

BAB IV

HASIL PENELITIAN DAN PEMBAHASAN

4.1. Data Proyek

Data umum dari Global Sevilla Pulomas *School* Jakarta sebagai berikut ini.

Pemilik Proyek	: X
Konsultan Pelaksana	: PT.Y
Kontraktor	: PT.Z
Nilai Proyek	: Rp 26.000.000.000,00
Waktu Pelaksana	: 315 hari
Waktu pekerjaan dimulai	: Juni 2017
Waktu pekerjaan selesai	: Juni 2018

4.2. Kegiatan Kritis

Setelah analisis menggunakan *Microsoft Project 2016*, didapatkan kegiatan-kegiatan yang berada dalam lintasan kritis. Berikut kegiatan lintasan kritis pada table 4.1.

Tabel 4.1 Kegiatan kritis pada kondisi normal

No	Kode	Nama Pekerjaan	Durasi
1	PGT	Galian Tanah Pile Cap	14
2	PBPL1	Beton Pelat Lantai Lantai 1	7
3	PBKPL1	Bekisting Pelat Lantai 1	7
4	PWPL1	Wiremesh Pelat Lantai Lantai 1	7
5	PLKPL1	Lantai Kerja Pelat Lantai Lantai 1	7
6	PPUPL1	Pasir Urug Pelat Lantai Lantai 1	7
7	PPPL1	Pembesian Pile Cap Lantai 1	28
8	PLKP1	Lantai Kerja Pile Cap Lantai 1	28
9	PPUPL1	Pasir Urug Pile Cap Lantai 1	28
10	PPKL1	Pembesian Kolom Lantai 1	14
11	PBCL1	Beton Canopy Lantai 1	7
12	PBKCL1	Bekisting Canopy Lantai 1	7
13	PPCL1	Pembesian Canopy Lantai 1	14
14	PBBL2	Beton Balok Lantai 2	7
15	PBKBL2	Bekisting Balok Lantai 2	14
16	PBPL2	Beton Pelat Lantai Lantai 2	7
17	PBKL2	Beton Kolom Lantai 2	7
18	PBKKL2	Bekisting Kolom Lantai 2	7
19	PPKL2	Pembesian Kolom Lantai 2	14

Tabel 4.1 Lanjutan

20	PBKBL3	Bekisting Balok Lantai 3	14
21	PBKPL3	Bekisting Pelat Lantai 3	14
22	PBKL3	Beton Kolom Lantai 3	7
23	PBKKL3	Bekisting Kolom Lantai 3	7
24	PPKL3	Pembesian Kolom Lantai 3	14
25	PBKBL4	Bekisting Balok Lantai 4	14
26	PBPL4	Beton Pelat Lantai Lantai 4	7
27	PBKPL4	Bekisting Pelat Lantai Lantai 4	14
28	PPPL4	Pembesian Pelat Lantai Lantai 4	14
29	PBKLA	Beton Kolom Lantai 4	7
30	PBKKL4	Bekisting Kolom Lantai 4	7
31	PPKL4	Pembesian Kolom Lantai 4	14
32	PBKBLA	Bekisting Balok Lantai Atap	14
33	PBKPLA	Bekisting Pelat Lantai Lantai Atap	14
34	PPTALA	Pembesian Talang Air Lantai Atap	7
35	PBRA1	Baja Rangka Baja Atap 1	21
36	PBRA2	Baja Rangka Baja Atap 2	21
37	PPRBA2	Pengecatan Rangka Baja Atap 2	21
38	PBR	Baja Ringan	7

Terpilihnya kegiatan-kegiatan lintasan kritis tersebut memiliki alasan-asalan sebagai berikut ini:

1. *Resource work* masing-masing kegiatan kritis dapat diubah dengan menambahkan jumlah jam kerja lembur atau penambahan jumlah tenaga kerja. Penambahan ini hanya dapat dilakukan pada kegiatan-kegiatan kritis saja, sehingga kegiatan lain tidak akan terjadi perubahan sama sekali.
2. Keseluruhan durasi proyek akan berjalan lebih cepat ketika kegiatan kritis dipercepat.

4.3. Biaya Langsung dan Tidak Langsung

Pada proyek konstruksi terdapat dua jenis biaya yaitu biaya langsung dan tidak langsung. Biaya fisik seluruh proyek yang mempengaruhi hasil akhir merupakan pengertian dari biaya langsung. Sedangkan untuk biaya tidak langsung merupakan biaya tidak mungkin menjadi permanen pada sebuah proyek tetapi selalu ada selama proyek berjalan. Analisis perhitungan biaya tidak langsung menggunakan model *Regresi Non Linier* algoritma genetika, persamaannya sebagai berikut.

$$y = -0.95 - 4.888(\ln(x_1 - 0.21) - \ln(x_2)) + \varepsilon \quad (4.1)$$

dengan,

x_1 = nilai total proyek (Rupiah),

x_2 = durasi proyek (hari), dan

ε = *random error*.

Perhitungan biaya langsung pada proyek ini sebagai berikut.

$$y = -0,95 - 4,888(\ln(x_1 - 0,21) - \ln(x_2))$$

$$y = -0,95 - 4,888\left(\ln\left(\frac{8.024.154.950}{1.000.000.000} - 0,21\right) - \ln(189)\right)$$

$$y = 14,62 \% = 0,1462$$

sehingga,

$$\begin{aligned} \text{biaya tidak langsung} &= 0,1462 \times \text{Rp } 8.024.154.950,00 \\ &= \text{Rp } 1.173.311.211,05 \end{aligned}$$

$$\begin{aligned} \text{Biaya tidak langsung per hari} &= \frac{\text{Biaya tidak langsung}}{\text{durasi normal proyek}} \\ &= \frac{\text{Rp } 1.173.311.211,05}{189 \text{ hari}} \\ &= \text{Rp } 6.207.995,83 / \text{hari} \end{aligned}$$

$$\begin{aligned} \text{Biaya Langsung} &= \text{Biaya total proyek} - \text{biaya tidak langsung} \\ &= \text{Rp } 8.024.154.950,00 - \text{Rp } 1.173.311.211,05 \\ &= \text{Rp } 6.850.843.738,95 \end{aligned}$$

4.4. Penerapan Metode *Time Cost Trade Off* (TCTO)

4.4.1. Penambahan Jam Kerja Lembur

Jam kerja normal pada proyek ini yaitu 8 jam kerja (08.00-17.00) dengan jam istirahat pada siang hari pukul 12.00 hingga 13.00. Jam lembur akan dilaksanakan setelah waktu kerja normal selesai yaitu pukul 18.00 sampai dengan 21.00 dengan pertimbangan hasil analisis. Menteri Tenaga Kerja mengeluarkan keputusan nomor KEP.102/MEN/VI/2004 pasal 3, pasal 7, dan pasal 11 standar upah untuk jam lembur adalah sebagai berikut.

1. Dalam 1 (satu) hari waktu kerja lembur hanya dilakukan maksimal sebanyak 3 (tiga) jam tetapi dalam 1 (satu) minggu hanya boleh sebanyak 14 (empat belas) jam.
2. Apabila pekerja melakukan jam lembur selama 3 (tiga) jam atau lebih, pekerja wajib mendapatkan makanan dan minuman paling sedikit 1.400 kalori.

3. Upah untuk kerja lembur jam pertama dibayar sebesar 1.5 (satu setengah) kali lipat upah waktu normal.
4. Upah untuk kerja lembur jam berikutnya dibayar sebesar 2 (dua) kali lipat upah satu jam waktu normal.

Tabel 4.2 Upah Tenaga Kerja

Jenis Pekerja	Biaya Normal perhari (Rp)	Biaya Normal Perjam (Rp)
Pekerja	100000.00	12500.00
Mandor	150000.00	18750.00
Tukang Batu	120000.00	15000.00
Tukang Besi	120000.00	15000.00
Tukang Kayu	120000.00	15000.00
Kepala Tukang Batu	135000.00	16875.00
Kepala Tukang Besi	135000.00	16875.00
Kepala Tukang Kayu	135000.00	16875.00

4.4.1.1. Analisis Biaya Lembur

Biaya lembur akan dihitung agar dapat mengetahui besaran upah biaya lembur tenaga kerja sehingga biaya total perkegiatan yang lembur dapat diketahui. Berikut contoh perhitungan upah lembur pekerja.

Resource Name : Pekerja

Biaya normal pekerja per jam (bn) : Rp 12.500,00

Biaya lembur per jam

$$\begin{aligned} \text{Lembur 1 Jam (L1)} &= 1,5 \times \text{bn} \\ &= 1,5 \times 12.500,00 \\ &= \text{Rp } 18.750,00 \end{aligned}$$

$$\begin{aligned} \text{Lembur 1 Jam} &= 18.750,00 \times 1 \\ &= \text{Rp } 18.750,00 \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 Jam (L2)} &= \text{L1} + 2,0 \times \text{bn} \\ &= (1,5 \times 12.500,00) + (2,0 \times 1 \times 12.500,00) \\ &= \text{Rp } 43.750,00 \end{aligned}$$

$$\begin{aligned}
 \text{Lembur 2 Jam} &= 43.750,00 \times 2 \\
 &= \text{Rp } 87.500,00 \\
 \text{Lembur 3 Jam (L3)} &= L1 + 2,0 \times bn \\
 &= (1,5 \times 12.500,00) + (2,0 \times 2 \times 12.500,00) \\
 &= \text{Rp } 68.750,00 \\
 \text{Lembur 3 Jam} &= 68.750,00 \times 3 \\
 &= \text{Rp } 206.250,00
 \end{aligned}$$

Tabel 4.3 Upah Lembur Tenaga Kerja

Jenis Pekerja	Biaya Normal Perjam (Rp)	Biaya Lembur (Rp)		
		1 Jam	2 Jam	3 Jam
Pekerja	12,500.00	18,750.00	43,750.00	68,750.00
Mandor	18,750.00	28,125.00	65,625.00	103,125.00
Tukang Batu	15,000.00	22,500.00	52,500.00	82,500.00
Tukang Besi	15,000.00	22,500.00	52,500.00	82,500.00
Tukang Kayu	15,000.00	22,500.00	52,500.00	82,500.00
Kepala Tukang Batu	16,875.00	25,312.50	59,062.50	92,812.50
Kepala Tukang Besi	16,875.00	25,312.50	59,062.50	92,812.50
Kepala Tukang Kayu	16,875.00	25,312.50	59,062.50	92,812.50

4.4.1.2. Analisis Durasi Percepatan

Masing-masing waktu lembur memiliki angka produktivitas untuk diinput pada analisis. Waktu lembur 1 jam memiliki produktivitas yang dapat dianalisis sebesar 90% atau 0,9, untuk waktu lembur 2 jam sebesar 80% atau 0,8, dan waktu lembur 3 jam sebesar 70% atau 0,7 dari produktivitas normal. Factor penurunan produktivitas disebabkan oleh kelelahan para pekerja dan keterbatasan dalam pencahayaan pada malam hari serta keadaan cuaca yang tidak dapat diprediksi sehingga pekerjaan saat waktu lembur tertunda. Contoh perhitungan percepatan durasi ini akan menggunakan kegiatan kritis dari Beton Plat Lantai Lantai 1 (PBPL1) dengan analisis sebagai berikut.

Nama pekerjaan : Beton Plat Lantai Lantai 1

Volume pekerjaan : 1923.56 m³

Durasi normal : 7 hari

$$\begin{aligned}
 \text{Produktivitas perhari} &= \frac{\text{volume}}{\text{durasi normal}} \\
 &= \frac{1923.56}{7}
 \end{aligned}$$

$$\begin{aligned}
 &= 32,858 \text{ m}^3/\text{hari} \\
 \text{Produktivitas perjam} &= \frac{\text{produktivitas per hari}}{\text{jam kerja per hari}} \\
 &= \frac{32,858}{8} \\
 &= 4,107 \text{ m}^3/\text{hari} \\
 \text{Durasi Percepatan (Dp)} &= \frac{\text{Volume pekerjaan}}{(\sum pp \times Pn \times jl) + (pn \times jk)} \quad (4.2)
 \end{aligned}$$

dengan,

pp = penurunan produktivitas, dan

pn = produktivitas normal perjam

Durasi percepatan (DP) lembur 1 jam

$$\begin{aligned}
 \text{DP 1 jam} &= \frac{\text{Volume pekerjaan}}{(\sum pp \times Pn \times jl) + (pn \times jk)} \\
 &= \frac{1923.56}{(0,9 \times 4,107 \times 1) + (4,107 \times 8)} \\
 &= 6,29 \text{ hari}
 \end{aligned}$$

Maksimal *Crashing* = Durasi normal – Durasi percepatan 1 jam

$$= 7 \text{ hari} - 6,29 \text{ hari}$$

$$= 0,71 \text{ hari}$$

Durasi percepatan (DP) lembur 2 jam

$$\begin{aligned}
 \text{DP 2 jam} &= \frac{\text{Volume pekerjaan}}{(\sum pp \times Pn \times jl) + (pn \times jk)} \\
 &= \frac{1923.56}{(0,8 \times 4,107 \times 1) + (0,9 \times 4,107 \times 1) + (4,107 \times 8)} \\
 &= 5,77 \text{ hari}
 \end{aligned}$$

Maksimal *Crashing* = Durasi normal – Durasi percepatan 2 jam

$$= 7 \text{ hari} - 5,77 \text{ hari}$$

$$= 1,23 \text{ hari}$$

Durasi percepatan (DP) lembur 3 jam

$$\begin{aligned}
 \text{DP 2 jam} &= \frac{\text{Volume pekerjaan}}{(\sum pp \times Pn \times jl) + (pn \times jk)} \\
 &= \frac{1923.56}{(0,7 \times 4,107 \times 1) + (0,8 \times 4,107 \times 1) + (0,9 \times 4,107 \times 1) + (4,107 \times 8)} \\
 &= 5,38 \text{ hari}
 \end{aligned}$$

Maksimal *Crashing* = Durasi normal – Durasi percepatan 2 jam

$$= 7 \text{ hari} - 5,38 \text{ hari}$$

$$= 1,62 \text{ hari}$$

Hasil perhitungan durasi percepatan pada *Microsoft Excel* harus sesuai dengan durasi percepatan *crashing* yang telah dilakukan di *Microsoft Project*. Berikut hasil keseluruhan data setelah dianalisis durasi percepatan durasi 1jam, 2 jam, dan 3 jam.

Tabel 4.4 Hasil analisis durasi percepatan

NAMA PEKERJAAN	DURASI			
	Normal	Lem. 1 Jam	Lem. 2 Jam	Lem. 3 Jam
Galian Tanah Pile Cap	14	12.58	11.55	10.77
Beton Pelat Lantai Lantai 1	7	6.29	5.77	5.38
Bekisting Pelat Lantai 1	7	6.29	5.77	5.38
Wiremesh Pelat Lantai Lantai 1	7	6.29	5.77	5.38
Lantai Kerja Pelat Lantai Lantai 1	7	6.29	5.77	5.38
Pasir Urug Pelat Lantai Lantai 1	7	6.29	5.77	5.38
Pembesian Pile Cap Lantai 1	28	25.17	23.09	21.54
Lantai Kerja Pile Cap Lantai 1	28	25.17	23.09	21.54
Pasir Urug Pile Cap Lantai 1	28	25.17	23.09	21.54
Pembesian Kolom Lantai 1	14	12.58	11.55	10.77
Beton Canopy Lantai 1	7	6.29	5.77	5.38
Bekisting Canopy Lantai 1	7	6.29	5.77	5.38
Pembesian Canopy Lantai 1	14	12.58	11.55	10.77
Beton Balok Lantai 2	7	6.29	5.77	5.38
Bekisting Balok Lantai 2	14	12.58	11.55	10.77
Beton Pelat Lantai Lantai 2	7	6.29	5.77	5.38
Beton Kolom Lantai 2	7	6.29	5.77	5.38
Bekisting Kolom Lantai 2	7	6.29	5.77	5.38
Pembesian Kolom Lantai 2	14	12.58	11.55	10.77
Bekisting Balok Lantai 3	14	12.58	11.55	10.77
Bekisting Pelat Lantai 3	14	12.58	11.55	10.77
Beton Kolom Lantai 3	7	6.29	5.77	5.38
Bekisting Kolom Lantai 3	7	6.29	5.77	5.39
Pembesiaan Kolom Lantai 3	14	12.58	11.55	10.77
Bekisting Balok Lantai 4	14	12.58	11.55	10.77
Beton Pelat Lantai Lantai 4	7	6.29	5.77	5.38
Bekisting Pelat Lantai Lantai 4	14	12.58	11.55	10.77
Pembesian Pelat Lantai Lantai 4	14	12.58	11.55	10.77
Beton Kolom Lantai 4	7	6.29	5.77	5.38
Bekisting Kolom Lantai 4	7	6.29	5.77	5.38
Pembesian Kolom Lantai 4	14	12.58	11.55	10.77
Bekisting Balok Lantai Atap	14	12.58	11.55	10.77
Bekisting Pelat Lantai Lantai Atap	14	12.58	11.55	10.77
Pembesian Talang Air Lantai Atap	7	6.29	5.77	5.38

Tabel 4.4 Lanjutan

Baja Rangka Baja Atap 1	21	18.88	17.32	16.15
Baja Rangka Baja Atap 2	21	18.88	17.32	16.15
Pengecatan Rangka Baja Atap 2	21	18.88	17.32	16.15
Baja Ringan	7	6.29	5.77	5.38

4.4.1.3. Analisis Biaya Percepatan

Setelah mendapatkan durasi percepatan untuk waktu lembur 1 jam, 2 jam, dan 3 jam, selanjutnya melakukan analisis biaya percepatan akibat penambahan jam kerja lembur. Pada analisis ini menggunakan *Microsoft Project* 2016 dan dikontrol dengan menggunakan *Microsot Excel* 2016. Contoh analisis biaya percepatan sebagai berikut.

1. Kondisi Normal

Nama pekerjaan : Bekisting Pelat Lantai Lantai 1
 Volume pekerjaan : 1923.56 m³
 Durasi pekerjaan : 7 hari

Tabel 4.5 Kebutuhan tenaga kerja Bekisting pelat lantai lantai 1

KOMPONEN	SATUAN	VOL	HARGA SATUAN (Rp)	
TENAGA				
Pekerja	OH	0.20	Rp	12,500.00
Tukang Kayu	OH	0.25	Rp	15,000.00
Kepala tukang Kayu	OH	0.15	Rp	16,875.00
Mandor	OH	0.05	Rp	18,750.00
MATERIAL				
Kayu kaso	m ³	0.02	Rp	2,000,000.00
Triplek 12 mm	m ²	0.35	Rp	160,000.00
Paku	kg	0.40	Rp	12,000.00

$$\text{Biaya Resources per hari} = \text{jam kerja} \times \text{koefisien} \times \text{harga} \quad (4.3)$$

Sehingga,

$$\text{Pekerja} = 8 \times 0,20 \times 12.500,00 = \text{Rp } 20.000,00/\text{hari}$$

$$\text{Tukang kayu} = 8 \times 0,25 \times 15.000,00 = \text{Rp } 30.000,00/\text{hari}$$

$$\text{Kepala tukang kayu} = 8 \times 0,15 \times 16.875,00 = \text{Rp } 20.250,00/\text{hari}$$

$$\text{Mandor} = 8 \times 0,05 \times 18.750,00 = \text{Rp } 7.500,00/\text{hari}$$

$$\begin{aligned} \text{Maka, total biaya tenaga kerja} &= 20.000 + 30.000 + 20.250 + 7.500 \\ &= \text{Rp } 77.750,00 \end{aligned}$$

Analisis biaya bahan material sebaga berikut.

$$\text{Biaya total } resource = \text{harga satuan} \times \text{volume} \times \text{koefisien} \quad (4.4)$$

$$\begin{aligned} \text{Kayu kaso} &= \text{Rp } 2.000.000,00 \times 1.923,56 \times 0,02 \\ &= \text{Rp } 76.942.400,00 \end{aligned}$$

$$\begin{aligned} \text{Triplek 12 mm} &= \text{Rp } 160.000,00 \times 1923,56 \times 0,35 \\ &= \text{Rp } 107.719.360,00 \end{aligned}$$

$$\begin{aligned} \text{Paku} &= \text{Rp } 12.000,00 \times 1923,56 \times 0,4 \\ &= \text{Rp } 9.233.088,00 \end{aligned}$$

$$\begin{aligned} \text{Maka, total biaya material} &= \text{Rp } 76.942.400,00 + \text{Rp } 107.719.360,00 + \\ &\quad \text{Rp } 9.233.088,00 \\ &= \text{Rp } 193.894.848,00 \end{aligned}$$

$$\begin{aligned} \text{Total biaya} &= (\text{total biaya tenaga kerja} \times \text{durasi}) + \text{total biaya material} \\ &= (\text{Rp } 77.750,00 \times 7) + \text{Rp } 193.894.848,00 \\ &= \text{Rp } 201.048.790,00 \end{aligned}$$

2. Kondisi Lembur 1 Jam

Nama pekerjaan : Bekisting Pelat Lantai Lantai 1

Volume pekerjaan : 1.923,56 m³

Durasi percepatan : 6.29 hari

Tabel 4.6 Harga kebutuhan tenaga kerja dengan 1 jam lembur

Jenis Pekerja	Satuan	Harga Lembur 1 jam	Biaya per Jam
Pekerja	OH	Rp18,750.00	Rp18,750.00
Tukang Kayu	OH	Rp22,500.00	Rp22,500.00
Kepala Tukang Kayu	OH	Rp25,312.50	Rp25,312.50
Mandor	OH	Rp28,125.00	Rp28,125.00

$$\text{Pekerja} = 0,20 \times 18.750,00 = \text{Rp } 3.750,00$$

$$\text{Tukang kayu} = 0,25 \times 22.500,00 = \text{Rp } 5.625,00$$

$$\text{Kepala tukang kayu} = 0,05 \times 25.312,50 = \text{Rp } 1.265,60$$

$$\text{Mandor} = 0,15 \times 28.125,00 = \text{Rp } 4.218,75$$

$$\begin{aligned} \text{Maka, total harga tenaga kerja} &= 3.750,00 + 5.625,00 + 1.265,60 + 4218,75 \\ &= \text{Rp } 14.859,35/\text{hari} \end{aligned}$$

Total biaya *resource* pada penambahan jam lembur 1 jam/hari.

$$\begin{aligned} \text{Tbrp} &= \text{Biaya normal per hari} + \text{total harga tenaga kerja 1 jam} \\ &= \text{Rp } 77.750,00 + \text{Rp } 14.859,35 \\ &= \text{Rp } 92.609,35/\text{hari} \end{aligned}$$

Total biaya percepatan 1 jam

$$\begin{aligned} \text{Tbp} &= (\text{Tbrp} \times \text{durasi}) + \text{Total biaya material} + \\ &= (\text{Rp } 92.609,35 \times 7) + \text{Rp } 193.894.848,00 \\ &= \text{Rp } 202.306.378,00 \end{aligned}$$

3. Kondisi Lembur 2 Jam

Nama pekerjaan	: Bekisting Pelat Lantai Lantai 1
Volume pekerjaan	: 1.923,56 m ³
Durasi percepatan	: 6.29 hari

Tabel 4.7 Harga kebutuhan tenaga kerja dengan 2 jam lembur

Jenis Pekerja	Satuan	Harga	
		Lembur 2 jam	Biaya per Jam
Pekerja	OH	Rp43.750.00	Rp 87.500,00
Tukang Kayu	OH	Rp52.500.00	Rp105.000,00
Kepala Tukang Kayu	OH	Rp59.062,50	Rp118.125,00
Mandor	OH	Rp65.625.00	Rp131.250,00

$$\begin{aligned} \text{Pekerja} &= 0,20 \times 43.750,00 &&= \text{Rp } 8.750,00 \\ \text{Tukang kayu} &= 0,25 \times 52.500,00 &&= \text{Rp } 13.125,00 \\ \text{Kepala tukang kayu} &= 0,05 \times 59.062,50 &&= \text{Rp } 2.953,13 \\ \text{Mandor} &= 0,15 \times 65.625,00 &&= \text{Rp } 4.218,75 \\ \text{Maka, total harga tenaga kerja} &= 8.750 + 13.125 + 2953,13 + 4218,75 \\ &= \text{Rp } 29.046,88/\text{hari} \end{aligned}$$

Total biaya *resource* pada penambahan jam lembur 1 jam/hari.

$$\begin{aligned} \text{Tbrp} &= \text{Biaya normal per hari} + \text{total harga tenaga kerja 1 jam} \\ &= \text{Rp } 77.750,00 + \text{Rp } 29.046,88 \\ &= \text{Rp } 106.796,88/\text{hari} \end{aligned}$$

Total biaya percepatan 1 jam

$$\begin{aligned}
 Tbp &= (Tbrp \times \text{durasi}) + \text{Total biaya material} + \\
 &= (\text{Rp } 106.796,88 \times 7) + \text{Rp } 193.894.848,00 \\
 &= \text{Rp } 203.551.393,00
 \end{aligned}$$

4. Kondisi Lembur 3 Jam

Nama pekerjaan	: Bekisting Pelat Lantai Lantai 1
Volume pekerjaan	: 1.923,56 m ³
Durasi percepatan	: 6.29 hari

Tabel 4.8 Harga kebutuhan tenaga kerja dengan 3 jam lembur

Jenis Pekerja	Satuan	Harga Lembur 3 jam	Biaya per Jam
Pekerja	OH	Rp68.750,00	Rp 87.500,00
Tukang Kayu	OH	Rp82.500,00	Rp105.000,00
Kepala Tukang Kayu	OH	Rp92.812,50	Rp118.125,00
Mandor	OH	Rp103.125,00	Rp131.250,00

Pekerja	= 0,20 × 68,750,00	= Rp 13.750,00
Tukang kayu	= 0,25 × 82.500,00	= Rp 20.625,00
Kepala tukang kayu	= 0,05 × 92.812,50	= Rp 4640,625
Mandor	= 0,15 × 103.125,00	= Rp 15.468,75

$$\begin{aligned}
 \text{Maka, total harga tenaga kerja} &= 13.750 + 20.625 + 4.640,625 + 15.468,75 \\
 &= \text{Rp } 54.489,375/\text{hari}
 \end{aligned}$$

Total biaya *resource* pada penambahan jam lembur 1 jam/hari.

$$\begin{aligned}
 Tbrp &= \text{Biaya normal per hari} + \text{total harga tenaga kerja 1 jam} \\
 &= \text{Rp } 77.750,00 + \text{Rp } 54.489,375 \\
 &= \text{Rp } 132.239,375/\text{hari}
 \end{aligned}$$

Total biaya percepatan 1 jam

$$\begin{aligned}
 Tbp &= (Tbrp \times \text{durasi}) + \text{Total biaya material} + \\
 &= (\text{Rp } 132.239,375 \times 7) + \text{Rp } 193.894.848,00 \\
 &= \text{Rp } 204.820.768,00
 \end{aligned}$$

Hasil analisis diatas merupakan salah satu kegiatan kritis yang didapatkan dari hasil pemrograman *Microsoft Project 2016*. Hasil analisis

keseluruhan kegiatan kritis dapat dilihat pada Tabel 4.9, Tabel 4.10, dan Tabel 4.11

Tabel 4.9 Hasil analisis biaya percepatan 1 jam

No	Nama Pekerjaan	Biaya	
		Normal	Lembur 1 Jam
1	Galian Tanah Pile Cap	Rp 1,029,000.00	Rp 1,093,125.00
2	Beton Pelat Lantai Lantai 1	Rp 264,654,625.00	Rp 265,005,666.00
3	Bekisting Pelat Lantai 1	Rp 201,048,790.00	Rp 202,306,378.00
4	Wiremesh Pelat Lantai Lantai 1	Rp 195,321,620.00	Rp 195,664,239.00
5	Lantai Kerja Pelat Lantai Lantai 1	Rp 84,601,008.00	Rp 84,723,205.00
6	Pasir Urug Pelat Lantai Lantai 1	Rp 64,570,200.00	Rp 64,701,606.00
7	Pembesian Pile Cap Lantai 1`	Rp 122,957,680.00	Rp 123,340,833.00
8	Lantai Kerja Pile Cap Lantai 1	Rp 5,691,574.00	Rp 5,676,974.00
9	Pasir Urug Pile Cap Lantai 1	Rp 4,325,000.00	Rp 4,342,563.00
10	Pembesian Kolom Lantai 1	Rp 227,910,080.00	Rp 228,638,486.00
11	Beton Canopy Lantai 1	Rp 8,676,725.00	Rp 8,711,573.00
12	Bekisting Canopy Lantai 1	Rp 5,536,640.00	Rp 5,566,381.00
13	Pembesian Canopy Lantai 1	Rp 48,473,880.00	Rp 48,633,405.00
14	Beton Balok Lantai 2	Rp 194,302,656.00	Rp 194,568,053.00
15	Bekisting Balok Lantai 2	Rp 111,372,420.00	Rp 112,057,001.00
16	Beton Pelat Lantai Lantai 2	Rp 249,908,843.00	Rp 250,239,787.00
17	Beton Kolom Lantai 2	Rp 89,333,246.00	Rp 89,453,652.00
18	Bekisting Kolom Lantai 2	Rp 88,730,390.00	Rp 89,290,743.00
19	Pembesian Kolom Lantai 2	Rp 117,396,080.00	Rp 117,775,839.00
20	Bekisting Balok Lantai 3	Rp 112,872,860.00	Rp 113,575,748.00
21	Bekisting Pelat Lantai 3	Rp 184,326,760.00	Rp 185,472,323.00
22	Beton Kolom Lantai 3	Rp 78,452,961.00	Rp 78,561,286.00
23	Bekisting Kolom Lantai 3	Rp 81,900,660.00	Rp 82,402,951.00
24	Pembesiaan Kolom Lantai 3	Rp 105,048,300.00	Rp 105,347,338.00
25	Bekisting Balok Lantai 4	Rp 117,552,220.00	Rp 118,284,592.00
26	Beton Pelat Lantai Lantai 4	Rp 256,814,913.00	Rp 257,153,572.00
27	Bekisting Pelat Lantai Lantai 4	Rp 184,326,760.00	Rp 185,472,323.00
28	Pembesian Pelat Lantai Lantai 4	Rp 168,610,268.00	Rp 168,913,281.00
29	Beton Kolom Lantai 4	Rp 65,449,540.00	Rp 65,543,340.00
30	Bekisting Kolom Lantai 4	Rp 71,855,740.00	Rp 72,299,324.00
31	Pembesian Kolom Lantai 4	Rp 93,498,210.00	Rp 93,818,629.00
32	Bekisting Balok Lantai Atap	Rp 62,117,880.00	Rp 62,483,739.00
33	Bekisting Pelat Lantai Lantai Atap	Rp 18,590,120.00	Rp 18,692,726.00
34	Pembesian Talang Air Lantai Atap	Rp 9,233,370.00	Rp 9,263,711.00
35	Baja Rangka Baja Atap 1	Rp 308,989,240.00	Rp 310,385,699.00
36	Baja Rangka Baja Atap 2	Rp 166,354,552.00	Rp 167,081,808.00
37	Pengecatan Rangka Baja Atap 2	Rp 6,711,540.00	Rp 6,794,321.00
38	Baja Ringan	Rp 264,800,600.00	Rp 265,159,969.00

Tabel 4.10 Hasil analisis biaya percepatan 2 jam

NO	Nama Pekerjaan	Biaya	
		Normal	Lembur 2 Jam
1	Galian Tanah Pile Cap	Rp 1,029,000.00	Rp 1,161,375.00
2	Beton Pelat Lantai Lantai 1	Rp 264,654,625.00	Rp 265,354,816.00
3	Bekisting Pelat Lantai 1	Rp 201,048,790.00	Rp 203,551,393.00
4	Wiremesh Pelat Lantai Lantai 1	Rp 195,321,620.00	Rp 196,005,645.00
5	Lantai Kerja Pelat Lantai Lantai 1	Rp 84,601,008.00	Rp 84,840,536.00
6	Pasir Urug Pelat Lantai Lantai 1	Rp 64,570,200.00	Rp 64,835,044.00
7	Pembesian Pile Cap Lantai 1	Rp 122,957,680.00	Rp 123,729,502.00
8	Lantai Kerja Pile Cap Lantai 1	Rp 5,691,574.00	Rp 5,686,184.00
9	Pasir Urug Pile Cap Lantai 1	Rp 4,325,000.00	Rp 4,351,406.00
10	Pembesian Kolom Lantai 1	Rp 227,910,080.00	Rp 229,359,099.00
11	Beton Canopy Lantai 1	Rp 8,676,725.00	Rp 8,723,129.00
12	Bekisting Canopy Lantai 1	Rp 5,536,640.00	Rp 5,600,703.00
13	Pembesian Canopy Lantai 1	Rp 48,473,880.00	Rp 48,786,702.00
14	Beton Balok Lantai 2	Rp 194,302,656.00	Rp 194,824,413.00
15	Bekisting Balok Lantai 2	Rp 111,372,420.00	Rp 112,746,748.00
16	Beton Pelat Lantai Lantai 2	Rp 249,908,843.00	Rp 250,569,130.00
17	Beton Kolom Lantai 2	Rp 89,333,246.00	Rp 89,571,421.00
18	Bekisting Kolom Lantai 2	Rp 88,730,390.00	Rp 89,840,149.00
19	Pembesian Kolom Lantai 2	Rp 117,396,080.00	Rp 118,145,721.00
20	Bekisting Balok Lantai 3	Rp 112,872,860.00	Rp 114,276,298.00
21	Bekisting Pelat Lantai 3	Rp 184,326,760.00	Rp 186,613,716.00
22	Beton Kolom Lantai 3	Rp 78,452,961.00	Rp 78,664,817.00
23	Bekisting Kolom Lantai 3	Rp 81,900,660.00	Rp 82,909,801.00
24	Pembesiaan Kolom Lantai 3	Rp 105,048,300.00	Rp 105,657,744.00
25	Bekisting Balok Lantai 4	Rp 117,552,220.00	Rp 119,012,476.00
26	Beton Pelat Lantai Lantai 4	Rp 256,814,913.00	Rp 257,492,100.00
27	Bekisting Pelat Lantai Lantai 4	Rp 184,326,760.00	Rp 186,613,716.00
28	Pembesian Pelat Lantai Lantai 4	Rp 168,610,268.00	Rp 169,207,968.00
29	Beton Kolom Lantai 4	Rp 65,449,540.00	Rp 65,629,537.00
30	Bekisting Kolom Lantai 4	Rp 71,855,740.00	Rp 72,744,015.00
31	Pembesian Kolom Lantai 4	Rp 93,498,210.00	Rp 94,114,304.00
32	Bekisting Balok Lantai Atap	Rp 62,117,880.00	Rp 62,868,108.00
33	Bekisting Pelat Lantai Lantai Atap	Rp 18,590,120.00	Rp 18,807,851.00
34	Pembesian Talang Air Lantai Atap	Rp 9,233,370.00	Rp 9,292,898.00
35	Baja Rangka Baja Atap 1	Rp 308,989,240.00	Rp 311,745,468.00
36	Baja Rangka Baja Atap 2	Rp 166,354,552.00	Rp 167,814,058.00
37	Pengecatan Rangka Baja Atap 2	Rp 6,711,540.00	Rp 6,865,103.00
38	Baja Ringan	Rp 264,800,600.00	Rp 265,572,706.00

Tabel 4.11 Hasil analisis biaya percepatan 3 jam

NO	Nama Pekerjaan	Biaya			
		Normal		Lembur 3 Jam	
1	Galian Tanah Pile Cap	Rp	1,029,000.00	Rp	1,230,906.00
2	Beton Pelat Lantai Lantai 1	Rp	264,654,625.00	Rp	265,710,619.00
3	Bekisting Pelat Lantai 1	Rp	201,048,790.00	Rp	204,820,768.00
4	Wiremesh Pelat Lantai Lantai 1	Rp	195,321,620.00	Rp	196,353,689.00
5	Lantai Kerja Pelat Lantai Lantai 1	Rp	84,601,008.00	Rp	84,985,445.00
6	Pasir Urug Pelat Lantai Lantai 1	Rp	64,570,200.00	Rp	64,971,419.00
7	Pembesian Pile Cap Lantai 1	Rp	122,957,680.00	Rp	124,125,849.00
8	Lantai Kerja Pile Cap Lantai 1	Rp	5,691,574.00	Rp	5,695,774.00
9	Pasir Urug Pile Cap Lantai 1	Rp	4,325,000.00	Rp	4,360,563.00
10	Pembesian Kolom Lantai 1	Rp	227,910,080.00	Rp	230,093,705.00
11	Beton Canopy Lantai 1	Rp	8,676,725.00	Rp	8,707,928.00
12	Bekisting Canopy Lantai 1	Rp	5,536,640.00	Rp	5,635,524.00
13	Pembesian Canopy Lantai 1	Rp	48,473,880.00	Rp	48,942,899.00
14	Beton Balok Lantai 2	Rp	194,302,656.00	Rp	195,085,631.00
15	Bekisting Balok Lantai 2	Rp	111,372,420.00	Rp	113,449,733.00
16	Beton Pelat Lantai Lantai 2	Rp	249,908,843.00	Rp	250,905,233.00
17	Beton Kolom Lantai 2	Rp	89,333,246.00	Rp	89,691,371.00
18	Bekisting Kolom Lantai 2	Rp	88,730,390.00	Rp	90,400,540.00
19	Pembesian Kolom Lantai 2	Rp	117,396,080.00	Rp	118,525,436.00
20	Bekisting Balok Lantai 3	Rp	112,872,860.00	Rp	114,987,385.00
21	Bekisting Pelat Lantai 3	Rp	184,326,760.00	Rp	185,305,573.00
22	Beton Kolom Lantai 3	Rp	78,452,961.00	Rp	78,770,331.00
23	Bekisting Kolom Lantai 3	Rp	81,900,660.00	Rp	83,426,373.00
24	Pembesian Kolom Lantai 3	Rp	105,048,300.00	Rp	105,977,081.00
25	Bekisting Balok Lantai 4	Rp	117,552,220.00	Rp	119,754,958.00
26	Beton Pelat Lantai Lantai 4	Rp	256,814,913.00	Rp	257,837,207.00
27	Bekisting Pelat Lantai Lantai 4	Rp	184,326,760.00	Rp	187,777,504.00
28	Pembesian Pelat Lantai Lantai 4	Rp	168,610,268.00	Rp	169,508,581.00
29	Beton Kolom Lantai 4	Rp	65,449,540.00	Rp	65,717,727.00
30	Bekisting Kolom Lantai 4	Rp	71,855,740.00	Rp	73,197,284.00
31	Pembesian Kolom Lantai 4	Rp	93,498,210.00	Rp	94,415,854.00
32	Bekisting Balok Lantai Atap	Rp	62,117,880.00	Rp	63,260,414.00
33	Bekisting Pelat Lantai Lantai Atap	Rp	18,590,120.00	Rp	18,431,654.00
34	Pembesian Talang Air Lantai Atap	Rp	9,233,370.00	Rp	9,322,398.00
35	Baja Rangka Baja Atap 1	Rp	308,989,240.00	Rp	313,131,859.00
36	Baja Rangka Baja Atap 2	Rp	166,354,552.00	Rp	168,560,068.00
37	Pengecatan Rangka Baja Atap 2	Rp	6,711,540.00	Rp	6,784,103.00
38	Baja Ringan	Rp	264,800,600.00	Rp	265,993,653.00

4.4.1.4. Analisis Cost Variance, Cost Slope, dan Duration Variance

Cost Variance, *Cost Slope*, dan *Duration Variance* dianalisis guna menghitung biaya langsung, biaya tidak langsung, dan biaya total keseluruhan proyek. Berikut contoh analisis *cost variance* (selisih biaya) antara biaya normal dengan biaya percepatan lembur 1 jam, 2 jam, dan 3 jam.

