

# LAMPIRAN

## Lampiran 1. Interpretasi Hasil Model Bahan Baku *Ethylene*

```

1 from statistics import NormalDist
2 from math import sqrt
3
4 #Menghitung q01*
5 def calculate_q01(A, D, h):
6     quantity = sqrt(2 * A * D / h)
7     return quantity
8
9 #Menghitung alpha
10 def calculate_alpha(h, q0, c_u, D):
11     alpha = h * q0 / (c_u * D)
12     return alpha
13
14 #Menentukan z_alpha
15 def determine_z_alpha(alpha):
16     norm = NormalDist(0, 1)
17     z_alpha = norm.inv_cdf(1-alpha)
18     return z_alpha
19
20 #Menghitung r1*
21 def calculate_reorderpoint(z_alpha, S, L, D):
22     r1 = z_alpha * S * sqrt(L) + D * L
23     return r1
24
25 #Menghitung f(z_alpha)
26 def calculate_f_z_alpha(z_alpha):
27     norm = NormalDist(0, 1)
28     f_z_alpha = norm.pdf(z_alpha)
29     return f_z_alpha
30
31 #Menghitung psi
32 def calculate_psi_z_alpha(z_alpha):
33     norm = NormalDist(0, 1)
34     psi_z_alpha = calculate_f_z_alpha(z_alpha) - z_alpha * norm.cdf(-z_alpha)
35     return psi_z_alpha
36
37 #Calculate N
38 def calculate_N(S, L, f_z_alpha, psi_z_alpha, z_alpha):
39     N = S * sqrt(L) * (f_z_alpha - z_alpha * psi_z_alpha)
40     return N
41
42 #Calculate q02*
43 def calculate_q02(A, D, h, c_u, N):
44     q02 = sqrt(2 * D * (A + c_u * N) / h)
45     return q02
46 #Parameters
47 D = 225291.170
48 S = 22529.117
49 L = 0.027
50 S_L = 3729.046
51 A = 1879145174
52 p = 14644570
53 h = 10060000
54 c_u = 14644570
55
56 #Paramater stopping criteria
57 eps = 0.00001
58 stop = False
59
60
61 #Inisialisasi
62 alpha = 0
63 z_alpha = 0
64 f_z_alpha = 0
65 N = 0
66 psi_z_alpha = 0
67 r1 = 0
68 r2 = 0
69
70 #Step 1
71 q01 = calculate_q01(A, D, h)
72 print("q01: ", str(q01))
73
74 #Step 2
75 alpha = calculate_alpha(h, q01, c_u, D)
76
77 z_alpha = determine_z_alpha(alpha)
78
79 r1 = calculate_reorderpoint(z_alpha, S, L, D)
80
81 iterasi = 1
82 r1_control = 10000
83 r2_control = 100
84
85 while( abs(r1_control - r2_control) > eps ):
86     print("")
87     print("Iterasi ke-" + str(iterasi))
88     print("Alpha: " + str(alpha))
89     print("z_alpha: " + str(z_alpha))
90     print("r1: " + str(r1))
91
92 #Step 3
93 f_z_alpha = calculate_f_z_alpha(z_alpha)
94 print("f_z_alpha: " + str(f_z_alpha))
95
96 psi_z_alpha = calculate_psi_z_alpha(z_alpha)
97 print("psi_z_alpha: " + str(psi_z_alpha))
98
99 N = calculate_N(S, L, f_z_alpha, psi_z_alpha, z_alpha)
100 print("N: " + str(N))
101
102 q02 = calculate_q02(A, D, h, c_u, N)
103 print("q02: " + str(q02))
104
105 #Step 4
106 alpha = calculate_alpha(h, q02, c_u, D)
107
108 #Step 5
109 iterasi = iterasi + 1
110 r1_control = r1
111 r2_control = r2
112 r1 = r2
113
114 #Tingkat pelayanan
115 nu = 1 - N/(D * sqrt(L))
116 print(".....")
117 print("Kebijakan inventory optimal")
118 print("Kuantitas pemesanan: " + str(q02) + " MT")
119 print("Reorder point: " + str(r2) + " MT")
120 print("Safety stock: " + str(z_alpha * S * sqrt(L)) + " MT")
121 print("Tingkat pelayanan: " + str(nu * 100) + "%")
122
123
124 OB = D * p
125 OP = A * D / q02
126 OS = h * (0.5 * q02 + r2 - D * sqrt(L))
127 OK = c_u * D * N / q02
128 OT = OB + OP + OS + OK
129
130 print("Ekspetasi ongkos total per tahun: Rp" + str(OT))

