



Performansi Kinerja Proyek Konstruksi berbasis Konsep Nilai Hasil [EVM]



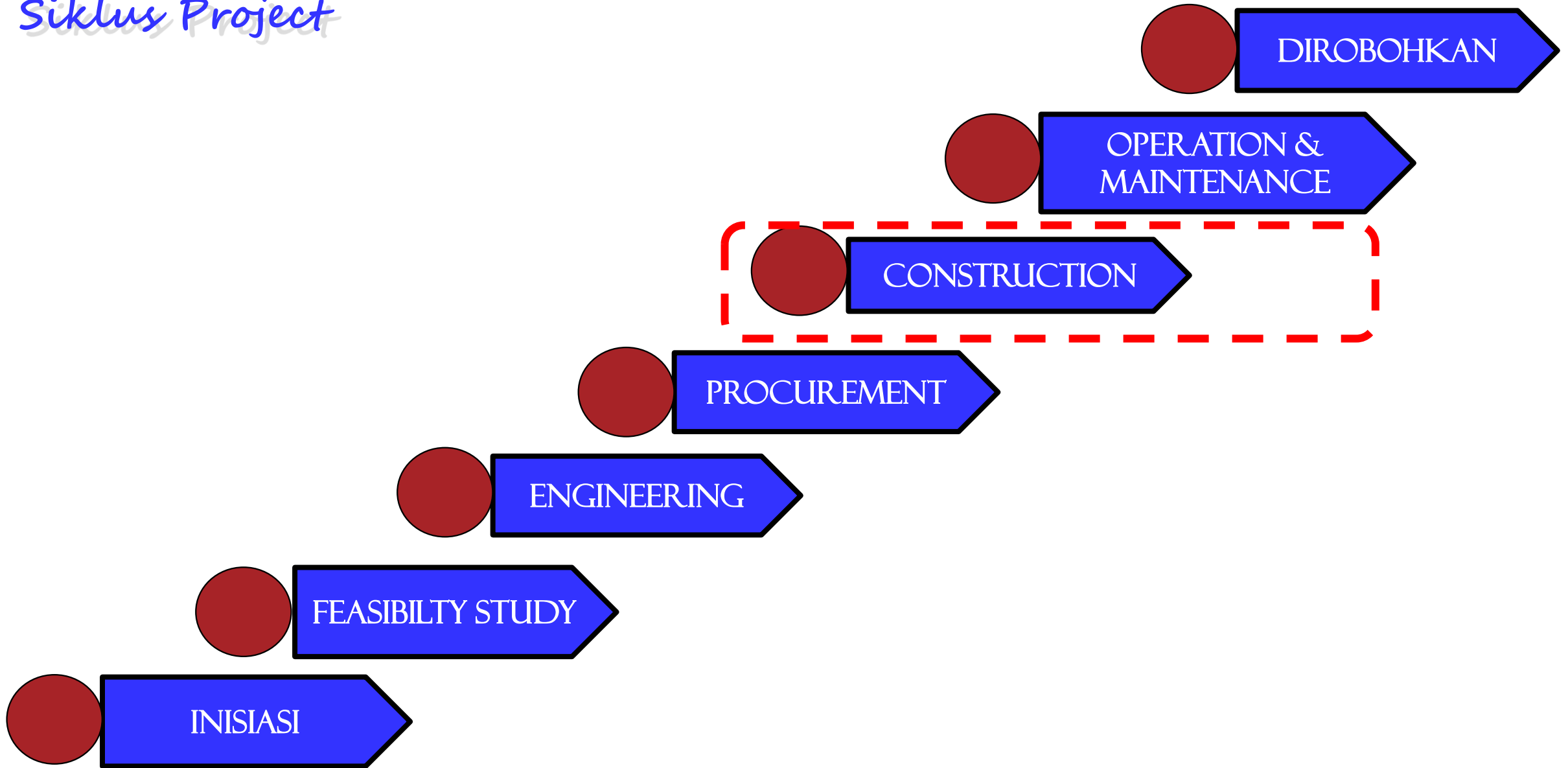
Ir. Hamonangan Girsang, ST., MT., IPU., ACPE.