Nama kegiatan : Bekisting Plat Lantai Lantai 1

Biaya normal : Rp 201.048.790,00

Biaya percepatan :

1 Jam= Rp 202.306.378,00

2 Jam= Rp 203.551.393,00

3 Jam= Rp 204.820.768,00

Selisih biaya (*Cost Variance*),

1 Jam= Rp 202.306.378,00 - Rp 201.048.790,00 = Rp 1.257.588,00

2 Jam= Rp 203.551.393,00 - Rp 201.048.790,00 = Rp 2.502.603,00

3 Jam= Rp 204.820.768,00 - Rp 201.048.790,00 = Rp 3.771.978,00

Hasil analisis perhitungan *cost variance* dilakukan keseluruhan kegiatan menggunakan *Microsoft Excel 2016* dapat dilihat pada Tabel 4.12 untuk *cost variance* waktu lembur 1 jam, Tabel 4.13 untuk *cost variance* waktu lembur 2 jam, Tabel 4.14 untuk *cost variance* waktu lembur 3 jam.

Tabel 4.12 *Cost Variance* dengan waktu lembur 1 jam

NO	Nama Pekerjaan	COST VARIANCE (Rp)
1	Galian Tanah Pile Cap	64,125.00
2	Beton Pelat Lantai Lantai1	351,041.00
3	Bekisting Pelat Lantai 1	1,257,588.00
4	Wiremesh Pelat Lantai Lantai 1	342,619.00
5	Lantai Kerja Pelat Lantai Lantai 1	122,197.00
6	Pasir Urug Pelat Lantai Lantai 1	131,406.00
7	Pembesian Pile Cap Lantai 1	383,153.00
8	Lantai Kerja Pile Cap Lantai 1	(14,600.00)
9	Pasir Urug Pile Cap Lantai 1	17,563.00
10	Pembesian Kolom Lantai 1	728,406.00
11	Beton Canopy Lantai 1	34,848.00
12	Bekisting Canopy Lantai 1	29,741.00
13	Pembesian Canopy Lantai 1	159,525.00

Tabel 4.12 Lanjutan

14	Beton Balok Lantai 2	265,397.00
15	Bekisting Balok Lantai 2	684,581.00
16	Beton Pelat Lantai Lantai 2	330,944.00
17	Beton Kolom Lantai 2	120,406.00
18	Bekisting Kolom Lantai 2	560,353.00
19	Pembesian Kolom Lantai 2	379,759.00
20	Bekisting Balok Lantai 3	702,888.00
21	Bekisting Pelat Lantai 3	1,145,563.00
22	Beton Kolom Lantai 3	108,325.00
23	Bekisting Kolom Lantai 3	502,291.00
24	Pembesian Kolom Lantai 3	299,038.00
25	Bekisting Balok Lantai 4	732,372.00
26	Beton Pelat Lantai Lantai 4	338,659.00
27	Bekisting Pelat Lantai Lantai 4	1,145,563.00
28	Pembesian Pelat Lantai Lantai 4	303,013.00
29	Beton Kolom Lantai 4	93,800.00
30	Bekisting Kolom Lantai 4	443,584.00
31	Pembesian Kolom Lantai 4	320,419.00
32	Bekisting Balok Lantai Atap	365,859.00
33	Bekisting Pelat Lantai Lantai Atap	102,606.00
34	Pembesian Talang Air Lantai Atap	30,341.00
35	Baja Rangka Baja Atap 1	1,396,459.00
36	Baja Rangka Baja Atap 2	727,256.00
37	Pengecatan Rangka Baja Atap 2	82,781.00
38	Baja Ringan	359,369.00

Tabel 4.13 *Cost Variance* dengan waktu lembur 2 jam

NO	Nama Pekerjaan	COST VARIANCE (Rp)
1	Galian Tanah Pile Cap	132,375.00
2	Beton Pelat Lantai Lantai 1	700,191.00
3	Bekisting Pelat Lantai 1	2,502,603.00
4	Wiremesh Pelat Lantai Lantai 1	684,025.00
5	Lantai Kerja Pelat Lantai Lantai 1	239,528.00
6	Pasir Urug Pelat Lantai Lantai 1	264,844.00
7	Pembesian Pile Cap Lantai 1	771,822.00
8	Lantai Kerja Pile Cap Lantai 1	(5,390.00)
9	Pasir Urug Pile Cap Lantai 1	26,406.00
10	Pembesian Kolom Lantai 1	1,449,019.00
11	Beton Canopy Lantai 1	46,404.00
12	Bekisting Canopy Lantai 1	64,063.00
13	Pembesian Canopy Lantai 1	312,822.00

Tabel 4.13 Lanjutan

14	Beton Balok Lantai 2	521,757.00
15	Bekisting Balok Lantai 2	1,374,328.00
16	Beton Pelat Lantai Lantai 2	660,287.00
17	Beton Kolom Lantai 2	238,175.00
18	Bekisting Kolom Lantai 2	1,109,759.00
19	Pembesian Kolom Lantai 2	749,641.00
20	Bekisting Balok Lantai 3	1,403,438.00
21	Bekisting Pelat Lantai 3	2,286,956.00
22	Beton Kolom Lantai 3	211,856.00
23	Bekisting Kolom Lantai 3	1,009,141.00
24	Pembesian Kolom Lantai 3	609,444.00
25	Bekisting Balok Lantai 4	1,460,256.00
26	Beton Pelat Lantai Lantai 4	677,187.00
27	Bekisting Pelat Lantai Lantai 4	2,286,956.00
28	Pembesian Pelat Lantai Lantai 4	597,700.00
29	Beton Kolom Lantai 4	179,997.00
30	Bekisting Kolom Lantai 4	888,275.00
31	Pembesian Kolom Lantai 4	616,094.00
32	Bekisting Balok Lantai Atap	750,228.00
33	Bekisting Pelat Lantai Lantai Atap	217,731.00
34	Pembesian Talang Air Lantai Atap	59,528.00
35	Baja Rangka Baja Atap 1	2,756,228.00
36	Baja Rangka Baja Atap 2	1,459,506.00
37	Pengecatan Rangka Baja Atap 2	153,563.00
38	Baja Ringan	772,106.00

Tabel 4.14 *Cost Variance* dengan waktu lembur 3 jam

NO	Nama Pekerjaan	COST VARIANCE (Rp)
1	Galian Tanah Pile Cap	201,906.00
2	Beton Pelat Lantai Lantai 1	1,055,994.00
3	Bekisting Pelat Lantai 1	3,771,978.00
4	Wiremesh Pelat Lantai Lantai 1	1,032,069.00
5	Lantai Kerja Pelat Lantai Lantai 1	384,437.00
6	Pasir Urug Pelat Lantai Lantai 1	401,219.00
7	Pembesian Pile Cap Lantai 1	1,168,169.00
8	Lantai Kerja Pile Cap Lantai 1	4,200.00
9	Pasir Urug Pile Cap Lantai 1	35,563.00
10	Pembesian Kolom Lantai 1	2,183,625.00
11	Beton Canopy Lantai 1	31,203.00
12	Bekisting Canopy Lantai 1	98,884.00
13	Pembesian Canopy Lantai 1	469,019.00

Tabel 4.14 Lanjutan

14	Beton Balok Lantai 2	782,975.00
15	Bekisting Balok Lantai 2	2,077,313.00
16	Beton Pelat Lantai Lantai 2	996,390.00
17	Beton Kolom Lantai 2	358,125.00
18	Bekisting Kolom Lantai 2	1,670,150.00
19	Pembesian Kolom Lantai 2	1,129,356.00
20	Bekisting Balok Lantai 3	2,114,525.00
21	Bekisting Pelat Lantai 3	978,813.00
22	Beton Kolom Lantai 3	317,370.00
23	Bekisting Kolom Lantai 3	1,525,713.00
24	Pembesian Kolom Lantai 3	928,781.00
25	Bekisting Balok Lantai 4	2,202,738.00
26	Beton Pelat Lantai Lantai 4	1,022,294.00
27	Bekisting Pelat Lantai Lantai 4	3,450,744.00
28	Pembesian Pelat Lantai Lantai 4	898,313.00
29	Beton Kolom Lantai 4	268,187.00
30	Bekisting Kolom Lantai 4	1,341,544.00
31	Pembesian Kolom Lantai 4	917,644.00
32	Bekisting Balok Lantai Atap	1,142,534.00
33	Bekisting Pelat Lantai Lantai Atap	(158,466.00)
34	Pembesian Talang Air Lantai Atap	89,028.00
35	Baja Rangka Baja Atap 1	4,142,619.00
36	Baja Rangka Baja Atap 2	2,205,516.00
37	Pengecatan Rangka Baja Atap 2	72,563.00
38	Baja Ringan	1,193,053.00

Duration variance adalah hasil perurangan antara durasi normal dengan durasi percepatan yang diakibatkan oleh ditambahkan jam waktu lembur. Hasil analisis *duration variance* untuk seluruh kegiatan pekerjaan menggunakan *Microsoft Excel 2016* adalah sebagai berikut ini.

Tabel 4.15 *Duration variance* dengan jam waktu lembur 1 jam

NO	Nama Pekerjaan	Durasi (hari)		
		Normal	Percepatan	Variance
1	Galian Tanah Pile Cap	14	12.58	1.42
2	Beton Pelat Lantai Lantai 1	7	6.29	0.71
3	Bekisting Pelat Lantai 1	7	6.29	0.71
4	Wiremesh Pelat Lantai Lantai 1	7	6.29	0.71
5	Lantai Kerja Pelat Lantai Lantai 1	7	6.29	0.71
6	Pasir Urug Pelat Lantai Lantai 1	7	6.29	0.71
7	Pembesian Pile Cap Lantai 1	28	25.17	2.83

Tabel 4.15 Lanjutan

8	Lantai Kerja Pile Cap Lantai 1	28	25.17	2.83
9	Pasir Urug Pile Cap Lantai 1	28	25.17	2.83
10	Pembesian Kolom Lantai 1	14	12.58	1.42
11	Beton Canopy Lantai 1	7	6.29	0.71
12	Bekisting Canopy Lantai 1	7	6.29	0.71
13	Pembesian Canopy Lantai 1	14	12.58	1.42
14	Beton Balok Lantai 2	7	6.29	0.71
15	Bekisting Balok Lantai 2	14	12.58	1.42
16	Beton Pelat Lantai Lantai 2	7	6.29	0.71
17	Beton Kolom Lantai 2	7	6.29	0.71
18	Bekisting Kolom Lantai 2	7	6.29	0.71
19	Pembesian Kolom Lantai 2	14	12.58	1.42
20	Bekisting Balok Lantai 3	14	12.58	1.42
21	Bekisting Pelat Lantai 3	14	12.58	1.42
22	Beton Kolom Lantai 3	7	6.29	0.71
23	Bekisting Kolom Lantai 3	7	6.29	0.71
24	Pembesian Kolom Lantai 3	14	12.58	1.42
25	Bekisting Balok Lantai 4	14	12.58	1.42
26	Beton Pelat Lantai Lantai 4	7	6.29	0.71
27	Bekisting Pelat Lantai Lantai 4	14	12.58	1.42
28	Pembesian Pelat Lantai Lantai 4	14	12.58	1.42
29	Beton Kolom Lantai 4	7	6.29	0.71
30	Bekisting Kolom Lantai 4	7	6.29	0.71
31	Pembesian Kolom Lantai 4	14	12.58	1.42
32	Bekisting Balok Lantai Atap	14	12.58	1.42
33	Bekisting Pelat Lantai Lantai Atap	14	12.58	1.42
34	Pembesian Talang Air Lantai Atap	7	6.29	0.71
35	Baja Rangka Baja Atap 1	21	18.88	2.12
36	Baja Rangka Baja Atap 2	21	18.88	2.12
37	Pengecatan Rangka Baja Atap 2	21	18.88	2.12
38	Baja Ringan	7	6.29	0.71

Tabel 4.16 *Duration variance* dengan jam waktu lembur 2 jam

NO	Nama Pekerjaan	Durasi (hari)		
		Normal	Percepatan	Variance
1	Galian Tanah Pile Cap	14	11.55	2.45
2	Beton Pelat Lantai Lantai 1	7	5.77	1.23
3	Bekisting Pelat Lantai 1	7	5.77	1.23
4	Wiremesh Pelat Lantai Lantai 1	7	5.77	1.23
5	Lantai Kerja Pelat Lantai Lantai 1	7	5.77	1.23
6	Pasir Urug Pelat Lantai Lantai 1	7	5.77	1.23
7	Pembesian Pile Cap Lantai 1	28	23.09	4.91
8	Lantai Kerja Pile Cap Lantai 1	28	23.09	4.91

Tabel 4.16 Lanjutan

9	Pasir Urug Pile Cap Lantai 1	28	23.09	4.91
10	Pembesian Kolom Lantai 1	14	11.55	2.45
11	Beton Canopy Lantai 1	7	5.77	1.23
12	Bekisting Canopy Lantai 1	7	5.77	1.23
13	Pembesian Canopy Lantai 1	14	11.55	2.45
14	Beton Balok Lantai 2	7	5.77	1.23
15	Bekisting Balok Lantai 2	14	11.55	2.45
16	Beton Pelat Lantai Lantai 2	7	5.77	1.23
17	Beton Kolom Lantai 2	7	5.77	1.23
18	Bekisting Kolom Lantai 2	7	5.77	1.23
19	Pembesian Kolom Lantai 2	14	11.55	2.45
20	Bekisting Balok Lantai 3	14	11.55	2.45
21	Bekisting Pelat Lantai 3	14	11.55	2.45
22	Beton Kolom Lantai 3	7	5.77	1.23
23	Bekisting Kolom Lantai 3	7	5.77	1.23
24	Pembesiaan Kolom Lantai 3	14	11.55	2.45
25	Bekisting Balok Lantai 4	14	11.55	2.45
26	Beton Pelat Lantai Lantai 4	7	5.77	1.23
27	Bekisting Pelat Lantai Lantai 4	14	11.55	2.45
28	Pembesian Pelat Lantai Lantai 4	14	11.55	2.45
29	Beton Kolom Lantai 4	7	5.77	1.23
30	Bekisting Kolom Lantai 4	7	5.77	1.23
31	Pembesian Kolom Lantai 4	14	11.55	2.45
32	Bekisting Balok Lantai Atap	14	11.55	2.45
33	Bekisting Pelat Lantai Lantai Atap	14	11.55	2.45
34	Pembesian Talang Air Lantai Atap	7	5.77	1.23
35	Baja Rangka Baja Atap 1	21	17.32	3.68
36	Baja Rangka Baja Atap 2	21	17.32	3.68
37	Pengecatan Rangka Baja Atap 2	21	17.32	3.68
38	Baja Ringan	7	5.77	1.23

Tabel 4.17 *Duration variance* dengan jam waktu lembur 3 jam

NO	Nama Pekerjaan	Durasi (hari)		
		Normal	Percepatan	Variance
1	Galian Tanah Pile Cap	14	10.77	3.23
2	Beton Pelat Lantai Lantai 1	7	5.38	1.62
3	Bekisting Pelat Lantai 1	7	5.38	1.62
4	Wiremesh Pelat Lantai Lantai 1	7	5.38	1.62
5	Lantai Kerja Pelat Lantai Lantai 1	7	5.38	1.62
6	Pasir Urug Pelat Lantai Lantai 1	7	5.38	1.62
7	Pembesian Pile Cap Lantai 1	28	21.54	6.46
8	Lantai Kerja Pile Cap Lantai 1	28	21.54	6.46
9	Pasir Urug Pile Cap Lantai 1	28	21.54	6.46
10	Pembesian Kolom Lantai 1	14	10.77	3.23

Tabel 4.17 Lanjutan

11	Beton Canopy Lantai 1	7	5.38	1.62
12	Bekisting Canopy Lantai 1	7	5.38	1.62
13	Pembesian Canopy Lantai 1	14	10.77	3.23
14	Beton Balok Lantai 2	7	5.38	1.62
15	Bekisting Balok Lantai 2	14	10.77	3.23
16	Beton Pelat Lantai Lantai 2	7	5.38	1.62
17	Beton Kolom Lantai 2	7	5.38	1.62
18	Bekisting Kolom Lantai 2	7	5.38	1.62
19	Pembesian Kolom Lantai 2	14	10.77	3.23
20	Bekisting Balok Lantai 3	14	10.77	3.23
21	Bekisting Pelat Lantai 3	14	10.77	3.23
22	Beton Kolom Lantai 3	7	5.38	1.62
23	Bekisting Kolom Lantai 3	7	5.39	1.61
24	Pembesian Kolom Lantai 3	14	10.77	3.23
25	Bekisting Balok Lantai 4	14	10.77	3.23
26	Beton Pelat Lantai Lantai 4	7	5.38	1.62
27	Bekisting Pelat Lantai Lantai 4	14	10.77	3.23
28	Pembesian Pelat Lantai Lantai 4	14	10.77	3.23
29	Beton Kolom Lantai 4	7	5.38	1.62
30	Bekisting Kolom Lantai 4	7	5.38	1.62
31	Pembesian Kolom Lantai 4	14	10.77	3.23
32	Bekisting Balok Lantai Atap	14	10.77	3.23
33	Bekisting Pelat Lantai Lantai Atap	14	10.77	3.23
34	Pembesian Talang Air Lantai Atap	7	5.38	1.62
35	Baja Rangka Baja Atap 1	21	16.15	4.85
36	Baja Rangka Baja Atap 2	21	16.15	4.85
37	Pengecatan Rangka Baja Atap 2	21	16.15	4.85
38	Baja Ringan	7	5.38	1.62

Cost Slope adalah ratio antara biaya normal dikurang biaya percepatan dengan durasi normal dikurang durasi percepatan. Berikut ini contoh analisis *cost slope* pada salah satu kegiatan pekerjaan.

Nama Kegiatan : Bekisting Plat Lantai Lantai 1

Cost variance

1 Jam = Rp 1.257.588,00

2 Jam = Rp 2.502.603,00

3 Jam = Rp 3.771.978,00

Duration Variance

1 Jam = 0,71 hari

2 Jam = 1,23 hari

3 Jam = 1,62 hari

Cost Slope,

$$\begin{aligned}
 \text{1 Jam} &= \frac{\text{Cost Variance}}{\text{Duration Variance}} \\
 &= \frac{1.257.588,00}{0,71} \\
 &= \text{Rp } 1.771.250,70/\text{hari} \\
 \text{2 Jam} &= \frac{\text{Cost Variance}}{\text{Duration Variance}} \\
 &= \frac{2.502.603,00}{1,23} \\
 &= \text{Rp } 2.034.636,59/\text{hari} \\
 \text{3 Jam} &= \frac{\text{Cost Variance}}{\text{Duration Variance}} \\
 &= \frac{3.771.978,00}{1,62} \\
 &= \text{Rp } 2.328.381,48/\text{hari}
 \end{aligned}$$

Hasil analisis *Cost Slope* seluruh kegiatan pekerjaan dengan menggunakan *Microsoft Excel 2016* adalah sebagai berikut ini.

Tabel 4.18 *Cost Slope* jam waktu lembur 1 jam

No	Nama Pekerjaan	Cost Variance (Rp)	Durasi Variance (Hari)	Cost Slope (Rp./Hari)
1	Galian Tanah Pile Cap	64,125.00	1.42	45158.45
2	Beton Pelat Lantai Lantai 1	351,041.00	0.71	494423.94
3	Bekisting Pelat Lantai 1	1,257,588.00	0.71	1771250.70
4	Wiremesh Pelat Lantai Lantai 1	342,619.00	0.71	482561.97
5	Lantai Kerja Pelat Lantai Lantai 1	122,197.00	0.71	172108.45
6	Pasir Urug Pelat Lantai Lantai 1	131,406.00	0.71	185078.87
7	Pembesian Pile Cap Lantai 1	383,153.00	2.83	135389.75
8	Lantai Kerja Pile Cap Lantai 1	-14,600.00	2.83	-5159.01
9	Pasir Urug Pile Cap Lantai 1	17,563.00	2.83	6206.01
10	Pembesian Kolom Lantai 1	728,406.00	1.42	512961.97
11	Beton Canopy Lantai 1	34,848.00	0.71	49081.69
12	Bekisting Canopy Lantai 1	29,741.00	0.71	41888.73
13	Pembesian Canopy Lantai 1	159,525.00	1.42	112341.55
14	Beton Balok Lantai 2	265,397.00	0.71	373798.59
15	Bekisting Balok Lantai 2	684,581.00	1.42	482099.30
16	Beton Pelat Lantai Lantai 2	330,944.00	0.71	466118.31
17	Beton Kolom Lantai 2	120,406.00	0.71	169585.92
18	Bekisting Kolom Lantai 2	560,353.00	0.71	789229.58
19	Pembesian Kolom Lantai 2	379,759.00	1.42	267435.92

Tabel 4.18 Lanjutan

20	Bekisting Balok Lantai 3	702,888.00	1.42	494991.55
21	Bekisting Pelat Lantai 3	1,145,563.00	1.42	806734.51
22	Beton Kolom Lantai 3	108,325.00	0.71	152570.42
23	Bekisting Kolom Lantai 3	502,291.00	0.71	707452.11
24	Pembesian Kolom Lantai 3	299,038.00	1.42	210590.14
25	Bekisting Balok Lantai 4	732,372.00	1.42	515754.93
26	Beton Pelat Lantai Lantai 4	338,659.00	0.71	476984.51
27	Bekisting Pelat Lantai Lantai 4	1,145,563.00	1.42	806734.51
28	Pembesian Pelat Lantai Lantai 4	303,013.00	1.42	213389.44
29	Beton Kolom Lantai 4	93,800.00	0.71	132112.68
30	Bekisting Kolom Lantai 4	443,584.00	0.71	624766.20
31	Pembesian Kolom Lantai 4	320,419.00	1.42	225647.18
32	Bekisting Balok Lantai Atap	365,859.00	1.42	257647.18
33	Bekisting Pelat Lantai Lantai Atap	102,606.00	1.42	72257.75
34	Pembesian Talang Air Lantai Atap	30,341.00	0.71	42733.80
35	Baja Rangka Baja Atap 1	1,396,459.00	2.12	658707.08
36	Baja Rangka Baja Atap 2	727,256.00	2.12	343045.28
37	Pengecatan Rangka Baja Atap 2	82,781.00	2.12	39047.64
38	Baja Ringan	359,369.00	0.71	506153.52

Tabel 4.19 *Cost Slope* jam waktu lembur 2 jam

No	Nama Pekerjaan	Cost Variance (Rp)	Durasi Variance (Hari)	Cost Slope (Rp./Hari)
1	Galian Tanah Pile Cap	132,375.00	2.45	54,030.61
2	Beton Pelat Lantai Lantai 1	700,191.00	1.23	569,260.98
3	Bekisting Pelat Lantai 1	2,502,603.00	1.23	2,034,636.59
4	Wiremesh Pelat Lantai Lantai 1	684,025.00	1.23	556,117.89
5	Pekerjaan Lantai Kerja Pelat Lantai Lantai 1	239,528.00	1.23	194,738.21
6	Pasir Urug Pelat Lantai Lantai 1	264,844.00	1.23	215,320.33
7	Pembesian Pile Cap Lantai 1	771,822.00	4.91	157,193.89
8	Lantai Kerja Pile Cap Lantai 1	-5,390.00	4.91	-1,097.76
9	Pasir Urug Pile Cap Lantai 1	26,406.00	4.91	5,378.00
10	Pembesian Kolom Lantai 1	1,449,019.00	2.45	591,436.33
11	Beton Canopy Lantai 1	46,404.00	1.23	37,726.83
12	Bekisting Canopy Lantai 1	64,063.00	1.23	52,083.74
13	Pembesian Canopy Lantai 1	312,822.00	2.45	127,682.45
14	Beton Balok Lantai 2	521,757.00	1.23	424,192.68
15	Bekisting Balok Lantai 2	1,374,328.00	2.45	560,950.20
16	Beton Pelat Lantai Lantai 2	660,287.00	1.23	536,818.70
17	Beton Kolom Lantai 2	238,175.00	1.23	193,638.21
18	Bekisting Kolom Lantai 2	1,109,759.00	1.23	902,243.09
19	Pembesian Kolom Lantai 2	749,641.00	2.45	305,975.92

Tabel 4.19 Lanjutan

20	Bekisting Balok Lantai 3	1,403,438.00	2.45	572,831.84
21	Bekisting Pelat Lantai 3	2,286,956.00	2.45	933,451.43
22	Beton Kolom Lantai 3	211,856.00	1.23	172,240.65
23	Bekisting Kolom Lantai 3	1,009,141.00	1.23	820,439.84
24	Pembesian Kolom Lantai 3	609,444.00	2.45	248,752.65
25	Bekisting Balok Lantai 4	1,460,256.00	2.45	596,022.86
26	Beton Pelat Lantai Lantai 4	677,187.00	1.23	550,558.54
27	Bekisting Pelat Lantai Lantai 4	2,286,956.00	2.45	933,451.43
28	Pembesian Pelat Lantai Lantai 4	597,700.00	2.45	243,959.18
29	Beton Kolom Lantai 4	179,997.00	1.23	146,339.02
30	Bekisting Kolom Lantai 4	888,275.00	1.23	722,174.80
31	Pembesian Kolom Lantai 4	616,094.00	2.45	251,466.94
32	Bekisting Balok Lantai Atap	750,228.00	2.45	306,215.51
33	Bekisting Pelat Lantai Lantai Atap	217,731.00	2.45	88,869.80
34	Pembesian Talang Air Lantai Atap	59,528.00	1.23	48,396.75
35	Baja Rangka Baja Atap 1	2,756,228.00	3.68	748,975.00
36	Baja Rangka Baja Atap 2	1,459,506.00	3.68	396,604.89
37	Pengecatan Rangka Baja Atap 2	153,563.00	3.68	41,729.08
38	Baja Ringan	772,106.00	1.23	627,728.46

Tabel 4.20 *Cost Slope* jam waktu lembur 3 jam

No	Nama Pekerjaan	Cost Variance (Rp)	Durasi Variance (Hari)	Cost Slope (Rp./Hari)
1	Galian Tanah Pile Cap	201,906.00	3.23	62,509.60
2	Beton Pelat Lantai Lantai 1	1,055,994.00	1.62	651,848.15
3	Bekisting Pelat Lantai 1	3,771,978.00	1.62	2,328,381.48
4	Wiremesh Pelat Lantai Lantai 1	1,032,069.00	1.62	637,079.63
5	Pekerjaan Lantai Kerja Pelat Lantai Lantai 1	384,437.00	1.62	237,306.79
6	Pasir Urug Pelat Lantai Lantai 1	401,219.00	1.62	247,666.05
7	Pembesian Pile Cap Lantai 1	1,168,169.00	6.46	180,831.11
8	Lantai Kerja Pile Cap Lantai 1	4,200.00	6.46	650.15
9	Pasir Urug Pile Cap Lantai 1	35,563.00	6.46	5,505.11
10	Pembesian Kolom Lantai 1	2,183,625.00	3.23	676,044.89
11	Beton Canopy Lantai 1	31,203.00	1.62	19,261.11
12	Bekisting Canopy Lantai 1	98,884.00	1.62	61,039.51
13	Pembesian Canopy Lantai 1	469,019.00	3.23	145,207.12
14	Beton Balok Lantai 2	782,975.00	1.62	483,317.90
15	Bekisting Balok Lantai 2	2,077,313.00	3.23	643,130.96
16	Beton Pelat Lantai Lantai 2	996,390.00	1.62	615,055.56
17	Beton Kolom Lantai 2	358,125.00	1.62	221,064.81
18	Bekisting Kolom Lantai 2	1,670,150.00	1.62	1,030,956.79
19	Pembesian Kolom Lantai 2	1,129,356.00	3.23	349,645.82

Tabel 4.20 Lanjutan

20	Bekisting Balok Lantai 3	2,114,525.00	3.23	654,651.70
21	Bekisting Pelat Lantai 3	978,813.00	3.23	303,038.08
22	Beton Kolom Lantai 3	317,370.00	1.62	195,907.41
23	Bekisting Kolom Lantai 3	1,525,713.00	1.61	947,647.83
24	Pembesiaan Kolom Lantai 3	928,781.00	3.23	287,548.30
25	Bekisting Balok Lantai 4	2,202,738.00	3.23	681,962.23
26	Beton Pelat Lantai Lantai 4	1,022,294.00	1.62	631,045.68
27	Bekisting Pelat Lantai Lantai 4	3,450,744.00	3.23	1,068,341.80
28	Pembesian Pelat Lantai Lantai 4	898,313.00	3.23	278,115.48
29	Beton Kolom Lantai 4	268,187.00	1.62	165,547.53
30	Bekisting Kolom Lantai 4	1,341,544.00	1.62	828,113.58
31	Pembesian Kolom Lantai 4	917,644.00	3.23	284,100.31
32	Bekisting Balok Lantai Atap	1,142,534.00	3.23	353,725.70
33	Bekisting Pelat Lantai Lantai Atap	-158,466.00	3.23	-49,060.68
34	Pembesian Talang Air Lantai Atap	89,028.00	1.62	54,955.56
35	Baja Rangka Baja Atap 1	4,142,619.00	4.85	854,148.25
36	Baja Rangka Baja Atap 2	2,205,516.00	4.85	454,745.57
37	Pengecatan Rangka Baja Atap 2	72,563.00	4.85	14,961.44
38	Baja Ringan	1,193,053.00	1.62	736,452.47

Tabel 4.21 *Cost Slope* dengan waktu lembur 1 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Slope (Rp./hari)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	14	12.58	1.42	Rp5,691,574.00	Rp5,676,974.00	-Rp10,281.69
2	PPUPL1	7	6.29	0.71	Rp4,325,000.00	Rp4,342,563.00	Rp24,736.62
3	PPRBA2	28	25.17	2.83	Rp6,711,540.00	Rp6,794,321.00	Rp29,251.24
4	PBKL4	28	25.17	2.83	Rp65,449,540.00	Rp65,543,340.00	Rp33,144.88
5	PBKPLA	28	25.17	2.83	Rp18,590,120.00	Rp18,692,726.00	Rp36,256.54
6	PBKCL1	7	6.29	0.71	Rp5,536,640.00	Rp5,566,381.00	Rp41,888.73
7	PPTALA	7	6.29	0.71	Rp9,233,370.00	Rp9,263,711.00	Rp42,733.80
8	PBCL1	7	6.29	0.71	Rp8,676,725.00	Rp8,711,573.00	Rp49,081.69
9	PBKL3	14	12.58	1.42	Rp78,452,961.00	Rp78,561,286.00	Rp76,285.21
10	PGT	7	6.29	0.71	Rp1,029,000.00	Rp1,093,125.00	Rp90,316.90
11	PPUPL1	14	12.58	1.42	Rp64,570,200.00	Rp64,701,606.00	Rp92,539.44
12	PBKL2	7	6.29	0.71	Rp89,333,246.00	Rp89,453,652.00	Rp169,585.92
13	PLKPL1	7	6.29	0.71	Rp84,601,008.00	Rp84,723,205.00	Rp172,108.45
14	PBBL2	14	12.58	1.42	Rp194,302,656.00	Rp194,568,053.00	Rp186,899.30
15	PPCL1	7	6.29	0.71	Rp48,473,880.00	Rp48,633,405.00	Rp224,683.10
16	PBPL2	14	12.58	1.42	Rp249,908,843.00	Rp250,239,787.00	Rp233,059.15
17	PBPL4	14	12.58	1.42	Rp256,814,913.00	Rp257,153,572.00	Rp238,492.25
18	PWPL1	14	12.58	1.42	Rp195,321,620.00	Rp195,664,239.00	Rp241,280.99
19	PBKBLA	14	12.58	1.42	Rp62,117,880.00	Rp62,483,739.00	Rp257,647.18
20	PPKL2	14	12.58	1.42	Rp117,396,080.00	Rp117,775,839.00	Rp267,435.92

