BAB IV

HASIL PENELITIAN DAN PEMBAHASAN

4.1. Data Penelitian

4.1.1. Data Umum Proyek

Data umum proyek pembangunan Hotel Whiz Prime, Lampung :

Pemilik Proyek : X

Konsultan Supervisi : PT. Y

Kontraktor : PT. Z

Anggaran : Rp.5.488.191.102,00

Waktu Pelaksanaan : 273 hari

Tanggal pekerjaan dimulai : 15 April 2015

Tanggal pekerjaan selesai : 13 Desember 2015

Data selengkapnya dapat dilihat pada lampiran.

4.2. Daftar Kegiatan-Kegiatan Kritis

Berikut daftar kegiatan-kegiatan kristis yang diperoleh berdasarkan analisis menggunakan *microsoft project* 2010.

Tabel 4.1 Daftar kegiatan kritis kondisi normal

KODE	NAMA PEKERJAAN	DURASI (HARI)
PPL	PEK. PEMBERSIHAN LAHAN	14
PGT1	PEK. GALIAN TANAH 1	21
PBKTP	PEK. BOBOK KEPALA TIANG PANCANG	14
BTPC	BETON PILE CAP	21
PPC	PEMBESIAN PILE CAP	28
BKPC	BEKISTING PILE CAP	7
BTS	BETON SLOOF	14
PS	PEMBESIAN SLOOF	21
BKS	BEKISTING SLOOF	7
BTKB	BETON KOLOM BASEMENT	7
PKB	PEMBESIAN KOLOM BASEMENT	7
BKKB	BEKISTING KOLOM BASEMENT	7
BTKD	BETON KOLOM DASAR	7
PKD	PEMBESIAN KOLOM DASAR	14
BTSWD	BETON SHEAR WALL DASAR	7

PSWD	PEMBESIAN SHEAR WALL DASAR	7
BTSWL2	BETON SHEAR WALL LANTAI 2	7
PSWL2	PEMBESIAN SHEAR WALL LANTAI 2	7
BTSWL3	BETON SHEAR WALL LANTAI 3	7
PSWL3	PEMBESIAN SHEAR WALL LANTAI 3	7
BTSWL5	BETON SHEAR WALL LANTAI 5	7
PSWL5	PEMBESIAN SHEAR WALL LANTAI 5	7
BTSWL6	BETON SHEAR WALL LANTAI 6	7
PSWL6	PEMBESIAN SHEAR WALL LANTAI 6	7
BTSWL7	BETON SHEAR WALL LANTAI 7	7
PSWL7	PEMBESIAN SHEAR WALL LANTAI 7	7
BTPL7	BETON PLAT LANTAI 7	7
PPL7	PEMBESIAN PLAT LANTAI 7	14
BKPL7	BEKISTING PLAT LANTAI 7	7
BTBL7	BETON BALOK LANTAI 7	7
PBL7	PEMBESIAN BALOK LANTAI 7	14
BKBL7	BEKISTING BALOK LANTAI 7	7

Beberapa alasan item kegiatan tersebut terpilih untuk dilakukan percepatan sebagai kegiatan kritis adalah sebagai berikut :

1. Kegiatan kritis tersebut memiliki *resource work* atau memiliki pekerja sehingga dapat dilakukan percepatan dengan penambahan jam kerja (lembur) dan penambahan tenaga kerja. Penambahan tersebut hanya dilakukan pada kegiatan-kegiatan kritis sehingga kegiatan lain tidak terjadi perubahan baik dari segi waktu maupun tenaga kerja.
2. Kegiatan kritis tersebut jika dipercepat maka akan sangat berpengaruh terhadap biaya tidak langsung keseluruhan proyek.

4.3. Penerapan Metode *Time Cost Trade Off*

4.3.1. Penambahan Jam Kerja (Waktu Lembur)

Pada proyek kali ini jam kerja normal yakni 8 jam (08.00 – 17.00) dengan waktu istirahat 1 jam (12.00 – 13.00). Kemudian, jam lembur ditambahkan selama 3 jam (18.00 – 21.00) dengan mempertimbangkan peraturan yang telah ada. Menurut Keputusan Menteri Tenaga Kerja dan Transmigrasi Nomor KEP.102/MEN/VI/2004 standar upah untuk lembur adalah sebagai berikut.

1. Waktu kerja lembur hanya dapat dilakukan paling banyak 3 (tiga) jam dalam 1 (satu) hari dan 14 (empat belas) jam dalam 1 minggu.
2. Ketentuan waktu kerja lembur sebagaimana dimaksud dalam ayat (1) tidak termasuk kerja lembur yang dilakukan pada waktu istirahat.
3. Pengusaha yang memerkejakan pekerja/buruh melebihi waktu kerja, wajib membayar upah lembur.
4. Memberikan makanan dan minuman sekurang-kurangnya 1.400 kalori apabila kerja lembur dilakukan selama 3 (tiga) jam atau lebih.
5. Untuk jam kerja lembur pertama harus dibayar upah sebesar 1,5 (satu setengah) kali upah sejam.
6. Untuk setiap jam kerja lembur berikutnya harus dibayar upah sebesar 2 (dua) kali upah sejam.

Tabel 4.2 Upah tenaga kerja

No	Pekerja/ Alat	Biaya normal per hari (Rp)	Biaya normal per Jam (Rp)
1	Pekerja	70,000	8,750
2	Tukang	90,000	11,250
3	Kepala tukang	100,000	12,500
4	Mandor	120,000	15,000
5	Alat pembersih lahan	2,000	250
6	Alat stripping	5,000	625
7	Alat beton	15,000	1,875
8	Alat pembesian	150	19
9	Alat bekisting batako	100	13
10	perancah	9,000	1,125
11	transport beton lt. dasar	35,000	4,375
12	transport besi lt.dasar	100	13
13	transport bekisting lt. dasar	5,000	625
14	transport beton lt.2	40,000	5,000
15	transport besi lt.2	150	19
16	transport bekisting lt.2	8,500	1,063
17	transport beton lt.3	45,000	5,625
18	transport besi lt.3	200	25
19	transport bekisting lt.3	12,000	1,500
20	transport beton lt.5	50,000	6,250
21	transport besi lt.5	250	31

Tabel 4.2 Lanjutan

22	transport bekisting lt.5	15,550	1,938
23	transport beton lt.6	50,000	6,250
24	transport besi lt.6	250	31
25	Transport bekisting lt.6	15,500	1,938
26	transport beton lt.7	50,000	6,250
27	transport besi lt.7	250	31
28	transport bekisting lt.7	15,500	1,938

Tabel 4.3 Upah lembur tenaga kerja

No	Pekerja/ Alat	Biaya normal per Jam (Rp)	Biaya Lembur		
			1	2	3
1	Pekerja	8,750	13,125	30,625	65,625
2	Tukang	11,250	16,875	39,375	84,375
3	Kepala tukang	12,500	18,750	43,750	93,750
4	Mandor	15,000	22,500	52,500	112,500
5	Alat pembersih lahan	250	375	875	1,875
6	Alat stripping	625	938	2,188	4,688
7	Alat beton	1,875	2,813	6,563	14,063
8	Alat pembesian	19	28	66	141
9	Alat bekisting batako	13	19	44	94
10	Perancah	1,125	1,688	3,938	8,438
11	transport beton lt. dasar	4,375	6,563	15,313	32,813
12	transport besi lt.dasar	13	19	44	94
13	transport bekisting lt. dasar	625	938	2,188	4,688
14	transport beton lt.2	5,000	7,500	17,500	37,500
15	transport besi lt.2	19	28	66	141
16	transport bekisting lt.2	1,063	1,595	3,721	7,973
17	transport beton lt.3	5,625	8,438	19,688	42,188
18	transport besi lt.3	25	38	88	188
19	transport bekisting lt.3	1,500	2,250	5,250	11,250
20	transport beton lt.5	6,250	9,375	21,875	46,875
21	transport besi lt.5	31	47	109	234
22	transport bekisting lt.5	1,938	2,907	6,783	14,535
23	transport beton lt.6	6,250	9,375	21,875	46,875
24	transport besi lt.6	31	47	109	234
25	transport bekisting lt.6	1,938	2,907	6,783	14,535
26	transport beton lt.7	6,250	9,375	21,875	46,875
27	transport besi lt.7	31	47	109	234
28	transport bekisting lt.7	1,938	2,906	6,781	14,531

Contoh perhitungan upah lembur untuk *resource name* Pekerja sebagai berikut.

1. **Analisis biaya lembur.**

   Resource name = Pekerja

   Biaya normal per hari = Rp.70.000,00

   Jam kerja normal per hari = 8 jam/hari

   Biaya normal per jam $= \frac{\text{Rp.70.000,00}}{\text{8 jam/hari}}$ = Rp.8.750,00

   a. Biaya lembur

      Lembur 1 jam = 1,5 × Rp.8.750,00

      = Rp.13.125,00

      Lembur 2 jam = (1,5 × Rp.8.750,00) + (2 × (1 × Rp.8.750,00))

      = Rp.30.625,00

      Lembur 3 jam = (1,5 × Rp.8.750,00) + (2 × (2 × Rp.8.750,00))

      = Rp.65.625,00

   b. Biaya lembur per jam

      Lembur 1 jam $= \frac{\text{Rp.13.125,00}}{\text{1 jam}}$ = Rp.13.125,00

      Lembur 2 jam $= \frac{\text{Rp.30.625,00}}{\text{2 jam}}$ = Rp.15.313,00

      Lembur 3 jam $= \frac{\text{Rp.65.625,00}}{\text{3 jam}}$ = Rp.21.875,00

Setelah menghitung biaya lembur, kemudian masuk ke tahap *crashing*. Tahap *crashing* adalah tahap percepatan durasi bagi kegiatan-kegiatan kritis. Dalam perhitungan ini terdapat produktivitas kerja untuk masing-masing waktu lembur. Produktivitas kerja lembur 1 jam per hari diperhitungkan sebesar 0,9 atau 90%, 2 jam perhari menjadi 0,8 atau 80% dan 3 jam sebesar 0,7 atau 70%. Penurunan produktivitas disebabkan berbagai faktor seperti kondisi penerangan yang terbatas karena malam hari dan kelelahan pekerja. Pada perhitungan percepatan durasi ini akan diambil contoh dari kegiatan kritis Pembesian Kolom *Basement* (PKB) sebagai berikut.

a. Durasi yang bisa dipercepat berdasarkan penambahan 1 jam lembur.

$$\frac{\text{Volume}}{(\Sigma\ \text{pp}\ \times \text{pn}\ \times \text{jam lembur}) + (\text{pn}\ \times \text{jam kerja normal})}$$

Keterangan :

pp = Penurunan produktivitas kerja

pn = produktivitas normal per jam

Data :

Volume = 1985,08 kg

Durasi normal = 7 hari

Jam kerja normal = 8 jam

Produktivitas per hari $= \frac{\text{Volume}}{\text{Durasi normal}} = \frac{1985,08}{7\ \text{hari}} = 283,58$ kg/hari

Produktivitas per jam $= \frac{\text{Produktivitas per hari}}{\text{jam kerja normal}} = \frac{283,58}{8\ \text{jam}} = 35,45$ kg/jam

Maksimal percepatan $= \frac{1985,08}{(0,9 \times 35,45 \times 1) + (35,45 \times 8)} = 6,29$ hari

$= 6$ hari

Maka, maksimal percepatan adalah 7 hari – 6 hari = 1 hari.

b. Durasi yang bisa dipercepat berdasarkan penambahan 2 jam lembur.

$$\frac{\text{Volume}}{(\Sigma\ \text{pp}\ \times \text{pn}\ \times \text{jam lembur}) + (\text{pn}\ \times \text{jam kerja normal})}$$

Keterangan :

pp = Penurunan produktivitas kerja

pn = produktivitas normal per jam

Data :

Volume = 1985,08 kg

Durasi normal = 7 hari

Jam kerja normal = 8 jam

Produktivitas per hari $= \frac{\text{Volume}}{\text{Durasi normal}} = \frac{1985,08}{7\ \text{hari}} = 283,58$ kg/hari

Produktivitas per jam $= \frac{\text{Produktivitas per hari}}{\text{jam kerja normal}} = \frac{283,58}{8\ \text{jam}} = 35,45$ kg/jam

Maksimal percepatan $= \frac{1985,08}{(0,8 \times 35,45 \times 1)+(0,9 \times 35,45 \times 1)+(35,45 \times 8)} = 5,77$ hari

$= 5$ hari

Maka, maksimal percepatan adalah 7 hari – 5 hari = 2 hari.

c. Durasi yang bisa dipercepat berdasarkan penambahan 3 jam lembur.

$$\frac{\text{Volume}}{(\Sigma\ \text{pp} \times \text{pn} \times \text{jam lembur}) + (\text{pn} \times \text{jam kerja normal})}$$

Keterangan :

pp = Penurunan produktivitas kerja

pn = produktivitas normal per jam

Data :

Volume = 1985,08 kg

Durasi normal = 7 hari

Jam kerja normal = 8 jam

Produktivitas per hari $= \frac{\text{Volume}}{\text{Durasi normal}} = \frac{1985,08}{7 \text{ hari}} = 283,58$ kg/hari

Produktivitas per jam $= \frac{\text{Produktivitas per hari}}{\text{jam kerja normal}} = \frac{283,58}{8 \text{ jam}} = 35,45$ kg/jam

Maksimal percepatan $= \frac{1985,08}{(0,7 \times 35,45 \times 1)+(0,8 \times 35,45 \times 1)+(0,9 \times 35,45 \times 1)+(35,45 \times 8)}$

$= 5,38$ hari

$= 5$ hari

Maka, maksimal percepatan adalah 7 hari – 5 hari = 2 hari.

Hasil perhitungan percepatan durasi berdasarkan perhitungan yang telah dilakukan secara manual dan menggunakan *microsoft project*. Berikut hasil lengkap pengolahan data percepatan durasi 1 sampai 3 jam.

Tabel 4.4 Hasil perhitungan percepatan durasi lembur 1 jam menggunakan *microsoft project*.

TASK NAME	Durasi (hari)	
	Normal	Lembur 1 jam
PEK. PEMBERSIHAN LAHAN	14	12.58
PEK. GALIAN TANAH 1	21	18.88
PEK. BOBOK KEPALA TIANG PANCANG	14	12.58
BETON PILE CAP	21	18.88
PEMBESIAN PILE CAP	28	25.17
BEKISTING PILE CAP	7	6.29
BETON SLOOF	14	12.58
PEMBESIAN SLOOF	21	18.88
BEKISTING SLOOF	7	6.29
BETON KOLOM BASEMENT	7	6.29
PEMBESIAN KOLOM BASEMENT	7	6.29
BEKISTING KOLOM BASEMENT	7	6.29
BETON KOLOM DASAR	7	6.29
PEMBESIAN KOLOM DASAR	14	12.58
BETON SHEAR WALL DASAR	7	6.29
PEMBESIAN SHEAR WALL DASAR	7	6.29
BETON SHEAR WALL LANTAI 2	7	6.29
PEMBESIAN SHEAR WALL LANTAI 2	7	6.29
BETON SHEAR WALL LANTAI 3	7	6.29
PEMBESIAN SHEAR WALL LANTAI 3	7	6.29
BETON SHEAR WALL LANTAI 5	7	6.29
PEMBESIAN SHEAR WALL LANTAI 5	7	6.29
BETON SHEAR WALL LANTAI 6	7	6.29
PEMBESIAN SHEAR WALL LANTAI 6	7	6.29
BETON SHEAR WALL LANTAI 7	7	6.29
PEMBESIAN SHEAR WALL LANTAI 7	7	6.29
BETON PLAT LANTAI 7	7	6.29
PEMBESIAN PLAT LANTAI 7	14	12.58
BEKISTING PLAT LANTAI 7	7	6.29
BETON BALOK LANTAI 7	7	6.29
PEMBESIAN BALOK LANTAI 7	14	12.58
BEKISTING BALOK LANTAI 7	7	6.29

Tabel 4.5 Hasil perhitungan percepatan durasi lembur 2 jam menggunakan *microsoft project*.

TASK NAME	Durasi (hari)	
	Normal	Lembur 2 jam
PEK. PEMBERSIHAN LAHAN	14	11.55
PEK. GALIAN TANAH 1	21	17.32
PEK. BOBOK KEPALA TIANG PANCANG	14	11.55
BETON PILE CAP	21	17.32
PEMBESIAN PILE CAP	28	23.09
BEKISTING PILE CAP	7	5.77
BETON SLOOF	14	11.55
PEMBESIAN SLOOF	21	17.32
BEKISTING SLOOF	7	5.77
BETON KOLOM BASEMENT	7	5.77
PEMBESIAN KOLOM BASEMENT	7	5.77
BEKISTING KOLOM BASEMENT	7	5.77
BETON KOLOM DASAR	7	5.77
PEMBESIAN KOLOM DASAR	14	11.55
BETON SHEAR WALL DASAR	7	5.77
PEMBESIAN SHEAR WALL DASAR	7	5.77
BETON SHEAR WALL LANTAI 2	7	5.77
PEMBESIAN SHEAR WALL LANTAI 2	7	5.77
BETON SHEAR WALL LANTAI 3	7	5.77
PEMBESIAN SHEAR WALL LANTAI 3	7	5.77
BETON SHEAR WALL LANTAI 5	7	5.77
PEMBESIAN SHEAR WALL LANTAI 5	7	5.77
BETON SHEAR WALL LANTAI 6	7	5.77
PEMBESIAN SHEAR WALL LANTAI 6	7	5.77
BETON SHEAR WALL LANTAI 7	7	5.77
PEMBESIAN SHEAR WALL LANTAI 7	7	5.77
BETON PLAT LANTAI 7	7	5.77
PEMBESIAN PLAT LANTAI 7	14	11.55
BEKISTING PLAT LANTAI 7	7	5.77
BETON BALOK LANTAI 7	7	5.77
PEMBESIAN BALOK LANTAI 7	14	11.55
BEKISTING BALOK LANTAI 7	7	5.77

Tabel 4.6 Hasil perhitungan percepatan durasi lembur 3 jam menggunakan *microsoft project*.

TASK NAME	Durasi (hari)	
	Normal	Lembur 3 jam
PEK. PEMBERSIHAN LAHAN	14	10.77
PEK. GALIAN TANAH 1	21	16.15
PEK. BOBOK KEPALA TIANG PANCANG	14	10.77
BETON PILE CAP	21	16.15
PEMBESIAN PILE CAP	28	21.54
BEKISTING PILE CAP	7	5.38
BETON SLOOF	14	10.77
PEMBESIAN SLOOF	21	16.15
BEKISTING SLOOF	7	5.38
BETON KOLOM BASEMENT	7	5.38
PEMBESIAN KOLOM BASEMENT	7	5.38
BEKISTING KOLOM BASEMENT	7	5.38
BETON KOLOM DASAR	7	5.38
PEMBESIAN KOLOM DASAR	14	10.77
BETON SHEAR WALL DASAR	7	5.38
PEMBESIAN SHEAR WALL DASAR	7	5.38
BETON SHEAR WALL LANTAI 2	7	5.38
PEMBESIAN SHEAR WALL LANTAI 2	7	5.38
BETON SHEAR WALL LANTAI 3	7	5.38
PEMBESIAN SHEAR WALL LANTAI 3	7	5.38
BETON SHEAR WALL LANTAI 5	7	5.38
PEMBESIAN SHEAR WALL LANTAI 5	7	5.38
BETON SHEAR WALL LANTAI 6	7	5.38
PEMBESIAN SHEAR WALL LANTAI 6	7	5.38
BETON SHEAR WALL LANTAI 7	7	5.38
PEMBESIAN SHEAR WALL LANTAI 7	7	5.38
BETON PLAT LANTAI 7	7	5.38
PEMBESIAN PLAT LANTAI 7	14	10.38
BEKISTING PLAT LANTAI 7	7	5.38
BETON BALOK LANTAI 7	7	5.38
PEMBESIAN BALOK LANTAI 7	14	10.77
BEKISTING BALOK LANTAI 7	7	5.38

Perhitungan percepatan durasi akan berpengaruh ke biaya setiap di setiap kegiatan kritis. Berikut adalah contoh perhitungan biaya normal dan setelah lembur 1 – 3 jam pada pekerjaan pembesian kolom *basement*.

Perhitungan waktu normal

Volume = 1985,08 kg

Durasi normal = 7 hari

Tabel 4.7 Kebutuhan material pekerjaan pembesian kolom *basement*.

Material	Satuan	Koefisien	Harga Satuan
Besi beton	kg	1,050	Rp.7.943,25
Kawat bendrat	kg	0,015	Rp.17.000,00

Sumber : Data Proyek

Untuk menentukan kebutuhan besi pada pekerjaan pembesian kolom *basement*, hitunglah dengan cara berikut.

Jumlah material = volume × koefisien

- Besi beton

  Jumlah material = 1985,08 kg × 1,050

  = 2084,334 kg

- Kawat bendrat

  Jumlah material = 1985,08 kg × 0,015

  = 29,776 kg

Kemudian lakukan perhitungan biaya menggunakan perhitungan berikut.

Harga material = jumlah material × harga satuan

- Besi beton

  Harga material = 2084,334 kg × Rp.7.943,25

  = Rp.16.556.386,05

- Kawat bendrat

  Harga material = 29,776 kg × Rp.17.000,00

  = Rp.506.195,40

Maka, total harga material = Rp.16.556.386,05 + Rp.506.195,40

= Rp.17.062.581,45

Tabel 4.8 Kebutuhan tenaga kerja pekerjaan pembesian kolom *basement*

Tenaga Kerja	Satuan	Koefisien	Harga Satuan
Pekerja	OH	0,005	Rp.70.000,00
Tukang besi	OH	0,010	Rp.90.000,00
Kepala tukang	OH	0,003	Rp.100.000,00
Mandor	OH	0,001	Rp.120.000,00
Alat pembesian	ls	1,000	Rp.150,00

Sumber : Data Proyek

Untuk menentukan kebutuhan tenaga kerja pada pekerjaan pembesian kolom *basement*, hitunglah dengan cara berikut.

$$\textbf{Jumlah tenaga kerja} = \frac{\textbf{volume} \times \textbf{koefisien}}{\textbf{durasi}}$$

- Pekerja

  Jumlah tenaga kerja $= \frac{1985{,}08\ \text{kg} \times 0{,}005}{7} = 1{,}418$

- Tukang besi

  Jumlah tenaga kerja $= \frac{1985{,}08\ \text{kg} \times 0{,}010}{7} = 2{,}836$

- Kepala tukang

  Jumlah tenaga kerja $= \frac{1985{,}08\ \text{kg} \times 0{,}003}{7} = 0{,}851$

- Mandor

  Jumlah tenaga kerja $= \frac{1985{,}08\ \text{kg} \times 0{,}001}{7} = 0{,}284$

- Alat pembesian

  Jumlah tenaga kerja $= \frac{1985{,}08\ \text{kg} \times 1{,}000}{7} = 283{,}583$

Kemudian lakukan perhitungan biaya menggunakan perhitungan berikut.