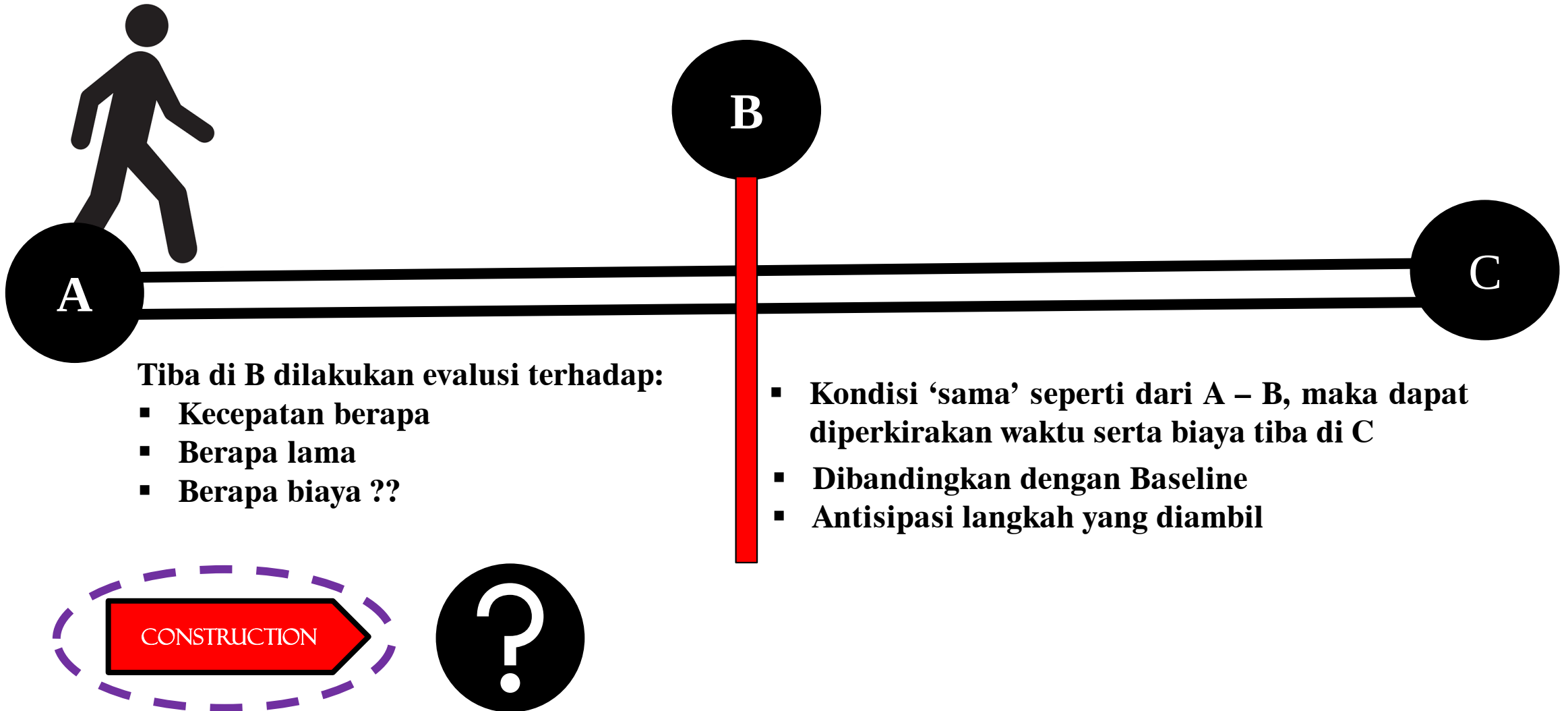
Jakarta, 28 December 2023

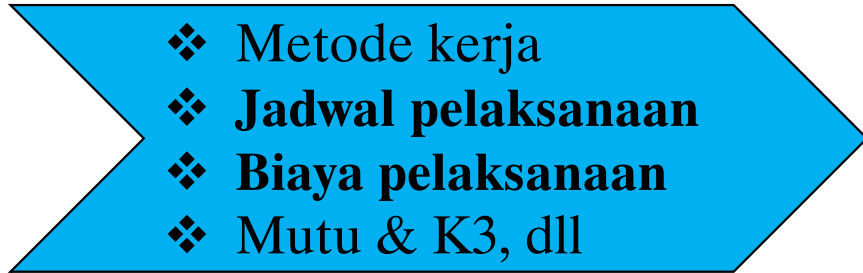


Siklus Project

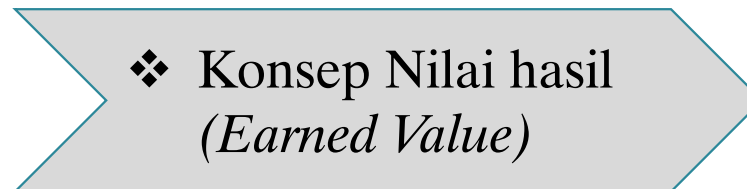
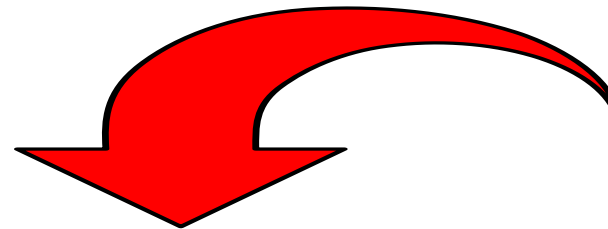
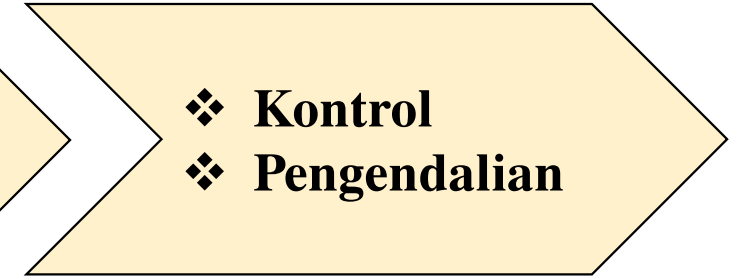
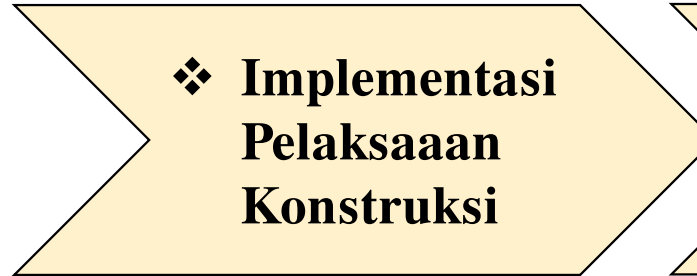


Baseline (rencana lamanya waktu tiba & biaya yang dibutuhkan)





Baseline



Indikator dasar sebagai acuan dalam menganalisa kinerja dari proyek konstruksi berdasarkan konsep nilai hasil
[Earned Value]

1. Planned Value (PV)/BCWS

Anggaran biaya yang dialokasikan berdasarkan rencana kerja (*bobot rencana*) yang telah disusun terhadap waktu tertentu, disebut juga dengan **BCWS** (*Budget Cost of Work Scheduled*).

