

BAB IV

HASIL PENELITIAN DAN PEMBAHASAN

4.1. Data Penelitian

Data umum dari Proyek Pembangunan Gedung Hotel Quest yang terletak di Daerah Istimewa Yogyakarta adalah sebagai berikut:

Pemilik Proyek	: P
Konsultan Pengawas	: PT. Q
Kontraktor	: PT. Z
Anggaran Keseluruhan	: Rp. 39.407.233.144,41
Anggaran Penelitian	: Rp. 6,119,074,363
Tanggal pelaksanaan dimulai	: 1 Februari 2017
Tanggal pelaksanaan selesai	: 30 April 2018

Gedung ini memiliki 11 lantai terdiri dari lantai basement, lantai 1, lantai 2, lantai 3, lantai 4, lantai 5, lantai 6, lantai 7, lantai 8, lantai 9, dan lantai atap.

4.2. Daftar Kegiatan-Kegiatan Kritis

Berdasarkan hasil analisis *Microsoft Project* untuk menjadwalkan proyek tersebut diketahui lintasan kritis dari kegiatan-kegiatan kritis. Daftar kegiatan-kegiatan kritis pada kondisi normal dapat dilihat pada Tabel 5.1.

Beberapa alasan pemilihan item kegiatan yang akan dipercepat adalah kegiatan kritis tersebut, dimana:

1. Kegiatan kritis yang terpilih tersebut mempunyai *resource work* atau yang memiliki pekerja sehingga dapat dipercepat dengan mengolah *resource work*;
2. Pada kegiatan kritis terpilih tersebut dapat dilakukan percepatan dengan penambahan jam lembur atau dengan penambahan jumlah tenaga kerja. Jika dilakukan penambahan tenaga kerja pada kegiatan kritis yang lain maka jumlah tenaga kerja tidak akan bertambah karena kegiatan kritis tersebut hanya memiliki indeks tenaga kerja yang kecil;
3. Pada kegiatan kritis terpilih tersebut apabila dipercepat dapat mengurangi biaya tidak langsung pada kegiatan tersebut;

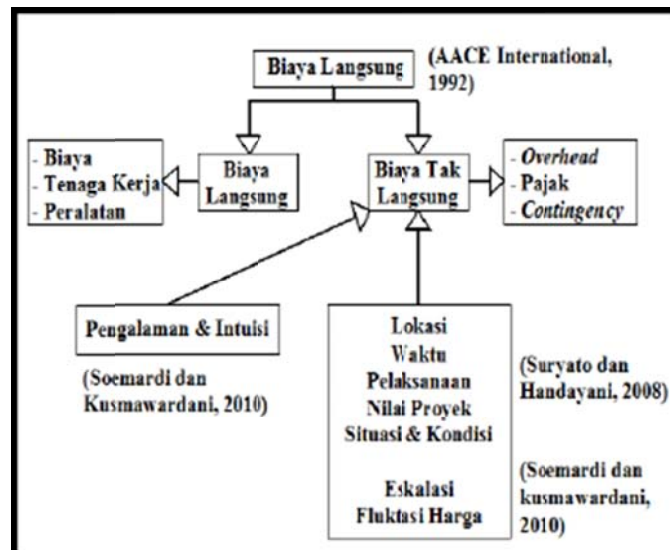
Tabel 4.1. Daftar Kegiatan Kritis pada Kondisi Normal

No.	Kode	Task Name	Durasi (Hari)
1	BBPT-1	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	24
2	BPBB-1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	12
3	KBB-1	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	18
4	KPLB-1	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	6
5	BPK-1	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	12
6	PPK-1	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	24
7	KPK-1	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	30
8	KPLSW-1	Bekisting Pek. Pit Lift Shear Wall Lt.1	6
9	KBPT-2	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	24
10	KPLB-2	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	6
11	KPK-2	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	12
12	PPTB-2	Pembesian Pek. Plat Tangga & Bordes Lt. 2	6
13	BPLB-2	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6
14	PPLB-2	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6
15	BPLSW-2	Beton K300 Pek. Pit Lift Shear Wall Lt.2	6
16	PPLSW-2	Pemesian Pek. Pit Lift Shear Wall Lt.2	6
17	KPLSW-2	Bekisting Pek. Pit Lift Shear Wall Lt.2	6
18	BBPT-3	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	12
19	KBPT-3	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	18
20	BBB-3	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	6
21	BBB-3	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	6
22	PBB-3	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	6
23	BBB-3	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	6
24	BBB-3	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	6
25	BBB-3	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	6
26	KBB-3	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	6
27	BPK-3	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	6
28	PPK-3	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	12
29	BPK-3	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	6
30	BPTB-3	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	6
31	BPLK-3	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	6
32	BPLK-3	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	6
33	BPLB-3	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	6
34	PBPLB-3	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	6
35	BBPLB-3	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	6
36	BPLSW-3	Beton K300 Pek. Pit Lift Shear Wall Lt.3	6

Tabel tersebut di atas menjelaskan bahwa beberapa pekerjaan yang akan dipercepat berdasarkan kegiatan-kegiatan kritis adalah kegiatan yang memiliki unsur tenaga kerja, beberapa kegiatan-kegiatan tersebut dengan kode kegiatan.

4.3. Biaya Langsung dan Tidak Langsung

Biaya-biaya dalam suatu proyek terdiri dari biaya langsung dan tidak langsung. Biaya langsung (*direct cost*) adalah biaya untuk segala sesuatu yang akan menjadi komponen permanen hasil akhir proyek. Penentuan biaya tidak langsung berdasarkan hasil dari Pemodelan Biaya Tak Langsung



Gambar 4.1. Skema Model hubungan biaya tidak langsung

Model Regresi Non Linear dengan menggunakan Alogaritma Genetika dengan persamaan :

$$Y = -0,95 - 4,888(\ln(x1 - 0,21) - \ln(x2)) + \varepsilon$$

Dengan:

$x1$ = Nilai Proyek (Miliar)

$x2$ = Durasi Pelaksanaan Proyek (Hari)

Perhitungan :

$$\begin{aligned} Y &= -0,95 - 4,888(\ln(6,119 - 0,21) - \ln(90)) + \varepsilon \\ &= 0,15\% \end{aligned}$$

Berdasarkan model regresi diatas pada proyek pembangunan Gedung dengan nilai total proyek sebesar Rp. 6.119.074.363 didapatkan presentase untuk biaya tidak langsung sebesar 0,15% dari nilai total proyek tersebut secara detail hitungan seperti contoh dibawah berikut ini :

$$\begin{aligned} \text{Biaya Tidak Langsung} &= 0,15\% \times \text{Rp. } 6,119,074,363 \\ &= \text{Rp. } 932,222,113,57 \end{aligned}$$

$$\begin{aligned}
 \text{Biaya Tidak Langsung/Hari} &= \frac{\text{Biaya Tidak Langsung}}{\text{Durasi Normal Proyek}} \\
 &= \frac{\text{Rp. 932,222,113.57}}{162 \text{ hari}} \\
 &= \text{Rp. 5,754,457.49} \\
 \text{Biaya Langsung} &= \text{Biaya Total Rencana} - \text{Biaya Tidak Langsung} \\
 &= \text{Rp. 6,119,074,363} - \text{Rp. 932,222,113.57} \\
 &= \text{Rp. 5,186,852,249.23}
 \end{aligned}$$

4.4. Penerapan Metode *Time Cost Trade Off*

4.4.1. Penambahan Jam Kerja (Waktu Lembur)

Dalam perencanaan penambahan jam kerja lembur memakai 8 jam kerja normal dan 1 jam istirahat (08.00-17.00), sedangkan kerja lembur dilakukan setelah waktu kerja normal (15.00-20.00). Menurut keputusan Menteri Tenaga Kerja Nomor KEP.102/MEN/VI/2004 pasal 3, pasal 7 dan pasal 11 standar upah untuk lembur adalah:

- a. Waktu kerja lembur hanya diapat dilakukan paling banyak 4 (jam) dalam 1 (satu) hari dan 14 (empat belas) jam dalam 1 (satu) minggu;
- b. Memberikan makanan dan minum sekurang-kurangnya 1.400 kalori apabila kerja lembur dilakukan selama 3 jam kurang atau lebih;
- c. Untuk kerja lembur pertama harus dibayar sebesar 1,5 kali upah sejam.
- d. Untuk setiap jam kerja lembur berikutnya harus dibayar upah sebesar 2 kali lipat upah satu jam.

Untuk lebih detail besar upah tenaga kerja pada proyek ini dapat dilihat pada Tabel 4.2. sebagai berikut

Tabel 4.2. Upah Tenaga Kerja Normal

No.	Pekerja / Alat Berat	Upah Per Hari	Upah Per Jam
1	Pekerja	Rp. 63,000.00	Rp. 7,875.00
2	Tukang Batu	Rp. 75,000.00	Rp. 9,375.00
3	Tukang Kayu	Rp. 77,000.00	Rp. 9,625.00
4	Tukang Besi	Rp. 76,000.00	Rp. 9,500.00
5	Kepala Tukang	Rp. 80,000.00	Rp. 10,000.00
6	Mandor	Rp. 79,000.00	Rp. 9,875.00

Analisis biaya lembur dihitung untuk mencari besarnya upah biaya lembur dari alat berat dan tenaga kerja. Berikut contoh analisis perhitungan lembur dari tenaga kerja sebagai berikut :

Tenaga Kerja

Untuk *Resource Name* : Pekerja (Tukang)

Biaya normal pekerja per jam (bn) : Rp 7.850.00

Biaya lembur per jam

$$\begin{aligned} \text{Lembur 1 Jam (L1)} &= 1.5 \times 7.875.00 \\ &= \text{Rp } 11.812.50 \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 Jam (L2)} &= (1.5 \times 7.875.00) + (2 \times 1 \times 7.875.00) \\ &= 11,812.50 + 15,750.00 \\ &= \text{Rp } 27,562.50 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 Jam (L3)} &= (1.5 \times 7.875.00) + (2 \times 2 \times 7.875.00) \\ &= 11,812.50 + 31,500 \\ &= \text{Rp } 43,312.50 \end{aligned}$$

Biaya lembur per jam

$$\begin{aligned} \text{Lembur 1 Jam} &= \left(\frac{11,812.50}{1} \right) \\ &= \text{Rp. } 11,812.50 \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 Jam} &= \left(\frac{27,562.50}{2} \right) \\ &= \text{Rp. } 13,781.25 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 Jam} &= \left(\frac{43,312.50}{3} \right) \\ &= \text{Rp. } 14,437.5 \end{aligned}$$

Tabel 4.3. Upah Lembur Tenaga Kerja

No.	Pekerja	Upah Perhari	Upah Lembur		
			1 Jam	2 Jam	3 jam
1	Pekerja	63,000.00	Rp11,812.50	Rp. 13,781.25	Rp. 14,437.50
2	Tukang Batu	75,000.00	Rp14,062.50	Rp. 16,406.25	Rp. 17,187.50
3	Tukang Kayu	77,000.00	Rp14,437.50	Rp. 16,843.75	Rp. 17,645.83
4	Tukang Besi	76,000.00	Rp14,250.00	Rp. 16,625.00	Rp. 17,416.67
5	Kepala Tukang	80,000.00	Rp15,000.00	Rp. 17,500.00	Rp. 18,333.33
6	Mandor	79,000.00	Rp14,812.50	Rp. 17,281.25	Rp. 18,104.17

Produktivitas kerja lembur untuk 1 jam perhari diperhitungkan sebesar 90%, 2 jam per hari diperhitungkan sebesar 80%, dan 3 jam per hari diperitungkan sebesar 70% dari produktivitas normal. Penurunan produktivitas untuk kerja lembur ini disebabkan oleh kelelahan pekerja, keterbatasan pandangan pada malam hari, serta keadaan cuaca yang dingin. Untuk kegiatan-kegiatan kritis yang akan dipercepat durasi percepatan dihitung berdasarkan penambahan jam lembur durasi normal yang ada.

4.4.2. Analisis Durasi Percepatan

Durasi aktifitas adalah lamanya waktu dari permulaan sampai penyelesaian suatu aktifitas, sementara durasi proyek adalah lamanya waktu dari permulaan sampai penyelesaian suatu proyek secara keseluruhan (Setiawan dan Trijeti, 2012).

Menurut Mangitung (2008), Percepatan proyek dapat didefinisikan sebagai suatu perubahan jadwal proyek dengan cara memperpendek satu atau lebih aktivitas baik yang berurutan maupun tidak berurutan yang akibatnya memperpendek total waktu pelaksanaan proyek sebagaimana yang telah ditetapkan sebelumnya melalui perjanjian antara pihak pengguna jasa dengan penyedia jasa konstruksi (i.e. kontraktor).

Adapun salah satu contoh perhitungannya adalah perhitungan Pekerjaan Pengecoran Pelat Lantai 1 sebagai berikut:

- 1) Durasi yang bisa di *crash* berdasarkan penambahan 1 jam lembur

(Volume)

$$\frac{2(\text{Prod. Perjam} \times \text{Jam Kerja}) + (\sum \text{Jam lembur} \times \text{Penurunan Prod.} \times \text{Prod. Perjam})}{}$$

- Volume = 75.12 m³
- Durasi normal = 12 hari
- Durasi normal (jam) = 12 x 7
= 84 jam
- Produktivitas jam normal = $\frac{\text{Volume}}{\text{Durasi normal (Jam)}}$
= $\frac{75.12}{42}$
= 0.894m³ / jam
- Maksimal *crashing* = $\frac{75.12}{(0.894 \times 7) + (1 \times 0.9 \times 0.894)}$
= 21.27 hari
- Maka maksimal *crashing* = 6 hari – 21.27 hari
= 2.73 hari

2) Durasi yang bisa di *crash* berdasarkan penambahan 2 jam lembur

$$\frac{(\text{Volume})}{2(\text{Prod. Perjam} \times \text{Jam Kerja}) + (\sum \text{Jam lembur} \times \text{Penurunan Prod.} \times \text{Prod. Perjam})}$$

- Volume = 75.12 m³
- Durasi normal = 12 hari
- Durasi normal (jam) = 12 x 7
= 84 jam
- Produktivitas jam normal = $\frac{\text{Volume}}{\text{Durasi normal (Jam)}}$
= $\frac{75.12}{84}$
= 0.894m³ / jam
- Maksimal *crashing* = $\frac{75.12}{(0.894 \times 7) + (1 \times 0.9 \times 0.894) + (1 \times 0.8 \times 0.894)}$
= 19.31 hari
- Maka maksimal *crashing* = 6 hari – 19.31hari
= 4.69 hari

3) Durasi yang bisa di *crash* berdasarkan penambahan 1 jam lembur

$$\frac{(\text{Volume})}{2(\text{Prod. Perjam} \times \text{Jam Kerja}) + (\sum \text{Jam lembur} \times \text{Penurunan Prod.} \times \text{Prod. Perjam})}$$

- Volume = 75.12 m³

- Durasi normal = 6 hari
- Durasi normal (jam) = 12 x 7
= 84 jam
- Produktivitas jam normal = $\frac{\text{Volume}}{\text{Durasi normal (Jam)}}$
= $\frac{75.12}{84}$
= 0.894m³ / jam
- Maksimal *crashing* =

$$\frac{75.12}{(0.894 \times 7) + (1 \times 0,9 \times 0.894) + (1 \times 0,8 \times 0.894) + (1 \times 0,7 \times 0.894)}$$

$$= 17.87 \text{ hari}$$

- Maka maksimal *crashing* = 6 hari – 17.87 hari
= 6.13 hari

Hasil perhitungan pengontrolan durasi *crashing* manual diatas sesuai dengan hasil perhitungan pada *Microsoft Project*, hasil dari pengolahan *Microsoft Project* dapat dilihat pada Tabel 4.4. untuk penambahan lembur yang dilakukan 1-3 jam pada tabel berikut:

Tabel 4.4. Hasil Perhitungan Durasi Crashing Microsoft Project 2013

Kode	Durasi (Hari)	Durasi Crashing (Hari)		
		1 Jam	2 Jam	3 jam
BBPT-1	24	21.27	19.31	17.87
BPBB-1	12	10.63	9.66	8.94
KBB-1	18	15.95	14.48	13.40
KPLB-1	6	5.32	4.83	4.47
BPK-1	12	10.63	9.66	8.94
PPK-1	24	21.27	19.31	17.87
KPK-1	30	26.58	24.14	22.34
KPLSW-1	6	5.32	4.83	4.47
KBPT-2	24	21.27	19.31	17.87
KPLB-2	6	5.32	4.83	4.47
KPK-2	12	10.63	9.66	8.94
PPTB-2	6	5.32	4.83	4.47
BPLB-2	6	5.32	4.83	4.47
PPLB-2	6	5.32	4.83	4.47
BPLSW-2	6	5.32	4.83	4.47

Kode	Durasi (Hari)	Durasi Crashing (Hari)		
		1 Jam	2 Jam	3 jam
PPLSW-2	6	5.32	4.83	4.47
KPLSW-2	6	5.32	4.83	4.47
BBPT-3	12	10.63	9.66	8.94
KBPT-3	18	15.95	14.48	13.40
BBB-3	6	5.32	4.83	4.47
BBB-3	6	5.32	4.83	4.47
PBB-3	6	5.32	4.83	4.47
BBB-3	6	5.32	4.83	4.47
BBB-3	6	5.32	4.83	4.47
BBB-3	6	5.32	4.83	4.47
KBB-3	6	5.32	4.83	4.47
BPK-3	6	5.32	4.83	4.47
PPK-3	12	10.63	9.66	8.94
BPK-3	6	5.32	4.83	4.47
BPTB-3	6	5.32	4.83	4.47
BPLK-3	6	5.32	4.83	4.47
BPLK-3	6	5.32	4.83	4.47
BPLB-3	6	5.32	4.83	4.47
PBPLB-3	6	5.32	4.83	4.47
BBPLB-3	6	5.32	4.83	4.47
BPLSW-3	6	5.32	4.83	4.47

Tabel 4.5. Hasil Perhitungan Maksimal Crashing

Kode	Durasi (Hari)	Durasi Crashing (Hari)		
		1 Jam	2 Jam	3 jam
BBPT-1	24	2.73	4.69	6.13
BPBB-1	12	1.37	2.34	3.06
KBB-1	18	2.05	3.52	4.60
KPLB-1	6	0.68	1.17	1.53
BPK-1	12	1.37	2.34	3.06
PPK-1	24	2.73	4.69	6.13
KPK-1	30	3.42	5.86	7.66
KPLSW-1	6	0.68	1.17	1.53
KBPT-2	24	2.73	4.69	6.13
KPLB-2	6	0.68	1.17	1.53
KPK-2	12	1.37	2.34	3.06
PPTB-2	6	0.68	1.17	1.53

Kode	Durasi (Hari)	Durasi Crashing (Hari)		
		1 Jam	2 Jam	3 jam
BPLB-2	6	0.68	1.17	1.53
PPLB-2	6	0.68	1.17	1.53
BPLSW-2	6	0.68	1.17	1.53
PPLSW-2	6	0.68	1.17	1.53
KPLSW-2	6	0.68	1.17	1.53
BBPT-3	12	1.37	2.34	3.06
KBPT-3	18	2.05	3.52	4.60
BBB-3	6	0.68	1.17	1.53
BBB-3	6	0.68	1.17	1.53
PBB-3	6	0.68	1.17	1.53
BBB-3	6	0.68	1.17	1.53
BBB-3	6	0.68	1.17	1.53
BBB-3	6	0.68	1.17	1.53
KBB-3	6	0.68	1.17	1.53
BPK-3	6	0.68	1.17	1.53
PPK-3	12	1.37	2.34	3.06
BPK-3	6	0.68	1.17	1.53
BPTB-3	6	0.68	1.17	1.53
BPLK-3	6	0.68	1.17	1.53
BPLK-3	6	0.68	1.17	1.53
BPLB-3	6	0.68	1.17	1.53
PBPLB-3	6	0.68	1.17	1.53
BBPLB-3	6	0.68	1.17	1.53
BPLSW-3	6	0.68	1.17	1.53

Adapun salah satu contoh perhitungannya adalah perhitungan Pekerjaan Pengecoran Pelat Lantai pada Lantai 1 di bawah ini:

Perhitungan Biaya Normal:

Nama pekerjaan : Pekerjaan Pelat Beton Tebal 12cm pada Lantai 1
Volume pekerjaan : 75.12m³
Durasi pekerjaan : 24 hari

Tabel 4.6. Kebutuhan Material Pekerjaan Beton K300 (fc') untuk Pelat Lantai 1

Bahan & Tenaga kerja	Satuan	Koefisien	Harga Satuan (Rp.)
Pekerja	OH	1.65	63,000
Tukang batu	OH	0.28	75,000
Kepala tukang	OH	0.03	80,000
Mandor	OH	0.08	79,000
Portland cement	Kg	413	1,175
Pasir beton	Kg	618	250
Kerikil beton	Kg	1021	97.22
Air	Liter	215	35

- Jumlah Harga Satuan Tenaga = koefisien \times harga satuan

$$\begin{aligned} \text{Pekerja} &= 1.65 \times \text{Rp. } 63,000.00 \\ &= \text{Rp. } 103,950.00 \end{aligned}$$

$$\begin{aligned} \text{Tukang batu} &= 0.28 \times \text{Rp. } 75,000.00 \\ &= \text{Rp. } 20,625.00 \end{aligned}$$

$$\begin{aligned} \text{Kepala Tukang} &= 0.03 \times \text{Rp. } 80,000.00 \\ &= \text{Rp. } 2,240.00 \end{aligned}$$

$$\begin{aligned} \text{Mandor} &= 0,08 \times \text{Rp. } 79,000.00 \\ &= \text{Rp. } 6,557.00 \end{aligned}$$

$$\begin{aligned} \text{Jumlah Harga Satuan Tenaga} &= \text{Rp. } 103,950 + \text{Rp. } 20,625 + \text{Rp. } 2,240 \\ &\quad + \text{Rp. } 6,557 \\ &= \text{Rp. } 133,372 \end{aligned}$$

- Jumlah material yang digunakan = koefisien \times harga satuan

$$\begin{aligned} \text{Portland cement} &= 413 \times \text{Rp. } 1,175.00,- \\ &= \text{Rp. } 485,275.00,- \end{aligned}$$

$$\begin{aligned} \text{Pasir beton} &= 681 \times \text{Rp. } 250.00,- \\ &= \text{Rp. } 170,250.00,- \end{aligned}$$

$$\begin{aligned} \text{Kerikil beton} &= 1,021 \times \text{Rp. } 97.22,- \\ &= \text{Rp. } 99,263.89,- \end{aligned}$$

$$\begin{aligned} \text{Air} &= 215 \times \text{Rp. } 35.00,- \\ &= \text{Rp. } 7,525.00,- \end{aligned}$$

$$\begin{aligned} \text{Jumlah Harga Satuan Material} &= \text{Rp. } 485,275 + \text{Rp. } 170,250 + \text{Rp. } 99,263.89 \\ &\quad + \text{Rp. } 7,525 \\ &= \text{Rp. } 762,313.89 \end{aligned}$$

$$\begin{aligned} \text{Jumlah Harga Satuan Pekerja + Material} &= \text{Rp. } 133,372.00 + \text{Rp. } 762,313.89 \\ &= \text{Rp. } 895,685.89 \end{aligned}$$

Biaya Total Normal Pada Pekerjaan Pengecoran Beton Mutu K300 Pelat Lantai 1

$$\text{Volume} = 75.12 \text{ m}^3$$

$$\begin{aligned} \text{Biaya Total Material} &= \text{Jumlah Harga Satuan Material} \times \text{Volume} \\ &= \text{Rp. } 762,313.89,- \times 75.12 \\ &= \text{Rp. } 57,265,019.33,- \end{aligned}$$

$$\begin{aligned} \text{Biaya Total Tenaga} &= \text{Jumlah Harga Satuan Tenaga} \times \text{Volume} \\ &= \text{Rp. } 133,372.00,- \times 75.12 \\ &= \text{Rp. } 10,018,905.64,- \end{aligned}$$

$$\begin{aligned} \text{Biaya Total} &= \text{Biaya Total Material} + \text{Biaya Total Tenaga} \\ &= \text{Rp. } 57,265,019.33,- + \text{Rp. } 10,018,905.64,- \\ &= \text{Rp. } 67,283,923.97,- \end{aligned}$$

$$\begin{aligned} \text{Biaya Total Tenaga Kerja Per Hari} &= \text{Biaya Total Tenaga} / \text{Durasi} \\ &= \text{Rp. } 10,018,905.64,- / 6 \\ &= \text{Rp. } 1,669,817.44,- \end{aligned}$$

Perhitungan Jumlah Tenaga Kerja Per Hari :

$$\begin{aligned} \text{Pekerja} &= (\text{Koef.} \times \text{Volume}) / \text{Durasi} \\ &= (1.65 \times 75.12) / 24 \\ &= 5.16 \end{aligned}$$

$$\begin{aligned} \text{Tukang Batu} &= (\text{Koef.} \times \text{Volume}) / \text{Durasi} \\ &= (0.28 \times 75.12) / 24 \\ &= 0.86 \end{aligned}$$

$$\begin{aligned} \text{Kepala Tukang} &= (\text{Koef.} \times \text{Volume}) / \text{Durasi} \\ &= (0.03 \times 75.12) / 24 \\ &= 0.09 \end{aligned}$$

$$\begin{aligned} \text{Mandor} &= (\text{Koef.} \times \text{Volume}) / \text{Durasi} \\ &= (0.08 \times 75.12) / 24 \\ &= 0.26 \end{aligned}$$

1. Perhitungan jumlah tenaga kerja dan upah tenaga kerja (Pengecoran Pelat Lt.1)

Jumlah Tenaga Kerja \times Biaya Lembur 1 jam :

Pekerja	= $5.16 \times \text{Rp. } 11,812.50$ = Rp. 61,005.66
Tukang Batu	= $0.86 \times \text{Rp. } 14,062.50$ = Rp. 12,104.30
Kepala Tukang	= $0.09 \times \text{Rp. } 15,000$ = Rp. 1,314.60
Mandor	= $0.26 \times \text{Rp. } 16,875$ = Rp. 3,848.14

Jumlah Biaya Lembur Tenaga Per hari :

$$\begin{aligned}
 (1 \text{ hari}) &= \text{Jumlah Biaya Tenaga Per hari} + \text{Jumlah Biaya Lembur 1 jam} \\
 &= \text{Rp. } 133,372 + (\text{Rp. } 61,005.66 + \text{Rp. } 24,208.60 + \text{Rp. } 12,104.30 \\
 &\quad + \text{Rp. } 3,848.14) \\
 &= \text{Rp.}
 \end{aligned}$$

Jumlah Total Biaya Lembur Tenaga :

$$\begin{aligned}
 (21.27 \text{ Hari}) &= \text{Rp. } 211,644.69 \times 21.27 \\
 &= \text{Rp. } 10,542,043.65
 \end{aligned}$$

Jumlah Total Biaya Lembur pada pekerjaan Pengecoran Pelat Lantai 1:

$$\begin{aligned}
 &= \text{Jumlah Total Biaya Material} + \text{Jumlah Total Biaya Lembur Tenaga} \\
 &= \text{Rp. } 57,265,019.33 + \text{Rp. } 10,542,043.65 \\
 &= \text{Rp. } 67,807,062.98
 \end{aligned}$$

2. Perhitungan Manual penambahan 2 Jam Lembur (Pengecoran Pelat Lantai 1)

Jumlah Tenaga Kerja \times Biaya Lembur 2 jam :

Pekerja	= $20.658 \times \text{Rp. } 27,562.50$ = Rp. 569,386.13
Tukang Batu	= $3.443 \times \text{Rp. } 32,812.50$ = Rp. 112,973.44
Kepala Tukang	= $0.351 \times \text{Rp. } 35,000$ = Rp. 12,269.60
Mandor	= $1.039 \times \text{Rp. } 34,562.50$ = Rp. 35,915.97

Jumlah Biaya Lembur Tenaga Per hari :

$$\begin{aligned}
 (1 \text{ hari}) &= \text{Jumlah Biaya Tenaga Per hari} + \text{Jumlah Biaya Lembur 2 jam} \\
 &= \text{Rp. 1,669,817.44} + (\text{Rp. 569,386.13} + \text{Rp. 112,973.44} \\
 &\quad + \text{Rp. 12,269.60} + \text{Rp. 35,915.97}) \\
 &= \text{Rp. 2,400,362.57}
 \end{aligned}$$

Jumlah Total Biaya Lembur Tenaga :

$$\begin{aligned}
 (4.82759 \text{ Hari}) &= \text{Rp. 2,400,362.57} \times 4.82759 \\
 &= \text{Rp. 11,587,957.23}
 \end{aligned}$$

Jumlah Total Biaya Lembur pada pekerjaan Pengecoran Pelat Lantai 1:

$$\begin{aligned}
 &= \text{Jumlah Total Biaya Material} + \text{Jumlah Total Biaya Lembur Tenaga} \\
 &= \text{Rp. 57,265,019.33} + \text{Rp. 11,587,957.23} \\
 &= \text{Rp. 68,852,976.57}
 \end{aligned}$$

3. Perhitungan Manual penambahan 3 Jam Lembur (Pengecoran Pelat Lantai 1)

Jumlah Tenaga Kerja × Biaya Lembur 3 jam :

$$\begin{aligned}
 \text{Pekerja} &= 20.658 \times \text{Rp. 43,313} \\
 &= \text{Rp. 894,749.63} \\
 \text{Tukang Batu} &= 3.443 \times \text{Rp. 51,563} \\
 &= \text{Rp. 177,529.69} \\
 \text{Kepala Tukang} &= 0.351 \times \text{Rp. 55,000} \\
 &= \text{Rp. 19,280.80} \\
 \text{Mandor} &= 1.039 \times \text{Rp. 54,313} \\
 &= \text{Rp. 56,439.38}
 \end{aligned}$$

Jumlah Biaya Lembur Tenaga Per hari :

$$\begin{aligned}
 (\text{hari}) &= \text{Jumlah Biaya Tenaga Per hari} + \text{Jumlah Biaya Lembur 3 jam} \\
 &= \text{Rp. 1,669,817.44} + \text{Rp. 894,749.63} + \text{Rp. 177,529.69} + \text{Rp. 19,280.80} \\
 &\quad + \text{Rp. 19,280.80} + \text{Rp. 56,439.38} \\
 &= \text{Rp. 2,817,816.93}
 \end{aligned}$$

Jumlah Total Biaya Lembur Tenaga :

$$\begin{aligned}
 (4.468085 \text{ Hari}) &= \text{Rp. 2,817,816.93} \times 4.468085 \\
 &= \text{Rp. 12,590,245.86}
 \end{aligned}$$

Jumlah Total Biaya Lembur pada pekerjaan Pengecoran Pelat Lantai 1:

$$\begin{aligned}
 &= \text{Jumlah Total Biaya Material} + \text{Jumlah Total Biaya Lembur Tenaga} \\
 &= \text{Rp. } 57,265,019.33 + \text{Rp. } 12,590,245.86 \\
 &= \text{Rp. } 69,855,265.19
 \end{aligned}$$

Selanjutnya dari perhitungan *Cost Slope* untuk kegiatan-kegiatan kritis yang terjadi setelah penambahan jam lembur dapat dilihat hasilnya secara lengkap pada tabel berikut ini:

Tabel 4.7. Cost Slope Biaya Pekerjaan Akibat Percepatan Biaya Lembur 1 Jam

Task Name	Baseline Cost	Cost
Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	20,327,539.30	20,495,153.05
Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	67,283,355.89	67,838,147.77
Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	47,396,645.00	48,152,964.38
Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	15,882,960.00	16,136,443.75
Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	26,166,840.03	26,372,942.70
Pembesian Pek. Kolom 20x50cm (K2) Lt.1	72,632,850.00	73,041,922.43
Bekisting Pek. Kolom 20x50cm (K2) Lt.1	100,417,725.00	102,054,002.50
Bekisting Pek. Pit Lift Shear Wall Lt.1	28,171,645.00	28,506,581.88
Bekisting Pek. Beton Plat Tebal 12cm Lt.2	135,204,830.00	137,408,245.00
Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	11,926,450.00	12,116,658.75
Bekisting Pek. Kolom 50x60cm (K1) Lt.2	38,110,300.00	38,731,301.88
Pembesian Pek. Plat Tangga & Bordes Lt. 2	11,182,273.75	11,248,387.50
Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	1,367,073.01	1,378,331.13
Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	3,038,398.75	3,056,311.25
Beton K300 Pek. Pit Lift Shear Wall Lt.2	5,857,977.99	5,906,243.62
Pembesian Pek. Pit Lift Shear Wall Lt.2	13,010,625.00	13,088,128.95
Bekisting Pek. Pit Lift Shear Wall Lt.2	21,675,065.00	21,932,740.63
Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	55,995,882.48	56,457,756.23
Bekisting Pek. Beton Plat Tebal 12cm Lt.3	127,837,110.00	129,920,550.00
Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	20,327,539.30	20,495,203.05
Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	3,552,838.53	3,582,154.78
Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	7,877,108.25	7,923,683.25
Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	3,507,458.85	3,536,452.60
Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	3,406,383.29	3,434,467.67
Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	3,477,602.05	3,506,352.05
Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	11,917,890.00	12,112,478.75
Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	22,347,726.29	22,532,051.29

Task Name	Baseline Cost	Cost
Pembesian Pek. Kolom 50x60cm (K1) Lt.3	62,015,721.00	62,382,102.25
Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	3,039,547.76	3,064,613.39
Beton K300 Pek. Plat Tangga & Bordes Lt. 3	4,479,478.10	4,516,406.85
Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	1,327,762.83	1,338,698.45
Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	880,630.24	888,220.86
Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	1,367,073.01	1,378,331.13
Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	3,025,258.75	3,043,171.25
Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	269,927.98	272,097.98
Beton K300 Pek. Pit Lift Shear Wall Lt.3	5,857,977.99	5,906,243.62