Harga tenaga kerja = jumlah tenaga kerja × harga satuan

- Pekerja

  Harga tenaga kerja = 1,418 × Rp.70.000,00 = Rp.99.254,00

- Tukang besi

  Harga tenaga kerja = 2,836 × Rp.90.000,00 = Rp.255.224,57

- Kepala tukang

  Harga tenaga kerja = 0,851 × Rp.100.000,00 = Rp.85.074,86
- Mandor

  Harga tenaga kerja = 0,284 × Rp.120.000,00 = Rp.34.029,94
- Alat pembesian

  Harga tenaga kerja = 283,583 × Rp.150,00 = Rp.42.537,43

Maka, total harga tenga kerja = Rp.99.254,00 + Rp.255.224,57 + Rp.85.074,86 + Rp.34.029,94 + Rp.42.537,43

= Rp.516.121,80

Total biaya = total harga material + (total harga tenaga kerja × durasi)

= Rp.20.675.427,05

Perhitungan lembur 1 jam

Durasi = 6,29 hari

Tabel 4.9 Kebutuhan tenaga kerja pekerjaan pembesian kolom *basement*

Tenaga Kerja	Satuan	Harga lembur per 1 jam	Harga Lembur
Pekerja	OH	Rp.13.125,00	Rp.13.125,00
Tukang besi	OH	Rp.16.875,00	Rp.16.875,00
Kepala tukang	OH	Rp.18.750,00	Rp.18.750,00
Mandor	OH	Rp.22.500,00	Rp.22.500,00
Alat pembesian	ls	Rp.28,00	Rp.28,00

Harga tenaga kerja lembur 1 jam = jumlah tenaga kerja × harga lembur

- Pekerja = 1,418 × Rp.13.125,00 = Rp.18.610,13
- Tukang besi = 2,836 × Rp.16.875,00 = Rp.47.845,61
- Kepala tukang = 0,851 × Rp.18.750,00 = Rp.15.951,54
- Mandor = 0,284 × Rp.22.500,00 = Rp.6.380,61
- Alat = 283,538 × Rp.28,00 = Rp.7.975,77

  Total upah percepatan 1 jam = Rp.96.772,65

Total upah percepatan 1 jam/hari = Total upah percepatan 1 jam + total upah normal perhari

= Rp.96.772,65 + Rp.516.121,80

= Rp.612.893,45

Total upah percepatan 1 jam = total harga material + (total upah percepatan × durasi percepatan)

= Rp.17.062.581,45 + (Rp.612.893,45×6,29)

= Rp.20.918.989,67

Perhitungan lembur 2 jam

Durasi = 5,77 hari

Tabel 4.10 Kebutuhan tenaga kerja pekerjaan pembesian kolom *basement*

Tenaga Kerja	Satuan	Harga lembur per 1 jam	Harga Lembur
Pekerja	OH	Rp.15.313,00	Rp.30.625,00
Tukang besi	OH	Rp.19.688,00	Rp.39.375,00
Kepala tukang	OH	Rp.21.875,00	Rp.43.750,00
Mandor	OH	Rp.26.250,00	Rp.52.500,00
Alat pembesian	ls	Rp.66,00	Rp.33,00

Harga tenaga kerja lembur 2 jam = jumlah tenaga kerja × harga lembur

- Pekerja = 1,418 × Rp.30.625,00 = Rp.43.423,63
- Tukang besi = 2,836 × Rp.39.375,00 = Rp.111.660,75
- Kepala tukang = 0,851 × Rp.43.750,00 = Rp.37.220,25
- Mandor = 0,284 × Rp.52.500,00 = Rp.14.888,10
- Alat = 283,538 × Rp.66,00 = Rp.18.610,13

Total upah percepatan 2 jam = Rp.225.802.85

Total upah percepatan 2 jam/hari = Total upah percepatan 1 jam + total upah normal perhari

= Rp.225.802,85 + Rp.516.121,80

= Rp.741.923,65

Total upah percepatan 2 jam = total harga material + (total upah percepatan × durasi percepatan)

= Rp.17.062.581,45 + (Rp.714.923,65×5,77)

= Rp.21.345.852,00

Perhitungan lembur 3 jam

Durasi = 5,38 hari

Tabel 4.11 Kebutuhan tenaga kerja pekerjaan pembesian kolom *basement*

Tenaga Kerja	Satuan	Harga lembur per 1 jam	Harga Lembur
Pekerja	OH	Rp.21.875,00	Rp.65.625,00
Tukang besi	OH	Rp.28.125,00	Rp.84.375,00
Kepala tukang	OH	Rp.31.250,00	Rp.93.750,00
Mandor	OH	Rp.37.500,00	Rp.112.500,00
Alat pembesian	ls	Rp.47,00	Rp.141,00

Harga tenaga kerja lembur 3 jam = jumlah tenaga kerja × harga lembur

- Pekerja = 1,418 × Rp.65.625,00 = Rp.43.423,63
- Tukang besi = 2,836 × Rp.84.375,00 = Rp.111.660,75
- Kepala tukang = 0,851 × Rp.93.750,00 = Rp.37.220,25
- Mandor = 0,284 × Rp.112.500,00 = Rp.14.888,10
- Alat = 283,538 × Rp.141,00 = Rp.18.610,13

Total upah percepatan 3 jam = Rp.483.863,25

Total upah percepatan 3 jam/hari = Total upah percepatan 1 jam + total upah normal perhari

= Rp.483.863,25 + Rp.516.121,80

= Rp.999.984,05

Total upah percepatan 3 jam = total harga material + (total upah percepatan × durasi percepatan)

= Rp.17.062.581,45 + (Rp.999.984,05×5,77)

= Rp.22.447.110,95

Hasil perhitungan tersebut sesuai dengan analisa pada *microsoft project*. Hasil perhitungan semua biaya akan ditampilkan pada tabel berikut.

Tabel 4.12 Perhitungan biaya dan durasi percepatan lembur 1 jam

Kegiatan	Durasi Normal (hari)	Durasi Percepatan (hari)	Biaya Normal (Rp)	Biaya Percepatan (Rp)
Pek. Pembersihan Lahan	14	12.58	61,622,262	65,760,207
Pek. Galian Tanah 1	21	18.88	29,145,900	31,103,800
Pek. Bobok Kepala Tiang Pancang	14	12.58	18,601,800	19,851,359
Beton Pile Cap	21	18.88	248,195,794	252,778,578
Pembesian Pile Cap	28	25.17	227,709,826	230,373,789
Bekisting Pile Cap	7	6.29	25,803,984	26,450,463
Beton Sloof	14	12.58	46,671,985	47,529,451
Pembesian Sloof	21	18.88	131,705,622	133,252,401
Bekisting Sloof	7	6.29	24,848,027	25,467,369
Beton Kolom Basement	7	6.29	8,211,124	8,357,649
Pembesian Kolom Basement	7	6.29	20,675,573	20,915,128
Bekisting Kolom Basement	7	6.29	6,637,693	6,921,404
Beton Kolom Dasar	7	6.29	63,942,681	65,175,175
Pembesian Kolom Dasar	14	12.58	153,635,430	155,519,176
Beton Shear Wall Dasar	7	6.29	31,768,268	32,378,081
Pembesian Shear Wall Dasar	7	6.29	38,070,682	38,533,885
Beton Shear Wall Lantai 2	7	6.29	28,637,386	29,191,535
Pembesian Shear Wall Lantai 2	7	6.29	34,456,461	34,881,625
Beton Shear Wall Lantai 3	7	6.29	25,471,592	25,972,555
Pembesian Shear Wall Lantai 3	7	6.29	31,518,604	31,923,154
Beton Shear Wall Lantai 5	7	6.29	20,637,019	21,045,620
Pembesian Shear Wall Lantai 5	7	6.29	26,562,311	26,901,055
Beton Shear Wall Lantai 6	7	6.29	20,637,019	21,045,620
Pembesian Shear Wall Lantai 6	7	6.29	26,562,311	26,901,055
Beton Shear Wall Lantai 7	7	6.29	20,637,019	21,045,620

Tabel 4.12 Lanjutan

Pembesian Shear Wall Lantai 7	7	6.29	26,955,181	27,304,659
Beton Plat Lantai 7	7	6.29	50,362,886	51,395,391
Pembesian Plat Lantai 7	14	12.58	68,981,977	69,875,665
Bekisting Plat Lantai 7	7	6.29	58,787,834	61,482,441
Beton Balok Lantai 7	7	6.29	30,855,154	31,495,607
Pembesian Balok Lantai 7	14	12.58	73,387,344	74,334,549
Bekisting Balok Lantai 7	7	6.29	29,123,314	30,457,578

Tabel 4.13 Perhitungan biaya dan durasi percepatan lembur 2 jam

Kegiatan	Durasi Normal (hari)	Durasi Percepatan (hari)	Biaya Normal (Rp)	Biaya Percepatan (Rp)
Pek. Pembersihan Lahan	14	11.55	61,622,262	71,830,033
Pek. Galian Tanah 1	21	17.32	29,145,900	33,962,792
Pek. Bobok Kepala Tiang Pancang	14	11.55	18,601,800	21,683,876
Beton Pile Cap	21	17.32	248,195,794	259,443,424
Pembesian Pile Cap	28	23.09	227,709,826	234,285,519
Bekisting Pile Cap	7	5.77	25,803,984	27,394,007
Beton Sloof	14	11.55	46,671,985	48,788,506
Pembesian Sloof	21	17.32	131,705,622	135,513,663
Bekisting Sloof	7	5.77	24,848,027	26,379,809
Beton Kolom Basement	7	5.77	8,211,124	8,571,612
Pembesian Kolom Basement	7	5.77	20,675,573	21,268,514
Bekisting Kolom Basement	7	5.77	6,637,693	7,340,616
Beton Kolom Dasar	7	5.77	63,942,681	66,973,224
Pembesian Kolom Dasar	14	11.55	153,635,430	158,281,636
Beton Shear Wall Dasar	7	5.77	31,768,268	33,272,986
Pembesian Shear Wall Dasar	7	5.77	38,070,682	39,216,738
Beton Shear Wall Lantai 2	7	5.77	28,637,386	30,006,852
Pembesian Shear Wall Lantai 2	7	5.77	34,456,461	35,514,468
Beton Shear Wall Lantai 3	7	5.77	25,471,592	26,705,572
Pembesian Shear Wall Lantai 3	7	5.77	31,518,604	32,484,512
Beton Shear Wall Lantai 5	7	5.77	20,637,019	21,645,790
Pembesian Shear Wall Lantai 5	7	5.77	26,562,311	27,408,881
Beton Shear Wall Lantai 6	7	5.77	20,637,019	21,645,790
Pembesian Shear Wall Lantai 6	7	5.77	26,562,311	27,408,881
Beton Shear Wall Lantai 7	7	5.77	20,637,019	21,645,790
Pembesian Shear Wall Lantai 7	7	5.77	26,955,181	27,819,497
Beton Plat Lantai 7	7	5.77	50,362,886	52,905,446
Pembesian Plat Lantai 7	14	11.55	68,981,977	71,197,618
Bekisting Plat Lantai 7	7	5.77	58,787,834	65,407,371
Beton Balok Lantai 7	7	5.77	30,855,154	32,421,462
Pembesian Balok Lantai 7	14	11.55	73,387,344	74,749,615
Bekisting Balok Lantai 7	7	5.77	29,123,314	32,394,208

Tabel 4.14 Perhitungan biaya dan durasi percepatan lembur 3 jam

Kegiatan	Durasi Normal (hari)	Durasi Percepatan (hari)	Biaya Normal (Rp)	Biaya Percepatan (Rp)
Pek. Pembersihan Lahan	14	10.77	61,622,262	86,912,353
Pek. Galian Tanah 1	21	16.15	29,145,900	41,093,900
Pek. Bobok Kepala Tiang Pancang	14	10.77	18,601,800	26,238,151
Beton Pile Cap	21	16.15	248,195,794	276,080,843
Pembesian Pile Cap	28	21.54	227,709,826	244,024,772
Bekisting Pile Cap	7	5.38	25,803,984	29,747,900
Beton Sloof	14	10.77	46,671,985	51,918,987
Pembesian Sloof	21	16.15	131,705,622	141,142,155
Bekisting Sloof	7	5.38	24,848,027	28,641,122
Beton Kolom Basement	7	5.38	8,211,124	9,105,229
Pembesian Kolom Basement	7	5.38	20,675,573	22,154,789
Bekisting Kolom Basement	7	5.38	6,637,693	8,386,432
Beton Kolom Dasar	7	5.38	63,942,681	71468160
Pembesian Kolom Dasar	14	10.77	153,635,430	165,135,334
Beton Shear Wall Dasar	7	5.38	31,768,268	35506527
Pembesian Shear Wall Dasar	7	5.38	38,070,682	40914050
Beton Shear Wall Lantai 2	7	5.38	28,637,386	32041386
Pembesian Shear Wall Lantai 2	7	5.38	34,456,461	37086162
Beton Shear Wall Lantai 3	7	5.38	25,471,592	28534982
Pembesian Shear Wall Lantai 3	7	5.38	31,518,604	33981494
Beton Shear Wall Lantai 5	7	5.38	20,637,019	23142754
Pembesian Shear Wall Lantai 5	7	5.38	26,562,311	28668045
Beton Shear Wall Lantai 6	7	5.38	20,637,019	23142754
Pembesian Shear Wall Lantai 6	7	5.38	26,562,311	28668045
Beton Shear Wall Lantai 7	7	5.38	20,637,019	23142754
Pembesian Shear Wall Lantai 7	7	5.38	26,955,181	29097050
Beton Plat Lantai 7	7	5.38	50,362,886	56,675,576
Pembesian Plat Lantai 7	14	10.38	68,981,977	74,468,943
Bekisting Plat Lantai 7	7	5.38	58,787,834	75,196,848
Beton Balok Lantai 7	7	5.38	30,855,154	34,732,250
Pembesian Balok Lantai 7	14	10.77	73,387,344	79,230,450
Bekisting Balok Lantai 7	7	5.38	29,123,314	37,239,997

2. Analisis *Cost Variance*, *Cost Slope* dan *Duration Variance*

Cost Variance

Cost variance merupakan selisih antara biaya setelah percepatan dan biaya normal suatu kegiatan proyek. Untuk menentukan nilai *cost variance* dapat lakukan perhitungan sebagai berikut.

Kegiatan = Pembesian kolom *basement*

Biaya normal = Rp.20.675.573,00

Biaya Percepatan

1 jam = Rp.20.915.128,00

2 jam = Rp.21.268.514,00

3 jam = Rp.22.154.789,00

Selisih biaya (*Cost variance*)

1 jam = Rp.20.915.128,00 - 20.675.573,00 = Rp.239.555,00

2 jam = Rp.21.268.514,00 - 20.675.573,00 = Rp.592.941,00

3 jam = Rp.22.154.789,00 - 20.675.573,00 = Rp.1.479.216,00

Hasil perhitungan *cost variance* pekerjaan pembesian kolom *basement* didapat dengan perhitungan menggunakan *microsoft project*. Pada tabel berikut merupakan hasil lengkap *cost variance*.

Tabel 4.15 *Cost variance* lembur 1 jam

No	Kegiatan	Cost Variance (Rp)
1	PEK. PEMBERSIHAN LAHAN	4,137,945
2	PEK. GALIAN TANAH 1	1,957,900
3	PEK. BOBOK KEPALA TIANG PANCANG	1,249,559
4	BETON PILE CAP	4,582,784
5	PEMBESIAN PILE CAP	2,663,963
6	BEKISTING PILE CAP	646,479
7	BETON SLOOF	857,466
8	PEMBESIAN SLOOF	1,546,779
9	BEKISTING SLOOF	619,342
10	BETON KOLOM BASEMENT	146,525
11	PEMBESIAN KOLOM BASEMENT	239,555
12	BEKISTING KOLOM BASEMENT	283,711
13	BETON KOLOM DASAR	1,232,494
14	PEMBESIAN KOLOM DASAR	1,883,746
15	BETON SHEAR WALL DASAR	609,813
16	PEMBESIAN SHEAR WALL DASAR	463,203
17	BETON SHEAR WALL LANTAI 2	554,149
18	PEMBESIAN SHEAR WALL LANTAI 2	425,164

Tabel 4.15 Lanjutan

19	BETON SHEAR WALL LANTAI 3	500,963
20	PEMBESIAN SHEAR WALL LANTAI 3	404,550
21	BETON SHEAR WALL LANTAI 5	408,601
22	PEMBESIAN SHEAR WALL LANTAI 5	338,744
23	BETON SHEAR WALL LANTAI 6	408,601
24	PEMBESIAN SHEAR WALL LANTAI 6	338,744
25	BETON SHEAR WALL LANTAI 7	408,601
26	PEMBESIAN SHEAR WALL LANTAI 7	349,478
27	BETON PLAT LANTAI 7	1,032,505
28	PEMBESIAN PLAT LANTAI 7	893,688
29	BEKISTING PLAT LANTAI 7	2,694,607
30	BETON BALOK LANTAI 7	640,453
31	PEMBESIAN BALOK LANTAI 7	947,205
32	BEKISTING BALOK LANTAI 7	1,334,264

Tabel 4.16 *Cost variance* lembur 2 jam

No	Kegiatan	Cost Variance (Rp)
1	PEK. PEMBERSIHAN LAHAN	10,207,771
2	PEK. GALIAN TANAH 1	4,816,892
3	PEK. BOBOK KEPALA TIANG PANCANG	3,082,076
4	BETON PILE CAP	11,247,630
5	PEMBESIAN PILE CAP	6,575,693
6	BEKISTING PILE CAP	1,590,023
7	BETON SLOOF	2,116,521
8	PEMBESIAN SLOOF	3,808,041
9	BEKISTING SLOOF	1,531,782
10	BETON KOLOM BASEMENT	360,488
11	PEMBESIAN KOLOM BASEMENT	592,941
12	BEKISTING KOLOM BASEMENT	702,923
13	BETON KOLOM DASAR	3,030,543
14	PEMBESIAN KOLOM DASAR	4,646,206
15	BETON SHEAR WALL DASAR	1,504,718
16	PEMBESIAN SHEAR WALL DASAR	1,146,056
17	BETON SHEAR WALL LANTAI 2	1,369,466
18	PEMBESIAN SHEAR WALL LANTAI 2	1,058,007
19	BETON SHEAR WALL LANTAI 3	1,233,980
20	PEMBESIAN SHEAR WALL LANTAI 3	965,908
21	BETON SHEAR WALL LANTAI 5	1,008,771
22	PEMBESIAN SHEAR WALL LANTAI 5	846,570
23	BETON SHEAR WALL LANTAI 6	1,008,771
24	PEMBESIAN SHEAR WALL LANTAI 6	846,570
25	BETON SHEAR WALL LANTAI 7	1,008,771
26	PEMBESIAN SHEAR WALL LANTAI 7	864,316
27	BETON PLAT LANTAI 7	2,542,560
28	PEMBESIAN PLAT LANTAI 7	2,215,641
29	BEKISTING PLAT LANTAI 7	6,619,537

Tabel 4.16 Lanjutan

30	BETON BALOK LANTAI 7	1,566,308
31	PEMBESIAN BALOK LANTAI 7	1,362,271
32	BEKISTING BALOK LANTAI 7	3,270,894

Tabel 4.17 *Cost variance* lembur 3 jam

No	Kegiatan	Cost Variance (Rp)
1	PEK. PEMBERSIHAN LAHAN	25,290,091
2	PEK. GALIAN TANAH 1	11,948,000
3	PEK. BOBOK KEPALA TIANG PANCANG	7,636,351
4	BETON PILE CAP	27,885,049
5	PEMBESIAN PILE CAP	16,314,946
6	BEKISTING PILE CAP	3,943,916
7	BETON SLOOF	5,247,002
8	PEMBESIAN SLOOF	9,436,533
9	BEKISTING SLOOF	3,793,095
10	BETON KOLOM BASEMENT	894,105
11	PEMBESIAN KOLOM BASEMENT	1,479,216
12	BEKISTING KOLOM BASEMENT	1,748,739
13	BETON KOLOM DASAR	7,525,479
14	PEMBESIAN KOLOM DASAR	11,499,904
15	BETON SHEAR WALL DASAR	3,738,259
16	PEMBESIAN SHEAR WALL DASAR	2,843,368
17	BETON SHEAR WALL LANTAI 2	3,404,000
18	PEMBESIAN SHEAR WALL LANTAI 2	2,629,701
19	BETON SHEAR WALL LANTAI 3	3,063,390
20	PEMBESIAN SHEAR WALL LANTAI 3	2,462,890
21	BETON SHEAR WALL LANTAI 5	2,505,735
22	PEMBESIAN SHEAR WALL LANTAI 5	2,105,734
23	BETON SHEAR WALL LANTAI 6	2,505,735
24	PEMBESIAN SHEAR WALL LANTAI 6	2,105,734
25	BETON SHEAR WALL LANTAI 7	2,505,735
26	PEMBESIAN SHEAR WALL LANTAI 7	2,141,869
27	BETON PLAT LANTAI 7	6,312,690
28	PEMBESIAN PLAT LANTAI 7	5,486,966
29	BEKISTING PLAT LANTAI 7	16,409,014
30	BETON BALOK LANTAI 7	3,877,096
31	PEMBESIAN BALOK LANTAI 7	5,843,106
32	BEKISTING BALOK LANTAI 7	8,116,683

Duration Variance

Duration variance adalah selisih antara durasi normal dan durasi percepatan. Analisis *duration variance* menggunakan *microsoft project* 2010, untuk hasil *duration variance* adalah sebagai berikut.

Tabel 4.18 *Duration variance* lembur 1 jam

No	Kegiatan	Duration Variance (Hari)
1	PEK. PEMBERSIHAN LAHAN	1.42
2	PEK. GALIAN TANAH 1	2.12
3	PEK. BOBOK KEPALA TIANG PANCANG	1.42
4	BETON PILE CAP	2.12
5	PEMBESIAN PILE CAP	2.83
6	BEKISTING PILE CAP	0.71
7	BETON SLOOF	1.42
8	PEMBESIAN SLOOF	2.12
9	BEKISTING SLOOF	0.71
10	BETON KOLOM BASEMENT	0.71
11	PEMBESIAN KOLOM BASEMENT	0.71
12	BEKISTING KOLOM BASEMENT	0.71
13	BETON KOLOM DASAR	0.71
14	PEMBESIAN KOLOM DASAR	1.42
15	BETON SHEAR WALL DASAR	0.71
16	PEMBESIAN SHEAR WALL DASAR	0.71
17	BETON SHEAR WALL LANTAI 2	0.71
18	PEMBESIAN SHEAR WALL LANTAI 2	0.71
19	BETON SHEAR WALL LANTAI 3	0.71
20	PEMBESIAN SHEAR WALL LANTAI 3	0.71
21	BETON SHEAR WALL LANTAI 5	0.71
22	PEMBESIAN SHEAR WALL LANTAI 5	0.71
23	BETON SHEAR WALL LANTAI 6	0.71
24	PEMBESIAN SHEAR WALL LANTAI 6	0.71
25	BETON SHEAR WALL LANTAI 7	0.71
26	PEMBESIAN SHEAR WALL LANTAI 7	0.71
27	BETON PLAT LANTAI 7	0.71
28	PEMBESIAN PLAT LANTAI 7	1.42
29	BEKISTING PLAT LANTAI 7	0.71
30	BETON BALOK LANTAI 7	0.71
31	PEMBESIAN BALOK LANTAI 7	1.42
32	BEKISTING BALOK LANTAI 7	0.71

Tabel 4.19 *Duration variance* lembur 2 jam

No	Kegiatan	Duration Variance (Hari)
1	PEK. PEMBERSIHAN LAHAN	2.45
2	PEK. GALIAN TANAH 1	3.68
3	PEK. BOBOK KEPALA TIANG PANCANG	2.45
4	BETON PILE CAP	3.68
5	PEMBESIAN PILE CAP	4.91
6	BEKISTING PILE CAP	1.23
7	BETON SLOOF	2.45
8	PEMBESIAN SLOOF	3.68
9	BEKISTING SLOOF	1.23
10	BETON KOLOM BASEMENT	1.23
11	PEMBESIAN KOLOM BASEMENT	1.23
12	BEKISTING KOLOM BASEMENT	1.23
13	BETON KOLOM DASAR	1.23
14	PEMBESIAN KOLOM DASAR	2.45
15	BETON SHEAR WALL DASAR	1.23
16	PEMBESIAN SHEAR WALL DASAR	1.23
17	BETON SHEAR WALL LANTAI 2	1.23
18	PEMBESIAN SHEAR WALL LANTAI 2	1.23
19	BETON SHEAR WALL LANTAI 3	1.23
20	PEMBESIAN SHEAR WALL LANTAI 3	1.23
21	BETON SHEAR WALL LANTAI 5	1.23
22	PEMBESIAN SHEAR WALL LANTAI 5	1.23
23	BETON SHEAR WALL LANTAI 6	1.23
24	PEMBESIAN SHEAR WALL LANTAI 6	1.23
25	BETON SHEAR WALL LANTAI 7	1.23
26	PEMBESIAN SHEAR WALL LANTAI 7	1.23
27	BETON PLAT LANTAI 7	1.23
28	PEMBESIAN PLAT LANTAI 7	2.45
29	BEKISTING PLAT LANTAI 7	1.23
30	BETON BALOK LANTAI 7	1.23
31	PEMBESIAN BALOK LANTAI 7	2.45
32	BEKISTING BALOK LANTAI 7	1.23

Tabel 4.20 *Duration variance* lembur 3 jam

No	Kegiatan	Duration Variance (Hari)
1	PEK. PEMBERSIHAN LAHAN	3.23
2	PEK. GALIAN TANAH 1	4.85
3	PEK. BOBOK KEPALA TIANG PANCANG	3.23
4	BETON PILE CAP	4.85
5	PEMBESIAN PILE CAP	6.46
6	BEKISTING PILE CAP	1.62
7	BETON SLOOF	3.23

Tabel 4.20 Lanjutan

8	PEMBESIAN SLOOF	4.85
9	BEKISTING SLOOF	1.62
10	BETON KOLOM BASEMENT	1.62
11	PEMBESIAN KOLOM BASEMENT	1.62
12	BEKISTING KOLOM BASEMENT	1.62
13	BETON KOLOM DASAR	1.62
14	PEMBESIAN KOLOM DASAR	3.23
15	BETON SHEAR WALL DASAR	1.62
16	PEMBESIAN SHEAR WALL DASAR	1.62
17	BETON SHEAR WALL LANTAI 2	1.62
18	PEMBESIAN SHEAR WALL LANTAI 2	1.62
19	BETON SHEAR WALL LANTAI 3	1.62
20	PEMBESIAN SHEAR WALL LANTAI 3	1.62
21	BETON SHEAR WALL LANTAI 5	1.62
22	PEMBESIAN SHEAR WALL LANTAI 5	1.62
23	BETON SHEAR WALL LANTAI 6	1.62
24	PEMBESIAN SHEAR WALL LANTAI 6	1.62
25	BETON SHEAR WALL LANTAI 7	1.62
26	PEMBESIAN SHEAR WALL LANTAI 7	1.62
27	BETON PLAT LANTAI 7	1.62
28	PEMBESIAN PLAT LANTAI 7	3.62
29	BEKISTING PLAT LANTAI 7	1.62
30	BETON BALOK LANTAI 7	1.62
31	PEMBESIAN BALOK LANTAI 7	3.23
32	BEKISTING BALOK LANTAI 7	1.62

Cost Slope

Cost slope merupakan perbandingan antara selisih biaya percepatan dengan biaya normal dan selisih durasi normal dengan durasi percepatan. Setelah mendapat hasil dari percepatan durasi dan selisih biaya, selanjutnya adalah menghitung *cost slope* untuk kegiatan-kegiatan kritis setelah penambahan jam lembur 1 sampai 3 jam. Untuk mendapatkan *cost slope* lakukan perhitungan seperti berikut.