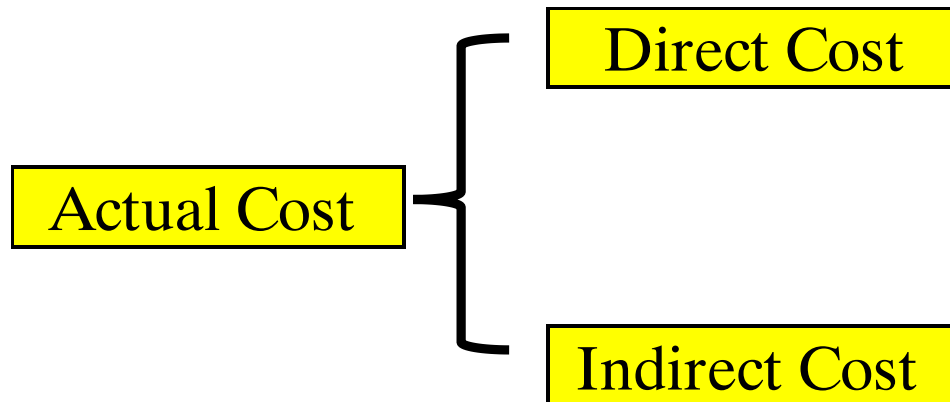
2. Earned Value (EV)

Nilai hasil yang diterima dari penyelesaian pekerjaan (*bobot realisasi*) selama periode waktu tertentu, disebut juga **BCWP** (*Budget Cost of Work Performed*).



3. Actual Cost (AC)

- Merupakan representasi dari **keseluruhan pengeluaran** yang dikeluarkan untuk menyelesaikan pekerjaan dalam periode tertentu. Atau disebut juga dengan *ACWP (Actual Cost of Work Performed)*.
- AC dapat berupa kumulatif hingga periode perhitungan kinerja atau jumlah biaya pengeluaran dalam waktu tertentu.



Analisa Varians

Analisa varians digunakan untuk mengetahui sampai sejauh mana hasil yang diramalkan dari apa yang diperkirakan. Analisa varians terdiri dari :

Schedule Variance (SV)

Hasil pengurangan dari ***Earned value (EV)*** dengan ***Planned Value(PV)***. Hasil dari *Schedule Variance* ini menunjukkan tentang pelaksanaan pekerjaan proyek. Harga SV sama dengan nol ($SV = 0$) ketika proyek sudah selesai karena semua *Planned Value* telah dihasilkan.

$$SV = EV - PV$$



Cost Variance (CV)

Hasil pengurangan antara *Earned Value(EV)* dengan *Actual Cost(AC)*. Nilai *Cost Variance* pada akhir proyek akan berbeda antara BAC (*Budgeted At Cost*) dan AC(*Actual Cost*) yang dikeluarkan atau dipergunakan.

$$CV = EV - AC$$



Analisa Indeks Performansi

Indeks performansi digunakan untuk mengetahui efisiensi penggunaan sumber daya (resources). Indeks performansi terdiri dari :

Schedule Performance Index (SPI)

Adalah faktor efisiensi kinerja [*Kinerja Waktu*] dalam menyelesaikan pekerjaan dapat diperlihatkan oleh perbandingan antara nilai pekerjaan yang secara fisik telah diselesaikan (EV) dengan rencana pengeluaran biaya yang dikeluarkan berdasarkan rencana pekerjaan (PV)

Formula untuk (SPI):

$$SPI = EV / PV$$

Dimana,

SPI = 1 : proyek tepat waktu

SPI > 1 : proyek lebih cepat

SPI < 1 : proyek terlambat



Cost Performance Index (CPI)

Adalah Faktor efisiensi biaya [Kinerja Biaya] yang telah dikeluarkan dapat diperlihatkan dengan membandingkan nilai pekerjaan yang secara fisik telah diselesaikan (EV) dengan biaya yang telah dikeluarkan dalam periode yang sama (AC).

Formula untuk CPI adalah : $CPI = EV / AC$

Dimana,

$CPI = 1$: biaya sesuai rencana

$CPI > 1$: biaya lebih kecil/hemat

$CPI < 1$: biaya lebih besar/boros



Prakiraan Waktu Dan Biaya Penyelesaian Akhir Proyek

- Perkiraan dihitung berdasarkan kecenderungan kinerja proyek pada saat peninjauan dan mengasumsikan bahwa kecenderungan tersebut tidak mengalami perubahan sampai akhir proyek [*kinerja proyek berjalan konstan*].
- Perkiraan ini berguna untuk memberikan suatu gambaran ke depan kepada kontraktor, sehingga dapat melakukan langkah-langkah perbaikan.



Estimate to Complete (ETC)

ETC merupakan prakiraan biaya untuk pekerjaan tersisa, dengan asumsi bahwa kecenderungan kinerja proyek akan tetap (konstan) sampai akhir proyek.

Formula untuk ETC adalah

$$ETC = (BAC - EV) / CPI$$

Dimana, **BAC** (*Budget at Completion*) adalah biaya total proyek yang telah dianggarkan.



Estimate at Completion (EAC)

EAC Merupakan prakiraan biaya total pada akhir proyek yang diperoleh dari biaya aktual (AC) ditambahkan dengan ETC.

Dengan Formula untuk EAC adalah

$$EAC = AC + ETC$$



Estimate Completion Date (ECD)

ECD Merupakan waktu perkiraan penyelesain proyek konstruksi.