Tabel 4.8. Cost Slope Biaya Pekerjaan Akibat Percepatan Biaya Lembur 2 Jam

Task Name	Baseline Cost	Cost
Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	20,327,539.30	20,784,134.61
Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	67,283,355.89	68,795,435.58
Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	47,396,645.00	49,456,910.00
Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	15,882,960.00	16,573,595.63
Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	26,166,840.03	26,754,686.28
Pembesian Pek. Kolom 20x50cm (K2) Lt.1	72,632,850.00	73,801,595.63
Bekisting Pek. Kolom 20x50cm (K2) Lt.1	100,417,725.00	104,875,207.50
Bekisting Pek. Pit Lift Shear Wall Lt.1	28,171,645.00	29,084,048.13
Bekisting Pek. Beton Plat Tebal 12cm Lt.2	135,204,830.00	141,207,156.88
Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	11,926,450.00	12,444,701.88
Bekisting Pek. Kolom 50x60cm (K1) Lt.2	38,110,300.00	39,802,081.56
Pembesian Pek. Plat Tangga & Bordes Lt. 2	11,182,273.75	11,362,311.25
Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	1,367,073.01	1,397,780.82
Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	3,038,398.75	3,087,257.50
Beton K300 Pek. Pit Lift Shear Wall Lt.2	5,857,977.99	5,989,727.68
Pemesian Pek. Pit Lift Shear Wall Lt.2	13,010,625.00	13,220,100.94
Bekisting Pek. Pit Lift Shear Wall Lt.2	21,675,065.00	22,377,044.38
Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	55,995,882.48	57,253,925.92
Bekisting Pek. Beton Plat Tebal 12cm Lt.3	127,837,110.00	133,512,699.38
Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	20,327,539.30	20,784,338.98
Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	3,552,838.53	3,628,946.86
Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	7,877,108.25	8,004,004.50
Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	3,507,458.85	3,586,393.54

Task Name	Baseline Cost	Cost
Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	3,406,383.29	3,483,502.98
Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	3,477,602.05	3,555,790.49
Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	11,917,890.00	12,446,724.38
Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	22,347,726.29	22,849,794.10
Pembesian Pek. Kolom 50x60cm (K1) Lt.3	62,015,721.00	63,013,794.75
Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	3,039,547.76	3,107,782.76
Beton K300 Pek. Plat Tangga & Bordes Lt. 3	4,479,478.10	4,580,209.66
Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	1,327,762.83	1,357,621.27
Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	880,630.24	901,110.24
Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	1,367,073.01	1,397,854.88
Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	3,025,258.75	3,074,192.50
Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	269,927.98	275,949.54
Beton K300 Pek. Pit Lift Shear Wall Lt.3	5,857,977.99	5,989,061.12

Tabel 4.9. Cost Slope Biaya Pekerjaan Akibat Percepatan Biaya Lembur 3 Jam

Task Name	Baseline Cost	Cost
Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	20,327,539.30	21,032,020.55
Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	67,283,355.89	69,615,067.38
Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	47,396,645.00	50,574,766.41
Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	15,882,960.00	16,972,468.17
Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	26,166,840.03	27,073,707.75
Pembesian Pek. Kolom 20x50cm (K2) Lt.1	72,632,850.00	74,435,708.70
Bekisting Pek. Kolom 20x50cm (K2) Lt.1	100,417,725.00	107,293,775.04
Bekisting Pek. Pit Lift Shear Wall Lt.1	28,171,645.00	29,579,121.88
Bekisting Pek. Beton Plat Tebal 12cm Lt.2	135,204,830.00	144,463,843.23
Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	11,926,450.00	12,725,891.55
Bekisting Pek. Kolom 50x60cm (K1) Lt.2	38,110,300.00	40,720,015.24
Pembesian Pek. Plat Tangga & Bordes Lt. 2	11,182,273.75	11,460,085.26
Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	1,367,073.01	1,414,583.42
Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	3,038,398.75	3,113,768.56
Beton K300 Pek. Pit Lift Shear Wall Lt.2	5,857,977.99	6,061,062.37
Pembesian Pek. Pit Lift Shear Wall Lt.2	13,010,625.00	13,333,580.27
Bekisting Pek. Pit Lift Shear Wall Lt.2	21,675,065.00	22,757,886.72
Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	55,995,882.48	57,936,396.05
Bekisting Pek. Beton Plat Tebal 12cm Lt.3	127,837,110.00	136,592,051.43

Task Name	Baseline Cost	Cost
Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	20,327,539.30	21,032,020.55
Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	3,552,838.53	3,676,017.70
Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	7,877,108.25	8,072,826.00
Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	3,507,458.85	3,629,140.11
Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	3,406,383.29	3,524,579.13
Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	3,477,602.05	3,598,191.64
Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	11,917,890.00	12,733,570.09
Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	22,347,726.29	23,122,146.09
Pembesian Pek. Kolom 50x60cm (K1) Lt.3	62,015,721.00	63,555,271.31
Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	3,039,547.76	3,144,781.10
Beton K300 Pek. Plat Tangga & Bordes Lt. 3	4,479,478.10	4,634,741.64
Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	1,327,762.83	1,373,692.00
Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	880,630.24	911,946.90
Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	1,367,073.01	1,414,517.80
Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	3,025,258.75	3,100,628.56
Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	269,927.98	279,291.52
Beton K300 Pek. Pit Lift Shear Wall Lt.3	5,857,977.99	6,061,062.37

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

Pada analisis *cost variance* dan *duration variance* dihitung dengan menggunakan *Microsoft Project 2013* yang akan digunakan untuk perhitungan biaya langsung, biaya tidak langsung, dan biaya total.

Berdasarkan pada tabel 5.9., tabel 5.10, dan tabel 5.11., dapat diketahui berapa selisih biaya (*cost variance*) antara biaya normal dengan biaya percepatan tiap lemburnya yaitu dengan cara:

$$\text{Selisih Biaya} = \text{Biaya Percepatan} - \text{Biaya Normal}$$

Dalam kasus ini diambil contoh salah satu item pekerjaan untuk perhitungan analisis *cost variance* :

Nama pekerjaan = Beton K300 untuk Pengecoran Pelat Lantai 1

Biaya Normal : Rp. 67,283,355.89

Biaya Percepatan :

Lembur 1 Jam = Rp. 67,838,147.77

Lembur 2 Jam = Rp. 68,795,435.58

Lembur 3 Jam = Rp. 69,615,067.38

Selisih Biaya

Lembur 1 jam	= Rp. 67,283,355.89 - Rp. 67,838,147.77 = Rp. 554,791.88
Lembur 2 jam	= Rp. 67,283,355.89 - Rp. 68,795,435.58 = Rp. 1,512,079.69
Lembur 2 jam	= Rp. 67,283,355.89 - Rp. 69,615,067.38 = Rp. 2,331,711.49

Kemudian hasil analisis dari *cost variance* untuk semua item pekerjaan dengan menggunakan *Microsoft Project 2013* dapat dilihat pada Tabel 4.10, 4.11, dan 4.12 sebagai berikut:

Tabel 4.10. Hasil Perhitungan Selisih Biaya Normal dan Biaya Percepatan pada Microsoft Project 2013 dengan Waktu Lembur 1 Jam

No.	Uraian Pekerjaan	Selisih Biaya (Rp)
1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	523,139.01
2	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	158,599.20
3	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	719,261.46
4	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	245,521.52
5	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	204,980.42
6	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	405,173.76
7	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	1,535,134.50
8	Bekisting Pek. Pit Lift Shear Wall Lt.1	315,751.13
9	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	2,081,869.98
10	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	174,810.43
11	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	582,652.70
12	Pembesian Pek. Plat Tangga & Bordes Lt. 2	67,421.86
13	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	9,468.14
14	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	11,518.73
15	Beton K300 Pek. Pit Lift Shear Wall Lt.2	45,352.57
16	Pemesian Pek. Pit Lift Shear Wall Lt.2	69,021.09
17	Bekisting Pek. Pit Lift Shear Wall Lt.2	237,677.13
18	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	437,791.34
19	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	1,974,815.03
20	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	158,599.20
21	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	25,229.70
22	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	50,597.24
23	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	26,970.77
24	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	27,116.53

No.	Uraian Pekerjaan	Selisih Biaya (Rp)
25	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	25,957.84
26	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	175,577.01
27	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	171,584.24
28	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	352,591.46
29	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	18,630.21
30	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	33,771.57
31	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	6,714.83
32	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	9,021.53
33	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	9,468.14
34	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	24,658.73
35	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	2,743.60
36	Beton K300 Pek. Pit Lift Shear Wall Lt.3	45,352.57

Tabel 4.11. Hasil Perhitungan Selisih Biaya Normal dan Biaya Percepatan pada Microsoft Project 2013 dengan Waktu Lembur 2 Jam

No.	Uraian Pekerjaan	Selisih Biaya (Rp)
1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	1,569,052.59
2	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	1,152,441.54
3	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	2,144,938.04
4	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	723,409.18
5	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	611,761.72
6	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	1,213,874.70
7	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	4,619,629.38
8	Bekisting Pek. Pit Lift Shear Wall Lt.1	947,033.42
9	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	6,235,359.41
10	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	533,371.35
11	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	1,753,274.25
12	Pembesian Pek. Plat Tangga & Bordes Lt. 2	191,982.18
13	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	30,701.08
14	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	45,288.41
15	Beton K300 Pek. Pit Lift Shear Wall Lt.2	136,410.55
16	Pembesian Pek. Pit Lift Shear Wall Lt.2	213,843.22
17	Bekisting Pek. Pit Lift Shear Wall Lt.2	723,393.16
18	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	1,308,272.14
19	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	5,902,161.66
20	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	474,594.75
21	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	80,420.85

No.	Uraian Pekerjaan	Selisih Biaya (Rp)
22	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	138,375.40
23	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	81,488.80
24	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	80,077.74
25	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	79,999.72
26	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	541,454.31
27	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	518,941.17
28	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	1,043,153.86
29	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	65,802.14
30	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	103,387.75
31	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	27,298.95
32	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	22,744.28
33	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	30,701.08
34	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	58,428.41
35	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	1,377.68
36	Beton K300 Pek. Pit Lift Shear Wall Lt.3	136,410.55

Tabel 4.12. Hasil Perhitungan Selisih Biaya Normal dan Biaya Percepatan pada Microsoft Project 2013 dengan Waktu Lembur 3 Jam

No.	Uraian Pekerjaan	Selisih Biaya (Rp)
1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	2,571,341.22
2	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	728,463.86
3	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	3,511,149.77
4	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	1,181,364.20
5	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	1,001,576.21
6	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	1,988,844.80
7	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	7,575,470.26
8	Bekisting Pek. Pit Lift Shear Wall Lt.1	1,551,984.99
9	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	10,215,607.16
10	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	876,976.72
11	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	2,875,069.29
12	Pembesian Pek. Plat Tangga & Bordes Lt. 2	311,347.09
13	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	51,048.39
14	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	77,649.57
15	Beton K300 Pek. Pit Lift Shear Wall Lt.2	223,670.50
16	Pemesian Pek. Pit Lift Shear Wall Lt.2	352,624.84
17	Bekisting Pek. Pit Lift Shear Wall Lt.2	1,188,850.01

No.	Uraian Pekerjaan	Selisih Biaya (Rp)
18	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	2,142,445.26
19	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	9,665,699.00
20	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	777,410.16
21	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	133,309.99
22	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	222,492.33
23	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	133,732.90
24	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	130,829.94
25	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	131,787.51
26	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	892,070.91
27	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	851,809.87
28	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	1,704,912.96
29	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	111,006.53
30	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	170,100.25
31	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	47,024.50
32	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	35,894.65
33	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	51,048.39
34	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	90,789.57
35	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	5,327.06
36	Beton K300 Pek. Pit Lift Shear Wall Lt.3	223,670.50

Duration Variance adalah selisih antara durasi normal dengan durasi percepatan, baik itu percepatan 1 jam hingga percepatan 3 jam yang diakibatkan adanya lembur dari suatu pekerjaan. Untuk hasil analisis *duration variance* dari semua item pekerjaan dengan menggunakan *Microsoft Project 2013* dapat dilihat Tabel 4.13., 4.14., dan 4.15., sebagai berikut:

Tabel 4.13. Hasil Perhitungan *Duration Variance* pada *Microsoft Project 2013* dengan Waktu Lembur 1 Jam

No.	Uraian Pekerjaan	Durasi Normal	Durasi Percepatan	<i>Duration Variance</i>
1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	24	21.27	2.73
2	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	12	10.63	1.37
3	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	18	15.95	2.05
4	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	6	5.32	0.68
5	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	12	10.63	1.37
6	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	24	21.27	2.73
7	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	30	26.58	3.42

No.	Uraian Pekerjaan	Durasi	Durasi	Duration
		Normal	Percepatan	Variance
8	Bekisting Pek. Pit Lift Shear Wall Lt.1	6	5.32	0.68
9	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	24	21.27	2.73
10	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	6	5.32	0.68
11	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	12	10.63	1.37
12	Pembesian Pek. Plat Tangga & Bordes Lt. 2	6	5.32	0.68
13	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6	5.32	0.68
14	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6	5.32	0.68
15	Beton K300 Pek. Pit Lift Shear Wall Lt.2	6	5.32	0.68
16	Pemesian Pek. Pit Lift Shear Wall Lt.2	6	5.32	0.68
17	Bekisting Pek. Pit Lift Shear Wall Lt.2	6	5.32	0.68
18	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	12	10.63	1.37
19	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	18	15.95	2.05
20	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	6	5.32	0.68
21	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	6	5.32	0.68
22	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	6	5.32	0.68
23	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	6	5.32	0.68
24	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	6	5.32	0.68
25	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	6	5.32	0.68
26	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	6	5.32	0.68
27	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	6	5.32	0.68
28	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	12	10.63	1.37
29	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	6	5.32	0.68
30	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	6	5.32	0.68
31	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	6	5.32	0.68
32	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	6	5.32	0.68
33	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	6	5.32	0.68
34	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	6	5.32	0.68
35	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	6	5.32	0.68
36	Beton K300 Pek. Pit Lift Shear Wall Lt.3	6	5.32	0.68

Tabel 4.14. Hasil Perhitungan Duration Variance pada Microsoft Project 2013 dengan Waktu Lembur 2 Jam

No.	Uraian Pekerjaan	Durasi	Durasi	Duration
		Normal	Percepatan	Variance
1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	24	19.31	4.69
2	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	12	9.66	2.34

No.	Uraian Pekerjaan	Durasi	Durasi	Duration
		Normal	Percepatan	Variance
3	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	18	14.48	3.52
4	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	6	4.83	1.17
5	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	12	9.66	2.34
6	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	24	19.31	4.69
7	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	30	24.14	5.86
8	Bekisting Pek. Pit Lift Shear Wall Lt.1	6	4.83	1.17
9	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	24	19.31	4.69
10	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	6	4.83	1.17
11	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	12	9.66	2.34
12	Pembesian Pek. Plat Tangga & Bordes Lt. 2	6	4.83	1.17
13	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6	4.83	1.17
14	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6	4.83	1.17
15	Beton K300 Pek. Pit Lift Shear Wall Lt.2	6	4.83	1.17
16	Pemesian Pek. Pit Lift Shear Wall Lt.2	6	4.83	1.17
17	Bekisting Pek. Pit Lift Shear Wall Lt.2	6	4.83	1.17
18	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	12	9.66	2.34
19	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	18	14.48	3.52
20	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	6	4.83	1.17
21	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	6	4.83	1.17
22	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	6	4.83	1.17
23	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	6	4.83	1.17
24	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	6	4.83	1.17
25	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	6	4.83	1.17
26	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	6	4.83	1.17
27	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	6	4.83	1.17
28	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	12	9.66	2.34
29	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	6	4.83	1.17
30	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	6	4.83	1.17
31	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	6	4.83	1.17
32	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	6	4.83	1.17
33	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	6	4.83	1.17
34	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	6	4.83	1.17
35	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	6	4.83	1.17
36	Beton K300 Pek. Pit Lift Shear Wall Lt.3	6	4.83	1.17

Tabel 4.15. Hasil Perhitungan Duration Variance pada Microsoft Project 2013 dengan Waktu Lembur 3 Jam

No.	Uraian Pekerjaan	Durasi	Durasi	Duration
		Normal	Percepatan	Variance
1	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.1	24	17.87	6.13
2	Beton K300 Pek. Beton Plat Tebal 12cm Lt.1	12	8.94	3.06
3	Bekisting Pek. Beton Balok 30x60cm (B1) Lt.1	18	13.40	4.60
4	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.1	6	4.47	1.53
5	Beton K300 Pek. Kolom 20x50cm (K2) Lt.1	12	8.94	3.06
6	Pembesian Pek. Kolom 20x50cm (K2) Lt.1	24	17.87	6.13
7	Bekisting Pek. Kolom 20x50cm (K2) Lt.1	30	22.34	7.66
8	Bekisting Pek. Pit Lift Shear Wall Lt.1	6	4.47	1.53
9	Bekisting Pek. Beton Plat Tebal 12cm Lt.2	24	17.87	6.13
10	Bekisting Pek. Pit Lift Balok 20x40cm (BA3) Lt.2	6	4.47	1.53
11	Bekisting Pek. Kolom 50x60cm (K1) Lt.2	12	8.94	3.06
12	Pembesian Pek. Plat Tangga & Bordes Lt. 2	6	4.47	1.53
13	Beton K300 Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6	4.47	1.53
14	Pembesian Pek. Pit Lift Balok 25x50cm (BA2) Lt.2	6	4.47	1.53
15	Beton K300 Pek. Pit Lift Shear Wall Lt.2	6	4.47	1.53
16	Pemesian Pek. Pit Lift Shear Wall Lt.2	6	4.47	1.53
17	Bekisting Pek. Pit Lift Shear Wall Lt.2	6	4.47	1.53
18	Beton K 300 Pek. Beton Plat Tebal 12cm Lt.3	12	8.94	3.06
19	Bekisting Pek. Beton Plat Tebal 12cm Lt.3	18	13.40	4.60
20	Beton K300 Pek. Beton Balok 30x60cm (B1) Lt.3	6	4.47	1.53
21	Beton K300 Pek. Beton Balok 25x60cm (BA1) Lt.3	6	4.47	1.53
22	Pembesian Pek. Beton Balok 25x60cm (BA1) Lt.3	6	4.47	1.53
23	Beton K300 Pek. Beton Balok 25x50cm (BA2) Lt.3	6	4.47	1.53
24	Beton K300 Pek. Beton Balok 20x40cm (BA3) Lt.3	6	4.47	1.53
25	Beton K300 Pek. Beton Balok 20x40cm (BK) Lt.3	6	4.47	1.53
26	Bekisting Pek. Beton Balok 20x40cm (BK) Lt.3	6	4.47	1.53
27	Beton K300 Pek. Kolom 50x60cm (K1) Lt.3	6	4.47	1.53
28	Pembesian Pek. Kolom 50x60cm (K1) Lt.3	12	8.94	3.06
29	Beton K300 Pek. Kolom 20x50cm (K2) Lt.3	6	4.47	1.53
30	Beton K300 Pek. Plat Tangga & Bordes Lt. 3	6	4.47	1.53
31	Beton K300 Pek. Pit Lift Kolom L 20x40cm (K3) Lt. 3	6	4.47	1.53
32	Beton K300 Pek. Pit Lift Kolom L 20x60cm (K4) Lt. 3	6	4.47	1.53
33	Beton K300 Pek. PIT lift Balok 25x50cm (BA2) Lt.3	6	4.47	1.53
34	Pembesian Pek. Beton PIT Lift Balok 25x50cm (BA2) Lt.3	6	4.47	1.53

No.	Uraian Pekerjaan	Durasi	Durasi	Duration
		Normal	Percepatan	Variance
35	Beton K300 Pek. Beton PIT Lift Balok 20x40cm (BA3) Lt.3	6	4.47	1.53
36	Beton K300 Pek. Pit Lift Shear Wall Lt.3	6	4.47	1.53

Dari data di atas selanjutnya kita dapat menghitung *Cost Slope* dimana biaya perhari dari selisih biaya normal dengan biaya percepatan dan selisih durasi normal dengan durasi percepatan. Salah satu contoh perhitungan *cost slope* dari item pekerjaan yang kritis adalah sebagai berikut:

Nama pekerjaan = Beton K300 untuk Pengecoran Pelat Lantai 1

Cost variance :

Lembur 1 Jam = Rp. 554,791.88

Lembur 2 Jam = Rp. 1,512,079.69

Lembur 3 Jam = Rp. 2,331,711.49

Duration variance

Lembur 1 Jam = 0.68 hari

Lembur 2 Jam = 1.17 hari

Lembur 3 Jam = 1.53 hari

Cost slope

$$\begin{aligned} \text{Lembur 1 jam} &= \frac{\text{Cost variance}}{\text{Duration variance}} \\ &= \frac{\text{Rp. 554,791.88}}{0.68} \\ &= \text{Rp. 815,870.41} \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 jam} &= \frac{\text{Cost variance}}{\text{Duration variance}} \\ &= \frac{\text{Rp. 1,512,079.69}}{1.17} \\ &= \text{Rp. 1,292,375.80} \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 jam} &= \frac{\text{Cost variance}}{\text{Duration variance}} \\ &= \frac{\text{Rp. 2,331,711.49}}{1.53} \\ &= \text{Rp. 1,523,994.44} \end{aligned}$$

Berikut hasil analisis dari *cost slope* untuk semua item pekerjaan dengan menggunakan *Microsoft Project 2013* dapat dilihat pada Tabel 4.16, 4.16, dan 4,18 sebagai berikut :

Tabel 4.16. Hasil analisis cost slope pada Microsoft Project 2013 pada waktu lembur 1 jam

No.	Kode Pekerjaan	Selisih Biaya (Rp)	Duration Variance	Cost Slope (Rp)
1	BBPT-1	167,613.75	2.73	191,333.25
2	BPBB-1	554,791.88	1.37	116,012.38
3	KBB-1	756,319.38	2.05	350,750.96
4	KPLB-1	253,483.75	0.68	359,188.89
5	BPK-1	206,102.67	1.37	149,939.38
6	PPK-1	409,072.43	2.73	148,188.55
7	KPK-1	1,636,277.50	3.42	449,168.98
8	KPLSW-1	334,936.88	0.68	464,339.89
9	KBPT-2	2,203,415.00	2.73	761,424.67
10	KPLB-2	190,208.75	0.68	255,741.19
11	KPK-2	621,001.88	1.37	426,199.66
12	PPTB-2	66,113.75	0.68	98,635.68
13	BPLB-2	11,258.12	0.68	13,923.73
14	PPLB-2	17,912.50	0.68	16,851.47
15	BPLSW-2	48,265.63	0.68	66,349.13
16	PPLSW-2	77,503.95	0.68	101,501.61
17	KPLSW-2	257,675.63	0.68	349,525.19
18	BBPT-3	461,873.75	1.37	320,236.26
19	KBPT-3	2,083,440.00	2.05	963,027.08
20	BBB-3	167,663.75	0.68	233,234.11
21	BBB-3	29,316.25	0.68	37,102.50
22	PBB-3	46,575.00	0.68	74,407.71
23	BBB-3	28,993.75	0.68	39,662.89
24	BBB-3	28,084.38	0.68	39,877.24
25	BBB-3	28,750.00	0.68	38,173.30
26	KBB-3	194,588.75	0.68	258,201.49
27	BPK-3	184,325.00	0.68	252,329.77
28	PPK-3	366,381.25	1.37	257,914.12
29	BPK-3	25,065.63	0.68	27,397.37
30	BPTB-3	36,928.75	0.68	49,664.07
31	BPLK-3	10,935.62	0.68	9,874.75
32	BPLK-3	7,590.62	0.68	13,266.96
33	BPLB-3	11,258.12	0.68	13,923.73
34	PBPLB-3	17,912.50	0.68	36,262.83
35	BBPLB-3	2,170.00	0.68	4,034.71
36	BPLSW-3	48,265.63	0.68	66,694.96

Tabel 4.17. Hasil analisis cost slope pada Microsoft Project 2013 pada waktu lembur 2 jam

No.	Kode Pekerjaan	Selisih Biaya (Rp)	Duration Variance	Cost Slope (Rp)
1	BBPT-1	1,512,079.69	4.69	334,577.39
2	BPBB-1	456,595.31	2.34	491,482.42
3	KBB-1	2,060,265.00	3.52	609,835.33
4	KPLB-1	690,635.63	1.17	618,298.45
5	BPK-1	587,846.25	2.34	260,898.38
6	PPK-1	1,168,745.63	4.69	258,840.93
7	KPK-1	4,457,482.50	5.86	788,054.42
8	KPLSW-1	912,403.13	1.17	807,763.80
9	KBPT-2	6,002,326.88	4.69	1,329,598.70
10	KPLB-2	518,251.88	1.17	455,872.95
11	KPK-2	1,691,781.56	2.34	747,719.90
12	PPTB-2	180,037.50	1.17	163,749.50
13	BPLB-2	30,707.81	1.17	26,186.21
14	PPLB-2	48,858.75	1.17	38,708.04
15	BPLSW-2	131,749.69	1.17	116,590.21
16	PPLSW-2	209,475.94	1.17	182,771.99
17	KPLSW-2	701,979.38	1.17	618,284.75
18	BBPT-3	1,258,043.44	2.34	557,939.59
19	KBPT-3	5,675,589.38	3.52	1,678,065.57
20	BBB-3	456,799.68	1.17	404,801.41
21	BBB-3	76,108.33	1.17	68,735.77
22	PBB-3	126,896.25	1.17	118,269.57
23	BBB-3	78,934.69	1.17	69,648.55
24	BBB-3	77,119.69	1.17	68,442.51
25	BBB-3	78,188.44	1.17	68,375.83
26	KBB-3	528,834.38	1.17	462,781.47
27	BPK-3	502,067.81	1.17	443,539.46
28	PPK-3	998,073.75	2.34	444,874.44
29	BPK-3	68,235.00	1.17	56,125.36
30	BPTB-3	100,731.56	1.17	88,365.60
31	BPLK-3	29,858.44	1.17	23,332.43
32	BPLK-3	20,480.00	1.17	19,439.55
33	BPLB-3	30,781.87	1.17	26,240.24
34	PBPLB-3	48,933.75	1.17	49,938.81
35	BBPLB-3	6,021.56	1.17	1,177.50
36	BPLSW-3	131,083.13	1.17	116,590.21

Tabel 4.18. Hasil analisis cost slope pada Microsoft Project 2013 pada waktu lembur 3 jam

No.	Kode Pekerjaan	Selisih Biaya (Rp)	Duration Variance	Cost Slope (Rp)
1	BBPT-1	2,571,341.22	6.13	419,628.60
2	BPBB-1	728,463.86	3.06	237,762.51
3	KBB-1	3,511,149.77	4.60	764,000.18
4	KPLB-1	1,181,364.20	1.53	771,168.30
5	BPK-1	1,001,576.21	3.06	326,903.35
6	PPK-1	1,988,844.80	6.13	324,568.42
7	KPK-1	7,575,470.26	7.66	989,019.73
8	KPLSW-1	1,551,984.99	1.53	1,013,101.31
9	KBPT-2	10,215,607.16	6.13	1,667,130.33
10	KPLB-2	876,976.72	1.53	573,187.40
11	KPK-2	2,875,069.29	3.06	938,390.67
12	PPTB-2	311,347.09	1.53	203,494.83
13	BPLB-2	51,048.39	1.53	33,364.96
14	PPLB-2	77,649.57	1.53	50,751.35
15	BPLSW-2	223,670.50	1.53	146,189.87
16	PPLSW-2	352,624.84	1.53	230,473.75
17	KPLSW-2	1,188,850.01	1.53	777,026.15
18	BBPT-3	2,142,445.26	3.06	699,270.33
19	KBPT-3	9,665,699.00	4.60	2,103,184.50
20	BBB-3	777,410.16	1.53	508,111.22
21	BBB-3	133,309.99	1.53	87,130.71
22	PBB-3	222,492.33	1.53	145,419.83
23	BBB-3	133,732.90	1.53	87,407.12
24	BBB-3	130,829.94	1.53	85,509.76
25	BBB-3	131,787.51	1.53	86,135.63
26	KBB-3	892,070.91	1.53	583,052.88
27	BPK-3	851,809.87	1.53	556,738.47
28	PPK-3	1,704,912.96	3.06	556,464.65
29	BPK-3	111,006.53	1.53	72,553.29
30	BPTB-3	170,100.25	1.53	111,176.64
31	BPLK-3	47,024.50	1.53	30,734.97
32	BPLK-3	35,894.65	1.53	23,460.55
33	BPLB-3	51,048.39	1.53	33,364.96
34	PBPLB-3	90,789.57	1.53	59,339.59
35	BBPLB-3	5,327.06	1.53	3,481.74
36	BPLSW-3	223,670.50	1.53	146,189.87

Kemudian dilakukan pengujian efisiensi *crashing*, dengan melakukan *crashing* ulang dari *cost slope* terkecil pada Tabel 4.19, 4.20, dan Tabel 4.21, dengan mengurutkan urutan kegiatan – kegiatan kritis hasil *crashing* diurutkan dari *cost slope* terkecil sebagai berikut:

Tabel 4.19. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Slope Terkecil hingga Terbesar pada Waktu Lembur 1 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp)
	Normal	Crash	Selisih	Normal	Crash	
BBPLB-3	6	5.32	0.68	269,927.98	272,097.98	2,170.00
BPLK-3	6	5.32	0.68	880,630.24	888,220.86	7,590.62
BPLK-3	6	5.32	0.68	1,327,762.83	1,338,698.45	10,935.62
BPLB-3	6	5.32	0.68	1,367,073.01	1,378,331.13	11,258.12
BPLB-2	6	5.32	0.68	1,367,073.01	1,378,331.13	11,258.12
PPLB-2	6	5.32	0.68	3,038,398.75	3,056,311.25	17,912.50
PBPLB-3	6	5.32	0.68	3,025,258.75	3,043,171.25	17,912.50
BPK-3	6	5.32	0.68	3,039,547.76	3,064,613.39	25,065.63
BBB-3	6	5.32	0.68	3,406,383.29	3,434,467.67	28,084.38
BBB-3	6	5.32	0.68	3,477,602.05	3,506,352.05	28,750.00
BBB-3	6	5.32	0.68	3,507,458.85	3,536,452.60	28,993.75
BBB-3	6	5.32	0.68	3,552,838.53	3,582,154.78	29,316.25
BPTB-3	6	5.32	0.68	4,479,478.10	4,516,406.85	36,928.75
PBB-3	6	5.32	0.68	7,877,108.25	7,923,683.25	46,575.00
BPLSW-2	6	5.32	0.68	5,857,977.99	5,906,243.62	48,265.63
BPLSW-3	6	5.32	0.68	5,857,977.99	5,906,243.62	48,265.63
PPTB-2	6	5.32	0.68	11,182,273.75	11,248,387.50	66,113.75
PPLSW-2	6	5.32	0.68	13,010,625.00	13,088,128.95	77,503.95
BPBB-1	6	5.32	0.68	20,327,539.30	20,495,153.05	167,613.75
BBB-3	6	5.32	0.68	20,327,539.30	20,495,203.05	167,663.75
BPK-3	6	5.32	0.68	22,347,726.29	22,532,051.29	184,325.00
KPLB-2	6	5.32	0.68	11,926,450.00	12,116,658.75	190,208.75
KBB-3	6	5.32	0.68	11,917,890.00	12,112,478.75	194,588.75
BPK-1	6	5.32	0.68	26,166,840.03	26,372,942.70	206,102.67
KPLSW-2	6	5.32	0.68	21,675,065.00	16,136,443.75	253,483.75
KPLB-1	6	5.32	0.68	15,882,960.00	21,932,740.63	257,675.63
KPLSW-1	6	5.32	0.68	28,171,645.00	28,506,581.88	334,936.88
PPK-3	6	5.32	0.68	62,015,721.00	62,382,102.25	366,381.25
PPK-1	6	5.32	0.68	72,632,850.00	73,041,922.43	409,072.43
BBPT-3	6	5.32	0.68	55,995,882.48	56,457,756.23	461,873.75
BBPT-1	6	5.32	0.68	67,283,355.89	67,838,147.77	554,791.88
KPK-2	6	5.32	0.68	38,110,300.00	38,731,301.88	621,001.88

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp)
	Normal	Crash	Selisih	Normal	Crash	
KBB-1	6	5.32	0.68	47,396,645.00	48,152,964.38	756,319.38
KPK-1	6	5.32	0.68	100,417,725.00	102,054,002.50	1,636,277.50
KBPT-3	6	5.32	0.68	127,837,110.00	129,920,550.00	2,083,440.00
KBPT-2	6	5.32	0.68	135,204,830.00	137,408,245.00	2,203,415.00