Tabel 4.21 Lanjutan

21	PBKKL4	14	12.58	1.42	Rp71,855,740.00	Rp72,299,324.00	Rp312,383.10
22	PBKKL3	14	12.58	1.42	Rp81,900,660.00	Rp82,402,951.00	Rp353,726.06
23	PPKL3	7	6.29	0.71	Rp105,048,300.00	Rp105,347,338.00	Rp421,180.28
24	PPPL4	7	6.29	0.71	Rp168,610,268.00	Rp168,913,281.00	Rp426,778.87
25	PPKL4	7	6.29	0.71	Rp93,498,210.00	Rp93,818,629.00	Rp451,294.37
26	PBPL1	7	6.29	0.71	Rp264,654,625.00	Rp265,005,666.00	Rp494,423.94
27	PBKBL3	14	12.58	1.42	Rp112,872,860.00	Rp113,575,748.00	Rp494,991.55
28	PBR	7	6.29	0.71	Rp264,800,600.00	Rp265,159,969.00	Rp506,153.52
29	PBRA2	14	12.58	1.42	Rp166,354,552.00	Rp167,081,808.00	Rp512,152.11
30	PPKL1	14	12.58	1.42	Rp227,910,080.00	Rp228,638,486.00	Rp512,961.97
31	PPPL1	7	6.29	0.71	Rp122,957,680.00	Rp123,340,833.00	Rp539,652.11
32	PBKPL3	21	18.88	2.12	Rp184,326,760.00	Rp185,472,323.00	Rp540,359.91
33	PBKPL4	21	18.88	2.12	Rp184,326,760.00	Rp185,472,323.00	Rp540,359.91
34	PBKPL1	21	18.88	2.12	Rp201,048,790.00	Rp202,306,378.00	Rp593,201.89
35	PBKKL2	7	6.29	0.71	Rp88,730,390.00	Rp89,290,743.00	Rp789,229.58
36	PBKBL2	7	6.29	0.71	Rp111,372,420.00	Rp112,057,001.00	Rp964,198.59
37	PBKBL4	7	6.29	0.71	Rp117,552,220.00	Rp118,284,592.00	Rp1,031,509.86
38	PBRA1	7	6.29	0.71	Rp308,989,240.00	Rp310,385,699.00	Rp1,966,843.66

Tabel 4.22 *Cost Slope* dengan waktu lembur 2 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Slope (Rp/hari)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	28	23.09	4.91	Rp5,691,574.00	Rp5,686,184.00	-Rp1,097.76
2	PPUPL1	28	23.09	4.91	Rp4,325,000.00	Rp4,351,406.00	Rp5,378.00
3	PBCL1	7	5.77	1.23	Rp8,676,725.00	Rp8,723,129.00	Rp37,726.83
4	PPRBA2	21	17.32	3.68	Rp6,711,540.00	Rp6,865,103.00	Rp41,729.08
5	PPTALA	7	5.77	1.23	Rp9,233,370.00	Rp9,292,898.00	Rp48,396.75
6	PBKCL1	7	5.77	1.23	Rp5,536,640.00	Rp5,600,703.00	Rp52,083.74
7	PGT	14	11.55	2.45	Rp1,029,000.00	Rp1,161,375.00	Rp54,030.61
8	PBKPLA	14	11.55	2.45	Rp18,590,120.00	Rp18,807,851.00	Rp88,869.80
9	PPCL1	14	11.55	2.45	Rp48,473,880.00	Rp48,786,702.00	Rp127,682.45
10	PBKL4	7	5.77	1.23	Rp65,449,540.00	Rp65,629,537.00	Rp146,339.02
11	PPPL1	28	23.09	4.91	Rp122,957,680.00	Rp123,729,502.00	Rp157,193.89
12	PBKL3	7	5.77	1.23	Rp78,452,961.00	Rp78,664,817.00	Rp172,240.65
13	PBKL2	7	5.77	1.23	Rp89,333,246.00	Rp89,571,421.00	Rp193,638.21
14	PLKPL1	7	5.77	1.23	Rp84,601,008.00	Rp84,840,536.00	Rp194,738.21
15	PPUPL1	7	5.77	1.23	Rp64,570,200.00	Rp64,835,044.00	Rp215,320.33
16	PPPL4	14	11.55	2.45	Rp168,610,268.00	Rp169,207,968.00	Rp243,959.18
17	PPKL3	14	11.55	2.45	Rp105,048,300.00	Rp105,657,744.00	Rp248,752.65
18	PPKL4	14	11.55	2.45	Rp93,498,210.00	Rp94,114,304.00	Rp251,466.94
19	PPKL2	14	11.55	2.45	Rp117,396,080.00	Rp118,145,721.00	Rp305,975.92
20	PBKBLA	14	11.55	2.45	Rp62,117,880.00	Rp62,868,108.00	Rp306,215.51
21	PBRA2	21	17.32	3.68	Rp166,354,552.00	Rp167,814,058.00	Rp396,604.89

Tabel 4.22 Lanjutan

22	PBBL2	7	5.77	1.23	Rp194,302,656.00	Rp194,824,413.00	Rp424,192.68
23	PBPL2	7	5.77	1.23	Rp249,908,843.00	Rp250,569,130.00	Rp536,818.70
24	PBPL4	7	5.77	1.23	Rp256,814,913.00	Rp257,492,100.00	Rp550,558.54
25	PWPL1	7	5.77	1.23	Rp195,321,620.00	Rp196,005,645.00	Rp556,117.89
26	PBKBL2	14	11.55	2.45	Rp111,372,420.00	Rp112,746,748.00	Rp560,950.20
27	PBPL1	7	5.77	1.23	Rp264,654,625.00	Rp265,354,816.00	Rp569,260.98
28	PBKBL3	14	11.55	2.45	Rp112,872,860.00	Rp114,276,298.00	Rp572,831.84
29	PPKL1	14	11.55	2.45	Rp227,910,080.00	Rp229,359,099.00	Rp591,436.33
30	PBKBL4	14	11.55	2.45	Rp117,552,220.00	Rp119,012,476.00	Rp596,022.86
31	PBR	7	5.77	1.23	Rp264,800,600.00	Rp265,572,706.00	Rp627,728.46
32	PBKKL4	7	5.77	1.23	Rp71,855,740.00	Rp72,744,015.00	Rp722,174.80
33	PBRA1	21	17.32	3.68	Rp308,989,240.00	Rp311,745,468.00	Rp748,975.00
34	PBKKL3	7	5.77	1.23	Rp81,900,660.00	Rp82,909,801.00	Rp820,439.84
35	PBKKL2	7	5.77	1.23	Rp88,730,390.00	Rp89,840,149.00	Rp902,243.09
36	PBKPL3	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp933,451.43
37	PBKPL4	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp933,451.43
38	PBKPL1	7	5.77	1.23	Rp201,048,790.00	Rp203,551,393.00	Rp2,034,636.59

Tabel 4.23 *Cost Slope* dengan waktu lembur 3 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Slope (Rp./hari)
		Normal	Crash	Selisih	Normal	Crash	
1	PBKPLA	14	10.77	3.23	Rp18,590,120.00	Rp18,431,654.00	-Rp49,060.68
2	PLKP1	28	21.54	6.46	Rp5,691,574.00	Rp5,695,774.00	Rp650.15
3	PPUPL1	28	21.54	6.46	Rp4,325,000.00	Rp4,360,563.00	Rp5,505.11
4	PPRBA2	21	16.15	4.85	Rp6,711,540.00	Rp6,784,103.00	Rp14,961.44
5	PBCL1	7	5.38	1.62	Rp8,676,725.00	Rp8,707,928.00	Rp19,261.11
6	PPTALA	7	5.38	1.62	Rp9,233,370.00	Rp9,322,398.00	Rp54,955.56
7	PBKCL1	7	5.38	1.62	Rp5,536,640.00	Rp5,635,524.00	Rp61,039.51
8	PGT	14	10.77	3.23	Rp1,029,000.00	Rp1,230,906.00	Rp62,509.60
9	PPCL1	14	10.77	3.23	Rp48,473,880.00	Rp48,942,899.00	Rp145,207.12
10	PBKL4	7	5.38	1.62	Rp65,449,540.00	Rp65,717,727.00	Rp165,547.53
11	PPPL1	28	21.54	6.46	Rp122,957,680.00	Rp124,125,849.00	Rp180,831.11
12	PBKL3	7	5.38	1.62	Rp78,452,961.00	Rp78,770,331.00	Rp195,907.41
13	PBKL2	7	5.38	1.62	Rp89,333,246.00	Rp89,691,371.00	Rp221,064.81
14	PLKPL1	7	5.38	1.62	Rp84,601,008.00	Rp84,985,445.00	Rp237,306.79
15	PPUPL1	7	5.38	1.62	Rp64,570,200.00	Rp64,971,419.00	Rp247,666.05
16	PPPL4	14	10.77	3.23	Rp168,610,268.00	Rp169,508,581.00	Rp278,115.48
17	PPKL4	14	10.77	3.23	Rp93,498,210.00	Rp94,415,854.00	Rp284,100.31
18	PPKL3	14	10.77	3.23	Rp105,048,300.00	Rp105,977,081.00	Rp287,548.30
19	PBKPL3	14	10.77	3.23	Rp184,326,760.00	Rp185,305,573.00	Rp303,038.08
20	PPKL2	14	10.77	3.23	Rp117,396,080.00	Rp118,525,436.00	Rp349,645.82
21	PBKBLA	14	10.77	3.23	Rp62,117,880.00	Rp63,260,414.00	Rp353,725.70
22	PBRA2	21	16.15	4.85	Rp166,354,552.00	Rp168,560,068.00	Rp454,745.57

Tabel 4.23 Lanjutan

23	PBBL2	7	5.38	1.62	Rp194,302,656.00	Rp195,085,631.00	Rp483,317.90
24	PBPL2	7	5.38	1.62	Rp249,908,843.00	Rp250,905,233.00	Rp615,055.56
25	PBPL4	7	5.38	1.62	Rp256,814,913.00	Rp257,837,207.00	Rp631,045.68
26	PWPL1	7	5.38	1.62	Rp195,321,620.00	Rp196,353,689.00	Rp637,079.63
27	PBKBL2	14	10.77	3.23	Rp111,372,420.00	Rp113,449,733.00	Rp643,130.96
28	PBPL1	7	5.38	1.62	Rp264,654,625.00	Rp265,710,619.00	Rp651,848.15
29	PBKBL3	14	10.77	3.23	Rp112,872,860.00	Rp114,987,385.00	Rp654,651.70
30	PPKL1	14	10.77	3.23	Rp227,910,080.00	Rp230,093,705.00	Rp676,044.89
31	PBKBL4	14	10.77	3.23	Rp117,552,220.00	Rp119,754,958.00	Rp681,962.23
32	PBR	7	5.38	1.62	Rp264,800,600.00	Rp265,993,653.00	Rp736,452.47
33	PBKKL4	7	5.38	1.62	Rp71,855,740.00	Rp73,197,284.00	Rp828,113.58
34	PBRA1	21	16.15	4.85	Rp308,989,240.00	Rp313,131,859.00	Rp854,148.25
35	PBKKL3	7	5.39	1.61	Rp81,900,660.00	Rp83,426,373.00	Rp947,647.83
36	PBKKL2	7	5.38	1.62	Rp88,730,390.00	Rp90,400,540.00	Rp1,030,956.79
37	PBKPL4	14	10.77	3.23	Rp184,326,760.00	Rp187,777,504.00	Rp1,068,341.80
38	PBKPL1	7	5.38	1.62	Rp201,048,790.00	Rp204,820,768.00	Rp2,328,381.48

Tabel 4.24 *Cost Variance* dari terkecil ke terbesar dengan waktu lembur 1 jam

No	Kode	Durasi			Biaya		Cost Variance (Rp)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	14	12.58	1.42	Rp5,691,574.00	Rp5,676,974.00	-Rp14,600.00
2	PPUPL1	7	6.29	0.71	Rp4,325,000.00	Rp4,342,563.00	Rp17,563.00
3	PBKCL1	7	6.29	0.71	Rp5,536,640.00	Rp5,566,381.00	Rp29,741.00
4	PPTALA	7	6.29	0.71	Rp9,233,370.00	Rp9,263,711.00	Rp30,341.00
5	PBCL1	7	6.29	0.71	Rp8,676,725.00	Rp8,711,573.00	Rp34,848.00
6	PGT	7	6.29	0.71	Rp1,029,000.00	Rp1,093,125.00	Rp64,125.00
7	PPRBA2	28	25.17	2.83	Rp6,711,540.00	Rp6,794,321.00	Rp82,781.00
8	PBKL4	28	25.17	2.83	Rp65,449,540.00	Rp65,543,340.00	Rp93,800.00
9	PBKPLA	28	25.17	2.83	Rp18,590,120.00	Rp18,692,726.00	Rp102,606.00
10	PBKL3	14	12.58	1.42	Rp78,452,961.00	Rp78,561,286.00	Rp108,325.00
11	PBKL2	7	6.29	0.71	Rp89,333,246.00	Rp89,453,652.00	Rp120,406.00
12	PLKPL1	7	6.29	0.71	Rp84,601,008.00	Rp84,723,205.00	Rp122,197.00
13	PPUPL1	14	12.58	1.42	Rp64,570,200.00	Rp64,701,606.00	Rp131,406.00
14	PPCL1	7	6.29	0.71	Rp48,473,880.00	Rp48,633,405.00	Rp159,525.00
15	PBBL2	14	12.58	1.42	Rp194,302,656.00	Rp194,568,053.00	Rp265,397.00
16	PPKL3	7	6.29	0.71	Rp105,048,300.00	Rp105,347,338.00	Rp299,038.00
17	PPPL4	7	6.29	0.71	Rp168,610,268.00	Rp168,913,281.00	Rp303,013.00
18	PPKL4	7	6.29	0.71	Rp93,498,210.00	Rp93,818,629.00	Rp320,419.00
19	PBPL2	14	12.58	1.42	Rp249,908,843.00	Rp250,239,787.00	Rp330,944.00
20	PBPL4	14	12.58	1.42	Rp256,814,913.00	Rp257,153,572.00	Rp338,659.00
21	PWPL1	14	12.58	1.42	Rp195,321,620.00	Rp195,664,239.00	Rp342,619.00
22	PBPL1	7	6.29	0.71	Rp264,654,625.00	Rp265,005,666.00	Rp351,041.00
23	PBR	7	6.29	0.71	Rp264,800,600.00	Rp265,159,969.00	Rp359,369.00

Tabel 4.24 Lanjutan

24	PBKBLA	14	12.58	1.42	Rp62,117,880.00	Rp62,483,739.00	Rp365,859.00
25	PPKL2	14	12.58	1.42	Rp117,396,080.00	Rp117,775,839.00	Rp379,759.00
26	PPPL1	7	6.29	0.71	Rp122,957,680.00	Rp123,340,833.00	Rp383,153.00
27	PBKKL4	14	12.58	1.42	Rp71,855,740.00	Rp72,299,324.00	Rp443,584.00
28	PBKKL3	14	12.58	1.42	Rp81,900,660.00	Rp82,402,951.00	Rp502,291.00
29	PBKKL2	7	6.29	0.71	Rp88,730,390.00	Rp89,290,743.00	Rp560,353.00
30	PBKBL2	7	6.29	0.71	Rp111,372,420.00	Rp112,057,001.00	Rp684,581.00
31	PBKBL3	14	12.58	1.42	Rp112,872,860.00	Rp113,575,748.00	Rp702,888.00
32	PBRA2	14	12.58	1.42	Rp166,354,552.00	Rp167,081,808.00	Rp727,256.00
33	PPKL1	14	12.58	1.42	Rp227,910,080.00	Rp228,638,486.00	Rp728,406.00
34	PBKBL4	7	6.29	0.71	Rp117,552,220.00	Rp118,284,592.00	Rp732,372.00
35	PBKPL3	21	18.88	2.12	Rp184,326,760.00	Rp185,472,323.00	Rp1,145,563.00
36	PBKPL4	21	18.88	2.12	Rp184,326,760.00	Rp185,472,323.00	Rp1,145,563.00
37	PBKPL1	21	18.88	2.12	Rp201,048,790.00	Rp202,306,378.00	Rp1,257,588.00
38	PBRA1	7	6.29	0.71	Rp308,989,240.00	Rp310,385,699.00	Rp1,396,459.00

Tabel 4.25 *Cost Variance* dari terkecil ke terbesar dengan waktu lembur 2 jam

No	Kode	Durasi			Biaya		Cost Variance (Rp)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	28	23.09	4.91	Rp5,691,574.00	Rp5,686,184.00	-Rp5,390.00
2	PPUPL1	28	23.09	4.91	Rp4,325,000.00	Rp4,351,406.00	Rp26,406.00
3	PBCL1	7	5.77	1.23	Rp8,676,725.00	Rp8,723,129.00	Rp46,404.00
4	PPTALA	7	5.77	1.23	Rp9,233,370.00	Rp9,292,898.00	Rp59,528.00
5	PBKCL1	7	5.77	1.23	Rp5,536,640.00	Rp5,600,703.00	Rp64,063.00
6	PGT	14	11.55	2.45	Rp1,029,000.00	Rp1,161,375.00	Rp132,375.00
7	PPRBA2	21	17.32	3.68	Rp6,711,540.00	Rp6,865,103.00	Rp153,563.00
8	PBKL4	7	5.77	1.23	Rp65,449,540.00	Rp65,629,537.00	Rp179,997.00
9	PBKL3	7	5.77	1.23	Rp78,452,961.00	Rp78,664,817.00	Rp211,856.00
10	PBKPLA	14	11.55	2.45	Rp18,590,120.00	Rp18,807,851.00	Rp217,731.00
11	PBKL2	7	5.77	1.23	Rp89,333,246.00	Rp89,571,421.00	Rp238,175.00
12	PLKPL1	7	5.77	1.23	Rp84,601,008.00	Rp84,840,536.00	Rp239,528.00
13	PPUPL1	7	5.77	1.23	Rp64,570,200.00	Rp64,835,044.00	Rp264,844.00
14	PPCL1	14	11.55	2.45	Rp48,473,880.00	Rp48,786,702.00	Rp312,822.00
15	PBBL2	7	5.77	1.23	Rp194,302,656.00	Rp194,824,413.00	Rp521,757.00
16	PPPL4	14	11.55	2.45	Rp168,610,268.00	Rp169,207,968.00	Rp597,700.00
17	PPKL3	14	11.55	2.45	Rp105,048,300.00	Rp105,657,744.00	Rp609,444.00
18	PPKL4	14	11.55	2.45	Rp93,498,210.00	Rp94,114,304.00	Rp616,094.00
19	PBPL2	7	5.77	1.23	Rp249,908,843.00	Rp250,569,130.00	Rp660,287.00
20	PBPL4	7	5.77	1.23	Rp256,814,913.00	Rp257,492,100.00	Rp677,187.00
21	PWPL1	7	5.77	1.23	Rp195,321,620.00	Rp196,005,645.00	Rp684,025.00
22	PBPL1	7	5.77	1.23	Rp264,654,625.00	Rp265,354,816.00	Rp700,191.00
23	PPKL2	14	11.55	2.45	Rp117,396,080.00	Rp118,145,721.00	Rp749,641.00
24	PBKBLA	14	11.55	2.45	Rp62,117,880.00	Rp62,868,108.00	Rp750,228.00

Tabel 4.25 Lanjutan

25	PPPL1	28	23.09	4.91	Rp122,957,680.00	Rp123,729,502.00	Rp771,822.00
26	PBR	7	5.77	1.23	Rp264,800,600.00	Rp265,572,706.00	Rp772,106.00
27	PBKKL4	7	5.77	1.23	Rp71,855,740.00	Rp72,744,015.00	Rp888,275.00
28	PBKKL3	7	5.77	1.23	Rp81,900,660.00	Rp82,909,801.00	Rp1,009,141.00
29	PBKKL2	7	5.77	1.23	Rp88,730,390.00	Rp89,840,149.00	Rp1,109,759.00
30	PBKBL2	14	11.55	2.45	Rp111,372,420.00	Rp112,746,748.00	Rp1,374,328.00
31	PBKBL3	14	11.55	2.45	Rp112,872,860.00	Rp114,276,298.00	Rp1,403,438.00
32	PPKL1	14	11.55	2.45	Rp227,910,080.00	Rp229,359,099.00	Rp1,449,019.00
33	PBRA2	21	17.32	3.68	Rp166,354,552.00	Rp167,814,058.00	Rp1,459,506.00
34	PBKBL4	14	11.55	2.45	Rp117,552,220.00	Rp119,012,476.00	Rp1,460,256.00
35	PBKPL3	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp2,286,956.00
36	PBKPL4	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp2,286,956.00
37	PBKPL1	7	5.77	1.23	Rp201,048,790.00	Rp203,551,393.00	Rp2,502,603.00
38	PBRA1	21	17.32	3.68	Rp308,989,240.00	Rp311,745,468.00	Rp2,756,228.00

Tabel 4.26 Cost Variance dari terkecil dan terbesar dengan waktu lembur 3 jam

No	Kode	Durasi			Biaya		Cost Variance (Rp)
		Normal	Crash	Selisih	Normal	Crash	
1	PBKPLA	14	10.77	3.23	Rp18,590,120.00	Rp18,431,654.00	-Rp158,466.00
2	PLKP1	28	21.54	6.46	Rp5,691,574.00	Rp5,695,774.00	Rp4,200.00
3	PBCL1	7	5.38	1.62	Rp8,676,725.00	Rp8,707,928.00	Rp31,203.00
4	PPUPL1	28	21.54	6.46	Rp4,325,000.00	Rp4,360,563.00	Rp35,563.00
5	PPRBA2	21	16.15	4.85	Rp6,711,540.00	Rp6,784,103.00	Rp72,563.00
6	PPTALA	7	5.38	1.62	Rp9,233,370.00	Rp9,322,398.00	Rp89,028.00
7	PBKCL1	7	5.38	1.62	Rp5,536,640.00	Rp5,635,524.00	Rp98,884.00
8	PGT	14	10.77	3.23	Rp1,029,000.00	Rp1,230,906.00	Rp201,906.00
9	PBKL4	7	5.38	1.62	Rp65,449,540.00	Rp65,717,727.00	Rp268,187.00
10	PBKL3	7	5.38	1.62	Rp78,452,961.00	Rp78,770,331.00	Rp317,370.00
11	PBKL2	7	5.38	1.62	Rp89,333,246.00	Rp89,691,371.00	Rp358,125.00
12	PLKPL1	7	5.38	1.62	Rp84,601,008.00	Rp84,985,445.00	Rp384,437.00
13	PPUPL1	7	5.38	1.62	Rp64,570,200.00	Rp64,971,419.00	Rp401,219.00
14	PPCL1	14	10.77	3.23	Rp48,473,880.00	Rp48,942,899.00	Rp469,019.00
15	PBBL2	7	5.38	1.62	Rp194,302,656.00	Rp195,085,631.00	Rp782,975.00
16	PPPL4	14	10.77	3.23	Rp168,610,268.00	Rp169,508,581.00	Rp898,313.00
17	PPKL4	14	10.77	3.23	Rp93,498,210.00	Rp94,415,854.00	Rp917,644.00
18	PPKL3	14	10.77	3.23	Rp105,048,300.00	Rp105,977,081.00	Rp928,781.00
19	PBKPL3	14	10.77	3.23	Rp184,326,760.00	Rp185,305,573.00	Rp978,813.00
20	PBPL2	7	5.38	1.62	Rp249,908,843.00	Rp250,905,233.00	Rp996,390.00
21	PBPL4	7	5.38	1.62	Rp256,814,913.00	Rp257,837,207.00	Rp1,022,294.00
22	PWPL1	7	5.38	1.62	Rp195,321,620.00	Rp196,353,689.00	Rp1,032,069.00
23	PBPL1	7	5.38	1.62	Rp264,654,625.00	Rp265,710,619.00	Rp1,055,994.00
24	PPKL2	14	10.77	3.23	Rp117,396,080.00	Rp118,525,436.00	Rp1,129,356.00
25	PBKBLA	14	10.77	3.23	Rp62,117,880.00	Rp63,260,414.00	Rp1,142,534.00

Tabel 4.26 Lanjutan

26	PPPL1	28	21.54	6.46	Rp122,957,680.00	Rp124,125,849.00	Rp1,168,169.00
27	PBR	7	5.38	1.62	Rp264,800,600.00	Rp265,993,653.00	Rp1,193,053.00
28	PBKKL4	7	5.38	1.62	Rp71,855,740.00	Rp73,197,284.00	Rp1,341,544.00
29	PBKKL3	7	5.39	1.61	Rp81,900,660.00	Rp83,426,373.00	Rp1,525,713.00
30	PBKKL2	7	5.38	1.62	Rp88,730,390.00	Rp90,400,540.00	Rp1,670,150.00
31	PBKBL2	14	10.77	3.23	Rp111,372,420.00	Rp113,449,733.00	Rp2,077,313.00
32	PBKBL3	14	10.77	3.23	Rp112,872,860.00	Rp114,987,385.00	Rp2,114,525.00
33	PPKL1	14	10.77	3.23	Rp227,910,080.00	Rp230,093,705.00	Rp2,183,625.00
34	PBKBL4	14	10.77	3.23	Rp117,552,220.00	Rp119,754,958.00	Rp2,202,738.00
35	PBRA2	21	16.15	4.85	Rp166,354,552.00	Rp168,560,068.00	Rp2,205,516.00
36	PBKPL4	14	10.77	3.23	Rp184,326,760.00	Rp187,777,504.00	Rp3,450,744.00
37	PBKPL1	7	5.38	1.62	Rp201,048,790.00	Rp204,820,768.00	Rp3,771,978.00
38	PBRA1	21	16.15	4.85	Rp308,989,240.00	Rp313,131,859.00	Rp4,142,619.00

4.4.1.5. Analisis Biaya Total Proyek

Sebelum menganalisis biaya total proyek, biaya tidak langsung dan biaya langsung harus dianalisis terlebih dahulu. Berikut menganalisis biaya tidak langsung dan biaya langsung.

1. Biaya Tidak Langsung

Analisis perhitungan biaya tidak langsung menggunakan model *Regresi Non Linier* algoritma genetika, persamaannya sebagai berikut.

$$y = -0.95 - 4.888(\ln(x1 - 0.21) - \ln(x2)) + \varepsilon \quad (4.1)$$

dengan,

$x1$ = nilai total proyek (Rupiah),

$x2$ = durasi proyek (hari), dan

ε = *random error*.

Sehingga biaya tidak langsung dianalisis sebagai berikut.

$$x1 = \text{Rp } 8.024.154.950,00$$

$$x2 = 189 \text{ hari}$$

$$y = -0,95 - 4,888(\ln(x1 - 0,21) - \ln(x2))$$

$$y = -0,95 - 4,888\left(\ln\left(\frac{8.024.154.950}{1.000.000.000} - 0,21\right) - \ln(189)\right)$$

$$y = 14,62\% = 0,1462$$

$$\begin{aligned} \text{biaya tidak langsung} &= y \times x1 \\ &= 0,1462 \times \text{Rp } 8.024.154.950,00 \\ &= \text{Rp } 1.173.311.211,05 \end{aligned}$$

Tabel 4.27 Biaya tidak langsung waktu lembur 1 jam

Kode	Durasi (hari)			Komulatif	Biaya Tidak Langsung (Rp)
	Normal	Crash	Selisih		
				189	Rp1,173,311,211.05
PLKP1	14	12.58	1.42	188	Rp1,164,495,856.98
PPUPL1	7	6.29	0.71	187	Rp1,160,088,179.94
PPRBA2	28	25.17	2.83	184	Rp1,142,519,551.75
PBKL4	28	25.17	2.83	181	Rp1,124,950,923.57
PBKPLA	28	25.17	2.83	178	Rp1,107,382,295.38
PBKCL1	7	6.29	0.71	178	Rp1,102,974,618.35
PPTALA	7	6.29	0.71	177	Rp1,098,566,941.31
PBCL1	7	6.29	0.71	176	Rp1,094,159,264.27
PBKL3	14	12.58	1.42	175	Rp1,085,343,910.20
PGT	7	6.29	0.71	174	Rp1,080,936,233.16
PPUPL1	14	12.58	1.42	173	Rp1,072,120,879.09
PBKL2	7	6.29	0.71	172	Rp1,067,713,202.06
PLKPL1	7	6.29	0.71	171	Rp1,063,305,525.02
PBBL2	14	12.58	1.42	170	Rp1,054,490,170.95
PPCL1	7	6.29	0.71	169	Rp1,050,082,493.91
PBPL2	14	12.58	1.42	168	Rp1,041,267,139.84
PBPL4	14	12.58	1.42	166	Rp1,032,451,785.77
PWPL1	14	12.58	1.42	165	Rp1,023,636,431.69
PBKBLA	14	12.58	1.42	163	Rp1,014,821,077.62
PPKL2	14	12.58	1.42	162	Rp1,006,005,723.55
PBKKL4	14	12.58	1.42	161	Rp997,190,369.48
PBKKL3	14	12.58	1.42	159	Rp988,375,015.40
PPKL3	7	6.29	0.71	159	Rp983,967,338.37
PPPL4	7	6.29	0.71	158	Rp979,559,661.33
PPKL4	7	6.29	0.71	157	Rp975,151,984.30
PBPL1	7	6.29	0.71	156	Rp970,744,307.26
PBKBL3	14	12.58	1.42	155	Rp961,928,953.19
PBR	7	6.29	0.71	154	Rp957,521,276.15
PBRA2	14	12.58	1.42	153	Rp948,705,922.08
PPKL1	14	12.58	1.42	151	Rp939,890,568.01
PPPL1	7	6.29	0.71	151	Rp935,482,890.97
PBKPL3	21	18.88	2.12	149	Rp922,321,939.82
PBKPL4	21	18.88	2.12	146	Rp909,160,988.67
PBKPL1	21	18.88	2.12	144	Rp896,000,037.52
PBKKL2	7	6.29	0.71	144	Rp891,592,360.48
PBKBL2	7	6.29	0.71	143	Rp887,184,683.45
PBKBL4	7	6.29	0.71	142	Rp882,777,006.41
PBRA1	7	6.29	0.71	141	Rp878,369,329.37

Tabel 4.28 Biaya tidak langsung waktu lembur 2 jam

Kode	Durasi (hari)			Komulatif	Biaya Tidak Langsung (Rp)
	Normal	Crash	Selisih		
				189	Rp1,173,311,211.05
PLKP1	28	23.09	4.91	184	Rp1,142,829,951.55
PPUPL1	28	23.09	4.91	179	Rp1,112,348,692.04
PBCL1	7	5.77	1.23	178	Rp1,104,712,857.18
PPRBA2	21	17.32	3.68	174	Rp1,081,867,432.54
PPTALA	7	5.77	1.23	173	Rp1,074,231,597.67
PBKCL1	7	5.77	1.23	172	Rp1,066,595,762.81
PGT	14	11.55	2.45	169	Rp1,051,386,173.03
PBKPLA	14	11.55	2.45	167	Rp1,036,176,583.26
PPCL1	14	11.55	2.45	164	Rp1,020,966,993.49
PBKL4	7	5.77	1.23	163	Rp1,013,331,158.62
PPPL1	28	23.09	4.91	158	Rp982,849,899.12
PBKL3	7	5.77	1.23	157	Rp975,214,064.25
PBKL2	7	5.77	1.23	156	Rp967,578,229.39
PLKPL1	7	5.77	1.23	155	Rp959,942,394.52
PPUPL1	7	5.77	1.23	153	Rp952,306,559.66
PPPL4	14	11.55	2.45	151	Rp937,096,969.88
PPKL3	14	11.55	2.45	149	Rp921,887,380.11
PPKL4	14	11.55	2.45	146	Rp906,677,790.34
PPKL2	14	11.55	2.45	144	Rp891,468,200.57
PBKBLA	14	11.55	2.45	141	Rp876,258,610.79
PBRA2	21	17.32	3.68	137	Rp853,413,186.15
PBBL2	7	5.77	1.23	136	Rp845,777,351.29
PBPL2	7	5.77	1.23	135	Rp838,141,516.42
PBPL4	7	5.77	1.23	134	Rp830,505,681.56
PWPL1	7	5.77	1.23	133	Rp822,869,846.69
PBKBL2	14	11.55	2.45	130	Rp807,660,256.92
PBPL1	7	5.77	1.23	129	Rp800,024,422.05
PBKBL3	14	11.55	2.45	126	Rp784,814,832.28
PPKL1	14	11.55	2.45	124	Rp769,605,242.51
PBKBL4	14	11.55	2.45	122	Rp754,395,652.73
PBR	7	5.77	1.23	120	Rp746,759,817.87
PBKKL4	7	5.77	1.23	119	Rp739,123,983.00
PBRA1	21	17.32	3.68	115	Rp716,278,558.36
PBKKL3	7	5.77	1.23	114	Rp708,642,723.50
PBKKL2	7	5.77	1.23	113	Rp701,006,888.63
PBKPL3	14	11.55	2.45	110	Rp685,797,298.86
PBKPL4	14	11.55	2.45	108	Rp670,587,709.09
PBKPL1	7	5.77	1.23	107	Rp662,951,874.22

Tabel 4.29 Biaya tidak langsung waktu lembur 3 jam

Kode	Durasi (hari)			Komulatif	Biaya Tidak Langsung (Rp)
	Normal	Crash	Selisih		
				189	Rp1,173,311,211.05
PBKPLA	14	10.77	3.23	186	Rp1,153,259,384.53
PLKP1	28	21.54	6.46	179	Rp1,113,155,731.50
PPUPL1	28	21.54	6.46	173	Rp1,073,052,078.47
PPRBA2	21	16.15	4.85	168	Rp1,042,943,298.71
PBCL1	7	5.38	1.62	166	Rp1,032,886,345.47
PPTALA	7	5.38	1.62	165	Rp1,022,829,392.24
PBKCL1	7	5.38	1.62	163	Rp1,012,772,439.00
PGT	14	10.77	3.23	160	Rp992,720,612.48
PPCL1	14	10.77	3.23	157	Rp972,668,785.96
PBKL4	7	5.38	1.62	155	Rp962,611,832.73
PPPL1	28	21.54	6.46	149	Rp922,508,179.69
PBKL3	7	5.38	1.62	147	Rp912,451,226.46
PBKL2	7	5.38	1.62	145	Rp902,394,273.22
PLKPL1	7	5.38	1.62	144	Rp892,337,319.98
PPUPL1	7	5.38	1.62	142	Rp882,280,366.74
PPPL4	14	10.77	3.23	139	Rp862,228,540.23
PPKL4	14	10.77	3.23	136	Rp842,176,713.71
PPKL3	14	10.77	3.23	132	Rp822,124,887.19
PBKPL3	14	10.77	3.23	129	Rp802,073,060.68
PPKL2	14	10.77	3.23	126	Rp782,021,234.16
PBKBLA	14	10.77	3.23	123	Rp761,969,407.64
PBRA2	21	16.15	4.85	118	Rp731,860,627.89
PBBL2	7	5.38	1.62	116	Rp721,803,674.65
PBPL2	7	5.38	1.62	115	Rp711,746,721.41
PBPL4	7	5.38	1.62	113	Rp701,689,768.17
PWPL1	7	5.38	1.62	111	Rp691,632,814.94
PBKBL2	14	10.77	3.23	108	Rp671,580,988.42
PBPL1	7	5.38	1.62	107	Rp661,524,035.18
PBKBL3	14	10.77	3.23	103	Rp641,472,208.67
PPKL1	14	10.77	3.23	100	Rp621,420,382.15
PBKBL4	14	10.77	3.23	97	Rp601,368,555.63
PBR	7	5.38	1.62	95	Rp591,311,602.39
PBKKL4	7	5.38	1.62	94	Rp581,254,649.16
PBRA1	21	16.15	4.85	89	Rp551,145,869.40
PBKKL3	7	5.39	1.61	87	Rp541,150,996.12
PBKKL2	7	5.38	1.62	86	Rp531,094,042.89
PBKPL4	14	10.77	3.23	82	Rp511,042,216.37
PBKPL1	7	5.38	1.62	81	Rp500,985,263.13

Biaya tidak langsung setiap waktu percepatan didapatkan dengan analisis sebagai berikut.