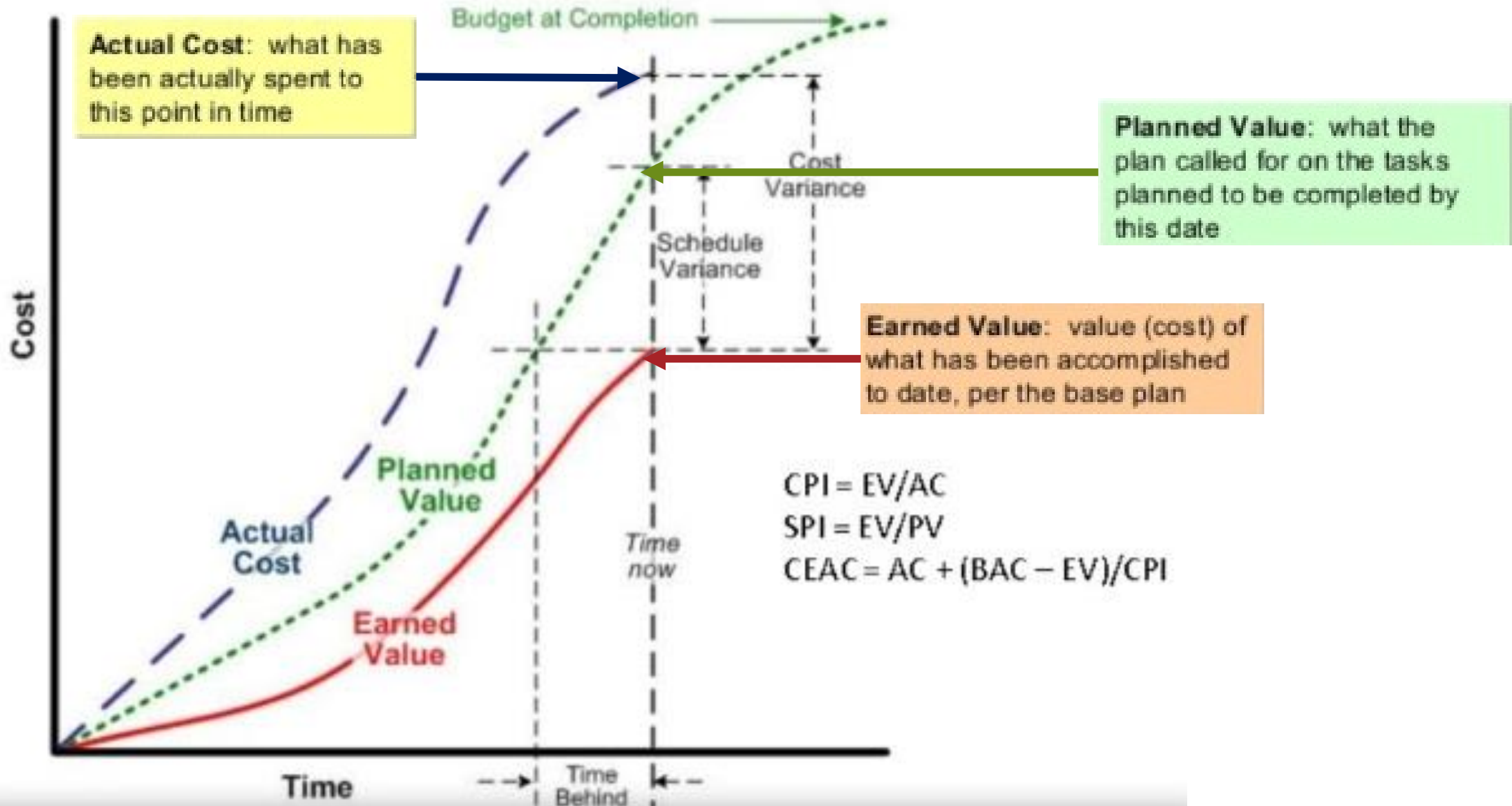
Formula untuk ECD adalah

$$ECD = [(OD - ATE)/SPI] + ATE$$

Dimana:

1. ECD (*Estimate Completion Date*) : Perkiraan Waktu Penyelesaian
2. ATE (*Actual Time Expended*) : Waktu Yang telah di tempuh
3. OD (*Original Duration*) : Waktu Yang direncanakan

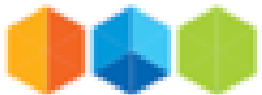
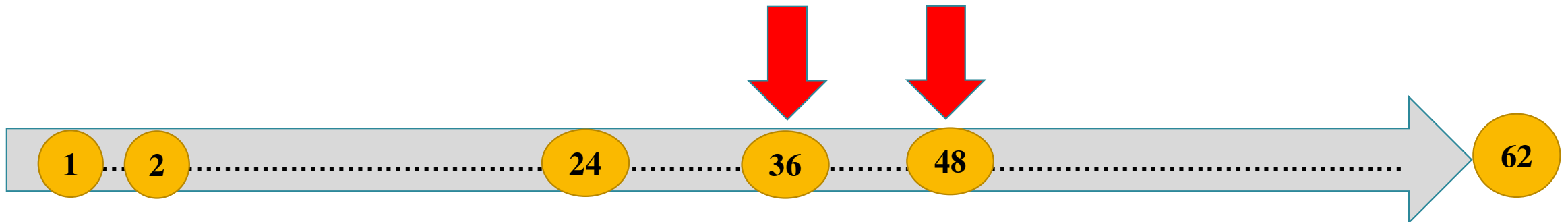