Tabel 4.20. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Slope Terkecil hingga Terbesar pada Waktu Lembur 2 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Normal	Crash	Selisih	Normal	Crash	
BBPLB-3	6	4.83	1.17	269,927.98	275,949.54	6,021.56
BPLK-3	6	4.83	1.17	880,630.24	901,110.24	20,480.00
BPLK-3	6	4.83	1.17	1,327,762.83	1,357,621.27	29,858.44
BPLB-3	6	4.83	1.17	1,367,073.01	1,397,780.82	30,707.81
BPLB-2	6	4.83	1.17	1,367,073.01	1,397,854.88	30,781.87
PPLB-2	6	4.83	1.17	3,038,398.75	3,087,257.50	48,858.75
PBPLB-3	6	4.83	1.17	3,025,258.75	3,074,192.50	48,933.75
BPK-3	6	4.83	1.17	3,039,547.76	3,107,782.76	68,235.00
BBB-3	6	4.83	1.17	3,406,383.29	3,628,946.86	76,108.33
BBB-3	6	4.83	1.17	3,477,602.05	3,483,502.98	77,119.69
BBB-3	6	4.83	1.17	3,507,458.85	3,555,790.49	78,188.44
BBB-3	6	4.83	1.17	3,552,838.53	3,586,393.54	78,934.69
BPTB-3	6	4.83	1.17	4,479,478.10	4,580,209.66	100,731.56
PBB-3	6	4.83	1.17	7,877,108.25	8,004,004.50	126,896.25
BPLSW-2	6	4.83	1.17	5,857,977.99	5,989,061.12	131,083.13
BPLSW-3	6	4.83	1.17	5,857,977.99	5,989,727.68	131,749.69
PPTB-2	6	4.83	1.17	11,182,273.75	11,362,311.25	180,037.50
PPLSW-2	6	4.83	1.17	13,010,625.00	13,220,100.94	209,475.94
BPBB-1	6	4.83	1.17	20,327,539.30	20,784,134.61	456,595.31
BBB-3	6	4.83	1.17	20,327,539.30	20,784,338.98	456,799.68
BPK-3	6	4.83	1.17	22,347,726.29	22,849,794.10	502,067.81
KPLB-2	6	4.83	1.17	11,926,450.00	12,444,701.88	518,251.88
KBB-3	6	4.83	1.17	11,917,890.00	12,446,724.38	528,834.38
BPK-1	6	4.83	1.17	26,166,840.03	26,754,686.28	587,846.25
KPLSW-2	6	4.83	1.17	21,675,065.00	16,573,595.63	690,635.63
KPLB-1	6	4.83	1.17	15,882,960.00	22,377,044.38	701,979.38
KPLSW-1	6	4.83	1.17	28,171,645.00	29,084,048.13	912,403.13
PPK-3	6	4.83	1.17	62,015,721.00	63,013,794.75	998,073.75
PPK-1	6	4.83	1.17	72,632,850.00	73,801,595.63	1,168,745.63
BBPT-3	6	4.83	1.17	55,995,882.48	57,253,925.92	1,258,043.44

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Normal	Crash	Selisih	Normal	Crash	
BBPT-1	6	4.83	1.17	67,283,355.89	68,795,435.58	1,512,079.69
KPK-2	6	4.83	1.17	38,110,300.00	39,802,081.56	1,691,781.56
KBB-1	6	4.83	1.17	47,396,645.00	49,456,910.00	2,060,265.00
KPK-1	6	4.83	1.17	100,417,725.00	104,875,207.50	4,457,482.50
KBPT-3	6	4.83	1.17	127,837,110.00	133,512,699.38	5,675,589.38
KBPT-2	6	4.83	1.17	135,204,830.00	141,207,156.88	6,002,326.88

Tabel 4.21. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Slope Terkecil hingga Terbesar pada Waktu Lembur 3 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Normal	Crash	Selisih	Normal	Crash	
BBPLB-3	6	4.47	1.53	269,927.98	279,291.52	9,363.54
BPLK-3	6	4.47	1.53	880,630.24	911,946.90	31,316.66
BPLK-3	6	4.47	1.53	1,327,762.83	1,373,692.00	45,929.17
BPLB-3	6	4.47	1.53	1,367,073.01	1,414,517.80	47,444.79
BPLB-2	6	4.47	1.53	1,367,073.01	1,414,583.42	47,510.41
PPLB-2	6	4.47	1.53	3,038,398.75	3,113,768.56	75,369.81
PBPLB-3	6	4.47	1.53	3,025,258.75	3,100,628.56	75,369.81
BPK-3	6	4.47	1.53	3,039,547.76	3,144,781.10	105,233.34
BBB-3	6	4.47	1.53	3,406,383.29	3,524,579.13	118,195.84
BBB-3	6	4.47	1.53	3,477,602.05	3,598,191.64	120,589.59
BBB-3	6	4.47	1.53	3,507,458.85	3,629,140.11	121,681.26
BBB-3	6	4.47	1.53	3,552,838.53	3,676,017.70	123,179.17
BPTB-3	6	4.47	1.53	4,479,478.10	4,634,741.64	155,263.54
PBB-3	6	4.47	1.53	7,877,108.25	8,072,826.00	195,717.75
BPLSW-2	6	4.47	1.53	5,857,977.99	6,061,062.37	203,084.38
BPLSW-3	6	4.47	1.53	5,857,977.99	6,061,062.37	203,084.38
PPTB-2	6	4.47	1.53	11,182,273.75	11,460,085.26	277,811.51
PPLSW-2	6	4.47	1.53	13,010,625.00	13,333,580.27	322,955.27
BPBB-1	6	4.47	1.53	20,327,539.30	21,032,020.55	704,481.25
BBB-3	6	4.47	1.53	20,327,539.30	21,032,020.55	704,481.25
BPK-3	6	4.47	1.53	22,347,726.29	23,122,146.09	774,419.80
KPLB-2	6	4.47	1.53	11,926,450.00	12,725,891.55	799,441.55
KBB-3	6	4.47	1.53	11,917,890.00	12,733,570.09	815,680.09
BPK-1	6	4.47	1.53	26,166,840.03	27,073,707.75	906,867.72
KPLSW-2	6	4.47	1.53	21,675,065.00	22,757,886.72	1,082,821.72
KPLB-1	6	4.47	1.53	15,882,960.00	16,972,468.17	1,089,508.17
KPLSW-1	6	4.47	1.53	28,171,645.00	29,579,121.88	1,407,476.88
PPK-3	6	4.47	1.53	62,015,721.00	63,555,271.31	1,539,550.31

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Normal	Crash	Selisih	Normal	Crash	
PPK-1	6	4.47	1.53	72,632,850.00	74,435,708.70	1,802,858.70
BBPT-3	6	4.47	1.53	55,995,882.48	57,936,396.05	1,940,513.57
BBPT-1	6	4.47	1.53	67,283,355.89	69,615,067.38	2,331,711.49
KPK-2	6	4.47	1.53	38,110,300.00	40,720,015.24	2,609,715.24
KBB-1	6	4.47	1.53	47,396,645.00	50,574,766.41	3,178,121.41
KPK-1	6	4.47	1.53	100,417,725.00	107,293,775.04	6,876,050.04
KBPT-3	6	4.47	1.53	127,837,110.00	136,592,051.43	8,754,941.43
KBPT-2	6	4.47	1.53	135,204,830.00	144,463,843.23	9,259,013.23

Berdasarkan nilai *cost slope* didapatkan juga nilai *cost variance* yang merupakan selisih antara biaya normal dan biaya *crashing*. Selisih biaya terkecil hingga terbesar dapat dilihat pada *Tabel 4.22*, *Tabel 4.23*, dan *Tabel 4.24* sebagai berikut:

Tabel 4.22. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Variance Terkecil hingga Terbesar pada Waktu Lembur 1 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp)
	Normal	Crash	Selisih	Normal	Crash	
BBPLB-3	6	5.32	0.68	269,927.98	272,097.98	3,191.18
BPLK-3	6	5.32	0.68	880,630.24	888,220.86	11,162.68
BPLK-3	6	5.32	0.68	1,327,762.83	1,338,698.45	16,081.79
BPLB-3	6	5.32	0.68	1,367,073.01	1,378,331.13	16,556.06
BPLB-2	6	5.32	0.68	1,367,073.01	1,378,331.13	16,556.06
PPLB-2	6	5.32	0.68	3,038,398.75	3,056,311.25	26,341.91
PBPLB-3	6	5.32	0.68	3,025,258.75	3,043,171.25	26,341.91
BPK-3	6	5.32	0.68	3,039,547.76	3,064,613.39	36,861.22
BBB-3	6	5.32	0.68	3,406,383.29	3,434,467.67	41,300.56
BBB-3	6	5.32	0.68	3,477,602.05	3,506,352.05	42,279.41
BBB-3	6	5.32	0.68	3,507,458.85	3,536,452.60	42,637.87
BBB-3	6	5.32	0.68	3,552,838.53	3,582,154.78	43,112.13
BPTB-3	6	5.32	0.68	4,479,478.10	4,516,406.85	54,306.99
PBB-3	6	5.32	0.68	7,877,108.25	7,923,683.25	68,492.65
BPLSW-2	6	5.32	0.68	5,857,977.99	5,906,243.62	70,978.87
BPLSW-3	6	5.32	0.68	5,857,977.99	5,906,243.62	70,978.87
PPTB-2	6	5.32	0.68	11,182,273.75	11,248,387.50	97,226.10
PPLSW-2	6	5.32	0.68	13,010,625.00	13,088,128.95	113,976.40
BPBB-1	6	5.32	0.68	20,327,539.30	20,495,153.05	246,490.81
BBB-3	6	5.32	0.68	20,327,539.30	20,495,203.05	246,564.34
BPK-3	6	5.32	0.68	22,347,726.29	22,532,051.29	271,066.18

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp)
	Normal	Crash	Selisih	Normal	Crash	
KPLB-2	6	5.32	0.68	11,926,450.00	12,116,658.75	279,718.75
KBB-3	6	5.32	0.68	11,917,890.00	12,112,478.75	286,159.93
BPK-1	6	5.32	0.68	26,166,840.03	26,372,942.70	303,092.16
KPLSW-2	6	5.32	0.68	21,675,065.00	16,136,443.75	372,770.22
KPLB-1	6	5.32	0.68	15,882,960.00	21,932,740.63	378,934.75
KPLSW-1	6	5.32	0.68	28,171,645.00	28,506,581.88	492,554.24
PPK-3	6	5.32	0.68	62,015,721.00	62,382,102.25	538,795.96
PPK-1	6	5.32	0.68	72,632,850.00	73,041,922.43	601,577.10
BBPT-3	6	5.32	0.68	55,995,882.48	56,457,756.23	679,226.10
BBPT-1	6	5.32	0.68	67,283,355.89	67,838,147.77	815,870.41
KPK-2	6	5.32	0.68	38,110,300.00	38,731,301.88	913,238.06
KBB-1	6	5.32	0.68	47,396,645.00	48,152,964.38	1,112,234.38
KPK-1	6	5.32	0.68	100,417,725.00	102,054,002.50	2,406,290.44
KBPT-3	6	5.32	0.68	127,837,110.00	129,920,550.00	3,063,882.35
KBPT-2	6	5.32	0.68	135,204,830.00	137,408,245.00	3,240,316.18

Tabel 4.23. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Variance Terkecil hingga Terbesar pada Waktu Lembur 2 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp)
	Normal	Crash	Selisih	Normal	Crash	
BBPLB-3	6	4.83	1.17	269,927.98	275,949.54	5,146.63
BPLK-3	6	4.83	1.17	880,630.24	901,110.24	17,504.27
BPLK-3	6	4.83	1.17	1,327,762.83	1,357,621.27	25,520.03
BPLB-3	6	4.83	1.17	1,367,073.01	1,397,780.82	26,245.99
BPLB-2	6	4.83	1.17	1,367,073.01	1,397,854.88	26,309.29
PPLB-2	6	4.83	1.17	3,038,398.75	3,087,257.50	41,759.62
PBPLB-3	6	4.83	1.17	3,025,258.75	3,074,192.50	41,823.72
BPK-3	6	4.83	1.17	3,039,547.76	3,107,782.76	58,320.51
BBB-3	6	4.83	1.17	3,406,383.29	3,628,946.86	65,049.85
BBB-3	6	4.83	1.17	3,477,602.05	3,483,502.98	65,914.26
BBB-3	6	4.83	1.17	3,507,458.85	3,555,790.49	66,827.73
BBB-3	6	4.83	1.17	3,552,838.53	3,586,393.54	67,465.55
BPTB-3	6	4.83	1.17	4,479,478.10	4,580,209.66	86,095.35
PBB-3	6	4.83	1.17	7,877,108.25	8,004,004.50	108,458.33
BPLSW-2	6	4.83	1.17	5,857,977.99	5,989,061.12	112,036.86
BPLSW-3	6	4.83	1.17	5,857,977.99	5,989,727.68	112,606.57
PPTB-2	6	4.83	1.17	11,182,273.75	11,362,311.25	153,878.21
PPLSW-2	6	4.83	1.17	13,010,625.00	13,220,100.94	179,039.26
BPBB-1	6	4.83	1.17	20,327,539.30	20,784,134.61	390,252.40

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp)
	Normal	Crash	Selisih	Normal	Crash	
BBB-3	6	4.83	1.17	20,327,539.30	20,784,338.98	390,427.08
BPK-3	6	4.83	1.17	22,347,726.29	22,849,794.10	429,117.79
KPLB-2	6	4.83	1.17	11,926,450.00	12,444,701.88	442,950.32
KBB-3	6	4.83	1.17	11,917,890.00	12,446,724.38	451,995.20
BPK-1	6	4.83	1.17	26,166,840.03	26,754,686.28	502,432.69
KPLSW-2	6	4.83	1.17	21,675,065.00	16,573,595.63	590,286.86
KPLB-1	6	4.83	1.17	15,882,960.00	22,377,044.38	599,982.38
KPLSW-1	6	4.83	1.17	28,171,645.00	29,084,048.13	779,831.74
PPK-3	6	4.83	1.17	62,015,721.00	63,013,794.75	853,054.49
PPK-1	6	4.83	1.17	72,632,850.00	73,801,595.63	998,927.89
BBPT-3	6	4.83	1.17	55,995,882.48	57,253,925.92	1,075,250.80
BBPT-1	6	4.83	1.17	67,283,355.89	68,795,435.58	1,292,375.80
KPK-2	6	4.83	1.17	38,110,300.00	39,802,081.56	1,445,967.15
KBB-1	6	4.83	1.17	47,396,645.00	49,456,910.00	1,760,910.26
KPK-1	6	4.83	1.17	100,417,725.00	104,875,207.50	3,809,814.10
KBPT-3	6	4.83	1.17	127,837,110.00	133,512,699.38	4,850,931.09
KBPT-2	6	4.83	1.17	135,204,830.00	141,207,156.88	5,130,193.91

Tabel 4.24. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Variance Terkecil hingga Terbesar pada Waktu Lembur 3 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp)
	Normal	Crash	Selisih	Normal	Crash	
BBPLB-3	6	4.47	1.53	269,927.98	279,291.52	6,119.96
BPLK-3	6	4.47	1.53	880,630.24	911,946.90	20,468.41
BPLK-3	6	4.47	1.53	1,327,762.83	1,373,692.00	30,019.07
BPLB-3	6	4.47	1.53	1,367,073.01	1,414,517.80	31,009.67
BPLB-2	6	4.47	1.53	1,367,073.01	1,414,583.42	31,052.56
PPLB-2	6	4.47	1.53	3,038,398.75	3,113,768.56	49,261.31
PBPLB-3	6	4.47	1.53	3,025,258.75	3,100,628.56	49,261.31
BPK-3	6	4.47	1.53	3,039,547.76	3,144,781.10	68,779.96
BBB-3	6	4.47	1.53	3,406,383.29	3,524,579.13	77,252.18
BBB-3	6	4.47	1.53	3,477,602.05	3,598,191.64	78,816.73
BBB-3	6	4.47	1.53	3,507,458.85	3,629,140.11	79,530.24
BBB-3	6	4.47	1.53	3,552,838.53	3,676,017.70	80,509.26
BPTB-3	6	4.47	1.53	4,479,478.10	4,634,741.64	101,479.44
PBB-3	6	4.47	1.53	7,877,108.25	8,072,826.00	127,920.10
BPLSW-2	6	4.47	1.53	5,857,977.99	6,061,062.37	132,734.89
BPLSW-3	6	4.47	1.53	5,857,977.99	6,061,062.37	132,734.89
PPTB-2	6	4.47	1.53	11,182,273.75	11,460,085.26	181,576.15

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp)
	Normal	Crash	Selisih	Normal	Crash	
PPLSW-2	6	4.47	1.53	13,010,625.00	13,333,580.27	211,081.88
BPBB-1	6	4.47	1.53	20,327,539.30	21,032,020.55	460,445.26
BBB-3	6	4.47	1.53	20,327,539.30	21,032,020.55	460,445.26
BPK-3	6	4.47	1.53	22,347,726.29	23,122,146.09	506,156.73
KPLB-2	6	4.47	1.53	11,926,450.00	12,725,891.55	522,510.82
KBB-3	6	4.47	1.53	11,917,890.00	12,733,570.09	533,124.24
BPK-1	6	4.47	1.53	26,166,840.03	27,073,707.75	592,724.00
KPLSW-2	6	4.47	1.53	21,675,065.00	22,757,886.72	707,726.61
KPLB-1	6	4.47	1.53	15,882,960.00	16,972,468.17	712,096.84
KPLSW-1	6	4.47	1.53	28,171,645.00	29,579,121.88	919,919.53
PPK-3	6	4.47	1.53	62,015,721.00	63,555,271.31	1,006,242.03
PPK-1	6	4.47	1.53	72,632,850.00	74,435,708.70	1,178,339.02
BBPT-3	6	4.47	1.53	55,995,882.48	57,936,396.05	1,268,309.52
BBPT-1	6	4.47	1.53	67,283,355.89	69,615,067.38	1,523,994.44
KPK-2	6	4.47	1.53	38,110,300.00	40,720,015.24	1,705,696.24
KBB-1	6	4.47	1.53	47,396,645.00	50,574,766.41	2,077,203.54
KPK-1	6	4.47	1.53	100,417,725.00	107,293,775.04	4,494,150.35
KBPT-3	6	4.47	1.53	127,837,110.00	136,592,051.43	5,722,183.94
KBPT-2	6	4.47	1.53	135,204,830.00	144,463,843.23	6,051,642.63

4.4.4. Analisis Biaya Total

Selanjutnya setelah perhitungan analisis tersebut di atas, maka dapat ditemukan analisis biaya langsung, analisis biaya tidak langsung, dan analisis total biaya. Berikut ini merupakan rincian analisis biaya yang telah dibuat menggunakan aplikasi *Microsoft Excel 2013* berdasarkan hasil perhitungan *Microsoft Project 2013* :

1. Analisis Biaya Tidak Langsung

Biaya tidak langsung adalah hasil antara perkalian biaya normal pada aplikasi *Microsoft Project 2013* dengan presentase biaya tidak langsung, di mana perhitungan presentase biaya tidak langsung adalah sebagai berikut:

$$y = -0,95 - 4.888(\ln(x1 - 0.21) - \ln(x2)) + \varepsilon$$

dimana:

$x1$ = Nilai total proyek

$x2$ = Durasi proyek

ε = random error

y = Prosentase biaya tak langsung

sehingga biaya tidak langsung dari proyek adalah sebagai berikut :

x_1 = Rp. 6,119,074,362.80

x_2 = 90 hari

ε = random error

y = $-0,95 - 4.888(\ln(x_1 - 0.21) - \ln(x_2)) + \varepsilon$

= $-0,95 - 4.888(\ln(\text{Rp. } 6,119,074,362.80 - 0.21) - \ln(90)) + \varepsilon$

= 12.362%

Biaya tidak langsung = $y \times x_1$

= 12.362% \times Rp. 6,119,074,362.80

= Rp. 932,222,113.57

Perhitungan analisis biaya tidak langsung terangkum pada *Tabel 4.24*, *Tabel 4.25*, dan *Tabel 4.26* sebagai berikut:

Tabel 4.25. Hasil Perhitungan Biaya Tidak Langsung pada Lembur 1 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung (Rp.)
	Normal	Crash	Selisih		
				162	932,222,113.57
BBPLB-3	5.32	6	0.68	161.32	928,309,082.48
BPLK-3	5.32	6	0.68	160.64	924,396,051.38
BPLK-3	5.32	6	0.68	159.96	920,483,020.29
BPLB-2	5.32	6	0.68	159.28	916,569,989.20
BPLB-3	5.32	6	0.68	158.60	912,656,958.10
PBPLB-3	5.32	6	0.68	157.92	908,723,531.46
PPLB-2	5.32	6	0.68	157.24	904,810,500.37
BPK-3	5.32	6	0.68	156.56	900,897,469.27
BBB-3	5.32	6	0.68	155.88	896,984,438.18
BBB-3	5.32	6	0.68	155.20	893,071,407.09
BBB-3	5.32	6	0.68	154.52	889,158,375.99
BBB-3	5.32	6	0.68	153.84	885,245,344.90
BPTB-3	5.32	6	0.68	153.16	881,332,313.80
BBPT-1	5.32	6	0.68	152.47	877,398,887.16
PBB-3	5.32	6	0.68	151.79	873,485,856.07
BPLSW-2	5.32	6	0.68	151.11	869,572,824.98
BPLSW-3	5.32	6	0.68	150.43	865,639,398.34
KPLB-1	5.32	6	0.68	149.75	861,726,367.24

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung (Rp.)
	Normal	Crash	Selisih		
PPTB-2	10.63	12	1.37	148.38	853,859,513.96
PPLSW-2	21.27	24	2.73	145.65	838,125,807.41
BPBB-1	10.63	12	1.37	144.28	830,258,954.13
BBB-3	21.27	24	2.73	141.55	814,525,247.57
BPK-3	5.32	6	0.68	140.87	810,612,216.47
KPLB-2	5.32	6	0.68	140.19	806,699,185.38
KBB-3	5.32	6	0.68	139.50	802,765,758.74
BPK-1	10.63	12	1.37	138.14	794,898,905.46
KPLSW-2	5.32	6	0.68	137.46	790,985,874.37
KPLSW-1	10.63	12	1.37	136.09	783,119,021.09
PPK-3	5.32	6	0.68	135.41	779,205,989.99
PPK-1	15.95	18	2.05	133.36	767,405,710.08
BBPT-3	5.32	6	0.68	132.67	763,472,283.44
KPK-2	10.63	12	1.37	131.31	755,605,430.16
KBB-1	26.58	30	3.42	127.89	735,938,296.96
KPK-1	5.32	6	0.68	127.21	732,025,265.87
KBPT-3	21.27	24	2.73	124.48	716,291,559.31
KBPT-2	15.95	18	2.05	122.43	704,491,279.39

Tabel 4.26. Hasil Perhitungan Biaya Tidak Langsung pada Lembur 2 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung (Rp.)
	Normal	Crash	Selisih		
				162	932,222,113.57
BBPLB-3	4.83	6	1.17	160.83	925,489,398.31
BPLK-3	4.83	6	1.17	159.66	918,756,683.04
BPLK-3	4.83	6	1.17	158.49	912,023,967.78
BPLB-2	4.83	6	1.17	157.32	905,277,362.44
BPLB-3	4.83	6	1.17	156.15	898,544,647.18
PBPLB-3	4.83	6	1.17	154.98	891,811,931.91
PPLB-2	4.83	6	1.17	153.81	885,079,216.65
BPK-3	4.83	6	1.17	152.64	878,332,611.31
BBB-3	4.83	6	1.17	151.47	871,599,896.05
BBB-3	4.83	6	1.17	150.30	864,867,180.79
BBB-3	4.83	6	1.17	149.13	858,134,465.52
BBB-3	4.83	6	1.17	147.96	851,401,750.26
BPTB-3	4.83	6	1.17	146.79	844,669,034.99
BBPT-1	4.83	6	1.17	145.62	837,936,319.73
PBB-3	4.83	6	1.17	144.45	831,203,604.46

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung (Rp.)
	Normal	Crash	Selisih		
BPLSW-2	4.83	6	1.17	143.28	824,470,889.20
BPLSW-3	4.83	6	1.17	142.10	817,724,283.86
KPLB-1	4.83	6	1.17	140.93	810,991,568.60
PPTB-2	19.31	24	4.69	136.24	784,005,147.26
PPLSW-2	9.66	12	2.34	133.90	770,511,936.59
BPBB-1	19.31	24	4.69	129.21	743,525,515.25
BBB-3	4.83	6	1.17	128.04	736,778,909.92
BPK-3	4.83	6	1.17	126.87	730,046,194.65
KPLB-2	9.66	12	2.34	124.52	716,552,983.98
KBB-3	4.83	6	1.17	123.35	709,820,268.72
BPK-1	4.83	6	1.17	122.18	703,087,553.46
KPLSW-2	9.66	12	2.34	119.84	689,594,342.79
KPLSW-1	9.66	12	2.34	117.49	676,101,132.12
PPK-3	14.48	18	3.52	113.97	655,861,316.11
PPK-1	4.83	6	1.17	112.80	649,128,600.85
BBPT-3	4.83	6	1.17	111.63	642,395,885.58
KPK-2	9.66	12	2.34	109.29	628,902,674.92
KBB-1	24.14	30	5.86	103.43	595,169,648.24
KPK-1	4.83	6	1.17	102.26	588,423,042.91
KBPT-3	19.31	24	4.69	97.57	561,436,621.57
KBPT-2	14.48	18	3.52	94.05	541,196,805.57

Tabel 4.27. Hasil Perhitungan Biaya Tidak Langsung pada Lembur 3 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung (Rp.)
	Normal	Crash	Selisih		
				90	756,414,913.52
BBPLB-3	6	4.47	1.53	88.47	743,555,859.99
BPLK-3	6	4.47	1.53	86.94	730,696,806.46
BPLK-3	6	4.47	1.53	85.41	717,837,752.93
BPLB-2	6	4.47	1.53	83.88	704,978,699.40
BPLB-3	6	4.47	1.53	82.35	692,119,645.87
PBPLB-3	6	4.47	1.53	80.82	679,260,592.34
PPLB-2	6	4.47	1.53	79.29	666,401,538.81
BPK-3	6	4.47	1.53	77.76	653,542,485.28
BBB-3	6	4.47	1.53	76.23	640,683,431.75
BBB-3	6	4.47	1.53	74.70	627,824,378.22
BBB-3	6	4.47	1.53	73.17	614,965,324.69
BBB-3	6	4.47	1.53	71.64	602,106,271.16

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung (Rp.)
	Normal	Crash	Selisih		
BPTB-3				162	932,222,113.57
BBPT-1	4.47	6	1.53	160.47	923,417,793.61
PBB-3	4.47	6	1.53	158.94	914,613,473.65
BPLSW-2	4.47	6	1.53	157.41	905,809,153.69
BPLSW-3	4.47	6	1.53	155.88	897,004,833.73
KPLB-1	4.47	6	1.53	154.35	888,200,513.76
PPTB-2	4.47	6	1.53	152.82	879,396,193.80
PPLSW-2	4.47	6	1.53	151.29	870,591,873.84
BPBB-1	4.47	6	1.53	149.76	861,787,553.88
BBB-3	4.47	6	1.53	148.23	852,983,233.92
BPK-3	4.47	6	1.53	146.70	844,178,913.96
KPLB-2	4.47	6	1.53	145.17	835,374,594.00
KBB-3	4.47	6	1.53	143.64	826,570,274.03
BPK-1	4.47	6	1.53	142.11	817,765,954.07
KPLSW-2	4.47	6	1.53	140.58	808,961,634.11
KPLSW-1	4.47	6	1.53	139.05	800,157,314.15
PPK-3	4.47	6	1.53	137.52	791,352,994.19
PPK-1	4.47	6	1.53	135.99	782,548,674.23
BBPT-3	4.47	6	1.53	134.46	773,744,354.26
KPK-2	8.94	12	3.06	131.40	756,113,675.99
KBB-1	17.87	24	6.13	125.27	720,852,319.45
KPK-1	8.94	12	3.06	122.20	703,221,641.18
KBPT-3	17.87	24	6.13	116.08	667,960,284.64
KBPT-2	4.47	6	1.53	114.55	659,155,964.68

Berdasarkan tabel di atas, untuk mencari biaya tidak langsung selanjutnya adalah dengan cara sebagai berikut :

Biaya tidak langsung akibat percepatan (Kode BBPT-1) :

Nilai Kumulatif didapatkan melalui persamaan :

= Nilai Kumulatif Sebelumnya – Selisih Durasi

Lembur 1 jam = 81.16 – 0.68

= 80.84

Lembur 2 jam = 74.79 – 1.17

= 73.62

Lembur 3 jam = 70.11 – 1.53

= 68.58

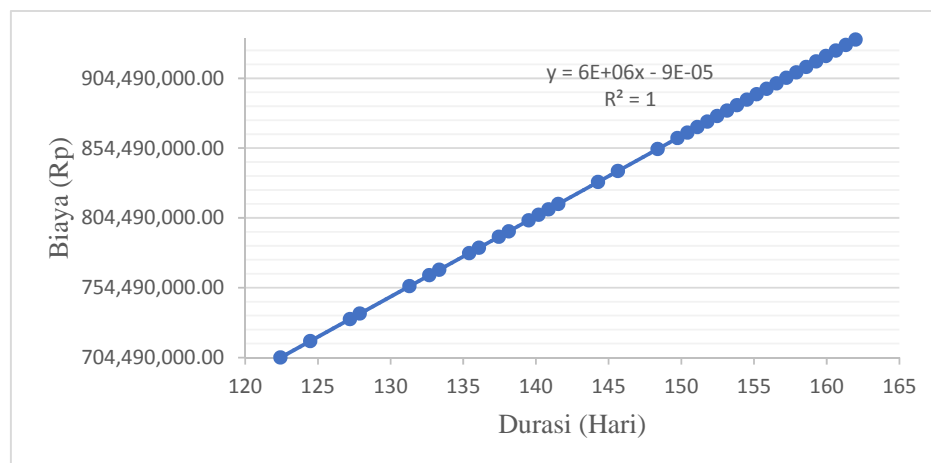
Perhitungan biaya tidak langsung :

$$\begin{aligned} \text{Lembur 1 jam} &= (\text{Rp. } 682,118,159.79 / 81.16) \times 80.84 \\ &= \text{Rp. } 676,403,024.89 \end{aligned}$$

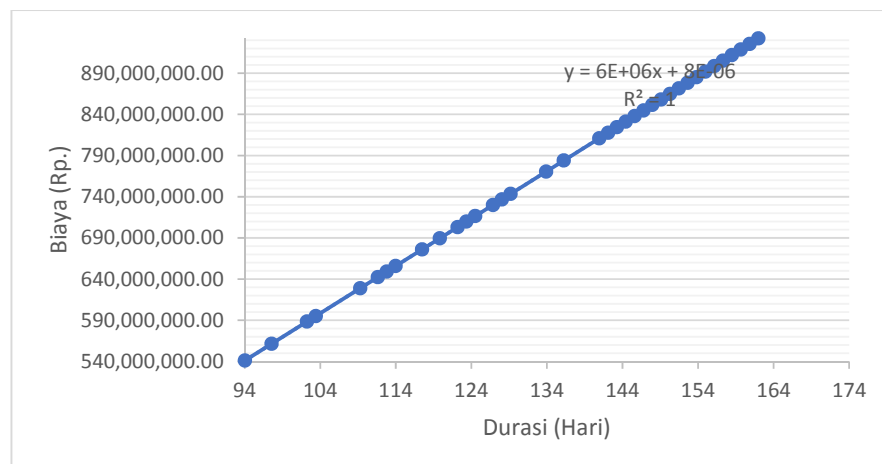
$$\begin{aligned} \text{Lembur 2 jam} &= (\text{Rp. } 628,580,793.14 / 74.79) \times 73.62 \\ &= \text{Rp. } 618,747,399.26 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 jam} &= (\text{Rp. } 589,247,217.63 / 70.11) \times 68.58 \\ &= \text{Rp. } 576,388,164.10 \end{aligned}$$

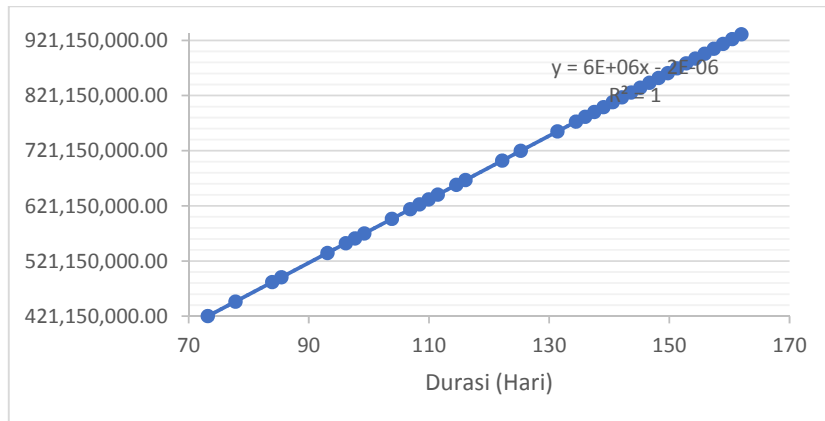
Dari tabel – tabel dapat disajikan grafik hubungan antara biaya tidak langsung dengan durasi kumulatif yang terlampir pada *Gambar 4.2*, *Gambar 4.3*, dan *Gambar 4.4* sebagai berikut :



Gambar 4.2. Grafik Biaya Tidak Langsung pada Lembur 1 Jam



Gambar 4.3. Grafik Biaya Tidak Langsung pada Lembur 2 Jam



Gambar 4.4. Grafik Biaya Tidak Langsung pada Lembur 3 Jam

2. Analisis Biaya Langsung

Biaya langsung dihasilkan melalui persamaan sebagai berikut :

Biaya Langsung = Biaya Normal pada Ms Project – Biaya Tdk Langsung

$$\begin{aligned} \text{Biaya Langsung} &= \text{Rp. } 6,119,074,362.80 - \text{Rp. } 932,222,113.57 \\ &= \text{Rp. } 5,362,659,449.29 \end{aligned}$$

Biaya hasil perhitungan biaya langsung lembur 1 jam, 2 jam, dan lembur 3 jam yang terlampir pada *Tabel 4.28*, *Tabel 4.29*, dan *Tabel 4.30* :

Tabel 4.28. Hasil Perhitungan Biaya Langsung pada Lembur 1 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung (Rp.)
	Normal	Crash	Selisih		
				162	932,222,113.57
BBPLB-3	4.47	6	1.53	160.47	923,417,793.61
BPLK-3	4.47	6	1.53	158.94	914,613,473.65
BPLK-3	4.47	6	1.53	157.41	905,809,153.69
BPLB-2	4.47	6	1.53	155.88	897,004,833.73
BPLB-3	4.47	6	1.53	154.35	888,200,513.76
PBPLB-3	4.47	6	1.53	152.82	879,396,193.80
PPLB-2	4.47	6	1.53	151.29	870,591,873.84
BPK-3	4.47	6	1.53	149.76	861,787,553.88
BBB-3	4.47	6	1.53	148.23	852,983,233.92
BBB-3	4.47	6	1.53	146.70	844,178,913.96
BBB-3	4.47	6	1.53	145.17	835,374,594.00
BBB-3	4.47	6	1.53	143.64	826,570,274.03
BPTB-3	4.47	6	1.53	142.11	817,765,954.07