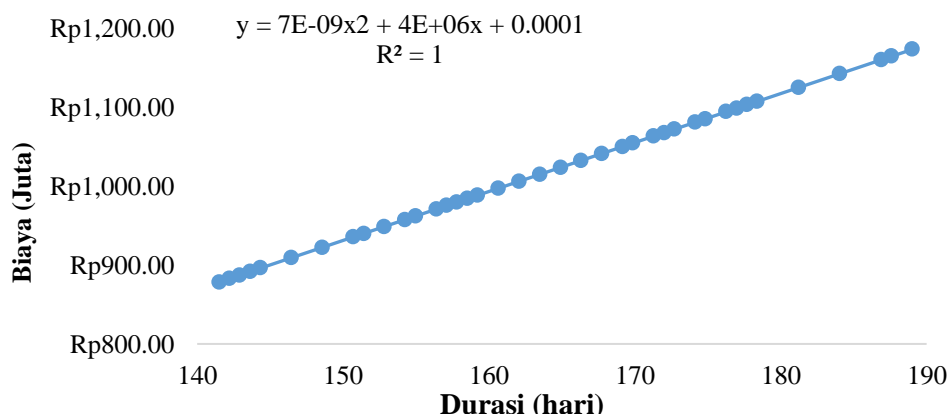
Kegiatan : Bekisting Plat Lantai Lantai 1 (kode: PBKPL1)

$$\begin{aligned} \text{Lembur 1 jam} &= (\text{Rp } 909.160.988,67 \times 144) / 146 \\ &= \text{Rp } 896.000.037,52 \end{aligned}$$

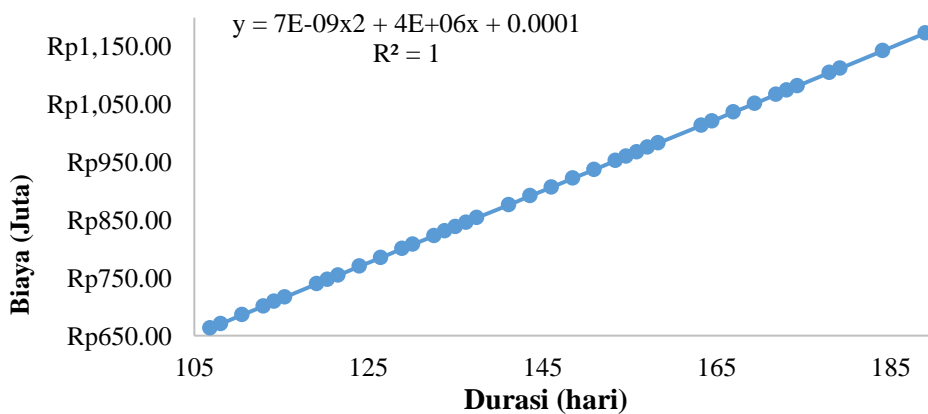
$$\begin{aligned} \text{Lembur 2 jam} &= (\text{Rp } 670.587.709,09 \times 107) / 108 \\ &= \text{Rp } 662.951.874,22 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 jam} &= (\text{Rp } 511.042.216,13 \times 81) / 82 \\ &= \text{Rp } 500.985.263,13 \end{aligned}$$

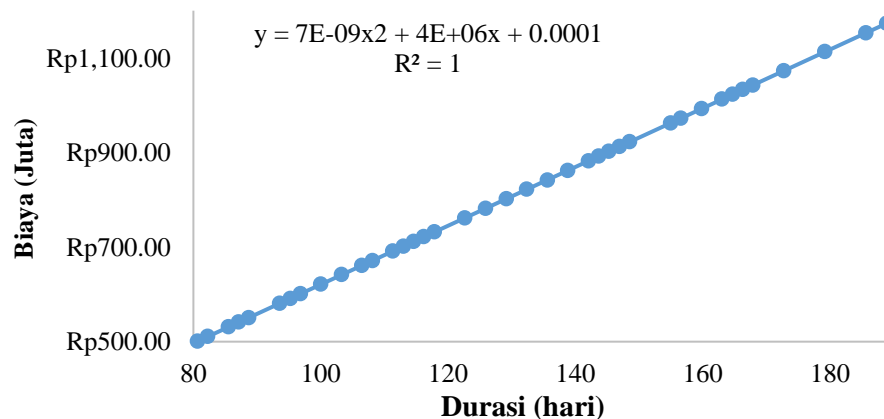
Berdasarkan hasil analisis biaya tidak langsung akibat penambah jam waktu lembur ditunjukkan dalam bentuk grafik sebagai berikut ini.



Gambar 4.1 Grafik hubungan biaya tidak langsung dengan durasi untuk waktu lembur 1 jam



Gambar 4.2 Grafik hubungan biaya tidak langsung dengan durasi untuk waktu lembur 2 jam



Gambar 4.3 Grafik hubungan biaya tidak langsung dengan durasi untuk waktu lembur 3 jam

2. Biaya Langsung

Biaya langsung dapat dianalisis sebagai berikut.

$$\begin{aligned}
 \text{Biaya langsung} &= \text{Biaya total proyek} - \text{Biaya tidak langsung} \\
 &= \text{Rp } 8.024.154.950,00 - \text{Rp } 1.173.311.211,05 \\
 &= \text{Rp } 6.850.843.738,95
 \end{aligned}$$

Tabel 4.30 Biaya langsung waktu lembur 1 jam

Kode	Durasi (hari)			Komulatif	Biaya Langsung (Rp)
	Normal	Crash	Selisih		
				189	Rp6,850,843,738.95
PLKP1	14	12.58	1.42	188	Rp6,850,833,457.26
PPUPL1	7	6.29	0.71	187	Rp6,850,858,193.88
PPRBA2	28	25.17	2.83	184	Rp6,850,887,445.12
PBKL4	28	25.17	2.83	181	Rp6,850,920,589.99
PBKPLA	28	25.17	2.83	178	Rp6,850,956,846.53
PBKCL1	7	6.29	0.71	178	Rp6,850,998,735.26
PPTALA	7	6.29	0.71	177	Rp6,851,041,469.06
PBCL1	7	6.29	0.71	176	Rp6,851,090,550.75
PBKL3	14	12.58	1.42	175	Rp6,851,166,835.97
PGT	7	6.29	0.71	174	Rp6,851,257,152.87
PPUPL1	14	12.58	1.42	173	Rp6,851,349,692.30
PBKL2	7	6.29	0.71	172	Rp6,851,519,278.22
PLKPL1	7	6.29	0.71	171	Rp6,851,691,386.67
PBBL2	14	12.58	1.42	170	Rp6,851,878,285.97
PPCL1	7	6.29	0.71	169	Rp6,852,102,969.06
PBPL2	14	12.58	1.42	168	Rp6,852,336,028.22
PBPL4	14	12.58	1.42	166	Rp6,852,574,520.47

Tabel 4.30 Lanjutan

PWPL1	14	12.58	1.42	165	Rp6,852,815,801.46
PBKBLA	14	12.58	1.42	163	Rp6,853,073,448.64
PPKL2	14	12.58	1.42	162	Rp6,853,340,884.56
PBKKL4	14	12.58	1.42	161	Rp6,853,653,267.66
PBKKL3	14	12.58	1.42	159	Rp6,854,006,993.71
PPKL3	7	6.29	0.71	159	Rp6,854,428,173.99
PPPL4	7	6.29	0.71	158	Rp6,854,854,952.87
PPKL4	7	6.29	0.71	157	Rp6,855,306,247.23
PBPL1	7	6.29	0.71	156	Rp6,855,800,671.18
PBKBL3	14	12.58	1.42	155	Rp6,856,295,662.73
PBR	7	6.29	0.71	154	Rp6,856,801,816.25
PBRA2	14	12.58	1.42	153	Rp6,857,313,968.36
PPKL1	14	12.58	1.42	151	Rp6,857,826,930.33
PPPL1	7	6.29	0.71	151	Rp6,858,366,582.44
PBKPL3	21	18.88	2.12	149	Rp6,858,906,942.35
PBKPL4	21	18.88	2.12	146	Rp6,859,447,302.26
PBKPL1	21	18.88	2.12	144	Rp6,860,040,504.14
PBKKL2	7	6.29	0.71	144	Rp6,860,829,733.72
PBKBL2	7	6.29	0.71	143	Rp6,861,793,932.31
PBKBL4	7	6.29	0.71	142	Rp6,862,825,442.17
PBRA1	7	6.29	0.71	141	Rp6,864,792,285.83

Tabel 4.31 Biaya langsung waktu lembur 2 jam

Kode	Durasi (hari)			Komulatif	Biaya Langsung (Rp)
	Normal	Crash	Selisih		
				189	Rp6,850,843,738.95
PLKP1	28	23.09	4.91	184	Rp6,850,842,641.19
PPUPL1	28	23.09	4.91	179	Rp6,850,848,019.19
PBCL1	7	5.77	1.23	178	Rp6,850,885,746.02
PPRBA2	21	17.32	3.68	174	Rp6,850,927,475.10
PPTALA	7	5.77	1.23	173	Rp6,850,975,871.85
PBKCL1	7	5.77	1.23	172	Rp6,851,027,955.59
PGT	14	11.55	2.45	169	Rp6,851,081,986.20
PBKPLA	14	11.55	2.45	167	Rp6,851,170,856.00
PPCL1	14	11.55	2.45	164	Rp6,851,298,538.44
PBKL4	7	5.77	1.23	163	Rp6,851,444,877.47
PPPL1	28	23.09	4.91	158	Rp6,851,602,071.36
PBKL3	7	5.77	1.23	157	Rp6,851,774,312.01
PBKL2	7	5.77	1.23	156	Rp6,851,967,950.22
PLKPL1	7	5.77	1.23	155	Rp6,852,162,688.43
PPUPL1	7	5.77	1.23	153	Rp6,852,378,008.76
PPPL4	14	11.55	2.45	151	Rp6,852,621,967.94

Tabel 4.31 Lanjutan

PPKL3	14	11.55	2.45	149	Rp6,852,870,720.59
PPKL4	14	11.55	2.45	146	Rp6,853,122,187.53
PPKL2	14	11.55	2.45	144	Rp6,853,428,163.45
PBKBLA	14	11.55	2.45	141	Rp6,853,734,378.96
PBRA2	21	17.32	3.68	137	Rp6,854,130,983.85
PBBL2	7	5.77	1.23	136	Rp6,854,555,176.54
PBPL2	7	5.77	1.23	135	Rp6,855,091,995.23
PBPL4	7	5.77	1.23	134	Rp6,855,642,553.77
PWPL1	7	5.77	1.23	133	Rp6,856,198,671.66
PBKBL2	14	11.55	2.45	130	Rp6,856,759,621.86
PBPL1	7	5.77	1.23	129	Rp6,857,328,882.84
PBKBL3	14	11.55	2.45	126	Rp6,857,901,714.67
PPKL1	14	11.55	2.45	124	Rp6,858,493,151.00
PBKBL4	14	11.55	2.45	122	Rp6,859,089,173.86
PBR	7	5.77	1.23	120	Rp6,859,716,902.31
PBKKL4	7	5.77	1.23	119	Rp6,860,439,077.11
PBRA1	21	17.32	3.68	115	Rp6,861,188,052.11
PBKKL3	7	5.77	1.23	114	Rp6,862,008,491.95
PBKKL2	7	5.77	1.23	113	Rp6,862,910,735.04
PBKPL3	14	11.55	2.45	110	Rp6,863,844,186.47
PBKPL4	14	11.55	2.45	108	Rp6,864,777,637.89
PBKPL1	7	5.77	1.23	107	Rp6,866,812,274.48

Tabel 4.32 Biaya langsung waktu lembur 3 jam

Kode	Durasi (hari)			Komulatif	Biaya Langsung (Rp)
	Normal	Crash	Selisih		
				189	Rp6,850,843,738.95
PBKPLA	14	10.77	3.23	186	Rp6,850,794,678.27
PLKP1	28	21.54	6.46	179	Rp6,850,795,328.42
PPUPL1	28	21.54	6.46	173	Rp6,850,800,833.53
PPRBA2	21	16.15	4.85	168	Rp6,850,815,794.98
PBCL1	7	5.38	1.62	166	Rp6,850,835,056.09
PPTALA	7	5.38	1.62	165	Rp6,850,890,011.64
PBKCL1	7	5.38	1.62	163	Rp6,850,951,051.15
PGT	14	10.77	3.23	160	Rp6,851,013,560.75
PPCL1	14	10.77	3.23	157	Rp6,851,158,767.87
PBKL4	7	5.38	1.62	155	Rp6,851,324,315.40
PPPL1	28	21.54	6.46	149	Rp6,851,505,146.51
PBKL3	7	5.38	1.62	147	Rp6,851,701,053.92
PBKL2	7	5.38	1.62	145	Rp6,851,922,118.73
PLKPL1	7	5.38	1.62	144	Rp6,852,159,425.52
PPUPL1	7	5.38	1.62	142	Rp6,852,407,091.57

Tabel 4.32 Lanjutan

PPPL4	14	10.77	3.23	139	Rp6,852,685,207.05
PPKL4	14	10.77	3.23	136	Rp6,852,969,307.36
PPKL3	14	10.77	3.23	132	Rp6,853,256,855.66
PBKPL3	14	10.77	3.23	129	Rp6,853,559,893.74
PPKL2	14	10.77	3.23	126	Rp6,853,909,539.56
PBKBLA	14	10.77	3.23	123	Rp6,854,263,265.26
PBRA2	21	16.15	4.85	118	Rp6,854,718,010.82
PBBL2	7	5.38	1.62	116	Rp6,855,201,328.73
PBPL2	7	5.38	1.62	115	Rp6,855,816,384.28
PBPL4	7	5.38	1.62	113	Rp6,856,447,429.96
PWPL1	7	5.38	1.62	111	Rp6,857,084,509.59
PBKBL2	14	10.77	3.23	108	Rp6,857,727,640.55
PBPL1	7	5.38	1.62	107	Rp6,858,379,488.70
PBKBL3	14	10.77	3.23	103	Rp6,859,034,140.40
PPKL1	14	10.77	3.23	100	Rp6,859,710,185.29
PBKBL4	14	10.77	3.23	97	Rp6,860,392,147.52
PBR	7	5.38	1.62	95	Rp6,861,128,599.99
PBKKL4	7	5.38	1.62	94	Rp6,861,956,713.57
PBRA1	21	16.15	4.85	89	Rp6,862,810,861.82
PBKKL3	7	5.39	1.61	87	Rp6,863,758,509.64
PBKKL2	7	5.38	1.62	86	Rp6,864,789,466.43
PBKPL4	14	10.77	3.23	82	Rp6,865,857,808.23
PBKPL1	7	5.38	1.62	81	Rp6,868,186,189.71

Biaya tidak langsung setaip waktu percepatan didapatkan dengan analisis sebagai berikut.

Kegiatan = Bekisting Plat Lantai Lantai 1 (kode: PBKPL1)

Lembur 1 jam = Biaya Langsung + selisih biaya

= Rp 6.858.906.942,35 + Rp 593.201,89

= Rp 6.860.040.504,14

Lembur 2 jam = Biaya Langsung + selisih biaya

= Rp 6.864.777.637,89 + Rp 2.034.636,59

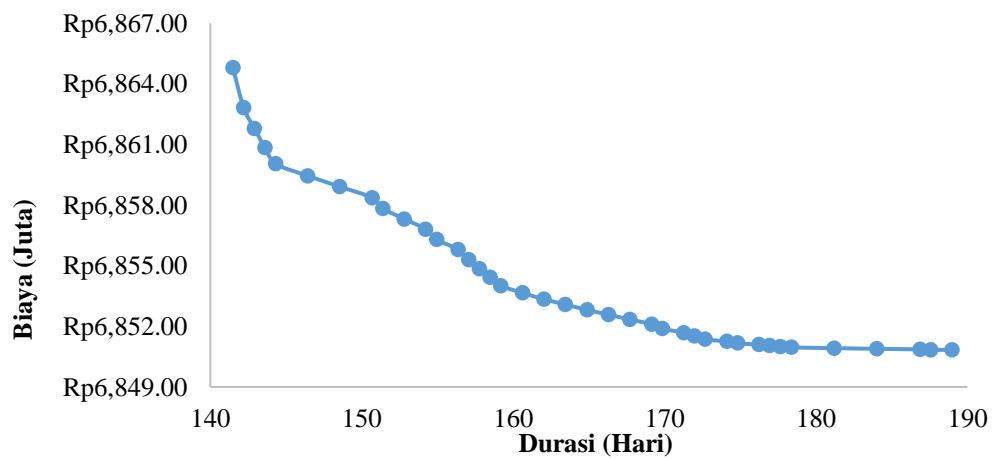
= Rp 6.859.447.302,26

Lembur 3 jam = Biaya Langsung + selisih biaya

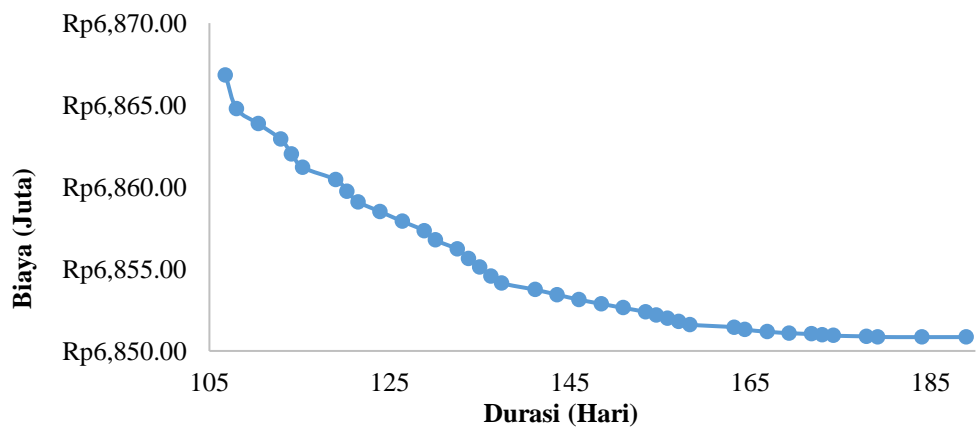
= Rp 6.865.857.808,23 + Rp 2.328.381,48

= Rp 6.868.186.189,71

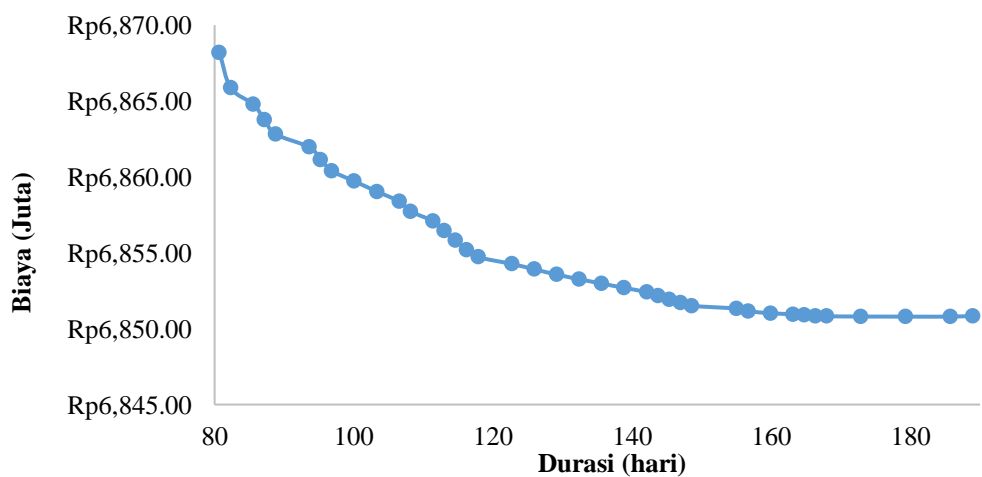
Berdasarkan hasil analisis biaya langsung akibat penambah jam waktu lembur ditunjukkan dalam bentuk grafik sebagai berikut ini.



Gambar 4.4 Grafik hubungan biaya langsung dengan durasi untuk waktu lembur 1 jam



Gambar 4.5 Grafik hubungan biaya langsung dengan durasi untuk waktu lembur 2 jam



Gambar 4.6 Grafik hubungan biaya langsung dengan durasi untuk waktu lembur 2 jam

3. Total Biaya

Penjumlahan antara biaya tidak langsung dengan biaya langsung akibat penambahan jumlah jam lembur 1 jam, 2 jam, dan 3 jam adalah total biaya proyek.

Biaya total dapat dianalisis dengan menggunakan persamaan berikut ini.

$$\text{Total biaya} = \text{biaya tidak langsung} + \text{biaya langsung}$$

Sehingga total biaya pada kegiatan proyek sebagai berikut.

Kegiatan	= Bekisting Plat Lantai Lantai 1 (kode: PBKPL1)
Lembur 1 jam	= Rp 896.000.037,52 + Rp 6.859.447.302,26 = Rp 7.756.040.541,66
Lembur 2 jam	= Rp 662.951.874,22 + Rp 6.859.447.302,26 = Rp 7.529.764.148,70
Lembur 3 jam	= Rp 500.985.263,13 + Rp 6.868.186.189,71 = Rp 7.369.171.452,84

Tabel 4.33 Total biaya untuk waktu lembur 1 jam

Kode	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)	Total Biaya (Rp)
	Rp1,173,311,211.05	Rp6,850,843,738.95	Rp8,024,154,950.00
PLKP1	Rp1,164,495,856.98	Rp6,850,833,457.26	Rp8,015,329,314.24
PPUPL1	Rp1,160,088,179.94	Rp6,850,858,193.88	Rp8,010,946,373.82
PPRBA2	Rp1,142,519,551.75	Rp6,850,887,445.12	Rp7,993,406,996.87
PBKL4	Rp1,124,950,923.57	Rp6,850,920,589.99	Rp7,975,871,513.56
PBKPLA	Rp1,107,382,295.38	Rp6,850,956,846.53	Rp7,958,339,141.91
PBKCL1	Rp1,102,974,618.35	Rp6,850,998,735.26	Rp7,953,973,353.61
PPTALA	Rp1,098,566,941.31	Rp6,851,041,469.06	Rp7,949,608,410.37
PBCL1	Rp1,094,159,264.27	Rp6,851,090,550.75	Rp7,945,249,815.03
PBKL3	Rp1,085,343,910.20	Rp6,851,166,835.97	Rp7,936,510,746.17
PGT	Rp1,080,936,233.16	Rp6,851,257,152.87	Rp7,932,193,386.03
PPUPL1	Rp1,072,120,879.09	Rp6,851,349,692.30	Rp7,923,470,571.40
PBKL2	Rp1,067,713,202.06	Rp6,851,519,278.22	Rp7,919,232,480.28
PLKPL1	Rp1,063,305,525.02	Rp6,851,691,386.67	Rp7,914,996,911.69
PBBL2	Rp1,054,490,170.95	Rp6,851,878,285.97	Rp7,906,368,456.91
PPCL1	Rp1,050,082,493.91	Rp6,852,102,969.06	Rp7,902,185,462.98
PBPL2	Rp1,041,267,139.84	Rp6,852,336,028.22	Rp7,893,603,168.06
PBPL4	Rp1,032,451,785.77	Rp6,852,574,520.47	Rp7,885,026,306.24
PWPL1	Rp1,023,636,431.69	Rp6,852,815,801.46	Rp7,876,452,233.15
PBKBLA	Rp1,014,821,077.62	Rp6,853,073,448.64	Rp7,867,894,526.26
PPKL2	Rp1,006,005,723.55	Rp6,853,340,884.56	Rp7,859,346,608.11

Tabel 4.33 Lanjutan

PBKKL4	Rp997,190,369.48	Rp6,853,653,267.66	Rp7,850,843,637.13
PBKKL3	Rp988,375,015.40	Rp6,854,006,993.71	Rp7,842,382,009.12
PPKL3	Rp983,967,338.37	Rp6,854,428,173.99	Rp7,838,395,512.36
PPPL4	Rp979,559,661.33	Rp6,854,854,952.87	Rp7,834,414,614.20
PPKL4	Rp975,151,984.30	Rp6,855,306,247.23	Rp7,830,458,231.53
PBPL1	Rp970,744,307.26	Rp6,855,800,671.18	Rp7,826,544,978.44
PBKBL3	Rp961,928,953.19	Rp6,856,295,662.73	Rp7,818,224,615.91
PBR	Rp957,521,276.15	Rp6,856,801,816.25	Rp7,814,323,092.40
PBRA2	Rp948,705,922.08	Rp6,857,313,968.36	Rp7,806,019,890.44
PPKL1	Rp939,890,568.01	Rp6,857,826,930.33	Rp7,797,717,498.34
PPPL1	Rp935,482,890.97	Rp6,858,366,582.44	Rp7,793,849,473.41
PBKPL3	Rp922,321,939.82	Rp6,858,906,942.35	Rp7,781,228,882.17
PBKPL4	Rp909,160,988.67	Rp6,859,447,302.26	Rp7,768,608,290.92
PBKPL1	Rp896,000,037.52	Rp6,860,040,504.14	Rp7,756,040,541.66
PBKKL2	Rp891,592,360.48	Rp6,860,829,733.72	Rp7,752,422,094.20
PBKBL2	Rp887,184,683.45	Rp6,861,793,932.31	Rp7,748,978,615.76
PBKBL4	Rp882,777,006.41	Rp6,862,825,442.17	Rp7,745,602,448.58
PBRA1	Rp878,369,329.37	Rp6,864,792,285.83	Rp7,743,161,615.21

Tabel 4.34 Total biaya untuk waktu lembur 2 jam

Kode	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)	Total Biaya (Rp)
	Rp1,173,311,211.05	Rp6,850,843,738.95	Rp8,024,154,950.00
PLKP1	Rp1,142,829,951.55	Rp6,850,842,641.19	Rp7,993,672,592.74
PPUPL1	Rp1,112,348,692.04	Rp6,850,848,019.19	Rp7,963,196,711.24
PBCL1	Rp1,104,712,857.18	Rp6,850,885,746.02	Rp7,955,598,603.20
PPRBA2	Rp1,081,867,432.54	Rp6,850,927,475.10	Rp7,932,794,907.64
PPTALA	Rp1,074,231,597.67	Rp6,850,975,871.85	Rp7,925,207,469.52
PBKCL1	Rp1,066,595,762.81	Rp6,851,027,955.59	Rp7,917,623,718.39
PGT	Rp1,051,386,173.03	Rp6,851,081,986.20	Rp7,902,468,159.23
PBKPLA	Rp1,036,176,583.26	Rp6,851,170,856.00	Rp7,887,347,439.26
PPCL1	Rp1,020,966,993.49	Rp6,851,298,538.44	Rp7,872,265,531.93
PBKL4	Rp1,013,331,158.62	Rp6,851,444,877.47	Rp7,864,776,036.09
PPPL1	Rp982,849,899.12	Rp6,851,602,071.36	Rp7,834,451,970.48
PBKL3	Rp975,214,064.25	Rp6,851,774,312.01	Rp7,826,988,376.26
PBKL2	Rp967,578,229.39	Rp6,851,967,950.22	Rp7,819,546,179.61
PLKPL1	Rp959,942,394.52	Rp6,852,162,688.43	Rp7,812,105,082.95
PPUPL1	Rp952,306,559.66	Rp6,852,378,008.76	Rp7,804,684,568.41
PPPL4	Rp937,096,969.88	Rp6,852,621,967.94	Rp7,789,718,937.82
PPKL3	Rp921,887,380.11	Rp6,852,870,720.59	Rp7,774,758,100.70
PPKL4	Rp906,677,790.34	Rp6,853,122,187.53	Rp7,759,799,977.87

Tabel 4.34 Lanjutan

PPKL2	Rp891,468,200.57	Rp6,853,428,163.45	Rp7,744,896,364.02
PBKBLA	Rp876,258,610.79	Rp6,853,734,378.96	Rp7,729,992,989.75
PBRA2	Rp853,413,186.15	Rp6,854,130,983.85	Rp7,707,544,170.01
PBBL2	Rp845,777,351.29	Rp6,854,555,176.54	Rp7,700,332,527.82
PBPL2	Rp838,141,516.42	Rp6,855,091,995.23	Rp7,693,233,511.66
PBPL4	Rp830,505,681.56	Rp6,855,642,553.77	Rp7,686,148,235.33
PWPL1	Rp822,869,846.69	Rp6,856,198,671.66	Rp7,679,068,518.35
PBKBL2	Rp807,660,256.92	Rp6,856,759,621.86	Rp7,664,419,878.78
PBPL1	Rp800,024,422.05	Rp6,857,328,882.84	Rp7,657,353,304.89
PBKBL3	Rp784,814,832.28	Rp6,857,901,714.67	Rp7,642,716,546.95
PPKL1	Rp769,605,242.51	Rp6,858,493,151.00	Rp7,628,098,393.51
PBKBL4	Rp754,395,652.73	Rp6,859,089,173.86	Rp7,613,484,826.59
PBR	Rp746,759,817.87	Rp6,859,716,902.31	Rp7,606,476,720.18
PBKKL4	Rp739,123,983.00	Rp6,860,439,077.11	Rp7,599,563,060.11
PBRA1	Rp716,278,558.36	Rp6,861,188,052.11	Rp7,577,466,610.47
PBKKL3	Rp708,642,723.50	Rp6,862,008,491.95	Rp7,570,651,215.45
PBKKL2	Rp701,006,888.63	Rp6,862,910,735.04	Rp7,563,917,623.67
PBKPL3	Rp685,797,298.86	Rp6,863,844,186.47	Rp7,549,641,485.33
PBKPL4	Rp670,587,709.09	Rp6,864,777,637.89	Rp7,535,365,346.98
PBKPL1	Rp662,951,874.22	Rp6,866,812,274.48	Rp7,529,764,148.70

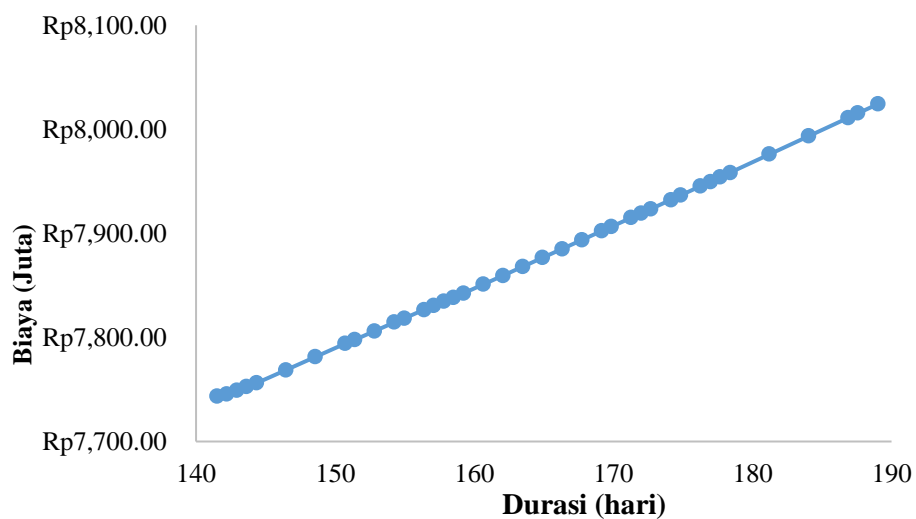
Tabel 4.35 Total biaya untuk waktu lembur 3 jam

Kode	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)	Total Biaya (Rp)
	Rp1,173,311,211.05	Rp6,850,843,738.95	Rp8,024,154,950.00
PBKPLA	Rp1,153,259,384.53	Rp6,850,794,678.27	Rp8,004,054,062.80
PLKP1	Rp1,113,155,731.50	Rp6,850,795,328.42	Rp7,963,951,059.92
PPUPL1	Rp1,073,052,078.47	Rp6,850,800,833.53	Rp7,923,852,912.00
PPRBA2	Rp1,042,943,298.71	Rp6,850,815,794.98	Rp7,893,759,093.69
PBCL1	Rp1,032,886,345.47	Rp6,850,835,056.09	Rp7,883,721,401.56
PPTALA	Rp1,022,829,392.24	Rp6,850,890,011.64	Rp7,873,719,403.88
PBKCL1	Rp1,012,772,439.00	Rp6,850,951,051.15	Rp7,863,723,490.15
PGT	Rp992,720,612.48	Rp6,851,013,560.75	Rp7,843,734,173.23
PPCL1	Rp972,668,785.96	Rp6,851,158,767.87	Rp7,823,827,553.83
PBKL4	Rp962,611,832.73	Rp6,851,324,315.40	Rp7,813,936,148.12
PPPL1	Rp922,508,179.69	Rp6,851,505,146.51	Rp7,774,013,326.21
PBKL3	Rp912,451,226.46	Rp6,851,701,053.92	Rp7,764,152,280.37
PBKL2	Rp902,394,273.22	Rp6,851,922,118.73	Rp7,754,316,391.95
PLKPL1	Rp892,337,319.98	Rp6,852,159,425.52	Rp7,744,496,745.50
PPUPL1	Rp882,280,366.74	Rp6,852,407,091.57	Rp7,734,687,458.32
PPPL4	Rp862,228,540.23	Rp6,852,685,207.05	Rp7,714,913,747.28
PPKL4	Rp842,176,713.71	Rp6,852,969,307.36	Rp7,695,146,021.07

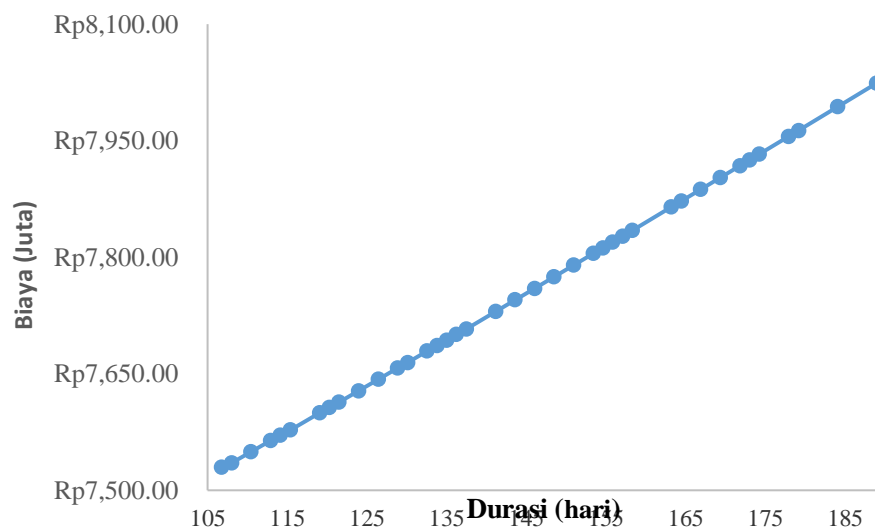
Tabel 4.35 Lanjutan

PPKL3	Rp822,124,887.19	Rp6,853,256,855.66	Rp7,675,381,742.85
PBKPL3	Rp802,073,060.68	Rp6,853,559,893.74	Rp7,655,632,954.42
PPKL2	Rp782,021,234.16	Rp6,853,909,539.56	Rp7,635,930,773.72
PBKBLA	Rp761,969,407.64	Rp6,854,263,265.26	Rp7,616,232,672.90
PBRA2	Rp731,860,627.89	Rp6,854,718,010.82	Rp7,586,578,638.71
PBBL2	Rp721,803,674.65	Rp6,855,201,328.73	Rp7,577,005,003.38
PBPL2	Rp711,746,721.41	Rp6,855,816,384.28	Rp7,567,563,105.69
PBPL4	Rp701,689,768.17	Rp6,856,447,429.96	Rp7,558,137,198.14
PWPL1	Rp691,632,814.94	Rp6,857,084,509.59	Rp7,548,717,324.53
PBKBL2	Rp671,580,988.42	Rp6,857,727,640.55	Rp7,529,308,628.97
PBPL1	Rp661,524,035.18	Rp6,858,379,488.70	Rp7,519,903,523.88
PBKBL3	Rp641,472,208.67	Rp6,859,034,140.40	Rp7,500,506,349.07
PPKL1	Rp621,420,382.15	Rp6,859,710,185.29	Rp7,481,130,567.44
PBKBL4	Rp601,368,555.63	Rp6,860,392,147.52	Rp7,461,760,703.15
PBR	Rp591,311,602.39	Rp6,861,128,599.99	Rp7,452,440,202.38
PBKKL4	Rp581,254,649.16	Rp6,861,956,713.57	Rp7,443,211,362.73
PBRA1	Rp551,145,869.40	Rp6,862,810,861.82	Rp7,413,956,731.22
PBKKL3	Rp541,150,996.12	Rp6,863,758,509.64	Rp7,404,909,505.77
PBKKL2	Rp531,094,042.89	Rp6,864,789,466.43	Rp7,395,883,509.32
PBKPL4	Rp511,042,216.37	Rp6,865,857,808.23	Rp7,376,900,024.60
PBKPL1	Rp500,985,263.13	Rp6,868,186,189.71	Rp7,369,171,452.84

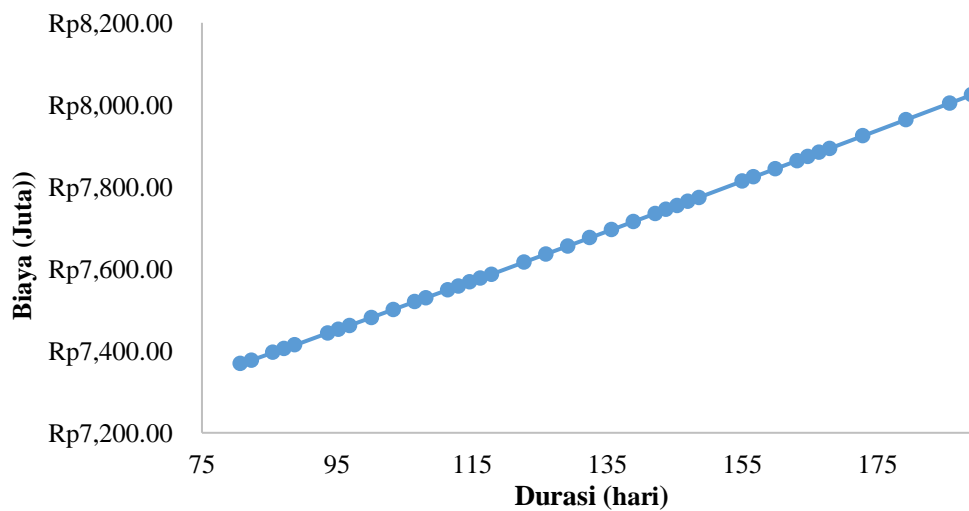
Berdasarkan hasil analisis total biaya akibat penambah jam waktu lembur ditunjukkan dalam bentuk grafik sebagai berikut ini.



