = (Nmin / faa) * (1 + (((Mt / Nmin) - E) / Kb))

If Ac <= Acmin1 Or Ac <= Acmin2 Then
```

```
    MsgBox "Ac< Acmin --'dimensi penampang harus dirubah", vbOKOnly, "ERROR"
    F2.Hide
    F1.Show
    F1.TT1(0).SetFocus
    Exit Sub
End If

'Beban Ultimate'
dp = Ya + E
Mu = 1.2 * (Mbs + MM) + 1.6 * Mh
    If F1.OP1.Value = True Then
    Rhop = Apsmin / (B * dp)
    ElseIf F1.OP2.Value = True Then
    Rhop = Apsmin / (A * dp)
    ElseIf F1.OP3.Value = True Then
    Rhop = Apsmin / (EE * dp)
    End If
Beta1 = 0.85 - (0.008 * (fac - 30))
fpss = fpu * (1 - ((gp / Beta1) * (Rhop * (fpu / fac))))
Omegap = (Rhop * fpss) / fac
Tps = Apsmin * fpss
    If F1.OP1.Value = True Then
    aa = Tps / (0.85 * fac * B)
    ElseIf F1.OP2.Value = True Then
    aa = Tps / (0.85 * fac * A)
    ElseIf F1.OP3.Value = True Then
    aa = Tps / (0.85 * fac * EE)
    End If
Mn = (Tps * (dp - (aa / 2)) * 10 ^ -6)
If (0.8 * Mn) < Mu Then
    m = ((Mu / 0.8) - Mn) * 10 ^ 6
    Apra = (m * 10 ^ 6) / (fy * (dp - (aa / 2)))
    jmltul = (Apra / Ass)
End If
F2.Text2.Text = E
F2.Text1.Text = jkabmin
F2.Text3.Text = jmltul
End Sub
Sub Prategsebagian()
Dim Nomin0
Dim El As Single
Dim Noawal1
Noawal = Noawall
E = (Kb + ((Mbs * 10 ^ 6 + (fa * Ac * Kb)) / Noawal))
El = Yb - Tbl
If E > El Then
  E = El
End If
Nmin = ((Mt - (fb * Ac * Ka)) / (E + Ka))
Nomin0 = Nmin / fr
If Nomin0 < Noawall Then
  Noawal1 = Noawall
Else
  Noawal1 = Nomin0
End If
```

```
Aps = (Noawal1 / fps)
jkabmin = (Aps / At)
EEE = (Kb + (Mbs * 10 ^ 6 / Noawal))

If E > EEE Then
  Ad1 = (Noawal1 * (1 + ((E - (Mbs * 10 ^ 6 / Noawal1)) / Ka))) / (fab - (fa * (Yb / Ya)))
  Ad2 = ((n * 10 ^ 6) * (1 + (((Mt / n) - E) / Kb))) / (faa - (fb * (Ya / Yb)))
  If Ac < Ad1 Or Ac < Ad2 Then
    MsgBox "Ac<Ad -->dimensi penampang harus dirubah", vbOKOnly, "ERROR"
    F2.Hide
    F1.Show
    F1.TT1(0).SetFocus
    Exit Sub
  End If
ElseIf E < EEE Then
'Kondisi awal'
    Acmin1 = (Noawal1 / fab) * (1 + ((E - (Mbs * 10 ^ 6 / Noawal1)) / Ka))
    'Acmin2 = (Nmin / faa) * (1 + (((Mt / Nmin) - EEE) / Kb))
'Kondisi akhir'
    'Ad1 = (Noawal1 * (1 + ((EEE - (Mbs * 10 ^ 6 / Noawal1)) / Ka))) / (fab - (fa * (Yb / Ya)))
    Ad2 = ((n) * (1 + (((Mt / n) - E) / Kb))) / (faa - (fb * (Ya / Yb)))

End If

If Ac < Acmin1 Or Ac < Acmin2 Or Ac < Ad1 Or Ac < Ad2 Then
    F2.Hide
    F1.Show
    F1.TT1(0).SetFocus
    Exit Sub
End If
'Beban Ultimate'
dp = Ya + E
Mu = 1.2 * (Mbs + MM) + 1.6 * Mh
 If F1.OP1.Value = True Then
    Rhop = Aps / (B * dp)
    ElseIf F1.OP2.Value = True Then
    Rhop = Aps / (A * dp)
    ElseIf F1.OP3.Value = True Then
    Rhop = Aps / (EE * dp)
    End If
Beta1 = 0.85 - (0.008 * (fac - 30))
fpss = fpu * (1 - ((gp / Beta1) * (Rhop * (fpu / fac))))
Omegap = (Rhop * fpss) / fac
Tps = Aps * fpss
If F1.OP1.Value = True Then
    aa = Tps / (0.85 * fac * B)
    ElseIf F1.OP2.Value = True Then
    aa = Tps / (0.85 * fac * A)
    ElseIf F1.OP3.Value = True Then
    aa = Tps / (0.85 * fac * EE)
    End If
Mn = Tps * (dp - (aa / 2)) * 10 ^ -6
If (0.8 * Mn) < Mu Then
    m = (Mu / 0.8) - Mn
    Apra = m * 10 ^ 6 / (fy * (dp - (aa / 2)))
```

```
    jmltul = Apra / Ass
    If jmltul < 0.5 Then
    jmltul = 1
    End If
End If
F2.Text5.Text = E
F2.Text4.Text = jkabmin
F2.Text6.Text = jmltul
End Sub
Sub RectangulercekAS()
Apsmin = Nomin / fps
jkabmin = Apsmin / At
Acmin1   (No / fab) * (1 + ((E - (Mbs / No)) / Ka))
Acmin2 = (No / faa) * (1 + (((Mt / n) - E) / Kb))
Do While (B * A) < Acmin2 And Acmin1
Rectangulerbalok.Show
Rectanguler
Loop
End Sub