```

## Lampiran 2. Interpretasi Hasil Model Bahan Baku *Butene-1*

```

1 from statistics import NormalDist
2 from math import sqrt
3
4 #Menghitung q01*
5 def calculate_q01(A, D, h):
6     quantity = sqrt(2 * A * D / h)
7     return quantity
8
9 #Menghitung alpha
10 def calculate_alpha(h, q0, c_u, D):
11     alpha = h * q0 / (c_u * D)
12     return alpha
13
14 #Menentukan z_alpha
15 def determine_z_alpha(alpha):
16     norm = NormalDist(0,1)
17     z_alpha = norm.inv_cdf(1-alpha)
18     return z_alpha
19
20 #Menghitung r1*
21 def calculate_reorderpoint(z_alpha, S, L, D):
22     r1 = z_alpha * S * sqrt(L) + D * L
23     return r1
24
25 #Menghitung f(z_alpha)
26 def calculate_f_z_alpha(z_alpha):
27     norm = NormalDist(0, 1)
28     f_z_alpha = norm.pdf(z_alpha)
29     return f_z_alpha
30
31 #Menghitung psi
32 def calculate_psi_z_alpha(z_alpha):
33     norm = NormalDist(0, 1)
34     psi_z_alpha = calculate_f_z_alpha(z_alpha) - z_alpha * norm.cdf(-z_alpha)
35     return psi_z_alpha
36
37 #Calculate N
38 def calculate_N(S, L, f_z_alpha, psi_z_alpha, z_alpha):
39     N = S * sqrt(L) * (f_z_alpha - z_alpha * psi_z_alpha)
40     return N
41
42 #Calculate q02*
43 def calculate_q02(A, D, h, c_u, N):
44     q02 = sqrt( 2 * D * (A + c_u * N) / h )
45     return q02
46 #Parameters
47 D = 166727.250
48 S = 16672.725
49 L = 0.027
50 S_L = 2759.689
51 A = 1878442287
52 p = 22811436
53 h = 10060000
54 c_u = 22811436
55
56 #Paramater stopping criteria
57 eps = 0.00001
58 stop = False
59
60
61 #Inisialisasi
62 alpha = 0
63 z_alpha = 0
64 f_z_alpha = 0
65 N = 0
66 psi_z_alpha = 0
67 r1 = 0
68 r2 = 0
69
70 #Step 1
71 q01 = calculate_q01(A, D, h)
72 print("q01: ", str(q01))
73
74 #Step 2
75 alpha = calculate_alpha(h, q01, c_u, D)
76
77 z_alpha = determine_z_alpha(alpha)
78
79 r1 = calculate_reorderpoint(z_alpha, S, L, D)
80
81 iterasi = 1
82 r1_control = 10000
83 r2_control = 100
84
85 while( abs(r1_control - r2_control) > eps ):
86     print("")
87     print("Iterasi ke- " + str(iterasi))
88     print("Alpha: " + str(alpha))
89     print("z_alpha: " + str(z_alpha))
90     print("r1: " + str(r1))
91
92 #Step 3
93 f_z_alpha = calculate_f_z_alpha(z_alpha)
94 print("f_z_alpha: " + str(f_z_alpha))
95
96 psi_z_alpha = calculate_psi_z_alpha(z_alpha)
97 print("psi_z_alpha: " + str(psi_z_alpha))
98
99 N = calculate_N(S, L, f_z_alpha, psi_z_alpha, z_alpha)
100 print("N: " + str(N))
101
102 q02 = calculate_q02(A, D, h, c_u, N)
103 print("q02: " + str(q02))
104
105 #Step 4
106 alpha = calculate_alpha(h, q02, c_u, D)
107 print("New alpha: " + str(alpha))
108
109 z_alpha = determine_z_alpha(alpha)
110 print("New z_alpha: " + str(z_alpha))
111
112 r2 = calculate_reorderpoint(z_alpha, S, L, D)
113 print("r2: " + str(r2))
114
115 #Step 5
116 iterasi = iterasi + 1
117 r1_control = r1
118 r2_control = r2
119 r1 = r2
120
121 #Inggkat pelayanan
122 nu = 1 - N/(D * sqrt(L))
123 print("-----")
124 print("Kebijakan inventory optimal")
125 print("Kuantitas pemesanan: " + str(q02) + " MT")
126 print("Reorder point: " + str(r2) + " MT")
127 print("Safety stock: " + str(z_alpha * S * sqrt(L)) + " MT")
128 print("Inggkat pelayanan: " + str(nu * 100) + "%")
129
130 OB = D * p
131 OP = A * D / n0
132 OS = h * (0.5 * q02 + r2 - D * sqrt(L))
133 OK = c_u * D * N / q02
134 OT = OB + OP + OS + OK
135 print("Ekspetasi ongkos total per tahun: Rp" + str(OT))

```

### Lampiran 3. Verifikasi Model Menggunakan Python

The image displays two screenshots of a Python online compiler (Programiz) showing the execution of a simulation model. The code in the left pane defines a simulation with parameters A, D, h, c\_u, N, and q02. It iteratively calculates alpha, z\_alpha, reorder points, and safety stock until convergence. The right pane shows the output for two iterations.