Gambar 4.7 Grafik hubungan antara biaya total dengan durasi percepatan 1 jam



Gambar 4.8 Grafik hubungan antara biaya total dengan durasi percepatan 2 jam



Gambar 4.9 Grafik hubungan antara biaya total dengan durasi percepatan 3 jam

4.4.1.6. Efisiensi waktu dan biaya proyek

Berikut analisis efisiensi waktu dan biaya proyek yang diakibatkan oleh penambahan jam waktu lembur 1 jam, 2 jam, dan 3 jam untuk mempercepat suatu kegiatan proyek.

Kegiatan : Bekisting Plat Lantai Lantai 1

Durasi : 7 hari

1. Lembur 1 Jam

Efisiensi waktu

$$Et = \left(\frac{189-157,09}{189} \right) \times 100\%$$

$$Et = 16,9 \%$$

Efisiensi Biaya

$$Ec = \left(\frac{\text{Rp } 8.024.154.950 - \text{Rp } 7.825.238.403,66}{\text{Rp } 8.024.154.950} \right) \times 100\%$$

$$Ec = 2,48 \%$$

2. Lembur 2 Jam

Efisiensi waktu

$$Et = \left(\frac{189-141,49}{189} \right) \times 100\%$$

$$Et = 25,1 \%$$

Efisiensi Biaya

$$Ec = \left(\frac{\text{Rp } 8.024.154.950 - \text{Rp } 7.728.861.636,91}{\text{Rp } 8.024.154.950} \right) \times 100\%$$

$$Ec = 3,68 \%$$

3. Lembur 3 Jam

Efisiensi waktu

$$Et = \left(\frac{189-80,7}{189} \right) \times 100\%$$

$$Et = 57,3 \%$$

Efisiensi Biaya

$$Ec = \left(\frac{\text{Rp } 8.024.154.950 - \text{Rp } 7.351.604.436,54}{\text{Rp } 8.024.154.950} \right) \times 100\%$$

$$Ec = 8,4 \%$$

Tabel 4.36 Hasil analisis efisiensi waktu dan biaya waktu lembur 1 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	189.000	Rp8,024,154,950.00		
PBR	188.290	Rp8,018,580,721.74	0.4	0.07
PLKPL1	187.580	Rp8,014,170,235.69	0.8	0.12
PBKBL2	186.160	Rp8,005,359,734.83	1.5	0.23
PBPL1	185.450	Rp8,000,958,334.68	1.9	0.29
PPUPL1	184.740	Rp7,996,557,474.54	2.3	0.34
PBKBLA	183.320	Rp7,987,749,972.92	3.0	0.45

Tabel 4.36 Lanjutan

PBKBL3	181.900	Rp7,978,944,424.29	3.8	0.56
PGT	180.480	Rp7,970,139,732.19	4.5	0.67
PBKKL4	179.770	Rp7,965,743,779.80	4.9	0.73
PBKBL4	178.350	Rp7,956,941,330.99	5.6	0.84
PBKPL3	176.930	Rp7,948,139,143.80	6.4	0.95
PBKPL4	175.510	Rp7,939,336,956.61	7.1	1.06
PWPL1	174.800	Rp7,934,942,746.05	7.5	1.11
PBKKL3	174.090	Rp7,930,549,777.46	7.9	1.17
PBPL4	173.380	Rp7,926,157,458.03	8.3	1.22
PBKPLA	171.960	Rp7,917,358,286.17	9.0	1.33
PPUPL1	169.130	Rp7,899,807,228.86	10.5	1.55
PPKL1	167.710	Rp7,891,010,005.78	11.3	1.66
PBPL2	167.000	Rp7,886,621,165.22	11.6	1.71
PPRBA2	164.880	Rp7,873,481,997.09	12.8	1.88
PPPL4	163.460	Rp7,864,688,571.04	13.5	1.99
PBRA2	161.340	Rp7,851,549,919.21	14.6	2.15
PPTALA	160.630	Rp7,847,165,183.02	15.0	2.21
PPPL1	157.800	Rp7,829,621,154.22	16.5	2.42
PBKPL1	157.090	Rp7,825,238,403.66	16.9	2.48
PLKP1	154.260	Rp7,807,698,815.74	18.4	2.70
PPKL2	152.840	Rp7,798,913,455.22	19.1	2.81
PPKL3	151.420	Rp7,790,128,272.95	19.9	2.92
PBKCL1	150.710	Rp7,785,752,108.59	20.3	2.97
PBKLA	150.000	Rp7,781,376,555.55	20.6	3.03
PBKLA3	149.290	Rp7,777,001,329.94	21.0	3.08
PPKL4	147.870	Rp7,768,218,463.89	21.8	3.19
PBKLA2	147.160	Rp7,763,844,042.01	22.1	3.24
PBBL2	146.450	Rp7,759,472,164.58	22.5	3.30
PBRA1	144.330	Rp7,746,348,420.22	23.6	3.46
PBKLA2	143.620	Rp7,741,982,439.07	24.0	3.52
PPCL1	142.200	Rp7,733,209,846.27	24.8	3.63
PBCL1	141.490	Rp7,728,861,636.91	25.1	3.68

Tabel 4.37 Hasil analisis efisiensi waktu dan biaya waktu lembur 2 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	189.000	Rp8,024,154,950.00		
PLKP1	184.090	Rp8,015,849,899.48	2.6	0.1
PPUPL1	179.180	Rp8,008,213,246.40	5.2	0.2
PBCL1	177.950	Rp8,000,579,757.06	5.8	0.3
PPRBA2	174.270	Rp7,992,948,051.97	7.8	0.4
PPTALA	173.040	Rp7,985,316,502.82	8.4	0.5

Tabel 4.37 Lanjutan

PBKCL1	171.810	Rp7,977,685,402.10	9.1	0.6
PGT	169.360	Rp7,970,054,585.85	10.4	0.7
PBKPLA	166.910	Rp7,962,424,434.14	11.7	0.8
PPCL1	164.460	Rp7,954,794,444.15	13.0	0.9
PBKLA	163.230	Rp7,947,164,742.78	13.6	1.0
PPPL1	158.320	Rp7,931,961,462.76	16.2	1.1
PBKLA3	157.090	Rp7,916,758,214.05	16.9	1.3
PBKLA2	155.860	Rp7,909,129,218.94	17.5	1.4
PLKPL1	154.630	Rp7,893,926,791.20	18.2	1.6
PPUPL1	153.400	Rp7,886,298,587.75	18.8	1.7
PPPL4	150.950	Rp7,871,096,688.91	20.1	1.9
PPKL3	148.500	Rp7,863,468,778.12	21.4	2.0
PPKL4	146.050	Rp7,855,841,108.38	22.7	2.1
PPKL2	143.600	Rp7,840,640,474.74	24.0	2.3
PBKBLA	141.150	Rp7,825,439,873.58	25.3	2.5
PBRA2	137.470	Rp7,810,239,425.11	27.3	2.7
PBBL2	136.240	Rp7,802,613,230.57	27.9	2.8
PBPL2	135.010	Rp7,794,987,318.76	28.6	2.9
PBPL4	133.780	Rp7,779,788,717.43	29.2	3.0
PWPL1	132.550	Rp7,764,590,283.98	29.9	3.2
PBKBL2	130.100	Rp7,756,965,891.46	31.2	3.3
PBPL1	128.870	Rp7,741,768,327.74	31.8	3.5
PBKBL3	126.420	Rp7,726,571,642.24	33.1	3.7
PPKL1	123.970	Rp7,703,739,574.35	34.4	4.0
PBKBL4	121.520	Rp7,680,909,200.12	35.7	4.3
PBR	120.290	Rp7,650,446,210.16	36.4	4.7
PBKKL4	119.060	Rp7,642,828,769.38	37.0	4.8
PBRA1	115.380	Rp7,627,638,228.38	39.0	4.9
PBKKL3	114.150	Rp7,597,176,101.05	39.6	5.3
PBKKL2	112.920	Rp7,566,716,128.26	40.3	5.7
PBKPL3	110.470	Rp7,543,901,454.89	41.6	6.0
PBKPL4	108.020	Rp7,528,735,714.19	42.8	6.2
PBKPL1	106.790	Rp7,514,895,157.70	43.5	6.3

Tabel 4.38 Hasil analisis efisiensi waktu dan biaya waktu lembur 3 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	189.000	Rp8,024,154,950.00		
PBKPLA	185.770	Rp8,013,597,692.29	1.7	0.1
PLKP1	179.310	Rp8,003,539,767.81	5.1	0.3
PPUPL1	172.850	Rp7,983,488,554.45	8.5	0.5
PPRBA2	168.000	Rp7,973,432,733.56	11.1	0.6

Tabel 4.38 Lanjutan

PBCL1	166.380	Rp7,953,382,430.26	12.0	0.9
PPTALA	164.760	Rp7,943,327,140.04	12.8	1.0
PBKCL1	163.140	Rp7,923,277,063.63	13.7	1.3
PGT	159.910	Rp7,903,227,637.65	15.4	1.5
PPCL1	156.680	Rp7,893,173,252.31	17.1	1.6
PBKL4	155.060	Rp7,883,119,012.66	18.0	1.8
PPPL1	148.600	Rp7,873,065,777.44	21.4	1.9
PBKL3	146.980	Rp7,832,965,888.43	22.2	2.4
PBKL2	145.360	Rp7,802,861,008.17	23.1	2.8
PLKPL1	143.740	Rp7,782,813,895.35	23.9	3.0
PPUPL1	142.120	Rp7,752,710,293.95	24.8	3.4
PPPL4	138.890	Rp7,742,658,750.53	26.5	3.5
PPKL4	135.660	Rp7,732,607,537.41	28.2	3.6
PPKL3	132.430	Rp7,722,557,276.77	29.9	3.8
PBKPL3	129.200	Rp7,692,455,466.50	31.6	4.1
PPKL2	125.970	Rp7,682,405,613.27	33.3	4.3
PBKBLA	122.740	Rp7,662,361,044.20	35.1	4.5
PBRA2	117.890	Rp7,642,316,587.02	37.6	4.8
PBBL2	116.270	Rp7,622,272,129.84	38.5	5.0
PBPL2	114.650	Rp7,582,176,019.26	39.3	5.5
PBPL4	113.030	Rp7,542,080,002.83	40.2	6.0
PWPL1	111.410	Rp7,532,031,074.16	41.1	6.1
PBKBL2	108.180	Rp7,511,987,768.23	42.8	6.4
PBPL1	106.560	Rp7,491,944,566.62	43.6	6.6
PBKBL3	103.330	Rp7,481,897,664.13	45.3	6.8
PPKL1	100.100	Rp7,461,856,946.84	47.0	7.0
PBKBL4	96.870	Rp7,441,817,241.53	48.7	7.3
PBR	95.250	Rp7,431,835,685.02	49.6	7.4
PBKKL4	93.630	Rp7,421,792,310.82	50.5	7.5
PBRA1	88.780	Rp7,411,749,341.59	53.0	7.6
PBKKL3	87.170	Rp7,391,713,429.87	53.9	7.9
PBKKL2	85.550	Rp7,371,678,211.09	54.7	8.1
PBKPL4	82.320	Rp7,361,639,259.80	56.4	8.3
PBKPL1	80.700	Rp7,351,604,436.54	57.3	8.4

4.4.2. Penambahan Tenaga Kerja

Penambahan tenaga kerja dilakukan dengan menganalisis kebutuhan setiap kegiatan pekerjaan di proyek menggunakan *Software Microsoft Excel 2016*. Proses analisis penambahan tenaga kerja tidak mengurangi atau menambah durasi kegiatan. Berikut contoh analisis penambahan tenaga kerja dan perubahan pada biaya akibat penambahan tenaga kerja.

4.4.2.1. Analisis Biaya Penambahan Tenaga Kerja

1. Durasi Normal

Kegiatan : Bekisting Plat Lantai Lantai 1

Volume : 1923,56 m³

Durasi : 7 hari

Tabel 4.39 Kebutuhan tenaga kerja bekisting plat lantai lantai 1

Tenaga Kerja	Satuan	Koefisien	Harga Satuan (Rp)
Pekerja	OH	0.20	Rp 100.000,00
Tukang Kayu	OH	0.25	Rp 120.000,00
Kepala tukang Kayu	OH	0.15	Rp 135.000,00
Mandor	OH	0.05	Rp 150.000,00

Analisis jumlah tenaga dan upah tenaga kerja per hari.

$$\text{Jumlah tenaga kerja} = \frac{(\text{koefisien} \times \text{volume})}{\text{durasi}}$$

$$\text{Upah tenaga kerja} = \text{Jumlah tenaga kerja} \times \text{harga}$$

a. Pekerja

$$\begin{aligned} \text{Jumlah tenaga kerja} &= \frac{(0,20 \times 1923,56)}{7} \\ &= 54,96 \text{ orang/hari} \end{aligned}$$

$$\begin{aligned} \text{Upah tenaga kerja} &= 54,96 \times \text{Rp } 100.000,00 \\ &= \text{Rp } 5.495.885,71 \end{aligned}$$

b. Tukang besi

$$\begin{aligned} \text{Jumlah tenaga kerja} &= \frac{(0,25 \times 1923,56)}{7} \\ &= 68,7 \text{ orang/hari} \end{aligned}$$

$$\begin{aligned} \text{Upah tenaga kerja} &= 68,7 \times \text{Rp } 120.000,00 \\ &= \text{Rp } 8.244.000,00 \end{aligned}$$

c. Kepala Tukang

$$\begin{aligned} \text{Jumlah tenaga kerja} &= \frac{(0,15 \times 1923,56)}{7} \\ &= 41,22 \text{ orang/hari} \\ \text{Upah tenaga kerja} &= 41,22 \times \text{Rp } 135.000,00 \\ &= \text{Rp } 5.564.584,00 \end{aligned}$$

d. Mandor

$$\begin{aligned} \text{Jumlah tenaga kerja} &= \frac{(0,05 \times 1923,56)}{7} \\ &= 13,74 \text{ orang/hari} \\ \text{Upah tenaga kerja} &= 13,74 \times \text{Rp } 150.000,00 \\ &= \text{Rp } 2.060.957,00 \end{aligned}$$

Total biaya upah tenaga kerja pada pekerjaan Bekisting Plat Lantai Lantai 1 dengan durasi normal 7 (tujuh) hari adalah.

$$\begin{aligned} &= \text{Rp } 5.495.885,71 + \text{Rp } 8.244.000,00 + \text{Rp } 5.564.584,00 + \text{Rp } 2.060.957,00 \\ &= \text{Rp } 23.426.383,85 \end{aligned}$$

2. Durasi Percepatan

Kegiatan : Bekisting Plat Lantai Lantai 1
 Volume : 1923,56 m³
 Durasi Normal : 7 hari
 Durasi *Crashing* 1 jam : 6,29 hari

a. Pekerja

$$\begin{aligned} \text{Jumlah tenaga kerja} &= \frac{(0,20 \times 1923,56)}{6,29} \\ &= 61,16 \text{ orang/hari} \\ \text{Upah tenaga kerja} &= 61,16 \times \text{Rp } 100.000,00 \\ &= \text{Rp } 6.116.248,01 \end{aligned}$$

b. Tukang besi

$$\begin{aligned} \text{Jumlah tenaga kerja} &= \frac{(0,25 \times 1923,56)}{6,29} \\ &= 76,45 \text{ orang/hari} \\ \text{Upah tenaga kerja} &= 76,45 \times \text{Rp } 120.000,00 \\ &= \text{Rp } 9.174.372,02 \end{aligned}$$

c. Kepala Tukang

$$\text{Jumlah tenaga kerja} = \frac{(0,15 \times 1923,56)}{6,29}$$

$$\begin{aligned}
 &= 45,87 \text{ orang/hari} \\
 \text{Upah tenaga kerja} &= 45,87 \times \text{Rp } 135.000,00 \\
 &= \text{Rp } 6.192.701,11 \\
 \text{d. Jumlah tenaga kerja} &= \frac{(0,05 \times 1923,56)}{6,29} \\
 &= 15,29 \text{ orang/hari} \\
 \text{Upah tenaga kerja} &= 13,74 \times \text{Rp } 150.000,00 \\
 &= \text{Rp } 2.293.593,01
 \end{aligned}$$

Total biaya upah tenaga kerja pada pekerjaan Bekisting Plat Lantai Lantai 1 dengan durasi normal 7 (tujuh) hari adalah.

$$\begin{aligned}
 &= \text{Rp } 6.116.248,01 + \text{Rp } 9.174.372,02 + \text{Rp } 6.192.701,11 + \text{Rp } 2.293.593,01 \\
 &= \text{Rp } 23.776.914,15
 \end{aligned}$$

Berikut hasil analisis biaya untuk penambahan tenaga kerja keseluruhan kegiatan proyek pada setiap waktu lembur 1 jam, 2 jam dan 3 jam ditunjukkan pada table 4.40, 4.41, dan 4.42

Tabel 4.40 hasil analisis penambahan tenaga kerja waktu lembur 1 jam

No	Kode	Durasi		Biaya	
		Normal	Lem. 1 Jam	Normal	Lembur 1 Jam
1	PGT	14	12.58	Rp1,029,000.00	Rp1,044,140.00
2	PBPL1	7	6.29	Rp264,654,625.00	Rp264,659,081.59
3	PBKPL1	7	6.29	Rp201,048,790.00	Rp201,066,487.80
4	PWPL1	7	6.29	Rp195,321,620.00	Rp195,331,181.20
5	PLKPL1	7	6.29	Rp84,601,008.00	Rp84,599,013.60
6	PPUPL1	7	6.29	Rp64,570,200.00	Rp64,575,040.00
7	PPPL1	28	25.17	Rp122,957,680.00	Rp123,027,296.25
8	PLKP1	28	25.17	Rp5,691,574.00	Rp5,773,757.95
9	PPUPL1	28	25.17	Rp4,325,000.00	Rp4,374,725.58
10	PPKL1	14	12.58	Rp227,910,080.00	Rp227,935,826.00
11	PBCL1	7	6.29	Rp8,676,725.00	Rp8,718,947.05
12	PBKCL1	7	6.29	Rp5,536,640.00	Rp5,559,014.00
13	PPCL1	14	12.58	Rp48,473,880.00	Rp48,534,601.00
14	PBBL2	7	6.29	Rp194,302,656.00	Rp194,328,073.72
15	PBKBL2	14	12.58	Rp111,372,420.00	Rp111,379,311.56
16	PBPL2	7	6.29	Rp249,908,843.00	Rp249,922,216.90
17	PBKPL2	7	6.29	Rp89,333,246.00	Rp89,356,857.16
18	PBKKL2	7	6.29	Rp88,730,390.00	Rp88,759,994.08
19	PPKL2	14	12.58	Rp117,396,080.00	Rp117,438,670.85
20	PBKBL3	14	12.58	Rp112,872,860.00	Rp112,886,783.72
21	PBKPL3	14	12.58	Rp184,326,760.00	Rp184,345,456.97

Tabel 4.40 Lanjutan

22	PBKL3	7	6.29	Rp78,452,961.00	Rp78,476,001.51
23	PBKKL3	7	6.29	Rp81,900,660.00	Rp81,911,103.00
24	PPKL3	14	12.58	Rp105,048,300.00	Rp105,091,143.95
25	PBKBL4	14	12.58	Rp117,552,220.00	Rp117,570,545.48
26	PBPL4	7	6.29	Rp256,814,913.00	Rp256,825,816.90
27	PBKPL4	14	12.58	Rp184,326,760.00	Rp184,345,456.97
28	PPPL4	14	12.58	Rp168,610,268.00	Rp168,641,405.80
29	PBKLA	7	6.29	Rp65,449,540.00	Rp65,472,348.04
30	PBKKL4	7	6.29	Rp71,855,740.00	Rp71,864,064.50
31	PPKL4	14	12.58	Rp93,498,210.00	Rp93,544,343.00
32	PBKBLA	14	12.58	Rp62,117,880.00	Rp62,129,030.48
33	PBKPLA	14	12.58	Rp18,590,120.00	Rp18,613,098.74
34	PPTALA	7	6.29	Rp9,233,370.00	Rp9,249,658.00
35	PBRA1	21	18.88	Rp308,989,240.00	Rp309,068,118.40
36	PBRA2	21	18.88	Rp166,354,552.00	Rp166,401,826.56
37	PPRBA2	21	18.88	Rp6,711,540.00	Rp6,757,720.00
38	PBR	7	6.29	Rp264,800,600.00	Rp263,972,348.63

Tabel 4.41 hasil analisis penambahan tenaga kerja waktu lembur 2 jam

No	Kode	Durasi		Biaya	
		Normal	Lem. 2 Jam	Normal	Lembur 2 Jam
1	PGT	14	11.55	Rp1,029,000.00	Rp1,039,500.00
2	PBPL1	7	5.77	Rp264,654,625.00	Rp264,653,618.59
3	PBKPL1	7	5.77	Rp201,048,790.00	Rp201,065,218.80
4	PWPL1	7	5.77	Rp195,321,620.00	Rp195,328,809.20
5	PLKPL1	7	5.77	Rp84,601,008.00	Rp84,611,051.10
6	PPUPL1	7	5.77	Rp64,570,200.00	Rp64,573,085.00
7	PPPL1	28	23.09	Rp122,957,680.00	Rp123,011,633.25
8	PLKP1	28	23.09	Rp5,691,574.00	Rp5,754,933.95
9	PPUPL1	28	23.09	Rp4,325,000.00	Rp4,360,165.58
10	PPKL1	14	11.55	Rp227,910,080.00	Rp227,928,922.80
11	PBCL1	7	5.77	Rp8,676,725.00	Rp8,714,549.05
12	PBKCL1	7	5.77	Rp5,536,640.00	Rp5,542,463.00
13	PPCL1	14	11.55	Rp48,473,880.00	Rp48,501,213.00
14	PBBL2	7	5.77	Rp194,302,656.00	Rp194,325,280.72
15	PBKBL2	14	11.55	Rp111,372,420.00	Rp111,387,447.06
16	PBPL2	7	5.77	Rp249,908,843.00	Rp249,917,255.90
17	PBKLA	7	5.77	Rp89,333,246.00	Rp89,359,428.66
18	PBKKL2	7	5.77	Rp88,730,390.00	Rp88,744,464.08
19	PPKL2	14	11.55	Rp117,396,080.00	Rp117,425,543.85
20	PBKBL3	14	11.55	Rp112,872,860.00	Rp112,886,783.72
21	PBKPL3	14	11.55	Rp184,326,760.00	Rp184,345,456.97

Tabel 4.41 Lanjutan

22	PBKL3	7	5.77	Rp78,452,961.00	Rp78,471,473.01
23	PBKKL3	7	5.77	Rp81,900,660.00	Rp81,908,459.50
24	PPKL3	14	11.55	Rp105,048,300.00	Rp105,058,417.95
25	PBKBL4	14	11.55	Rp117,552,220.00	Rp117,571,633.98
26	PBPL4	7	5.77	Rp256,814,913.00	Rp256,821,085.90
27	PBKPL4	14	11.55	Rp184,326,760.00	Rp184,351,071.47
28	PPPL4	14	11.55	Rp168,610,268.00	Rp168,633,886.80
29	PBKL4	7	5.77	Rp65,449,540.00	Rp65,472,011.54
30	PBKKL4	7	5.77	Rp71,855,740.00	Rp71,863,501.00
31	PPKL4	14	11.55	Rp93,498,210.00	Rp93,544,879.50
32	PBKBLA	14	11.55	Rp62,117,880.00	Rp65,472,011.54
33	PBKPLA	14	11.55	Rp18,590,120.00	Rp18,697,550.24
34	PPTALA	7	5.77	Rp9,233,370.00	Rp9,244,426.00
35	PBRA1	21	17.32	Rp308,989,240.00	Rp309,059,646.40
36	PBRA2	21	17.32	Rp166,354,552.00	Rp166,387,510.56
37	PPRBA2	21	17.32	Rp6,711,540.00	Rp6,745,180.00
38	PBR	7	5.77	Rp264,800,600.00	Rp263,977,464.75

Tabel 4.42 hasil analisis penambahan tenaga kerja waktu lembur 2 jam

No	Kode	Durasi		Biaya	
		Normal	Lem. 3 Jam	Normal	Lembur 3 Jam
1	PGT	14	10.77	Rp1,029,000.00	Rp1,033,920.00
2	PBPL1	7	5.38	Rp264,654,625.00	Rp264,657,319.09
3	PBKPL1	7	5.38	Rp201,048,790.00	Rp201,061,789.80
4	PWPL1	7	5.38	Rp195,321,620.00	Rp195,327,643.20
5	PLKPL1	7	5.38	Rp84,601,008.00	Rp84,599,434.60
6	PPUPL1	7	5.38	Rp64,570,200.00	Rp64,574,360.00
7	PPPL1	28	21.54	Rp122,957,680.00	Rp123,006,404.25
8	PLKP1	28	21.54	Rp5,691,574.00	Rp5,740,906.45
9	PPUPL1	28	21.54	Rp4,325,000.00	Rp4,349,315.58
10	PPKL1	14	10.77	Rp227,910,080.00	Rp227,961,484.80
11	PBCL1	7	5.38	Rp8,676,725.00	Rp8,712,575.55
12	PBKCL1	7	5.38	Rp5,536,640.00	Rp5,545,939.00
13	PPCL1	14	10.77	Rp48,473,880.00	Rp48,513,031.50
14	PBBL2	7	5.38	Rp194,302,656.00	Rp194,318,938.22
15	PBKBL2	14	10.77	Rp111,372,420.00	Rp111,394,861.56
16	PBPL2	7	5.38	Rp249,908,843.00	Rp249,917,606.90
17	PBKL2	7	5.38	Rp89,333,246.00	Rp89,362,409.16
18	PBKKL2	7	5.38	Rp88,730,390.00	Rp88,753,044.08
19	PPKL2	14	10.77	Rp117,396,080.00	Rp117,401,732.85
20	PBKBL3	14	10.77	Rp112,872,860.00	Rp112,880,613.72
21	PBKPL3	14	10.77	Rp184,326,760.00	Rp184,350,562.97

Tabel 4.42 Lanjutan

22	PBKL3	7	5.38	Rp78,452,961.00	Rp78,464,463.01
23	PBKKL3	7	5.39	Rp81,900,660.00	Rp81,922,100.00
24	PPKL3	14	10.77	Rp105,048,300.00	Rp105,076,158.45
25	PBKBL4	14	10.77	Rp117,552,220.00	Rp117,579,741.48
26	PBPL4	7	5.38	Rp256,814,913.00	Rp256,816,747.40
27	PBKPL4	14	10.77	Rp184,326,760.00	Rp184,350,562.97
28	PPPL4	14	10.77	Rp168,610,268.00	Rp168,646,150.80
29	PBKL4	7	5.38	Rp65,449,540.00	Rp65,471,538.04
30	PBKKL4	7	5.38	Rp71,855,740.00	Rp71,860,136.00
31	PPKL4	14	10.77	Rp93,498,210.00	Rp93,551,853.00
32	PBKBLA	14	10.77	Rp62,117,880.00	Rp62,119,860.48
33	PBKPLA	14	10.77	Rp18,590,120.00	Rp18,605,345.24
34	PPTALA	7	5.38	Rp9,233,370.00	Rp9,244,212.00
35	PBRA1	21	16.15	Rp308,989,240.00	Rp309,023,042.90
36	PBRA2	21	16.15	Rp166,354,552.00	Rp166,373,464.56
37	PPRBA2	21	16.15	Rp6,711,540.00	Rp6,736,655.00
38	PBR	7	5.38	Rp264,800,600.00	Rp263,990,106.75

4.4.2.2. Analisis Cost Variance, Duration Variance, dan Cost Slope

Cost variance, *duration variance*, dan *cost slope* dianalisis untuk menghitung biaya langsung, biaya tidak langsung, dan biaya total kegiatan seluruh kegiatan proyek. Berikut contoh perhitungan *cost variance* (selisih biaya) antara biaya normal dengan biaya percepatan setiap waktu lembur.

1. Cost Variance.

Nama kegiatan : Bekisting Plat Lantai Lantai 1

Biaya normal : Rp 201.048.790,00

Biaya percepatan :

1 Jam = Rp 201.066.487,80

2 Jam = Rp 201.065.218,80

3 Jam = Rp 201.061.789,80

Selisih biaya (*Cost Variance*),

1 Jam = Rp 201.066.487,80 - Rp 201.048.790,00 = Rp 17.697,80

2 Jam = Rp 201.065.218,80 - Rp 201.048.790,00 = Rp 16.428,80

3 Jam = Rp 201.061.789,80 - Rp 201.048.790,00 = Rp 12.999,80

2. Duration Variance

Duration variance adalah hasil pengurangan antara durasi normal dengan durasi percepatan yang diakibatkan oleh ditambahkan jam waktu lembur.

Durasi Normal	: 7 hari	
Lembur 1 Jam	= 7 – 6,29	= 0,71 hari
Lembur 2 Jam	= 7 – 5,77	= 1,23 hari
Lembur 3 jam	= 7 – 5,38	= 1,62 hari

3. *Cost Slope*

Cost Slope adalah ratio antara biaya normal dikurang biaya percepatan dengan durasi normal dikurang durasi percepatan. Berikut ini contoh analisis *cost slope* pada salah satu kegiatan pekerjaan.

Nama Kegiatan : Bekisting Plat Lantai Lantai 1

Cost variance

1 Jam	= Rp 17.697,80
2 Jam	= Rp 16.428,80
3 Jam	= Rp 12.999,80

Duration Variance

1 Jam	= 0,71 hari
2 Jam	= 1,23 hari
3 Jam	= 1,62 hari

Cost Slope,

$$\begin{aligned}
 1 \text{ Jam} &= \frac{\text{Cost Variance}}{\text{Duration Variance}} \\
 &= \frac{17.697,80}{0,71} \\
 &= \text{Rp } 24.926,40/\text{hari}
 \end{aligned}$$

$$\begin{aligned}
 2 \text{ Jam} &= \frac{\text{Cost Variance}}{\text{Duration Variance}} \\
 &= \frac{16.428,80}{1,23} \\
 &= \text{Rp } 12.356,75/\text{hari}
 \end{aligned}$$

$$\begin{aligned}
 3 \text{ Jam} &= \frac{\text{Cost Variance}}{\text{Duration Variance}} \\
 &= \frac{12.999,80}{1,62} \\
 &= \text{Rp } 8.024,57 /\text{hari}
 \end{aligned}$$

Hasil analisis *Cost Slope* seluruh kegiatan pekerjaan dengan menggunakan *Microsoft Excel 2016* adalah sebagai berikut ini.