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung (Rp.)
	Normal	Crash	Selisih		
BBPT-1	4.47	6	1.53	140.58	808,961,634.11
PBB-3	4.47	6	1.53	139.05	800,157,314.15
BPLSW-2	4.47	6	1.53	137.52	791,352,994.19
BPLSW-3	4.47	6	1.53	135.99	782,548,674.23
KPLB-1	4.47	6	1.53	134.46	773,744,354.26
PPTB-2	8.94	12	3.06	131.40	756,113,675.99
PPLSW-2	17.87	24	6.13	125.27	720,852,319.45
BPBB-1	8.94	12	3.06	122.20	703,221,641.18
BBB-3	17.87	24	6.13	116.08	667,960,284.64
BPK-3	4.47	6	1.53	114.55	659,155,964.68
KPLB-2	8.94	12	3.06	111.48	641,525,286.41
KBB-3	4.47	6	1.53	109.95	632,720,966.45
BPK-1	4.47	6	1.53	108.42	623,916,646.48
KPLSW-2	4.47	6	1.53	106.89	615,112,326.52
KPLSW-1	8.94	12	3.06	103.83	597,481,648.25
PPK-3	13.40	18	4.60	99.23	571,035,630.85
PPK-1	4.47	6	1.53	97.70	562,220,291.71
BBPT-3	4.47	6	1.53	96.17	553,415,971.75
KPK-2	8.94	12	3.06	93.11	535,785,293.48
KBB-1	22.34	30	7.66	85.45	491,708,597.80
KPK-1	4.47	6	1.53	83.92	482,893,258.66
KBPT-3	17.87	24	6.13	77.79	447,631,902.12
KBPT-2	13.40	18	4.60	73.19	421,185,884.72

Tabel 4.29. Hasil Perhitungan Biaya Langsung pada Lembur 2 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung (Rp.)
	Normal	Crash	Selisih		
				162	5,186,852,249.23
BBPLB-3	5.32	6	0.68	161.32	5,186,854,992.83
BPLK-3	5.32	6	0.68	160.64	5,186,861,707.66
BPLK-3	5.32	6	0.68	159.96	5,186,870,729.19
BPLB-2	5.32	6	0.68	159.28	5,186,880,197.33
BPLB-3	5.32	6	0.68	158.60	5,186,889,665.47
PBPLB-3	5.32	6	0.68	157.92	5,186,901,184.20
PPLB-2	5.32	6	0.68	157.24	5,186,919,814.41
BPK-3	5.32	6	0.68	156.56	5,186,944,473.14
BBB-3	5.32	6	0.68	155.88	5,186,969,702.84
BBB-3	5.32	6	0.68	155.20	5,186,995,660.68

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung (Rp.)
	Normal	Crash	Selisih		
BBB-3	5.32	6	0.68	154.52	5,187,022,631.45
BBB-3	5.32	6	0.68	153.84	5,187,049,747.97
BPTB-3	5.32	6	0.68	153.16	5,187,083,519.54
BBPT-1	5.32	6	0.68	152.47	5,187,128,872.11
PBB-3	5.32	6	0.68	151.79	5,187,174,224.68
BPLSW-2	5.32	6	0.68	151.11	5,187,224,821.93
BPLSW-3	5.32	6	0.68	150.43	5,187,292,243.79
KPLB-1	5.32	6	0.68	149.75	5,187,361,264.88
PPTB-2	10.63	12	1.37	148.38	5,187,519,864.08
PPLSW-2	21.27	24	2.73	145.65	5,187,925,037.84
BPBB-1	10.63	12	1.37	144.28	5,188,130,018.26
BBB-3	21.27	24	2.73	141.55	5,188,653,157.27
BPK-3	5.32	6	0.68	140.87	5,188,811,756.46
KPLB-2	5.32	6	0.68	140.19	5,188,983,340.71
KBB-3	5.32	6	0.68	139.50	5,189,158,151.14
BPK-1	10.63	12	1.37	138.14	5,189,510,742.60
KPLSW-2	5.32	6	0.68	137.46	5,189,686,319.61
KPLSW-1	10.63	12	1.37	136.09	5,190,124,110.95
PPK-3	5.32	6	0.68	135.41	5,190,361,788.08
PPK-1	15.95	18	2.05	133.36	5,191,081,049.55
BBPT-3	5.32	6	0.68	132.67	5,191,326,571.06
KPK-2	10.63	12	1.37	131.31	5,191,909,223.77
KBB-1	26.58	30	3.42	127.89	5,193,444,358.26
KPK-1	5.32	6	0.68	127.21	5,193,760,109.39
KBPT-3	21.27	24	2.73	124.48	5,195,841,979.38
KBPT-2	15.95	18	2.05	122.43	5,197,816,794.40

Tabel 4.30. Hasil Perhitungan Biaya Langsung pada Lembur 3 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung (Rp.)
	Normal	Crash	Selisih		
				162	5,186,852,249.23
BBPLB-3	4.83	6	1.17	160.83	5,186,853,626.91
BPLK-3	4.83	6	1.17	159.66	5,186,876,371.18
BPLK-3	4.83	6	1.17	158.49	5,186,903,670.13
BPLB-2	4.83	6	1.17	157.32	5,186,934,371.20
BPLB-3	4.83	6	1.17	156.15	5,186,965,072.28
PBPLB-3	4.83	6	1.17	154.98	5,187,010,360.69
PPLB-2	4.83	6	1.17	153.81	5,187,068,789.10

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung (Rp.)
	Normal	Crash	Selisih		
BPK-3	4.83	6	1.17	152.64	5,187,134,591.25
BBB-3	4.83	6	1.17	151.47	5,187,214,590.96
BBB-3	4.83	6	1.17	150.30	5,187,294,668.70
BBB-3	4.83	6	1.17	149.13	5,187,375,089.56
BBB-3	4.83	6	1.17	147.96	5,187,456,578.36
BPTB-3	4.83	6	1.17	146.79	5,187,559,966.11
BBPT-1	4.83	6	1.17	145.62	5,187,696,376.66
PBB-3	4.83	6	1.17	144.45	5,187,832,787.20
BPLSW-2	4.83	6	1.17	143.28	5,187,971,162.60
BPLSW-3	4.83	6	1.17	142.10	5,188,163,144.78
KPLB-1	4.83	6	1.17	140.93	5,188,376,988.00
PPTB-2	19.31	24	4.69	136.24	5,189,590,862.70
PPLSW-2	9.66	12	2.34	133.90	5,190,202,624.42
BPBB-1	19.31	24	4.69	129.21	5,191,771,677.02
BBB-3	4.83	6	1.17	128.04	5,192,246,271.77
BPK-3	4.83	6	1.17	126.87	5,192,765,212.94
KPLB-2	9.66	12	2.34	124.52	5,193,808,366.80
KBB-3	4.83	6	1.17	123.35	5,194,341,738.15
BPK-1	4.83	6	1.17	122.18	5,194,883,192.46
KPLSW-2	9.66	12	2.34	119.84	5,196,035,634.00
KPLSW-1	9.66	12	2.34	117.49	5,197,343,906.14
PPK-3	14.48	18	3.52	113.97	5,199,488,844.18
PPK-1	4.83	6	1.17	112.80	5,200,212,237.34
BBPT-3	4.83	6	1.17	111.63	5,200,935,646.53
KPK-2	9.66	12	2.34	109.29	5,202,688,920.78
KBB-1	24.14	30	5.86	103.43	5,207,308,550.17
KPK-1	4.83	6	1.17	102.26	5,208,255,583.59
KBPT-3	19.31	24	4.69	97.57	5,214,490,943.00
KBPT-2	14.48	18	3.52	94.05	5,220,393,104.65

Berdasarkan tabel di atas, untuk mencari biaya langsung selanjutnya adalah dengan cara sebagai berikut:

Biaya langsung akibat percepatan (Kode BBPT-1) :

Nilai Kumulatif didapatkan melalui persamaan :

= Nilai Kumulatif Sebelumnya – Selisih Durasi

Lembur 1 jam = 81.16 – 0.68

= 80.84

$$\begin{aligned}\text{Lembur 2 jam} &= 74.79 - 1.17 \\ &= 73.62\end{aligned}$$

$$\begin{aligned}\text{Lembur 3 jam} &= 70.11 - 1.53 \\ &= 68.58\end{aligned}$$

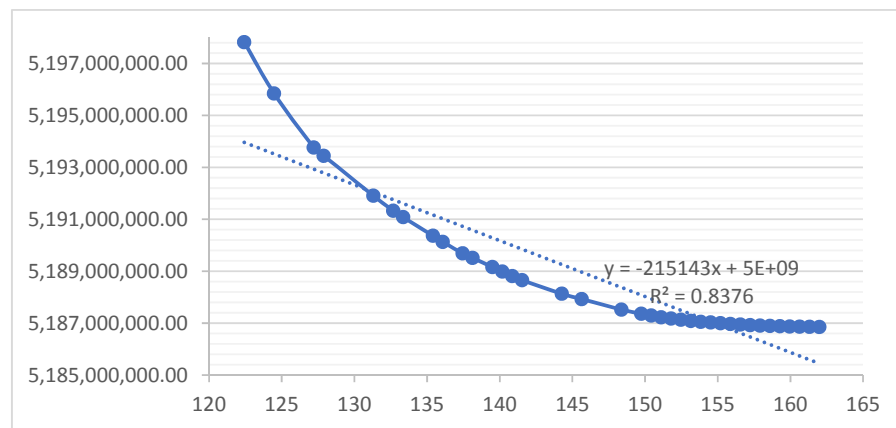
Perhitungan biaya langsung:

$$\begin{aligned}\text{Lembur 1 jam} &= \text{Rp. } 5,362,915,625.52 + \text{Rp. } 46,575.00 \\ &= \text{Rp. } 5,362,962,200.52\end{aligned}$$

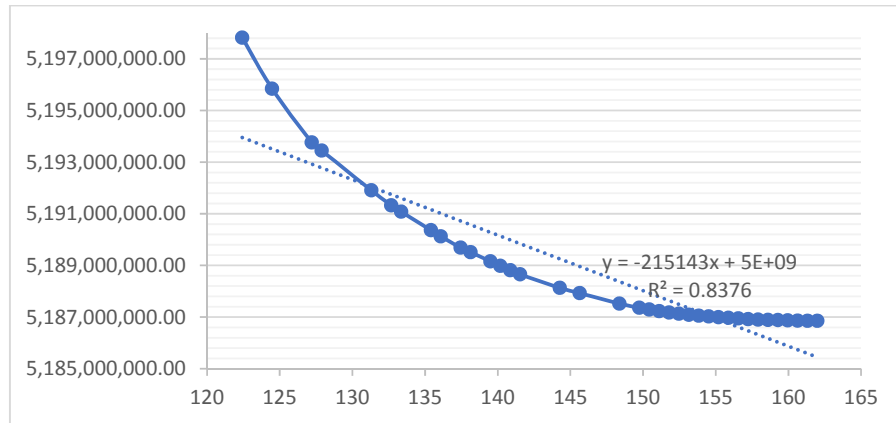
$$\begin{aligned}\text{Lembur 2 jam} &= \text{Rp. } 5,363,354,409.17 + \text{Rp. } 126,896.25 \\ &= \text{Rp. } 5,363,481,305.42\end{aligned}$$

$$\begin{aligned}\text{Lembur 3 jam} &= \text{Rp. } 5,363,931,613.96 + \text{Rp. } 195,717.75 \\ &= \text{Rp. } 5,364,134,698.34\end{aligned}$$

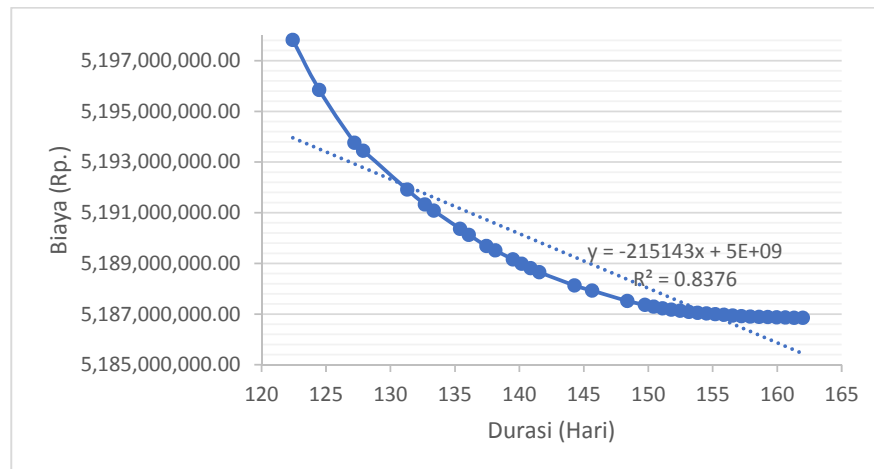
Dari tabel – tabel dapat disajikan grafik hubungan antara biaya tidak langsung dengan durasi kumulatif yang terlampir pada *Gambar 4.4*, *Gambar 4.5*, dan *Gambar 4.6* sebagai berikut :



Gambar 4.5. Grafik Biaya Langsung pada Lembur 1 Jam



Gambar 4.6. Grafik Biaya Langsung pada Lembur 2 Jam



Gambar 4.7. Grafik Biaya Langsung pada Lembur 3 Jam

3. Menentukan Biaya Total

Untuk menentukan total biaya terhadap total durasi proyek dapat dilakukan dengan persamaan sebagai berikut (Kode BBPT-1) :

Total biaya = biaya langsung + biaya tidak langsung

Sehingga nilai dari total biaya pada proyek sebagai berikut

$$\begin{aligned} \text{Total biaya} &= \text{Rp. } 5,362,962,200.52 + \text{Rp. } 676,403,024.89 \\ &= \text{Rp. } 6,039,365,225.41 \end{aligned}$$

Berikut tabel perbandingan biaya langsung, biaya tidak langsung dan total biaya :

Tabel 4.31. Hasil Perhitungan Biaya Total Lembur 1 Jam

Kode	Biaya Langsung (Rp.)	Biaya Tidak Langsung (Rp.)	Biaya Total (Rp.)
	5,186,852,249.23	932,222,113.57	6,119,074,362.80
BBPLB-3	5,186,854,992.83	928,309,082.48	6,115,164,075.31
BPLK-3	5,186,861,707.66	924,396,051.38	6,111,257,759.04
BPLK-3	5,186,870,729.19	920,483,020.29	6,107,353,749.48
BPLB-2	5,186,880,197.33	916,569,989.20	6,103,450,186.53
BPLB-3	5,186,889,665.47	912,656,958.10	6,099,546,623.57
PBPLB-3	5,186,901,184.20	908,723,531.46	6,095,624,715.66
PPLB-2	5,186,919,814.41	904,810,500.37	6,091,730,314.78
BPK-3	5,186,944,473.14	900,897,469.27	6,087,841,942.41
BBB-3	5,186,969,702.84	896,984,438.18	6,083,954,141.02
BBB-3	5,186,995,660.68	893,071,407.09	6,080,067,067.76
BBB-3	5,187,022,631.45	889,158,375.99	6,076,181,007.44
BBB-3	5,187,049,747.97	885,245,344.90	6,072,295,092.87
BPTB-3	5,187,083,519.54	881,332,313.80	6,068,415,833.34
BBPT-1	5,187,128,872.11	877,398,887.16	6,064,527,759.28
PBB-3	5,187,174,224.68	873,485,856.07	6,060,660,080.75
BPLSW-2	5,187,224,821.93	869,572,824.98	6,056,797,646.91
BPLSW-3	5,187,292,243.79	865,639,398.34	6,052,931,642.13
KPLB-1	5,187,361,264.88	861,726,367.24	6,049,087,632.13
PPTB-2	5,187,519,864.08	853,859,513.96	6,041,379,378.04
PPLSW-2	5,187,925,037.84	838,125,807.41	6,026,050,845.24
BPBB-1	5,188,130,018.26	830,258,954.13	6,018,388,972.38
BBB-3	5,188,653,157.27	814,525,247.57	6,003,178,404.83
BPK-3	5,188,811,756.46	810,612,216.47	5,999,423,972.94
KPLB-2	5,188,983,340.71	806,699,185.38	5,995,682,526.09
KBB-3	5,189,158,151.14	802,765,758.74	5,991,923,909.88
BPK-1	5,189,510,742.60	794,898,905.46	5,984,409,648.06
KPLSW-2	5,189,686,319.61	790,985,874.37	5,980,672,193.98
KPLSW-1	5,190,124,110.95	783,119,021.09	5,973,243,132.04
PPK-3	5,190,361,788.08	779,205,989.99	5,969,567,778.08
PPK-1	5,191,081,049.55	767,405,710.08	5,958,486,759.62
BBPT-3	5,191,326,571.06	763,472,283.44	5,954,798,854.50
KPK-2	5,191,909,223.77	755,605,430.16	5,947,514,653.92
KBB-1	5,193,444,358.26	735,938,296.96	5,929,382,655.22
KPK-1	5,193,760,109.39	732,025,265.87	5,925,785,375.26
KBPT-3	5,195,841,979.38	716,291,559.31	5,912,133,538.68
KBPT-2	5,197,816,794.40	704,491,279.39	5,902,308,073.79

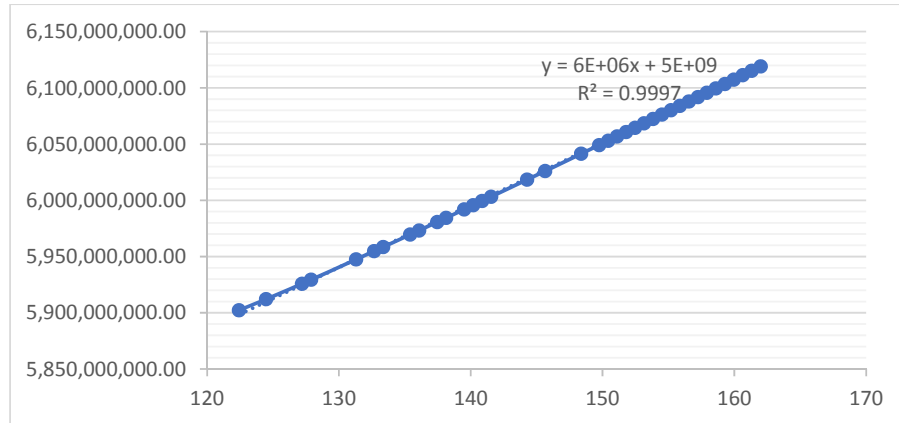
Tabel 4.32. Hasil Perhitungan Biaya Total Lembur 2 Jam

Kode	Biaya Langsung (Rp.)	Biaya Tidak Langsung (Rp.)	Biaya Total (Rp.)
	5,186,852,249.23	932,222,113.57	6,119,074,362.80
BBPLB-3	5,186,853,626.91	925,489,398.31	6,112,343,025.21
BPLK-3	5,186,876,371.18	918,756,683.04	6,105,633,054.23
BPLK-3	5,186,903,670.13	912,023,967.78	6,098,927,637.91
BPLB-2	5,186,934,371.20	905,277,362.44	6,092,211,733.65
BPLB-3	5,186,965,072.28	898,544,647.18	6,085,509,719.46
PBPLB-3	5,187,010,360.69	891,811,931.91	6,078,822,292.61
PPLB-2	5,187,068,789.10	885,079,216.65	6,072,148,005.75
BPK-3	5,187,134,591.25	878,332,611.31	6,065,467,202.56
BBB-3	5,187,214,590.96	871,599,896.05	6,058,814,487.01
BBB-3	5,187,294,668.70	864,867,180.79	6,052,161,849.49
BBB-3	5,187,375,089.56	858,134,465.52	6,045,509,555.08
BBB-3	5,187,456,578.36	851,401,750.26	6,038,858,328.62
BPTB-3	5,187,559,966.11	844,669,034.99	6,032,229,001.10
BBPT-1	5,187,696,376.66	837,936,319.73	6,025,632,696.38
PBB-3	5,187,832,787.20	831,203,604.46	6,019,036,391.66
BPLSW-2	5,187,971,162.60	824,470,889.20	6,012,442,051.80
BPLSW-3	5,188,163,144.78	817,724,283.86	6,005,887,428.64
KPLB-1	5,188,376,988.00	810,991,568.60	5,999,368,556.60
PPTB-2	5,189,590,862.70	784,005,147.26	5,973,596,009.96
PPLSW-2	5,190,202,624.42	770,511,936.59	5,960,714,561.01
BPBB-1	5,191,771,677.02	743,525,515.25	5,935,297,192.27
BBB-3	5,192,246,271.77	736,778,909.92	5,929,025,181.69
BPK-3	5,192,765,212.94	730,046,194.65	5,922,811,407.59
KPLB-2	5,193,808,366.80	716,552,983.98	5,910,361,350.78
KBB-3	5,194,341,738.15	709,820,268.72	5,904,162,006.87
BPK-1	5,194,883,192.46	703,087,553.46	5,897,970,745.92
KPLSW-2	5,196,035,634.00	689,594,342.79	5,885,629,976.79
KPLSW-1	5,197,343,906.14	676,101,132.12	5,873,445,038.26
PPK-3	5,199,488,844.18	655,861,316.11	5,855,350,160.30
PPK-1	5,200,212,237.34	649,128,600.85	5,849,340,838.19
BBPT-3	5,200,935,646.53	642,395,885.58	5,843,331,532.11
KPK-2	5,202,688,920.78	628,902,674.92	5,831,591,595.70
KBB-1	5,207,308,550.17	595,169,648.24	5,802,478,198.41
KPK-1	5,208,255,583.59	588,423,042.91	5,796,678,626.50
KBPT-3	5,214,490,943.00	561,436,621.57	5,775,927,564.57
KBPT-2	5,220,393,104.65	541,196,805.57	5,761,589,910.22

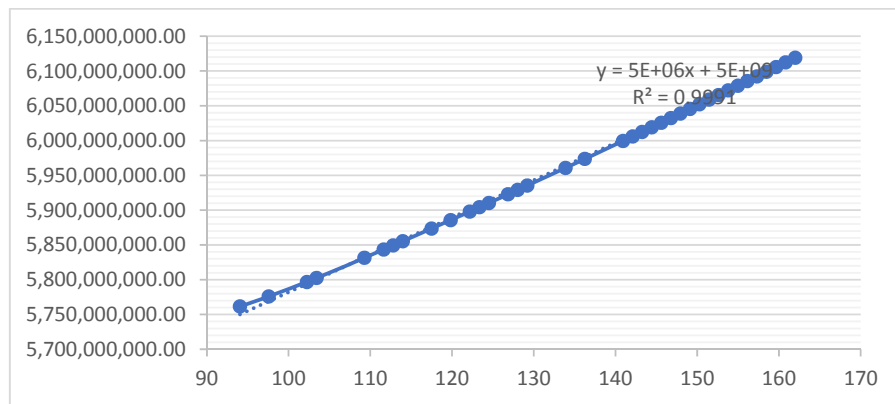
Tabel 4.33. Hasil Perhitungan Biaya Total Lembur 3 Jam

Kode	Biaya Langsung (Rp.)	Biaya Tidak Langsung (Rp.)	Biaya Total (Rp.)
	5,186,852,249.23	932,222,113.57	6,119,074,362.80
BBPLB-3	5,186,857,576.29	923,417,793.61	6,110,275,369.90
BPLK-3	5,186,893,470.93	914,613,473.65	6,101,506,944.58
BPLK-3	5,186,940,495.43	905,809,153.69	6,092,749,649.12
BPLB-2	5,186,991,543.82	897,004,833.73	6,083,996,377.54
BPLB-3	5,187,042,592.21	888,200,513.76	6,075,243,105.97
PBPLB-3	5,187,120,241.77	879,396,193.80	6,066,516,435.58
PPLB-2	5,187,211,031.34	870,591,873.84	6,057,802,905.18
BPK-3	5,187,322,037.87	861,787,553.88	6,049,109,591.75
BBB-3	5,187,452,867.81	852,983,233.92	6,040,436,101.73
BBB-3	5,187,584,655.33	844,178,913.96	6,031,763,569.28
BBB-3	5,187,717,965.32	835,374,594.00	6,023,092,559.31
BBB-3	5,187,851,698.22	826,570,274.03	6,014,421,972.25
BPTB-3	5,188,021,798.47	817,765,954.07	6,005,787,752.54
BBPT-1	5,188,244,290.81	808,961,634.11	5,997,205,924.92
PBB-3	5,188,467,961.30	800,157,314.15	5,988,625,275.45
BPLSW-2	5,188,691,631.80	791,352,994.19	5,980,044,625.99
BPLSW-3	5,189,002,978.89	782,548,674.23	5,971,551,653.12
KPLB-1	5,189,355,603.73	773,744,354.26	5,963,099,957.99
PPTB-2	5,190,084,067.59	756,113,675.99	5,946,197,743.58
PPLSW-2	5,192,072,912.38	720,852,319.45	5,912,925,231.84
BPBB-1	5,193,074,488.59	703,221,641.18	5,896,296,129.77
BBB-3	5,195,645,829.81	667,960,284.64	5,863,606,114.45
BPK-3	5,196,423,239.97	659,155,964.68	5,855,579,204.65
KPLB-2	5,198,128,152.93	641,525,286.41	5,839,653,439.34
KBB-3	5,198,979,962.80	632,720,966.45	5,831,700,929.24
BPK-1	5,199,856,939.52	623,916,646.48	5,823,773,586.01
KPLSW-2	5,200,749,010.43	615,112,326.52	5,815,861,336.95
KPLSW-1	5,202,891,455.69	597,481,648.25	5,800,373,103.94
PPK-3	5,206,402,605.46	571,035,630.85	5,777,438,236.31
PPK-1	5,207,583,969.66	562,220,291.71	5,769,804,261.37
BBPT-3	5,208,772,819.67	553,415,971.75	5,762,188,791.42
KPK-2	5,211,647,888.96	535,785,293.48	5,747,433,182.43
KBB-1	5,219,223,359.22	491,708,597.80	5,710,931,957.02
KPK-1	5,220,775,344.21	482,893,258.66	5,703,668,602.87
KBPT-3	5,230,990,951.37	447,631,902.12	5,678,622,853.49
KBPT-2	5,240,656,650.37	421,185,884.72	5,661,842,535.08

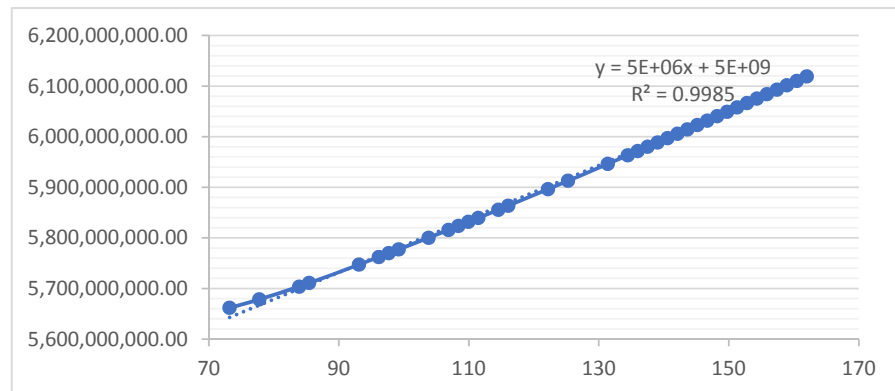
Dari tabel – tabel dapat disajikan grafik hubungan antara biaya tidak langsung dengan durasi kumulatif yang terlampir pada *Gambar 4.4*, *Gambar 4.5*, dan *Gambar 4.6* sebagai berikut :



Gambar 4.8. Grafik Biaya Total pada Lembur 1 Jam



Gambar 4.9. Grafik Biaya Total pada Lembur 2 Jam



Gambar 4.10. Grafik Biaya Total pada Lembur 3 Jam

4.4.5. Efisiensi Waktu dan Biaya

Berdasarkan hasil analisis durasi percepatan dan total biaya proyek dapat dihitung efisiensi waktu dan biaya dari proyek tersebut. Berikut contoh perhitungan analisis efisiensi waktu dan biaya proyek pada masing-masing jam lembur diambil dari salah satu pekerjaan dengan item pekerjaan Pengecoran Beton Pelat Lantai 1 :

1. Lembur 1 jam

Efisiensi waktu

$$\begin{aligned} Et &= \left(\frac{90-80.48}{90} \right) \times 100\% \\ &= 10.58\% \end{aligned}$$

Efisiensi Biaya :

$$\begin{aligned} Ec &= \left(\frac{\text{Rp. 6,119,074,362} - \text{Rp. 6,039,365,225.41}}{\text{Rp. 6,119,074,362}} \right) \times 100\% \\ &= 1.30\% \end{aligned}$$

2. Lembur 2 jam

Efisiensi waktu

$$\begin{aligned} Et &= \left(\frac{90-73.62}{90} \right) \times 100\% \\ &= 18.20\% \end{aligned}$$

Efisiensi Biaya :

$$\begin{aligned} Ec &= \left(\frac{\text{Rp. 6,119,074,362} - \text{Rp. 5,982,228,704.68}}{\text{Rp. 6,119,074,362}} \right) \times 100\% \\ &= 2.24\% \end{aligned}$$

3. Lembur 3 jam

Efisiensi waktu

$$\begin{aligned} Et &= \left(\frac{90-68.58}{90} \right) \times 100\% \\ &= 23.80\% \end{aligned}$$

Efisiensi Biaya :

$$\begin{aligned} Ec &= \left(\frac{\text{Rp. 6,119,074,362} - \text{Rp. 5,940,319,778.06}}{\text{Rp. 6,119,074,362}} \right) \times 100\% \\ &= 2.92\% \end{aligned}$$

Secara keseluruhan hasil perhitungan efisiensi waktu dan biaya dapat dilihat pada Tabel 4.33, Tabel 4.34 dan Tabel 4.34 sebagai berikut:

Tabel 4.34. Hasil Perhitungan Efisiensi Waktu dan Biaya pada Lembur 1 Jam

Kode	Kumulatif	Biaya Total (Rp.)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	162	6,119,074,362.80	0.00	0.00
BBPLB-3	161.32	6,115,164,075.31	0.42	0.06
BPLK-3	160.64	6,111,257,759.04	0.84	0.13
BPLK-3	159.96	6,107,353,749.48	1.26	0.19
BPLB-2	159.28	6,103,450,186.53	1.68	0.26
BPLB-3	158.60	6,099,546,623.57	2.10	0.32
PBPLB-3	157.92	6,095,624,715.66	2.52	0.38
PPLB-2	157.24	6,091,730,314.78	2.94	0.45
BPK-3	156.56	6,087,841,942.41	3.36	0.51
BBB-3	155.88	6,083,954,141.02	3.78	0.57
BBB-3	155.20	6,080,067,067.76	4.20	0.64
BBB-3	154.52	6,076,181,007.44	4.62	0.70
BBB-3	153.84	6,072,295,092.87	5.04	0.76
BPTB-3	153.16	6,068,415,833.34	5.46	0.83
BBPT-1	152.47	6,064,527,759.28	5.88	0.89
PBB-3	151.79	6,060,660,080.75	6.30	0.95
BPLSW-2	151.11	6,056,797,646.91	6.72	1.02
BPLSW-3	150.43	6,052,931,642.13	7.14	1.08
KPLB-1	149.75	6,049,087,632.13	7.56	1.14
PPTB-2	148.38	6,041,379,378.04	8.41	1.27
PPLSW-2	145.65	6,026,050,845.24	10.09	1.52
BPBB-1	144.28	6,018,388,972.38	10.94	1.65
BBB-3	141.55	6,003,178,404.83	12.63	1.89
BPK-3	140.87	5,999,423,972.94	13.05	1.96
KPLB-2	140.19	5,995,682,526.09	13.46	2.02
KBB-3	139.50	5,991,923,909.88	13.89	2.08
BPK-1	138.14	5,984,409,648.06	14.73	2.20
KPLSW-2	137.46	5,980,672,193.98	15.15	2.26
KPLSW-1	136.09	5,973,243,132.04	15.99	2.38
PPK-3	135.41	5,969,567,778.08	16.41	2.44
PPK-1	133.36	5,958,486,759.62	17.68	2.62
BBPT-3	132.67	5,954,798,854.50	18.10	2.68
KPK-2	131.31	5,947,514,653.92	18.95	2.80
KBB-1	127.89	5,929,382,655.22	21.06	3.10
KPK-1	127.21	5,925,785,375.26	21.48	3.16
KBPT-3	124.48	5,912,133,538.68	23.16	3.38
KBPT-2	122.43	5,902,308,073.79	24.43	3.54