Contoh kegiatan : Pekerjaan pembesian kolom *basement*

Lembur 1 jam

$$Slope = \frac{\text{biaya percepatan} - \text{biaya normal}}{\text{durasi normal} - \text{durasi percepatan}}$$

$$Slope = \frac{\text{Rp.20.915.128,00} - \text{Rp.20.675.573,00}}{7 - 6.29} = \text{Rp.337.401,00}$$

Tabel 4.21 *Cost slope* biaya pekerjaan akibat lembur 1 jam

No	Kegiatan	*Duration Variance* (hari)	*Cost Variance* (Rp)	*Cost Slope* (Rp)
1	Pek. Pembersihan Lahan	1.42	4,137,945	2,914,046
2	Pek. Galian Tanah 1	2.12	1,957,900	923,538
3	Pek. Bobok Kepala Tiang Pancang	1.42	1,249,559	879,971
4	Beton Pile Cap	2.12	4,582,784	2,161,691
5	Pembesian Pile Cap	2.83	2,663,963	941,330
6	Bekisting Pile Cap	0.71	646,479	910,534
7	Beton Sloof	1.42	857,466	603,849
8	Pembesian Sloof	2.12	1,546,779	729,613
9	Bekisting Sloof	0.71	619,342	872,313
10	Beton Kolom Basement	0.71	146,525	206,373
11	Pembesian Kolom Basement	0.71	239,555	337,401
12	Bekisting Kolom Basement	0.71	283,711	399,593
13	Beton Kolom Dasar	0.71	1,232,494	1,735,907
14	Pembesian Kolom Dasar	1.42	1,883,746	1,326,582
15	Beton Shear Wall Dasar	0.71	609,813	858,892
16	Pembesian Shear Wall Dasar	0.71	463,203	652,399
17	Beton Shear Wall Lantai 2	0.71	554,149	780,492
18	Pembesian Shear Wall Lantai 2	0.71	425,164	598,823
19	Beton Shear Wall Lantai 3	0.71	500,963	705,582
20	Pembesian Shear Wall Lantai 3	0.71	404,550	569,789
21	Beton Shear Wall Lantai 5	0.71	408,601	575,494
22	Pembesian Shear Wall Lantai 5	0.71	338,744	477,104
23	Beton Shear Wall Lantai 6	0.71	408,601	575,494
24	Pembesian Shear Wall Lantai 6	0.71	338,744	477,104
25	Beton Shear Wall Lantai 7	0.71	408,601	575,494
26	Pembesian Shear Wall Lantai 7	0.71	349,478	492,223
27	Beton Plat Lantai 7	0.71	1,032,505	1,454,232
28	Pembesian Plat Lantai 7	1.42	893,688	629,358
29	Bekisting Plat Lantai 7	0.71	2,694,607	3,795,221
30	Beton Balok Lantai 7	0.71	640,453	902,046
31	Pembesian Balok Lantai 7	1.42	947,205	667,046
32	Bekisting Balok Lantai 7	0.71	1,334,264	1,879,245

Lembur 2 jam

$$Slope = \frac{\text{biaya percepatan} - \text{biaya normal}}{\text{durasi normal} - \text{durasi percepatan}}$$

$$Slope = \frac{\text{Rp.21.268.514,00} - \text{Rp.20.675.573,00}}{7 - 5{,}77}$$

$$= \text{Rp.482.066,00}$$

Tabel 4.22 *Slope* biaya pekerjaan akibat lembur 2 jam

No	Kegiatan	*Duration Variance* (hari)	*Cost Variance* (Rp)	*Cost Slope* (Rp)
1	Pek. Pembersihan Lahan	2.45	10,207,771	4,166,437
2	Pek. Galian Tanah 1	3.68	4,816,892	1,308,938
3	Pek. Bobok Kepala Tiang Pancang	2.45	3,082,076	1,257,990
4	Beton Pile Cap	3.68	11,247,630	3,056,421
5	Pembesian Pile Cap	4.91	6,575,693	1,339,245
6	Bekisting Pile Cap	1.23	1,590,023	1,292,702
7	Beton Sloof	2.45	2,116,521	863,886
8	Pembesian Sloof	3.68	3,808,041	1,034,794
9	Bekisting Sloof	1.23	1,531,782	1,245,351
10	Beton Kolom Basement	1.23	360,488	293,080
11	Pembesian Kolom Basement	1.23	592,941	482,066
12	Bekisting Kolom Basement	1.23	702,923	571,482
13	Beton Kolom Dasar	1.23	3,030,543	2,463,856
14	Pembesian Kolom Dasar	2.45	4,646,206	1,896,411
15	Beton Shear Wall Dasar	1.23	1,504,718	1,223,348
16	Pembesian Shear Wall Dasar	1.23	1,146,056	931,753
17	Beton Shear Wall Lantai 2	1.23	1,369,466	1,113,387
18	Pembesian Shear Wall Lantai 2	1.23	1,058,007	860,168
19	Beton Shear Wall Lantai 3	1.23	1,233,980	1,003,236
20	Pembesian Shear Wall Lantai 3	1.23	965,908	785,291
21	Beton Shear Wall Lantai 5	1.23	1,008,771	820,139
22	Pembesian Shear Wall Lantai 5	1.23	846,570	688,268
23	Beton Shear Wall Lantai 6	1.23	1,008,771	820,139
24	Pembesian Shear Wall Lantai 6	1.23	846,570	688,268
25	Beton Shear Wall Lantai 7	1.23	1,008,771	820,139
26	Pembesian Shear Wall Lantai 7	1.23	864,316	702,696
27	Beton Plat Lantai 7	1.23	2,542,560	2,067,122
28	Pembesian Plat Lantai 7	2.45	2,215,641	904,343
29	Bekisting Plat Lantai 7	1.23	6,619,537	5,381,737
30	Beton Balok Lantai 7	1.23	1,566,308	1,273,421
31	Pembesian Balok Lantai 7	2.45	1,362,271	556,029
32	Bekisting Balok Lantai 7	1.23	3,270,894	2,659,263

Lembur 3 jam

$$Slope = \frac{\text{biaya percepatan} - \text{biaya normal}}{\text{durasi normal} - \text{durasi percepatan}}$$

$$Slope = \frac{\text{Rp.22.154.789,00} - \text{Rp.20.675.573,00}}{7 - 5{,}38}$$

$$= \text{Rp.913.096,00}$$

Tabel 4.23 *Slope* biaya pekerjaan akibat lembur 3 jam

NO	Kegiatan	*Duration Variance (hari)*	*Cost Variance (Rp)*	*Cost Slope (Rp)*
1	Pek. Pembersihan Lahan	3.23	25,290,091	7,829,750
2	Pek. Galian Tanah 1	4.85	11,948,000	2,463,505
3	Pek. Bobok Kepala Tiang Pancang	3.23	7,636,351	2,364,195
4	Beton Pile Cap	4.85	27,885,049	5,749,495
5	Pembesian Pile Cap	6.46	16,314,946	2,525,533
6	Bekisting Pile Cap	1.62	3,943,916	2,434,516
7	Beton Sloof	3.23	5,247,002	1,624,459
8	Pembesian Sloof	4.85	9,436,533	1,945,677
9	Bekisting Sloof	1.62	3,793,095	2,341,417
10	Beton Kolom Basement	1.62	894,105	551,917
11	Pembesian Kolom Basement	1.62	1,479,216	913,096
12	Bekisting Kolom Basement	1.62	1,748,739	1,079,469
13	Beton Kolom Dasar	1.62	7,525,479	4,645,357
14	Pembesian Kolom Dasar	3.23	11,499,904	3,560,342
15	Beton Shear Wall Dasar	1.62	3,738,259	2,307,567
16	Pembesian Shear Wall Dasar	1.62	2,843,368	1,755,165
17	Beton Shear Wall Lantai 2	1.62	3,404,000	2,101,235
18	Pembesian Shear Wall Lantai 2	1.62	2,629,701	1,623,272
19	Beton Shear Wall Lantai 3	1.62	3,063,390	1,890,981
20	Pembesian Shear Wall Lantai 3	1.62	2,462,890	1,520,302
21	Beton Shear Wall Lantai 5	1.62	2,505,735	1,546,750
22	Pembesian Shear Wall Lantai 5	1.62	2,105,734	1,299,836
23	Beton Shear Wall Lantai 6	1.62	2,505,735	1,546,750
24	Pembesian Shear Wall Lantai 6	1.62	2,105,734	1,299,836
25	Beton Shear Wall Lantai 7	1.62	2,505,735	1,546,750
26	Pembesian Shear Wall Lantai 7	1.62	2,141,869	1,322,141
27	Beton Plat Lantai 7	1.62	6,312,690	3,896,722
28	Pembesian Plat Lantai 7	3.62	5,486,966	1,515,736
29	Bekisting Plat Lantai 7	1.62	16,409,014	10,129,021
30	Beton Balok Lantai 7	1.62	3,877,096	2,393,269
31	Pembesian Balok Lantai 7	3.23	5,843,106	1,809,011
32	Bekisting Balok Lantai 7	1.62	8,116,683	5,010,298

Dari hasil *cost slope* kegiatan-kegaitan kritis tersebut, selanjutnya adalah mengurutkan *cost slope* dari terkecil ke terbesar untuk mngetahui efisiensi dari masing-masing pekerjaan yang dipercepat.

Tabel 4.24 *Cost slope* dari terkecil ke terbesar 1 jam

No	Kode	Durasi (hari)			Biaya (Rp)		*Cost Slope (Rp)*
		Normal	Percepatan	Selisih	Normal	Percepatan	
1	BTKB	7	6.29	0.71	8,211,124	8,357,649	206,373
2	PKB	7	6.29	0.71	20,675,573	20,915,128	337,401
3	BKKB	7	6.29	0.71	6,637,693	6,921,404	399,593
4	PSWL5	7	6.29	0.71	26,562,311	26,901,055	477,104
5	PSWL6	7	6.29	0.71	26,562,311	26,901,055	477,104
6	PSWL7	7	6.29	0.71	26,955,181	27,304,659	492,223
7	PSWL3	7	6.29	0.71	31,518,604	31,923,154	569,789
8	BTSWL5	7	6.29	0.71	20,637,019	21,045,620	575,494
9	BTSWL6	7	6.29	0.71	20,637,019	21,045,620	575,494
10	BTSWL7	7	6.29	0.71	20,637,019	21,045,620	575,494
11	PSWL2	7	6.29	0.71	34,456,461	34,881,625	598,823
12	BTS	14	12.58	1.42	46,671,985	47,529,451	603,849
13	PPL7	14	12.58	1.42	68,981,977	69,875,665	629,358
14	PSWD	7	6.29	0.71	38,070,682	38,533,885	652,399
15	PBL7	14	12.58	1.42	73,387,344	74,334,549	667,046
16	BTSWL3	7	6.29	0.71	25,471,592	25,972,555	705,582
17	PS	21	18.88	2.12	131,705,622	133,252,401	729,613
18	BTSWL2	7	6.29	0.71	28,637,386	29,191,535	780,492
19	BTSWD	7	6.29	0.71	31,768,268	32,378,081	858,892
20	BKS	7	6.29	0.71	24,848,027	25,467,369	872,313
21	PBKTP	14	12.58	1.42	18,601,800	19,851,359	879,971
22	BTBL7	7	6.29	0.71	30,855,154	31,495,607	902,046
23	BKPC	7	6.29	0.71	25,803,984	26,450,463	910,534
24	PGT1	21	18.88	2.12	29,145,900	31,103,800	923,538
25	PPC	28	25.17	2.83	227,709,826	230,373,789	941,330
26	PKD	14	12.58	1.42	153,635,430	155,519,176	1,326,582
27	BTPL7	7	6.29	0.71	50,362,886	51,395,391	1,454,232
28	BTKD	7	6.29	0.71	63,942,681	65,175,175	1,735,907
29	BKBL7	7	6.29	0.71	29,123,314	30,457,578	1,879,245
30	BTPC	21	18.88	2.12	248,195,794	252,778,578	2,161,691
31	PPL	14	12.58	1.42	61,622,262	65,760,207	2,914,046
32	BKPL7	7	6.29	0.71	58,787,834	61,482,441	3,795,221

Tabel 4.25 *Cost slope* dari terkecil ke terbesar 2 jam

No	Kode	Durasi (hari)			Biaya (Rp)		*Cost Slope (Rp)*
		Normal	Percepatan	Selisih	Normal	Percepatan	
1	BTKB	7	5.77	1.23	8,211,124	8,571,612	293,080
2	PKB	7	5.77	1.23	20,675,573	21,268,514	482,066
3	BKKB	7	5.77	1.23	6,637,693	7,340,616	571,482
4	PSWL5	7	5.77	1.23	26,562,311	27,408,881	688,268
5	PSWL6	7	5.77	1.23	26,562,311	27,408,881	688,268
6	PSWL7	7	5.77	1.23	26,955,181	27,819,497	702,696
7	PSWL3	7	5.77	1.23	31,518,604	32,484,512	785,291
8	BTSWL5	7	5.77	1.23	20,637,019	21,645,790	820,139
9	BTSWL6	7	5.77	1.23	20,637,019	21,645,790	820,139

Tabel 4.25 Lanjutan

10	BTSWL7	7	5.77	1.23	20,637,019	21,645,790	820,139
11	PSWL2	7	5.77	1.23	34,456,461	35,514,468	860,168
12	BTS	14	11.55	2.45	46,671,985	48,788,506	863,886
13	PPL7	14	11.55	2.45	68,981,977	71,197,618	904,343
14	PSWD	7	5.77	1.23	38,070,682	39,216,738	931,753
15	PBL7	7	5.77	1.23	25,471,592	26,705,572	1,003,236
16	BTSWL3	21	17.32	3.68	131,705,622	135,513,663	1,034,794
17	PS	7	5.77	1.23	28,637,386	30,006,852	1,113,387
18	BTSWL2	7	5.77	1.23	31,768,268	33,272,986	1,223,348
19	BTSWD	7	5.77	1.23	24,848,027	26,379,809	1,245,351
20	BKS	14	11.55	2.45	18,601,800	21,683,876	1,257,990
21	PBKTP	7	5.77	1.23	30,855,154	32,421,462	1,273,421
22	BTBL7	7	5.77	1.23	25,803,984	27,394,007	1,292,702
23	BKPC	21	17.32	3.68	29,145,900	33,962,792	1,308,938
24	PGT1	28	23.09	4.91	227,709,826	234,285,519	1,339,245
25	PPC	14	11.55	2.45	73,387,344	76,749,615	1,372,356
26	PKD	14	11.55	2.45	153,635,430	158,281,636	1,896,411
27	BTPL7	7	5.77	1.23	50,362,886	52,905,446	2,067,122
28	BTKD	7	5.77	1.23	63,942,681	66,973,224	2,463,856
29	BKBL7	7	5.77	1.23	29,123,314	32,394,208	2,659,263
30	BTPC	21	17.32	3.68	248,195,794	259,443,424	3,056,421
31	PPL	14	11.55	2.45	61,622,262	71,830,033	4,166,437
32	BKPL7	7	5.77	1.23	58,787,834	65,407,371	5,381,737

Tabel 4.26 *Cost slope* dari terkecil ke terbesar 3 jam

No	Kode	Durasi (hari)			Biaya (Rp)		*Cost Slope (Rp)*
		Normal	Percepatan	Selisih	Normal	Percepatan	
1	BTKB	7	5.38	1.62	8,211,124	9,105,229	551,917
2	PKB	7	5.38	1.62	20,675,573	22,154,789	913,096
3	BKKB	7	5.38	1.62	6,637,693	8,386,432	1,079,469
4	PSWL5	7	5.38	1.62	26,562,311	28,668,045	1,299,836
5	PSWL6	7	5.38	1.62	26,562,311	28,668,045	1,299,836
6	PSWL7	7	5.38	1.62	26,955,181	29,097,050	1,322,141
7	PSWL3	14	10.38	3.62	68,981,977	74,468,943	1,515,736
8	BTSWL5	7	5.38	1.62	31,518,604	33,981,494	1,520,302
9	BTSWL6	7	5.38	1.62	20,637,019	23,142,754	1,546,750
10	BTSWL7	7	5.38	1.62	20,637,019	23,142,754	1,546,750
11	PSWL2	7	5.38	1.62	20,637,019	23,142,754	1,546,750
12	BTS	7	5.38	1.62	34,456,461	37,086,162	1,623,272
13	PPL7	14	10.77	3.23	46,671,985	51,918,987	1,624,459
14	PSWD	7	5.38	1.62	38,070,682	40,914,050	1,755,165
15	PBL7	14	10.77	3.23	73,387,344	79,230,450	1,809,011
16	BTSWL3	7	5.38	1.62	25,471,592	28,534,982	1,890,981
17	PS	21	16.15	4.85	131,705,622	141,142,155	1,945,677
18	BTSWL2	7	5.38	1.62	28,637,386	32,041,386	2,101,235
19	BTSWD	7	5.38	1.62	31,768,268	35,506,527	2,307,567
20	BKS	7	5.38	1.62	24,848,027	28,641,122	2,341,417
21	PBKTP	14	10.77	3.23	18,601,800	26,238,151	2,364,195
22	BTBL7	7	5.38	1.62	30,855,154	34,732,250	2,393,269

Tabel 4.26 Lanjutan

23	BKPC	7	5.38	1.62	25,803,984	29,747,900	2,434,516
24	PGT1	21	16.15	4.85	29,145,900	41,093,900	2,463,505
25	PPC	28	21.54	6.46	227,709,826	244,024,772	2,525,533
26	PKD	14	10.77	3.23	153,635,430	165,135,334	3,560,342
27	BTPL7	7	5.38	1.62	50,362,886	56,675,576	3,896,722
28	BTKD	7	5.38	1.62	63,942,681	71,468,160	4,645,357
29	BKBL7	7	5.38	1.62	29,123,314	37,239,997	5,010,298
30	BTPC	21	16.15	4.85	248,195,794	276,080,843	5,749,495
31	PPL	14	10.77	3.23	61,622,262	86,912,353	7,829,750
32	BKPL7	7	5.38	1.62	58,787,834	75,196,848	10,129,021

Berikut urutan nilai *cost variance* dari terkecil ke terbesar.

Tabel 4.27 *Cost variance* dari terkecil ke terbesar 1 jam

No	Kode	Durasi (hari)			Biaya (Rp)		*Cost Variance (Rp)*
		Normal	Percepatan	Selisih	Normal	Percepatan	
1	BTKB	7	6.29	0.71	8,211,124	8,357,649	146,525
2	PKB	7	6.29	0.71	20,675,573	20,915,128	239,555
3	BKKB	7	6.29	0.71	6,637,693	6,921,404	283,711
4	PSWL5	7	6.29	0.71	26,562,311	26,901,055	338,744
5	PSWL6	7	6.29	0.71	26,562,311	26,901,055	338,744
6	PSWL7	7	6.29	0.71	26,955,181	27,304,659	349,478
7	PSWL3	7	6.29	0.71	31,518,604	31,923,154	404,550
8	BTSWL5	7	6.29	0.71	20,637,019	21,045,620	408,601
9	BTSWL6	7	6.29	0.71	20,637,019	21,045,620	408,601
10	BTSWL7	7	6.29	0.71	20,637,019	21,045,620	408,601
11	PSWL2	7	6.29	0.71	34,456,461	34,881,625	425,164
12	BTS	7	6.29	0.71	38,070,682	38,533,885	463,203
13	PPL7	7	6.29	0.71	25,471,592	25,972,555	500,963
14	PSWD	7	6.29	0.71	28,637,386	29,191,535	554,149
15	PBL7	7	6.29	0.71	31,768,268	32,378,081	609,813
16	BTSWL3	7	6.29	0.71	24,848,027	25,467,369	619,342
17	PS	7	6.29	0.71	30,855,154	31,495,607	640,453
18	BTSWL2	7	6.29	0.71	25,803,984	26,450,463	646,479
19	BTSWD	14	12.58	1.42	46,671,985	47,529,451	857,466
20	BKS	14	12.58	1.42	68,981,977	69,875,665	893,688
21	PBKTP	14	12.58	1.42	73,387,344	74,334,549	947,205
22	BTBL7	7	6.29	0.71	50,362,886	51,395,391	1,032,505
23	BKPC	7	6.29	0.71	63,942,681	65,175,175	1,232,494
24	PGT1	14	12.58	1.42	18,601,800	19,851,359	1,249,559
25	PPC	7	6.29	0.71	29,123,314	30,457,578	1,334,264
26	PKD	21	18.88	2.12	131,705,622	133,252,401	1,546,779
27	BTPL7	14	12.58	1.42	153,635,430	155,519,176	1,883,746
28	BTKD	21	18.88	2.12	29,145,900	31,103,800	1,957,900
29	BKBL7	28	25.17	2.83	227,709,826	230,373,789	2,663,963
30	BTPC	7	6.29	0.71	58,787,834	61,482,441	2,694,607
31	PPL	14	12.58	1.42	61,622,262	65,760,207	4,137,945
32	BKPL7	21	18.88	2.12	248,195,794	252,778,578	4,582,784

Tabel 4.28 *Cost variance* dari terkecil ke terbesar 2 jam

No	Kode	Durasi (hari)			Biaya (Rp)		*Cost Variance (Rp)*
		Normal	Percepatan	Selisih	Normal	Percepatan	
1	BTKB	7	5.77	1.23	8,211,124	8,571,612	360,488
2	PKB	7	5.77	1.23	20,675,573	21,268,514	592,941
3	BKKB	7	5.77	1.23	6,637,693	7,340,616	702,923
4	PSWL5	7	5.77	1.23	26,562,311	27,408,881	846,570
5	PSWL6	7	5.77	1.23	26,562,311	27,408,881	846,570
6	PSWL7	7	5.77	1.23	26,955,181	27,819,497	864,316
7	PSWL3	7	5.77	1.23	31,518,604	32,484,512	965,908
8	BTSWL5	7	5.77	1.23	20,637,019	21,645,790	1,008,771
9	BTSWL6	7	5.77	1.23	20,637,019	21,645,790	1,008,771
10	BTSWL7	7	5.77	1.23	20,637,019	21,645,790	1,008,771
11	PSWL2	7	5.77	1.23	34,456,461	35,514,468	1,058,007
12	PSWD	7	5.77	1.23	38,070,682	39,216,738	1,146,056
13	BTSWL3	7	5.77	1.23	25,471,592	26,705,572	1,233,980
14	PBL7	14	11.55	2.45	73,387,344	74,749,615	1,362,271
15	BTSWL2	7	5.77	1.23	28,637,386	30,006,852	1,369,466
16	BTSWD	7	5.77	1.23	31,768,268	33,272,986	1,504,718
17	BKS	7	5.77	1.23	24,848,027	26,379,809	1,531,782
18	BTBL7	7	5.77	1.23	30,855,154	32,421,462	1,566,308
19	BKPC	7	5.77	1.23	25,803,984	27,394,007	1,590,023
20	BTS	14	11.55	2.45	46,671,985	48,788,506	2,116,521
21	PPL7	14	11.55	2.45	68,981,977	71,197,618	2,215,641
22	BTPL7	7	5.77	1.23	50,362,886	52,905,446	2,542,560
23	BTKD	7	5.77	1.23	63,942,681	66,973,224	3,030,543
24	PBKTP	14	11.55	2.45	18,601,800	21,683,876	3,082,076
25	BKBL7	7	5.77	1.23	29,123,314	32,394,208	3,270,894
26	PS	21	17.32	3.68	131,705,622	135,513,663	3,808,041
27	PKD	14	11.55	2.45	153,635,430	158,281,636	4,646,206
28	PGT1	21	17.32	3.68	29,145,900	33,962,792	4,816,892
29	PPC	28	23.09	4.91	227,709,826	234,285,519	6,575,693
30	BKPL7	7	5.77	1.23	58,787,834	65,407,371	6,619,537
31	PPL	14	11.55	2.45	61,622,262	71,830,033	10,207,771
32	BTPC	21	17.32	3.68	248,195,794	259,443,424	11,247,630

Tabel 4.29 *Cost variance* dari terkecil ke terbesar 3 jam

No	Kode	Durasi (hari)			Biaya (Rp)		*Cost Variance (Rp)*
		Normal	Percepatan	Selisih	Normal	Percepatan	
1	BTKB	7	5.38	1.62	8,211,124	9,105,229	894,105
2	PKB	7	5.38	1.62	20,675,573	22,154,789	1,479,216
3	BKKB	7	5.38	1.62	6,637,693	8,386,432	1,748,739
4	PSWL5	7	5.38	1.62	26,562,311	28668045	2,105,734
5	PSWL6	7	5.38	1.62	26,562,311	28668045	2,105,734
6	PSWL7	7	5.38	1.62	26,955,181	29097050	2,141,869
7	PSWL3	7	5.38	1.62	31,518,604	33981494	2,462,890
8	BTSWL5	7	5.38	1.62	20,637,019	23142754	2,505,735
9	BTSWL6	7	5.38	1.62	20,637,019	23142754	2,505,735

Tabel 4.29 Lanjutan

10	BTSWL7	7	5.38	1.62	20,637,019	23142754	2,505,735
11	PSWL2	7	5.38	1.62	34,456,461	37086162	2,629,701
12	PSWD	7	5.38	1.62	38,070,682	40914050	2,843,368
13	BTSWL3	7	5.38	1.62	25,471,592	28534982	3,063,390
14	BTSWL2	7	5.38	1.62	28,637,386	32041386	3,404,000
15	BTSWD	7	5.38	1.62	31,768,268	35506527	3,738,259
16	BKS	7	5.38	1.62	24,848,027	28,641,122	3,793,095
17	BTBL7	7	5.38	1.62	30,855,154	34,732,250	3,877,096
18	BKPC	7	5.38	1.62	25,803,984	29,747,900	3,943,916
19	BTS	14	10.77	3.23	46,671,985	51,918,987	5,247,002
20	PPL7	14	10.38	3.62	68,981,977	74,468,943	5,486,966
21	PBL7	14	10.77	3.23	73,387,344	79,230,450	5,843,106
22	BTPL7	7	5.38	1.62	50,362,886	56,675,576	6,312,690
23	BTKD	7	5.38	1.62	63,942,681	71468160	7,525,479
24	PBKTP	14	10.77	3.23	18,601,800	26,238,151	7,636,351
25	BKBL7	7	5.38	1.62	29,123,314	37,239,997	8,116,683
26	PS	21	16.15	4.85	131,705,622	141,142,155	9,436,533
27	PKD	14	10.77	3.23	153,635,430	165,135,334	11,499,904
28	PGT1	21	16.15	4.85	29,145,900	41,093,900	11,948,000
29	PPC	28	21.54	6.46	227,709,826	244,024,772	16,314,946
30	BKPL7	7	5.38	1.62	58,787,834	75,196,848	16,409,014
31	PPL	14	10.77	3.23	61,622,262	86,912,353	25,290,091
32	BTPC	21	16.15	4.85	248,195,794	276,080,843	27,885,049

Biaya Langsung dan Tidak Langsung

Dari sisi biaya, dalam proyek terdiri dari dua jenis biaya yaitu biaya langsung dan tidak langsung. Biaya langsung merupakan biaya yang digunakan untuk segala hal yang akan menjadi hasil akhir proyek secara permanen. Sedangkan biaya tidak langsung merupakan biaya yang tidak akan menjadi wujud permanen akan tetapi ada selama proyek berlangsung. Untuk mengetahui biaya tidak langsung yaitu menggunakan hasil dari pemodelan biaya dengan model regresi non linier menggunakan algoritma genematika, persamaannya adalah sebagai berikut.