Tabel 4.43 *Cost Variance, Duration variance, Cost Slope* dengan waktu lembur 1 jam

Kode	Cost Variance (Rp)	Durasi Variance (hari)	Cost Slope (Rp./Hari)
PLKP1	-14600.00	2.83	-5159.01
PPUPC1	17563.00	2.83	6206.01
PPRBA2	82781.00	2.12	39047.64
PBKCL1	29741.00	0.71	41888.73
PPTALA	30341.00	0.71	42733.80
PGT	64125.00	1.42	45158.45
PBCL1	34848.00	0.71	49081.69
PBKPLA	102606.00	1.42	72257.75
PPCL1	159525.00	1.42	112341.55
PBKL4	93800.00	0.71	132112.68
PPPL1	383153.00	2.83	135389.75
PBKL3	108325.00	0.71	152570.42
PBKL2	120406.00	0.71	169585.92
PLKPL1	122197.00	0.71	172108.45
PPUPL1	131406.00	0.71	185078.87
PPKL3	299038.00	1.42	210590.14
PPPL4	303013.00	1.42	213389.44
PPKL4	320419.00	1.42	225647.18
PBKBLA	365859.00	1.42	257647.18
PPKL2	379759.00	1.42	267435.92
PBRA2	727256.00	2.12	343045.28
PBBL2	265397.00	0.71	373798.59
PBPL2	330944.00	0.71	466118.31
PBPL4	338659.00	0.71	476984.51
PBKBL2	684581.00	1.42	482099.30
PWPL1	342619.00	0.71	482561.97
PBPL1	351041.00	0.71	494423.94
PBKBL3	702888.00	1.42	494991.55
PBR	359369.00	0.71	506153.52
PPKL1	728406.00	1.42	512961.97
PBKBL4	732372.00	1.42	515754.93
PBKKL4	443584.00	0.71	624766.20
PBRA1	1396459.00	2.12	658707.08
PBKKL3	502291.00	0.71	707452.11
PBKKL2	560353.00	0.71	789229.58
PBKPL3	1145563.00	1.42	806734.51
PBKPL4	1145563.00	1.42	806734.51
PBKPL1	1257588.00	0.71	1771250.70

Tabel 4.44 *Cost Variance, Duration variance, Cost Slope* dengan waktu lembur 2 jam

Kode	Cost Variance (Rp)	Durasi Variance (hari)	Cost Slope (Rp./Hari)
PLKP1	-14600.00	2.83	-5159.01
PPUPC1	17563.00	2.83	6206.01
PPRBA2	82781.00	2.12	39047.64
PBKCL1	29741.00	0.71	41888.73
PPTALA	30341.00	0.71	42733.80
PGT	64125.00	1.42	45158.45
PBCL1	34848.00	0.71	49081.69
PBKPLA	102606.00	1.42	72257.75
PPCL1	159525.00	1.42	112341.55
PBKL4	93800.00	0.71	132112.68
PPPL1	383153.00	2.83	135389.75
PBKL3	108325.00	0.71	152570.42
PBKL2	120406.00	0.71	169585.92
PLKPL1	122197.00	0.71	172108.45
PPUPL1	131406.00	0.71	185078.87
PPKL3	299038.00	1.42	210590.14
PPPL4	303013.00	1.42	213389.44
PPKL4	320419.00	1.42	225647.18
PBKBLA	365859.00	1.42	257647.18
PPKL2	379759.00	1.42	267435.92
PBRA2	727256.00	2.12	343045.28
PBBL2	265397.00	0.71	373798.59
PBPL2	330944.00	0.71	466118.31
PBPL4	338659.00	0.71	476984.51
PBKBL2	684581.00	1.42	482099.30
PWPL1	342619.00	0.71	482561.97
PBPL1	351041.00	0.71	494423.94
PBKBL3	702888.00	1.42	494991.55
PBR	359369.00	0.71	506153.52
PPKL1	728406.00	1.42	512961.97
PBKBL4	732372.00	1.42	515754.93
PBKKL4	443584.00	0.71	624766.20
PBRA1	1396459.00	2.12	658707.08
PBKKL3	502291.00	0.71	707452.11
PBKKL2	560353.00	0.71	789229.58
PBKPL3	1145563.00	1.42	806734.51
PBKPL4	1145563.00	1.42	806734.51
PBKPL1	1257588.00	0.71	1771250.70

Tabel 4.45 *Cost Variance, Duration variance, Cost Slope* dengan waktu lembur 1 jam

Kode	Cost Variance (Rp)	Durasi Variance	Cost Slope (Rp./Hari)
PBKPLA	-158466.00	3.23	-49060.68
PBPL1	4200.00	6.46	650.15
PBPL2	35563.00	6.46	5505.11
PBPL3	72563.00	4.85	14961.44
PBPL4	31203.00	1.62	19261.11
PBPL5	89028.00	1.62	54955.56
PBPL6	98884.00	1.62	61039.51
PBPL7	201906.00	3.23	62509.60
PBPL8	469019.00	3.23	145207.12
PBPL9	268187.00	1.62	165547.53
PBPL10	1168169.00	6.46	180831.11
PBPL11	317370.00	1.62	195907.41
PBPL12	358125.00	1.62	221064.81
PBPL13	384437.00	1.62	237306.79
PBPL14	401219.00	1.62	247666.05
PBPL15	898313.00	3.23	278115.48
PBPL16	917644.00	3.23	284100.31
PBPL17	928781.00	3.23	287548.30
PBPL18	978813.00	3.23	303038.08
PBPL19	1129356.00	3.23	349645.82
PBPL20	1142534.00	3.23	353725.70
PBPL21	2205516.00	4.85	454745.57
PBPL22	782975.00	1.62	483317.90
PBPL23	996390.00	1.62	615055.56
PBPL24	1022294.00	1.62	631045.68
PBPL25	1032069.00	1.62	637079.63
PBPL26	2077313.00	3.23	643130.96
PBPL27	1055994.00	1.62	651848.15
PBPL28	2114525.00	3.23	654651.70
PBPL29	2183625.00	3.23	676044.89
PBPL30	2202738.00	3.23	681962.23
PBPL31	1193053.00	1.62	736452.47
PBPL32	1341544.00	1.62	828113.58
PBPL33	4142619.00	4.85	854148.25
PBPL34	1525713.00	1.61	947647.83
PBPL35	1670150.00	1.62	1030956.79
PBPL36	3450744.00	3.23	1068341.80
PBPL37	3771978.00	1.62	2328381.48

Tabel 4.46 *Cost Slope* dengan waktu lembur 1 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Slope (Rp./hari)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	28	25.17	2.83	Rp5,691,574.00	Rp5,676,974.00	-Rp5,159.01
2	PPUPC1	28	25.17	2.83	Rp4,325,000.00	Rp4,342,563.00	Rp6,206.01
3	PPRBA2	21	18.88	2.12	Rp6,711,540.00	Rp6,794,321.00	Rp39,047.64
4	PBKCL1	7	6.29	0.71	Rp5,536,640.00	Rp5,566,381.00	Rp41,888.73
5	PPTALA	7	6.29	0.71	Rp9,233,370.00	Rp9,263,711.00	Rp42,733.80
6	PGT	14	12.58	1.42	Rp1,029,000.00	Rp1,093,125.00	Rp45,158.45
7	PBCL1	7	6.29	0.71	Rp8,676,725.00	Rp8,711,573.00	Rp49,081.69
8	PBKPLA	14	12.58	1.42	Rp18,590,120.00	Rp18,692,726.00	Rp72,257.75
9	PPCL1	14	12.58	1.42	Rp48,473,880.00	Rp48,633,405.00	Rp112,341.55
10	PBKL4	7	6.29	0.71	Rp65,449,540.00	Rp65,543,340.00	Rp132,112.68
11	PPPL1	28	25.17	2.83	Rp122,957,680.00	Rp123,340,833.00	Rp135,389.75
12	PBKL3	7	6.29	0.71	Rp78,452,961.00	Rp78,561,286.00	Rp152,570.42
13	PBKL2	7	6.29	0.71	Rp89,333,246.00	Rp89,453,652.00	Rp169,585.92
14	PLKPL1	7	6.29	0.71	Rp84,601,008.00	Rp84,723,205.00	Rp172,108.45
15	PPUPL1	7	6.29	0.71	Rp64,570,200.00	Rp64,701,606.00	Rp185,078.87
16	PPKL3	14	12.58	1.42	Rp105,048,300.00	Rp105,347,338.00	Rp210,590.14
17	PPPL4	14	12.58	1.42	Rp168,610,268.00	Rp168,913,281.00	Rp213,389.44
18	PPKL4	14	12.58	1.42	Rp93,498,210.00	Rp93,818,629.00	Rp225,647.18
19	PBKBLA	14	12.58	1.42	Rp62,117,880.00	Rp62,483,739.00	Rp257,647.18
20	PPKL2	14	12.58	1.42	Rp117,396,080.00	Rp117,775,839.00	Rp267,435.92
21	PBRA2	21	18.88	2.12	Rp166,354,552.00	Rp167,081,808.00	Rp343,045.28
22	PBBL2	7	6.29	0.71	Rp194,302,656.00	Rp194,568,053.00	Rp373,798.59
23	PBPL2	7	6.29	0.71	Rp249,908,843.00	Rp250,239,787.00	Rp466,118.31
24	PBPL4	7	6.29	0.71	Rp256,814,913.00	Rp257,153,572.00	Rp476,984.51
25	PBKBL2	14	12.58	1.42	Rp111,372,420.00	Rp112,057,001.00	Rp482,099.30
26	PWPL1	7	6.29	0.71	Rp195,321,620.00	Rp195,664,239.00	Rp482,561.97
27	PBPL1	7	6.29	0.71	Rp264,654,625.00	Rp265,005,666.00	Rp494,423.94
28	PBKBL3	14	12.58	1.42	Rp112,872,860.00	Rp113,575,748.00	Rp494,991.55
29	PBR	7	6.29	0.71	Rp264,800,600.00	Rp265,159,969.00	Rp506,153.52
30	PPKL1	14	12.58	1.42	Rp227,910,080.00	Rp228,638,486.00	Rp512,961.97
31	PBKBL4	14	12.58	1.42	Rp117,552,220.00	Rp118,284,592.00	Rp515,754.93
32	PBKKL4	7	6.29	0.71	Rp71,855,740.00	Rp72,299,324.00	Rp624,766.20
33	PBRA1	21	18.88	2.12	Rp308,989,240.00	Rp310,385,699.00	Rp658,707.08
34	PBKKL3	7	6.29	0.71	Rp81,900,660.00	Rp82,402,951.00	Rp707,452.11
35	PBKKL2	7	6.29	0.71	Rp88,730,390.00	Rp89,290,743.00	Rp789,229.58
36	PBKPL3	14	12.58	1.42	Rp184,326,760.00	Rp185,472,323.00	Rp806,734.51
37	PBKPL4	14	12.58	1.42	Rp184,326,760.00	Rp185,472,323.00	Rp806,734.51
38	PBKPL1	7	6.29	0.71	Rp201,048,790.00	Rp202,306,378.00	Rp1,771,250.70

Tabel 4.47 *Cost Slope* dengan waktu lembur 2 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Slope (Rp./hari)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	28	23.09	4.91	Rp5,691,574.00	Rp5,686,184.00	-Rp1,097.76
2	PPUPC1	28	23.09	4.91	Rp4,325,000.00	Rp4,351,406.00	Rp5,378.00
3	PBCL1	7	5.77	1.23	Rp8,676,725.00	Rp8,723,129.00	Rp37,726.83
4	PPRBA2	21	17.32	3.68	Rp6,711,540.00	Rp6,865,103.00	Rp41,729.08
5	PPTALA	7	5.77	1.23	Rp9,233,370.00	Rp9,292,898.00	Rp48,396.75
6	PBKCL1	7	5.77	1.23	Rp5,536,640.00	Rp5,600,703.00	Rp52,083.74
7	PGT	14	11.55	2.45	Rp1,029,000.00	Rp1,161,375.00	Rp54,030.61
8	PBKPLA	14	11.55	2.45	Rp18,590,120.00	Rp18,807,851.00	Rp88,869.80
9	PPCL1	14	11.55	2.45	Rp48,473,880.00	Rp48,786,702.00	Rp127,682.45
10	PBKLA	7	5.77	1.23	Rp65,449,540.00	Rp65,629,537.00	Rp146,339.02
11	PPPL1	28	23.09	4.91	Rp122,957,680.00	Rp123,729,502.00	Rp157,193.89
12	PBKLA3	7	5.77	1.23	Rp78,452,961.00	Rp78,664,817.00	Rp172,240.65
13	PBKLA2	7	5.77	1.23	Rp89,333,246.00	Rp89,571,421.00	Rp193,638.21
14	PLKPL1	7	5.77	1.23	Rp84,601,008.00	Rp84,840,536.00	Rp194,738.21
15	PPUPL1	7	5.77	1.23	Rp64,570,200.00	Rp64,835,044.00	Rp215,320.33
16	PPPL4	14	11.55	2.45	Rp168,610,268.00	Rp169,207,968.00	Rp243,959.18
17	PPKL3	14	11.55	2.45	Rp105,048,300.00	Rp105,657,744.00	Rp248,752.65
18	PPKL4	14	11.55	2.45	Rp93,498,210.00	Rp94,114,304.00	Rp251,466.94
19	PPKL2	14	11.55	2.45	Rp117,396,080.00	Rp118,145,721.00	Rp305,975.92
20	PBKBLA	14	11.55	2.45	Rp62,117,880.00	Rp62,868,108.00	Rp306,215.51
21	PBRA2	21	17.32	3.68	Rp166,354,552.00	Rp167,814,058.00	Rp396,604.89
22	PBBL2	7	5.77	1.23	Rp194,302,656.00	Rp194,824,413.00	Rp424,192.68
23	PBPL2	7	5.77	1.23	Rp249,908,843.00	Rp250,569,130.00	Rp536,818.70
24	PBPL4	7	5.77	1.23	Rp256,814,913.00	Rp257,492,100.00	Rp550,558.54
25	PWPL1	7	5.77	1.23	Rp195,321,620.00	Rp196,005,645.00	Rp556,117.89
26	PBKBL2	14	11.55	2.45	Rp111,372,420.00	Rp112,746,748.00	Rp560,950.20
27	PBPL1	7	5.77	1.23	Rp264,654,625.00	Rp265,354,816.00	Rp569,260.98
28	PBKBL3	14	11.55	2.45	Rp112,872,860.00	Rp114,276,298.00	Rp572,831.84
29	PPKL1	14	11.55	2.45	Rp227,910,080.00	Rp229,359,099.00	Rp591,436.33
30	PBKBL4	14	11.55	2.45	Rp117,552,220.00	Rp119,012,476.00	Rp596,022.86
31	PBR	7	5.77	1.23	Rp264,800,600.00	Rp265,572,706.00	Rp627,728.46
32	PBKKL4	7	5.77	1.23	Rp71,855,740.00	Rp72,744,015.00	Rp722,174.80
33	PBRA1	21	17.32	3.68	Rp308,989,240.00	Rp311,745,468.00	Rp748,975.00
34	PBKKL3	7	5.77	1.23	Rp81,900,660.00	Rp82,909,801.00	Rp820,439.84
35	PBKKL2	7	5.77	1.23	Rp88,730,390.00	Rp89,840,149.00	Rp902,243.09
36	PBKPL3	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp933,451.43
37	PBKPL4	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp933,451.43
38	PBKPL1	7	5.77	1.23	Rp201,048,790.00	Rp203,551,393.00	Rp2,034,636.59

Tabel 4.48 *Cost Slope* dengan waktu lembur 3 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Slope (Rp./hari)
		Normal	Crash	Selisih	Normal	Crash	
1	PBKPLA	14	10.77	3.23	Rp18,590,120.00	Rp18,431,654.00	-Rp49,060.68
2	PLKP1	28	21.54	6.46	Rp5,691,574.00	Rp5,695,774.00	Rp650.15
3	PPUPC1	28	21.54	6.46	Rp4,325,000.00	Rp4,360,563.00	Rp5,505.11
4	PPRBA2	21	16.15	4.85	Rp6,711,540.00	Rp6,784,103.00	Rp14,961.44
5	PBCL1	7	5.38	1.62	Rp8,676,725.00	Rp8,707,928.00	Rp19,261.11
6	PPTALA	7	5.38	1.62	Rp9,233,370.00	Rp9,322,398.00	Rp54,955.56
7	PBKCL1	7	5.38	1.62	Rp5,536,640.00	Rp5,635,524.00	Rp61,039.51
8	PGT	14	10.77	3.23	Rp1,029,000.00	Rp1,230,906.00	Rp62,509.60
9	PPCL1	14	10.77	3.23	Rp48,473,880.00	Rp48,942,899.00	Rp145,207.12
10	PBKLA	7	5.38	1.62	Rp65,449,540.00	Rp65,717,727.00	Rp165,547.53
11	PPPL1	28	21.54	6.46	Rp122,957,680.00	Rp124,125,849.00	Rp180,831.11
12	PBKLA3	7	5.38	1.62	Rp78,452,961.00	Rp78,770,331.00	Rp195,907.41
13	PBKLA2	7	5.38	1.62	Rp89,333,246.00	Rp89,691,371.00	Rp221,064.81
14	PLKPL1	7	5.38	1.62	Rp84,601,008.00	Rp84,985,445.00	Rp237,306.79
15	PPUPL1	7	5.38	1.62	Rp64,570,200.00	Rp64,971,419.00	Rp247,666.05
16	PPPL4	14	10.77	3.23	Rp168,610,268.00	Rp169,508,581.00	Rp278,115.48
17	PPKL4	14	10.77	3.23	Rp93,498,210.00	Rp94,415,854.00	Rp284,100.31
18	PPKL3	14	10.77	3.23	Rp105,048,300.00	Rp105,977,081.00	Rp287,548.30
19	PBKPL3	14	10.77	3.23	Rp184,326,760.00	Rp185,305,573.00	Rp303,038.08
20	PPKL2	14	10.77	3.23	Rp117,396,080.00	Rp118,525,436.00	Rp349,645.82
21	PBKBLA	14	10.77	3.23	Rp62,117,880.00	Rp63,260,414.00	Rp353,725.70
22	PBRA2	21	16.15	4.85	Rp166,354,552.00	Rp168,560,068.00	Rp454,745.57
23	PBBL2	7	5.38	1.62	Rp194,302,656.00	Rp195,085,631.00	Rp483,317.90
24	PBPL2	7	5.38	1.62	Rp249,908,843.00	Rp250,905,233.00	Rp615,055.56
25	PBPL4	7	5.38	1.62	Rp256,814,913.00	Rp257,837,207.00	Rp631,045.68
26	PWPL1	7	5.38	1.62	Rp195,321,620.00	Rp196,353,689.00	Rp637,079.63
27	PBKBL2	14	10.77	3.23	Rp111,372,420.00	Rp113,449,733.00	Rp643,130.96
28	PBPL1	7	5.38	1.62	Rp264,654,625.00	Rp265,710,619.00	Rp651,848.15
29	PBKBL3	14	10.77	3.23	Rp112,872,860.00	Rp114,987,385.00	Rp654,651.70
30	PPKL1	14	10.77	3.23	Rp227,910,080.00	Rp230,093,705.00	Rp676,044.89
31	PBKBL4	14	10.77	3.23	Rp117,552,220.00	Rp119,754,958.00	Rp681,962.23
32	PBR	7	5.38	1.62	Rp264,800,600.00	Rp265,993,653.00	Rp736,452.47
33	PBKKL4	7	5.38	1.62	Rp71,855,740.00	Rp73,197,284.00	Rp828,113.58
34	PBRA1	21	16.15	4.85	Rp308,989,240.00	Rp313,131,859.00	Rp854,148.25
35	PBKKL3	7	5.39	1.61	Rp81,900,660.00	Rp83,426,373.00	Rp947,647.83
36	PBKKL2	7	5.38	1.62	Rp88,730,390.00	Rp90,400,540.00	Rp1,030,956.79
37	PBKPL4	14	10.77	3.23	Rp184,326,760.00	Rp187,777,504.00	Rp1,068,341.80
38	PBKPL1	7	5.38	1.62	Rp201,048,790.00	Rp204,820,768.00	Rp2,328,381.48

Tabel 4.49 *Cost Variance* dengan waktu lembur 1 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Variance (Rp)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	28	25.17	2.83	Rp5,691,574.00	Rp5,676,974.00	-Rp14,600.00
2	PBKCL1	7	6.29	0.71	Rp5,536,640.00	Rp5,566,381.00	Rp29,741.00
3	PPTALA	7	6.29	0.71	Rp9,233,370.00	Rp9,263,711.00	Rp30,341.00
4	PBCL1	7	6.29	0.71	Rp8,676,725.00	Rp8,711,573.00	Rp34,848.00
5	PGT	14	12.58	1.42	Rp1,029,000.00	Rp1,093,125.00	Rp64,125.00
6	PPRBA2	21	18.88	2.12	Rp6,711,540.00	Rp6,794,321.00	Rp82,781.00
7	PBKLA	7	6.29	0.71	Rp65,449,540.00	Rp65,543,340.00	Rp93,800.00
8	PBKPLA	14	12.58	1.42	Rp18,590,120.00	Rp18,692,726.00	Rp102,606.00
9	PBKLA3	7	6.29	0.71	Rp78,452,961.00	Rp78,561,286.00	Rp108,325.00
10	PBKLA2	7	6.29	0.71	Rp89,333,246.00	Rp89,453,652.00	Rp120,406.00
11	PLKPL1	7	6.29	0.71	Rp84,601,008.00	Rp84,723,205.00	Rp122,197.00
12	PPUPL1	7	6.29	0.71	Rp64,570,200.00	Rp64,701,606.00	Rp131,406.00
13	PPUPL1	7	6.29	0.71	Rp64,570,200.00	Rp64,701,606.00	Rp131,406.00
14	PPCL1	14	12.58	1.42	Rp48,473,880.00	Rp48,633,405.00	Rp159,525.00
15	PBBL2	7	6.29	0.71	Rp194,302,656.00	Rp194,568,053.00	Rp265,397.00
16	PPKL3	14	12.58	1.42	Rp105,048,300.00	Rp105,347,338.00	Rp299,038.00
17	PPPL4	14	12.58	1.42	Rp168,610,268.00	Rp168,913,281.00	Rp303,013.00
18	PPKL4	14	12.58	1.42	Rp93,498,210.00	Rp93,818,629.00	Rp320,419.00
19	PBPL2	7	6.29	0.71	Rp249,908,843.00	Rp250,239,787.00	Rp330,944.00
20	PBPL4	7	6.29	0.71	Rp256,814,913.00	Rp257,153,572.00	Rp338,659.00
21	PWPL1	7	6.29	0.71	Rp195,321,620.00	Rp195,664,239.00	Rp342,619.00
22	PBPL1	7	6.29	0.71	Rp264,654,625.00	Rp265,005,666.00	Rp351,041.00
23	PBR	7	6.29	0.71	Rp264,800,600.00	Rp265,159,969.00	Rp359,369.00
24	PBKBLA	14	12.58	1.42	Rp62,117,880.00	Rp62,483,739.00	Rp365,859.00
25	PPKL2	14	12.58	1.42	Rp117,396,080.00	Rp117,775,839.00	Rp379,759.00
26	PPPL1	28	25.17	2.83	Rp122,957,680.00	Rp123,340,833.00	Rp383,153.00
27	PBKKL4	7	6.29	0.71	Rp71,855,740.00	Rp72,299,324.00	Rp443,584.00
28	PBKKL3	7	6.29	0.71	Rp81,900,660.00	Rp82,402,951.00	Rp502,291.00
29	PBKKL2	7	6.29	0.71	Rp88,730,390.00	Rp89,290,743.00	Rp560,353.00
30	PBKBL2	14	12.58	1.42	Rp111,372,420.00	Rp112,057,001.00	Rp684,581.00
31	PBKBL3	14	12.58	1.42	Rp112,872,860.00	Rp113,575,748.00	Rp702,888.00
32	PBRA2	21	18.88	2.12	Rp166,354,552.00	Rp167,081,808.00	Rp727,256.00
33	PPKL1	14	12.58	1.42	Rp227,910,080.00	Rp228,638,486.00	Rp728,406.00
34	PBKBL4	14	12.58	1.42	Rp117,552,220.00	Rp118,284,592.00	Rp732,372.00
35	PBKPL3	14	12.58	1.42	Rp184,326,760.00	Rp185,472,323.00	Rp1,145,563.00
36	PBKPL4	14	12.58	1.42	Rp184,326,760.00	Rp185,472,323.00	Rp1,145,563.00
37	PBKPL1	7	6.29	0.71	Rp201,048,790.00	Rp202,306,378.00	Rp1,257,588.00
38	PBRA1	21	18.88	2.12	Rp308,989,240.00	Rp310,385,699.00	Rp1,396,459.00

Tabel 4.50 *Cost Variance* dengan waktu lembur 2 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Variance (Rp)
		Normal	Crash	Selisih	Normal	Crash	
1	PLKP1	28	23.09	4.91	Rp5,691,574.00	Rp5,686,184.00	-Rp5,390.00
2	PBCL1	7	5.77	1.23	Rp8,676,725.00	Rp8,723,129.00	Rp46,404.00
3	PPTALA	7	5.77	1.23	Rp9,233,370.00	Rp9,292,898.00	Rp59,528.00
4	PBKCL1	7	5.77	1.23	Rp5,536,640.00	Rp5,600,703.00	Rp64,063.00
5	PGT	14	11.55	2.45	Rp1,029,000.00	Rp1,161,375.00	Rp132,375.00
6	PPRBA2	21	17.32	3.68	Rp6,711,540.00	Rp6,865,103.00	Rp153,563.00
7	PBKLA	7	5.77	1.23	Rp65,449,540.00	Rp65,629,537.00	Rp179,997.00
8	PBKLA	7	5.77	1.23	Rp78,452,961.00	Rp78,664,817.00	Rp211,856.00
9	PBKPLA	14	11.55	2.45	Rp18,590,120.00	Rp18,807,851.00	Rp217,731.00
10	PBKLA	7	5.77	1.23	Rp89,333,246.00	Rp89,571,421.00	Rp238,175.00
11	PLKPL1	7	5.77	1.23	Rp84,601,008.00	Rp84,840,536.00	Rp239,528.00
12	PPUPL1	7	5.77	1.23	Rp64,570,200.00	Rp64,835,044.00	Rp264,844.00
13	PPUPL1	7	5.77	1.23	Rp64,570,200.00	Rp64,835,044.00	Rp264,844.00
14	PPCL1	14	11.55	2.45	Rp48,473,880.00	Rp48,786,702.00	Rp312,822.00
15	PBBL2	7	5.77	1.23	Rp194,302,656.00	Rp194,824,413.00	Rp521,757.00
16	PPPL4	14	11.55	2.45	Rp168,610,268.00	Rp169,207,968.00	Rp597,700.00
17	PPKL3	14	11.55	2.45	Rp105,048,300.00	Rp105,657,744.00	Rp609,444.00
18	PPKL4	14	11.55	2.45	Rp93,498,210.00	Rp94,114,304.00	Rp616,094.00
19	PBPL2	7	5.77	1.23	Rp249,908,843.00	Rp250,569,130.00	Rp660,287.00
20	PBPL4	7	5.77	1.23	Rp256,814,913.00	Rp257,492,100.00	Rp677,187.00
21	PWPL1	7	5.77	1.23	Rp195,321,620.00	Rp196,005,645.00	Rp684,025.00
22	PBPL1	7	5.77	1.23	Rp264,654,625.00	Rp265,354,816.00	Rp700,191.00
23	PPKL2	14	11.55	2.45	Rp117,396,080.00	Rp118,145,721.00	Rp749,641.00
24	PBKBLA	14	11.55	2.45	Rp62,117,880.00	Rp62,868,108.00	Rp750,228.00
25	PPPL1	28	23.09	4.91	Rp122,957,680.00	Rp123,729,502.00	Rp771,822.00
26	PBR	7	5.77	1.23	Rp264,800,600.00	Rp265,572,706.00	Rp772,106.00
27	PBKKL4	7	5.77	1.23	Rp71,855,740.00	Rp72,744,015.00	Rp888,275.00
28	PBKKL3	7	5.77	1.23	Rp81,900,660.00	Rp82,909,801.00	Rp1,009,141.00
29	PBKKL2	7	5.77	1.23	Rp88,730,390.00	Rp89,840,149.00	Rp1,109,759.00
30	PBKBL2	14	11.55	2.45	Rp111,372,420.00	Rp112,746,748.00	Rp1,374,328.00
31	PBKBL3	14	11.55	2.45	Rp112,872,860.00	Rp114,276,298.00	Rp1,403,438.00
32	PPKL1	14	11.55	2.45	Rp227,910,080.00	Rp229,359,099.00	Rp1,449,019.00
33	PBRA2	21	17.32	3.68	Rp166,354,552.00	Rp167,814,058.00	Rp1,459,506.00
34	PBKBL4	14	11.55	2.45	Rp117,552,220.00	Rp119,012,476.00	Rp1,460,256.00
35	PBKPL3	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp2,286,956.00
36	PBKPL4	14	11.55	2.45	Rp184,326,760.00	Rp186,613,716.00	Rp2,286,956.00
37	PBKPL1	7	5.77	1.23	Rp201,048,790.00	Rp203,551,393.00	Rp2,502,603.00
38	PBRA1	21	17.32	3.68	Rp308,989,240.00	Rp311,745,468.00	Rp2,756,228.00

Tabel 4.51 *Cost Variance* dengan waktu lembur 3 jam urutan terkecil ke terbesar

No	Kode	Durasi			Biaya		Cost Variance (Rp)
		Normal	Crash	Selisih	Normal	Crash	
1	PBKPLA	14	10.77	3.23	Rp18,590,120.00	Rp18,431,654.00	-Rp158,466.00
2	PLKP1	28	21.54	6.46	Rp5,691,574.00	Rp5,695,774.00	Rp4,200.00
3	PBCL1	7	5.38	1.62	Rp8,676,725.00	Rp8,707,928.00	Rp31,203.00
4	PPRBA2	21	16.15	4.85	Rp6,711,540.00	Rp6,784,103.00	Rp72,563.00
5	PPTALA	7	5.38	1.62	Rp9,233,370.00	Rp9,322,398.00	Rp89,028.00
6	PBKCL1	7	5.38	1.62	Rp5,536,640.00	Rp5,635,524.00	Rp98,884.00
7	PGT	14	10.77	3.23	Rp1,029,000.00	Rp1,230,906.00	Rp201,906.00
8	PBKLA4	7	5.38	1.62	Rp65,449,540.00	Rp65,717,727.00	Rp268,187.00
9	PBKLA3	7	5.38	1.62	Rp78,452,961.00	Rp78,770,331.00	Rp317,370.00
10	PBKLA2	7	5.38	1.62	Rp89,333,246.00	Rp89,691,371.00	Rp358,125.00
11	PLKPL1	7	5.38	1.62	Rp84,601,008.00	Rp84,985,445.00	Rp384,437.00
12	PPUPL1	7	5.38	1.62	Rp64,570,200.00	Rp64,971,419.00	Rp401,219.00
13	PPUPL1	7	5.38	1.62	Rp64,570,200.00	Rp64,971,419.00	Rp401,219.00
14	PPCL1	14	10.77	3.23	Rp48,473,880.00	Rp48,942,899.00	Rp469,019.00
15	PBBL2	7	5.38	1.62	Rp194,302,656.00	Rp195,085,631.00	Rp782,975.00
16	PPPL4	14	10.77	3.23	Rp168,610,268.00	Rp169,508,581.00	Rp898,313.00
17	PPKL4	14	10.77	3.23	Rp93,498,210.00	Rp94,415,854.00	Rp917,644.00
18	PPKL3	14	10.77	3.23	Rp105,048,300.00	Rp105,977,081.00	Rp928,781.00
19	PBKPL3	14	10.77	3.23	Rp184,326,760.00	Rp185,305,573.00	Rp978,813.00
20	PBPL2	7	5.38	1.62	Rp249,908,843.00	Rp250,905,233.00	Rp996,390.00
21	PBPL4	7	5.38	1.62	Rp256,814,913.00	Rp257,837,207.00	Rp1,022,294.00
22	PWPL1	7	5.38	1.62	Rp195,321,620.00	Rp196,353,689.00	Rp1,032,069.00
23	PBPL1	7	5.38	1.62	Rp264,654,625.00	Rp265,710,619.00	Rp1,055,994.00
24	PPKL2	14	10.77	3.23	Rp117,396,080.00	Rp118,525,436.00	Rp1,129,356.00
25	PBKBLA	14	10.77	3.23	Rp62,117,880.00	Rp63,260,414.00	Rp1,142,534.00
26	PPPL1	28	21.54	6.46	Rp122,957,680.00	Rp124,125,849.00	Rp1,168,169.00
27	PBR	7	5.38	1.62	Rp264,800,600.00	Rp265,993,653.00	Rp1,193,053.00
28	PBKKL4	7	5.38	1.62	Rp71,855,740.00	Rp73,197,284.00	Rp1,341,544.00
29	PBKKL3	7	5.39	1.61	Rp81,900,660.00	Rp83,426,373.00	Rp1,525,713.00
30	PBKKL2	7	5.38	1.62	Rp88,730,390.00	Rp90,400,540.00	Rp1,670,150.00
31	PBKBL2	14	10.77	3.23	Rp111,372,420.00	Rp113,449,733.00	Rp2,077,313.00
32	PBKBL3	14	10.77	3.23	Rp112,872,860.00	Rp114,987,385.00	Rp2,114,525.00
33	PPKL1	14	10.77	3.23	Rp227,910,080.00	Rp230,093,705.00	Rp2,183,625.00
34	PBKBL4	14	10.77	3.23	Rp117,552,220.00	Rp119,754,958.00	Rp2,202,738.00
35	PBRA2	21	16.15	4.85	Rp166,354,552.00	Rp168,560,068.00	Rp2,205,516.00
36	PBKPL4	14	10.77	3.23	Rp184,326,760.00	Rp187,777,504.00	Rp3,450,744.00
37	PBKPL1	7	5.38	1.62	Rp201,048,790.00	Rp204,820,768.00	Rp3,771,978.00
38	PBRA1	21	16.15	4.85	Rp308,989,240.00	Rp313,131,859.00	Rp4,142,619.00

4.4.2.3. Biaya Langsung dan Tidak Langsung

Analisis perhitungan biaya tidak langsung menggunakan model *Regresi Non Linier* algoritma genematika, persamaannya sebagai berikut.

$$y = -0.95 - 4.888(\ln(x_1 - 0.21) - \ln(x_2)) + \varepsilon$$

dengan,

x_1 = nilai total proyek (Rupiah),

x_2 = durasi proyek (hari), dan

ε = *random error*.

Perhitungan biaya langsung pada proyek ini sebagai berikut.

$$y = -0,95 - 4,888(\ln(x_1 - 0,21) - \ln(x_2))$$

$$y = -0,95 - 4,888\left(\ln\left(\frac{8.024.154.950}{1.000.000.000} - 0,21\right) - \ln(189)\right)$$

$$y = 14,62224 = 0,146 \%$$

sehingga,

$$\text{biaya tidak langsung} = 0,146\% \times \text{Rp } 8.024.154.950,00$$

$$= \text{Rp } 1.173.311.211,05$$

$$\text{Biaya Langsung} = \text{Biaya total proyek} - \text{biaya tidak langsung}$$

$$= \text{Rp } 8.024.154.950,00 - \text{Rp } 1.173.311.211,05$$

$$= \text{Rp } 6.850.843.739,05$$

Hasil analisis biaya tidak langsung dan biaya langsung pada seluruh kegiatan proyek yang diakibatkan penambahan waktu jam lembur dapat dilihat pada Table 4.52, Tabel 4.53, dan Tabel 4.54.