Tabel 4.35. Hasil Perhitungan Efisiensi Waktu dan Biaya pada Lembur 2 Jam

Kode	Kumulatif	Biaya Total (Rp.)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	162	6,119,074,362.80	0.00	0.00
BBPLB-3	160.83	6,112,343,025.21	0.72	0.11
BPLK-3	159.66	6,105,633,054.23	1.44	0.22
BPLK-3	158.49	6,098,927,637.91	2.17	0.33
BPLB-2	157.32	6,092,211,733.65	2.89	0.44
BPLB-3	156.15	6,085,509,719.46	3.61	0.55
PBPLB-3	154.98	6,078,822,292.61	4.33	0.66
PPLB-2	153.81	6,072,148,005.75	5.06	0.77
BPK-3	152.64	6,065,467,202.56	5.78	0.88
BBB-3	151.47	6,058,814,487.01	6.50	0.98
BBB-3	150.30	6,052,161,849.49	7.23	1.09
BBB-3	149.13	6,045,509,555.08	7.95	1.20
BBB-3	147.96	6,038,858,328.62	8.67	1.31
BPTB-3	146.79	6,032,229,001.10	9.39	1.42
BBPT-1	145.62	6,025,632,696.38	10.11	1.53
PBB-3	144.45	6,019,036,391.66	10.84	1.63
BPLSW-2	143.28	6,012,442,051.80	11.56	1.74
BPLSW-3	142.10	6,005,887,428.64	12.28	1.85
KPLB-1	140.93	5,999,368,556.60	13.00	1.96
PPTB-2	136.24	5,973,596,009.96	15.90	2.38
PPLSW-2	133.90	5,960,714,561.01	17.35	2.59
BPBB-1	129.21	5,935,297,192.27	20.24	3.00
BBB-3	128.04	5,929,025,181.69	20.97	3.11
BPK-3	126.87	5,922,811,407.59	21.69	3.21
KPLB-2	124.52	5,910,361,350.78	23.13	3.41
KBB-3	123.35	5,904,162,006.87	23.86	3.51
BPK-1	122.18	5,897,970,745.92	24.58	3.61
KPLSW-2	119.84	5,885,629,976.79	26.03	3.82
KPLSW-1	117.49	5,873,445,038.26	27.47	4.01
PPK-3	113.97	5,855,350,160.30	29.65	4.31
PPK-1	112.80	5,849,340,838.19	30.37	4.41
BBPT-3	111.63	5,843,331,532.11	31.09	4.51
KPK-2	109.29	5,831,591,595.70	32.54	4.70
KBB-1	103.43	5,802,478,198.41	36.16	5.17
KPK-1	102.26	5,796,678,626.50	36.88	5.27
KBPT-3	97.57	5,775,927,564.57	39.77	5.61
KBPT-2	94.05	5,761,589,910.22	41.95	5.84

Tabel 4.36. Hasil Perhitungan Efisiensi Waktu dan Biaya pada Lembur 3 Jam

Kode	Kumulatif	Biaya Total (Rp.)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	162	6,119,074,362.80	0.00	0.00
BBPLB-3	160.47	6,110,275,369.90	0.94	0.14
BPLK-3	158.94	6,101,506,944.58	1.89	0.29
BPLK-3	157.41	6,092,749,649.12	2.83	0.43
BPLB-2	155.88	6,083,996,377.54	3.78	0.57
BPLB-3	154.35	6,075,243,105.97	4.72	0.72
PBPLB-3	152.82	6,066,516,435.58	5.67	0.86
PPLB-2	151.29	6,057,802,905.18	6.61	1.00
BPK-3	149.76	6,049,109,591.75	7.56	1.14
BBB-3	148.23	6,040,436,101.73	8.50	1.29
BBB-3	146.70	6,031,763,569.28	9.44	1.43
BBB-3	145.17	6,023,092,559.31	10.39	1.57
BBB-3	143.64	6,014,421,972.25	11.33	1.71
BPTB-3	142.11	6,005,787,752.54	12.28	1.85
BBPT-1	140.58	5,997,205,924.92	13.22	1.99
PBB-3	139.05	5,988,625,275.45	14.17	2.13
BPLSW-2	137.52	5,980,044,625.99	15.11	2.27
BPLSW-3	135.99	5,971,551,653.12	16.06	2.41
KPLB-1	134.46	5,963,099,957.99	17.00	2.55
PPTB-2	131.40	5,946,197,743.58	18.89	2.83
PPLSW-2	125.27	5,912,925,231.84	22.67	3.37
BPBB-1	122.20	5,896,296,129.77	24.57	3.64
BBB-3	116.08	5,863,606,114.45	28.35	4.17
BPK-3	114.55	5,855,579,204.65	29.29	4.31
KPLB-2	111.48	5,839,653,439.34	31.18	4.57
KBB-3	109.95	5,831,700,929.24	32.13	4.70
BPK-1	108.42	5,823,773,586.01	33.07	4.83
KPLSW-2	106.89	5,815,861,336.95	34.02	4.96
KPLSW-1	103.83	5,800,373,103.94	35.91	5.21
PPK-3	99.23	5,777,438,236.31	38.74	5.58
PPK-1	97.70	5,769,804,261.37	39.69	5.71
BBPT-3	96.17	5,762,188,791.42	40.63	5.83
KPK-2	93.11	5,747,433,182.43	42.53	6.07
KBB-1	85.45	5,710,931,957.02	47.25	6.67
KPK-1	83.92	5,703,668,602.87	48.20	6.79
KBPT-3	77.79	5,678,622,853.49	51.98	7.20
KBPT-2	73.19	5,661,842,535.08	54.82	7.47

4.4.6. Penambahan Tenaga Pekerja

Berdasarkan hasil perhitungan dari percepatan durasi maka dilakukan penambahan tenaga kerja dan menghitung ulang kebutuhan tenaga kerja dengan durasi baru setelah *crashing*, tanpa menambah jam kerja perhari. Berikut contoh perhitungan tenaga kerja dan biaya pada pekerjaan Pengecoran Beton Pelat Lt. 1:

4.4.6.1. Analisis Penambahan Tenaga Kerja

Berikut merupakan salah satu contoh perhitungan untuk analisis kebutuhan tenaga kerja dengan rincian sebagai berikut:

Nama Pekerjaan : Pengecoran Beton Pelat Lantai 1
Durasi Pekerjaan : 24 Hari
Jam kerja : 8 jam/hari
Volume Pekerjaan : 75.12 m³

Tabel 4.37. Perhitungan Kebutuhan Tenaga Kerja

ITEM		C.I.1		DURASI		24			
DESKRIP:		Pekerjaan Beton		PERKIRAAN		VOL.PEK		75.12	
		Plat tebal 12-cm							
Membuat 1 m3 beton mutu f'c = 26,4 MPa (K 300) slump (12±2) cm w/c = 0,52									
No	Uraian	Kode	Satuan	Koefisien	Harga Satuan (Rp.)	Jumlah Harga Satuan (Rp.)	JUMLAH	Jumlah (Perhari)	TOTAL HARGA (Rp.)
A	TENAGA KERJA			1	2	3 = 1 x 2	4 = 1 X Vol.	5 = 4 / durasi	7 = 3 x Vol
1.00	Pekerja	L.01	OH	1.65	63,000.00	103,950.00	123.95	20.66	7,808,724.00
2.00	Tukang Batu	L.02a	OH	0.28	75,000.00	20,625.00	20.66	3.44	1,549,350.00
3.00	Kepala Tukang	L.03	OH	0.03	80,000.00	2,240.00	2.10	0.35	168,268.80
4.00	Mandor	L.04	OH	0.08	79,000.00	6,557.00	6.23	1.04	492,561.84
JUMLAH HARGA TENAGA KERJA						133,372.00			
B	BAHAN								
1.00	Portland cement	M.483	kg	413.00	1,175.00	485,275.00	31,024.56	5,170.76	36,453,858.00
2.00	Pasir beton	M.11	kg	681.00	250.00	170,250.00	51,156.72	8,526.12	12,789,180.00
3.00	Kerikil beton	M.28	kg	1,021.00	97.22	99,263.89	76,697.52	12,782.92	7,456,703.33
4.00	Air,	M.805	liter	215.00	35.00	7,525.00	16,150.80	2,691.80	565,278.00
E	Overhead & Profit			5% x D					
F	Harga Satuan Pekerjaan (D+E)					895,685.00			67,283,923.97

Keterangan :

Kolom 1: Nilai koefisien didapatkan dari perhitungan analisa harga satuan pekerjaan

Kolom 2: Harga satuan didapat dari daftar arga satuan pekerjaan (tenaga kerja) dan Analisa biaya alat (alat)

Kolom 3: Hasil perkalian kolom 2 dan kolom 3

Kolom 4: Hasil perkalian kolom 2 dengan volume pekerjaan

Kolom 5: Kolom 4 dibagi dengan durasi

Kolom 6: kolom 5 dibagi dengan durasi jam pekerjaan perhari

Kolom 7: Kolom 3 dikali volume pekerjaan

Kemudian untuk perhitungan analisis penambahan tenaga kerja diambil salah satu contoh jenis pekerjaan yakni sebagai berikut:

Nama Pekerjaan : Pengecoran Beton Pelat Lantai 1

Volume pekerjaan : 75.12 m³

Perhitungan jumlah tenaga kerja dan upah tenaga kerja:

$$\begin{aligned} \text{- Pekerja} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\ &= (1.65 \times 75.12) / 6 \\ &= 20.66 \text{ orang/hari} \end{aligned}$$

$$\begin{aligned} \text{Upah pekerja} &= 20.66 \times \text{Rp. } 63,000.00 \\ &= \text{Rp. } 1,301,454.00 \end{aligned}$$

$$\begin{aligned} \text{- Tukang Batu} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\ &= (0.28 \times 75.12) / 6 \\ &= 3.51 \text{ orang/hari} \end{aligned}$$

$$\begin{aligned} \text{Upah T. Batu} &= 3.51 \times \text{Rp. } 75,000.00 \\ &= \text{Rp. } 262,920 \end{aligned}$$

$$\begin{aligned} \text{- Kepala Tukang} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\ &= (0.03 \times 75.12) / 6 \\ &= 0.38 \text{ orang/hari} \end{aligned}$$

$$\begin{aligned} \text{Upah K. Tukang} &= 0.38 \times \text{Rp. } 80,000 \\ &= \text{Rp. } 30,048 \end{aligned}$$

$$\begin{aligned}
 - \text{Mandor} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.08 \times 75.12) / 6 \\
 &= 1 \text{ orang/hari} \\
 \text{Upah K. Tukang} &= 1 \times \text{Rp. } 79,000 \\
 &= \text{Rp. } 79,000
 \end{aligned}$$

Total upah tenaga kerja pada durasi normal :

$$\begin{aligned}
 &= (\text{Rp. } 1,301,454.00 + \text{Rp. } 262,920 + \text{Rp. } 30,048 + \text{Rp. } 79,000) \times 24 \text{ hari} \\
 &= \text{Rp } 10,040,532
 \end{aligned}$$

1. Lembur 1 jam

Perhitungan jumlah tenaga kerja dan upah tenaga kerja:

$$\begin{aligned}
 - \text{Pekerja} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (1.65 \times 75.12) / 5.32 \\
 &= 23.3 \text{ orang/hari} \\
 \text{Upah pekerja} &= 23.3 \times \text{Rp. } 63,000.00 \\
 &= \text{Rp. } 1,467,900 \\
 - \text{Tukang Batu} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.28 \times 75.12) / 5.32 \\
 &= 3.95 \text{ orang/hari} \\
 \text{Upah T. Batu} &= 3.95 \times \text{Rp. } 75,000.00 \\
 &= \text{Rp. } 296,250 \\
 - \text{Kepala Tukang} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.03 \times 75.12) / 5.32 \\
 &= 0.42 \text{ orang/hari} \\
 \text{Upah K. Tukang} &= 0.42 \times \text{Rp. } 80,000 \\
 &= \text{Rp. } 33,888 \\
 - \text{Mandor} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.08 \times 75.12) / 5.32 \\
 &= 1.13 \text{ orang/hari} \\
 \text{Upah Mandor} &= 1.13 \times \text{Rp. } 79,000 \\
 &= \text{Rp. } 89,270
 \end{aligned}$$

$$\begin{aligned}
 &\text{Total upah tenaga kerja pada durasi percepatan 1 jam:} \\
 &= (\text{Rp. } 1,467,900 + \text{Rp. } 296,250 + \text{Rp. } 33,888 + \text{Rp. } 89,270) \times 5.32 \text{ hari} \\
 &= \text{Rp } 10,040,478.56
 \end{aligned}$$

$$\begin{aligned}
 \text{Selisih biaya} &= \text{Biaya percepatan} - \text{Biaya normal} \\
 &= \text{Rp } 10,040,478.56 - \text{Rp } 10,040,532 \\
 &= \text{Rp. } 53.44
 \end{aligned}$$

2. Lembur 2 Jam

Perhitungan jumlah tenaga kerja dan upah tenaga kerja:

$$\begin{aligned}
 - \text{Pekerja} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (1.65 \times 75.12) / 4.83 \\
 &= 25.66 \text{ orang/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Upah pekerja} &= 25.66 \times \text{Rp. } 63,000 \\
 &= \text{Rp. } 1,616,580
 \end{aligned}$$

$$\begin{aligned}
 - \text{Tukang Batu} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.28 \times 75.12) / 4.83 \\
 &= 4.35 \text{ orang/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Upah T. Batu} &= 4.35 \times \text{Rp. } 75,000.00 \\
 &= \text{Rp. } 326,250
 \end{aligned}$$

$$\begin{aligned}
 - \text{Kepala Tukang} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.03 \times 75.12) / 4.83 \\
 &= 0.47 \text{ orang/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Upah K. Tukang} &= 0.47 \times \text{Rp. } 80,000 \\
 &= \text{Rp. } 37,600
 \end{aligned}$$

$$\begin{aligned}
 - \text{Mandor} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.08 \times 75.12) / 4.83 \\
 &= 1.24 \text{ orang/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Upah K. Tukang} &= 1.24 \times \text{Rp. } 79,000 \\
 &= \text{Rp. } 97,960
 \end{aligned}$$

$$\begin{aligned}
 &\text{Total upah tenaga kerja pada durasi percepatan 1 jam:} \\
 &= (\text{Rp. } 1,616,580 + \text{Rp. } 326,250 + \text{Rp. } 37,600 + \text{Rp. } 97,960) \times 4.83 \text{ hari} \\
 &= \text{Rp } 10,038,623.70
 \end{aligned}$$

$$\begin{aligned}
 \text{Selisih biaya} &= \text{Biaya percepatan} - \text{Biaya normal} \\
 &= \text{Rp } 10,038,623.70 - \text{Rp } 10,040,532 \\
 &= \text{Rp. } 1,908.3
 \end{aligned}$$

3. Lembur 3 jam

Perhitungan jumlah tenaga kerja dan upah tenaga kerja:

$$\begin{aligned}
 - \text{Pekerja} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (1.65 \times 75.12) / 4.47 \\
 &= 27.73 \text{ orang/hari} \\
 \text{Upah pekerja} &= 27.73 \times \text{Rp. } 63,000 \\
 &= \text{Rp. } 1,746,990 \\
 - \text{Tukang Batu} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.28 \times 75.12) / 4.47 \\
 &= 4.71 \text{ orang/hari} \\
 \text{Upah T. Batu} &= 4.71 \times \text{Rp. } 75,000.00 \\
 &= \text{Rp. } 353,250 \\
 - \text{Kepala Tukang} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.03 \times 75.12) / 4.47 \\
 &= 0.5 \text{ orang/hari} \\
 \text{Upah K. Tukang} &= 0.5 \times \text{Rp. } 80,000 \\
 &= \text{Rp. } 40,000 \\
 - \text{Mandor} &= (\text{koefisien} \times \text{volume}) / \text{durasi} \\
 &= (0.08 \times 75.12) / 4.47 \\
 &= 1.34 \text{ orang/hari} \\
 \text{Upah K. Tukang} &= 1.34 \times \text{Rp. } 79,000 \\
 &= \text{Rp. } 106,209
 \end{aligned}$$

Total upah tenaga kerja pada durasi percepatan 1 jam:

$$\begin{aligned}
 &= (\text{Rp. } 1,746,990 + \text{Rp. } 353,250 + \text{Rp. } 40,000 + \text{Rp. } 106,209) \times 4.47 \text{ hari} \\
 &= \text{Rp } 10,041,627.03
 \end{aligned}$$

$$\begin{aligned}
 \text{Selisih biaya} &= \text{Biaya percepatan} - \text{Biaya normal} \\
 &= \text{Rp } 10,041,627.03 - \text{Rp } 10,040,532 \\
 &= \text{Rp. } 1,095.03
 \end{aligned}$$

Kemudian hasil dari penambahan tenaga kerja diambil contoh pada pekerjaan Pengecoran Beton Pelat Lantai 1 dapat dilihat pada Tabel 4.37 sebagai berikut:

Tabel 4.38. Hasil Penambahan Komponen pada Pekerjaan Pengecoran Beton Pelat Lantai 1

Kode	Jumlah Penambahan Komponen (unit/jam)			
	Normal	1 Jam	2 Jam	3 Jam
Pekerja	20.66	23.3	25.66	27.73
Tukang Batu	3.51	3.95	4.35	4.71
Kepala Tukang	0.38	0.42	0.47	0.5
Mandor	1.0	1.13	1.24	1.34

Kemudian hasil keseluruhan penambahan tenaga kerja untuk semua pekerjaan dapat dilihat pada Tabel 4.39.

Tabel 4.39. Perbandingan Biaya Total Resource Normal dengan Lembur 1 Jam, Lembur 2 Jam dan Lembur 3 Jam

Kode	Biaya (Rp.)			
	Normal	Lembur 1 Jam	Lembur 2 Jam	Lembur 3 Jam
BBPLB-3	67,283,923.97	Rp67,288,000	Rp67,289,491	Rp67,292,713
BPLK-3	20,327,539.30	Rp20,334,430	Rp20,334,073	Rp20,331,969
BPLK-3	47,396,645.00	Rp47,404,952	Rp47,410,327	Rp47,407,898
BPLB-2	15,882,960.00	Rp15,897,172	Rp15,892,247	Rp15,898,705
BPLB-3	26,166,840.03	Rp26,174,758	Rp26,175,808	Rp26,172,005
PBPLB-3	72,632,850.00	Rp72,634,830	Rp72,634,683	Rp72,634,948
PPLB-2	100,417,725.00	Rp100,418,590	Rp100,417,622	Rp100,419,615
BPK-3	28,164,112.50	Rp28,179,610	Rp28,180,495	Rp28,181,591
BBB-3	135,204,830.00	Rp135,219,849	Rp135,218,925	Rp135,219,524
BBB-3	11,926,450.00	Rp11,924,178	Rp11,924,683	Rp11,924,762
BBB-3	38,110,300.00	Rp38,124,928	Rp38,124,964	Rp38,123,791
BBB-3	11,182,273.75	Rp11,188,936	Rp11,188,936	Rp11,189,034
BPTB-3	1,367,073.01	Rp1,380,380	Rp1,380,830	Rp1,379,732
BBPT-1	3,038,398.75	Rp3,034,672	Rp3,034,407	Rp3,034,659
PBB-3	5,857,977.99	Rp5,865,228	Rp5,866,213	Rp5,866,157
BPLSW-2	13,010,625.00	Rp13,008,752	Rp13,009,148	Rp13,008,943
BPLSW-3	21,675,065.00	Rp21,676,225	Rp21,678,123	Rp21,673,745
KPLB-1	55,995,882.48	Rp56,010,988	Rp56,008,973	Rp56,009,685
PPTB-2	127,837,110.00	Rp127,867,324	Rp127,865,318	Rp127,869,362
PPLSW-2	20,327,539.30	Rp20,340,837	Rp20,340,840	Rp20,340,926

Kode	Biaya (Rp.)			
	Normal	Lembur 1 Jam	Lembur 2 Jam	Lembur 3 Jam
BPBB-1	3,552,838.53	Rp3,556,795	Rp3,558,905	Rp3,561,009
BBB-3	7,877,108.25	Rp7,884,647	Rp7,884,741	Rp7,884,449
BPK-3	3,507,458.85	Rp3,510,532	Rp3,509,648	Rp3,508,449
KPLB-2	3,406,383.29	Rp3,419,731	Rp3,418,875	Rp3,417,720
KBB-3	3,477,602.05	Rp3,479,129	Rp3,480,299	Rp3,480,991
BPK-1	11,917,890.00	Rp11,913,079	Rp11,915,060	Rp11,912,892
KPLSW-2	22,347,726.29	Rp22,352,982	Rp22,352,993	Rp22,352,997
KPLSW-1	62,015,721.00	Rp62,023,761	Rp62,023,650	Rp62,023,752
PPK-3	3,039,547.76	Rp3,035,909	Rp3,037,005	Rp3,037,946
PPK-1	4,479,478.10	Rp4,491,253	Rp4,490,420	Rp4,486,732
BBPT-3	1,327,762.83	Rp1,341,594	Rp1,340,648	Rp1,342,687
KPK-2	880,630.24	Rp888,636	Rp888,155	Rp888,774
KBB-1	1,367,073.01	Rp1,376,235	Rp1,378,371	Rp1,378,823
KPK-1	3,025,258.75	Rp3,033,908	Rp3,033,906	Rp3,033,499
KBPT-3	269,927.98	Rp273,693	Rp271,766	Rp272,429
KBPT-2	5,857,977.99	Rp5,870,341	Rp5,869,323	Rp5,869,789
BBPLB-3	67,283,923.97	Rp67,288,000	Rp67,289,491	Rp67,292,713

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

Sama dengan *Cost Variance*, *Cost Slope*, dan *Duration Variance* pada penambahan jam lembur, pada analisis penambahan tenaga kerja pun dihitung dengan menggunakan *Microsoft Project 2013* yang akan digunakan untuk perhitungan biaya langsung, biaya tidak langsung, dan biaya total.

Berdasarkan pada Tabel 4.9, Tabel 4.10 dan Tabel 4.11, juga dapat diketahui selisih biaya (*cost variance*) antara biaya normal dengan biaya percepatan tiap lemburnya yaitu dengan cara sebagai berikut :

Nama pekerjaan = Beton K300 untuk Pengecoran Pelat Lantai 1

Biaya Normal : Rp. 67,283,355.89

Lembur 1 Jam = Rp.67,283,951.89

Lembur 2 Jam = Rp. 67,283,995.56

Lembur 3 Jam = Rp. 67,283,980.33

Selisih Biaya (*Cost Variance*):

Lembur 1 Jam = Rp.67,283,952 - Rp. 67,283,355.89

= Rp. 596.00

$$\begin{aligned} \text{Lembur 2 Jam} &= \text{Rp. } 67,283,996 - \text{Rp. } 67,283,355.89 \\ &= \text{Rp. } 639.67 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 Jam} &= \text{Rp. } 67,283,980 - \text{Rp. } 67,283,355.89 \\ &= \text{Rp. } 624.44 \end{aligned}$$

Duration Variance yakni selisih antara durasi normal dengan durasi percepatan (*duration variance*) akibat adanya lembur. Untuk menentukan nilai *duration variance* dapat dilakukan perhitungan sebagai berikut:

Kegiatan = Beton K300 untuk Pengecoran Pelat Lantai 1

Durasi normal = 6 hari

- Lembur 1 jam = $6 - 5,32 = 0,68$
- Lembur 2 jam = $6 - 4,83 = 1,17$
- Lembur 3 jam = $6 - 4,47 = 1,53$

Cost slope

$$\begin{aligned} \text{Lembur 1 jam} &= \frac{\text{Cost variance}}{\text{Duration variance}} \\ &= \frac{\text{Rp. } 596.00}{0.68} \\ &= \text{Rp. } 876.48 \end{aligned}$$

$$\begin{aligned} \text{Lembur 2 jam} &= \frac{\text{Cost variance}}{\text{Duration variance}} \\ &= \frac{\text{Rp. } 639.67}{1.17} \\ &= \text{Rp. } 546.73 \end{aligned}$$

$$\begin{aligned} \text{Lembur 3 jam} &= \frac{\text{Cost variance}}{\text{Duration variance}} \\ &= \frac{\text{Rp. } 624.44}{1.53} \\ &= \text{Rp. } 408.13 \end{aligned}$$

Berikut hasil perhitungan *cost variance*, *duration*, dan *cost slope* pada Tabel 4.40, Tabel 4.41, dan Tabel 4.42.

Tabel 4.40. Hasil Perhitungan Cost Variance, Duration Variance, dan Cost Slope pada Microsoft Project 2013 terhadap durasi untuk waktu lembur 1 jam

Kode Pekerjaan	Duration Variance (Hari)	Cost Variance (Rp.)	Cost Slope (Rp)
BBPT-1	2.73	4,076.09	1,490.79
BPBB-1	1.37	6,891.17	5,040.76
KBB-1	2.05	8,306.92	4,050.91
KPLB-1	0.68	14,211.96	20,791.56
BPK-1	1.37	7,918.23	5,792.04
PPK-1	2.73	1,979.55	724.00
KPK-1	3.42	865.23	253.16
KPLSW-1	0.68	15,497.49	22,790.42
KBPT-2	2.73	15,019.05	5,493.08
KPLB-2	0.68	-2,271.90	-3,323.70
KPK-2	1.37	14,627.77	10,699.94
PPTB-2	0.68	6,662.53	9,747.03
BPLB-2	0.68	13,307.40	19,569.71
PPLB-2	0.68	-3,727.06	-5,452.56
BPLSW-2	0.68	7,249.56	10,605.84
PPLSW-2	0.68	-1,873.30	-2,754.85
KPLSW-2	0.68	1,160.06	1,705.98
BBPT-3	1.37	15,105.35	11,049.28
KBPT-3	2.05	30,214.48	14,734.22
BBB-3	0.68	13,298.17	19,556.13
BBB-3	0.68	3,956.36	5,818.18
PBB-3	0.68	7,538.70	11,086.33
BBB-3	0.68	3,073.03	4,519.15
BBB-3	0.68	13,347.31	19,628.39
BBB-3	0.68	1,527.34	2,246.09
KBB-3	0.68	-4,811.45	-7,075.66
BPK-3	0.68	5,255.60	7,728.82
PPK-3	1.37	8,040.12	5,881.20
BPK-3	0.68	-3,639.09	-5,351.60
BPTB-3	0.68	11,775.02	17,316.20
BPLK-3	0.68	13,831.11	20,339.87
BPLK-3	0.68	8,005.56	11,772.88
BPLB-3	0.68	9,162.40	13,474.12
PBPLB-3	0.68	8,648.84	12,718.88
BBPLB-3	0.68	3,764.63	5,536.22
BPLSW-3	0.68	12,362.56	18,180.24

Tabel 4.41. Hasil Perhitungan Cost Variance, Duration Variance, dan Cost Slope pada Microsoft Project 2013 terhadap durasi untuk waktu lembur 2 jam

Kode Pekerjaan	Duration Variance (Hari)	Cost Variance (Rp.)	Cost Slope (Rp)
BBPT-1	4.69	5,566.81	1,187.04
BPBB-1	2.34	6,533.69	2,786.43
KBB-1	3.52	13,681.92	3,889.96
KPLB-1	1.17	9,286.84	7,937.47
BPK-1	2.34	8,968.34	3,824.73
PPK-1	4.69	1,833.06	390.87
KPK-1	5.86	-103.03	-17.58
KPLSW-1	1.17	16,382.67	13,973.46
KBPT-2	4.69	14,094.63	3,005.47
KPLB-2	1.17	-1,767.39	-1,510.59
KPK-2	2.34	14,663.66	6,253.62
PPTB-2	1.17	6,662.31	5,682.56
BPLB-2	1.17	13,757.08	11,733.98
PPLB-2	1.17	-3,992.00	-3,411.97
BPLSW-2	1.17	8,235.29	7,038.71
PPLSW-2	1.17	-1,476.71	-1,262.15
KPLSW-2	1.17	3,057.79	2,613.50
BBPT-3	2.34	13,090.09	5,582.54
KBPT-3	3.52	28,208.11	8,019.95
BBB-3	1.17	13,300.31	11,344.38
BBB-3	1.17	6,066.92	5,185.40
PBB-3	1.17	7,633.02	6,523.95
BBB-3	1.17	2,189.12	1,871.05
BBB-3	1.17	12,491.73	10,676.69
BBB-3	1.17	2,697.14	2,305.25
KBB-3	1.17	-2,829.54	-2,418.41
BPK-3	1.17	5,266.61	4,501.38
PPK-3	2.34	7,928.75	3,381.38
BPK-3	1.17	-2,542.58	-2,168.67
BPTB-3	1.17	10,942.14	9,352.25
BPLK-3	1.17	12,884.89	11,012.72
BPLK-3	1.17	7,525.12	6,431.73
BPLB-3	1.17	11,298.08	9,656.48
PBPLB-3	1.17	8,647.50	7,391.03
BBPLB-3	1.17	1,837.86	1,570.82
BPLSW-3	1.17	11,345.29	9,696.83

Tabel 4.42. Hasil Perhitungan Cost Variance, Duration Variance, dan Cost Slope pada Microsoft Project 2013 terhadap durasi untuk waktu lembur 3 jam

Kode Pekerjaan	Duration Variance (Hari)	Cost Variance (Rp.)	Cost Slope (Rp)
BBPT-1	6.13	8,789.38	1,434.38
BPBB-1	3.06	4,429.72	1,445.81
KBB-1	4.60	11,253.04	2,448.58
KPLB-1	1.53	15,744.63	10,277.74
BPK-1	3.06	5,164.97	1,685.79
PPK-1	6.13	2,097.84	342.36
KPK-1	7.66	1,889.79	246.72
KPLSW-1	1.53	17,478.61	11,409.65
KBPT-2	6.13	14,693.68	2,397.93
KPLB-2	1.53	-1,687.63	-1,103.03
KPK-2	3.06	13,490.85	4,403.26
PPTB-2	1.53	6,760.32	4,418.51
BPLB-2	1.53	12,659.05	8,273.89
PPLB-2	1.53	-3,739.83	-2,444.33
BPLSW-2	1.53	8,179.01	5,345.76
PPLSW-2	1.53	-1,682.09	-1,099.41
KPLSW-2	1.53	-1,319.62	-862.49
BBPT-3	3.06	13,802.45	4,504.97
KBPT-3	4.60	32,252.34	7,017.87
BBB-3	1.53	13,386.46	8,749.32
BBB-3	1.53	8,170.42	5,340.15
PBB-3	1.53	7,341.21	4,798.17
BBB-3	1.53	990.15	647.15
BBB-3	1.53	11,336.88	7,409.72
BBB-3	1.53	3,388.81	2,214.91
KBB-3	1.53	-4,997.92	-3,266.62
BPK-3	1.53	5,270.27	3,444.62
PPK-3	3.06	8,030.92	2,621.20
BPK-3	1.53	-1,601.35	-1,046.63
BPTB-3	1.53	7,253.75	4,741.01
BPLK-3	1.53	14,924.07	9,754.29
BPLK-3	1.53	8,143.39	5,322.48
BPLB-3	1.53	11,750.05	7,679.77
PBPLB-3	1.53	8,240.27	5,385.80
BBPLB-3	1.53	2,500.85	1,634.54
BPLSW-3	1.53	11,811.01	7,719.62

Berdasarkan hasil dari *cost slope* pada tabel di atas maka dapat disusun *cost slope* dari urutan terkecil hingga terbesar untuk menguji efisiensi *crashing*. Berikut urutan yang didapat dari perhitungan menggunakan *Microsoft Excel 2013*:

Tabel 4.43. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Slope Terkecil hingga Terbesar pada Waktu Lembur 1 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPLB-3	5.32	6.00	0.68	11,913,078.55	11,917,890.00	-7,075.66
BPLK-3	5.32	6.00	0.68	3,034,671.69	3,038,398.75	-5,452.56
BPLK-3	5.32	6.00	0.68	3,035,908.67	3,039,547.76	-5,351.60
BPLB-3	5.32	6.00	0.68	11,924,178.10	11,926,450.00	-3,323.70
BPLB-2	5.32	6.00	0.68	13,008,751.70	13,010,625.00	-2,754.85
PPLB-2	26.58	30.00	3.42	100,418,590.23	100,417,725.00	253.16
PBPLB-3	21.27	24.00	2.73	72,634,829.55	72,632,850.00	724.00
BPK-3	21.27	24.00	2.73	67,288,000.07	67,283,923.97	1,490.79
BBB-3	5.32	6.00	0.68	21,676,225.06	21,675,065.00	1,705.98
BBB-3	5.32	6.00	0.68	3,479,129.39	3,477,602.05	2,246.09
BBB-3	15.95	18.00	2.05	47,404,951.92	47,396,645.00	4,050.91
BBB-3	5.32	6.00	0.68	3,510,531.88	3,507,458.85	4,519.15
BPTB-3	10.63	12.00	1.37	20,334,430.47	20,327,539.30	5,040.76
PBB-3	21.27	24.00	2.73	135,219,849.05	135,204,830.00	5,493.08
BPLSW-2	5.32	6.00	0.68	273,692.61	269,927.98	5,536.22
BPLSW-3	10.63	12.00	1.37	26,174,758.26	26,166,840.03	5,792.04
PPTB-2	5.32	6.00	0.68	3,556,794.89	3,552,838.53	5,818.18
PPLSW-2	10.63	12.00	1.37	62,023,761.12	62,015,721.00	5,881.20
BPBB-1	5.32	6.00	0.68	22,352,981.89	22,347,726.29	7,728.82
BBB-3	5.32	6.00	0.68	11,188,936.28	11,182,273.75	9,747.03
BPK-3	5.32	6.00	0.68	5,865,227.55	5,857,977.99	10,605.84
KPLB-2	10.63	12.00	1.37	38,124,927.77	38,110,300.00	10,699.94
KBB-3	10.63	12.00	1.37	56,010,987.83	55,995,882.48	11,049.28
BPK-1	5.32	6.00	0.68	7,884,646.95	7,877,108.25	11,086.33
KPLSW-2	5.32	6.00	0.68	888,635.80	880,630.24	11,772.88
KPLB-1	5.32	6.00	0.68	3,033,907.59	3,025,258.75	12,718.88
KPLSW-1	5.32	6.00	0.68	1,376,235.41	1,367,073.01	13,474.12
PPK-3	15.95	18.00	2.05	127,867,324.48	127,837,110.00	14,734.22
PPK-1	5.32	6.00	0.68	4,491,253.12	4,479,478.10	17,316.20
BBPT-3	5.32	6.00	0.68	5,870,340.55	5,857,977.99	18,180.24
BBPT-1	5.32	6.00	0.68	20,340,837.47	20,327,539.30	19,556.13
KPK-2	5.32	6.00	0.68	1,380,380.41	1,367,073.01	19,569.71