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

dengan :

x_1 = nilai proyek

x_2 = durasi pelaksanaan proyek

$y = -0,95-(4,888(\ln(Rp.5.488.191.102 – 0,21) – \ln(273)) + \varepsilon$

$y = 0,1833 = 18,3\%$

Secara detail proyek pembangunan hotel dengan nilai proyek sebesar Rp. 5.488.191.102 diperoleh persentase biaya tidak langsung sebesar 18,3% dan berikut adalah hitungan dari biaya langsung dan biaya tidak langsung.

Biaya tidak langsung = 18,3% x Rp.5.488.191.102
= Rp.1.006.397.167,21

Biaya tidak langsung/hari = biaya tidak langsung/durasi normal proyek
= Rp.1.006.397.167,21/273 hari
= Rp.3.686.436,51/hari

Biaya langsung = biaya total proyek - biaya tidak langsung
= Rp.5.448.191.102 - Rp.1.006.397.167,21
= Rp.4.481.793.934,79

Pada tabel 4.28 – tabel 4.30 merupakan hasil dari perhitungan biaya tidak langsung dan biaya langsung terhadap percepatan proyek untuk lembur 1 – 3 jam.

Tabel 4.30 Biaya tidak langsung dan tidak langsung untuk lembur 1 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	273.00	1,006,397,167	4,481,793,935
BTKB	272.29	1,003,779,797	4,481,940,460
PKB	271.58	1,001,162,427	4,482,180,015
BKKB	270.87	998,545,057	4,482,463,726
PSWL5	270.16	995,927,688	4,482,802,470
PSWL6	269.45	993,310,318	4,483,141,214
PSWL7	268.74	990,692,948	4,483,490,692
PSWL3	268.03	988,075,578	4,483,895,242
BTSWL5	267.32	985,458,208	4,484,303,843
BTSWL6	266.61	982,840,838	4,484,712,444
BTSWL7	265.90	980,223,468	4,485,121,045
PSWL2	265.19	977,606,098	4,485,546,209
BTS	263.77	972,371,358	4,486,403,675
PPL7	262.35	967,136,618	4,487,297,363
PSWD	261.64	964,519,248	4,487,760,566
PBL7	260.22	959,284,509	4,488,707,771

Tabel 4.30 Lanjutan

BTSWL3	259.51	956,667,139	4,489,208,734
PS	257.39	948,851,893	4,490,755,513
BTSWL2	256.68	946,234,523	4,491,309,662
BTSWD	255.97	943,617,153	4,491,919,475
BKS	255.26	940,999,784	4,492,538,817
PBKTP	253.84	935,765,044	4,493,788,376
BTBL7	253.13	933,147,674	4,494,428,829
BKPC	252.42	930,530,304	4,495,075,308
PGT1	250.30	922,715,058	4,497,033,208
PPC	247.47	912,282,443	4,499,697,171
PKD	246.05	907,047,703	4,501,580,917
BTPL7	245.34	904,430,333	4,502,613,422
BTKD	244.63	901,812,963	4,503,845,916
BKBL7	243.92	899,195,593	4,505,180,180
BTPC	241.80	891,380,348	4,509,762,964
PPL	240.38	886,145,608	4,513,900,909
BKPL7	239.67	883,528,238	4,516,595,516

Tabel 4.31 Biaya tidak langsung dan tidak langsung untuk lembur 2 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	273.00	1,006,397,167	4,481,793,935
BTKB	271.77	1,001,862,850	4,482,154,423
PKB	270.54	997,328,533	4,482,747,364
BKKB	269.31	992,794,216	4,483,450,287
PSWL5	268.08	988,259,900	4,484,296,857
PSWL6	266.85	983,725,583	4,485,143,427
PSWL7	265.62	979,191,266	4,486,007,743
PSWL3	264.39	974,656,949	4,486,973,651
BTSWL5	263.16	970,122,632	4,487,982,422
BTSWL6	261.93	965,588,315	4,488,991,193
BTSWL7	260.70	961,053,998	4,489,999,964
PSWL2	259.47	956,519,681	4,491,057,971
BTS	257.02	947,487,912	4,493,174,492
PPL7	254.57	938,456,142	4,495,390,133
PSWD	253.34	933,921,825	4,496,536,189
BTSWL3	252.11	929,387,509	4,497,770,169
PS	248.43	915,821,422	4,501,578,210
BTSWL2	247.20	911,287,105	4,502,947,676
BTSWD	245.97	906,752,788	4,504,452,394
BKS	244.74	902,218,471	4,505,984,176
PBKTP	242.29	893,186,702	4,509,066,252
BTBL7	241.06	888,652,385	4,510,632,560
BKPC	239.83	884,118,068	4,512,222,583

Tabel 4.31 Lanjutan

PGT1	236.15	870,551,982	4,517,039,475
PPC	231.24	852,451,579	4,523,615,168
PBL7	228.79	843,419,809	4,526,977,439
PKD	226.34	834,388,040	4,531,623,645
BTPL7	225.11	829,853,723	4,534,166,205
BTKD	223.88	825,319,406	4,537,196,748
BKBL7	222.65	820,785,089	4,540,467,642
BTPC	218.97	807,219,003	4,551,715,272
PPL	216.52	798,187,233	4,561,923,043
BKPL7	215.29	793,652,916	4,568,542,580

Tabel 4.32 Biaya tidak langsung dan tidak langsung untuk lembur 3 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	273.00	1,006,397,167	4,481,793,935
BTKB	271.38	1,000,425,140	4,482,688,040
PKB	269.76	994,453,113	4,484,167,256
BKKB	268.14	988,481,086	4,485,915,995
PSWL5	266.52	982,509,059	4,488,021,729
PSWL6	264.90	976,537,031	4,490,127,463
PSWL7	263.28	970,565,004	4,492,269,332
PSWL3	259.66	957,220,104	4,497,756,298
BTSWL5	258.04	951,248,077	4,500,219,188
BTSWL6	256.42	945,276,050	4,502,724,923
BTSWL7	254.80	939,304,023	4,505,230,658
PSWL2	253.18	933,331,996	4,507,736,393
BTS	251.56	927,359,968	4,510,366,094
PPL7	248.33	915,452,779	4,515,613,096
PSWD	246.71	909,480,751	4,518,456,464
PBL7	243.48	897,573,561	4,524,299,570
BTSWL3	241.86	891,601,534	4,527,362,960
PS	237.01	873,722,317	4,536,799,493
BTSWL2	235.39	867,750,290	4,540,203,493
BTSWD	233.77	861,778,263	4,543,941,752
BKS	232.15	855,806,236	4,547,734,847
PBKTP	228.92	843,899,046	4,555,371,198
BTBL7	227.30	837,927,019	4,559,248,294
BKPC	225.68	831,954,992	4,563,192,210
PGT1	220.83	814,075,774	4,575,140,210
PPC	214.37	790,261,395	4,591,455,156
PKD	211.14	778,354,205	4,602,955,060
BTPL7	209.52	772,382,178	4,609,267,750
BTKD	207.90	766,410,150	4,616,793,229
BKBL7	206.28	760,438,123	4,624,909,912

Tabel 4.32 Lanjutan

BTPC	201.43	742,558,906	4,652,794,961
PPL	198.20	730,651,716	4,678,085,052
BKPL7	196.58	724,679,689	4,694,494,066

Untuk mendapatkan nilai biaya tidak langsung dan biaya langsung pada setiap waktu percepatan menggunakan persamaan sebagai berikut.

Kegiatan : Pembesian kolom *basement*

Biaya tidak langsung

Lembur 1 jam = (Rp.1.003.779.797,00 × 271,58) / 272,29

= Rp.1.001.162.427,00

Lembur 2 jam = (Rp.1.001.862.850,00 × 270,54) / 271,77

= Rp.997.328.533,00

Lembur 3 jam = (Rp.1.000.425.140,00 × 269,76) / 271,38

= Rp.994.453.113,00

Biaya langsung

Biaya langsung lembur = biaya langsung sebelumnya + *cost variance*

Lembur 1 jam = Rp.4.481.940.460,00 + Rp.239.555,00

= Rp.4.482.180.015,00

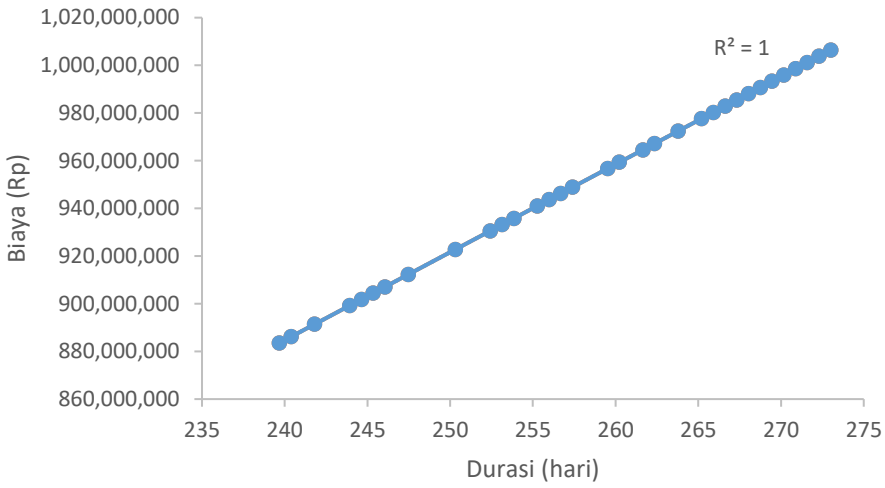
Lembur 2 jam = Rp.4.482.154.423,00 + Rp.592.941,00

= Rp.4.482.747.364,00

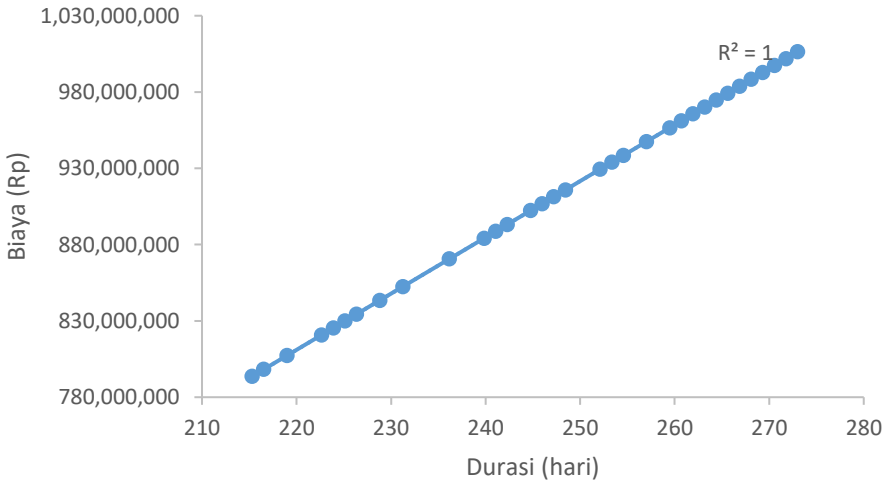
Lembur 3 jam = Rp.4.482.688.040,00 + Rp.1.479.216,00

= Rp.4.484.167.256,00

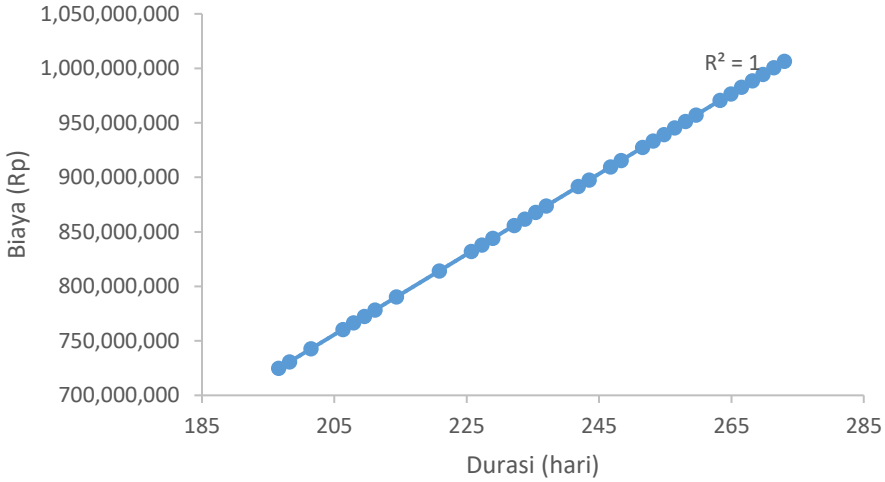
Dari hasil biaya tidak langsung dan biaya langsung jika ditampilkan dalam bentuk grafik adalah sebagai berikut.



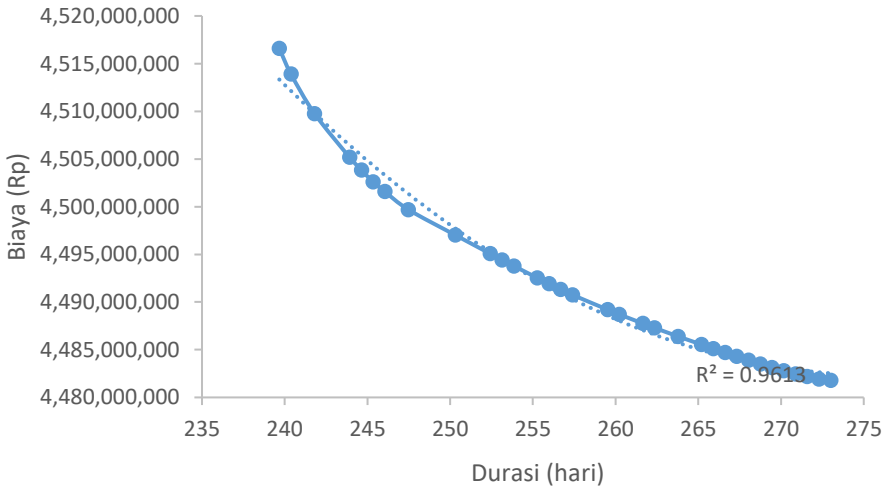
Gambar 4.1 Grafik Biaya tidak langsung untuk lembur 1 jam



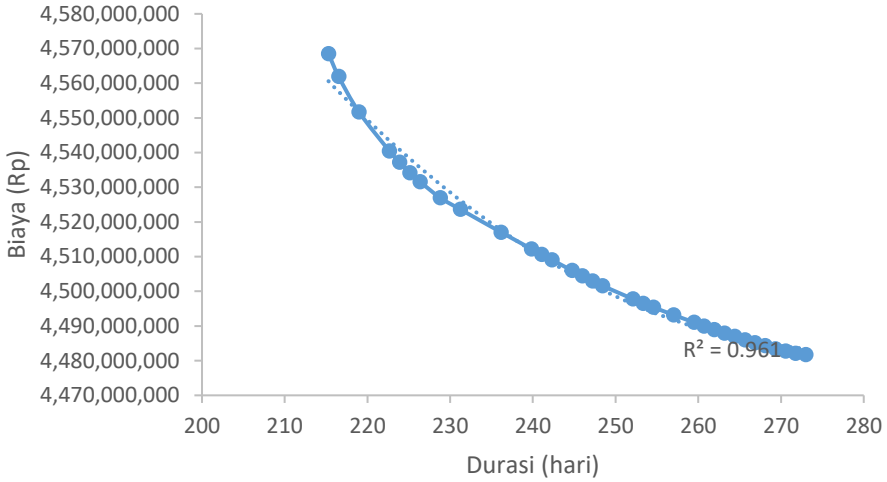
Gambar 4.2 Grafik Biaya tidak langsung untuk lembur 2 jam



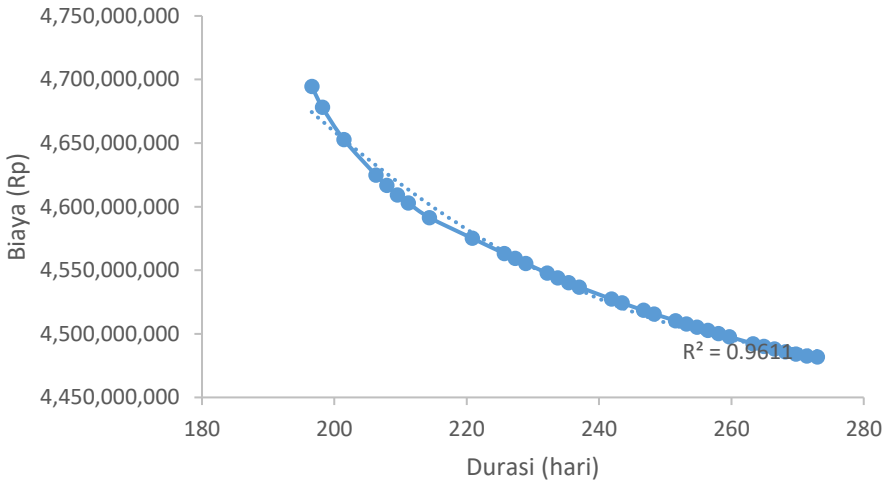
Gambar 4.3 Grafik Biaya tidak langsung untuk lembur 3 jam



Gambar 4.4 Grafik Biaya langsung untuk lembur 1 jam



Gambar 4.5 Grafik Biaya langsung untuk lembur 2 jam



Gambar 4.6 Grafik Biaya langsung untuk lembur 3 jam

Total Biaya

Total biaya merupakan penjumlahan dari biaya tidak langsung dan biaya langsung. Berikut adalah contoh perhitungan dari total biaya total pada pekerjaan pembesian kolom *basement*.

Biaya total = biaya tidak langsung percepatan + biaya langsung percepatan

Lembur 1 jam = Rp.1.001.162.427,00 + Rp.4.482.180.015,00

= Rp.5.483.342.442,00

Lembur 2 jam = Rp.997.328.533,00 + Rp.4.482.747.364,00

= Rp.5.480.075.897,00

Lembur 3 jam = Rp.994.453.113,00 + Rp.4.484.167.256,00

= Rp.5.478.620.369,00

Tabel 4.33 Biaya total untuk lembur 1 jam

Kode	Durasi Kumulatif (hari)	Biaya Total (Rp)
	273.00	5,488,191,102
BTKB	272.29	5,485,720,257
PKB	271.58	5,483,342,442
BKKB	270.87	5,481,008,783
PSWL5	270.16	5,478,730,157
PSWL6	269.45	5,476,451,531
PSWL7	268.74	5,474,183,639
PSWL3	268.03	5,471,970,820
BTSWL5	267.32	5,469,762,051
BTSWL6	266.61	5,467,553,282
BTSWL7	265.90	5,465,344,513
PSWL2	265.19	5,463,152,307
BTS	263.77	5,458,775,033
PPL7	262.35	5,454,433,981
PSWD	261.64	5,452,279,814
PBL7	260.22	5,447,992,279
BTSWL3	259.51	5,445,875,872
PS	257.39	5,439,607,406
BTSWL2	256.68	5,437,544,185
BTSWD	255.97	5,435,536,628
BKS	255.26	5,433,538,600
PBKTP	253.84	5,429,553,419
BTBL7	253.13	5,427,576,503
BKPC	252.42	5,425,605,612
PGT1	250.30	5,419,748,266
PPC	247.47	5,411,979,614
PKD	246.05	5,408,628,620
BTPL7	245.34	5,407,043,755
BTKD	244.63	5,405,658,879
BKBL7	243.92	5,404,375,773

Tabel 4.33 Lanjutan

BTPC	241.80	5,401,143,312
PPL	240.38	5,400,046,517
BKPL7	239.67	5,400,123,754

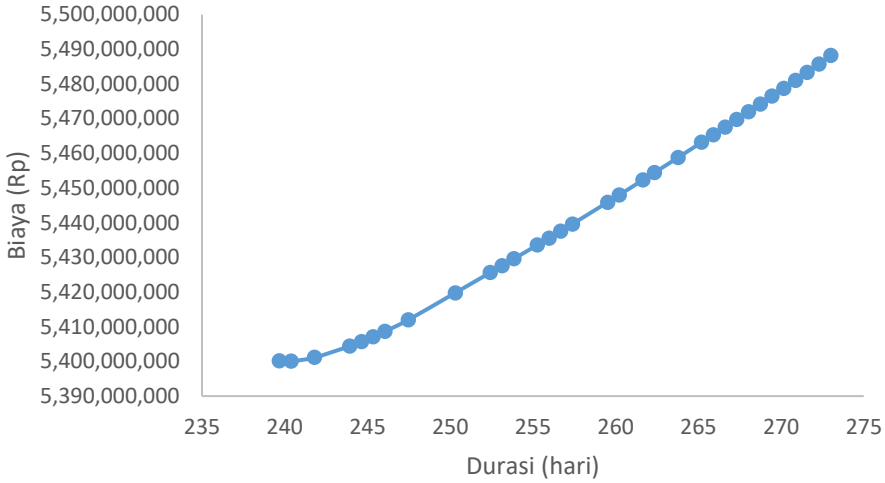
Tabel 4.34 Biaya total untuk lembur 2 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)
	273.00	5,488,191,102
BTKB	271.77	5,484,017,273
PKB	270.54	5,480,075,897
BKKB	269.31	5,476,244,503
PSWL5	268.08	5,472,556,756
PSWL6	266.85	5,468,869,009
PSWL7	265.62	5,465,199,009
PSWL3	264.39	5,461,630,600
BTSWL5	263.16	5,458,105,054
BTSWL6	261.93	5,454,579,508
BTSWL7	260.70	5,451,053,962
PSWL2	259.47	5,447,577,652
BTS	257.02	5,440,662,404
PPL7	254.57	5,433,846,275
PSWD	253.34	5,430,458,014
BTSWL3	252.11	5,427,157,677
PS	248.43	5,417,399,632
BTSWL2	247.20	5,414,234,781
BTSWD	245.97	5,411,205,182
BKS	244.74	5,408,202,647
PBKTP	242.29	5,402,252,954
BTBL7	241.06	5,399,284,945
BKPC	239.83	5,396,340,651
PGT1	236.15	5,387,591,457
PPC	231.24	5,376,066,746
PBL7	228.79	5,370,397,248
PKD	226.34	5,366,011,684
BTPL7	225.11	5,364,019,928
BTKD	223.88	5,362,516,154
BKBL7	222.65	5,361,252,731
BTPC	218.97	5,358,934,274
PPL	216.52	5,360,110,276
BKPL7	215.29	5,362,195,496

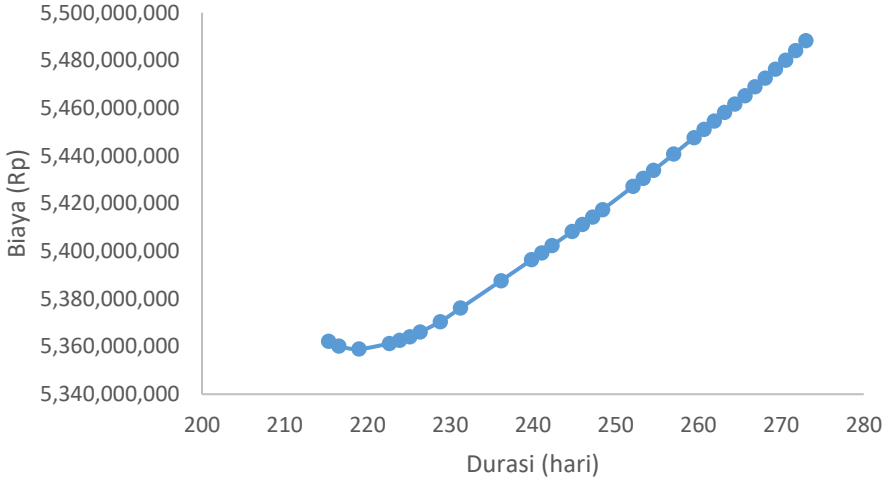
Tabel 4.35 Biaya total untuk lembur 3 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)
	273.00	5,488,191,102
BTKB	271.38	5,483,113,180
PKB	269.76	5,478,620,369
BKKB	268.14	5,474,397,081
PSWL5	266.52	5,470,530,787
PSWL6	264.90	5,466,664,494
PSWL7	263.28	5,462,834,336
PSWL3	259.66	5,454,976,402
BTSWL5	258.04	5,451,467,265
BTSWL6	256.42	5,448,000,973
BTSWL7	254.80	5,444,534,681
PSWL2	253.18	5,441,068,388
BTS	251.56	5,437,726,062
PPL7	248.33	5,431,065,874
PSWD	246.71	5,427,937,215
PBL7	243.48	5,421,873,131
BTSWL3	241.86	5,418,964,494
PS	237.01	5,410,521,810
BTSWL2	235.39	5,407,953,783
BTSWD	233.77	5,405,720,015
BKS	232.15	5,403,541,083
PBKTP	228.92	5,399,270,244
BTBL7	227.30	5,397,175,312
BKPC	225.68	5,395,147,201
PGT1	220.83	5,389,215,984
PPC	214.37	5,381,716,550
PKD	211.14	5,381,309,264
BTPL7	209.52	5,381,649,927
BTKD	207.90	5,383,203,379
BKBL7	206.28	5,385,348,035
BTPC	201.43	5,395,353,867
PPL	198.20	5,408,736,768
BKPL7	196.58	5,419,173,755

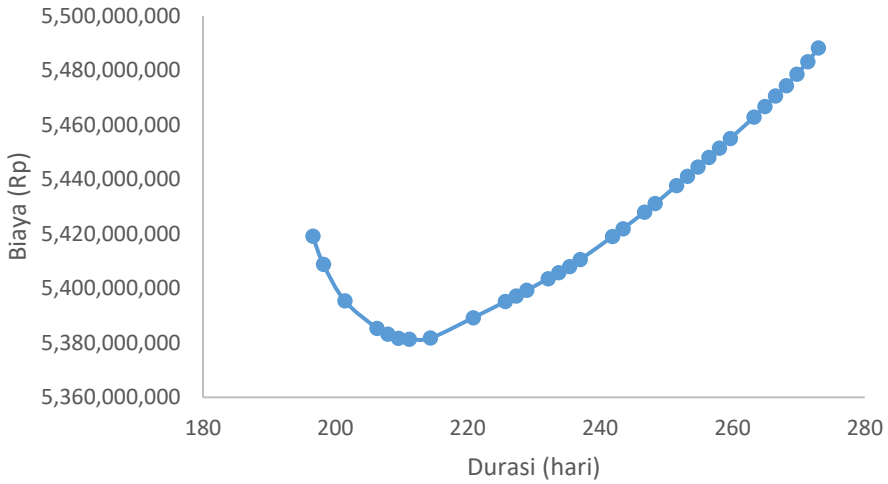
Dari hasil biaya tidak langsung dan biaya langsung jika ditampilkan dalam bentuk grafik adalah sebagai berikut.