**Iteration 14 (Top Screenshot):**

```

Iterasi ke-14
Alpha: 0.047767071907083866
z_alpha: 1.666007296170736
r1: 12253.58088774347
r2: 12253.58088774347
f_z_alpha: 0.0943833545863924
psi_z_alpha: 0.019815367967462513
N: 245.8366566570936
q02: 15665.758162289644
New z_alpha: 0.047767071907083866
New z_alpha: 1.666007296170736
r2: 12253.58088774347
Tingkat pelayanan: 99.5891915752529%
Ekspetasi ongkos total per tahun: Rp207748552882.129
  
```

**Iteration 13 (Bottom Screenshot):**

```

Iterasi ke-13
Alpha: 0.034364242682008385
z_alpha: 1.82020452990644
r1: 9488.271970030426
r2: 9488.271970030426
f_z_alpha: 0.07611549830618163
psi_z_alpha: 0.0135658830019103
N: 140.8794912699222
q02: 12991.76067314851
New z_alpha: 0.034364242682008385
New z_alpha: 1.82020452990644
r2: 9488.271970030426
Tingkat pelayanan: 99.4857674742479%
Ekspetasi ongkos total per tahun: Rp375383252868.748
  
```

**Lampiran 4. Produk *Polyethylene***



## DAFTAR RIWAYAT HIDUP PENULIS

NAMA	: LAILA FITRIANI	
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Fakultas	: Teknik	
Program Studi	: Teknik Industri	
Jumlah SKS	: 148 SKS	
IPK	: 3.76	
Angkatan	: 2019	

### **Riwayat Pendidikan**

Sekolah Dasar	: SDN 2 KRENCENG
SLTP	: SMPN 2 CILEGON
SLTA	: SMAN 2 KRAKATAU STEEL

### **Riwayat Organsiasi**

1. Anggota *Volunteer* Mental Health Advocate 2020/2021
2. Anggota Departement Komdis & PI HMTI FT UNTIRTA Periode 2020/2021
3. Anggota Departement Komdis & PI HMTI FT UNTIRTA Periode 2021/2022
4. Anggota BEM FT UNTIRTA Periode 2021/2022
5. Anggota Departement Hubungan Masyarakat Industrial Event and Exploration 2021/2022
6. Sekretaris Umum Kementerian Sosial dan Masyarakat BEM FT UNTIRTA Periode 2021/2022

7. Anggota Divisi Public Information Laboratorium Sistem Produksi 2021/2022
8. Bendahara Laboratorium Sistem Produksi 2022/2023

### **Riwayat Kepanitiaan**

1. Divisi PDD Musyawarah Kaderasi
2. Divisi Humas POM TI 2020
3. Divisi Humas INDEX 2020
4. Divisi Komdis KT 1 2020
5. Divisi Humas Silaturahmi HMTI 2021
6. Divisi Acara Visualisasi Poster 2021
7. Divisi Humas Upgrading Pengurus HMTI 2021
8. Bendahara Isra Mi'raj HMTI 2021
9. Divisi PDD HMTI Anniversary 2021
10. Divisi Komdis Latihan Kepemimpinan 2021
11. Divisi PDD HMTI Explore 2021
12. Divisi PDD Makrab LK 2021
13. Divisi PDD Bukber & SOTR 2021
14. Koordinator Divisi Acara HMTI Award 2021
15. Divisi Acara LPJ dan TOR 2021
16. Divisi Acara HMTI Exploration 2021
17. Divisi Acara Upgrading HMTI 2022
18. Divisi Komdis Kaderisasi Tingkat 1 2022
19. Divisi Acara Makrab KT 1 2022
20. Ketua Pelaksana HMTI Award 2022
21. Divisi Komdis Pengenalan Dunia Kampus Teknik 2022

### **Kompetensi Yang dikuasai**

1. Microsoft Word
2. Microsoft Excel
3. Microsoft Visio
4. Microsoft Power Point
5. AutoCad

6. Minitab
7. POM QM
8. IBM SPSS Statistic
9. PowerSim
10. Vensim PLE
11. Flexsim
12. Pro Model
13. Python

### **Prestasi**

1. Juara 1 Kejuaraan Olahraga Pelajar Cabang Olahraga Atletik Lari 60 meter KU-12 putri
2. Juara 1 Pekan Olahraga Pelajar Daerah VII Cabang Olahraga Atletik Estafet 4x100 meter Putri
3. Juara 1 Pekan Olahraga Pelajar Provinsi IV Cabang Olahraga Atletik Estafet 4x100 meter Putri
4. Juara 1 Kejuaraan Olahraga Prestasi Cabang Olahraga Atletik Lari 100 meter Putri
5. Juara 2 Kejuaraan Olahraga Siswa Nasional Tingkat Kota Cilegon Cabang Olahraga Atletik Lompat Jauh Putri
6. Juara 2 Kejuaraan Olahraga Siswa Nasional Tingkat Kota Cilegon Cabang Olahraga Atletik 60 meter Putri
7. Juara 2 Kejuaraan Olahraga Prestasi Cabang Olahraga Atletik 200 meter putri
8. Juara 2 Kejuaraan Olahraga Prestasi Cabang Olahraga Atletik Lompat Jauh Putri
9. Finalis Lomba Rancang Bangun Alat Bantu Tingkat Nasional 2021