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
KBB-1	5.32	6.00	0.68	3,419,730.60	3,406,383.29	19,628.39
KPK-1	5.32	6.00	0.68	1,341,593.94	1,327,762.83	20,339.87
KBPT-3	5.32	6.00	0.68	15,897,171.96	15,882,960.00	20,791.56
KBPT-2	5.32	6.00	0.68	28,179,609.99	28,164,112.50	22,790.42

Tabel 4.44. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Slope Terkecil hingga Terbesar pada Waktu Lembur 2 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPLB-3	4.83	6.00	1.17	3,034,406.75	3,038,398.75	-3,411.97
BPLK-3	4.83	6.00	1.17	11,915,060.46	11,917,890.00	-2,418.41
BPLK-3	4.83	6.00	1.17	3,037,005.18	3,039,547.76	-2,168.67
BPLB-3	4.83	6.00	1.17	11,924,682.61	11,926,450.00	-1,510.59
BPLB-2	4.83	6.00	1.17	13,009,148.29	13,010,625.00	-1,262.15
PPLB-2	24.14	30.00	5.86	100,417,621.97	100,417,725.00	-17.58
PBPLB-3	19.31	24.00	4.69	72,634,683.06	72,632,850.00	390.87
BPK-3	19.31	24.00	4.69	67,289,490.78	67,283,923.97	1,187.04
BBB-3	4.83	6.00	1.17	271,765.84	269,927.98	1,570.82
BBB-3	4.83	6.00	1.17	3,509,647.97	3,507,458.85	1,871.05
BBB-3	4.83	6.00	1.17	3,480,299.19	3,477,602.05	2,305.25
BBB-3	4.83	6.00	1.17	21,678,122.79	21,675,065.00	2,613.50
BPTB-3	9.66	12.00	2.34	20,334,072.99	20,327,539.30	2,786.43
PBB-3	19.31	24.00	4.69	135,218,924.63	135,204,830.00	3,005.47
BPLSW-2	9.66	12.00	2.34	62,023,649.75	62,015,721.00	3,381.38
BPLSW-3	9.66	12.00	2.34	26,175,808.37	26,166,840.03	3,824.73
PPTB-2	14.48	18.00	3.52	47,410,326.92	47,396,645.00	3,889.96
PPLSW-2	4.83	6.00	1.17	22,352,992.90	22,347,726.29	4,501.38
BPBB-1	4.83	6.00	1.17	3,558,905.45	3,552,838.53	5,185.40
BBB-3	9.66	12.00	2.34	56,008,972.57	55,995,882.48	5,582.54
BPK-3	4.83	6.00	1.17	11,188,936.06	11,182,273.75	5,682.56
KPLB-2	9.66	12.00	2.34	38,124,963.66	38,110,300.00	6,253.62
KBB-3	4.83	6.00	1.17	888,155.36	880,630.24	6,431.73
BPK-1	4.83	6.00	1.17	7,884,741.27	7,877,108.25	6,523.95
KPLSW-2	4.83	6.00	1.17	5,866,213.28	5,857,977.99	7,038.71
KPLB-1	4.83	6.00	1.17	3,033,906.25	3,025,258.75	7,391.03
KPLSW-1	4.83	6.00	1.17	15,892,246.84	15,882,960.00	7,937.47
PPK-3	14.48	18.00	3.52	127,865,318.11	127,837,110.00	8,019.95
PPK-1	4.83	6.00	1.17	4,490,420.24	4,479,478.10	9,352.25
BBPT-3	4.83	6.00	1.17	1,378,371.09	1,367,073.01	9,656.48

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPT-1	4.83	6.00	1.17	5,869,323.28	5,857,977.99	9,696.83
KPK-2	4.83	6.00	1.17	3,418,875.02	3,406,383.29	10,676.69
KBB-1	4.83	6.00	1.17	1,340,647.72	1,327,762.83	11,012.72
KPK-1	4.83	6.00	1.17	20,340,839.61	20,327,539.30	11,344.38
KBPT-3	4.83	6.00	1.17	1,380,830.09	1,367,073.01	11,733.98
KBPT-2	4.83	6.00	1.17	28,180,495.17	28,164,112.50	13,973.46

Tabel 4.45. Urutan Uraian Pekerjaan Berdasarkan Nilai Cost Slope Terkecil hingga Terbesar pada Waktu Lembur 3 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPLB-3	4.47	6.00	1.53	11,912,892.08	11,917,890.00	-3,266.62
BPLK-3	4.47	6.00	1.53	3,034,658.92	3,038,398.75	-2,444.33
BPLK-3	4.47	6.00	1.53	11,924,762.37	11,926,450.00	-1,103.03
BPLB-3	4.47	6.00	1.53	13,008,942.91	13,010,625.00	-1,099.41
BPLB-2	4.47	6.00	1.53	3,037,946.41	3,039,547.76	-1,046.63
PPLB-2	4.47	6.00	1.53	21,673,745.38	21,675,065.00	-862.49
PBPLB-3	22.34	30.00	7.66	100,419,614.79	100,417,725.00	246.72
BPK-3	17.87	24.00	6.13	72,634,947.84	72,632,850.00	342.36
BBB-3	4.47	6.00	1.53	3,508,449.00	3,507,458.85	647.15
BBB-3	17.87	24.00	6.13	67,292,713.35	67,283,923.97	1,434.38
BBB-3	8.94	12.00	3.06	20,331,969.02	20,327,539.30	1,445.81
BBB-3	4.47	6.00	1.53	272,428.83	269,927.98	1,634.54
BPTB-3	8.94	12.00	3.06	26,172,005.00	26,166,840.03	1,685.79
PBB-3	4.47	6.00	1.53	3,480,990.86	3,477,602.05	2,214.91
BPLSW-2	17.87	24.00	6.13	135,219,523.68	135,204,830.00	2,397.93
BPLSW-3	13.40	18.00	4.60	47,407,898.04	47,396,645.00	2,448.58
PPTB-2	8.94	12.00	3.06	62,023,751.92	62,015,721.00	2,621.20
PPLSW-2	4.47	6.00	1.53	22,352,996.56	22,347,726.29	3,444.62
BPBB-1	8.94	12.00	3.06	38,123,790.85	38,110,300.00	4,403.26
BBB-3	4.47	6.00	1.53	11,189,034.07	11,182,273.75	4,418.51
BPK-3	8.94	12.00	3.06	56,009,684.93	55,995,882.48	4,504.97
KPLB-2	4.47	6.00	1.53	4,486,731.85	4,479,478.10	4,741.01
KBB-3	4.47	6.00	1.53	7,884,449.46	7,877,108.25	4,798.17
BPK-1	4.47	6.00	1.53	888,773.63	880,630.24	5,322.48
KPLSW-2	4.47	6.00	1.53	3,561,008.95	3,552,838.53	5,340.15
KPLB-1	4.47	6.00	1.53	5,866,157.00	5,857,977.99	5,345.76
KPLSW-1	4.47	6.00	1.53	3,033,499.02	3,025,258.75	5,385.80
PPK-3	13.40	18.00	4.60	127,869,362.34	127,837,110.00	7,017.87

Kode	Durasi (Hari)			Biaya (Rp)		Cost Slope (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
PPK-1	4.47	6.00	1.53	3,417,720.17	3,406,383.29	7,409.72
BBPT-3	4.47	6.00	1.53	1,378,823.06	1,367,073.01	7,679.77
BBPT-1	4.47	6.00	1.53	5,869,789.00	5,857,977.99	7,719.62
KPK-2	4.47	6.00	1.53	1,379,732.06	1,367,073.01	8,273.89
KBB-1	4.47	6.00	1.53	20,340,925.76	20,327,539.30	8,749.32
KPK-1	4.47	6.00	1.53	1,342,686.90	1,327,762.83	9,754.29
KBPT-3	4.47	6.00	1.53	15,898,704.63	15,882,960.00	10,277.74
KBPT-2	4.47	6.00	1.53	28,181,591.11	28,164,112.50	11,409.65

Berdasarkan nilai *cost slope* kemudian didapat nilai *cost variance* yang merupakan selisih antara biaya normal dan biaya *crashing*. Kemudian diurutkan menjadi biaya terkecil hingga biaya terbesar terdapat dalam Tabel berikut ini :

Tabel 4.46. Urutan Pekerjaan Berdasarkan Cost Variance Terkecil Hingga Terbesar pada Lembur 1 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPLB-3	5.32	6.00	0.68	11,913,078.55	11,917,890.00	-4,811.45
BPLK-3	5.32	6.00	0.68	3,034,671.69	3,038,398.75	-3,727.06
BPLK-3	5.32	6.00	0.68	3,035,908.67	3,039,547.76	-3,639.09
BPLB-3	5.32	6.00	0.68	11,924,178.10	11,926,450.00	-2,271.90
BPLB-2	5.32	6.00	0.68	13,008,751.70	13,010,625.00	-1,873.30
PPLB-2	26.58	30.00	3.42	100,418,590.23	100,417,725.00	865.23
PBPLB-3	5.32	6.00	0.68	21,676,225.06	21,675,065.00	1,160.06
BPK-3	5.32	6.00	0.68	3,479,129.39	3,477,602.05	1,527.34
BBB-3	21.27	24.00	2.73	72,634,829.55	72,632,850.00	1,979.55
BBB-3	5.32	6.00	0.68	3,510,531.88	3,507,458.85	3,073.03
BBB-3	5.32	6.00	0.68	273,692.61	269,927.98	3,764.63
BBB-3	5.32	6.00	0.68	3,556,794.89	3,552,838.53	3,956.36
BPTB-3	21.27	24.00	2.73	67,288,000.07	67,283,923.97	4,076.09
PBB-3	5.32	6.00	0.68	22,352,981.89	22,347,726.29	5,255.60
BPLSW-2	5.32	6.00	0.68	11,188,936.28	11,182,273.75	6,662.53
BPLSW-3	10.63	12.00	1.37	20,334,430.47	20,327,539.30	6,891.17
PPTB-2	5.32	6.00	0.68	5,865,227.55	5,857,977.99	7,249.56
PPLSW-2	5.32	6.00	0.68	7,884,646.95	7,877,108.25	7,538.70
BPBB-1	10.63	12.00	1.37	26,174,758.26	26,166,840.03	7,918.23
BBB-3	5.32	6.00	0.68	888,635.80	880,630.24	8,005.56
BPK-3	10.63	12.00	1.37	62,023,761.12	62,015,721.00	8,040.12
KPLB-2	15.95	18.00	2.05	47,404,951.92	47,396,645.00	8,306.92

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
KBB-3	5.32	6.00	0.68	3,033,907.59	3,025,258.75	8,648.84
BPK-1	5.32	6.00	0.68	1,376,235.41	1,367,073.01	9,162.40
KPLSW-2	5.32	6.00	0.68	4,491,253.12	4,479,478.10	11,775.02
KPLB-1	5.32	6.00	0.68	5,870,340.55	5,857,977.99	12,362.56
KPLSW-1	5.32	6.00	0.68	20,340,837.47	20,327,539.30	13,298.17
PPK-3	5.32	6.00	0.68	1,380,380.41	1,367,073.01	13,307.40
PPK-1	5.32	6.00	0.68	3,419,730.60	3,406,383.29	13,347.31
BBPT-3	5.32	6.00	0.68	1,341,593.94	1,327,762.83	13,831.11
BBPT-1	5.32	6.00	0.68	15,897,171.96	15,882,960.00	14,211.96
KPK-2	10.63	12.00	1.37	38,124,927.77	38,110,300.00	14,627.77
KBB-1	21.27	24.00	2.73	135,219,849.05	135,204,830.00	15,019.05
KPK-1	10.63	12.00	1.37	56,010,987.83	55,995,882.48	15,105.35
KBPT-3	5.32	6.00	0.68	28,179,609.99	28,164,112.50	15,497.49
KBPT-2	15.95	18.00	2.05	127,867,324.48	127,837,110.00	30,214.48

Tabel 4.47. Urutan Pekerjaan Berdasarkan Cost Variance Terkecil Hingga Terbesar pada Lembur 2 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPLB-3	4.83	6.00	1.17	3,034,406.75	3,038,398.75	-3,992.00
BPLK-3	4.83	6.00	1.17	11,915,060.46	11,917,890.00	-2,829.54
BPLK-3	4.83	6.00	1.17	3,037,005.18	3,039,547.76	-2,542.58
BPLB-3	4.83	6.00	1.17	11,924,682.61	11,926,450.00	-1,767.39
BPLB-2	4.83	6.00	1.17	13,009,148.29	13,010,625.00	-1,476.71
PPLB-2	24.14	30.00	5.86	100,417,621.97	100,417,725.00	-103.03
PBPLB-3	19.31	24.00	4.69	72,634,683.06	72,632,850.00	1,833.06
BPK-3	4.83	6.00	1.17	271,765.84	269,927.98	1,837.86
BBB-3	4.83	6.00	1.17	3,509,647.97	3,507,458.85	2,189.12
BBB-3	4.83	6.00	1.17	3,480,299.19	3,477,602.05	2,697.14
BBB-3	4.83	6.00	1.17	21,678,122.79	21,675,065.00	3,057.79
BBB-3	4.83	6.00	1.17	22,352,992.90	22,347,726.29	5,266.61
BPTB-3	19.31	24.00	4.69	67,289,490.78	67,283,923.97	5,566.81
PBB-3	4.83	6.00	1.17	3,558,905.45	3,552,838.53	6,066.92
BPLSW-2	9.66	12.00	2.34	20,334,072.99	20,327,539.30	6,533.69
BPLSW-3	4.83	6.00	1.17	11,188,936.06	11,182,273.75	6,662.31
PPTB-2	4.83	6.00	1.17	888,155.36	880,630.24	7,525.12
PPLSW-2	4.83	6.00	1.17	7,884,741.27	7,877,108.25	7,633.02
BPBB-1	9.66	12.00	2.34	62,023,649.75	62,015,721.00	7,928.75
BBB-3	4.83	6.00	1.17	5,866,213.28	5,857,977.99	8,235.29

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BPK-3	4.83	6.00	1.17	3,033,906.25	3,025,258.75	8,647.50
KPLB-2	9.66	12.00	2.34	26,175,808.37	26,166,840.03	8,968.34
KBB-3	4.83	6.00	1.17	15,892,246.84	15,882,960.00	9,286.84
BPK-1	4.83	6.00	1.17	4,490,420.24	4,479,478.10	10,942.14
KPLSW-2	4.83	6.00	1.17	1,378,371.09	1,367,073.01	11,298.08
KPLB-1	4.83	6.00	1.17	5,869,323.28	5,857,977.99	11,345.29
KPLSW-1	4.83	6.00	1.17	3,418,875.02	3,406,383.29	12,491.73
PPK-3	4.83	6.00	1.17	1,340,647.72	1,327,762.83	12,884.89
PPK-1	9.66	12.00	2.34	56,008,972.57	55,995,882.48	13,090.09
BBPT-3	4.83	6.00	1.17	20,340,839.61	20,327,539.30	13,300.31
BBPT-1	14.48	18.00	3.52	47,410,326.92	47,396,645.00	13,681.92
KPK-2	4.83	6.00	1.17	1,380,830.09	1,367,073.01	13,757.08
KBB-1	19.31	24.00	4.69	135,218,924.63	135,204,830.00	14,094.63
KPK-1	9.66	12.00	2.34	38,124,963.66	38,110,300.00	14,663.66
KBPT-3	4.83	6.00	1.17	28,180,495.17	28,164,112.50	16,382.67
KBPT-2	14.48	18.00	3.52	127,865,318.11	127,837,110.00	28,208.11

Tabel 4. 48. Urutan Pekerjaan Berdasarkan Cost Variance Terkecil Hingga Terbesar pada Lembur 3 Jam

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BBPLB-3	4.47	6.00	1.53	11,912,892.08	11,917,890.00	-4,997.92
BPLK-3	4.47	6.00	1.53	3,034,658.92	3,038,398.75	-3,739.83
BPLK-3	4.47	6.00	1.53	11,924,762.37	11,926,450.00	-1,687.63
BPLB-3	4.47	6.00	1.53	13,008,942.91	13,010,625.00	-1,682.09
BPLB-2	4.47	6.00	1.53	3,037,946.41	3,039,547.76	-1,601.35
PPLB-2	4.47	6.00	1.53	21,673,745.38	21,675,065.00	-1,319.62
PBPLB-3	4.47	6.00	1.53	3,508,449.00	3,507,458.85	990.15
BPK-3	22.34	30.00	7.66	100,419,614.79	100,417,725.00	1,889.79
BBB-3	17.87	24.00	6.13	72,634,947.84	72,632,850.00	2,097.84
BBB-3	4.47	6.00	1.53	272,428.83	269,927.98	2,500.85
BBB-3	4.47	6.00	1.53	3,480,990.86	3,477,602.05	3,388.81
BBB-3	8.94	12.00	3.06	20,331,969.02	20,327,539.30	4,429.72
BPTB-3	8.94	12.00	3.06	26,172,005.00	26,166,840.03	5,164.97
PBB-3	4.47	6.00	1.53	22,352,996.56	22,347,726.29	5,270.27
BPLSW-2	4.47	6.00	1.53	11,189,034.07	11,182,273.75	6,760.32
BPLSW-3	4.47	6.00	1.53	4,486,731.85	4,479,478.10	7,253.75
PPTB-2	4.47	6.00	1.53	7,884,449.46	7,877,108.25	7,341.21
PPLSW-2	8.94	12.00	3.06	62,023,751.92	62,015,721.00	8,030.92

Kode	Durasi (Hari)			Biaya (Rp)		Cost Variance (Rp.)
	Crash	Normal	Selisih	Crash	Normal	
BPBB-1	4.47	6.00	1.53	888,773.63	880,630.24	8,143.39
BBB-3	4.47	6.00	1.53	3,561,008.95	3,552,838.53	8,170.42
BPK-3	4.47	6.00	1.53	5,866,157.00	5,857,977.99	8,179.01
KPLB-2	4.47	6.00	1.53	3,033,499.02	3,025,258.75	8,240.27
KBB-3	17.87	24.00	6.13	67,292,713.35	67,283,923.97	8,789.38
BPK-1	13.40	18.00	4.60	47,407,898.04	47,396,645.00	11,253.04
KPLSW-2	4.47	6.00	1.53	3,417,720.17	3,406,383.29	11,336.88
KPLB-1	4.47	6.00	1.53	1,378,823.06	1,367,073.01	11,750.05
KPLSW-1	4.47	6.00	1.53	5,869,789.00	5,857,977.99	11,811.01
PPK-3	4.47	6.00	1.53	1,379,732.06	1,367,073.01	12,659.05
PPK-1	4.47	6.00	1.53	20,340,925.76	20,327,539.30	13,386.46
BBPT-3	8.94	12.00	3.06	38,123,790.85	38,110,300.00	13,490.85
BBPT-1	8.94	12.00	3.06	56,009,684.93	55,995,882.48	13,802.45
KPK-2	17.87	24.00	6.13	135,219,523.68	135,204,830.00	14,693.68
KBB-1	4.47	6.00	1.53	1,342,686.90	1,327,762.83	14,924.07
KPK-1	4.47	6.00	1.53	15,898,704.63	15,882,960.00	15,744.63
KBPT-3	4.47	6.00	1.53	28,181,591.11	28,164,112.50	17,478.61
KBPT-2	13.40	18.00	4.60	127,869,362.34	127,837,110.00	32,252.34

4.4.8. Analisis Biaya Total Penambahan Kerja

Selanjutnya dari perhitungan analisis sebelumnya, didapat hasil analisis biaya langsung, analisis biaya tidak langsung dan analisis total biaya. Berikut merupakan rincian analisis biaya yang telah dibuat menggunakan aplikasi *Microsoft Excel 2013* berdasarkan hasil perhitungan *Microsoft Project 2013* :

Analisis Biaya Tidak Langsung

$$\text{Lembur 1 jam} = (\text{Rp. } 932,222,113.57 / 162) \times 75.72$$

$$= \text{Rp. } 636,397,808.58$$

$$\text{Lembur 2 jam} = (\text{Rp. } 932,222,113.57 / 162) \times 63.09$$

$$= \text{Rp. } 530,246,854.38$$

$$\text{Lembur 3 jam} = (\text{Rp. } 932,222,113.57 / 162) \times 54.81$$

$$= \text{Rp. } 460,656,682.33$$

Perhitungan analisis biaya tidak langsung terangkum pada *Tabel 4.49*, *Tabel 4.50*, dan *Tabel 4.51*. sebagai berikut :

Tabel 4.49. Hasil Perhitungan Biaya Tidak Langsung pada Lembur 1 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung
	Normal	Crash	Selisih		
				162.00	932,222,113.57
KPK-1	5.32	6	0.68	161.32	928,309,082.48
KPLSW-1	5.32	6	0.6835	160.64	924,375,655.84
KBB-3	5.32	6	0.68	159.96	920,462,624.74
PPLB-2	5.32	6	0.6835	159.27	916,529,198.10
KPLSW-2	5.32	6	0.68	158.59	912,616,167.01
BPK-3	26.58	30	3.4177	155.18	892,949,033.81
BBPLB-3	21.27	24	2.7342	152.44	877,215,327.25
KPLB-2	21.27	24	2.7342	149.71	861,481,620.70
BPLK-3	5.32	6	0.68	149.03	857,568,589.60
PPLSW-2	5.32	6	0.68	148.35	853,655,558.51
KPK-2	15.95	18	2.0506	146.30	841,855,278.59
BBB-3	5.32	6	0.68	145.62	837,942,247.50
BPK-3	10.63	12	1.3671	144.25	830,075,394.22
BPLB-2	21.27	24	2.7342	141.51	814,341,687.66
BPLB-3	5.32	6	0.68	140.83	810,428,656.56
BBB-3	10.63	12	1.3671	139.47	802,561,803.29
BPTB-3	5.32	6	0.68	138.79	798,648,772.19
BBB-3	10.63	12	1.3671	137.42	790,781,918.91
BPLSW-2	5.32	6	0.68	136.74	786,868,887.82
BPLSW-3	5.32	6	0.6835	136.06	782,935,461.18
BBPT-1	5.32	6	0.6835	135.37	779,002,034.54
BPBB-1	10.63	12	1.3671	134.01	771,135,181.26
BBB-3	10.63	12	1.3671	132.64	763,268,327.98
PPK-1	5.32	6	0.68	131.96	759,355,296.89
BBB-3	5.32	6	0.68	131.28	755,442,265.79
BPK-1	5.32	6	0.68	130.60	751,529,234.70
BPLK-3	5.32	6	0.68	129.92	747,616,203.61
BBPT-3	15.95	18	2.0506	127.87	735,815,923.69
KBPT-2	5.32	6	0.68	127.19	731,902,892.59
PPTB-2	5.32	6	0.68	126.51	727,989,861.50
KBB-1	5.32	6	0.68	125.83	724,076,830.40
KPLB-1	5.32	6	0.68	125.15	720,163,799.31
PBB-3	5.32	6	0.68	124.47	716,250,768.22
PPK-3	5.32	6	0.68	123.79	712,337,737.12
PBPLB-3	5.32	6	0.6835	123.11	708,404,310.48
KBPT-3	5.32	6	0.68	122.43	704,491,279.39

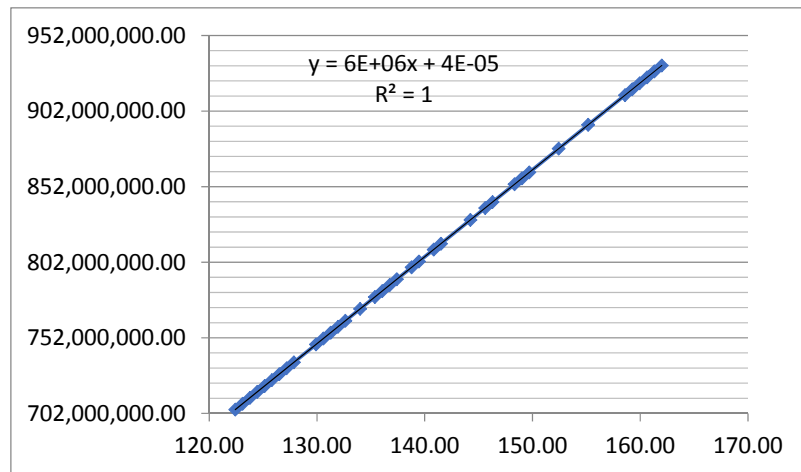
Tabel 4.50. Hasil Perhitungan Biaya Tidak Langsung pada Lembur 2 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung
	Normal	Crash	Selisih		
				162	932,222,113.57
KPK-1	4.83	6.0	1.17	160.83	925,489,398.31
KPLSW-1	4.83	6.0	1.17	159.66	918,756,683.04
KBB-3	4.83	6.0	1.17	158.4876	912,010,077.71
PPLB-2	4.83	6.0	1.17	157.3176	905,277,362.44
KPLSW-2	4.83	6.0	1.17	156.1476	898,544,647.18
BPK-3	24.14	30.0	5.86	150.2855	864,811,620.51
BBPLB-3	19.31	24.0	4.69	145.5959	837,825,199.17
KPLB-2	19.31	24.0	4.69	140.9062	810,838,777.83
BPLK-3	4.83	6.0	1.17	139.7362	804,106,062.57
PPLSW-2	4.83	6.0	1.17	138.5662	797,373,347.30
KPK-2	4.83	6.0	1.17	137.3962	790,640,632.04
BBB-3	4.83	6.0	1.17	136.2262	783,907,916.77
BPK-3	9.66	12.0	2.34	133.8814	770,414,706.10
BPLB-2	19.31	24.0	4.69	129.1917	743,428,284.76
BPLB-3	9.66	12.0	2.34	126.8469	729,935,074.10
BBB-3	9.66	12.0	2.34	124.5021	716,441,863.43
BPTB-3	14.48	18.0	3.52	120.9848	696,202,047.42
BBB-3	4.83	6.0	1.17	119.8148	689,469,332.16
BPLSW-2	4.83	6.0	1.17	118.6448	682,736,616.89
BPLSW-3	9.66	12.0	2.34	116.3	669,243,406.22
BPBB-1	4.83	6.0	1.17	115.1276	662,496,800.89
BBB-3	9.66	12.0	2.34	112.7828	649,003,590.22
BBPT-1	4.83	6.0	1.17	111.6128	642,270,874.96
BBB-3	4.83	6.0	1.17	110.4428	635,538,159.69
PPK-1	4.83	6.0	1.17	109.2728	628,805,444.43
BPK-1	4.83	6.0	1.17	108.1028	622,072,729.16
BPLK-3	4.83	6.0	1.17	106.9328	615,340,013.90
BBPT-3	14.48	18.0	3.52	103.4155	595,100,197.89
KBPT-2	4.83	6.0	1.17	102.2455	588,367,482.63
PPTB-2	4.83	6.0	1.17	101.0755	581,634,767.36
KBB-1	4.83	6.0	1.17	99.90552	574,902,052.10
KPLB-1	4.83	6.0	1.17	98.73552	568,169,336.84
PBB-3	4.83	6.0	1.17	97.56552	561,436,621.57
PPK-3	4.83	6.0	1.17	96.3931	554,690,016.24
PBPLB-3	4.83	6.0	1.17	95.22069	547,943,410.90
KBPT-3	4.83	6.0	1.17	94.04828	541,196,805.57

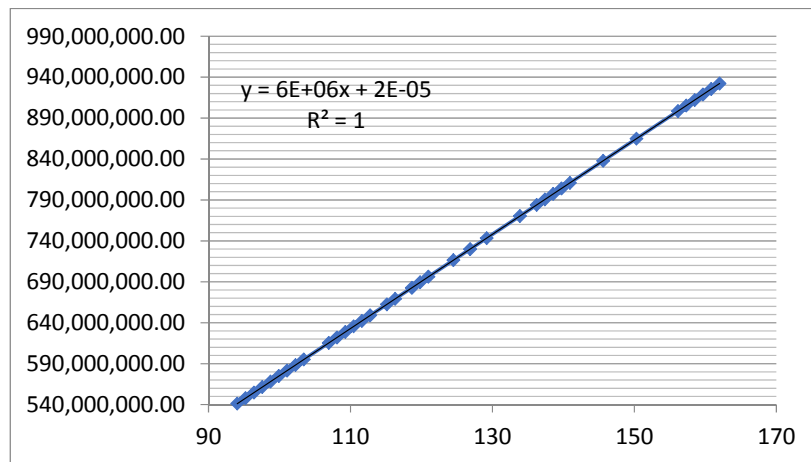
Tabel 4.51. Hasil Perhitungan Biaya Tidak Langsung pada Lembur 3 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Tidak Langsung
	Normal	Crash	Selisih		
				162	932,222,113.57
KPK-1	4.47	6	1.53	160.47	923,417,793.61
KPLSW-1	4.47	6	1.53	158.94	914,613,473.65
KBB-3	4.47	6	1.53	157.41	905,809,153.69
PPLB-2	4.47	6	1.53	155.88	897,004,833.73
KPLSW-2	4.47	6	1.53	154.35	888,200,513.76
BPK-3	4.47	6	1.53	152.82	879,396,193.80
BBPLB-3	22.34	30	7.65	145.1604	835,319,498.13
KPLB-2	17.87	24	6.12	139.0328	800,058,141.58
BPLK-3	4.47	6	1.53	137.5028	791,253,821.62
PPLSW-2	17.87	24	6.12	131.3751	755,992,465.08
KPK-2	8.93	12	3.06	128.3113	738,361,786.81
BBB-3	4.47	6	1.53	126.7813	729,557,466.85
BPK-3	8.93	12	3.06	123.7174	711,926,788.58
BPLB-2	4.47	6	1.53	122.1874	703,122,468.62
BPLB-3	17.87	24	6.12	116.0598	667,861,112.07
BBB-3	13.40	18	4.59	111.464	641,415,094.67
BPTB-3	8.93	12	3.06	108.4002	623,784,416.40
BBB-3	4.47	6	1.53	106.8702	614,980,096.44
BPLSW-2	8.93	12	3.06	103.8064	597,349,418.16
BPLSW-3	4.47	6	1.53	102.2764	588,545,098.20
BPBB-1	8.93	12	3.06	99.21255	570,914,419.93
BBB-3	4.47	6	1.53	97.68255	562,110,099.97
BBPT-1	4.47	6	1.53	96.15255	553,305,780.01
PPK-1	4.47	6	1.53	94.62255	544,501,460.05
BBB-3	4.47	6	1.53	93.09255	535,697,140.09
BPK-1	4.47	6	1.53	91.56255	526,892,820.12
BPLK-3	4.47	6	1.53	90.03255	518,088,500.16
BBPT-3	13.40	18	4.59	85.43681	491,642,482.76
KBPT-2	4.47	6	1.53	83.90681	482,838,162.80
PPTB-2	4.47	6	1.53	82.37681	474,033,842.83
KBB-1	4.47	6	1.53	80.84681	465,229,522.87
KPLB-1	4.47	6	1.53	79.31681	456,425,202.91
PBB-3	4.47	6	1.53	77.78681	447,620,882.95
PPK-3	4.47	6	1.53	76.25681	438,816,562.99
PBPLB-3	4.46	6	1.5319	74.72489	430,001,223.85
KBPT-3	4.46	6	1.5319	73.19298	421,185,884.72

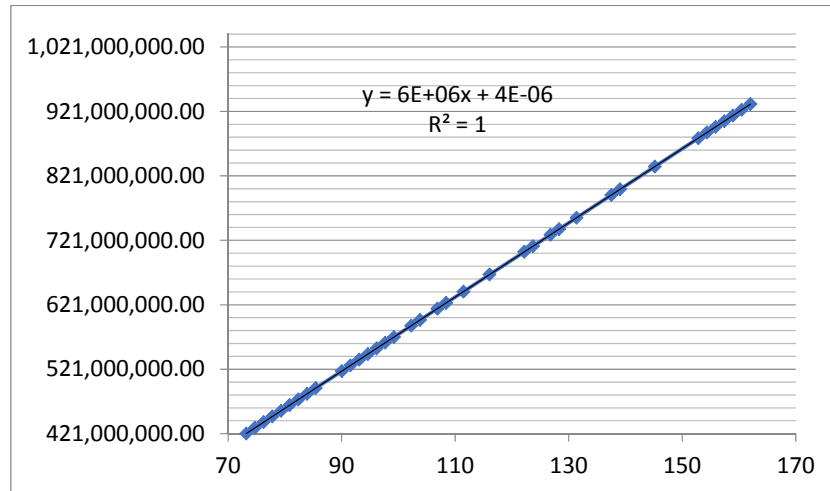
Dari tabel – tabel dapat disajikan grafik hubungan antara biaya tidak langsung dengan durasi kumulatif yang terlampir pada *Gambar 4.10*, *Gambar 4.11*, dan *Gambar 4.12* sebagai berikut :



Gambar 4.11. Grafik Biaya Tidak Langsung pada Lembur 1 Jam



Gambar 4.12. Grafik Biaya Tidak Langsung pada Lembur 2 Jam



Gambar 4.13. Grafik Biaya Tidak Langsung pada Lembur 3 Jam

Analisis Biaya Langsung

Biaya langsung dihasilkan melalui persamaan sebagai berikut :

Biaya langsung lembur = biaya langsung sebelumnya + cost variance

Lembur 1 jam = Rp. 5,362,594,064.12 + Rp 596

= Rp. 5,362,594,670.12

Lembur 2 jam = Rp Rp. 5,362,594,860.39 + Rp 639.67

= Rp 5,362,595,500.06

Lembur 3 jam = Rp. 5,362,595,069.29+ Rp 624.44

= Rp 5,362,595,693.74

Biaya hasil perhitungan biaya langsung lembur 1 jam, 2 jam, dan lembur 3 jam yang terlampir pada *Tabel 4.49*, *Tabel 4.50*, dan *Tabel 4.51*:

Tabel 4.49. Hasil Perhitungan Biaya Langsung pada Lembur 1 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung
	Normal	Crash	Selisih		
				162	5,186,852,249.23
KPK-1	5.32	6.00	0.68	161.32	5,186,847,437.78
KPLSW-1	5.32	6.00	0.68	160.6365	5,186,843,710.71
KBB-3	5.32	6.00	0.68	159.9565	5,186,840,071.62
PPLB-2	5.32	6.00	0.68	159.2729	5,186,837,799.73
KPLSW-2	5.32	6.00	0.68	158.5929	5,186,835,926.43
BPK-3	26.58	30.00	3.42	155.1752	5,186,836,791.66
BBPLB-3	21.27	24.00	2.73	152.441	5,186,838,771.21

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung
	Normal	Crash	Selisih		
KPLB-2	21.27	24.00	2.73	149.7068	5,186,842,847.30
BPLK-3	5.32	6.00	0.68	149.0268	5,186,844,007.36
PPLSW-2	5.32	6.00	0.68	148.3468	5,186,845,534.70
KPK-2	15.95	18.00	2.05	146.2962	5,186,853,841.63
BBB-3	5.32	6.00	0.68	145.6162	5,186,856,914.65
BPK-3	10.63	12.00	1.37	144.2491	5,186,863,805.82
BPLB-2	21.27	24.00	2.73	141.5149	5,186,878,824.87
BPLB-3	5.32	6.00	0.68	140.8349	5,186,882,589.50
BBB-3	10.63	12.00	1.37	139.4678	5,186,890,507.73
BPTB-3	5.32	6.00	0.68	138.7878	5,186,894,464.09
BBB-3	10.63	12.00	1.37	137.4208	5,186,902,504.21
BPLSW-2	5.32	6.00	0.68	136.7408	5,186,907,759.81
BPLSW-3	5.32	6.00	0.68	136.0572	5,186,914,422.33
BBPT-1	5.32	6.00	0.68	135.3737	5,186,921,671.90
BPBB-1	10.63	12.00	1.37	134.0066	5,186,936,299.67
BBB-3	10.63	12.00	1.37	132.6395	5,186,951,405.02
PPK-1	5.32	6.00	0.68	131.9595	5,186,958,943.72
BBB-3	5.32	6.00	0.68	131.2795	5,186,966,949.28
BPK-1	5.32	6.00	0.68	130.5995	5,186,975,598.11
BPLK-3	5.32	6.00	0.68	129.9195	5,186,984,760.52
BBPT-3	15.95	18.00	2.05	127.8689	5,187,014,975.00
KBPT-2	5.32	6.00	0.68	127.1889	5,187,026,750.02
PPTB-2	5.32	6.00	0.68	126.5089	5,187,039,112.58
KBB-1	5.32	6.00	0.68	125.8289	5,187,052,410.75
KPLB-1	5.32	6.00	0.68	125.1489	5,187,065,718.15
PBB-3	5.32	6.00	0.68	124.4689	5,187,079,065.46
PPK-3	5.32	6.00	0.68	123.7889	5,187,092,896.57
PBPLB-3	5.32	6.00	0.68	123.1053	5,187,107,108.53
KBPT-3	5.32	6.00	0.68	122.4253	5,187,122,606.01

Tabel 4.50. Hasil Perhitungan Biaya Langsung pada Lembur 2 Jam

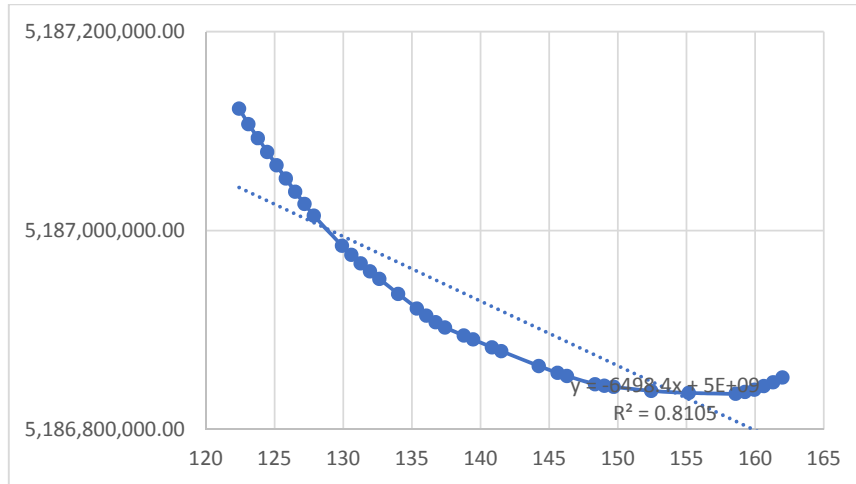
Kode	Durasi (Hari)			Kumulatif	Biaya Langsung
	Normal	Crash	Selisih		
				162	5,186,852,249.23
KPK-1	4.83	6	1.17	160.83	5,186,848,257.23
KPLSW-1	4.83	6	1.17	159.66	5,186,845,427.68
KBB-3	4.83	6	1.17	158.49	5,186,842,885.10
PPLB-2	4.83	6	1.17	157.32	5,186,841,117.72

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung
	Normal	Crash	Selisih		
KPLSW-2	4.83	6	1.17	156.15	5,186,839,641.01
BPK-3	24.14	30	5.86	150.29	5,186,839,537.97
BBPLB-3	19.31	24	4.69	145.60	5,186,841,371.03
KPLB-2	19.31	24	4.69	140.91	5,186,846,937.84
BPLK-3	4.83	6	1.17	139.74	5,186,848,775.70
PPLSW-2	4.83	6	1.17	138.57	5,186,850,964.82
KPK-2	4.83	6	1.17	137.40	5,186,853,661.96
BBB-3	4.83	6	1.17	136.23	5,186,856,719.75
BPK-3	9.66	12	2.34	133.88	5,186,863,253.44
BPLB-2	19.31	24	4.69	129.19	5,186,877,348.07
BPLB-3	9.66	12	2.34	126.85	5,186,885,276.83
BBB-3	9.66	12	2.34	124.50	5,186,894,245.17
BPTB-3	14.48	18	3.52	120.98	5,186,907,927.09
BBB-3	4.83	6	1.17	119.81	5,186,913,193.70
BPLSW-2	4.83	6	1.17	118.64	5,186,919,260.62
BPLSW-3	9.66	12	2.34	116.30	5,186,932,350.71
BPBB-1	4.83	6	1.17	115.13	5,186,939,013.03
BBB-3	9.66	12	2.34	112.78	5,186,953,676.68
BBPT-1	4.83	6	1.17	111.61	5,186,961,201.80
BBB-3	4.83	6	1.17	110.44	5,186,968,834.82
PPK-1	4.83	6	1.17	109.27	5,186,977,070.12
BPK-1	4.83	6	1.17	108.10	5,186,985,717.62
BPLK-3	4.83	6	1.17	106.93	5,186,995,004.46
BBPT-3	14.48	18	3.52	103.42	5,187,023,212.57
KBPT-2	4.83	6	1.17	102.25	5,187,034,154.71
PPTB-2	4.83	6	1.17	101.08	5,187,045,452.80
KBB-1	4.83	6	1.17	99.91	5,187,056,798.09
KPLB-1	4.83	6	1.17	98.74	5,187,069,289.82
PBB-3	4.83	6	1.17	97.57	5,187,082,174.70
PPK-3	4.83	6	1.17	96.39	5,187,095,475.01
PBPLB-3	4.83	6	1.17	95.22	5,187,109,232.10
KBPT-3	4.83	6	1.17	94.05	5,187,125,614.77

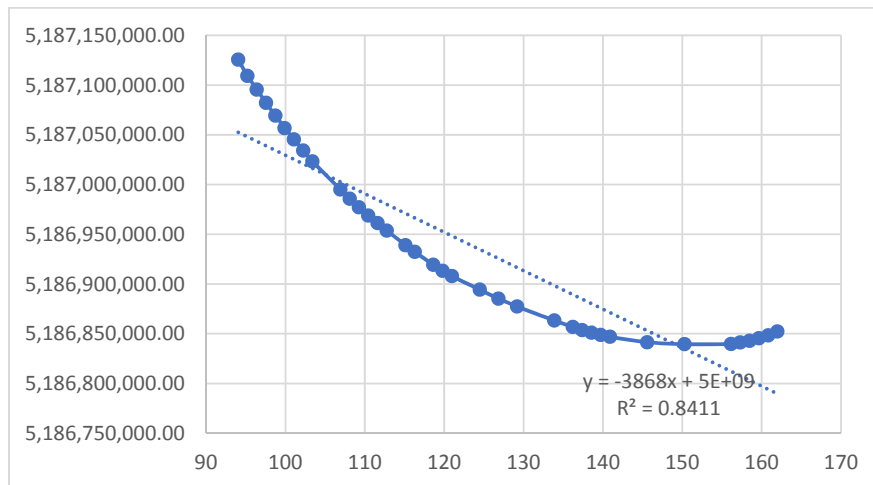
Tabel 4.51. Hasil Perhitungan Biaya Langsung pada Lembur 3 Jam

Kode	Durasi (Hari)			Kumulatif	Biaya Langsung
	Normal	Crash	Selisih		
	4.47	6.00	1.53	160.47	5,186,847,251.31
KPK-1	4.47	6.00	1.53	158.94	5,186,843,511.48
KPLSW-1	4.47	6.00	1.53	157.41	5,186,841,823.85
KBB-3	4.47	6.00	1.53	155.88	5,186,840,141.75
PPLB-2	4.47	6.00	1.53	154.35	5,186,838,540.41
KPLSW-2	4.47	6.00	1.53	152.82	5,186,837,220.79
BPK-3	22.34	30.00	7.66	145.16	5,186,839,110.58
BBPLB-3	17.87	24.00	6.13	139.03	5,186,841,208.42
KPLB-2	4.47	6.00	1.53	137.50	5,186,842,198.56
BPLK-3	17.87	24.00	6.13	131.38	5,186,850,987.95
PPLSW-2	8.94	12.00	3.06	128.31	5,186,855,417.66
KPK-2	4.47	6.00	1.53	126.78	5,186,857,918.51
BBB-3	8.94	12.00	3.06	123.72	5,186,863,083.48
BPK-3	4.47	6.00	1.53	122.19	5,186,866,472.29
BPLB-2	17.87	24.00	6.13	116.06	5,186,881,165.97
BPLB-3	13.40	18.00	4.60	111.46	5,186,892,419.01
BBB-3	8.94	12.00	3.06	108.40	5,186,900,449.94
BPTB-3	4.47	6.00	1.53	106.87	5,186,905,720.21
BBB-3	8.94	12.00	3.06	103.81	5,186,919,211.06
BPLSW-2	4.47	6.00	1.53	102.28	5,186,925,971.37
BPLSW-3	8.94	12.00	3.06	99.21	5,186,939,773.82
BPBB-1	4.47	6.00	1.53	97.68	5,186,947,027.57
BBB-3	4.47	6.00	1.53	96.15	5,186,954,368.78
BBPT-1	4.47	6.00	1.53	94.62	5,186,962,512.17
PPK-1	4.47	6.00	1.53	93.09	5,186,970,682.60
BBB-3	4.47	6.00	1.53	91.56	5,186,978,861.61
BPK-1	4.47	6.00	1.53	90.03	5,186,987,101.88
BPLK-3	13.40	18.00	4.60	85.44	5,187,019,354.22
BBPT-3	4.47	6.00	1.53	83.91	5,187,030,691.10
KBPT-2	4.47	6.00	1.53	82.38	5,187,042,441.15
PPTB-2	4.47	6.00	1.53	80.85	5,187,054,252.16
KBB-1	4.47	6.00	1.53	79.32	5,187,066,911.22
KPLB-1	4.47	6.00	1.53	77.79	5,187,080,297.68
PBB-3	4.47	6.00	1.53	76.26	5,187,095,221.74
PPK-3	4.47	6.00	1.53	74.72	5,187,110,966.37
PBPLB-3	4.47	6.00	1.53	73.19	5,187,128,444.98
KBPT-3	4.47	6.00	1.53	160.47	5,186,847,251.31

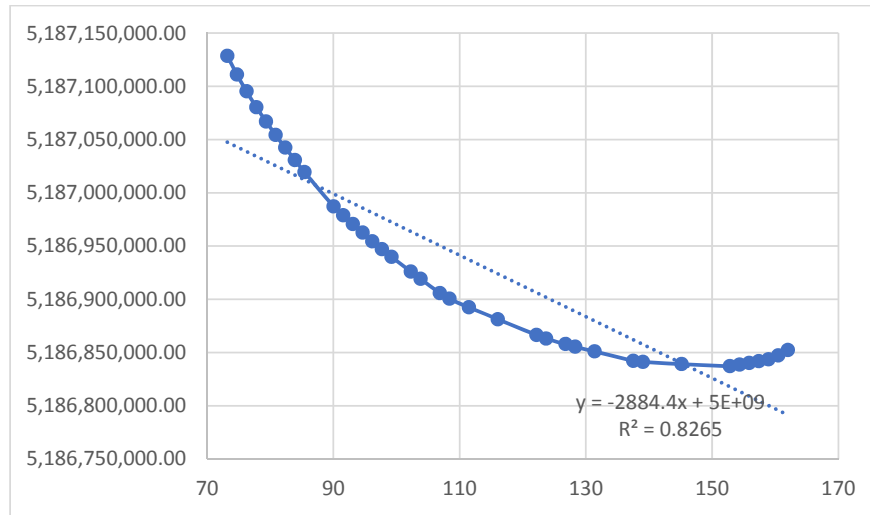
Dari tabel – tabel dapat disajikan grafik hubungan antara biaya tidak langsung dengan durasi kumulatif yang terlampir pada *Gambar 4.14*, *Gambar 4.15*, dan *Gambar 4.16* sebagai berikut :



Gambar 4.14. Grafik Biaya Langsung pada Lembur 1 Jam



Gambar 4.15. Grafik Biaya Langsung pada Lembur 2 Jam



Gambar 4.16. Grafik Biaya Langsung pada Lembur 3 Jam

Menentukan Total Biaya

Kemudian menentukan total biaya terhadap total durasi proyek dapat dilakukan dengan persamaan sebagai berikut (Kode BBPT-1):

Biaya total = Biaya langsung + Biaya tidak langsung

$$\begin{aligned} \text{Biaya total Lembur 1 jam} &= \text{Rp. } 5,186,852,249.23 + \text{Rp } 932,222,113.57 \\ &= \text{Rp. } 6,119,074,362.80 \end{aligned}$$

$$\begin{aligned} \text{Biaya total Lembur 2 jam} &= \text{Rp. } 5,186,848,257.23 + \text{Rp } 925,489,398.31 \\ &= \text{Rp. } 5,892,842,354.44 \end{aligned}$$

$$\begin{aligned} \text{Biaya total Lembur 3 jam} &= \text{Rp. } 5,186,847,251.31 + \text{Rp } 923,417,793.61 \\ &= \text{Rp. } 5,823,252,376.07 \end{aligned}$$

Berikut tabel perbandingan biaya langsung, biaya tidak langsung dan total biaya :

Tabel 4.52. Hasil Perhitungan Biaya Total Lembur 1 Jam

Kode	Biaya Langsung	Biaya Tidak Langsung	Biaya Total
	5,186,852,249.23	932,222,113.57	6,119,074,362.80
BBPLB-3	5,186,847,437.78	928,309,082.48	6,113,351,606.76
BPLK-3	5,186,843,710.71	924,375,655.84	6,107,629,000.64
BPLK-3	5,186,840,071.62	920,462,624.74	6,101,906,524.75
BPLB-2	5,186,837,799.73	916,529,198.10	6,096,186,027.77
BPLB-3	5,186,835,926.43	912,616,167.01	6,090,465,760.19
PBPLB-3	5,186,836,791.66	892,949,033.81	6,084,745,738.96

Kode	Biaya Langsung	Biaya Tidak Langsung	Biaya Total
PPLB-2	5,186,838,771.21	877,215,327.25	6,079,025,923.07
BPK-3	5,186,842,847.30	861,481,620.70	6,073,306,335.54
BBB-3	5,186,844,007.36	857,568,589.60	6,067,587,698.69
BBB-3	5,186,845,534.70	853,655,558.51	6,061,869,157.79
BBB-3	5,186,853,841.63	841,855,278.59	6,056,151,292.16
BBB-3	5,186,856,914.65	837,942,247.50	6,050,433,885.08
BPTB-3	5,186,863,805.82	830,075,394.22	6,044,716,727.47
BBPT-1	5,186,878,824.87	814,341,687.66	6,039,000,510.04
PBB-3	5,186,882,589.50	810,428,656.56	6,033,284,292.61
BPLSW-2	5,186,890,507.73	802,561,803.29	6,027,568,185.18
BPLSW-3	5,186,894,464.09	798,648,772.19	6,021,852,108.96
KPLB-1	5,186,902,504.21	790,781,918.91	6,016,136,781.25
PPTB-2	5,186,907,759.81	786,868,887.82	6,010,421,535.42
PPLSW-2	5,186,914,422.33	782,935,461.18	6,004,706,289.60
BPBB-1	5,186,921,671.90	779,002,034.54	5,998,991,750.70
BBB-3	5,186,936,299.67	771,135,181.26	5,993,277,222.90
BPK-3	5,186,951,405.02	763,268,327.98	5,987,562,695.11
KPLB-2	5,186,958,943.72	759,355,296.89	5,981,848,251.44
KBB-3	5,186,966,949.28	755,442,265.79	5,976,133,847.08
BPK-1	5,186,975,598.11	751,529,234.70	5,970,420,326.18
KPLSW-2	5,186,984,760.52	747,616,203.61	5,964,707,390.45
KPLSW-1	5,187,014,975.00	735,815,923.69	5,958,994,760.71
PPK-3	5,187,026,750.02	731,902,892.59	5,953,284,035.94
PPK-1	5,187,039,112.58	727,989,861.50	5,947,574,029.15
BBPT-3	5,187,052,410.75	724,076,830.40	5,941,865,192.46
KPK-2	5,187,065,718.15	720,163,799.31	5,936,156,625.73
KBB-1	5,187,079,065.46	716,250,768.22	5,930,448,188.55
KPK-1	5,187,092,896.57	712,337,737.12	5,924,740,246.38
KBPT-3	5,187,107,108.53	708,404,310.48	5,919,032,889.39
KBPT-2	5,187,122,606.01	704,491,279.39	5,913,328,262.82

Tabel 4.53. Hasil Perhitungan Biaya Total Lembur 2 Jam

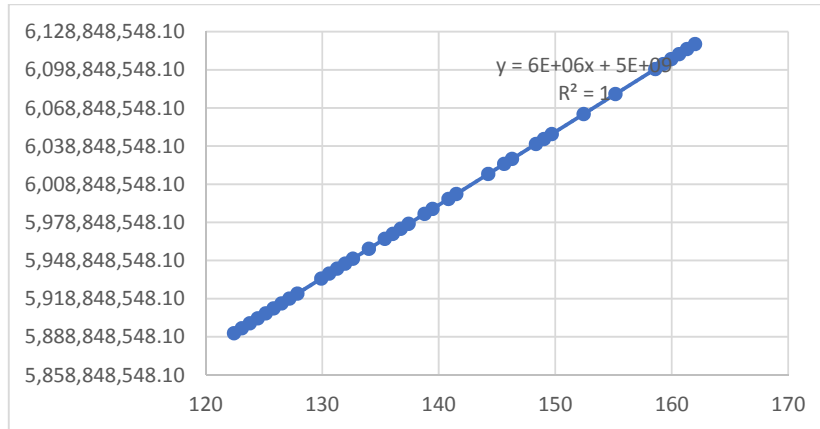
Kode	Biaya Langsung	Biaya Tidak Langsung	Biaya Total
	5,186,852,249.23	932,222,113.57	6,119,074,362.80
BBPLB-3	5,186,848,257.23	925,489,398.31	6,109,233,367.90
BPLK-3	5,186,845,427.68	918,756,683.04	6,099,392,520.42
BPLK-3	5,186,842,885.10	912,010,077.71	6,089,551,736.42

Kode	Biaya Langsung	Biaya Tidak Langsung	Biaya Total
BPLB-2	5,186,841,117.72	905,277,362.44	6,079,712,974.43
BPLB-3	5,186,839,641.01	898,544,647.18	6,069,874,391.07
PBPLB-3	5,186,839,537.97	864,811,620.51	6,060,036,089.77
PPLB-2	5,186,841,371.03	837,825,199.17	6,050,197,970.52
BPK-3	5,186,846,937.84	810,838,777.83	6,040,360,088.66
BBB-3	5,186,848,775.70	804,106,062.57	6,030,523,188.22
BBB-3	5,186,850,964.82	797,373,347.30	6,020,686,388.92
BBB-3	5,186,853,661.96	790,640,632.04	6,010,850,194.54
BBB-3	5,186,856,719.75	783,907,916.77	6,001,014,483.51
BPTB-3	5,186,863,253.44	770,414,706.10	5,991,179,048.05
BBPT-1	5,186,877,348.07	743,428,284.76	5,981,344,598.71
PBB-3	5,186,885,276.83	729,935,074.10	5,971,510,149.37
BPLSW-2	5,186,894,245.17	716,441,863.43	5,961,675,739.92
BPLSW-3	5,186,907,927.09	696,202,047.42	5,951,841,348.33
KPLB-1	5,186,913,193.70	689,469,332.16	5,942,007,704.73
PPTB-2	5,186,919,260.62	682,736,616.89	5,932,174,183.98
PPLSW-2	5,186,932,350.71	669,243,406.22	5,922,340,663.24
BPBB-1	5,186,939,013.03	662,496,800.89	5,912,507,885.94
BBB-3	5,186,953,676.68	649,003,590.22	5,902,675,108.65
BPK-3	5,186,961,201.80	642,270,874.96	5,892,842,354.44
KPLB-2	5,186,968,834.82	635,538,159.69	5,883,009,649.17
KBB-3	5,186,977,070.12	628,805,444.43	5,873,176,944.60
BPK-1	5,186,985,717.62	622,072,729.16	5,863,345,145.81
KPLSW-2	5,186,995,004.46	615,340,013.90	5,853,513,998.97
KPLSW-1	5,187,023,212.57	595,100,197.89	5,843,683,082.04
PPK-3	5,187,034,154.71	588,367,482.63	5,833,854,160.53
PPK-1	5,187,045,452.80	581,634,767.36	5,824,025,893.55
BBPT-3	5,187,056,798.09	574,902,052.10	5,814,198,734.08
KPK-2	5,187,069,289.82	568,169,336.84	5,804,371,862.26
KBB-1	5,187,082,174.70	561,436,621.57	5,794,545,168.02
KPK-1	5,187,095,475.01	554,690,016.24	5,784,718,976.35
KBPT-3	5,187,109,232.10	547,943,410.90	5,774,893,354.36
KBPT-2	5,187,125,614.77	541,196,805.57	5,765,070,525.64

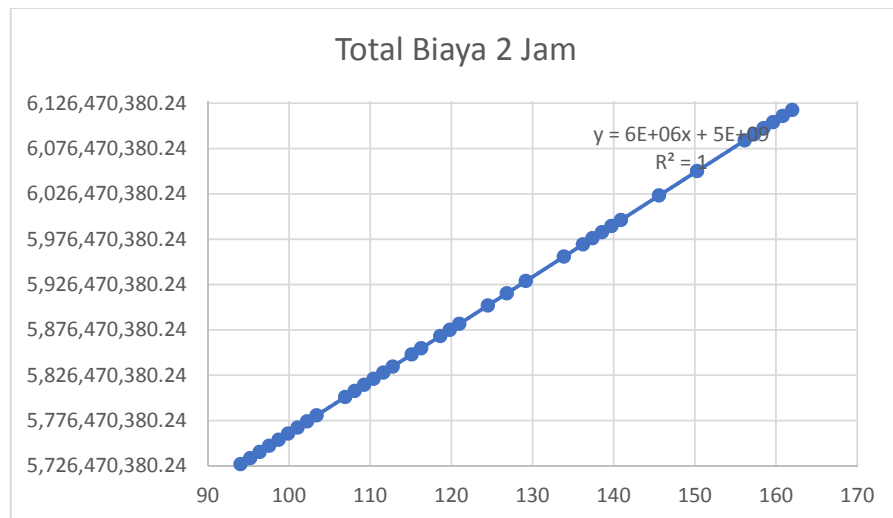
Tabel 4.54. Hasil Perhitungan Biaya Total Lembur 3 Jam

Kode	Biaya Langsung	Biaya Tidak Langsung	Biaya Total
	5,186,852,249.23	932,222,113.57	6,119,074,362.80
BBPLB-3	5,186,847,251.31	923,417,793.61	6,106,207,761.56
BPLK-3	5,186,843,511.48	914,613,473.65	6,093,341,249.78
BPLK-3	5,186,841,823.85	905,809,153.69	6,080,474,804.98
BPLB-2	5,186,840,141.75	897,004,833.73	6,067,610,385.30
BPLB-3	5,186,838,540.41	888,200,513.76	6,054,746,167.09
PBPLB-3	5,186,837,220.79	879,396,193.80	6,041,882,258.57
PPLB-2	5,186,839,110.58	835,319,498.13	6,029,018,458.68
BPK-3	5,186,841,208.42	800,058,141.58	6,016,154,974.36
BBB-3	5,186,842,198.56	791,253,821.62	6,003,292,410.10
BBB-3	5,186,850,987.95	755,992,465.08	5,990,429,950.10
BBB-3	5,186,855,417.66	738,361,786.81	5,977,568,117.56
BBB-3	5,186,857,918.51	729,557,466.85	5,964,706,784.57
BPTB-3	5,186,863,083.48	711,926,788.58	5,951,845,631.38
BBPT-1	5,186,866,472.29	703,122,468.62	5,938,985,521.78
PBB-3	5,186,881,165.97	667,861,112.07	5,926,125,412.17
BPLSW-2	5,186,892,419.01	641,415,094.67	5,913,265,348.54
BPLSW-3	5,186,900,449.94	623,784,416.40	5,900,405,344.77
KPLB-1	5,186,905,720.21	614,980,096.44	5,887,546,065.74
PPTB-2	5,186,919,211.06	597,349,418.16	5,874,686,873.25
PPLSW-2	5,186,925,971.37	588,545,098.20	5,861,827,680.75
BPBB-1	5,186,939,773.82	570,914,419.93	5,848,969,242.96
BBB-3	5,186,947,027.57	562,110,099.97	5,836,110,805.16
KPLB-2	5,186,954,368.78	553,305,780.01	5,823,252,376.07
KBB-3	5,186,962,512.17	544,501,460.05	5,810,394,015.69
BPK-1	5,186,970,682.60	535,697,140.09	5,797,535,672.00
KPLSW-2	5,186,978,861.61	526,892,820.12	5,784,678,225.52
KPLSW-1	5,186,987,101.88	518,088,500.16	5,771,821,420.59
PPK-3	5,187,019,354.22	491,642,482.76	5,758,964,842.47
PPK-1	5,187,030,691.10	482,838,162.80	5,746,110,237.42
BBPT-3	5,187,042,441.15	474,033,842.83	5,733,256,312.11
KPK-2	5,187,054,252.16	465,229,522.87	5,720,403,564.21
KBB-1	5,187,066,911.22	456,425,202.91	5,707,551,051.69
KPK-1	5,187,080,297.68	447,620,882.95	5,694,698,697.44
KBPT-3	5,187,095,221.74	438,816,562.99	5,681,846,843.85
KBPT-2	5,187,110,966.37	430,001,223.85	5,668,995,564.17

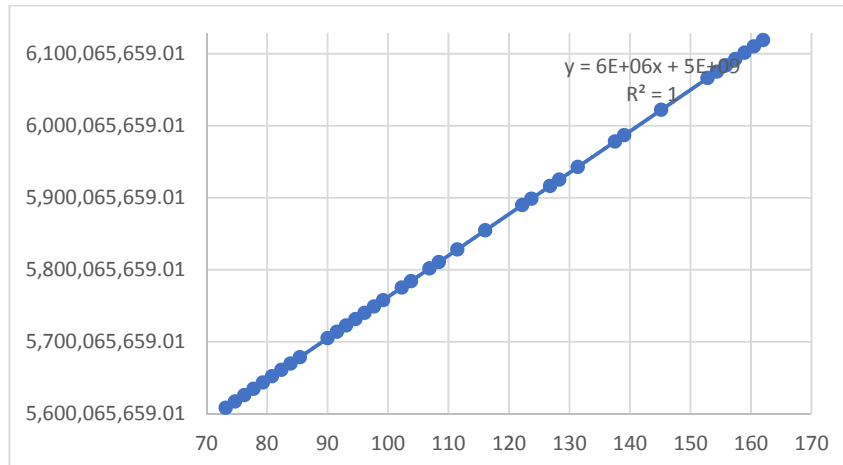
Dari tabel – tabel dapat disajikan grafik hubungan antara biaya tidak langsung dengan durasi kumulatif yang terlampir pada *Gambar 4.17*, *Gambar 4.18*, dan *Gambar 4.19* sebagai berikut :



Gambar 4.17. Grafik Biaya Total pada Lembur 1 Jam



Gambar 4.18. Grafik Biaya Total pada Lembur 2 Jam



Gambar 4.19. Grafik Biaya Total pada Lembur 3 Jam

4.4.9. Efisiensi Waktu dan Biaya

Berdasarkan hasil analisis durasi percepatan dan total biaya proyek dapat dihitung efisiensi waktu dan biaya dari proyek tersebut. Berikut contoh perhitungan analisis efisiensi waktu dan biaya proyek pada masing-masing jam lembur diambil dari salah satu pekerjaan dengan item pekerjaan Pengecoran Beton Pelat Lantai 1 :

1. Lembur 1 jam

Efisiensi waktu

$$Et = \left(\frac{90-75.72}{90} \right) \times 100\%$$

$$= 15.87\%$$

Efisiensi Biaya :

$$Ec = \left(\frac{\text{Rp. } 6,119,074,362.80 - \text{Rp. } 5,362,694,670.12}{\text{Rp. } 6,119,074,362.80} \right) \times 100\%$$

$$= 1.96 \%$$

2. Lembur 2 jam

Efisiensi waktu

$$Et = \left(\frac{90-63.09}{90} \right) \times 100\%$$

$$= 29.90\%$$

Efisiensi Biaya :

$$E_c = \left(\frac{\text{Rp. 6,119,074,362} - \text{Rp. 5,362,595,500.06}}{\text{Rp. 6,119,074,362}} \right) \times 100\%$$

$$= 3.70 \%$$

3. Lembur 3 jam

Efisiensi waktu

$$E_t = \left(\frac{90 - 54.81}{90} \right) \times 100\%$$

$$= 39.10\%$$

Efisiensi Biaya :

$$E_c = \left(\frac{\text{Rp. 6,119,074,362} - \text{Rp. 5,362,595,693.74}}{\text{Rp. 6,119,074,362}} \right) \times 100\%$$

$$= 4.83 \%$$

Secara keseluruhan hasil perhitungan efisiensi waktu dan biaya dapat dilihat pada Tabel 4.55, Tabel 4.56 dan Tabel 4.57 sebagai berikut:

Tabel 4.55. Hasil Perhitungan Efisiensi Waktu dan Biaya pada Lembur 1 Jam

Kode	Kumulatif	Biaya Total	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	162	6,119,074,362.80	0.00	0.00
BBPLB-3	161.32	6,115,156,520.26	0.42	0.06
BPLK-3	160.64	6,111,219,366.55	0.84	0.13
BPLK-3	159.96	6,107,302,696.37	1.26	0.19
BPLB-2	159.27	6,103,366,997.83	1.68	0.26
BPLB-3	158.59	6,099,452,093.44	2.10	0.32
PBPLB-3	155.18	6,079,785,825.47	4.21	0.64
PPLB-2	152.44	6,064,054,098.46	5.90	0.90
BPK-3	149.71	6,048,324,468.00	7.59	1.16
BBB-3	149.03	6,044,412,596.97	8.01	1.22
BBB-3	148.35	6,040,501,093.21	8.43	1.28
BBB-3	146.30	6,028,709,120.21	9.69	1.48
BBB-3	145.62	6,024,799,162.15	10.11	1.54
BPTB-3	144.25	6,016,939,200.03	10.96	1.67
BBPT-1	141.51	6,001,220,512.53	12.65	1.93
PBB-3	140.83	5,997,311,246.06	13.06	1.99
BPLSW-2	139.47	5,989,452,311.02	13.91	2.12
BPLSW-3	138.79	5,985,543,236.28	14.33	2.18
KPLB-1	137.42	5,977,684,423.12	15.17	2.31
PPTB-2	136.74	5,973,776,647.63	15.59	2.37

Kode	Kumulatif	Biaya Total	Efisiensi Waktu (%)	Efisiensi Biaya (%)
PPLSW-2	136.06	5,969,849,883.51	16.01	2.44
BPBB-1	135.37	5,965,923,706.44	16.44	2.50
BBB-3	134.01	5,958,071,480.93	17.28	2.63
BPK-3	132.64	5,950,219,733.00	18.12	2.76
KPLB-2	131.96	5,946,314,240.61	18.54	2.82
KBB-3	131.28	5,942,409,215.07	18.96	2.89
BPK-1	130.60	5,938,504,832.81	19.38	2.95
KPLSW-2	129.92	5,934,600,964.12	19.80	3.01
KPLSW-1	127.87	5,922,830,898.69	21.07	3.21
PPK-3	127.19	5,918,929,642.61	21.49	3.27
PPK-1	126.51	5,915,028,974.08	21.91	3.33
BBPT-3	125.83	5,911,129,241.15	22.33	3.40
KPK-2	125.15	5,907,229,517.46	22.75	3.46
KBB-1	124.47	5,903,329,833.68	23.17	3.53
KPK-1	123.79	5,899,430,633.69	23.59	3.59
KBPT-3	123.11	5,895,511,419.01	24.01	3.65
KBPT-2	122.43	5,891,613,885.40	24.43	3.72