Gambar 4.7 Grafik Biaya total untuk lembur 1 jam



Gambar 4.8 Grafik Biaya total untuk lembur 2 jam



Gambar 4.9 Grafik Biaya total untuk lembur 3 jam

3. Efisiensi Waktu dan Biaya Proyek

Efisiensi waktu adalah perbandingan antara selisih durasi normal dengan durasi komulatif kegiatan dan durasi normal dalam bentuk persen (%), sedangkan efisiensi biaya memiliki maksud yang sama dengan efisiensi waktu akan tetapi merupakan perbandingan antara biaya total. Untuk menentukan nilai efisiensi dapat menggunakan perhitungan sebgai berikut dengan contoh kegiatan pembesian kolom *basement*.

Lembur 1 jam

Efisiensi waktu $= \frac{(273{,}00-271{,}58)}{273{,}00} \times 100\%$

$= 0{,}52\ \%$

Efisiensi biaya $= \frac{(\text{Rp.}5.488.191.102{,}00-\text{Rp.}5.483.342.442{,}00)}{\text{Rp.}5.488.191.102{,}00} \times 100\%$

$= 0{,}09\ \%$

Lembur 2 jam

Efisiensi waktu $= \frac{(273{,}00-270{,}54)}{273{,}00} \times 100\%$

$= 0{,}9\ \%$

Efisiensi biaya $= \frac{(\text{Rp.}5.488.191.102{,}00-\text{Rp.}5.480.075.897{,}00)}{\text{Rp.}5.488.191.102{,}00} \times 100\%$

$= 0{,}15\ \%$

Lembur 3 jam

Efisiensi waktu $= \frac{(273{,}00-269{,}76)}{273{,}00} \times 100\%$

$= 1{,}19\ \%$

Efisiensi biaya $= \frac{(\text{Rp.}5.488.191.102{,}00-\text{Rp.}5.478.620.369{,}00)}{\text{Rp.}5.488.191.102{,}00} \times 100\%$

$= 0{,}17\ \%$

Tabel 4.36 Efisiensi waktu dan biaya untuk lembur 1 jam

KODE	Durasi (hari)	Biaya Total (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	273.00	5,488,191,102	0.00	0.00
BTKB	272.29	5,485,720,257	0.26	0.05
PKB	271.58	5,483,342,442	0.52	0.09
BKKB	270.87	5,481,008,783	0.78	0.13
PSWL5	270.16	5,478,730,157	1.04	0.17
PSWL6	269.45	5,476,451,531	1.30	0.21
PSWL7	268.74	5,474,183,639	1.56	0.26
PSWL3	268.03	5,471,970,820	1.82	0.30
BTSWL5	267.32	5,469,762,051	2.08	0.34
BTSWL6	266.61	5,467,553,282	2.34	0.38
BTSWL7	265.90	5,465,344,513	2.60	0.42
PSWL2	265.19	5,463,152,307	2.86	0.46
BTS	263.77	5,458,775,033	3.38	0.54
PPL7	262.35	5,454,433,981	3.90	0.62
PSWD	261.64	5,452,279,814	4.16	0.65
PBL7	260.22	5,447,992,279	4.68	0.73
BTSWL3	259.51	5,445,875,872	4.94	0.77
PS	257.39	5,439,607,406	5.72	0.89
BTSWL2	256.68	5,437,544,185	5.98	0.92

Tabel 4.36 Lanjutan

BTSWD	255.97	5,435,536,628	6.24	0.96
BKS	255.26	5,433,538,600	6.50	1.00
PBKTP	253.84	5,429,553,419	7.02	1.07
BTBL7	253.13	5,427,576,503	7.28	1.10
BKPC	252.42	5,425,605,612	7.54	1.14
PGT1	250.30	5,419,748,266	8.32	1.25
PPC	247.47	5,411,979,614	9.35	1.39
PKD	246.05	5,408,628,620	9.87	1.45
BTPL7	245.34	5,407,043,755	10.13	1.48
BTKD	244.63	5,405,658,879	10.39	1.50
BKBL7	243.92	5,404,375,773	10.65	1.53
BTPC	241.80	5,401,143,312	11.43	1.59
PPL	240.38	5,400,046,517	11.95	1.61
BKPL7	239.67	5,400,123,754	12.21	1.60

Tabel 4.37 Efisiensi waktu dan biaya untuk lembur 2 jam

KODE	Durasi (hari)	Biaya Total (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	273.00	5,488,191,102	0.00	0.00
BTKB	271.77	5,484,017,273	0.45	0.08
PKB	270.54	5,480,075,897	0.90	0.15
BKKB	269.31	5,476,244,503	1.35	0.22
PSWL5	268.08	5,472,556,756	1.80	0.28
PSWL6	266.85	5,468,869,009	2.25	0.35
PSWL7	265.62	5,465,199,009	2.70	0.42
PSWL3	264.39	5,461,630,600	3.15	0.48
BTSWL5	263.16	5,458,105,054	3.60	0.55
BTSWL6	261.93	5,454,579,508	4.05	0.61
BTSWL7	260.70	5,451,053,962	4.51	0.68
PSWL2	259.47	5,447,577,652	4.96	0.74
BTS	257.02	5,440,662,404	5.85	0.87
PPL7	254.57	5,433,846,275	6.75	0.99
PSWD	253.34	5,430,458,014	7.20	1.05
BTSWL3	252.11	5,427,157,677	7.65	1.11
PS	248.43	5,417,399,632	9.00	1.29
BTSWL2	247.20	5,414,234,781	9.45	1.35
BTSWD	245.97	5,411,205,182	9.90	1.40
BKS	244.74	5,408,202,647	10.35	1.46
PBKTP	242.29	5,402,252,954	11.25	1.57
BTBL7	241.06	5,399,284,945	11.70	1.62
BKPC	239.83	5,396,340,651	12.15	1.67
PGT1	236.15	5,387,591,457	13.50	1.83
PPC	231.24	5,376,066,746	15.30	2.04
PBL7	228.79	5,370,397,248	16.19	2.15

Tabel 4.37 Lanjutan

PKD	226.34	5,366,011,684	17.09	2.23
BTPL7	225.11	5,364,019,928	17.54	2.26
BTKD	223.88	5,362,516,154	17.99	2.29
BKBL7	222.65	5,361,252,731	18.44	2.31
BTPC	218.97	5,358,934,274	19.79	2.36
PPL	216.52	5,360,110,276	20.69	2.33
BKPL7	215.29	5,362,195,496	21.14	2.30

Tabel 4.38 Efisiensi waktu dan biaya untuk lembur 3 jam

KODE	Durasi (hari)	Biaya Total (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	273.00	5,488,191,102	0.00	0.00
BTKB	271.38	5,483,113,180	0.59	0.09
PKB	269.76	5,478,620,369	1.19	0.17
BKKB	268.14	5,474,397,081	1.78	0.25
PSWL5	266.52	5,470,530,787	2.37	0.32
PSWL6	264.90	5,466,664,494	2.97	0.39
PSWL7	263.28	5,462,834,336	3.56	0.46
PPL7	259.66	5,454,976,402	4.89	0.61
PSWL3	258.04	5,451,467,265	5.48	0.67
BTSWL5	256.42	5,448,000,973	6.07	0.73
BTSWL6	254.80	5,444,534,681	6.67	0.80
BTSWL7	253.18	5,441,068,388	7.26	0.86
PSWL2	251.56	5,437,726,062	7.85	0.92
BTS	248.33	5,431,065,874	9.04	1.04
PSWD	246.71	5,427,937,215	9.63	1.10
PBL7	243.48	5,421,873,131	10.81	1.21
BTSWL3	241.86	5,418,964,494	11.41	1.26
PS	237.01	5,410,521,810	13.18	1.42
BTSWL2	235.39	5,407,953,783	13.78	1.46
BTSWD	233.77	5,405,720,015	14.37	1.50
BKS	232.15	5,403,541,083	14.96	1.54
PBKTP	228.92	5,399,270,244	16.15	1.62
BTBL7	227.30	5,397,175,312	16.74	1.66
BKPC	225.68	5,395,147,201	17.33	1.70
PGT1	220.83	5,389,215,984	19.11	1.80
PPC	214.37	5,381,716,550	21.48	1.94
PKD	211.14	5,381,309,264	22.66	1.95
BTPL7	209.52	5,381,649,927	23.25	1.94
BTKD	207.90	5,383,203,379	23.85	1.91
BKBL7	206.28	5,385,348,035	24.44	1.87
BTPC	201.43	5,395,353,867	26.22	1.69
PPL	198.20	5,408,736,768	27.40	1.45
BKPL7	196.58	5,419,173,755	27.99	1.26

Penambahan Tenaga Kerja

Berdasarkan hasil perhitungan percepatan durasi maka akan dilakukan perhitungan ulang mengenai kebutuhan pekerja tanpa harus menambah waktu lembur per hari. Contoh perhitungan tenaga kerja dan biayanya pada kegiatan pembesian kolom *basement* adalah sebagai berikut.

1. Analisi Biaya Penambahan Tenaga Kerja

Volume = 1985,08 kg

Durasi = 7 hari

Tabel 4.39 Kebutuhan tenaga kerja pada kegiatan pembesian kolom *basement*

Tenaga Kerja	Satuan	Koefisien	Harga Satuan
Pekerja	OH	0,005	Rp.70.000,00
Tukang besi	OH	0,010	Rp.90.000,00
Kepala tukang	OH	0,003	Rp.100.000,00
Mandor	OH	0,001	Rp.120.000,00
Alat pembesian	ls	1,000	Rp.150,00

Perhitungan jumlah tenaga kerja dan upah tenaga kerja.

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

Upah tenaga kerja = jumlah tenaga kerja × harga upah

Durasi Normal

- Pekerja

  Jumlah tenaga kerja $= \frac{(0{,}005 \times 1985{,}08)}{7}$

  = 1,418 orang/hari

  Upah tenaga kerja = 1,418 × Rp.70.000,00

  = Rp.99.254,00

- Tukang besi

  Jumlah tenaga kerja $= \frac{(0{,}010 \times 1985{,}08)}{7}$

  = 2,836 orang/hari

  Upah tenaga kerja = 2,836 × Rp.90.000,00

  = Rp.255.224.57

- Kepala tukang

  Jumlah tenaga kerja $= \frac{(0{,}003 \times 1985{,}08)}{7}$

  = 0,851 orang/hari

  Upah tenaga kerja = 0,851 × Rp.100.000,00

  = Rp.85.074,86

- Mandor

  Jumlah tenaga kerja $= \frac{(0{,}001 \times 1985{,}08)}{7}$

  = 0,284 orang/hari

  Upah tenaga kerja = 0,284 × Rp.120.000,00

  = Rp.34.029,94

- Alat pembesian

  Jumlah tenaga kerja $= \frac{(1{,}000 \times 1985{,}08)}{7}$

  = 283,583 orang/hari

  Upah tenaga kerja = 283,583 × Rp.150,00

  = Rp.45.537,43

  Total upah tenaga kerja pada durasi normal = (Rp.99.254,00 + Rp.255.224,57 + Rp.85.074,86 + Rp.34.029,94 + Rp.45.537,43) × 7

  = Rp.3.612.845,60

  Durasi percepatan 6,29 hari

  - Pekerja

    Jumlah tenaga kerja $= \frac{(0{,}005 \times 1985{,}08)}{6{,}29}$

    = 1,578 orang/hari

Upah tenaga kerja = 1,578 × Rp.70.000,00
= Rp.110.460,00

- Tukang besi

Jumlah tenaga kerja $= \frac{(0{,}010 \times 1985{,}08)}{6{,}29}$
= 3,156 orang/hari
Upah tenaga kerja = 3,156 × Rp.90.000,00
= Rp.284.040,00

- Kepala tukang

Jumlah tenaga kerja $= \frac{(0{,}003 \times 1985{,}08)}{6{,}29}$
= 0,947 orang/hari
Upah tenaga kerja = 0,947 × Rp.100.000,00
= Rp.94.700,00

- Mandor

Jumlah tenaga kerja $= \frac{(0{,}001 \times 1985{,}08)}{6{,}29}$
= 0,316 orang/hari
Upah tenaga kerja = 0,316 × Rp.120.000,00
= Rp.37.920,00

- Alat pembesian

Jumlah tenaga kerja $= \frac{(1{,}000 \times 1985{,}08)}{6{,}29}$
= 315,594 orang/hari
Upah tenaga kerja = 315,594 × Rp.150,00
= Rp.47.339,00

Total upah tenaga kerja pada durasi percepatan 6,29 hari = (Rp.110.460,00+ Rp.284.040,00 + Rp.94.700,00+ Rp.37.920,00 + Rp.47.339,00) × 7
= Rp.3.613.348,00

Selisih biaya = Biaya percepatan – Biaya normal
= Rp.3.613.347,74 - Rp.3.612.845,60
= Rp.502,74

Pada tabel berikut merupakan hasil dari analisis biaya untuk penambahan tenaga kerja setiap waktu lemburnya.

Tabel 4.40 Durasi dan biaya penambahan tenaga kerja untuk lembur 1 jam

Kode	Durasi (hari)		Biaya (Rp)	
	Normal	Lembur 1 jam	Normal	Lembur 1 jam
PPL	14	12.58	61,622,262	61,636,981
PGT1	21	18.88	29,145,900	29,140,336
PBKTP	14	12.58	18,601,800	18,611,229
BTPC	21	18.88	248,195,794	248,199,368
PPC	28	25.17	227,709,826	227,704,566
BKPC	7	6.29	25,803,984	25,809,761
BTS	14	12.58	46,671,985	46,679,685
PS	21	18.88	131,705,622	131,710,226
BKS	7	6.29	24,848,027	24,848,495
BTKB	7	6.29	8,211,124	8,218,859
PKB	7	6.29	20,675,573	20,675,929
BKKB	7	6.29	6,637,693	6,636,212
BTKD	7	6.29	63,942,681	63,938,837
PKD	14	12.58	153,635,430	153,639,480
BTSWD	7	6.29	31,768,268	31,769,129
PSWD	7	6.29	38,070,682	38,069,485
BTSWL2	7	6.29	28,637,386	28,637,079
PSWL2	7	6.29	34,456,461	34,450,501
BTSWL3	7	6.29	25,471,592	25,476,851
PSWL3	7	6.29	31,518,604	31,527,788
BTSWL5	7	6.29	20,637,019	20,640,978
PSWL5	7	6.29	26,562,311	26,554,927
BTSWL6	7	6.29	20,637,019	20,640,978
PSWL6	7	6.29	26,562,311	26,554,927
BTSWL7	7	6.29	20,637,019	20,640,978
PSWL7	7	6.29	26,955,181	26,957,799
BTPL7	7	6.29	50,362,886	50,362,858
PPL7	14	12.58	68,981,977	68,982,524
BKPL7	7	6.29	58,787,834	58,785,741
BTBL7	7	6.29	30,855,154	30,863,782
PBL7	14	12.58	73,387,344	73,402,378
BKBL7	7	6.29	29,123,314	29,123,181

Tabel 4.41 Durasi dan biaya penambahan tenaga kerja untuk lembur 2 jam

Kode	Durasi (hari)		Biaya (Rp)	
	Normal	Lembur 2 jam	Normal	Lembur 2 jam
PPL	14	11.55	61,622,262	61,633,595
PGT1	21	17.32	29,145,900	29,140,034
PBKTP	14	11.55	18,601,800	18,609,360
BTPC	21	17.32	248,195,794	248,196,586
PPC	28	23.09	227,709,826	227,706,735
BKPC	7	5.77	25,803,984	25,809,762

Tabel 4.41 Lanjutan

BTS	14	11.55	46,671,985	46,679,765
PS	21	17.32	131,705,622	131,713,067
BKS	7	5.77	24,848,027	24,847,896
BTKB	7	5.77	8,211,124	8,218,383
PKB	7	5.77	20,675,573	20,677,286
BKKB	7	5.77	6,637,693	6,634,705
BTKD	7	5.77	63,942,681	63,937,109
PKD	14	11.55	153,635,430	153,636,117
BTSWD	7	5.77	31,768,268	31,768,308
PSWD	7	5.77	38,070,682	38,070,146
BTSWL2	7	5.77	28,637,386	28,636,801
PSWL2	7	5.77	34,456,461	34,450,593
BTSWL3	7	5.77	25,471,592	25,477,830
PSWL3	7	5.77	31,518,604	31,527,849
BTSWL5	7	5.77	20,637,019	20,639,537
PSWL5	7	5.77	26,562,311	26,554,517
BTSWL6	7	5.77	20,637,019	20,639,537
PSWL6	7	5.77	26,562,311	26,554,517
BTSWL7	7	5.77	20,637,019	20,639,537
PSWL7	7	5.77	26,955,181	26,958,353
BTPL7	7	5.77	50,362,886	50,361,894
PPL7	14	11.55	68,981,977	68,979,754
BKPL7	7	5.77	58,787,834	58,786,010
BTBL7	7	5.77	30,855,154	30,865,169
PBL7	14	11.55	73,387,344	73,400,796
BKBL7	7	5.77	29,123,314	29,123,500

Tabel 4.42 Durasi dan biaya penambahan tenaga kerja untuk lembur 3 jam

Kode	Durasi (hari)		Biaya (Rp)	
	Normal	Lembur 3 jam	Normal	Lembur 3 jam
PPL	14	10.77	61,622,262	61,635,353
PGT1	21	16.15	29,145,900	29,140,737
PBKTP	14	10.77	18,601,800	18,610,129
BTPC	21	16.15	248,195,794	248,198,416
PPC	28	21.54	227,709,826	227,703,585
BKPC	7	5.38	25,803,984	25,809,765
BTS	14	10.77	46,671,985	46,681,649
PS	21	16.15	131,705,622	131,714,154
BKS	7	5.38	24,848,027	24,848,188
BTKB	7	5.38	8,211,124	8,218,076
PKB	7	5.38	20,675,573	20,675,661
BKKB	7	5.38	6,637,693	6,634,413
BTKD	7	5.38	63,942,681	63,937,728
PKD	14	10.77	153,635,430	153,636,571
BTSWD	7	5.38	31,768,268	31,767,958
PSWD	7	5.38	38,070,682	38,069,418
BTSWL2	7	5.38	28,637,386	28,636,712
PSWL2	7	5.38	34,456,461	34,450,827
BTSWL3	7	5.38	25,471,592	25,476,899

Tabel 4.42 Lanjutan

PSWL3	7	5.38	31,518,604	31,528,347
BTSWL5	7	5.38	20,637,019	20,640,365
PSWL5	7	5.38	26,562,311	26,554,314
BTSWL6	7	5.38	20,637,019	20,640,365
PSWL6	7	5.38	26,562,311	26,554,314
BTSWL7	7	5.38	20,637,019	20,640,365
PSWL7	7	5.38	26,955,181	26,957,052
BTPL7	7	5.38	50,362,886	50,362,376
PPL7	14	10.38	68,981,977	68,981,594
BKPL7	7	5.38	58,787,834	58,784,809
BTBL7	7	5.38	30,855,154	30,863,501
PBL7	14	10.77	73,387,344	73,398,881
BKBL7	7	5.38	29,123,314	29,123,290

2. Analisis *Cost Variance, Duration Variance* dan *Cost Slope*

Cost Variance

Cost variance merupakan selisih antara biaya setelah percepatan dan biaya normal suatu kegiatan proyek. Untuk menentukan nilai *cost variance* dapat lakukan perhitungan sebagai berikut.

Kegiatan = Pembesian kolom *basement*

Biaya normal = Rp.20.675.573,00

Biaya Percepatan

1 jam = Rp.20.675.929,00

2 jam = Rp.20.677.286,00

3 jam = Rp.20.675.661,00

Selisih biaya (*Cost variance*)

1 jam = Rp.20.675.573,00 - Rp.20.675.573,00

= Rp.356,00

2 jam = Rp.20.677.286,00 - Rp.20.675.573,00

= Rp.1.713,00

3 jam = Rp.20.675.661,00 - 20.675.573,00

= Rp.88,00

Duration Variance

Duration variance adalah selisih antara durasi normal dan durasi percepatan.

Kegiatan = Pembesian kolom *basement*

Durasi normal = 7 hari

- Lembur 1 jam = 7 – 6,29 = 0,71
- Lembur 2 jam = 7 – 5,77 = 1,23
- Lmebur 3 jam = 7 – 5,38 = 1,62

Cost Slope

Cost slope merupakan perbandingan antara selisih biaya percepatan dengan biaya normal dan selisih durasi normal dengan durasi percepatan. Setelah mendapat hasil dari percepatan durasi dan selisih biaya, selanjutnya adalah menghitung *cost slope* untuk kegiatan-kegiatan kritis setelah penambahan jam lembur 1 sampai 3 jam. Untuk mendapatkan *cost slope* lakukan perhitungan seperti berikut.

Contoh kegiatan : Pekerjaan pembesian kolom *basement*

Lembur 1 jam

$$Slope = \frac{\text{biaya percepatan} - \text{biaya normal}}{\text{durasi normal} - \text{durasi percepatan}}$$

$$Slope = \frac{\text{Rp.20.675.929,00} - \text{Rp.20.675.573,00}}{7 - 6.29}$$

= Rp.502,00

Lembur 2 jam

$$Slope = \frac{\text{biaya percepatan} - \text{biaya normal}}{\text{durasi normal} - \text{durasi percepatan}}$$

$$Slope = \frac{\text{Rp.20.677.286,00} - \text{Rp.20.675.573,00}}{7 - 5,77}$$

= Rp.1.393,00

Lembur 1 jam

$$Slope = \frac{\text{biaya percepatan} - \text{biaya normal}}{\text{durasi normal} - \text{durasi percepatan}}$$

$$Slope = \frac{\text{Rp.20.675.661,00} - \text{Rp.20.675.573,00}}{7 - 5{,}38}$$

$$= \text{Rp.54,00}$$

Hasil perhitungan *cost variance*, *duration variance* dan *cost slope* pekerjaan pembesian kolom *basement* didapat dengan perhitungan menggunakan *microsoft project*. Pada tabel berikut merupakan hasil lengkap *cost variance*.