Sub Prategang()
If F1.OPP1.Value = True Then
    F2.Text4.Text = ""
    F2.Text5.Text = ""
    F2.Text6.Text = ""
    Prategpenuh
ElseIf F1.OPP2.Value = True Then
    F2.Text1.Text = ""
    F2.Text2.Text = ""
    F2.Text3.Text = ""
    Prategsebagian
End If
End Sub
Sub hitungmoment()

Dim BA As Single
Dim BB As Single
Dim ITV As Single
Dim k As Integer
If F2.OPP1.Value = True Then

    If Val(F2.JR.Text) > Val(F1.T1(9).Text) Then
    MsgBox "Jarak X melebihi Panjang Bentang", vbCritical, "Mohon diulang"
    'F2.JR.SetFocus
    Exit Sub
    End If
      moment = (0.5) * (F1.T1(6).Text + qbs) * (F2.JR.Text) ^ 2
      Mx1 = (moment / Noawal) * 10 ^ 6
      NN1 = (moment / ((1 - Lop) * fps)) * 10 ^ 3
      ea = (fb * Ka * Ac) / (((1 - Lop) * fps) * 10 ^ 3)
      eb = (fa * Kb * Ac) / Noawal
      Mx2 = Mx1 + eb
      NN2 = NN1 - ea

    If F1.OPP2.Value = True Then
```

```
Sub hitungmoment()

Dim BA As Single
Dim BB As Single
Dim ITV As Single
Dim k As Integer
If F2.OPP1.Value = True Then

   If Val(F2.JR.Text) > Val(F1.T1(9).Text) Then
   MsgBox "Jarak X melebihi Panjang Bentang", vbCritical, "Mohon diulang"
   'F2.JR.SetFocus
   Exit Sub
   End If
      moment = ((0.5) * (F1.T1(6).Text + qbs) * (F2.JR.Text) * L) - ((0.5) * (F1.T1(6).Text + qbs) *
(F2.JR.Text) ^ 2)
      Mx1 = (moment / Noawal) * 10 ^ 6
      NN1 = (moment / ((1 - Lop) * fps)) * 10 ^ 3
      ea = (fb * Ka * Ac) / (((1 - Lop) * fps) * 10 ^ 3)
      eb = (fa * Kb * Ac) / Noawal
      Mx2 = Mx1 + eb
      NN2 = NN1 - ea

   If F1.OPP2.Value = True Then

      With F2.MSG1
      .Row = 1
      .Col = 0
      .Text = F2.JR.Text
      .CellAlignment = 4
      .Col = 1
      .Text = moment
      .CellAlignment = 4
      .Col = 2
      .Text = Mx2
      .CellAlignment = 4
      .Col = 3
      .Text = NN2
      .CellAlignment = 4
      .Row = 0
      .Col = 2
      .Text = "q"
      .CellAlignment = 4
      .Row = 0
      .Col = 3
      .Text = "r"
      .CellAlignment = 4
      End With
   ElseIf F1.OPP1.Value = True Then

      With F2.MSG1
      .Row = 1
```

```
    .Col = 0
    .Text = F2.JR.Text
    .CellAlignment = 4
    .Col = 1
    .Text = moment
    .CellAlignment = 4
    .Col = 2
    .Text = Mx1
    .CellAlignment = 4
    .Col = 3
    .Text = NN1
    .CellAlignment = 4
    .Row = 0
    .Col = 2
    .Text = "m"
    .CellAlignment = 4
    .Row = 0
    .Col = 3
    .Text = "n"
    .CellAlignment = 4
    End With
  End If
ElseIf F2.OPP2.Value = True Then
BA = F2.BA.Text
BB = F2.BB.Text
ITV = F2.ITV.Text
k = 1

For I = BA To BB Step ITV

    moment = ((0.5) * (F1.T1(6).Text + qbs) * I * L) - ((0.5) * (F1.T1(6).Text + qbs) * I ^ 2)
    Mx1 = (moment / Noawal) * 10 ^ 6
    NN1 = (moment / ((1 - Lop) * fps)) * 10 ^ 3
    ea = (fb * Ka * Ac) / (((1 - Lop) * fps) * 10 ^ 3)
    eb = (fa * Kb * Ac) / Noawal
    Mx2 = Mx1 + eb
    NN2 = NN1 - ea


If F1.OPP2.Value = True Then
  With F2.MSG1
  .Row = k
  .Col = 0
  .Text = I
  .CellAlignment = 4
  .Col = 1
  .Text = moment
  .CellAlignment = 4
  .Col = 2
  .Text = Mx2
  .CellAlignment = 4
```

```
    .Col = 3
    .Text = NN2
    .CellAlignment = 4
    .Rows = F2.MSG1.Rows + 1
    End With

ElseIf F1.OPP1.Value = True Then
    With F2.MSG1
    .Row = k
    .Col = 0
    .Text = I
    .CellAlignment = 4
    .Col = 1
    .Text = moment
    .CellAlignment = 4
    .Col = 2
    .Text = Mx1
    .CellAlignment = 4
    .Col = 3
    .Text = NN1
    .CellAlignment = 4
    .Rows = F2.MSG1.Rows + 1
    End With
  End If

  k = k + 1
  Next I
  F2.MSG1.Rows = k
  End If

  End Sub
```