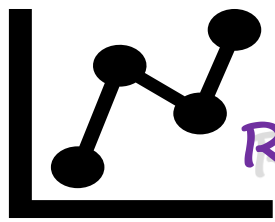


Project Case



Project Name : Apartement *Tanpa Nama* Building Project
Plan of budgeting : IDR. 164.552.000.000,- excl tax
Time Schedule : 434 days (62 weeks)





Required Data

1. Time Schedule di lengkapi dengan S-curve.
2. Bobot rencana (%) dalam tinjauan perminggu
3. Hasil pekerjaan (*actual progres*) per minggu
4. Data uang yang dikerluarkan untuk pelaksanaan proyek kontruksi setiap minggu



Project Case

Nomor	Aktifitas	Costing	Bobot	Waktu (Minggu)											
				1	2	3	4	5	6	7	8	9	10	11	12
1	A	40,000,000	0.05			0.02	0.02								
2			0.07			0.01	0.01	0.01	0.01	0.01	0.01				
3			0.04			0.02	0.02								
4			0.18			0.04	0.04	0.04	0.04	0.04					
5			0.04					0.02	0.02						
6			0.22			0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	
7	G	90,000,000	0.11									0.03	0.03	0.03	0.03
8	H	90,000,000	0.11	0.05	0.05										
9	I	160,000,000	0.19	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
		830,000,000	1.00												
Bobot Rencana perminggu (%)				0.07	0.07	0.12	0.12	0.11	0.11	0.09	0.05	0.07	0.07	0.07	0.05
Aktual bobot rencana perminggu (%)				0.05	0.05	0.15	0.11	0.20							
Bobot Kumulatif perminggu (%)				0.07	0.14	0.27	0.39	0.50	0.61	0.70	0.74	0.81	0.88	0.95	1.00
Aktual bobot kumulatif perminggu (%)				0.05	0.10	0.25	0.36	0.56							

Contoh !!

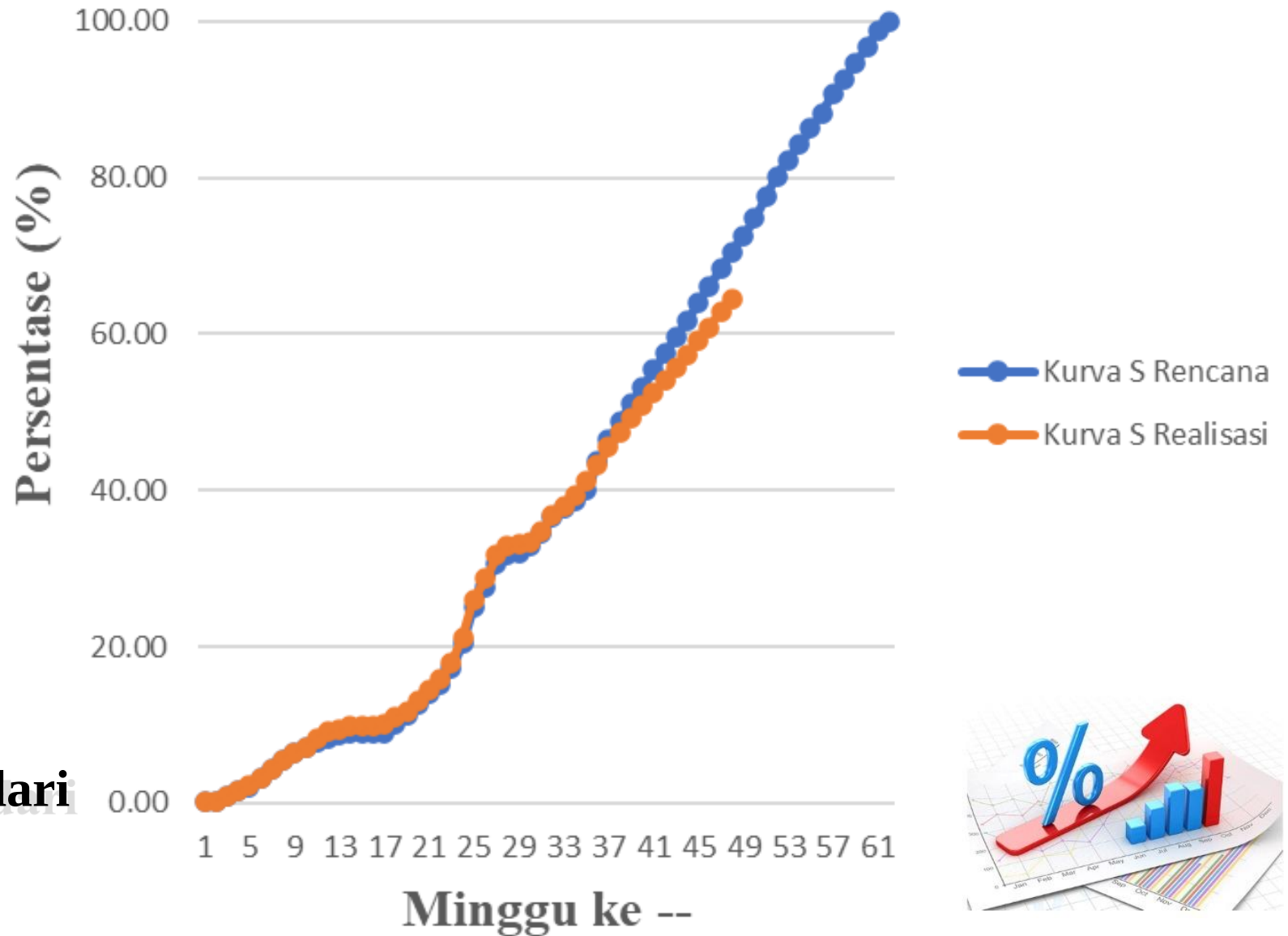
Project Case

Apartement Building Project

Minggu	36	37	38	39	40	41	42
Planning	43,7	46,4	48,8	51,1	53,3	55,4	57,5
Realisasi	43,21	45,52	47,45	49,21	50,89	52,51	54,09
Deviasi	-0,51	-0,89	-1,30	-1,86	-2,36	-2,91	-3,44