Tabel 4.43 *Cost variance*, *duration variance* dan *cost slope* lembur 1 jam

Kode	*Duration Variance (hari)*	*Cost Variance (Rp)*	*Cost Slope (Rp)*
PPL	1.42	14,719	10,365
PGT1	2.12	-5,564	-2,625
PBKTP	1.42	9,429	6,640
BTPC	2.12	3,574	1,686
PPC	2.83	-5,260	-1,859
BKPC	0.71	5,777	8,137
BTS	1.42	7,700	5,423
PS	2.12	4,604	2,172
BKS	0.71	468	659
BTKB	0.71	7,735	10,895
PKB	0.71	356	502
BKKB	0.71	-1,481	-2,086
BTKD	0.71	-3,844	-5,414
PKD	1.42	4,050	2,852
BTSWD	0.71	861	1,212
PSWD	0.71	-1,197	-1,686
BTSWL2	0.71	-307	-432
PSWL2	0.71	-5,960	-8,394
BTSWL3	0.71	5,259	7,406
PSWL3	0.71	9,184	12,935
BTSWL5	0.71	3,959	5,576
PSWL5	0.71	-7,384	-10,400
BTSWL6	0.71	3,959	5,576
PSWL6	0.71	-7,384	-10,400
BTSWL7	0.71	3,959	5,576
PSWL7	0.71	2,618	3,687
BTPL7	0.71	-28	-40
PPL7	1.42	547	385

Tabel 4.43 Lanjutan

BKPL7	0.71	-2,093	-2,948
BTBL7	0.71	8,628	12,153
PBL7	1.42	15,034	10,588
BKBL7	0.71	-133	-187

Tabel 4.44 *Cost variance, duration variance* dan *cost slope* lembur 2 jam

Kode	*Duration Variance (hari)*	*Cost Variance (Rp)*	*Cost Slope (Rp)*
PPL	2.45	11,333	4,626
PGT1	3.68	-5,866	-1,594
PBKTP	2.45	7,560	3,086
BTPC	3.68	792	215
PPC	4.91	-3,091	-630
BKPC	1.23	5,778	4,697
BTS	2.45	7,780	3,176
PS	3.68	7,445	2,023
BKS	1.23	-131	-107
BTKB	1.23	7,259	5,901
PKB	1.23	1,713	1,393
BKKB	1.23	-2,988	-2,429
BTKD	1.23	-5,572	-4,530
PKD	2.45	687	281
BTSWD	1.23	40	32
PSWD	1.23	-536	-436
BTSWL2	1.23	-585	-475
PSWL2	1.23	-5,868	-4,771
BTSWL3	1.23	6,238	5,071
PSWL3	1.23	9,245	7,516
BTSWL5	1.23	2,518	2,047
PSWL5	1.23	-7,794	-6,337
BTSWL6	1.23	2,518	2,047
PSWL6	1.23	-7,794	-6,337
BTSWL7	1.23	2,518	2,047
PSWL7	1.23	3,172	2,579
BTPL7	1.23	-992	-807
PPL7	2.45	-2,223	-907
BKPL7	1.23	-1,824	-1,483
BTBL7	1.23	10,015	8,142
PBL7	2.45	13,452	5,491
BKBL7	1.23	186	151

Tabel 4.45 *Cost variance, duration variance* dan *cost slope* lembur 3 jam

Kode	*Duration Variance (hari)*	*Cost Variance (Rp)*	*Cost Slope (Rp)*
PPL	3.23	13,091	4,053
PGT1	4.85	-5,163	-1,065
PBKTP	3.23	8,329	2,579
BTPC	4.85	2,622	541
PPC	6.46	-6,241	-966
BKPC	1.62	5,781	3,569
BTS	3.23	9,664	2,992
PS	4.85	8,532	1,759
BKS	1.62	161	100
BTKB	1.62	6,952	4,292
PKB	1.62	88	54
BKKB	1.62	-3,280	-2,025
BTKD	1.62	-4,953	-3,058
PKD	3.23	1,141	353
BTSWD	1.62	-310	-191
PSWD	1.62	-1,264	-780
BTSWL2	1.62	-674	-416
PSWL2	1.62	-5,634	-3,478
BTSWL3	1.62	5,307	3,276
PSWL3	1.62	9,743	6,014
BTSWL5	1.62	3,346	2,066
PSWL5	1.62	-7,997	-4,936
BTSWL6	1.62	3,346	2,066
PSWL6	1.62	-7,997	-4,936
BTSWL7	1.62	3,346	2,066
PSWL7	1.62	1,871	1,155
BTPL7	1.62	-510	-315
PPL7	3.62	-383	-106
BKPL7	1.62	-3,025	-1,867
BTBL7	1.62	8,347	5,152
PBL7	3.23	11,537	3,572
BKBL7	1.62	-24	-15

Dari hasil *cost slope* kegiatan-kegaitan kritis tersebut, selanjutnya adalah mengurutkan *cost slope* dari terkecil ke terbesar untuk mngetahui efisiensi dari masing-masing pekerjaan yang dipercepat.

Tabel 4.46 *Cost slope* dari terkecil ke terbesar untuk lembur 1 jam

Kode	Durasi (hari)			Biaya (Rp)		*Cost Slope*
	Normal	Percepatan	Selisih	Normal	Percepatan	*(Rp)*
PSWL5	6.29	7	0.71	26,562,311	26,554,927	-10,400
PSWL6	6.29	7	0.71	26,562,311	26,554,927	-10,400
PSWL2	6.29	7	0.71	34,456,461	34,450,501	-8,394
BTKD	6.29	7	0.71	63,942,681	63,938,837	-5,414
BKKB	6.29	7	0.71	58,787,834	58,785,741	-2,948
PGT1	18.88	21	2.12	29,145,900	29,140,336	-2,625
BKPL7	6.29	7	0.71	6,637,693	6,636,212	-2,086
PPL7	25.17	28	2.83	227,709,826	227,704,566	-1,859
BTPL7	6.29	7	0.71	38,070,682	38,069,485	-1,686
PPC	6.29	7	0.71	28,637,386	28,637,079	-432
BTSWL2	6.29	7	0.71	29,123,314	29,123,181	-187
PSWD	6.29	7	0.71	50,362,886	50,362,858	-40
BKS	12.58	14	1.42	68,981,977	68,982,524	385
BTSWD	6.29	7	0.71	20,675,573	20,675,929	502
BKBL7	6.29	7	0.71	24,848,027	24,848,495	659
BTPC	6.29	7	0.71	31,768,268	31,769,129	1,212
PKD	18.88	21	2.12	248,195,794	248,199,368	1,686
PKB	18.88	21	2.12	131,705,622	131,710,226	2,172
PS	12.58	14	1.42	153,635,430	153,639,480	2,852
BTSWL5	6.29	7	0.71	26,955,181	26,957,799	3,687
BTSWL6	12.58	14	1.42	46,671,985	46,679,685	5,423
BTSWL7	6.29	7	0.71	20,637,019	20,640,978	5,576
PSWL7	6.29	7	0.71	20,637,019	20,640,978	5,576
PBKTP	6.29	7	0.71	20,637,019	20,640,978	5,576
BTS	12.58	14	1.42	18,601,800	18,611,229	6,640
PPL	6.29	7	0.71	25,471,592	25,476,851	7,406
BKPC	6.29	7	0.71	25,803,984	25,809,761	8,137
BTSWL3	12.58	14	1.42	61,622,262	61,636,981	10,365
PBL7	12.58	14	1.42	73,387,344	73,402,378	10,588
BTKB	6.29	7	0.71	8,211,124	8,218,859	10,895
PSWL3	6.29	7	0.71	30,855,154	30,863,782	12,153
BTBL7	6.29	7	0.71	31,518,604	31,527,788	12,935

Tabel 4.47 *Cost slope* dari terkecil ke terbesar untuk lembur 2 jam

Kode	Durasi (hari)			Biaya (Rp)		*Cost Slope*
	Normal	Percepatan	Selisih	Normal	Percepatan	*(Rp)*
PSWL5	5.77	7	1.23	26,562,311	26,554,517	-6,337
PSWL6	5.77	7	1.23	26,562,311	26,554,517	-6,337
PSWL2	5.77	7	1.23	34,456,461	34,450,593	-4,771
BTKD	5.77	7	1.23	63,942,681	63,937,109	-4,530
BKKB	5.77	7	1.23	6,637,693	6,634,705	-2,429
PGT1	17.32	21	3.68	29,145,900	29,140,034	-1,594
BKPL7	5.77	7	1.23	58,787,834	58,786,010	-1,483
PPL7	11.55	14	2.45	68,981,977	68,979,754	-907
BTPL7	5.77	7	1.23	50,362,886	50,361,894	-807
PPC	23.09	28	4.91	227,709,826	227,706,735	-630

Tabel 4.47 Lanjutan

BTSWL2	5.77	7	1.23	28,637,386	28,636,801	-475
PSWD	5.77	7	1.23	38,070,682	38,070,146	-436
BKS	5.77	7	1.23	24,848,027	24,847,896	-107
BTSWD	5.77	7	1.23	31,768,268	31,768,308	32
BKBL7	5.77	7	1.23	29,123,314	29,123,500	151
BTPC	17.32	21	3.68	248,195,794	248,196,586	215
PKD	11.55	14	2.45	153,635,430	153,636,117	281
PKB	5.77	7	1.23	20,675,573	20,677,286	1,393
PS	17.32	21	3.68	131,705,622	131,713,067	2,023
BTSWL5	5.77	7	1.23	20,637,019	20,639,537	2,047
BTSWL6	5.77	7	1.23	20,637,019	20,639,537	2,047
BTSWL7	5.77	7	1.23	20,637,019	20,639,537	2,047
PSWL7	5.77	7	1.23	26,955,181	26,958,353	2,579
PBKTP	11.55	14	2.45	18,601,800	18,609,360	3,086
BTS	11.55	14	2.45	46,671,985	46,679,765	3,176
PPL	11.55	14	2.45	61,622,262	61,633,595	4,626
BKPC	5.77	7	1.23	25,803,984	25,809,762	4,697
BTSWL3	5.77	7	1.23	25,471,592	25,477,830	5,071
PBL7	11.55	14	2.45	73,387,344	73,400,796	5,491
BTKB	5.77	7	1.23	8,211,124	8,218,383	5,901
PSWL3	5.77	7	1.23	31,518,604	31,527,849	7,516
BTBL7	5.77	7	1.23	30,855,154	30,865,169	8,142

Tabel 4.48 *Cost slope* dari terkecil ke terbesar untuk lembur 3 jam

Kode	Durasi (hari)			Biaya (Rp)		*Cost Slope*
	Normal	Percepatan	Selisih	Normal	Percepatan	*(Rp)*
PSWL5	5.38	7	1.62	26,562,311	26,554,314	-4,936
PSWL6	5.38	7	1.62	26,562,311	26,554,314	-4,936
PSWL2	5.38	7	1.62	34,456,461	34,450,827	-3,478
BTKD	5.38	7	1.62	63,942,681	63,937,728	-3,058
BKKB	5.38	7	1.62	6,637,693	6,634,413	-2,025
PGT1	5.38	7	1.62	58,787,834	58,784,809	-1,867
BKPL7	16.15	21	4.85	29,145,900	29,140,737	-1,065
PPL7	21.54	28	6.46	227,709,826	227,703,585	-966
BTPL7	5.38	7	1.62	38,070,682	38,069,418	-780
PPC	5.38	7	1.62	28,637,386	28,636,712	-416
BTSWL2	5.38	7	1.62	50,362,886	50,362,376	-315
PSWD	5.38	7	1.62	31,768,268	31,767,958	-191
BKS	10.38	14	3.62	68,981,977	68,981,594	-106
BTSWD	5.38	7	1.62	29,123,314	29,123,290	-15
BKBL7	5.38	7	1.62	20,675,573	20,675,661	54
BTPC	5.38	7	1.62	24,848,027	24,848,188	100
PKD	10.77	14	3.23	153,635,430	153,636,571	353
PKB	16.15	21	4.85	248,195,794	248,198,416	541
PS	5.38	7	1.62	26,955,181	26,957,052	1,155
BTSWL5	16.15	21	4.85	131,705,622	131,714,154	1,759
BTSWL6	5.38	7	1.62	20,637,019	20,640,365	2,066
BTSWL7	5.38	7	1.62	20,637,019	20,640,365	2,066
PSWL7	5.38	7	1.62	20,637,019	20,640,365	2,066

Tabel 4.48 Lanjutan

PBKTP	10.77	14	3.23	18,601,800	18,610,129	2,579
BTS	10.77	14	3.23	46,671,985	46,681,649	2,992
PPL	5.38	7	1.62	25,471,592	25,476,899	3,276
BKPC	5.38	7	1.62	25,803,984	25,809,765	3,569
BTSWL3	10.77	14	3.23	73,387,344	73,398,881	3,572
PBL7	10.77	14	3.23	61,622,262	61,635,353	4,053
BTKB	5.38	7	1.62	8,211,124	8,218,076	4,292
PSWL3	5.38	7	1.62	30,855,154	30,863,501	5,152
BTBL7	5.38	7	1.62	31,518,604	31,528,347	6,014

Berikut urutan nilai *cost variance* dari terkecil ke terbesar.

Tabel 4.49 *Cost variance* dari terkecil ke terbesar untuk lembur 1 jam

Kode	Durasi (hari)			Biaya (Rp)		*Cost Variance (Rp)*
	Normal	Percepatan	Selisih	Normal	Percepatan	
PSWL5	6.29	7	0.71	26,562,311	26,554,927	-7,384
PSWL6	6.29	7	0.71	26,562,311	26,554,927	-7,384
PSWL2	6.29	7	0.71	34,456,461	34,450,501	-5,960
PGT1	18.88	21	2.12	29,145,900	29,140,336	-5,564
PPC	25.17	28	2.83	227,709,826	227,704,566	-5,260
BTKD	6.29	7	0.71	63,942,681	63,938,837	-3,844
BKPL7	6.29	7	0.71	58,787,834	58,785,741	-2,093
BKKB	6.29	7	0.71	6,637,693	6,636,212	-1,481
PSWD	6.29	7	0.71	38,070,682	38,069,485	-1,197
BTSWL2	6.29	7	0.71	28,637,386	28,637,079	-307
BKBL7	6.29	7	0.71	29,123,314	29,123,181	-133
BTPL7	6.29	7	0.71	50,362,886	50,362,858	-28
PKB	6.29	7	0.71	20,675,573	20,675,929	356
BKS	6.29	7	0.71	24,848,027	24,848,495	468
PPL7	12.58	14	1.42	68,981,977	68,982,524	547
BTSWD	6.29	7	0.71	31,768,268	31,769,129	861
PSWL7	6.29	7	0.71	26,955,181	26,957,799	2,618
BTPC	18.88	21	2.12	248,195,794	248,199,368	3,574
BTSWL5	6.29	7	0.71	20,637,019	20,640,978	3,959
BTSWL6	6.29	7	0.71	20,637,019	20,640,978	3,959
BTSWL7	6.29	7	0.71	20,637,019	20,640,978	3,959
PKD	12.58	14	1.42	153,635,430	153,639,480	4,050
PS	18.88	21	2.12	131,705,622	131,710,226	4,604
BTSWL3	6.29	7	0.71	25,471,592	25,476,851	5,259
BKPC	6.29	7	0.71	25,803,984	25,809,761	5,777
BTS	12.58	14	1.42	46,671,985	46,679,685	7,700
BTKB	6.29	7	0.71	8,211,124	8,218,859	7,735
BTBL7	6.29	7	0.71	30,855,154	30,863,782	8,628
PSWL3	6.29	7	0.71	31,518,604	31,527,788	9,184
PBKTP	12.58	14	1.42	18,601,800	18,611,229	9,429
PPL	12.58	14	1.42	61,622,262	61,636,981	14,719
PBL7	12.58	14	1.42	73,387,344	73,402,378	15,034

Tabel 4.50 *Cost variance* dari terkecil ke terbesar untuk lembur 2 jam

Kode	Durasi (hari)			Biaya (Rp)		*Cost Variance (Rp)*
	Normal	Percepatan	Selisih	Normal	Percepatan	
PSWL5	5.77	7	1.23	26,562,311	26,554,517	-7,794
PSWL6	5.77	7	1.23	26,562,311	26,554,517	-7,794
PSWL2	5.77	7	1.23	34,456,461	34,450,593	-5,868
PGT1	17.32	21	3.68	29,145,900	29,140,034	-5,866
BTKD	5.77	7	1.23	63,942,681	63,937,109	-5,572
PPC	23.09	28	4.91	227,709,826	227,706,735	-3,091
BKKB	5.77	7	1.23	6,637,693	6,634,705	-2,988
PPL7	11.55	14	2.45	68,981,977	68,979,754	-2,223
BKPL7	5.77	7	1.23	58,787,834	58,786,010	-1,824
BTPL7	5.77	7	1.23	50,362,886	50,361,894	-992
BTSWL2	5.77	7	1.23	28,637,386	28,636,801	-585
PSWD	5.77	7	1.23	38,070,682	38,070,146	-536
BKS	5.77	7	1.23	24,848,027	24,847,896	-131
BTSWD	5.77	7	1.23	31,768,268	31,768,308	40
BKBL7	5.77	7	1.23	29,123,314	29,123,500	186
PKD	11.55	14	2.45	153,635,430	153,636,117	687
BTPC	17.32	21	3.68	248,195,794	248,196,586	792
PKB	5.77	7	1.23	20,675,573	20,677,286	1,713
BTSWL5	5.77	7	1.23	20,637,019	20,639,537	2,518
BTSWL6	5.77	7	1.23	20,637,019	20,639,537	2,518
BTSWL7	5.77	7	1.23	20,637,019	20,639,537	2,518
PSWL7	5.77	7	1.23	26,955,181	26,958,353	3,172
BKPC	5.77	7	1.23	25,803,984	25,809,762	5,778
BTSWL3	5.77	7	1.23	25,471,592	25,477,830	6,238
BTKB	5.77	7	1.23	8,211,124	8,218,383	7,259
PS	17.32	21	3.68	131,705,622	131,713,067	7,445
PBKTP	11.55	14	2.45	18,601,800	18,609,360	7,560
BTS	11.55	14	2.45	46,671,985	46,679,765	7,780
PSWL3	5.77	7	1.23	31,518,604	31,527,849	9,245
BTBL7	5.77	7	1.23	30,855,154	30,865,169	10,015
PPL	11.55	14	2.45	61,622,262	61,633,595	11,333
PBL7	11.55	14	2.45	73,387,344	73,400,796	13,452

Tabel 4.51 *Cost variance* dari terkecil ke terbesar untuk lembur 3 jam

Kode	Durasi (hari)			Biaya (Rp)		*Cost Variance (Rp)*
	Normal	Percepatan	Selisih	Normal	Percepatan	
PSWL5	5.38	7	1.62	26,562,311	26,554,314	-7,997
PSWL6	5.38	7	1.62	26,562,311	26,554,314	-7,997
PPC	21.54	28	6.46	227,709,826	227,703,585	-6,241
PSWL2	5.38	7	1.62	34,456,461	34,450,827	-5,634
PGT1	16.15	21	4.85	29,145,900	29,140,737	-5,163
BTKD	5.38	7	1.62	63,942,681	63,937,728	-4,953

Tabel 4.51 Lanjutan

BKKB	5.38	7	1.62	6,637,693	6,634,413	-3,280
BKPL7	5.38	7	1.62	58,787,834	58,784,809	-3,025
PSWD	5.38	7	1.62	38,070,682	38,069,418	-1,264
BTSWL2	5.38	7	1.62	28,637,386	28,636,712	-674
BTPL7	5.38	7	1.62	50,362,886	50,362,376	-510
PPL7	10.38	14	3.62	68,981,977	68,981,594	-383
BTSWD	5.38	7	1.62	31,768,268	31,767,958	-310
BKBL7	5.38	7	1.62	29,123,314	29,123,290	-24
PKB	5.38	7	1.62	20,675,573	20,675,661	88
BKS	5.38	7	1.62	24,848,027	24,848,188	161
PKD	10.77	14	3.23	153,635,430	153,636,571	1,141
PSWL7	5.38	7	1.62	26,955,181	26,957,052	1,871
BTPC	16.15	21	4.85	248,195,794	248,198,416	2,622
BTSWL5	5.38	7	1.62	20,637,019	20,640,365	3,346
BTSWL6	5.38	7	1.62	20,637,019	20,640,365	3,346
BTSWL7	5.38	7	1.62	20,637,019	20,640,365	3,346
BTSWL3	5.38	7	1.62	25,471,592	25,476,899	5,307
BKPC	5.38	7	1.62	25,803,984	25,809,765	5,781
BTKB	5.38	7	1.62	8,211,124	8,218,076	6,952
PBKTP	10.77	14	3.23	18,601,800	18,610,129	8,329
BTBL7	5.38	7	1.62	30,855,154	30,863,501	8,347
PS	16.15	21	4.85	131,705,622	131,714,154	8,532
BTS	10.77	14	3.23	46,671,985	46,681,649	9,664
PSWL3	5.38	7	1.62	31,518,604	31,528,347	9,743
PBL7	10.77	14	3.23	73,387,344	73,398,881	11,537
PPL	10.77	14	3.23	61,622,262	61,635,353	13,091

Biaya Langsung dan Tidak Langsung

Dari sisi biaya, dalam proyek terdiri dari dua jenis biaya yaitu biaya langsung dan tidak langsung. Biaya langsung merupakan biaya yang digunakan untuk segala hal yang akan menjadi hasil akhir proyek secara permanen. Sedangkan biaya tidak langsung merupakan biaya yang tidak akan menjadi wujud permanen akan tetapi ada selama proyek berlangsung. Untuk mengetahui biaya tidak langsung yaitu menggunakan hasil dari pemodelan biaya dengan model regresi non linier menggunakan algoritma genematika, persamaannya adalah sebagai berikut.

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

dengan :

x_1 = nilai proyek

x_2 = durasi pelaksanaan proyek

$y = -0,95-(4,888(\ln(Rp.5.488.191.102 – 0,21) – \ln(273)) + \varepsilon$

$y = 0,1833 = 18,3\%$

Secara detail proyek pembangunan hotel dengan nilai proyek sebesar Rp. 5.488.191.102 diperoleh persentase biaya tidak langsung sebesar 18,3% dan berikut adalah hitungan dari biaya langsung dan biaya tidak langsung.

Biaya tidak langsung = 18,3% x Rp.5.488.191.102
= Rp.1.006.397.167,21

Biaya tidak langsung/hari = biaya tidak langsung/durasi normal proyek
= Rp.1.006.397.167,21/273 hari
= Rp.3.686.436,51/hari

Biaya langsung = biaya total proyek - biaya tidak langsung
= Rp.5.448.191.102 - Rp.1.006.397.167,21
= Rp.4.481.793.934,79

Pada tabel 4.50 – tabel 4.52 merupakan hasil dari perhitungan biaya tidak langsung dan biaya langsung terhadap percepatan proyek untuk lembur 1 – 3 jam.

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

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	273.00	1,006,397,167	4,481,793,935
PSWL5	272.29	1,003,779,797	4,481,786,551
PSWL6	271.58	1,001,162,427	4,481,779,167
PSWL2	270.87	998,545,057	4,481,773,208
BTKD	270.16	995,927,688	4,481,769,364
BKPL7	269.45	993,310,318	4,481,767,270
PGT1	267.33	985,495,072	4,481,761,706
BKKB	266.62	982,877,702	4,481,760,225
PPC	263.79	972,445,087	4,481,754,965
PSWD	263.08	969,827,717	4,481,753,768
BTSWL2	262.37	967,210,347	4,481,753,462
BKBL7	261.66	964,592,977	4,481,753,329
BTPL7	260.95	961,975,607	4,481,753,301
PPL7	259.53	956,740,867	4,481,753,847
PKB	258.82	954,123,497	4,481,754,204
BKS	258.11	951,506,128	4,481,754,671

Tabel 4.52 Lanjutan

BTSWD	257.40	948,888,758	4,481,755,532
BTPC	255.28	941,073,512	4,481,759,106
PS	253.16	933,258,267	4,481,763,710
PKD	251.74	928,023,527	4,481,767,760
PSWL7	251.03	925,406,157	4,481,770,378
BTS	249.61	920,171,417	4,481,778,078
BTSWL5	248.90	917,554,047	4,481,782,037
BTSWL6	248.19	914,936,677	4,481,785,996
BTSWL7	247.48	912,319,307	4,481,789,955
PBKTP	246.06	907,084,568	4,481,799,384
BTSWL3	245.35	904,467,198	4,481,804,643
BKPC	244.64	901,849,828	4,481,810,421
PPL	243.22	896,615,088	4,481,825,139
PBL7	241.80	891,380,348	4,481,840,174
BTKB	241.09	888,762,978	4,481,847,909
BTBL7	240.38	886,145,608	4,481,856,537
PSWL3	239.67	883,528,238	4,481,865,721

Tabel 4.53 Biaya tidak langsung dan tidak langsung untuk lembur 2 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	273.00	1,006,397,167	4,481,793,935
PSWL5	271.77	1,001,862,850	4,481,786,140
PSWL6	270.54	997,328,533	4,481,778,346
PSWL2	269.31	992,794,216	4,481,772,478
BTKD	268.08	988,259,900	4,481,766,905
BKKB	266.85	983,725,583	4,481,763,918
PGT1	263.17	970,159,496	4,481,758,052
BKPL7	261.94	965,625,179	4,481,756,228
PPL7	259.49	956,593,410	4,481,754,005
BTPL7	258.26	952,059,093	4,481,753,013
PPC	253.35	933,958,690	4,481,749,922
BTSWL2	252.12	929,424,373	4,481,749,337
PSWD	250.89	924,890,056	4,481,748,801
BKS	249.66	920,355,739	4,481,748,669
BTSWD	248.43	915,821,422	4,481,748,709
BKBL7	247.20	911,287,105	4,481,748,895
BTPC	243.52	897,721,019	4,481,749,687
PKD	241.07	888,689,249	4,481,750,374
PKB	239.84	884,154,933	4,481,752,087
PS	236.16	870,588,846	4,481,759,532
BTSWL5	234.93	866,054,529	4,481,762,050
BTSWL6	233.70	861,520,212	4,481,764,568
BTSWL7	232.47	856,985,895	4,481,767,086

Tabel 4.53 Lanjutan

PSWL7	231.24	852,451,579	4,481,770,259
PBKTP	228.79	843,419,809	4,481,777,819
BTS	226.34	834,388,040	4,481,785,599
PPL	223.89	825,356,270	4,481,796,932
BKPC	222.66	820,821,953	4,481,802,710
BTSWL3	221.43	816,287,636	4,481,808,948
PBL7	218.98	807,255,867	4,481,822,400
BTKB	217.75	802,721,550	4,481,829,658
PSWL3	216.52	798,187,233	4,481,838,903
BTBL7	215.29	793,652,916	4,481,848,918

Tabel 4.54 Biaya tidak langsung dan tidak langsung untuk lembur 3 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)	Biaya Langsung (Rp)
	273.00	1,006,397,167	4,481,793,935
PSWL5	271.38	1,000,425,140	4,481,785,938
PSWL6	269.76	994,453,113	4,481,777,941
PSWL2	268.14	988,481,086	4,481,772,307
BTKD	266.52	982,509,059	4,481,767,354
BKKB	264.90	976,537,031	4,481,764,074
BKPL7	263.28	970,565,004	4,481,761,049
PGT1	258.43	952,685,787	4,481,755,886
PPC	251.97	928,871,407	4,481,749,645
PSWD	250.35	922,899,380	4,481,748,381
BTSWL2	248.73	916,927,353	4,481,747,707
BTPL7	247.11	910,955,326	4,481,747,198
BTSWD	245.49	904,983,299	4,481,746,888
PPL7	241.87	891,638,399	4,481,746,505
BKBL7	240.25	885,666,372	4,481,746,482
PKB	238.63	879,694,344	4,481,746,569
BKS	237.01	873,722,317	4,481,746,731
PKD	233.78	861,815,127	4,481,747,872
BTPC	228.93	843,935,910	4,481,750,494
PSWL7	227.31	837,963,883	4,481,752,366
PS	222.46	820,084,666	4,481,760,898
BTSWL5	220.84	814,112,639	4,481,764,244
BTSWL6	219.22	808,140,612	4,481,767,590
BTSWL7	217.60	802,168,585	4,481,770,937
PBKTP	214.37	790,261,395	4,481,779,266
BTS	211.14	778,354,205	4,481,788,930
BTSWL3	209.52	772,382,178	4,481,794,236
BKPC	207.90	766,410,150	4,481,800,018
PBL7	204.67	754,502,960	4,481,811,554
PPL	201.44	742,595,771	4,481,824,645

Tabel 4.54 Lanjutan

BTKB	199.82	736,623,743	4,481,831,598
BTBL7	198.20	730,651,716	4,481,839,944
PSWL3	196.58	724,679,689	4,481,849,687

Untuk mendapatkan nilai biaya tidak langsung dan biaya langsung pada setiap waktu percepatan menggunakan persamaan sebagai berikut.