Tabel 4.52 Biaya langsung dan biaya tidak langsung waktu lembur 1 jam

Kode	Durasi Komulatif	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	189.000	Rp1,173,311,211.05	Rp6,850,843,738.95
PLKP1	186.170	Rp1,155,742,582.86	Rp6,850,838,579.94
PPUPC1	185.460	Rp1,151,334,905.83	Rp6,850,844,785.95
PPRBA2	184.750	Rp1,146,927,228.79	Rp6,850,883,833.59
PBKCL1	184.040	Rp1,142,519,551.75	Rp6,850,925,722.32
PPTALA	182.620	Rp1,133,704,197.68	Rp6,850,968,456.12
PGT	180.500	Rp1,120,543,246.53	Rp6,851,013,614.57
PBCL1	179.790	Rp1,116,135,569.50	Rp6,851,062,696.26
PBKPLA	178.370	Rp1,107,320,215.42	Rp6,851,134,954.01
PPCL1	177.660	Rp1,102,912,538.39	Rp6,851,247,295.56
PBKLA	176.950	Rp1,098,504,861.35	Rp6,851,379,408.24

Tabel 4.52 Lanjutan

PPPL1	176.240	Rp1,094,097,184.31	Rp6,851,514,797.99
PBKL3	175.530	Rp1,089,689,507.28	Rp6,851,667,368.41
PBKL2	174.820	Rp1,085,281,830.24	Rp6,851,836,954.33
PLKPL1	173.400	Rp1,076,466,476.17	Rp6,852,009,062.78
PPUPL1	172.690	Rp1,072,058,799.13	Rp6,852,194,141.65
PPKL3	171.270	Rp1,063,243,445.06	Rp6,852,404,731.79
PPPL4	169.850	Rp1,054,428,090.99	Rp6,852,618,121.23
PPKL4	168.430	Rp1,045,612,736.92	Rp6,852,843,768.41
PBKBLA	167.720	Rp1,041,205,059.88	Rp6,853,101,415.59
PPKL2	167.010	Rp1,036,797,382.84	Rp6,853,368,851.51
PBRA2	166.300	Rp1,032,389,705.81	Rp6,853,711,896.79
PBBL2	165.590	Rp1,027,982,028.77	Rp6,854,085,695.38
PBPL2	164.880	Rp1,023,574,351.74	Rp6,854,551,813.69
PBPL4	163.460	Rp1,014,758,997.66	Rp6,855,028,798.20
PBKBL2	162.040	Rp1,005,943,643.59	Rp6,855,510,897.50
PWPL1	159.210	Rp988,375,015.40	Rp6,855,993,459.47
PBPL1	158.500	Rp983,967,338.37	Rp6,856,487,883.41
PBKBL3	157.790	Rp979,559,661.33	Rp6,856,982,874.96
PBR	157.080	Rp975,151,984.30	Rp6,857,489,028.48
PPKL1	155.660	Rp966,336,630.22	Rp6,858,001,990.45
PBKBL4	154.240	Rp957,521,276.15	Rp6,858,517,745.38
PBKKL4	152.120	Rp944,360,325.00	Rp6,859,142,511.58
PBRA1	150.700	Rp935,544,970.93	Rp6,859,801,218.66
PBKKL3	149.280	Rp926,729,616.85	Rp6,860,508,670.77
PBKKL2	147.860	Rp917,914,262.78	Rp6,861,297,900.35
PBKPL3	146.440	Rp909,098,908.71	Rp6,862,104,634.85
PBKPL4	145.730	Rp904,691,231.67	Rp6,862,911,369.36
PBKPL1	143.610	Rp891,530,280.52	Rp6,864,682,620.07

Tabel 4.53 Biaya langsung dan biaya tidak langsung waktu lembur 2 jam

Kode	Durasi Komulatif	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	189.000	Rp1,173,311,211.05	Rp6,850,843,738.95
PLKP1	184.090	Rp1,142,829,951.55	Rp6,850,842,641.19
PPUPC1	179.180	Rp1,112,348,692.04	Rp6,850,848,019.19
PBCL1	177.950	Rp1,104,712,857.18	Rp6,850,885,746.02
PPRBA2	174.270	Rp1,081,867,432.54	Rp6,850,927,475.10
PPTALA	173.040	Rp1,074,231,597.67	Rp6,850,975,871.85
PBKCL1	171.810	Rp1,066,595,762.81	Rp6,851,027,955.59
PGT	169.360	Rp1,051,386,173.03	Rp6,851,081,986.20
PBKPLA	166.910	Rp1,036,176,583.26	Rp6,851,170,856.00
PPCL1	164.460	Rp1,020,966,993.49	Rp6,851,298,538.44
PBKL4	163.230	Rp1,013,331,158.62	Rp6,851,444,877.47

Tabel 4.53 Lanjutan

PPPL1	158.320	Rp982,849,899.12	Rp6,851,602,071.36
PBKL3	157.090	Rp975,214,064.25	Rp6,851,774,312.01
PBKL2	155.860	Rp967,578,229.39	Rp6,851,967,950.22
PLKPL1	154.630	Rp959,942,394.52	Rp6,852,162,688.43
PPUPL1	153.400	Rp952,306,559.66	Rp6,852,378,008.76
PPPL4	150.950	Rp937,096,969.88	Rp6,852,621,967.94
PPKL3	148.500	Rp921,887,380.11	Rp6,852,870,720.59
PPKL4	146.050	Rp906,677,790.34	Rp6,853,122,187.53
PPKL2	143.600	Rp891,468,200.57	Rp6,853,428,163.45
PBKBLA	141.150	Rp876,258,610.79	Rp6,853,734,378.96
PBRA2	137.470	Rp853,413,186.15	Rp6,854,130,983.85
PBBL2	136.240	Rp845,777,351.29	Rp6,854,555,176.54
PBPL2	135.010	Rp838,141,516.42	Rp6,855,091,995.23
PBPL4	133.780	Rp830,505,681.56	Rp6,855,642,553.77
PWPL1	132.550	Rp822,869,846.69	Rp6,856,198,671.66
PBKBL2	130.100	Rp807,660,256.92	Rp6,856,759,621.86
PBPL1	128.870	Rp800,024,422.05	Rp6,857,328,882.84
PBKBL3	126.420	Rp784,814,832.28	Rp6,857,901,714.67
PPKL1	123.970	Rp769,605,242.51	Rp6,858,493,151.00
PBKBL4	121.520	Rp754,395,652.73	Rp6,859,089,173.86
PBR	120.290	Rp746,759,817.87	Rp6,859,716,902.31
PBKKL4	119.060	Rp739,123,983.00	Rp6,860,439,077.11
PBRA1	115.380	Rp716,278,558.36	Rp6,861,188,052.11
PBKKL3	114.150	Rp708,642,723.50	Rp6,862,008,491.95
PBKKL2	112.920	Rp701,006,888.63	Rp6,862,910,735.04
PBKPL3	110.470	Rp685,797,298.86	Rp6,863,844,186.47
PBKPL4	108.020	Rp670,587,709.09	Rp6,864,777,637.89
PBKPL1	106.790	Rp662,951,874.22	Rp6,866,812,274.48

Tabel 4.54 Biaya langsung dan biaya tidak langsung waktu lembur 3 jam

KODE	Durasi Komulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	189.000	Rp1,173,311,211.05	Rp6,850,843,738.95
PBKPLA	185.770	Rp1,153,259,384.53	Rp6,850,794,678.27
PLKP1	179.310	Rp1,113,155,731.50	Rp6,850,795,328.42
PPUPC1	172.850	Rp1,073,052,078.47	Rp6,850,800,833.53
PPRBA2	168.000	Rp1,042,943,298.71	Rp6,850,815,794.98
PBCL1	166.380	Rp1,032,886,345.47	Rp6,850,835,056.09
PPTALA	164.760	Rp1,022,829,392.24	Rp6,850,890,011.64
PBKCL1	163.140	Rp1,012,772,439.00	Rp6,850,951,051.15
PGT	159.910	Rp992,720,612.48	Rp6,851,013,560.75
PPCL1	156.680	Rp972,668,785.96	Rp6,851,158,767.87

PBKL4	155.060	Rp962,611,832.73	Rp6,851,324,315.40
PPPL1	148.600	Rp922,508,179.69	Rp6,851,505,146.51
PBKL3	146.980	Rp912,451,226.46	Rp6,851,701,053.92
PBKL2	145.360	Rp902,394,273.22	Rp6,851,922,118.73
PLKPL1	143.740	Rp892,337,319.98	Rp6,852,159,425.52
PPUPL1	142.120	Rp882,280,366.74	Rp6,852,407,091.57
PPPL4	138.890	Rp862,228,540.23	Rp6,852,685,207.05
PPKL4	135.660	Rp842,176,713.71	Rp6,852,969,307.36
PPKL3	132.430	Rp822,124,887.19	Rp6,853,256,855.66
PBKPL3	129.200	Rp802,073,060.68	Rp6,853,559,893.74
PPKL2	125.970	Rp782,021,234.16	Rp6,853,909,539.56
PBKBLA	122.740	Rp761,969,407.64	Rp6,854,263,265.26
PBRA2	117.890	Rp731,860,627.89	Rp6,854,718,010.82
PBBL2	116.270	Rp721,803,674.65	Rp6,855,201,328.73
PBPL2	114.650	Rp711,746,721.41	Rp6,855,816,384.28
PBPL4	113.030	Rp701,689,768.17	Rp6,856,447,429.96
PWPL1	111.410	Rp691,632,814.94	Rp6,857,084,509.59
PBKBL2	108.180	Rp671,580,988.42	Rp6,857,727,640.55
PBPL1	106.560	Rp661,524,035.18	Rp6,858,379,488.70
PBKBL3	103.330	Rp641,472,208.67	Rp6,859,034,140.40
PPKL1	100.100	Rp621,420,382.15	Rp6,859,710,185.29
PBKBL4	96.870	Rp601,368,555.63	Rp6,860,392,147.52
PBR	95.250	Rp591,311,602.39	Rp6,861,128,599.99
PBKKL4	93.630	Rp581,254,649.16	Rp6,861,956,713.57
PBRA1	88.780	Rp551,145,869.40	Rp6,862,810,861.82
PBKKL3	87.170	Rp541,150,996.12	Rp6,863,758,509.64
PBKKL2	85.550	Rp531,094,042.89	Rp6,864,789,466.43
PBKPL4	82.320	Rp511,042,216.37	Rp6,865,857,808.23
PBKPL1	80.700	Rp500,985,263.13	Rp6,868,186,189.71

Berdasarkan hasil analisis *Microsoft Excel* 2016, cara perhitungan manual untuk menganalisis biaya langsung dan biaya tidak langsung pada setiap waktu lembur sebagai berikut.

Biaya tidak langsung

Kegiatan : Bekisting Plat Lantai Lantai 1 (kode: PBKPL1)

$$\begin{aligned} \text{Lembur 1 jam} &= (\text{Rp } 979.621.741,29 \times 157,09) / 157,8 \\ &= \text{Rp } 975.214.064,25 \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 jam} &= (\text{Rp } 876.196.530,83 \times 123,97) / 126,42 \\ &= \text{Rp } 853.351.106,20 \end{aligned}$$

$$\text{Lembur 3 jam} = (\text{Rp } 691.632.814,94 \times 109,79) / 111,41$$

$$= \text{Rp } 681.575.861,70$$

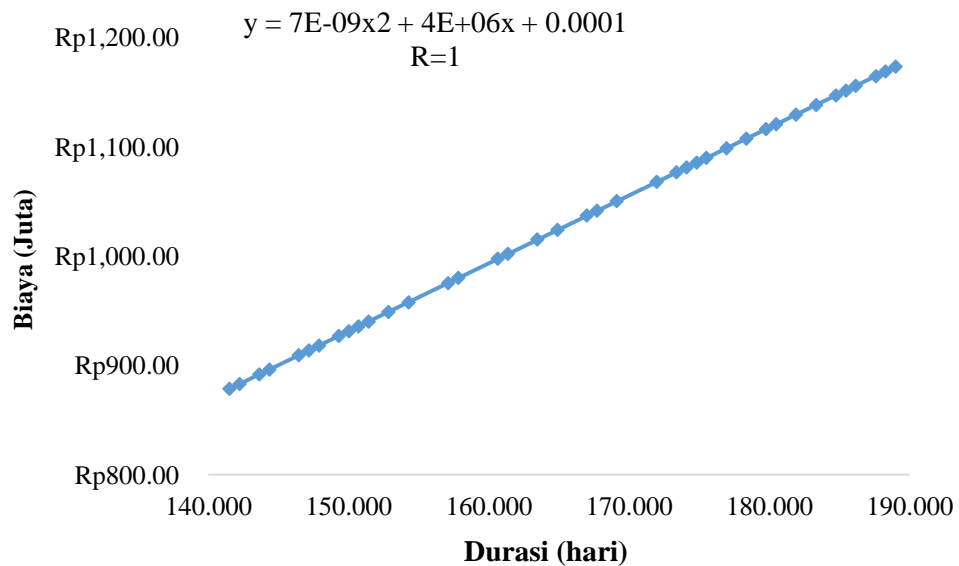
Biaya Langsung

$$\begin{aligned} \text{Lembur 1 jam} &= \text{Biaya langsung} + \text{Cost Slope} \\ &= \text{Rp } 6.849.999.412,94 + \text{Rp } 24.926,48 \\ &= \text{Rp } 6.850.024.339,41 \end{aligned}$$

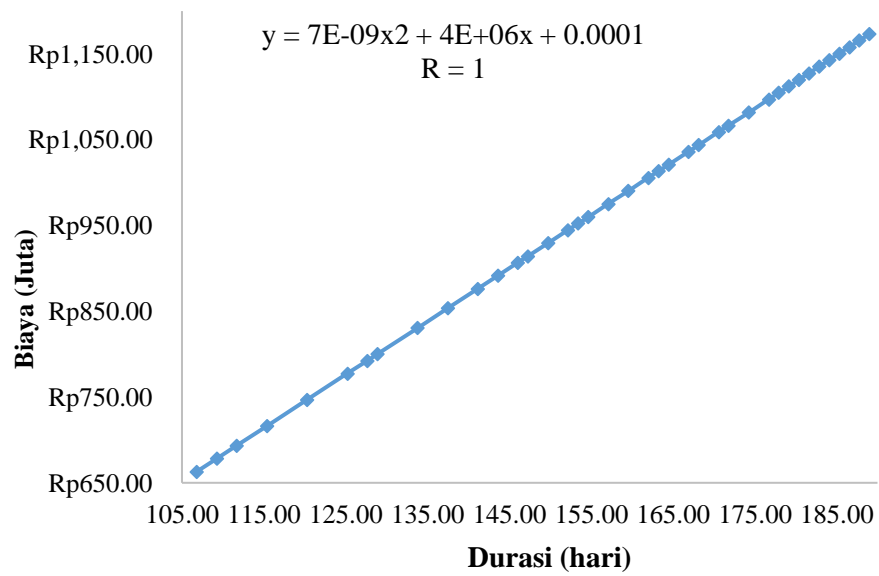
$$\begin{aligned} \text{Lembur 2 jam} &= \text{Biaya langsung} + \text{Cost Slope} \\ &= \text{Rp } 6.850.375.111,40 + \text{Rp } 24.926,48 \\ &= \text{Rp } 6.850,388.738,73 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 jam} &= \text{Biaya langsung} + \text{Cost Slope} \\ &= \text{Rp } 6.850.447.187,90 + \text{Rp } 8.024,57 \\ &= \text{Rp } 6.850.455.212,46 \end{aligned}$$

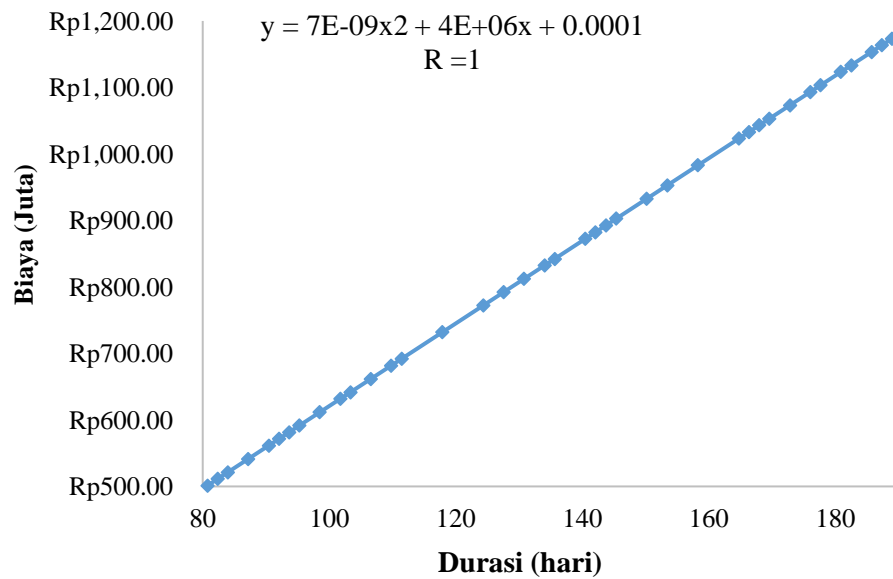
Berdasarkan hasil analisis menggunakan *Microsoft Excel 2016*, berikut tampilan grafik biaya tidak langsung dan biaya langsung akibat penambahan waktu lembur.



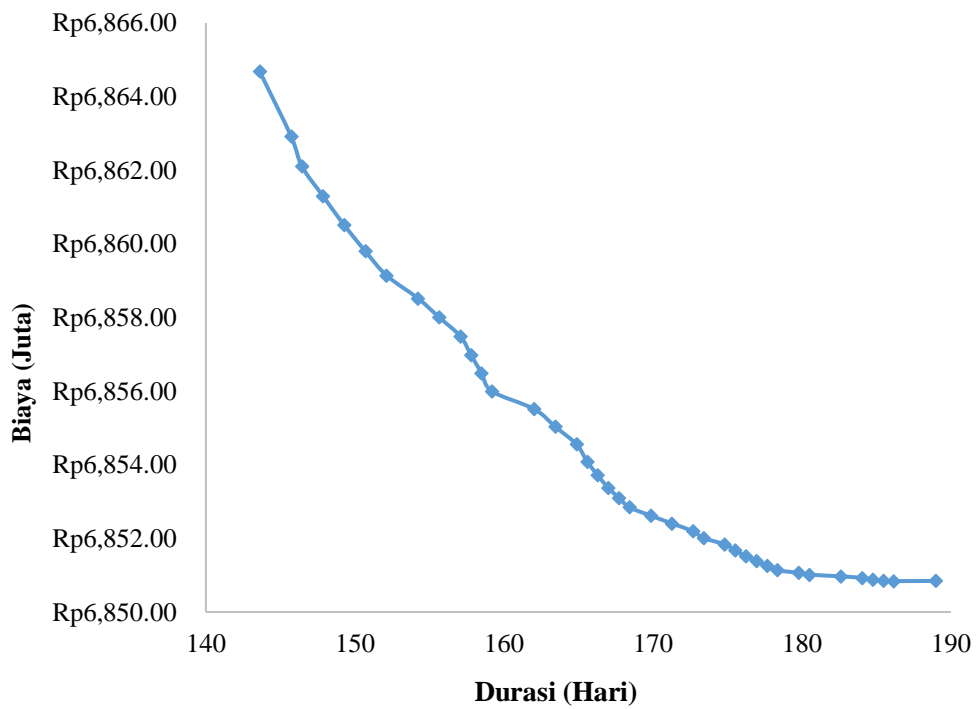
Gambar 4.10 Grafik hubungan biaya tidak langsung dengan durasi untuk waktu lembur 1 jam



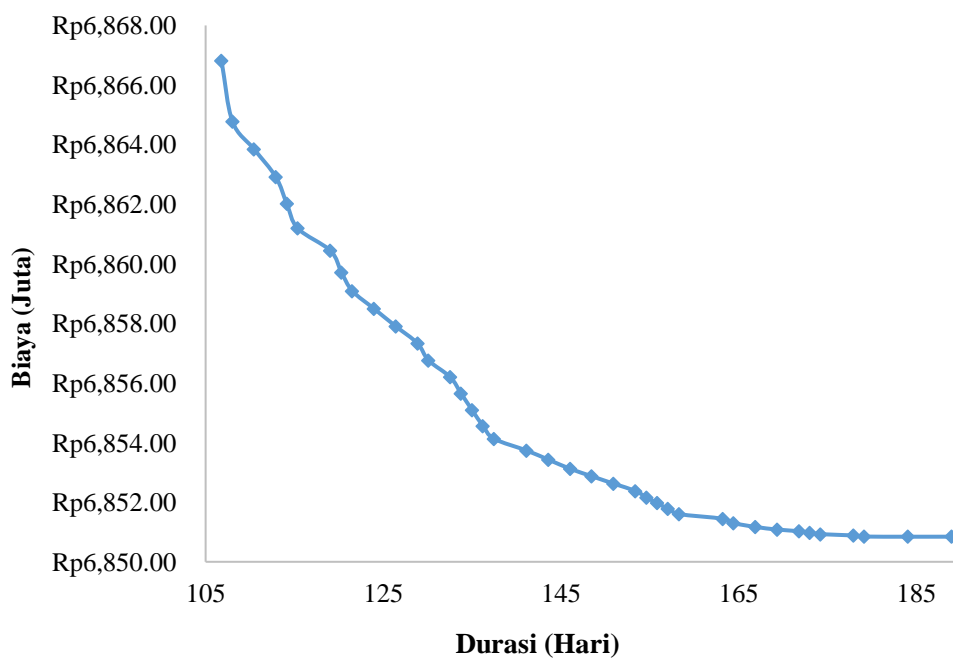
Gambar 4.11 Grafik hubungan biaya tidak langsung dengan durasi untuk waktu lembur 2 jam



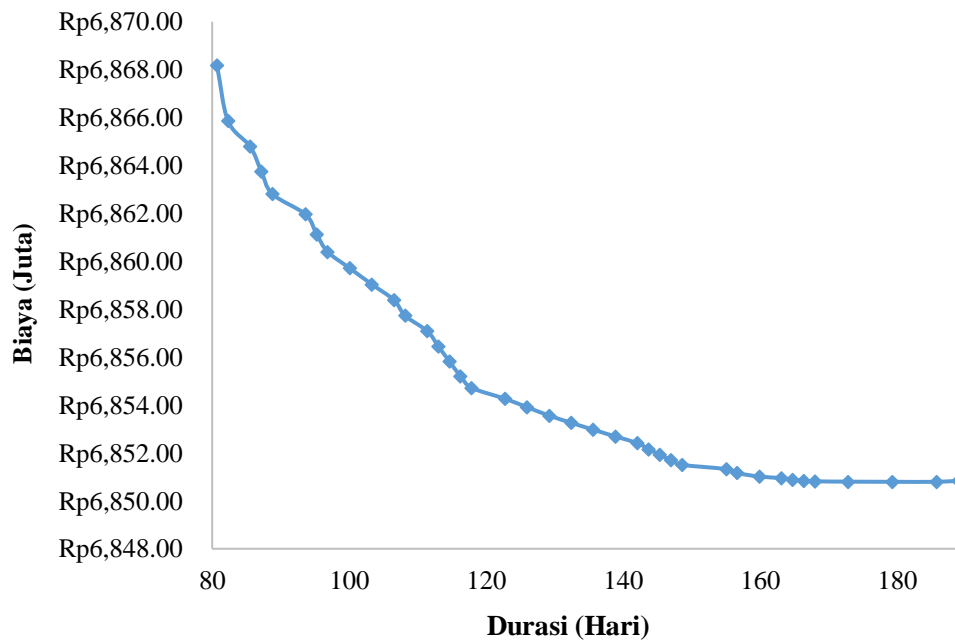
Gambar 4.12 Grafik hubungan biaya tidak langsung dengan durasi untuk waktu lembur 3 jam



Gambar 4.13 Grafik hubungan biaya langsung dengan durasi untuk waktu lembur 1 jam



Gambar 4.14 Grafik hubungan biaya langsung dengan durasi untuk waktu lembur 2 jam



Gambar 4.15 Grafik hubungan biaya langsung dengan durasi untuk waktu lembur 3 jam

4.4.2.4. Biaya Total

Total biaya adalah biaya tidak langsung ditambahkan dengan biaya langsung akibat penambahan waktu lembur 1 jam, 2 jam, dan 3 jam. Berikut analisis biaya total.

Biaya total = biaya tidak langsung + biaya langsung

Seingga biaya total pada kegiatan proyek ini sebagai berikut.

Kegiatan : Bekisting Plat Lantai Lantai 1

Lembur 1 jam = Rp 975.214.064,25 + Rp 6.850.024.339,41

= Rp 7.825.238.404,66

Lembur 2 jam = Rp 853.351.106,20 + Rp 6.850.388.738,73

= Rp 7.703.739.845,93

Lembur 3 jam = Rp 681.575.861,70 + Rp 6.850.455.212,46

= Rp 7.532.031.074,16

Hasil analisis biaya total pada seluruh kegiatan proyek yang diakibatkan penambahan waktu jam lembur dapat dilihat pada Table 4.55, Tabel 4.56, dan Tabel 4.57.

Tabel 4.55 Biaya total untuk waktu lembur 1 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)
	189.000	Rp8,024,154,950.00
PLKP1	186.170	Rp8,006,581,162.80
PPUPC1	185.460	Rp8,002,179,691.77
PPRBA2	184.750	Rp7,997,811,062.38
PBKCL1	184.040	Rp7,993,445,274.08
PPTALA	182.620	Rp7,984,672,653.81
PGT	180.500	Rp7,971,556,861.11
PBCL1	179.790	Rp7,967,198,265.76
PBKPLA	178.370	Rp7,958,455,169.43
PPCL1	177.660	Rp7,954,159,833.95
PBKLA	176.950	Rp7,949,884,269.59
PPPL1	176.240	Rp7,945,611,982.30
PBKLA3	175.530	Rp7,941,356,875.69
PBKLA2	174.820	Rp7,937,118,784.57
PLKPL1	173.400	Rp7,928,475,538.95
PPUPL1	172.690	Rp7,924,252,940.78
PPKL3	171.270	Rp7,915,648,176.85
PPPL4	169.850	Rp7,907,046,212.22
PPKL4	168.430	Rp7,898,456,505.33
PBKBLA	167.720	Rp7,894,306,475.47
PPKL2	167.010	Rp7,890,166,234.35
PBRA2	166.300	Rp7,886,101,602.60
PBBL2	165.590	Rp7,882,067,724.16
PBPL2	164.880	Rp7,878,126,165.43
PBPL4	163.460	Rp7,869,787,795.86
PBKBL2	162.040	Rp7,861,454,541.09
PWPL1	159.210	Rp7,844,368,474.87
PBPL1	158.500	Rp7,840,455,221.78
PBKBL3	157.790	Rp7,836,542,536.29
PBR	157.080	Rp7,832,641,012.78
PPKL1	155.660	Rp7,824,338,620.68
PBKBL4	154.240	Rp7,816,039,021.53
PBKKL4	152.120	Rp7,803,502,836.58
PBRA1	150.700	Rp7,795,346,189.58
PBKKL3	149.280	Rp7,787,238,287.62
PBKKL2	147.860	Rp7,779,212,163.13
PBKPL3	146.440	Rp7,771,203,543.56
PBKPL4	145.730	Rp7,767,602,601.03
PBKPL1	143.610	Rp7,756,212,900.59

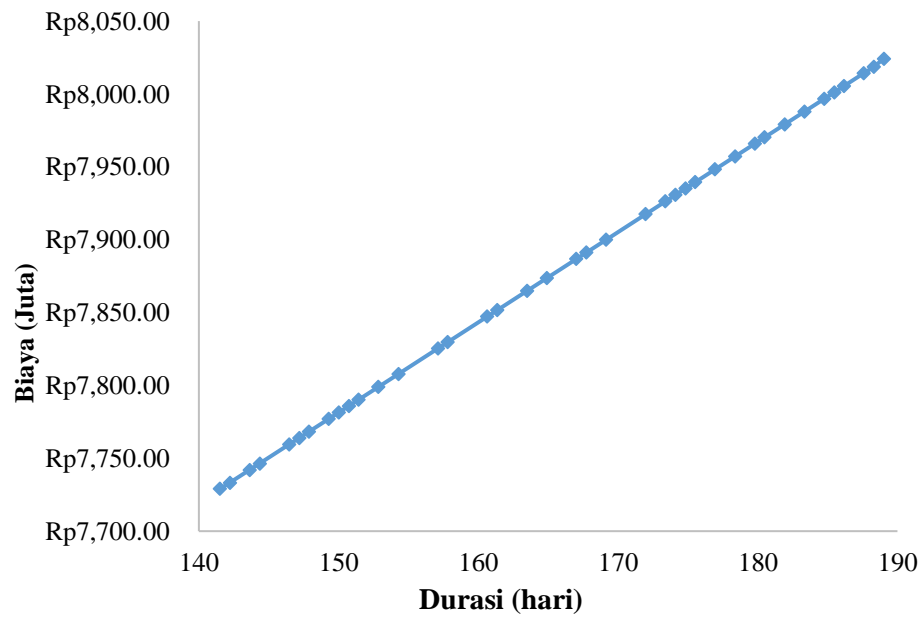
Tabel 4.56 Biaya total untuk waktu lembur 2 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)
	189.000	Rp8,024,154,950.00
PLKP1	184.090	Rp7,993,672,592.74
PPUPC1	179.180	Rp7,963,196,711.24
PBCL1	177.950	Rp7,955,598,603.20
PPRBA2	174.270	Rp7,932,794,907.64
PPTALA	173.040	Rp7,925,207,469.52
PBKCL1	171.810	Rp7,917,623,718.39
PGT	169.360	Rp7,902,468,159.23
PBKPLA	166.910	Rp7,887,347,439.26
PPCL1	164.460	Rp7,872,265,531.93
PBKLA	163.230	Rp7,864,776,036.09
PPPL1	158.320	Rp7,834,451,970.48
PBKLA3	157.090	Rp7,826,988,376.26
PBKLA2	155.860	Rp7,819,546,179.61
PLKPL1	154.630	Rp7,812,105,082.95
PPUPL1	153.400	Rp7,804,684,568.41
PPPL4	150.950	Rp7,789,718,937.82
PPKL3	148.500	Rp7,774,758,100.70
PPKL4	146.050	Rp7,759,799,977.87
PPKL2	143.600	Rp7,744,896,364.02
PBKBLA	141.150	Rp7,729,992,989.75
PBRA2	137.470	Rp7,707,544,170.01
PBBL2	136.240	Rp7,700,332,527.82
PBPL2	135.010	Rp7,693,233,511.66
PBPL4	133.780	Rp7,686,148,235.33
PWPL1	132.550	Rp7,679,068,518.35
PBKBL2	130.100	Rp7,664,419,878.78
PBPL1	128.870	Rp7,657,353,304.89
PBKBL3	126.420	Rp7,642,716,546.95
PPKL1	123.970	Rp7,628,098,393.51
PBKBL4	121.520	Rp7,613,484,826.59
PBR	120.290	Rp7,606,476,720.18
PBKKL4	119.060	Rp7,599,563,060.11
PBRA1	115.380	Rp7,577,466,610.47
PBKKL3	114.150	Rp7,570,651,215.45
PBKKL2	112.920	Rp7,563,917,623.67
PBKPL3	110.470	Rp7,549,641,485.33
PBKPL4	108.020	Rp7,535,365,346.98
PBKPL1	106.790	Rp7,529,764,148.70

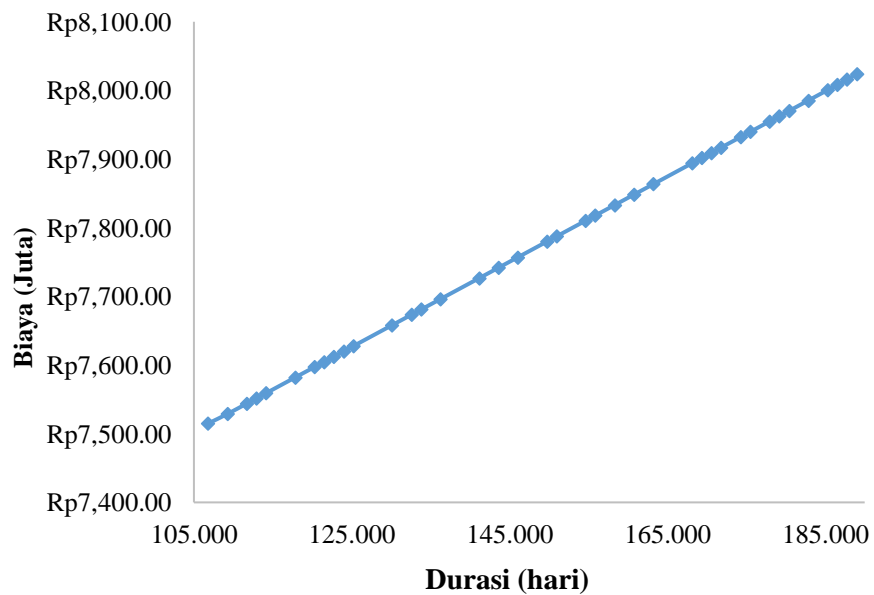
Tabel 4.57 Biaya total untuk waktu lembur 3 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)
	189.000	Rp8,024,154,950.00
PBKPLA	185.770	Rp8,004,054,062.80
PLKP1	179.310	Rp7,963,951,059.92
PPUPC1	172.850	Rp7,923,852,912.00
PPRBA2	168.000	Rp7,893,759,093.69
PBCL1	166.380	Rp7,883,721,401.56
PPTALA	164.760	Rp7,873,719,403.88
PBKCL1	163.140	Rp7,863,723,490.15
PGT	159.910	Rp7,843,734,173.23
PPCL1	156.680	Rp7,823,827,553.83
PBKL4	155.060	Rp7,813,936,148.12
PPPL1	148.600	Rp7,774,013,326.21
PBKL3	146.980	Rp7,764,152,280.37
PBKL2	145.360	Rp7,754,316,391.95
PLKPL1	143.740	Rp7,744,496,745.50
PPUPL1	142.120	Rp7,734,687,458.32
PPPL4	138.890	Rp7,714,913,747.28
PPKL4	135.660	Rp7,695,146,021.07
PPKL3	132.430	Rp7,675,381,742.85
PBKPL3	129.200	Rp7,655,632,954.42
PPKL2	125.970	Rp7,635,930,773.72
PBKBLA	122.740	Rp7,616,232,672.90
PBRA2	117.890	Rp7,586,578,638.71
PBBL2	116.270	Rp7,577,005,003.38
PBPL2	114.650	Rp7,567,563,105.69
PBPL4	113.030	Rp7,558,137,198.14
PWPL1	111.410	Rp7,548,717,324.53
PBKBL2	108.180	Rp7,529,308,628.97
PBPL1	106.560	Rp7,519,903,523.88
PBKBL3	103.330	Rp7,500,506,349.07
PPKL1	100.100	Rp7,481,130,567.44
PBKBL4	96.870	Rp7,461,760,703.15
PBR	95.250	Rp7,452,440,202.38
PBKKL4	93.630	Rp7,443,211,362.73
PBRA1	88.780	Rp7,413,956,731.22
PBKKL3	87.170	Rp7,404,909,505.77
PBKKL2	85.550	Rp7,395,883,509.32
PBKPL4	82.320	Rp7,376,900,024.60
PBKPL1	80.700	Rp7,369,171,452.84

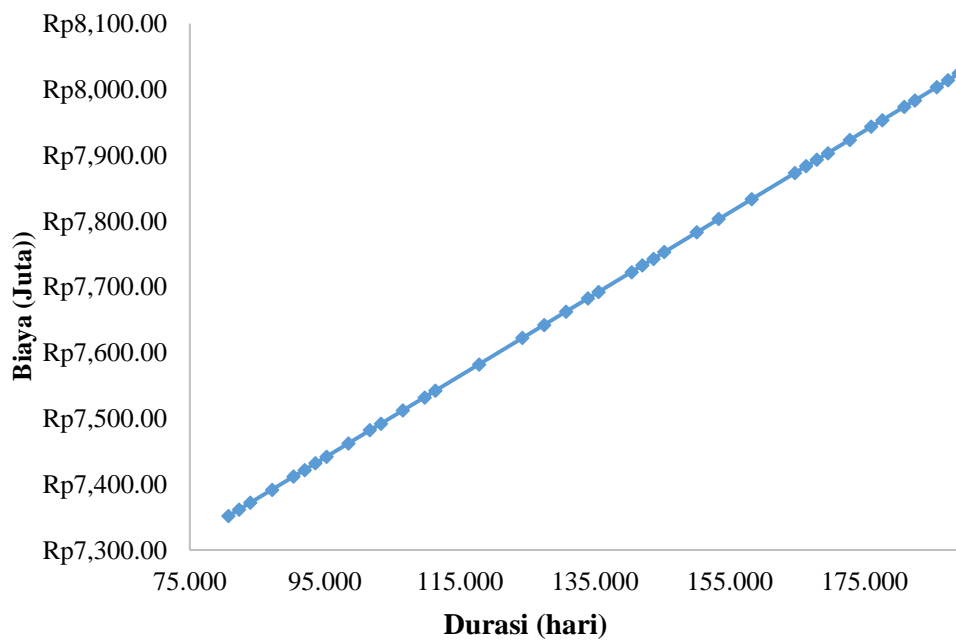
Berikut grafil hubungan antara biaya total dengan durasi percepatan.



Gambar 4.16 Grafik hubungan antara biaya total dan durasi percepatan 1 jam



Gambar 4.17 Grafik hubungan antara biaya total dan durasi percepatan 2 jam



Gambar 4.18 Grafik hubungan antara biaya total dan durasi percepatan 3 jam

4.4.2.5. Efisiensi waktu dan biaya proyek

Berikut analisis efisiensi waktu dan biaya proyek yang diakibatkan oleh penambahan jam waktu lembur 1 jam, 2 jam, dan 3 jam untuk mempercepat suatu kegiatan proyek.