Minggu	43	44	45	46	47	48
Planning	59,6	61,8	64	66,2	68,4	70,5
Realisasi	55,64	57,23	59,26	60,89	62,94	64,55
Deviasi	-4,00	-4,58	-4,77	-5,31	-5,43	-5,99

Trend performance terlambat dari minggu ke 36 – 48



Budget Plan IDR.164.552.000.000,-



Perhitungan BCWS/PV

Week	Bobot Pekerjaan		Nilai Kontrak (RAB)	Planned Value (PV) BCWS	Planned Value (PV) Komulatif
	(%)	Komulatif			
12	0.61	8.35	164,552,000,000	1,003,767,200	13,740,092,000
24	3.14	20.39	164,552,000,000	5,166,932,800	33,552,180,131
36	3.73	43.72	164,552,000,000	6,137,789,600	71,942,161,731
48	2.17	70.54	164,552,000,000	3,570,778,400	116,075,008,131

Perhitungan BCWP/EV

Week	Bobot Realisasi		Nilai Kontrak (RAB)	Earned Value (PV)	Earned Value (PV) Komulatif
	(%)	Komulatif			
12	1.07	9.28	164,552,000,000	1,760,706,400	15,270,425,600
24	3.21	21.22	164,552,000,000	5,282,119,200	34,917,934,400
36	2.11	43.21	164,552,000,000	3,472,047,200	71,102,919,200
48	1.61	64.55	164,552,000,000	2,649,287,200	106,218,316,000



Actual Cost of Work Performed (ACWP)



Actual Cost of Work Performed)/ACWP adalah jumlah **biaya aktual pekerjaan** yang telah dikeluarkan pada kurun waktu pelaporan tertentu.

Week	Actual Cost (ACWP)	Actual Cost (ACWP) Komulatif
12	1,629,064,800	14,385,464,944
24	2,722,019,184	48,549,586,632
36	1,889,550,616	74,979,616,223
48	3,584,929,872	109,165,952,431



Perhitungan Schedule Varians

TIME SCHEDULE



$$SV = EV - PV$$

Week	Earned Value (EV)	Planned Value (PV)	Schedule Variance (SV)
12	15,270,425,600	13,740,092,000	1,530,333,600
24	34,917,934,400	33,552,180,131	1,365,754,269
36	71,102,919,200	71,942,161,731	-839,242,531
48	106,218,316,000	116,075,008,131	-9,856,692,131



Perhitungan Cost Varians

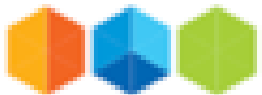
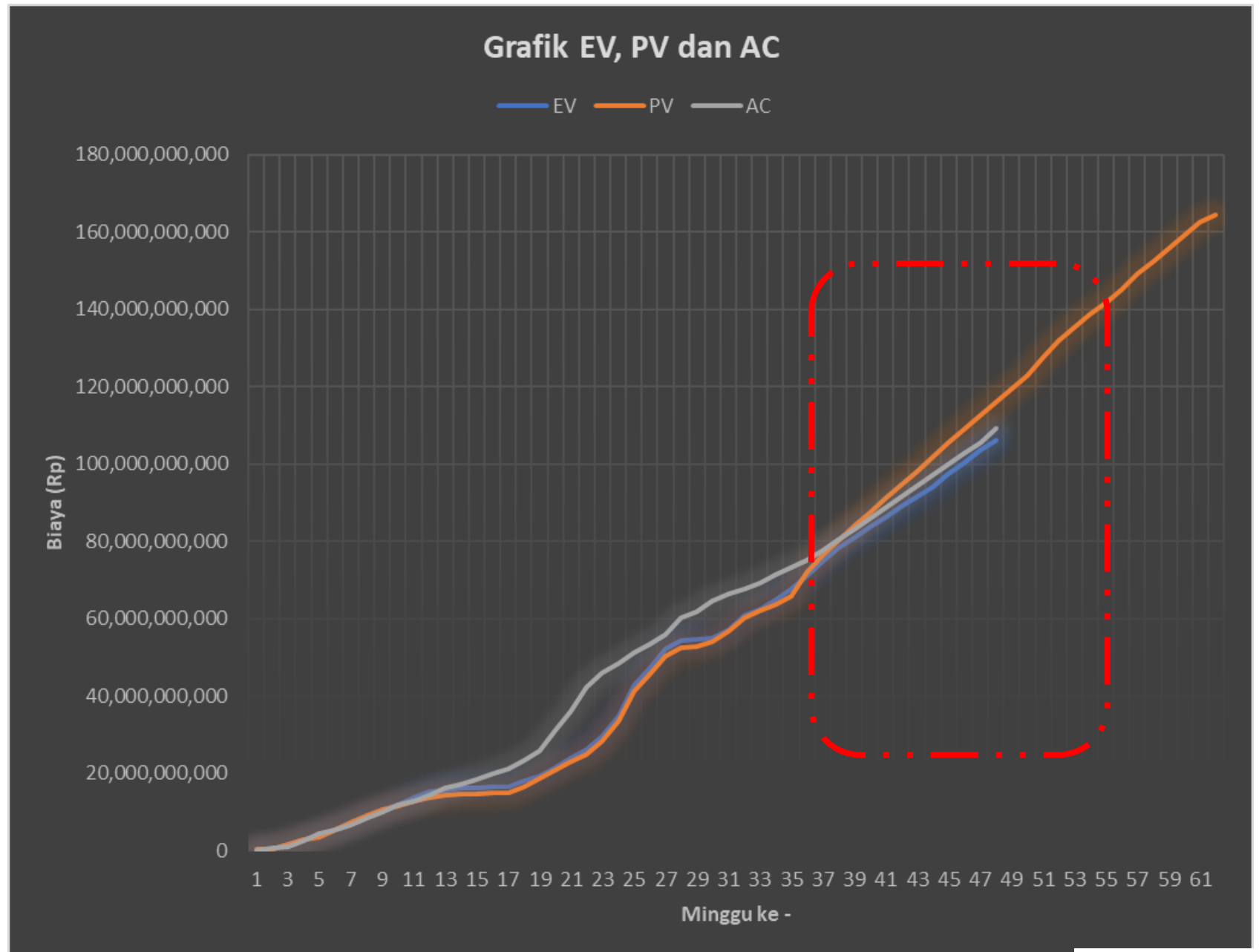