Kegiatan : Pembesian kolom *basement*

Biaya tidak langsung

Lembur 1 jam = (Rp.956.740.867,00 × 258,82) / 259,53

= Rp.954.123.497,00

Lembur 2 jam = (Rp.888.689.249,00 × 239,84) / 2241,07

= Rp.884.154.933,00

Lembur 3 jam = (Rp.885.666.372,00 × 238,63) / 240,25

= Rp.879.694.344,00

Biaya langsung

Biaya langsung lembur = biaya langsung sebelumnya + *cost variance*

Lembur 1 jam = Rp.4.481.753.847,00 + Rp.356,00

= Rp.4.481.754.204,00

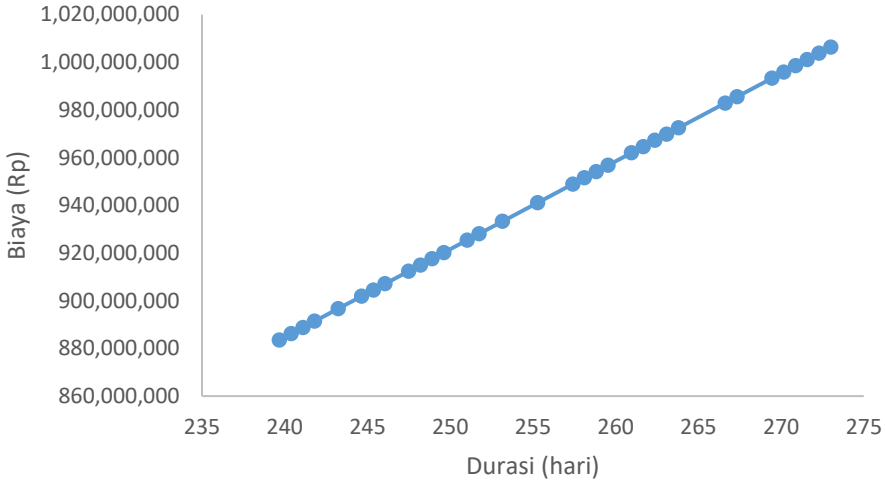
Lembur 2 jam = Rp.4.481.750.374,00 + Rp.1.713,00

= Rp.4.481.752.087,00

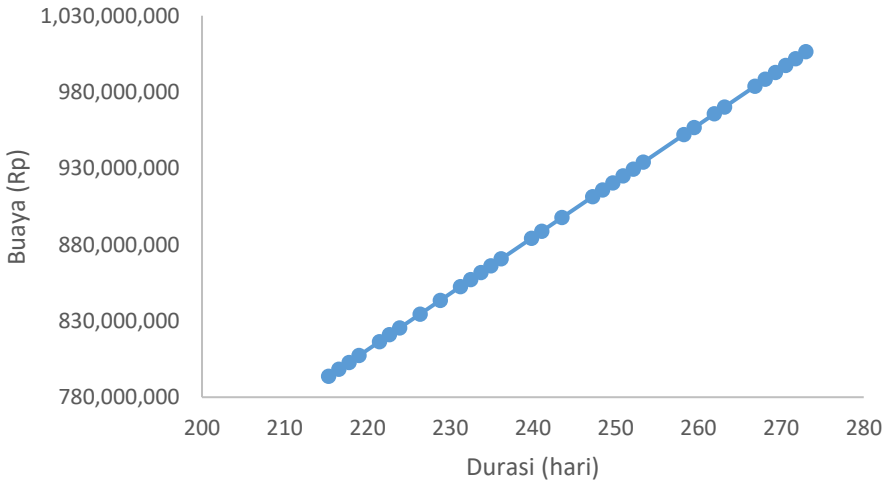
Lembur 3 jam = Rp.4.481.746.482,00 + Rp.88,00

= Rp.4.481.746.570,00

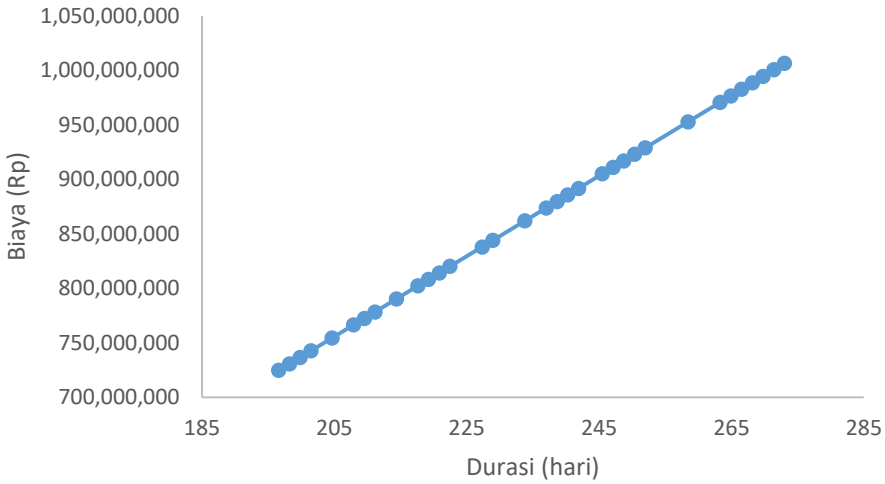
Dari hasil biaya tidak langsung dan biaya langsung jika ditampilkan dalam bentuk grafik adalah sebagai berikut.



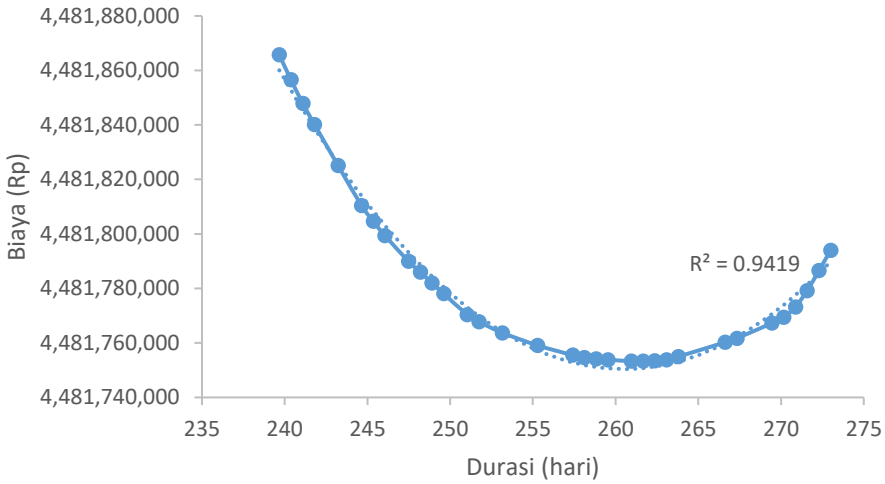
Gambar 4.10 Grafik Biaya tidak langsung untuk lembur 1 jam



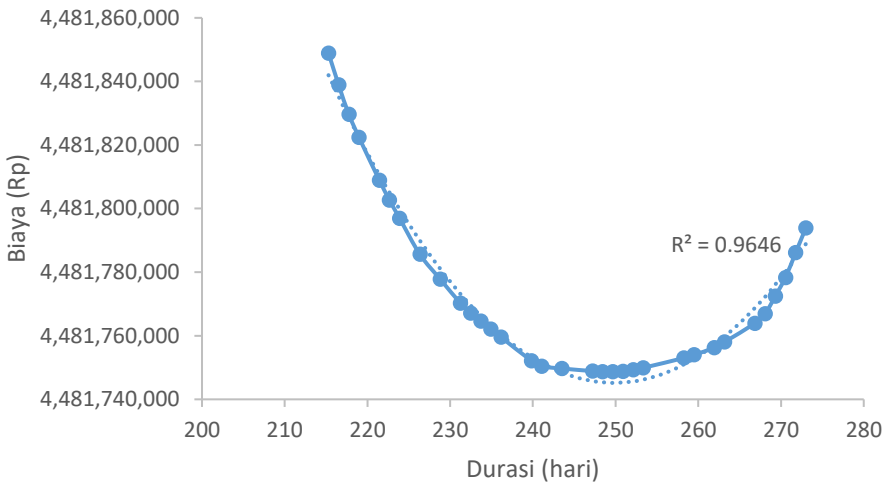
Gambar 4.11 Grafik Biaya tidak langsung untuk lembur 2 jam



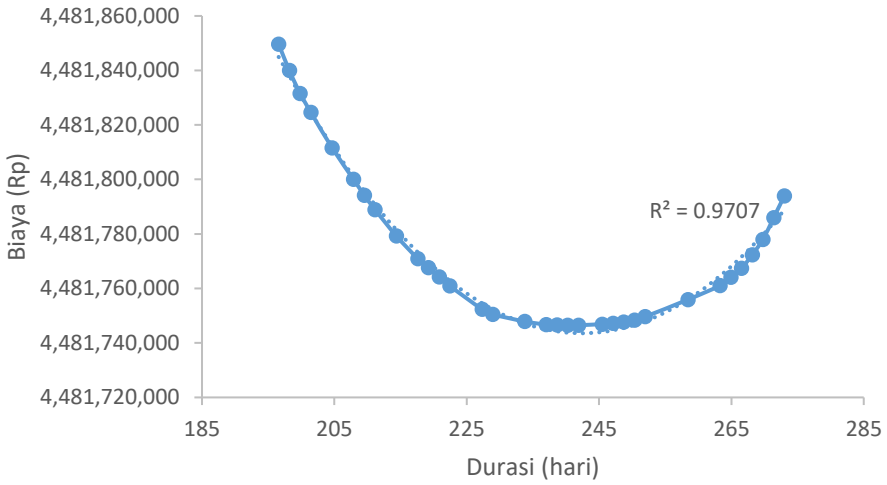
Gambar 4.12 Grafik Biaya tidak langsung untuk lembur 3 jam



Gambar 4.13 Grafik Biaya langsung untuk lembur 1 jam



Gambar 4.14 Grafik Biaya langsung untuk lembur 2 jam



Gambar 4.15 Grafik Biaya langsung untuk lembur 3 jam

Total Biaya

Total biaya merupakan penjumlahan dari biaya tidak langsung dan biaya langsung. Berikut adalah contoh perhitungan dari total biaya total pada pekerjaan pembesian kolom *basement*.

Biaya total = biaya tidak langsung percepatan + biaya langsung percepatan

Lembur 1 jam = Rp.954.123.497,00 + Rp.4.481.754.204,00

= Rp.5.435.877.701,00

Lembur 2 jam = Rp.884.154.933,00 + Rp.4.481.752.087,00

= Rp.5.365.907.020,00

Lembur 3 jam = Rp.879.694.344,00 + Rp.4.481.746.569,00

= Rp.5.361.440.914,00

Tabel 4.55 Biaya total untuk lembur 1 jam

Kode	Durasi Kumulatif (hari)	Biaya Total (Rp)
	273.00	5,488,191,102
PSWL5	272.29	5,485,566,348
PSWL6	271.58	5,482,941,595
PSWL2	270.87	5,480,318,265
BTKD	270.16	5,477,697,051
BKPL7	269.45	5,475,077,588
PGT1	267.33	5,467,256,778
BKKB	266.62	5,464,637,927
PPC	263.79	5,454,200,052
PSWD	263.08	5,451,581,485
BTSWL2	262.37	5,448,963,809
BKBL7	261.66	5,446,346,306
BTPL7	260.95	5,443,728,908
PPL7	259.53	5,438,494,715
PKB	258.82	5,435,877,701
BKS	258.11	5,433,260,799
BTSWD	257.40	5,430,644,290
BTPC	255.28	5,422,832,618
PS	253.16	5,415,021,977
PKD	251.74	5,409,791,287
PSWL7	251.03	5,407,176,535
BTS	249.61	5,401,949,495
BTSWL5	248.90	5,399,336,084
BTSWL6	248.19	5,396,722,673
BTSWL7	247.48	5,394,109,263
PBKTP	246.06	5,388,883,952
BTSWL3	245.35	5,386,271,841
BKPC	244.64	5,383,660,248
PPL	243.22	5,378,440,227
PBL7	241.80	5,373,220,522

Tabel 4.55 Lanjutan

BTKB	241.09	5,370,610,887
BTBL7	240.38	5,368,002,146
PSWL3	239.67	5,365,393,959

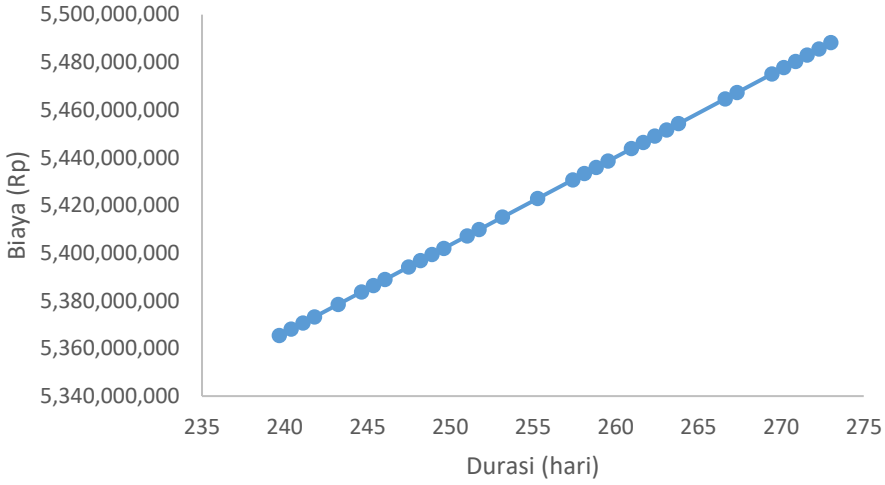
Tabel 4.56 Biaya total untuk lembur 2 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)
	273.00	5,488,191,102
PSWL5	271.77	5,483,648,991
PSWL6	270.54	5,479,106,880
PSWL2	269.31	5,474,566,694
BTKD	268.08	5,470,026,805
BKKB	266.85	5,465,489,500
PGT1	263.17	5,451,917,548
BKPL7	261.94	5,447,381,407
PPL7	259.49	5,438,347,415
BTPL7	258.26	5,433,812,106
PPC	253.35	5,415,708,611
BTSWL2	252.12	5,411,173,710
PSWD	250.89	5,406,638,857
BKS	249.66	5,402,104,408
BTSWD	248.43	5,397,570,131
BKBL7	247.20	5,393,036,000
BTPC	243.52	5,379,470,706
PKD	241.07	5,370,439,624
PKB	239.84	5,365,907,020
PS	236.16	5,352,348,378
BTSWL5	234.93	5,347,816,580
BTSWL6	233.70	5,343,284,781
BTSWL7	232.47	5,338,752,982
PSWL7	231.24	5,334,221,837
PBKTP	228.79	5,325,197,628
BTS	226.34	5,316,173,639
PPL	223.89	5,307,153,202
BKPC	222.66	5,302,624,663
BTSWL3	221.43	5,298,096,584
PBL7	218.98	5,289,078,266
BTKB	217.75	5,284,551,208
PSWL3	216.52	5,280,026,136
BTBL7	215.29	5,275,501,834

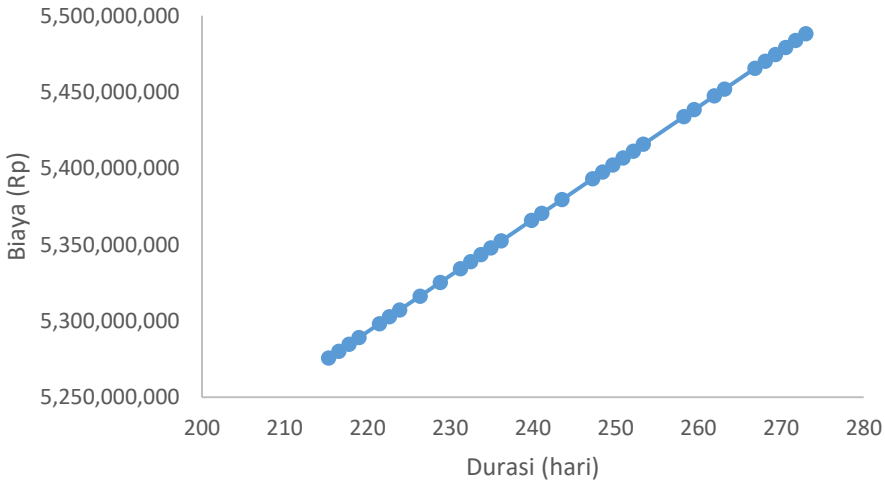
Tabel 4.57 Biaya total untuk lembur 3 jam

Kode	Durasi Kumulatif (hari)	Biaya Tidak Langsung (Rp)
	273.00	5,488,191,102
PSWL5	271.38	5,482,211,078
PSWL6	269.76	5,476,231,054
PSWL2	268.14	5,470,253,393
BTKD	266.52	5,464,276,412
BKKB	264.90	5,458,301,106
BKPL7	263.28	5,452,326,053
PGT1	258.43	5,434,441,673
PPC	251.97	5,410,621,053
PSWD	250.35	5,404,647,761
BTSWL2	248.73	5,398,675,061
BTPL7	247.11	5,392,702,524
BTSWD	245.49	5,386,730,187
PPL7	241.87	5,373,384,904
BKBL7	240.25	5,367,412,853
PKB	238.63	5,361,440,914
BKS	237.01	5,355,469,048
PKD	233.78	5,343,562,999
BTPC	228.93	5,325,686,404
PSWL7	227.31	5,319,716,249
PS	222.46	5,301,845,564
BTSWL5	220.84	5,295,876,883
BTSWL6	219.22	5,289,908,202
BTSWL7	217.60	5,283,939,521
PBKTP	214.37	5,272,040,660
BTS	211.14	5,260,143,134
BTSWL3	209.52	5,254,176,414
BKPC	207.90	5,248,210,168
PBL7	204.67	5,236,314,515
PPL	201.44	5,224,420,416
BTKB	199.82	5,218,455,341
BTBL7	198.20	5,212,491,661
PSWL3	196.58	5,206,529,376

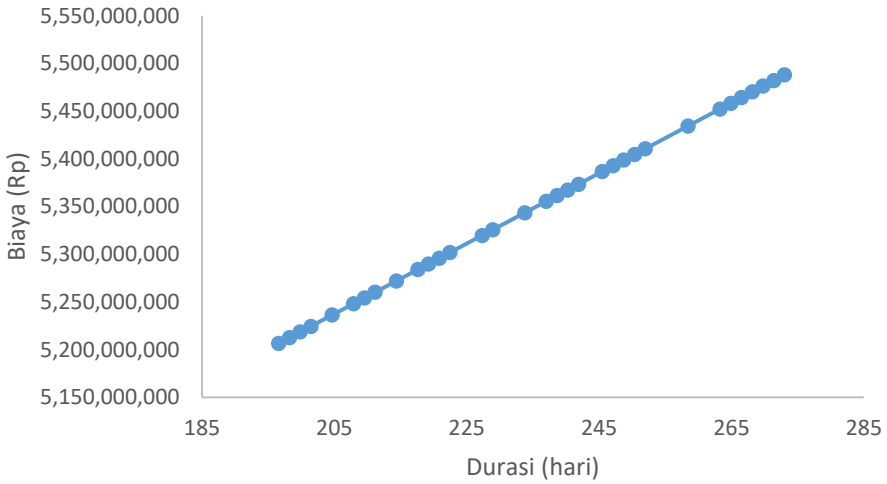
Dari hasil biaya tidak langsung dan biaya langsung jika ditampilkan dalam bentuk grafik adalah sebagai berikut.



Gambar 4.16 Grafik Biaya total untuk lembur 1 jam



Gambar 4.17 Grafik Biaya total untuk lembur 2 jam



Gambar 4.18 Grafik Biaya total untuk lembur 3 jam

3. Efisiensi Waktu dan Biaya Proyek

Efisiensi waktu adalah perbandingan antara selsisih durasi normal dengan durasi komulatif kegiatan dan durasi normal dalam bentuk persen (%), sedangkan efisiensi biaya memiliki maksud yang sma dengan efisiensi waktu akan tetapi merupakan perbandingan antara biaya total. Untuk menentukan nilai efisiensi dapat menggunakan perhitungan sebgai berikut dengan contoh kegiatan pembesian kolom *basement*.