Kegiatan : Bekisting Plat Lantai Lantai 1

1. Lembur 1 Jam

Efisiensi waktu

$$Et = \left(\frac{189 - 157,09}{189} \right) \times 100\%$$

$$Et = 16,9 \%$$

Efisiensi Biaya

$$Ec = \left(\frac{\text{Rp } 8.024.154.950 - \text{Rp } 7.825.238.403,66}{\text{Rp } 8.024.154.950} \right) \times 100\%$$

$$Ec = 2,48 \%$$

2. Lembur 1 Jam

Efisiensi waktu

$$Et = \left(\frac{189 - 141,49}{189} \right) \times 100\%$$

$$Et = 25,1 \%$$

Efisiensi Biaya

$$E_c = \left(\frac{\text{Rp } 8.024.154.950 - \text{Rp } 7.728.861.636,91}{\text{Rp } 8.024.154.950} \right) \times 100\%$$

$$E_c = 3,68 \%$$

3. Lembur 1 Jam

Efisiensi waktu

$$E_t = \left(\frac{189 - 80,7}{189} \right) \times 100\%$$

$$E_t = 57,3 \%$$

Efisiensi Biaya

$$E_c = \left(\frac{\text{Rp } 8.024.154.950 - \text{Rp } 7.351.604.436,54}{\text{Rp } 8.024.154.950} \right) \times 100\%$$

$$E_c = 8,4 \%$$

Tabel 4.58 hasil perhitungan efisiensi waktu dan biaya waktu lembur 1 jam

KODE	Durasi Komulatif (hari)	Total Biaya (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	189.000	Rp8,024,154,950.00		
PLKP1	186.170	Rp8,006,581,162.80	1.5	0.22
PPUPC1	185.460	Rp8,002,179,691.77	1.9	0.27
PPRBA2	184.750	Rp7,997,811,062.38	2.2	0.33
PBKCL1	184.040	Rp7,993,445,274.08	2.6	0.38
PPTALA	182.620	Rp7,984,672,653.81	3.4	0.49
PGT	180.500	Rp7,971,556,861.11	4.5	0.66
PBCL1	179.790	Rp7,967,198,265.76	4.9	0.71
PBKPLA	178.370	Rp7,958,455,169.43	5.6	0.82
PPCL1	177.660	Rp7,954,159,833.95	6.0	0.87
PBKL4	176.950	Rp7,949,884,269.59	6.4	0.93
PPPL1	176.240	Rp7,945,611,982.30	6.8	0.98
PBKL3	175.530	Rp7,941,356,875.69	7.1	1.03
PBKL2	174.820	Rp7,937,118,784.57	7.5	1.08
PLKPL1	173.400	Rp7,928,475,538.95	8.3	1.19
PPUPL1	172.690	Rp7,924,252,940.78	8.6	1.25
PPKL3	171.270	Rp7,915,648,176.85	9.4	1.35
PPPL4	169.850	Rp7,907,046,212.22	10.1	1.46
PPKL4	168.430	Rp7,898,456,505.33	10.9	1.57
PBKBLA	167.720	Rp7,894,306,475.47	11.3	1.62
PPKL2	167.010	Rp7,890,166,234.35	11.6	1.67
PBRA2	166.300	Rp7,886,101,602.60	12.0	1.72
PBBL2	165.590	Rp7,882,067,724.16	12.4	1.77
PBPL2	164.880	Rp7,878,126,165.43	12.8	1.82

Tabel 4.58 Lanjutan

PBPL4	163.460	Rp7,869,787,795.86	13.5	1.92
PBKBL2	162.040	Rp7,861,454,541.09	14.3	2.03
PWPL1	159.210	Rp7,844,368,474.87	15.8	2.24
PBPL1	158.500	Rp7,840,455,221.78	16.1	2.29
PBKBL3	157.790	Rp7,836,542,536.29	16.5	2.34
PBR	157.080	Rp7,832,641,012.78	16.9	2.39
PPKL1	155.660	Rp7,824,338,620.68	17.6	2.49
PBKBL4	154.240	Rp7,816,039,021.53	18.4	2.59
PBKKL4	152.120	Rp7,803,502,836.58	19.5	2.75
PBRA1	150.700	Rp7,795,346,189.58	20.3	2.85
PBKKL3	149.280	Rp7,787,238,287.62	21.0	2.95
PBKKL2	147.860	Rp7,779,212,163.13	21.8	3.05
PBKPL3	146.440	Rp7,771,203,543.56	22.5	3.15
PBKPL4	145.730	Rp7,767,602,601.03	22.9	3.20
PBKPL1	143.610	Rp7,756,212,900.59	24.0	3.34

Tabel 4.59 hasil perhitungan efisiensi waktu dan biaya waktu lembur 2 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	189.000	Rp8,024,154,950.00		
PLKP1	184.090	Rp7,993,672,592.74	2.6	0.4
PPUPC1	179.180	Rp7,963,196,711.24	5.2	0.8
PBCL1	177.950	Rp7,955,598,603.20	5.8	0.9
PPRBA2	174.270	Rp7,932,794,907.64	7.8	1.1
PPTALA	173.040	Rp7,925,207,469.52	8.4	1.2
PBKCL1	171.810	Rp7,917,623,718.39	9.1	1.3
PGT	169.360	Rp7,902,468,159.23	10.4	1.5
PBKPLA	166.910	Rp7,887,347,439.26	11.7	1.7
PPCL1	164.460	Rp7,872,265,531.93	13.0	1.9
PBKL4	163.230	Rp7,864,776,036.09	13.6	2.0
PPPL1	158.320	Rp7,834,451,970.48	16.2	2.4
PBKL3	157.090	Rp7,826,988,376.26	16.9	2.5
PBKL2	155.860	Rp7,819,546,179.61	17.5	2.5
PLKPL1	154.630	Rp7,812,105,082.95	18.2	2.6
PPUPL1	153.400	Rp7,804,684,568.41	18.8	2.7
PPPL4	150.950	Rp7,789,718,937.82	20.1	2.9
PPKL3	148.500	Rp7,774,758,100.70	21.4	3.1
PPKL4	146.050	Rp7,759,799,977.87	22.7	3.3
PPKL2	143.600	Rp7,744,896,364.02	24.0	3.5
PBKBLA	141.150	Rp7,729,992,989.75	25.3	3.7
PBRA2	137.470	Rp7,707,544,170.01	27.3	3.9
PBBL2	136.240	Rp7,700,332,527.82	27.9	4.0

Tabel 4.59 Lanjutan

PBPL2	135.010	Rp7,693,233,511.66	28.6	4.1
PBPL4	133.780	Rp7,686,148,235.33	29.2	4.2
PWPL1	132.550	Rp7,679,068,518.35	29.9	4.3
PBKBL2	130.100	Rp7,664,419,878.78	31.2	4.5
PBPL1	128.870	Rp7,657,353,304.89	31.8	4.6
PBKBL3	126.420	Rp7,642,716,546.95	33.1	4.8
PPKL1	123.970	Rp7,628,098,393.51	34.4	4.9
PBKBL4	121.520	Rp7,613,484,826.59	35.7	5.1
PBR	120.290	Rp7,606,476,720.18	36.4	5.2
PBKKL4	119.060	Rp7,599,563,060.11	37.0	5.3
PBRA1	115.380	Rp7,577,466,610.47	39.0	5.6
PBKKL3	114.150	Rp7,570,651,215.45	39.6	5.7
PBKKL2	112.920	Rp7,563,917,623.67	40.3	5.7
PBKPL3	110.470	Rp7,549,641,485.33	41.6	5.9
PBKPL4	108.020	Rp7,535,365,346.98	42.8	6.1
PBKPL1	106.790	Rp7,529,764,148.70	43.5	6.2

Tabel 4.60 hasil perhitungan efisiensi waktu dan biaya waktu lembur 2 jam

Kode	Durasi Komulatif (hari)	Total Biaya (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	189.000	Rp8,024,154,950.00		
PBKPLA	185.770	Rp8,004,054,062.80	1.7	0.3
PLKP1	179.310	Rp7,963,951,059.92	5.1	0.8
PPUPC1	172.850	Rp7,923,852,912.00	8.5	1.3
PPRBA2	168.000	Rp7,893,759,093.69	11.1	1.6
PBCL1	166.380	Rp7,883,721,401.56	12.0	1.8
PPTALA	164.760	Rp7,873,719,403.88	12.8	1.9
PBKCL1	163.140	Rp7,863,723,490.15	13.7	2.0
PGT	159.910	Rp7,843,734,173.23	15.4	2.2
PPCL1	156.680	Rp7,823,827,553.83	17.1	2.5
PBKL4	155.060	Rp7,813,936,148.12	18.0	2.6
PPPL1	148.600	Rp7,774,013,326.21	21.4	3.1
PBKL3	146.980	Rp7,764,152,280.37	22.2	3.2
PBKL2	145.360	Rp7,754,316,391.95	23.1	3.4
PLKPL1	143.740	Rp7,744,496,745.50	23.9	3.5
PPUPL1	142.120	Rp7,734,687,458.32	24.8	3.6
PPPL4	138.890	Rp7,714,913,747.28	26.5	3.9
PPKL4	135.660	Rp7,695,146,021.07	28.2	4.1
PPKL3	132.430	Rp7,675,381,742.85	29.9	4.3
PBKPL3	129.200	Rp7,655,632,954.42	31.6	4.6
PPKL2	125.970	Rp7,635,930,773.72	33.3	4.8
PBKBLA	122.740	Rp7,616,232,672.90	35.1	5.1
PBRA2	117.890	Rp7,586,578,638.71	37.6	5.5

Tabel 4.60 Lanjutan

PBBL2	116.270	Rp7,577,005,003.38	38.5	5.6
PBPL2	114.650	Rp7,567,563,105.69	39.3	5.7
PBPL4	113.030	Rp7,558,137,198.14	40.2	5.8
PWPL1	111.410	Rp7,548,717,324.53	41.1	5.9
PBKBL2	108.180	Rp7,529,308,628.97	42.8	6.2
PBPL1	106.560	Rp7,519,903,523.88	43.6	6.3
PBKBL3	103.330	Rp7,500,506,349.07	45.3	6.5
PPKL1	100.100	Rp7,481,130,567.44	47.0	6.8
PBKBL4	96.870	Rp7,461,760,703.15	48.7	7.0
PBR	95.250	Rp7,452,440,202.38	49.6	7.1
PBKKL4	93.630	Rp7,443,211,362.73	50.5	7.2
PBRA1	88.780	Rp7,413,956,731.22	53.0	7.6
PBKKL3	87.170	Rp7,404,909,505.77	53.9	7.7
PBKKL2	85.550	Rp7,395,883,509.32	54.7	7.8
PBKPL4	82.320	Rp7,376,900,024.60	56.4	8.1
PBKPL1	80.700	Rp7,369,171,452.84	57.3	8.2

4.5. Denda Keterlambatan

Apabila sebuah proyek terlambat dari rencana, maka akan dikenakan denda. Biaya denda keterlambatan suatu proyek dapat dianalisis menggunakan persamaan berikut.

Total denda = total hari keterlambatan \times denda perhari

Denda perhari sebesar 1‰ (satu permil) dari nilai kontrak

Sehingga biaya denda keterlambatan dapat dianalisis sebagai berikut.

Kegiatan : Bekisting Plat Lantai Lantai 1

Total hari keterlambatan = 1,42 hari

Biaya total proyek = Rp 8.024.154.950,00

Total denda = $1,42 \times \frac{1}{1000} \times \text{Rp } 8.024.154.950,00$

= Rp 5.697.150,01

Tabel 4.61 Biaya denda untuk waktu lembur 1 jam

Kode	Kegiatan	Denda
PGTC	Galian Tanah Pile Cap	Rp11,394,300.03
PBPL1	Beton Pelat Lantai Lantai 1	Rp5,697,150.01
PBKPL1	Bekisting Pelat Lantai 1	Rp5,697,150.01
PWPL1	Wiremesh Pelat Lantai Lantai 1	Rp5,697,150.01
PLKPL1	Lantai Kerja Pelat Lantai Lantai 1	Rp5,697,150.01
PPUPL1	Pasir Urug Pelat Lantai Lantai 1	Rp5,697,150.01
PPPL1	Pembesian Pile Cap Lantai 1	Rp22,708,358.51
PLKP1	Lantai Kerja Pile Cap Lantai 1	Rp22,708,358.51
PPUPL1	Pasir Urug Pile Cap Lantai 1	Rp22,708,358.51
PPKL1	Pembesian Kolom Lantai 1	Rp11,394,300.03
PBCL1	Beton Canopy Lantai 1	Rp5,697,150.01
PBKCL1	Bekisting Canopy Lantai 1	Rp5,697,150.01
PPCL1	Pembesian Canopy Lantai 1	Rp11,394,300.03
PBBL2	Beton Balok Lantai 2	Rp5,697,150.01
PBKBL2	Bekisting Balok Lantai 2	Rp11,394,300.03
PBPL2	Beton Pelat Lantai Lantai 2	Rp5,697,150.01
PBKL2	Beton Kolom Lantai 2	Rp5,697,150.01
PBKKL2	Bekisting Kolom Lantai 2	Rp5,697,150.01
PPKL2	Pembesian Kolom Lantai 2	Rp11,394,300.03
PBKBL3	Bekisting Balok Lantai 3	Rp11,394,300.03
PBKPL3	Bekisting Pelat Lantai 3	Rp11,394,300.03
PBKL3	Beton Kolom Lantai 3	Rp5,697,150.01
PBKKL3	Bekisting Kolom Lantai 3	Rp5,697,150.01
PPKL3	Pembesian Kolom Lantai 3	Rp11,394,300.03
PBKBL4	Bekisting Balok Lantai 4	Rp11,394,300.03
PBPL4	Beton Pelat Lantai Lantai 4	Rp5,697,150.01
PBKPL4	Bekisting Pelat Lantai Lantai 4	Rp11,394,300.03
PPPL4	Pembesian Pelat Lantai Lantai 4	Rp11,394,300.03
PBKL4	Beton Kolom Lantai 4	Rp5,697,150.01
PBKKL4	Bekisting Kolom Lantai 4	Rp5,697,150.01
PPKL4	Pembesian Kolom Lantai 4	Rp11,394,300.03
PBKBLA	Bekisting Balok Lantai Atap	Rp11,394,300.03
PBKPLA	Bekisting Pelat Lantai Lantai Atap	Rp11,394,300.03
PPTALA	Pembesian Talang Air Lantai Atap	Rp5,697,150.01
PBRA1	Baja Rangka Baja Atap 1	Rp17,011,208.49
PBRA2	Baja Rangka Baja Atap 2	Rp17,011,208.49
PPRBA2	Pengecatan Rangka Baja Atap 2	Rp17,011,208.49
PBR	Baja Ringan	Rp5,697,150.01

Tabel 4.62 Biaya denda untuk waktu lembur 2 jam

Kode	Kegiatan	Denda
PGTC	Galian Tanah Pile Cap	Rp19,659,179.63
PBPL1	Beton Pelat Lantai Lantai 1	Rp9,869,710.59
PBKPL1	Bekisting Pelat Lantai 1	Rp9,869,710.59
PWPL1	Wiremesh Pelat Lantai Lantai 1	Rp9,869,710.59
PLKPL1	Lantai Kerja Pelat Lantai Lantai 1	Rp9,869,710.59
PPUPL1	Pasir Urug Pelat Lantai Lantai 1	Rp9,869,710.59
PPPL1	Pembesian Pile Cap Lantai 1	Rp39,398,600.80
PLKP1	Lantai Kerja Pile Cap Lantai 1	Rp39,398,600.80
PPUPL1	Pasir Urug Pile Cap Lantai 1	Rp39,398,600.80
PPKL1	Pembesian Kolom Lantai 1	Rp19,659,179.63
PBCL1	Beton Canopy Lantai 1	Rp9,869,710.59
PBKCL1	Bekisting Canopy Lantai 1	Rp9,869,710.59
PPCL1	Pembesian Canopy Lantai 1	Rp19,659,179.63
PBBL2	Beton Balok Lantai 2	Rp9,869,710.59
PBKBL2	Bekisting Balok Lantai 2	Rp19,659,179.63
PBPL2	Beton Pelat Lantai Lantai 2	Rp9,869,710.59
PBKL2	Beton Kolom Lantai 2	Rp9,869,710.59
PBKKL2	Bekisting Kolom Lantai 2	Rp9,869,710.59
PPKL2	Pembesian Kolom Lantai 2	Rp19,659,179.63
PBKBL3	Bekisting Balok Lantai 3	Rp19,659,179.63
PBKPL3	Bekisting Pelat Lantai 3	Rp19,659,179.63
PBKL3	Beton Kolom Lantai 3	Rp9,869,710.59
PBKKL3	Bekisting Kolom Lantai 3	Rp9,869,710.59
PPKL3	Pembesian Kolom Lantai 3	Rp19,659,179.63
PBKBL4	Bekisting Balok Lantai 4	Rp19,659,179.63
PBPL4	Beton Pelat Lantai Lantai 4	Rp9,869,710.59
PBKPL4	Bekisting Pelat Lantai Lantai 4	Rp19,659,179.63
PPPL4	Pembesian Pelat Lantai Lantai 4	Rp19,659,179.63
PBKL4	Beton Kolom Lantai 4	Rp9,869,710.59
PBKKL4	Bekisting Kolom Lantai 4	Rp9,869,710.59
PPKL4	Pembesian Kolom Lantai 4	Rp19,659,179.63
PBKBLA	Bekisting Balok Lantai Atap	Rp19,659,179.63
PBKPLA	Bekisting Pelat Lantai Lantai Atap	Rp19,659,179.63
PPTALA	Pembesian Talang Air Lantai Atap	Rp9,869,710.59
PBRA1	Baja Rangka Baja Atap 1	Rp29,528,890.22
PBRA2	Baja Rangka Baja Atap 2	Rp29,528,890.22
PPRBA2	Pengecatan Rangka Baja Atap 2	Rp29,528,890.22
PBR	Baja Ringan	Rp9,869,710.59

Tabel 4.63 Biaya denda untuk waktu lembur 3 jam

Kode	Kegiatan	Denda
PGTC	Galian Tanah Pile Cap	Rp25,918,020.49
PBPL1	Beton Pelat Lantai Lantai 1	Rp12,999,131.02
PBKPL1	Bekisting Pelat Lantai 1	Rp12,999,131.02
PWPL1	Wiremesh Pelat Lantai Lantai 1	Rp12,999,131.02
PLKPL1	Lantai Kerja Pelat Lantai Lantai 1	Rp12,999,131.02
PPUPL1	Pasir Urug Pelat Lantai Lantai 1	Rp12,999,131.02
PPPL1	Pembesian Pile Cap Lantai 1	Rp51,836,040.98
PLKP1	Lantai Kerja Pile Cap Lantai 1	Rp51,836,040.98
PPUPL1	Pasir Urug Pile Cap Lantai 1	Rp51,836,040.98
PPKL1	Pembesian Kolom Lantai 1	Rp25,918,020.49
PBCL1	Beton Canopy Lantai 1	Rp12,999,131.02
PBKCL1	Bekisting Canopy Lantai 1	Rp12,999,131.02
PPCL1	Pembesian Canopy Lantai 1	Rp25,918,020.49
PBBL2	Beton Balok Lantai 2	Rp12,999,131.02
PBKBL2	Bekisting Balok Lantai 2	Rp25,918,020.49
PBPL2	Beton Pelat Lantai Lantai 2	Rp12,999,131.02
PBKL2	Beton Kolom Lantai 2	Rp12,999,131.02
PBKKL2	Bekisting Kolom Lantai 2	Rp12,999,131.02
PPKL2	Pembesian Kolom Lantai 2	Rp25,918,020.49
PBKBL3	Bekisting Balok Lantai 3	Rp25,918,020.49
PBKPL3	Bekisting Pelat Lantai 3	Rp25,918,020.49
PBKL3	Beton Kolom Lantai 3	Rp12,999,131.02
PBKKL3	Bekisting Kolom Lantai 3	Rp12,918,889.47
PPKL3	Pembesaaan Kolom Lantai 3	Rp25,918,020.49
PBKBL4	Bekisting Balok Lantai 4	Rp25,918,020.49
PBPL4	Beton Pelat Lantai Lantai 4	Rp12,999,131.02
PBKPL4	Bekisting Pelat Lantai Lantai 4	Rp25,918,020.49
PPPL4	Pembesian Pelat Lantai Lantai 4	Rp25,918,020.49
PBKL4	Beton Kolom Lantai 4	Rp12,999,131.02
PBKKL4	Bekisting Kolom Lantai 4	Rp12,999,131.02
PPKL4	Pembesian Kolom Lantai 4	Rp25,918,020.49
PBKBLA	Bekisting Balok Lantai Atap	Rp25,918,020.49
PBKPLA	Bekisting Pelat Lantai Lantai Atap	Rp25,918,020.49
PPTALA	Pembesian Talang Air Lantai Atap	Rp12,999,131.02
PBRA1	Baja Rangka Baja Atap 1	Rp38,917,151.51
PBRA2	Baja Rangka Baja Atap 2	Rp38,917,151.51
PPRBA2	Pengecatan Rangka Baja Atap 2	Rp38,917,151.51
PBR	Baja Ringan	Rp12,999,131.02

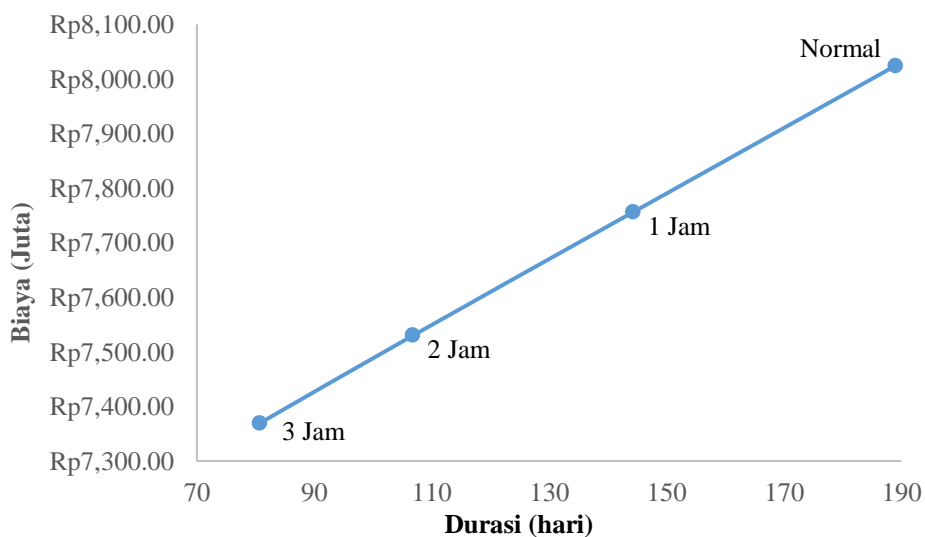
4.6. Perbandingan antara penambahan jam lembur dengan tenaga kerja

Berdasarkan hasil analisis dengan metode *Time Cost Trade Off* antara penambahan jam kerja waktu lembur 1 jam, 2 jam, dan 3 jam atau penambahan tenaga kerja didapatkan perbedaan hasil. Berikut hasil analisis dari perbandingan biaya penambahan jam lembur dan penambahan tenaga kerja.

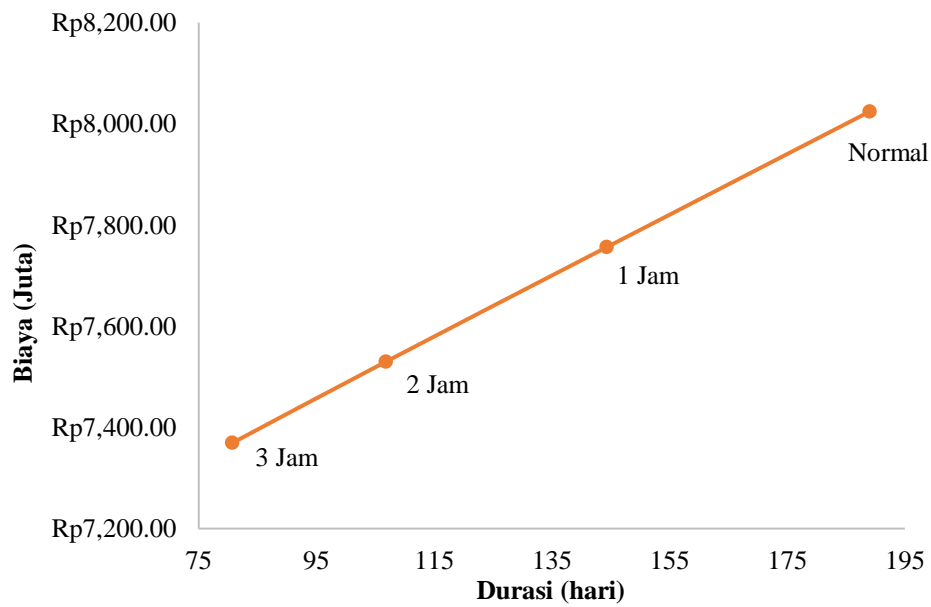
Tabel 4.64 Perbandingan antara biaya penambahan kerja dan tenaga kerja

No	Penambahan tenaga kerja	Durasi Lembur (hari)	Biaya penambahan Jam lembur	Biaya penambahan tenaga kerja
1	Normal	189	Rp8,024,154,950.00	Rp8,024,154,950.00
2	1 jam	144.33	Rp7,743,051,949.44	Rp7,756,212,900.59
3	2 jam	106.79	Rp7,529,764,148.70	Rp7,529,764,148.70
4	3 jam	80.7	Rp7,369,062,047.52	Rp7,369,171,452.84

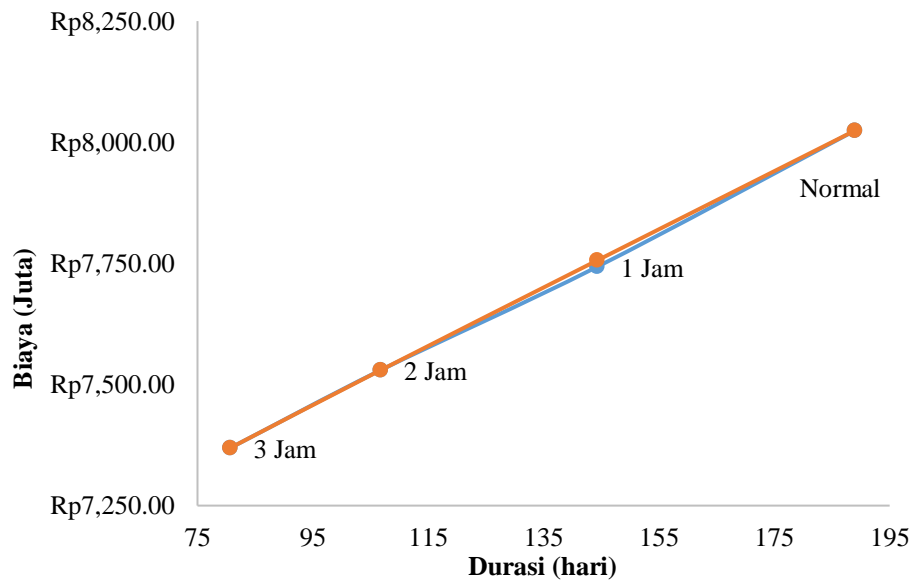
Berikut grafik perbandingan antara penambahan jam lembur kerja dan tenaga kerja.



Gambar 4.19 Hubungan biaya dengan durasi akibat penambahan jam lembur



Gambar 4.20 Hubungan biaya dengan durasi akibat penambahan tenaga kerja



Gambar 4.21 Hubungan biaya dengan durasi akibat penambahan tenaga kerja dan penambahan waktu lembur

Berikut tabel hasil analisis perbandingan penambahan jam lembur dengan penambahan tenaga kerja akibat penambahan jam lembur 1 jam, 2 jam, dan 3 jam.

Tabel 4.65 Perbandingan antara penambahan jam lembur dengan penambahan tenaga kerja untuk waktu lembur 1 jam

Kode	Durasi Percepatan (Hari)	Biaya Penambahan Jam Kerja (Rp)	Biaya Penambahan Tenaga Kerja (Rp)
PLKP1	6.29	Rp8,006,581,162.80	Rp8,006,581,162.80
PPUPC1	6.29	Rp7,989,018,740.62	Rp8,002,179,691.77
PPRBA2	12.58	Rp7,975,896,837.11	Rp7,997,811,062.38
PBKCL1	6.29	Rp7,971,531,048.81	Rp7,993,445,274.08
PPTALA	6.29	Rp7,967,166,105.58	Rp7,984,672,653.81
PGT	12.58	Rp7,958,395,909.96	Rp7,971,556,861.11
PBCL1	12.58	Rp7,954,037,314.61	Rp7,967,198,265.76
PBKPLA	12.58	Rp7,945,294,218.28	Rp7,958,455,169.43
PPCL1	6.29	Rp7,936,591,205.76	Rp7,954,159,833.95
PBKL4	12.58	Rp7,932,315,641.40	Rp7,949,884,269.59
PPPL1	12.58	Rp7,914,882,402.97	Rp7,945,611,982.30
PBKL3	12.58	Rp7,910,627,296.35	Rp7,941,356,875.69
PBKL2	6.29	Rp7,906,389,205.23	Rp7,937,118,784.57
PLKPL1	6.29	Rp7,902,153,636.65	Rp7,928,475,538.95
PPUPL1	6.29	Rp7,897,931,038.48	Rp7,924,252,940.78
PPKL3	12.58	Rp7,889,326,274.55	Rp7,915,648,176.85
PPPL4	25.17	Rp7,880,724,309.92	Rp7,907,046,212.22
PPKL4	12.58	Rp7,872,134,603.03	Rp7,898,456,505.33
PBKBLA	6.29	Rp7,863,576,896.14	Rp7,894,306,475.47
PPKL2	18.88	Rp7,855,028,977.98	Rp7,890,166,234.35
PBRA2	12.58	Rp7,842,211,072.11	Rp7,886,101,602.60
PBBL2	18.88	Rp7,838,177,193.67	Rp7,882,067,724.16
PBPL2	6.29	Rp7,834,235,634.94	Rp7,878,126,165.43
PBPL4	25.17	Rp7,830,304,942.41	Rp7,869,787,795.86
PBKBL2	6.29	Rp7,821,971,687.64	Rp7,861,454,541.09
PWPL1	25.17	Rp7,818,046,572.57	Rp7,844,368,474.87
PBPL1	12.58	Rp7,814,133,319.48	Rp7,840,455,221.78
PBKBL3	12.58	Rp7,805,812,956.96	Rp7,836,542,536.29
PBR	6.29	Rp7,801,911,433.44	Rp7,832,641,012.78
PPKL1	6.29	Rp7,793,609,041.34	Rp7,824,338,620.68
PBKBL4	6.29	Rp7,785,309,442.20	Rp7,816,039,021.53
PBKKL4	12.58	Rp7,781,526,531.36	Rp7,803,502,836.58
PBRA1	6.29	Rp7,769,024,287.28	Rp7,795,346,189.58
PBKKL3	6.29	Rp7,765,324,062.36	Rp7,787,238,287.62
PBKKL2	18.88	Rp7,761,705,614.90	Rp7,779,212,163.13
PBKPL3	6.29	Rp7,753,696,995.34	Rp7,771,203,543.56
PBKPL4	12.58	Rp7,745,688,375.77	Rp7,767,602,601.03
PBKPL1	6.29	Rp7,743,051,949.44	Rp7,756,212,900.59

Tabel 4.66 Perbandingan antara penambahan jam lembur dengan penambahan tenaga kerja untuk waktu lembur 2 jam

Kode	Durasi Percepatan (Hari)	Biaya Penambahan Jam Kerja (Rp)	Biaya Penambahan Tenaga Kerja (Rp)
PLKP1	23.09	Rp7,993,672,592.74	Rp7,993,672,592.74
PPUPC1	23.09	Rp7,963,196,711.24	Rp7,963,196,711.24
PBCL1	5.77	Rp7,955,598,603.20	Rp7,955,598,603.20
PPRBA2	17.32	Rp7,932,794,907.64	Rp7,932,794,907.64
PPTALA	5.77	Rp7,925,207,469.52	Rp7,925,207,469.52
PBKCL1	5.77	Rp7,917,623,718.39	Rp7,917,623,718.39
PGT	11.55	Rp7,902,468,159.23	Rp7,902,468,159.23
PBKPLA	11.55	Rp7,887,347,439.26	Rp7,887,347,439.26
PPCL1	11.55	Rp7,872,265,531.93	Rp7,872,265,531.93
PBKL4	5.77	Rp7,864,776,036.09	Rp7,864,776,036.09
PPPL1	23.09	Rp7,834,451,970.48	Rp7,834,451,970.48
PBKL3	5.77	Rp7,826,988,376.26	Rp7,826,988,376.26
PBKL2	5.77	Rp7,819,546,179.61	Rp7,819,546,179.61
PLKPL1	5.77	Rp7,812,105,082.95	Rp7,812,105,082.95
PPUPL1	5.77	Rp7,804,684,568.41	Rp7,804,684,568.41
PPPL4	11.55	Rp7,789,718,937.82	Rp7,789,718,937.82
PPKL3	11.55	Rp7,774,758,100.70	Rp7,774,758,100.70
PPKL4	11.55	Rp7,759,799,977.87	Rp7,759,799,977.87
PPKL2	11.55	Rp7,744,896,364.02	Rp7,744,896,364.02
PBKBLA	11.55	Rp7,729,992,989.75	Rp7,729,992,989.75
PBRA2	17.32	Rp7,707,544,170.01	Rp7,707,544,170.01
PBBL2	5.77	Rp7,700,332,527.82	Rp7,700,332,527.82
PBPL2	5.77	Rp7,693,233,511.66	Rp7,693,233,511.66
PBPL4	5.77	Rp7,686,148,235.33	Rp7,686,148,235.33
PWPL1	5.77	Rp7,679,068,518.35	Rp7,679,068,518.35
PBKBL2	11.55	Rp7,664,419,878.78	Rp7,664,419,878.78
PBPL1	5.77	Rp7,657,353,304.89	Rp7,657,353,304.89
PBKBL3	11.55	Rp7,642,716,546.95	Rp7,642,716,546.95
PPKL1	11.55	Rp7,628,098,393.51	Rp7,628,098,393.51
PBKBL4	11.55	Rp7,613,484,826.59	Rp7,613,484,826.59
PBR	5.77	Rp7,606,476,720.18	Rp7,606,476,720.18
PBKKL4	5.77	Rp7,599,563,060.11	Rp7,599,563,060.11
PBRA1	17.32	Rp7,577,466,610.47	Rp7,577,466,610.47
PBKKL3	5.77	Rp7,570,651,215.45	Rp7,570,651,215.45
PBKKL2	5.77	Rp7,563,917,623.67	Rp7,563,917,623.67
PBKPL3	11.55	Rp7,549,641,485.33	Rp7,549,641,485.33
PBKPL4	11.55	Rp7,535,365,346.98	Rp7,535,365,346.98
PBKPL1	5.77	Rp7,529,764,148.70	Rp7,529,764,148.70

Tabel 4.67 Perbandingan antara penambahan jam lembur dengan penambahan tenaga kerja untuk waktu lembur 3 jam

Kode	Durasi Percepatan (Hari)	Biaya Penambahan Jam Kerja (Rp)	Biaya Penambahan Tenaga Kerja (Rp)
PBKPLA	10.77	Rp8,003,944,657.48	Rp8,004,054,062.80
PLKP1	21.54	Rp7,963,841,654.60	Rp7,963,951,059.92
PPUPC1	21.54	Rp7,923,743,506.68	Rp7,923,852,912.00
PPRBA2	16.15	Rp7,893,649,688.37	Rp7,893,759,093.69
PBCL1	5.38	Rp7,883,611,996.24	Rp7,883,721,401.56
PPTALA	5.38	Rp7,873,609,998.56	Rp7,873,719,403.88
PBKCL1	5.38	Rp7,863,614,084.83	Rp7,863,723,490.15
PGT	10.77	Rp7,843,624,767.91	Rp7,843,734,173.23
PPCL1	10.77	Rp7,823,718,148.51	Rp7,823,827,553.83
PBKL4	5.38	Rp7,813,826,742.81	Rp7,813,936,148.12
PPPL1	21.54	Rp7,773,903,920.89	Rp7,774,013,326.21
PBKL3	5.38	Rp7,764,042,875.06	Rp7,764,152,280.37
PBKL2	5.38	Rp7,754,206,986.63	Rp7,754,316,391.95
PLKPL1	5.38	Rp7,744,387,340.19	Rp7,744,496,745.50
PPUPL1	5.38	Rp7,734,578,053.00	Rp7,734,687,458.32
PPPL4	10.77	Rp7,714,804,341.96	Rp7,714,913,747.28
PPKL4	10.77	Rp7,695,036,615.75	Rp7,695,146,021.07
PPKL3	10.77	Rp7,675,272,337.53	Rp7,675,381,742.85
PBKPL3	10.77	Rp7,655,523,549.10	Rp7,655,632,954.42
PPKL2	10.77	Rp7,635,821,368.40	Rp7,635,930,773.72
PBKBLA	10.77	Rp7,616,123,267.58	Rp7,616,232,672.90
PBRA2	16.15	Rp7,586,469,233.39	Rp7,586,578,638.71
PBBL2	5.38	Rp7,576,895,598.06	Rp7,577,005,003.38
PBPL2	5.38	Rp7,567,453,700.37	Rp7,567,563,105.69
PBPL4	5.38	Rp7,558,027,792.82	Rp7,558,137,198.14
PWPL1	5.38	Rp7,548,607,919.21	Rp7,548,717,324.53
PBKBL2	10.77	Rp7,529,199,223.65	Rp7,529,308,628.97
PBPL1	5.38	Rp7,519,794,118.56	Rp7,519,903,523.88
PBKBL3	10.77	Rp7,500,396,943.75	Rp7,500,506,349.07
PPKL1	10.77	Rp7,481,021,162.12	Rp7,481,130,567.44
PBKBL4	10.77	Rp7,461,651,297.83	Rp7,461,760,703.15
PBR	5.38	Rp7,452,330,797.07	Rp7,452,440,202.38
PBKKL4	5.38	Rp7,443,101,957.41	Rp7,443,211,362.73
PBRA1	16.15	Rp7,413,847,325.90	Rp7,413,956,731.22
PBKKL3	5.39	Rp7,404,800,100.45	Rp7,404,909,505.77
PBKKL2	5.38	Rp7,395,774,104.00	Rp7,395,883,509.32
PBKPL4	10.77	Rp7,376,790,619.28	Rp7,376,900,024.60
PBKPL1	5.38	Rp7,369,062,047.52	Rp7,369,171,452.84