$$CV = EV - AC$$

Week	Earned Value (EV)	Actual Cost (AC)	Cost Variance (CV)
12	15,270,425,600	14,385,464,944	884,960,656
24	34,917,934,400	48,549,586,632	-13,631,652,232
36	71,102,919,200	74,979,616,223	-3,876,697,023
48	106,218,316,000	109,165,952,431	-2,947,636,431



Grafik EV, PV dan AC



Perhitungan SPI

$$SPI = EV / PV$$

Week	Earned Value (EV)	Planned Value (PV)/(BCWS)	SPI
12	15,270,425,600	13,740,092,000	1.11
24	34,917,934,400	33,552,180,131	1.04
36	71,102,919,200	71,942,161,731	0.99
48	106,218,316,000	116,075,008,131	0.92

TIME SCHEDULE



Dimana,
SPI = 1 : proyek tepat waktu
SPI > 1 : proyek lebih cepat
SPI < 1 : proyek terlambat



Perhitungan CPI

$$\text{CPI} = \text{EV} / \text{AC}$$

Week	Earned Value (EV)	Actual Cost (ACWP)	CPI
12	15,270,425,600	14,385,464,944	1.06
24	34,917,934,400	48,549,586,632	0.72
36	71,102,919,200	74,979,616,223	0.95
48	106,218,316,000	109,165,952,431	0.97

Dimana,
CPI = 1 : biaya sesuai rencana
CPI > 1 : biaya lebih kecil/hemat
CPI < 1 : biaya lebih besar/boros



Perhitungan Estimate to Complete (ETC)

$$ETC = (BAC - EV) / CPI$$

$$ETC (M48) = (BAC - BCWP (M48) / CPI (M48)$$

$$ETC (M48) = (Rp. 164.552.000.000,- - Rp. 106.218.316.000,-) / 0.97$$

$$ETC (M48) = Rp. 59.952.486.657,-$$

Perhitungan Estimate at Completion (EAC)

$$EAC = AC + ETC$$

$$EAC = ACWP (M48) + ETC (M48)$$

$$EAC = Rp. 109.165.952.431,- + Rp. 59.952.486.657,-$$

$$EAC = Rp. 169.118.439.088,-$$



Perhitungan Estimate Completion Date (ECD)

$$ECD = [(OD - ATE)/SPI] + ATE$$

Dimana:

1. ECD (*Estimate Completion Date*) : Perkiraan Waktu Penyelesaian
2. ATE (*Actual Time Expended*) : Waktu Yang telah di tempuh
3. OD (*Original Duration*) : Waktu Yang direncanakan



Perkiraan Waktu penyelesaian proyek				
[OD] / Original Duration (Rencana)	62	Minggu	434	Hari
[ATE] / Waktu yang telah ditempuh	48	Minggu	336	Hari
Sisa waktu [OD - ATE]	14	Minggu	98	Hari
SPI (M48)	0.92			
[ECD] / Perkiraan Waktu Penyelesaian	63.2	Minggu	443	Hari