Lembur 1 jam

Efisiensi waktu $= \frac{(273{,}00-258{,}82)}{273{,}00} \times 100\%$

$= 5{,}19\ \%$

Efisiensi biaya $= \frac{(\text{Rp.}5.488.191.102{,}00-\text{Rp.}5.435.877.701{,}00)}{\text{Rp.}5.488.191.102{,}00} \times 100\%$

$= 0{,}95\ \%$

Lembur 2 jam

Efisiensi waktu $= \frac{(273{,}00-239{,}84)}{273{,}00} \times 100\%$

$= 12{,}15\ \%$

Efisiensi biaya $= \frac{(\text{Rp.}5.488.191.102{,}00-\text{Rp.}5.365.907.020{,}00)}{\text{Rp.}5.488.191.102{,}00} \times 100\%$

$= 2{,}23\ \%$

Lembur 3 jam

Efisiensi waktu $= \frac{(273{,}00-238{,}63)}{273{,}00} \times 100\%$

$= 12{,}59\ \%$

Efisiensi biaya $= \frac{(\text{Rp.}5.488.191.102{,}00-\text{Rp.}5.361.440.914{,}00)}{\text{Rp.}5.488.191.102{,}00} \times 100\%$

$= 2{,}31\ \%$

Tabel 4.58 Efisiensi waktu dan biaya untuk lembur 1 jam

KODE	Durasi (hari)	Biaya Total (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	273.00	5,488,191,102	0.00	0.00
PSWL5	272.29	5,485,566,348	0.26	0.05
PSWL6	271.58	5,482,941,595	0.52	0.10
PSWL2	270.87	5,480,318,265	0.78	0.14
BTKD	270.16	5,477,697,051	1.04	0.19
BKPL7	269.45	5,475,077,588	1.30	0.24
PGT1	267.33	5,467,256,778	2.08	0.38
BKKB	266.62	5,464,637,927	2.34	0.43
PPC	263.79	5,454,200,052	3.37	0.62
PSWD	263.08	5,451,581,485	3.63	0.67
BTSWL2	262.37	5,448,963,809	3.89	0.71
BKBL7	261.66	5,446,346,306	4.15	0.76
BTPL7	260.95	5,443,728,908	4.41	0.81
PPL7	259.53	5,438,494,715	4.93	0.91
PKB	258.82	5,435,877,701	5.19	0.95
BKS	258.11	5,433,260,799	5.45	1.00
BTSWD	257.40	5,430,644,290	5.71	1.05
BTPC	255.28	5,422,832,618	6.49	1.19
PS	253.16	5,415,021,977	7.27	1.33

Tabel 4.58 Lanjutan

PKD	251.74	5,409,791,287	7.79	1.43
PSWL7	251.03	5,407,176,535	8.05	1.48
BTS	249.61	5,401,949,495	8.57	1.57
BTSWL5	248.90	5,399,336,084	8.83	1.62
BTSWL6	248.19	5,396,722,673	9.09	1.67
BTSWL7	247.48	5,394,109,263	9.35	1.71
PBKTP	246.06	5,388,883,952	9.87	1.81
BTSWL3	245.35	5,386,271,841	10.13	1.86
BKPC	244.64	5,383,660,248	10.39	1.90
PPL	243.22	5,378,440,227	10.91	2.00
PBL7	241.80	5,373,220,522	11.43	2.09
BTKB	241.09	5,370,610,887	11.69	2.14
BTBL7	240.38	5,368,002,146	11.95	2.19
PSWL3	239.67	5,365,393,959	12.21	2.24

Tabel 4.59 Efisiensi waktu dan biaya untuk lembur 2 jam

KODE	Durasi (hari)	Biaya Total (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	273.00	5,488,191,102	0.00	0.00
PSWL5	271.77	5,483,648,991	0.45	0.08
PSWL6	270.54	5,479,106,880	0.90	0.17
PSWL2	269.31	5,474,566,694	1.35	0.25
BTKD	268.08	5,470,026,805	1.80	0.33
BKKB	266.85	5,465,489,500	2.25	0.41
PGT1	263.17	5,451,917,548	3.60	0.66
BKPL7	261.94	5,447,381,407	4.05	0.74
PPL7	259.49	5,438,347,415	4.95	0.91
BTPL7	258.26	5,433,812,106	5.40	0.99
PPC	253.35	5,415,708,611	7.20	1.32
BTSWL2	252.12	5,411,173,710	7.65	1.40
PSWD	250.89	5,406,638,857	8.10	1.49
BKS	249.66	5,402,104,408	8.55	1.57
BTSWD	248.43	5,397,570,131	9.00	1.65
BKBL7	247.20	5,393,036,000	9.45	1.73
BTPC	243.52	5,379,470,706	10.80	1.98
PKD	241.07	5,370,439,624	11.70	2.15
PKB	239.84	5,365,907,020	12.15	2.23
PS	236.16	5,352,348,378	13.49	2.48
BTSWL5	234.93	5,347,816,580	13.95	2.56
BTSWL6	233.70	5,343,284,781	14.40	2.64
BTSWL7	232.47	5,338,752,982	14.85	2.72
PSWL7	231.24	5,334,221,837	15.30	2.81
PBKTP	228.79	5,325,197,628	16.19	2.97
BTS	226.34	5,316,173,639	17.09	3.13

Tabel 4.59 Lanjutan

PPL	223.89	5,307,153,202	17.99	3.30
BKPC	222.66	5,302,624,663	18.44	3.38
BTSWL3	221.43	5,298,096,584	18.89	3.46
PBL7	218.98	5,289,078,266	19.79	3.63
BTKB	217.75	5,284,551,208	20.24	3.71
PSWL3	216.52	5,280,026,136	20.69	3.79
BTBL7	215.29	5,275,501,834	21.14	3.88

Tabel 4.60 Efisiensi waktu dan biaya untuk lembur 3 jam

KODE	Durasi (hari)	Biaya Total (Rp)	Efisiensi Waktu (%)	Efisiensi Biaya (%)
	273.00	5,488,191,102	0.00	0.00
PSWL5	271.38	5,482,211,078	0.59	0.11
PSWL6	269.76	5,476,231,054	1.19	0.22
PSWL2	268.14	5,470,253,393	1.78	0.33
BTKD	266.52	5,464,276,412	2.37	0.44
BKKB	264.90	5,458,301,106	2.97	0.54
BKPL7	263.28	5,452,326,053	3.56	0.65
PGT1	258.43	5,434,441,673	5.34	0.98
PPC	251.97	5,410,621,053	7.70	1.41
PSWD	250.35	5,404,647,761	8.30	1.52
BTSWL2	248.73	5,398,675,061	8.89	1.63
BTPL7	247.11	5,392,702,524	9.48	1.74
BTSWD	245.49	5,386,730,187	10.08	1.85
PPL7	241.87	5,373,384,904	11.40	2.09
BKBL7	240.25	5,367,412,853	12.00	2.20
PKB	238.63	5,361,440,914	12.59	2.31
BKS	237.01	5,355,469,048	13.18	2.42
PKD	233.78	5,343,562,999	14.37	2.64
BTPC	228.93	5,325,686,404	16.14	2.96
PSWL7	227.31	5,319,716,249	16.74	3.07
PS	222.46	5,301,845,564	18.51	3.40
BTSWL5	220.84	5,295,876,883	19.11	3.50
BTSWL6	219.22	5,289,908,202	19.70	3.61
BTSWL7	217.60	5,283,939,521	20.29	3.72
PBKTP	214.37	5,272,040,660	21.48	3.94
BTS	211.14	5,260,143,134	22.66	4.16
BTSWL3	209.52	5,254,176,414	23.25	4.26
BKPC	207.90	5,248,210,168	23.85	4.37
PBL7	204.67	5,236,314,515	25.03	4.59
PPL	201.44	5,224,420,416	26.21	4.81
BTKB	199.82	5,218,455,341	26.81	4.91
BTBL7	198.20	5,212,491,661	27.40	5.02
PSWL3	196.58	5,206,529,376	27.99	5.13

4.3.2. Perhitungan Biaya Denda Keterlambatan

Perhitungan biaya denda dapat dicari menggunakan persamaan :

Total denda = Total hari keterlambatan × denda per hari

Dengan denda per hari = 1 ‰ dari total nilai kontrak

Sehingga perhitungan biaya denda :

Total keterlambatan = 0,8 – 1,0 hari

Biaya total proyek = Rp.5.488.191.102,00

Total denda $= 1 \times \frac{1}{1000} \times 5.488.191.102{,}00$

= Rp.5.488.191,10

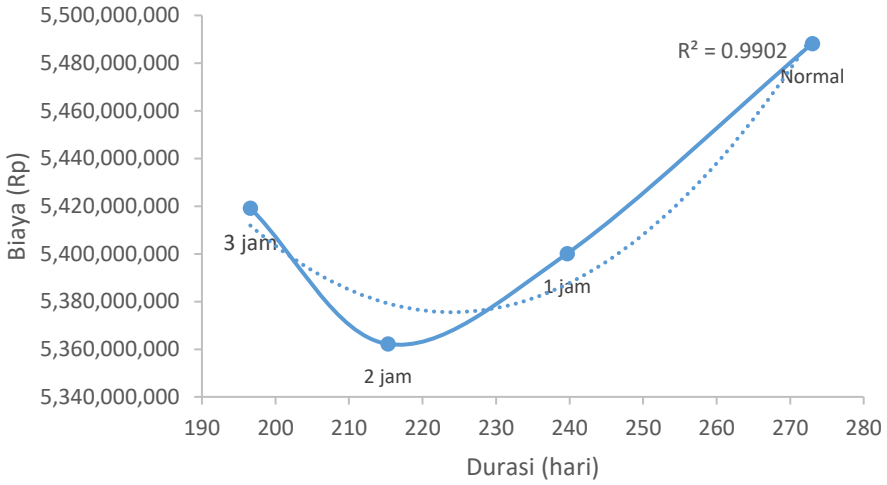
4.3.3. Perbandingan Penambahan Jam Lembur dengan Penambahan Tenaga Kerja

Berikut adalah tabel hasil analisa dari penambahan jam lembur 1 – 3 jam dan penambahan tenaga kerja dengan metode *time cost trade off*.

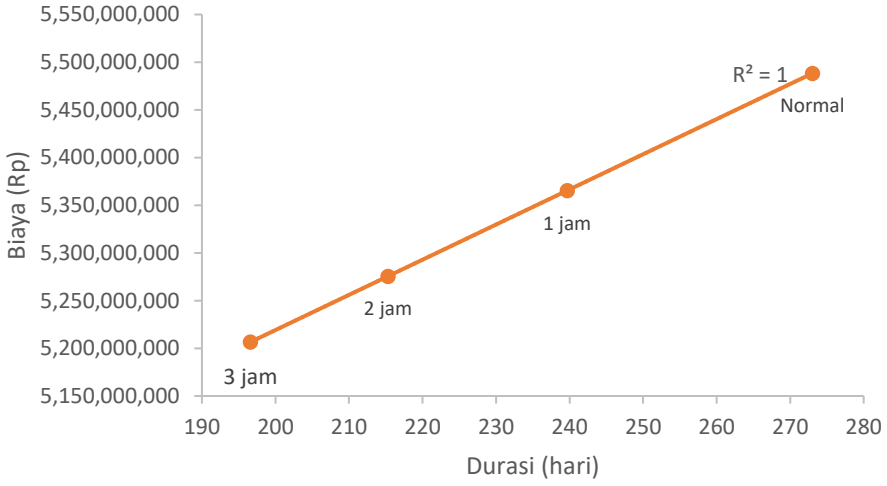
Tabel 4.61 Perbandingan biaya normal dengan biaya penambahan jam lembur dan biaya penambahan tenaga kerja

No	Penambahan tenaga	Durasi	Biaya Penambahan jam Lembur (Rp)	Biaya Penambahan Tenaga (Rp)
1	Normal	273	5,488,191,102.00	5,488,191,102.00
2	1	239.67	5,400,123,754.12	5,365,393,959.28
3	2	215.29	5,362,195,496.01	5,275,501,833.74
4	3	196.58	5,419,173,754.91	5,206,529,376.10

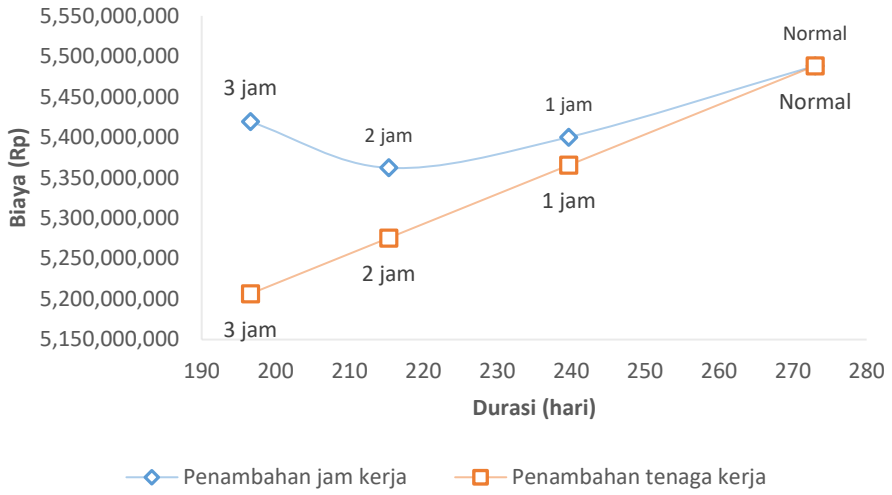
Dalam bentuk grafik dapat disajikan seperti grafik dibawah ini.



Gambar 4.19 Grafik biaya dan durasi terhadap penambahan jam lembur



Gambar 4.20 Grafik biaya dan durasi terhadap penambahan tenaga kerja



Gambar 4.21 Grafik perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja

Tabel berikut adalah perbandingan antara biaya akibat penambahan jam lembur dan biaya akibat penambahan tenaga kerja.

Tabel 4.62 Perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja akibat lembur 1 jam

Kode	Durasi Percepatan (hari)	Durasi Normal (hari)	Biaya Penambahan Jam Kerja (Rp)	Biaya Penambahan Tenaga (Rp)
PPL	12.58	14	5,485,720,257	5,485,566,348
PGT1	18.88	21	5,483,342,442	5,482,941,595
PBKTP	12.58	14	5,481,008,783	5,480,318,265
BTPC	18.88	21	5,478,730,157	5,477,697,051
PPC	25.17	28	5,476,451,531	5,475,077,588
BKPC	6.29	7	5,474,183,639	5,467,256,778
BTS	12.58	14	5,471,970,820	5,464,637,927
PS	18.88	21	5,469,762,051	5,454,200,052
BKS	6.29	7	5,467,553,282	5,451,581,485
BTKB	6.29	7	5,465,344,513	5,448,963,809
PKB	6.29	7	5,463,152,307	5,446,346,306
BKKB	6.29	7	5,458,775,033	5,443,728,908
BTKD	6.29	7	5,454,433,981	5,438,494,715
PKD	12.58	14	5,452,279,814	5,435,877,701
BTSWD	6.29	7	5,447,992,279	5,433,260,799
PSWD	6.29	7	5,445,875,872	5,430,644,290
BTSWL2	6.29	7	5,439,607,406	5,422,832,618
PSWL2	6.29	7	5,437,544,185	5,415,021,977
BTSWL3	6.29	7	5,435,536,628	5,409,791,287
PSWL3	6.29	7	5,433,538,600	5,407,176,535

Tabel 4.62 Lanjutan

BTSWL5	6.29	7	5,429,553,419	5,401,949,495
PSWL5	6.29	7	5,427,576,503	5,399,336,084
BTSWL6	6.29	7	5,425,605,612	5,396,722,673
PSWL6	6.29	7	5,419,748,266	5,394,109,263
BTSWL7	6.29	7	5,411,979,614	5,388,883,952
PSWL7	6.29	7	5,408,628,620	5,386,271,841
BTPL7	6.29	7	5,407,043,755	5,383,660,248
PPL7	12.58	14	5,405,658,879	5,378,440,227
BKPL7	6.29	7	5,404,375,773	5,373,220,522
BTBL7	6.29	7	5,401,143,312	5,370,610,887
PBL7	12.58	14	5,400,046,517	5,368,002,146
BKBL7	6.29	7	5,400,123,754	5,365,393,959

Tabel 4.63 Perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja akibat lembur 2 jam

Kode	Durasi Percepatan (hari)	Durasi Normal (hari)	Biaya Penambahan Jam Kerja (Rp)	Biaya Penambahan Tenaga (Rp)
PPL	11.55	14	5,484,017,273	5,483,648,991
PGT1	17.32	21	5,480,075,897	5,479,106,880
PBKTP	11.55	14	5,476,244,503	5,474,566,694
BTPC	17.32	21	5,472,556,756	5,470,026,805
PPC	23.09	28	5,468,869,009	5,465,489,500
BKPC	5.77	7	5,465,199,009	5,451,917,548
BTS	11.55	14	5,461,630,600	5,447,381,407
PS	17.32	21	5,458,105,054	5,438,347,415
BKS	5.77	7	5,454,579,508	5,433,812,106
BTKB	5.77	7	5,451,053,962	5,415,708,611
PKB	5.77	7	5,447,577,652	5,411,173,710
BKKB	5.77	7	5,440,662,404	5,406,638,857
BTKD	5.77	7	5,433,846,275	5,402,104,408
PKD	11.55	14	5,430,458,014	5,397,570,131
BTSWD	5.77	7	5,427,157,677	5,393,036,000
PSWD	5.77	7	5,417,399,632	5,379,470,706
BTSWL2	5.77	7	5,414,234,781	5,370,439,624
PSWL2	5.77	7	5,411,205,182	5,365,907,020
BTSWL3	5.77	7	5,408,202,647	5,352,348,378
PSWL3	5.77	7	5,402,252,954	5,347,816,580
BTSWL5	5.77	7	5,399,284,945	5,343,284,781
PSWL5	5.77	7	5,396,340,651	5,338,752,982
BTSWL6	5.77	7	5,387,591,457	5,334,221,837
PSWL6	5.77	7	5,376,066,746	5,325,197,628
BTSWL7	5.77	7	5,370,397,248	5,316,173,639
PSWL7	5.77	7	5,366,011,684	5,307,153,202
BTPL7	5.77	7	5,364,019,928	5,302,624,663
PPL7	11.55	14	5,362,516,154	5,298,096,584
BKPL7	5.77	7	5,361,252,731	5,289,078,266
BTBL7	5.77	7	5,358,934,274	5,284,551,208

Tabel 4.63 Lanjutan

PBL7	11.55	14	5,360,110,276	5,280,026,136
BKBL7	5.77	7	5,362,195,496	5,275,501,834

Tabel 4.64 Perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja akibat lembur 3 jam

Kode	Durasi Percepatan (hari)	Durasi Normal (hari)	Biaya Penambahan Jam Kerja (Rp)	Biaya Penambahan Tenaga (Rp)
PPL	10.77	14	5,483,113,180	5,482,211,078
PGT1	16.15	21	5,478,620,369	5,476,231,054
PBKTP	10.77	14	5,474,397,081	5,470,253,393
BTPC	16.15	21	5,470,530,787	5,464,276,412
PPC	21.54	28	5,466,664,494	5,458,301,106
BKPC	5.38	7	5,462,834,336	5,452,326,053
BTS	10.77	14	5,454,976,402	5,434,441,673
PS	16.15	21	5,451,467,265	5,410,621,053
BKS	5.38	7	5,448,000,973	5,404,647,761
BTKB	5.38	7	5,444,534,681	5,398,675,061
PKB	5.38	7	5,441,068,388	5,392,702,524
BKKB	5.38	7	5,437,726,062	5,386,730,187
BTKD	5.38	7	5,431,065,874	5,373,384,904
PKD	10.77	14	5,427,937,215	5,367,412,853
BTSWD	5.38	7	5,421,873,131	5,361,440,914
PSWD	5.38	7	5,418,964,494	5,355,469,048
BTSWL2	5.38	7	5,410,521,810	5,343,562,999
PSWL2	5.38	7	5,407,953,783	5,325,686,404
BTSWL3	5.38	7	5,405,720,015	5,319,716,249
PSWL3	5.38	7	5,403,541,083	5,301,845,564
BTSWL5	5.38	7	5,399,270,244	5,295,876,883
PSWL5	5.38	7	5,397,175,312	5,289,908,202
BTSWL6	5.38	7	5,395,147,201	5,283,939,521
PSWL6	5.38	7	5,389,215,984	5,272,040,660
BTSWL7	5.38	7	5,381,716,550	5,260,143,134
PSWL7	5.38	7	5,381,309,264	5,254,176,414
BTPL7	5.38	7	5,381,649,927	5,248,210,168
PPL7	10.38	14	5,383,203,379	5,236,314,515
BKPL7	5.38	7	5,385,348,035	5,224,420,416
BTBL7	5.38	7	5,395,353,867	5,218,455,341
PBL7	10.77	14	5,408,736,768	5,212,491,661
BKBL7	5.38	7	5,419,173,755	5,206,529,376

Jika proyek mengalami keterlambatan penyelesaian maka akan dikenakan biaya denda. Tabel berikut adalah hasil dari perhitungan denda yang akan dibayar jika proyek mengalami keterlambatan.

Tabel 4.65 Perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja akibat lembur 1 jam

Kode	Duration	Biaya Penambahan Jam Kerja	Biaya Penambahan Tenaga	Denda
PPL	12.58	5,485,720,257	5,485,566,348	7,793,231
PGT1	18.88	5,483,342,442	5,482,941,595	11,634,965
PBKTP	12.58	5,481,008,783	5,480,318,265	7,793,231
BTPC	18.88	5,478,730,157	5,477,697,051	11,634,965
PPC	25.17	5,476,451,531	5,475,077,588	15,531,581
BKPC	6.29	5,474,183,639	5,467,256,778	3,896,616
BTS	12.58	5,471,970,820	5,464,637,927	7,793,231
PS	18.88	5,469,762,051	5,454,200,052	11,634,965
BKS	6.29	5,467,553,282	5,451,581,485	3,896,616
BTKB	6.29	5,465,344,513	5,448,963,809	3,896,616
PKB	6.29	5,463,152,307	5,446,346,306	3,896,616
BKKB	6.29	5,458,775,033	5,443,728,908	3,896,616
BTKD	6.29	5,454,433,981	5,438,494,715	3,896,616
PKD	12.58	5,452,279,814	5,435,877,701	7,793,231
BTSWD	6.29	5,447,992,279	5,433,260,799	3,896,616
PSWD	6.29	5,445,875,872	5,430,644,290	3,896,616
BTSWL2	6.29	5,439,607,406	5,422,832,618	3,896,616
PSWL2	6.29	5,437,544,185	5,415,021,977	3,896,616
BTSWL3	6.29	5,435,536,628	5,409,791,287	3,896,616
PSWL3	6.29	5,433,538,600	5,407,176,535	3,896,616
BTSWL5	6.29	5,429,553,419	5,401,949,495	3,896,616
PSWL5	6.29	5,427,576,503	5,399,336,084	3,896,616
BTSWL6	6.29	5,425,605,612	5,396,722,673	3,896,616
PSWL6	6.29	5,419,748,266	5,394,109,263	3,896,616
BTSWL7	6.29	5,411,979,614	5,388,883,952	3,896,616
PSWL7	6.29	5,408,628,620	5,386,271,841	3,896,616
BTPL7	6.29	5,407,043,755	5,383,660,248	3,896,616
PPL7	12.58	5,405,658,879	5,378,440,227	7,793,231
BKPL7	6.29	5,404,375,773	5,373,220,522	3,896,616
BTBL7	6.29	5,401,143,312	5,370,610,887	3,896,616
PBL7	12.58	5,400,046,517	5,368,002,146	7,793,231
BKBL7	6.29	5,400,123,754	5,365,393,959	3,896,616

Tabel 4.66 Perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja akibat lembur 2 jam

Kode	Duration	Biaya Penambahan Jam Kerja	Biaya Penambahan Tenaga	Denda
PPL	11.55	5,484,017,273	5,483,648,991	13,446,068
PGT1	17.32	5,480,075,897	5,479,106,880	20,196,543
PBKTP	11.55	5,476,244,503	5,474,566,694	13,446,068
BTPC	17.32	5,472,556,756	5,470,026,805	20,196,543
PPC	23.09	5,468,869,009	5,465,489,500	26,947,018
BKPC	5.77	5,465,199,009	5,451,917,548	6,750,475
BTS	11.55	5,461,630,600	5,447,381,407	13,446,068
PS	17.32	5,458,105,054	5,438,347,415	20,196,543
BKS	5.77	5,454,579,508	5,433,812,106	6,750,475
BTKB	5.77	5,451,053,962	5,415,708,611	6,750,475
PKB	5.77	5,447,577,652	5,411,173,710	6,750,475
BKKB	5.77	5,440,662,404	5,406,638,857	6,750,475
BTKD	5.77	5,433,846,275	5,402,104,408	6,750,475
PKD	11.55	5,430,458,014	5,397,570,131	13,446,068
BTSWD	5.77	5,427,157,677	5,393,036,000	6,750,475
PSWD	5.77	5,417,399,632	5,379,470,706	6,750,475
BTSWL2	5.77	5,414,234,781	5,370,439,624	6,750,475
PSWL2	5.77	5,411,205,182	5,365,907,020	6,750,475
BTSWL3	5.77	5,408,202,647	5,352,348,378	6,750,475
PSWL3	5.77	5,402,252,954	5,347,816,580	6,750,475
BTSWL5	5.77	5,399,284,945	5,343,284,781	6,750,475
PSWL5	5.77	5,396,340,651	5,338,752,982	6,750,475
BTSWL6	5.77	5,387,591,457	5,334,221,837	6,750,475
PSWL6	5.77	5,376,066,746	5,325,197,628	6,750,475
BTSWL7	5.77	5,370,397,248	5,316,173,639	6,750,475
PSWL7	5.77	5,366,011,684	5,307,153,202	6,750,475
BTPL7	5.77	5,364,019,928	5,302,624,663	6,750,475
PPL7	11.55	5,362,516,154	5,298,096,584	13,446,068
BKPL7	5.77	5,361,252,731	5,289,078,266	6,750,475
BTBL7	5.77	5,358,934,274	5,284,551,208	6,750,475
PBL7	11.55	5,360,110,276	5,280,026,136	13,446,068
BKBL7	5.77	5,362,195,496	5,275,501,834	6,750,475

Tabel 4.67 Perbandingan biaya penambahan jam lembur dan biaya penambahan tenaga kerja akibat lembur 3 jam

Kode	Duration	Biaya Penambahan Jam Kerja	Biaya Penambahan Tenaga	Denda
PPL	10.77	5,483,113,180	5,482,211,078	17,726,857
PGT1	16.15	5,478,620,369	5,476,231,054	26,617,727
PBKTP	10.77	5,474,397,081	5,470,253,393	17,726,857
BTPC	16.15	5,470,530,787	5,464,276,412	26,617,727
PPC	21.54	5,466,664,494	5,458,301,106	35,453,715
BKPC	5.38	5,462,834,336	5,452,326,053	8,890,870
BTS	10.77	5,454,976,402	5,434,441,673	17,726,857
PS	16.15	5,451,467,265	5,410,621,053	26,617,727
BKS	5.38	5,448,000,973	5,404,647,761	8,890,870
BTKB	5.38	5,444,534,681	5,398,675,061	8,890,870
PKB	5.38	5,441,068,388	5,392,702,524	8,890,870
BKKB	5.38	5,437,726,062	5,386,730,187	8,890,870
BTKD	5.38	5,431,065,874	5,373,384,904	8,890,870
PKD	10.77	5,427,937,215	5,367,412,853	17,726,857
BTSWD	5.38	5,421,873,131	5,361,440,914	8,890,870
PSWD	5.38	5,418,964,494	5,355,469,048	8,890,870
BTSWL2	5.38	5,410,521,810	5,343,562,999	8,890,870
PSWL2	5.38	5,407,953,783	5,325,686,404	8,890,870
BTSWL3	5.38	5,405,720,015	5,319,716,249	8,890,870
PSWL3	5.38	5,403,541,083	5,301,845,564	8,890,870
BTSWL5	5.38	5,399,270,244	5,295,876,883	8,890,870
PSWL5	5.38	5,397,175,312	5,289,908,202	8,890,870
BTSWL6	5.38	5,395,147,201	5,283,939,521	8,890,870
PSWL6	5.38	5,389,215,984	5,272,040,660	8,890,870
BTSWL7	5.38	5,381,716,550	5,260,143,134	8,890,870
PSWL7	5.38	5,381,309,264	5,254,176,414	8,890,870
BTPL7	5.38	5,381,649,927	5,248,210,168	8,890,870
PPL7	10.38	5,383,203,379	5,236,314,515	19,867,252
BKPL7	5.38	5,385,348,035	5,224,420,416	8,890,870
BTBL7	5.38	5,395,353,867	5,218,455,341	8,890,870
PBL7	10.77	5,408,736,768	5,212,491,661	17,726,857
BKBL7	5.38	5,419,173,755	5,206,529,376	8,890,870