Tabel 4.56. Hasil Perhitungan Efisiensi Waktu dan Biaya pada Lembur 2 Jam

Kode	Kumulatif	Biaya Total	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	162	6,119,074,362.80	0.00	0.00
BBPLB-3	160.83	6,112,337,655.54	0.72	0.11
BPLK-3	159.66	6,105,602,110.73	1.44	0.22
BPLK-3	158.4876	6,098,852,962.81	2.17	0.33
BPLB-2	157.3176	6,092,118,480.16	2.89	0.44
BPLB-3	156.1476	6,085,384,288.18	3.61	0.55
PBPLB-3	150.2855	6,051,651,158.48	7.23	1.10
PPLB-2	145.5959	6,024,666,570.20	10.13	1.54
BPK-3	140.9062	5,997,685,715.67	13.02	1.98
BBB-3	139.7362	5,990,954,838.27	13.74	2.09
BBB-3	138.5662	5,984,224,312.12	14.47	2.20
BBB-3	137.3962	5,977,494,294.00	15.19	2.31
BBB-3	136.2262	5,970,764,636.53	15.91	2.42
BPTB-3	133.8814	5,957,277,959.55	17.36	2.64
BBPT-1	129.1917	5,930,305,632.84	20.25	3.08
PBB-3	126.8469	5,916,820,350.92	21.70	3.31
BPLSW-2	124.5021	5,903,336,108.59	23.15	3.53

Kode	Kumulatif	Biaya Total	Efisiensi Waktu (%)	Efisiensi Biaya (%)
BPLSW-3	120.9848	5,883,109,974.51	25.32	3.86
KPLB-1	119.8148	5,876,382,525.86	26.04	3.97
PPTB-2	118.6448	5,869,655,877.51	26.76	4.08
PPLSW-2	116.3	5,856,175,756.94	28.21	4.30
BPBB-1	115.1276	5,849,435,813.92	28.93	4.41
BBB-3	112.7828	5,835,957,266.90	30.38	4.63
BPK-3	111.6128	5,829,232,076.76	31.10	4.74
KPLB-2	110.4428	5,822,506,994.52	31.83	4.85
KBB-3	109.2728	5,815,782,514.54	32.55	4.96
BPK-1	108.1028	5,809,058,446.78	33.27	5.07
KPLSW-2	106.9328	5,802,335,018.36	33.99	5.18
KPLSW-1	103.4155	5,782,123,410.47	36.16	5.51
PPK-3	102.2455	5,775,401,637.34	36.89	5.62
PPK-1	101.0755	5,768,680,220.16	37.61	5.73
BBPT-3	99.90552	5,761,958,850.19	38.33	5.84
KPK-2	98.73552	5,755,238,626.65	39.05	5.95
KBB-1	97.56552	5,748,518,796.27	39.77	6.06
KPK-1	96.3931	5,741,785,491.25	40.50	6.17
KBPT-3	95.22069	5,735,052,643.00	41.22	6.28
KBPT-2	94.04828	5,728,322,420.33	41.95	6.39

Tabel 4.57. Hasil Perhitungan Efisiensi Waktu dan Biaya pada Lembur 3 Jam

Kode	Kumulatif	Biaya Total	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	162	6,119,074,362.80	0.00	0.00
BBPLB-3	160.47	6,110,265,044.92	0.94	0.14
BPLK-3	158.94	6,101,456,985.13	1.89	0.29
BPLK-3	157.41	6,092,650,977.53	2.83	0.43
BPLB-2	155.88	6,083,844,975.48	3.78	0.58
BPLB-3	154.35	6,075,039,054.17	4.72	0.72
PBPLB-3	152.82	6,066,233,414.59	5.67	0.86
PPLB-2	145.1604	6,022,158,608.70	10.39	1.58
BPK-3	139.0328	5,986,899,350.00	14.18	2.16
BBB-3	137.5028	5,978,096,020.19	15.12	2.30
BBB-3	131.3751	5,942,843,453.03	18.90	2.88
BBB-3	128.3113	5,925,217,204.47	20.80	3.17
BBB-3	126.7813	5,916,415,385.36	21.74	3.31
BPTB-3	123.7174	5,898,789,872.06	23.63	3.60

Kode	Kumulatif	Biaya Total	Efisiensi Waktu (%)	Efisiensi Biaya (%)
BBPT-1	122.1874	5,889,988,940.90	24.58	3.74
PBB-3	116.0598	5,854,742,278.04	28.36	4.32
BPLSW-2	111.464	5,828,307,513.68	31.20	4.75
BPLSW-3	108.4002	5,810,684,866.33	33.09	5.04
KPLB-1	106.8702	5,801,885,816.64	34.03	5.18
PPTB-2	103.8064	5,784,268,629.22	35.92	5.47
PPLSW-2	102.2764	5,775,471,069.58	36.87	5.62
BPBB-1	99.21255	5,757,854,193.75	38.76	5.90
BBB-3	97.68255	5,749,057,127.54	39.70	6.05
BPK-3	96.15255	5,740,260,148.79	40.65	6.19
KPLB-2	94.62255	5,731,463,972.22	41.59	6.33
KBB-3	93.09255	5,722,667,822.68	42.54	6.48
BPK-1	91.56255	5,713,871,681.73	43.48	6.62
KPLSW-2	90.03255	5,705,075,602.05	44.42	6.77
KPLSW-1	85.43681	5,678,661,836.98	47.26	7.20
PPK-3	83.90681	5,669,868,853.89	48.21	7.34
PPK-1	82.37681	5,661,076,283.98	49.15	7.48
BBPT-3	80.84681	5,652,283,775.04	50.09	7.63
KPK-2	79.31681	5,643,492,114.13	51.04	7.77
KBB-1	77.78681	5,634,701,180.63	51.98	7.92
KPK-1	76.25681	5,625,911,784.73	52.93	8.06
KBPT-3	74.72489	5,617,112,190.22	53.87	8.20
KBPT-2	73.19298	5,608,314,329.69	54.82	8.35

4.4.10. Biaya Total Jam Lembur dan Penambahan Tenaga Kerja

Dari perhitungan didapat perbedaan antara biaya total akibat penambahan jam lembur dan biaya total akibat penambahan tenaga kerja, seperti yang pada tabel berikut:

Tabel 4.58. Biaya Akibat Penambahan Lembur dan Penambahan Tenaga 1 Jam

Kode	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
BBPLB-3	0.68	6,115,164,075.31	5,997,311,246.06
BPLK-3	0.68	6,111,257,759.04	5,942,409,215.07
BPLK-3	0.68	6,111,257,759.04	5,942,409,215.07
BPLB-2	0.68	6,103,450,186.53	5,907,229,517.46
BPLB-3	0.68	6,099,546,623.57	5,934,600,964.12
PBPLB-3	0.68	6,091,730,314.78	6,111,219,366.55

Kode	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
PPLB-2	0.68	6,087,841,942.41	6,107,302,696.37
BPK-3	0.68	6,095,624,715.66	5,938,504,832.81
BBB-3	0.68	6,083,954,141.02	6,040,501,093.21
BBB-3	0.68	6,083,954,141.02	6,040,501,093.21
BBB-3	0.68	6,083,954,141.02	6,040,501,093.21
BBB-3	0.68	6,083,954,141.02	6,040,501,093.21
BPTB-3	0.68	6,068,415,833.34	5,918,929,642.61
BBPT-1	0.68	6,056,797,646.91	5,965,923,706.44
PBB-3	0.68	6,052,931,642.13	5,915,028,974.08
BPLSW-2	0.68	6,060,660,080.75	5,946,314,240.61
BPLSW-3	0.68	6,041,379,378.04	5,969,849,883.51
KPLB-1	0.68	6,026,050,845.24	6,099,452,093.44
PPTB-2	1.37	6,018,388,972.38	6,016,939,200.03
PPLSW-2	2.73	5,958,486,759.62	6,064,054,098.46
BPBB-1	1.37	5,984,409,648.06	5,989,452,311.02
BBB-3	2.73	6,064,527,759.28	6,048,324,468.00
BPK-3	0.68	6,083,954,141.02	6,040,501,093.21
KPLB-2	0.68	6,087,841,942.41	6,107,302,696.37
KBB-3	0.68	5,995,682,526.09	6,103,366,997.83
BPK-1	1.37	5,969,567,778.08	5,977,684,423.12
KPLSW-2	0.68	5,991,923,909.88	6,115,156,520.26
KPLSW-1	1.37	5,954,798,854.50	5,950,219,733.00
PPK-3	0.68	5,980,672,193.98	6,044,412,596.97
PPK-1	2.05	5,929,382,655.22	6,028,709,120.21
BBPT-3	0.68	6,049,087,632.13	5,895,511,419.01
KPK-2	1.37	5,947,514,653.92	5,958,071,480.93
KBB-1	3.42	5,925,785,375.26	6,079,785,825.47
KPK-1	0.68	5,973,243,132.04	5,891,613,885.40
KBPT-3	2.73	5,902,308,073.79	6,001,220,512.53
KBPT-2	2.05	5,912,133,538.68	5,922,830,898.69

Tabel 4.59. Biaya Akibat Penambahan Lembur dan Penambahan Tenaga 2 Jam

Kode	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
BBPLB-3	1.17	6,112,343,025.21	5,990,954,838.27
BPLK-3	1.17	6,105,633,054.23	5,829,232,076.76
BPLK-3	1.17	6,105,633,054.23	5,829,232,076.76
BPLB-2	1.17	6,092,211,733.65	5,735,052,643.00
BPLB-3	1.17	6,085,509,719.46	5,768,680,220.16

Kode	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
PBPLB-3	1.17	6,072,148,005.75	6,112,337,655.54
PPLB-2	1.17	6,078,822,292.61	5,809,058,446.78
BPK-3	1.17	6,065,467,202.56	6,098,852,962.81
BBB-3	1.17	6,058,814,487.01	5,984,224,312.12
BBB-3	1.17	6,058,814,487.01	5,984,224,312.12
BBB-3	1.17	6,058,814,487.01	5,984,224,312.12
BBB-3	1.17	6,058,814,487.01	5,984,224,312.12
BPTB-3	1.17	6,032,229,001.10	5,775,401,637.34
BBPT-1	1.17	6,012,442,051.80	5,815,782,514.54
PBB-3	1.17	6,005,887,428.64	5,761,958,850.19
BPLSW-2	1.17	6,019,036,391.66	5,822,506,994.52
BPLSW-3	1.17	5,973,596,009.96	5,849,435,813.92
KPLB-1	1.17	5,960,714,561.01	6,085,384,288.18
PPTB-2	4.69	5,849,340,838.19	6,024,666,570.20
PPLSW-2	2.34	5,897,970,745.92	5,903,336,108.59
BPBB-1	4.69	6,025,632,696.38	5,997,685,715.67
BBB-3	1.17	6,058,814,487.01	5,984,224,312.12
BPK-3	1.17	6,065,467,202.56	6,098,852,962.81
KPLB-2	2.34	5,855,350,160.30	5,916,820,350.92
KBB-3	1.17	5,910,361,350.78	6,092,118,480.16
BPK-1	1.17	5,904,162,006.87	6,105,602,110.73
KPLSW-2	2.34	5,935,297,192.27	5,957,277,959.55
KPLSW-1	2.34	5,843,331,532.11	5,856,175,756.94
PPK-3	3.52	5,802,478,198.41	5,883,109,974.51
PPK-1	1.17	5,885,629,976.79	5,970,764,636.53
BBPT-3	1.17	5,999,368,556.60	5,802,335,018.36
KPK-2	2.34	5,831,591,595.70	5,835,957,266.90
KBB-1	5.86	5,796,678,626.50	6,051,651,158.48
KPK-1	1.17	5,873,445,038.26	5,728,322,420.33
KBPT-3	4.69	5,761,589,910.22	5,930,305,632.84
KBPT-2	3.52	5,775,927,564.57	5,782,123,410.47

Tabel 4.60. Biaya Akibat Penambahan Lembur dan Penambahan Tenaga 3 Jam

Kode	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
BBPLB-3	1.53	6,110,275,369.90	5,916,415,385.36
BPLK-3	1.53	6,101,506,944.58	5,731,463,972.22
BPLK-3	1.53	6,101,506,944.58	5,731,463,972.22
BPLB-2	1.53	6,083,996,377.54	5,643,492,114.13

Kode	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
BPLB-3	1.53	6,075,243,105.97	5,661,076,283.98
PBPLB-3	1.53	6,066,516,435.58	5,705,075,602.05
PPLB-2	1.53	6,057,802,905.18	6,101,456,985.13
BPK-3	1.53	6,049,109,591.75	6,075,039,054.17
BBB-3	1.53	6,040,436,101.73	5,978,096,020.19
BBB-3	1.53	6,040,436,101.73	5,978,096,020.19
BBB-3	1.53	6,040,436,101.73	5,978,096,020.19
BBB-3	1.53	6,040,436,101.73	5,978,096,020.19
BPTB-3	1.53	6,005,787,752.54	5,749,057,127.54
BBPT-1	1.53	5,997,205,924.92	5,942,843,453.03
PBB-3	1.53	5,988,625,275.45	5,740,260,148.79
BPLSW-2	1.53	5,980,044,625.99	5,713,871,681.73
BPLSW-3	1.53	5,971,551,653.12	5,652,283,775.04
KPLB-1	1.53	5,963,099,957.99	5,617,112,190.22
PPTB-2	3.06	5,946,197,743.58	5,775,471,069.58
PPLSW-2	6.13	5,912,925,231.84	6,083,844,975.48
BPBB-1	3.06	5,896,296,129.77	5,925,217,204.47
BBB-3	6.13	6,040,436,101.73	5,978,096,020.19
BPK-3	1.53	6,049,109,591.75	6,075,039,054.17
KPLB-2	3.06	5,839,653,439.34	6,092,650,977.53
KBB-3	1.53	5,831,700,929.24	6,110,265,044.92
BPK-1	1.53	5,823,773,586.01	5,898,789,872.06
KPLSW-2	1.53	5,815,861,336.95	6,066,233,414.59
KPLSW-1	3.06	5,800,373,103.94	5,608,314,329.69
PPK-3	4.60	5,777,438,236.31	5,810,684,866.33
PPK-1	1.53	5,769,804,261.37	5,986,899,350.00
BBPT-3	1.53	5,762,188,791.42	5,757,854,193.75
KPK-2	3.06	5,747,433,182.43	5,784,268,629.22
KBB-1	7.66	5,710,931,957.02	5,828,307,513.68
KPK-1	1.53	5,703,668,602.87	6,022,158,608.70
KBPT-3	6.13	5,678,622,853.49	5,678,661,836.98
KBPT-2	4.60	5,661,842,535.08	5,608,742,278.04

Dari tabel – tabel di atas disimpulkan bahwa terdapat perbedaan antara biaya akibat penambahan jam kerja (lembur) dengan penambahan tenaga kerja, biaya di atas adalah biaya yang langsung dibebankan kepada proyek sesuai urutan dari item pekerjaan berdasarkan *cost slope*. Pada penambahan Lembur 1 jam jika dibandingkan dengan penambahan tenaga kerja 1 jam pada durasi 5.32 hari

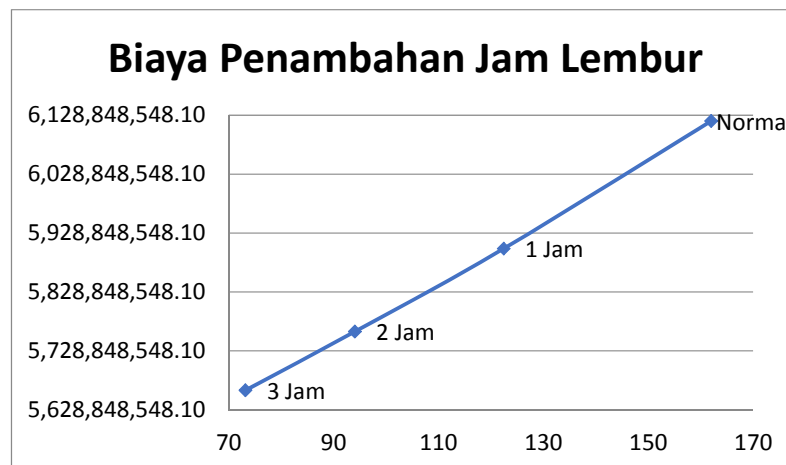
penambahan tenaga kerja lebih efektif dengan biaya Rp. 5,608,314,329.69 dibandingkan dengan penambahan jam lembur. Selanjutnya pada tambahan tenaga kerja 2 jam dan pada penambahan tenaga kerja 3 juga memiliki hasil yang sama yakni penambahan tenaga kerja lebih efektif dibandingkan dengan penambahan jam lembur.

Selanjutnya membandingkan biaya antara biaya kondisi normal dengan penambahan jam lembur dan penambahan tenaga, untuk lebih lanjut akan dijelaskan dalam tabel berikut ini :

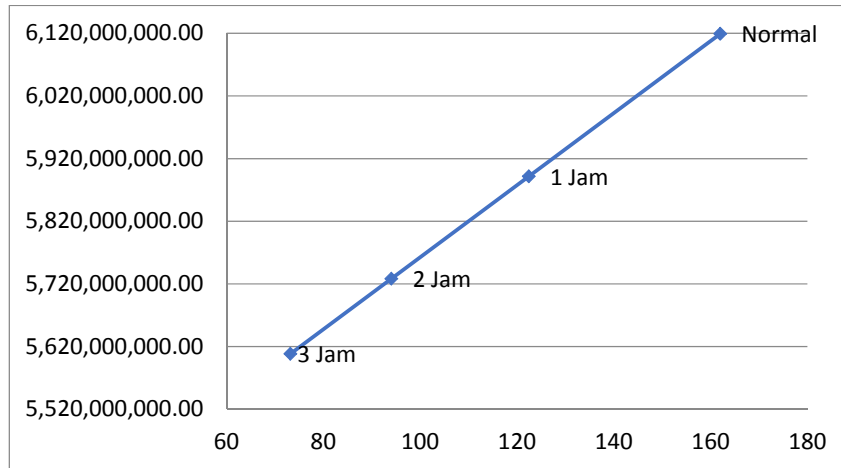
Tabel 4.61. Perbandingan Hasil Akhir Biaya Antara Kondisi Normal dengan Penambahan Jam Lembur dan Tenaga Kerja

No	Penambahan Alat	Durasi	Penambahan Jam Lembur	Penambahan Tenaga Kerja
1	Normal	162	6,119,074,362.80	6,119,074,362.80
2	1	122.43	5,902,308,073.79	5,891,613,885.40
3	2	94.05	5,761,589,910.22	5,728,322,420.33
4	3	73.19	5,661,842,535.08	5,608,314,329.69

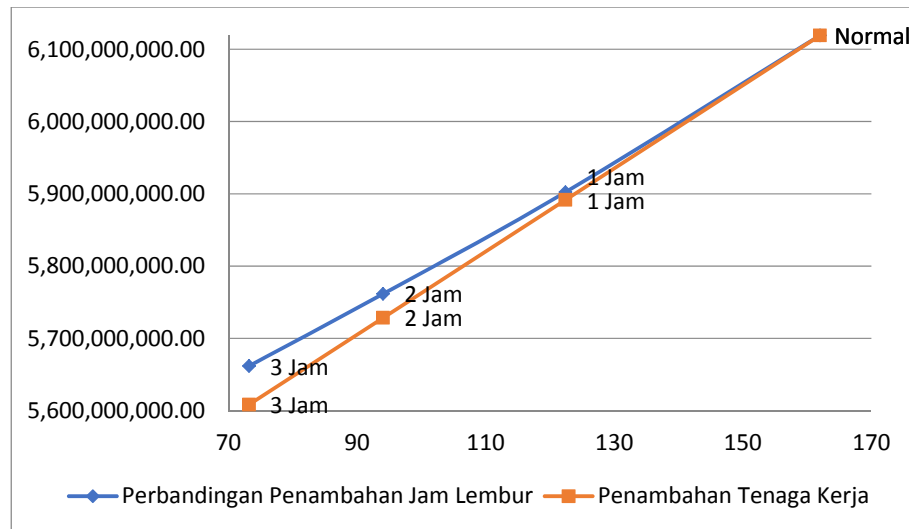
Dari tabel di atas didapat grafik perbandingan antara biaya normal dengan penambahan lembur 1 jam hingga 3 jam, grafik perbandingan antara biaya normal dengan penambahan tenaga kerja, dan grafik gabungan keduanya antara perbandingan biaya normal dengan penambahan lembur dan tenaga kerja sebagai berikut :



Gambar 4.20. Grafik Biaya Perbandingan Biaya Normal dengan Penambahan Lembur 1 Jam Hingga 3 Jam



Gambar 4.21. Grafik Biaya Perbandingan Biaya Normal dengan Penambahan Penambahan Tenaga Kerja 1 Jam Hingga 3 Jam



Gambar 4.22. Grafik Perbandingan Biaya Normal dengan Penambahan Lembur dan Tenaga Kerja

4.4.11. Analisis Biaya Keterlambatan Kerja

Untuk biaya denda akibat keterlambatan proyek dapat dihitung dengan rumus berikut ini :

Total denda = total hari keterlambatan \times denda perhari

Dengan,

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

Berikut dibawah ini salah satu contoh perhitungan biaya denda untuk pekerjaan kode BBPT-1 :

$$\begin{aligned} \text{Total hari keterlambatan} &= 0.68 \\ \text{Biaya total proyek} &= \text{Rp. } 6,119,074,362.80 \\ \text{Total denda} &= 0.68 \times \frac{1}{1000} \times \text{Rp. } 6,119,074,362.80 \\ &= \text{Rp. } 4,160,970.57 \end{aligned}$$

Selanjutnya hasil penambahan biaya dari penambahan tenaga kerja yang kemudian dapat dibandingkan antara durasi percepatan dan biaya totanya serta dengan denda apabila proyek mengalami keterlambatan dari jadwal perencanaan yang dapat dilihat pada tabel berikut ini :

Tabel 4.62. Perbandingan Penambahan Biaya Jam Kerja, Tenaga Kerja dan Denda Pada Lembur 1 Jam

Durasi	Biaya (Rp)		
	Penambahan Jam Lembur	Penambahan Tenaga Kerja	Denda
21.27	523,139.01	4,076.09	16,730,633.70
10.63	158,599.20	6,891.17	8,365,316.85
15.95	719,261.46	8,306.92	12,547,975.28
5.32	245,521.52	14,211.96	4,182,658.43
10.63	204,980.42	7,918.23	8,365,316.85
21.27	405,173.76	1,979.55	16,730,633.70
26.58	1,535,134.50	865.23	20,913,292.13
5.32	315,751.13	15,497.49	4,160,970.57
21.27	2,081,869.98	15,019.05	16,730,633.70
5.32	174,810.43	(2,271.90)	4,182,658.43
10.63	582,652.70	14,627.77	8,365,316.85
5.32	67,421.86	6,662.53	4,182,658.43
5.32	9,468.14	13,307.40	4,160,970.57
5.32	11,518.73	(3,727.06)	4,182,658.43
5.32	45,352.57	7,249.56	4,182,658.43
5.32	69,021.09	(1,873.30)	4,160,970.57
5.32	237,677.13	1,160.06	4,160,970.57
10.63	437,791.34	15,105.35	8,365,316.85
15.95	1,974,815.03	30,214.48	12,547,975.28
5.32	158,599.20	13,298.17	4,160,970.57
5.32	25,229.70	3,956.36	4,160,970.57
5.32	50,597.24	7,538.70	4,160,970.57
5.32	26,970.77	3,073.03	4,160,970.57
5.32	27,116.53	13,347.31	4,160,970.57

Durasi	Biaya (Rp)		
	Penambahan Jam Lembur	Penambahan Tenaga Kerja	Denda
5.32	25,957.84	1,527.34	4,160,970.57
5.32	175,577.01	(4,811.45)	4,160,970.57
5.32	171,584.24	5,255.60	4,160,970.57
10.63	352,591.46	8,040.12	8,365,316.85
5.32	18,630.21	(3,639.09)	4,160,970.57
5.32	33,771.57	11,775.02	4,160,970.57
5.32	6,714.83	13,831.11	4,160,970.57
5.32	9,021.53	8,005.56	4,160,970.57
5.32	9,468.14	9,162.40	4,160,970.57
5.32	24,658.73	8,648.84	4,160,970.57
5.32	2,743.60	3,764.63	4,160,970.57
5.32	45,352.57	12,362.56	4,160,970.57

Tabel 4.63. Perbandingan Penambahan Biaya Jam Kerja, Tenaga Kerja dan Denda Pada Lembur 2 Jam

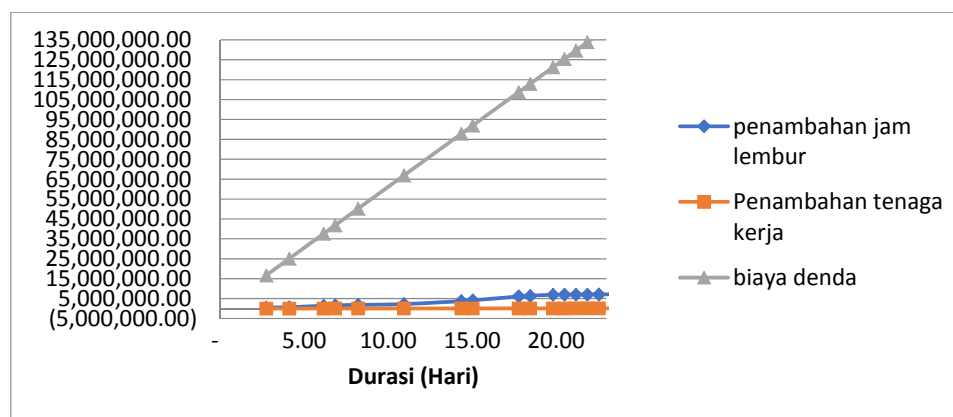
Durasi	Biaya (Rp)		
	Penambahan Jam Lembur	Penambahan Tenaga Kerja	Denda
19.31	1,569,052.59	5,566.81	28,696,348.74
9.66	1,152,441.54	6,533.69	14,348,174.37
14.48	2,144,938.04	13,681.92	21,522,261.55
4.83	723,409.18	9,286.84	7,159,317.00
9.66	611,761.72	8,968.34	14,348,174.37
19.31	1,213,874.70	1,833.06	28,696,348.74
24.14	4,619,629.38	(103.03)	35,870,435.92
4.83	947,033.42	16,382.67	7,174,087.18
19.31	6,235,359.41	14,094.63	28,696,348.74
4.83	533,371.35	(1,767.39)	7,159,317.00
9.66	1,753,274.25	14,663.66	14,348,174.37
4.83	191,982.18	6,662.31	7,174,087.18
4.83	30,701.08	13,757.08	7,174,087.18
4.83	45,288.41	(3,992.00)	7,159,317.00
4.83	136,410.55	8,235.29	7,159,317.00
4.83	213,843.22	(1,476.71)	7,159,317.00
4.83	723,393.16	3,057.79	7,159,317.00
9.66	1,308,272.14	13,090.09	14,348,174.37
14.48	5,902,161.66	28,208.11	21,522,261.55
4.83	474,594.75	13,300.31	7,174,087.18

Durasi	Biaya (Rp)		
	Penambahan Jam Lembur	Penambahan Tenaga Kerja	Denda
4.83	474,594.75	13,300.31	7,159,317.00
4.83	138,375.40	7,633.02	7,159,317.00
4.83	474,594.75	13,300.31	7,159,317.00
4.83	474,594.75	13,300.31	7,159,317.00
4.83	474,594.75	13,300.31	7,159,317.00
4.83	541,454.31	(2,829.54)	7,159,317.00
4.83	518,941.17	5,266.61	7,159,317.00
9.66	1,043,153.86	7,928.75	14,348,174.37
4.83	518,941.17	5,266.61	7,174,087.18
4.83	103,387.75	10,942.14	7,159,317.00
4.83	27,298.95	12,884.89	7,159,317.00
4.83	27,298.95	12,884.89	7,159,317.00
4.83	30,701.08	11,298.08	7,159,317.00
4.83	58,428.41	8,647.50	7,159,317.00
4.83	1,377.68	1,837.86	7,159,317.00
4.83	136,410.55	11,345.29	7,159,317.00

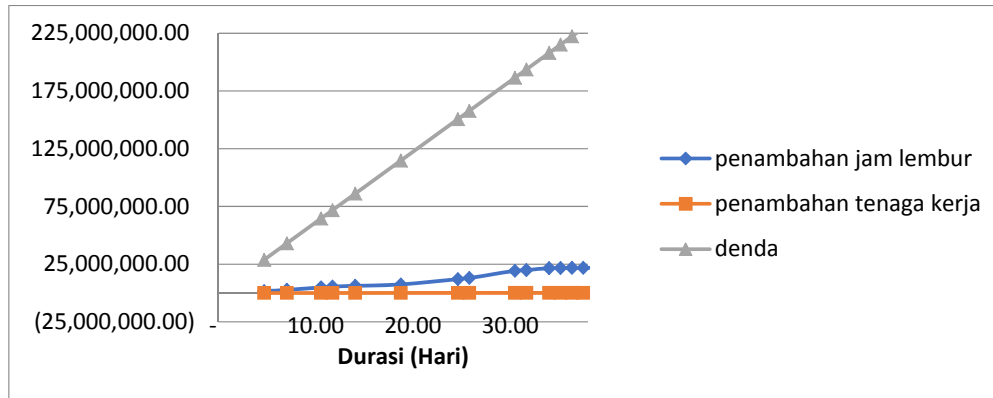
Tabel 4.64. Perbandingan Penambahan Biaya Jam Kerja, Tenaga Kerja dan Denda Pada Lembur 3 Jam

Durasi	Biaya (Rp)		
	Penambahan Jam Lembur	Penambahan Tenaga Kerja	Denda
17.87	2,571,341.22	8,789.38	37,495,604.61
8.94	728,463.86	4,429.72	18,747,802.30
13.40	3,511,149.77	11,253.04	28,121,703.45
4.47	1,181,364.20	15,744.63	9,373,901.15
8.94	1,001,576.21	5,164.97	18,747,802.30
17.87	1,988,844.80	2,097.84	37,495,604.61
22.34	7,575,470.26	1,889.79	46,869,505.76
4.47	1,551,984.99	17,478.61	9,373,901.15
17.87	10,215,607.16	14,693.68	37,495,604.61
4.47	876,976.72	(1,687.63)	9,362,183.78
8.94	2,875,069.29	13,490.85	18,747,802.30
4.47	311,347.09	6,760.32	9,362,183.78
4.47	51,048.39	12,659.05	9,362,183.78
4.47	77,649.57	(3,739.83)	9,362,183.78
4.47	223,670.50	8,179.01	9,362,183.78
4.47	352,624.84	(1,682.09)	9,362,183.78
4.47	1,188,850.01	(1,319.62)	9,362,183.78

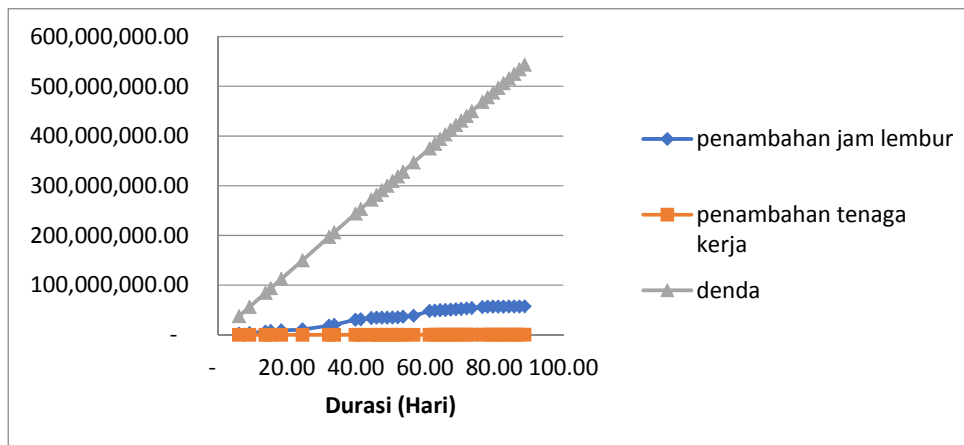
Durasi	Biaya (Rp)		
	Penambahan Jam Lembur	Penambahan Tenaga Kerja	Denda
8.94	2,142,445.26	13,802.45	18,747,802.30
13.40	9,665,699.00	32,252.34	28,121,703.45
4.47	777,410.16	13,386.46	9,362,183.78
4.47	777,410.16	13,386.46	9,362,183.78
4.47	222,492.33	7,341.21	9,362,183.78
4.47	777,410.16	13,386.46	9,362,183.78
4.47	777,410.16	13,386.46	9,362,183.78
4.47	777,410.16	13,386.46	9,362,183.78
4.47	777,410.16	13,386.46	9,362,183.78
4.47	892,070.91	(4,997.92)	9,362,183.78
4.47	851,809.87	5,270.27	9,362,183.78
8.94	1,704,912.96	8,030.92	18,747,802.30
4.47	851,809.87	5,270.27	9,362,183.78
4.47	170,100.25	7,253.75	9,362,183.78
4.47	47,024.50	14,924.07	9,362,183.78
4.47	47,024.50	14,924.07	9,362,183.78
4.47	51,048.39	11,750.05	9,362,183.78
4.47	90,789.57	8,240.27	9,362,183.78
4.47	5,327.06	2,500.85	9,362,183.78
4.47	223,670.50	11,811.01	9,362,183.78



Gambar 4.23. Perbandingan Biaya Penambahan Jam Lembur, Tenaga Kerja dan Denda pada Lembur 1 Jam



Gambar 4.24. Perbandingan Biaya Penambahan Jam Lembur, Tenaga Kerja dan Denda pada Lembur 2 Jam



Gambar 4.25. Perbandingan Biaya Penambahan Jam Lembur, Tenaga Kerja dan Denda pada Lembur 1 Jam