CONCLUSION

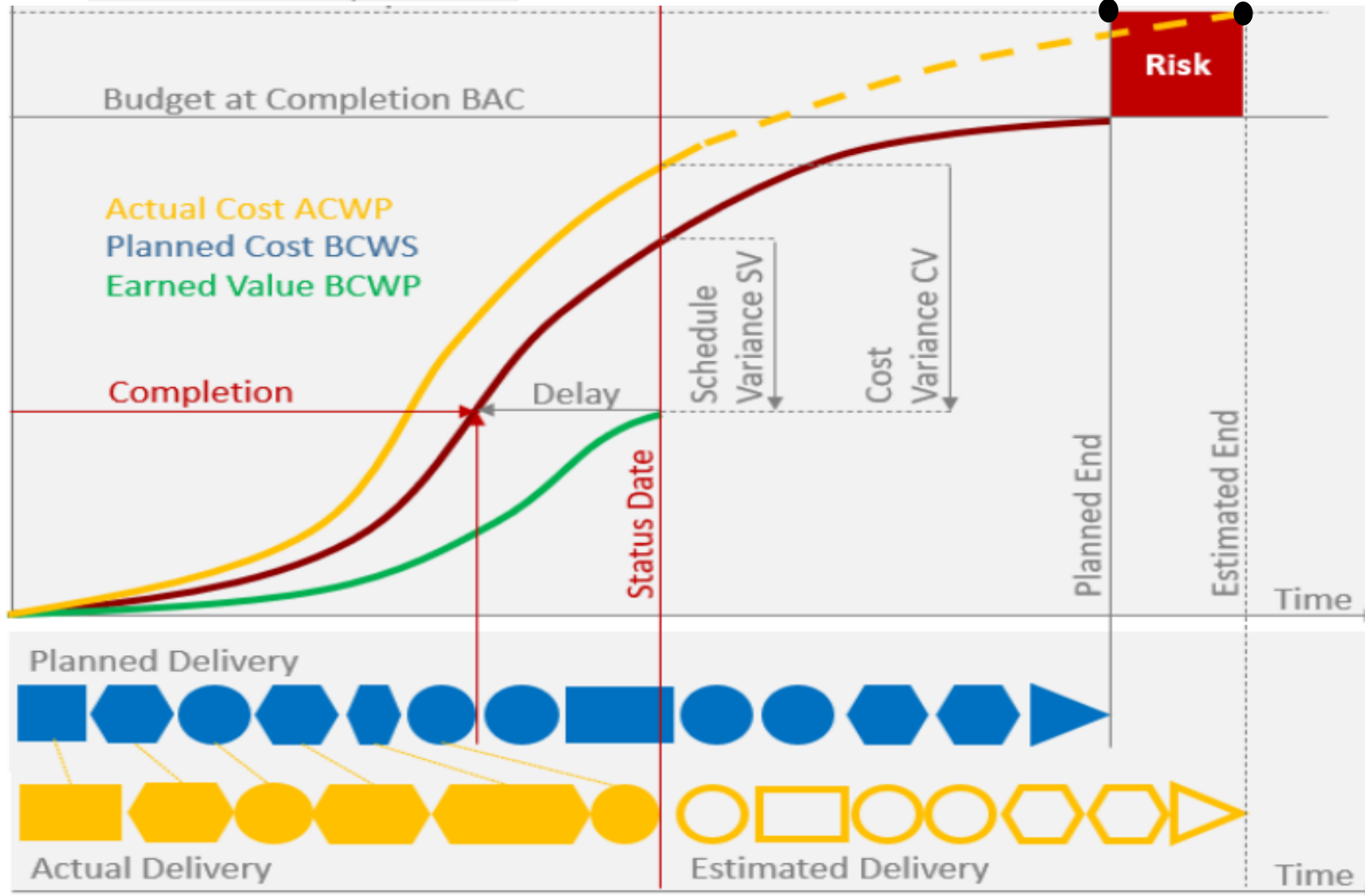
- ❖ Proyek akan terselesaikan 443 hari [*Jadwal rencana semula 434 hari*]
- ❖ Biaya Pelaksanaan Proyek akan Menjadi IDR. 169.118.439.088,- [*dari Rencana Anggaran Awal sebesar IDR. 164.552.000.000,-*]



- ❖ Point [1] & [2] akan terjadi jika performance proyek sama dengan sebelumnya.
- ❖ Dengan mengetahui kondisi ini, dicarikan langkah-langkah upaya untuk mengembalikan ke rencana di baseline

Estimated at Completion EAC

434 hari 443 hari



IDR. 169.118.439.088,-

IDR. 164.552.000.000,-



Calculation Attached

Planned Value

Week	Bobot Pekerjaan		Nilai Kontrak (RAB)	Planned Value (PV) BCWS	Planned Value (PV) Kumulatif
	(%)	Kumulatif			
1	0,12	0,12	164.552.000.000	197.462.400	197.462.400
2	0,12	0,24	164.552.000.000	197.462.400	394.924.800
3	0,66	0,9	164.552.000.000	1.086.043.200	1.480.968.000
4	0,71	1,61	164.552.000.000	1.168.319.200	2.649.287.200
5	0,54	2,15	164.552.000.000	888.580.800	3.537.868.000
6	1,08	3,23	164.552.000.000	1.777.161.600	5.315.029.600
7	1,09	4,32	164.552.000.000	1.793.616.800	7.108.646.400
8	1,17	5,49	164.552.000.000	1.925.258.400	9.033.904.800
9	0,9	6,39	164.552.000.000	1.480.968.000	10.514.872.800
10	0,65	7,04	164.552.000.000	1.069.588.000	11.584.460.800
11	0,7	7,74	164.552.000.000	1.151.864.000	12.736.324.800
12	0,61	8,35	164.552.000.000	1.003.767.200	13.740.092.000
13	0,3	8,65	164.552.000.000	493.656.000	14.233.748.000
14	0,27	8,92	164.552.000.000	444.290.400	14.678.038.400
15	0,00	8,92	164.552.000.000	27.331	14.678.065.731
16	0,05	8,97	164.552.000.000	82.276.000	14.760.341.731
17	0,03	9,00	164.552.000.000	49.365.600	14.809.707.331
18	1,05	10,05	164.552.000.000	1.727.796.000	16.537.503.331
19	1,27	11,32	164.552.000.000	2.089.810.400	18.627.313.731
20	1,27	12,59	164.552.000.000	2.089.810.400	20.717.124.131
21	1,38	13,97	164.552.000.000	2.270.817.600	22.987.941.731
22	1,15	15,12	164.552.000.000	1.892.348.000	24.880.289.731
23	2,13	17,25	164.552.000.000	3.504.957.600	28.385.247.331
24	3,14	20,39	164.552.000.000	5.166.932.800	33.552.180.131
25	4,68	25,07	164.552.000.000	7.701.033.600	41.253.213.731
26	2,63	27,70	164.552.000.000	4.327.717.600	45.580.931.331
27	2,93	30,63	164.552.000.000	4.821.373.600	50.402.304.931
28	1,23	31,86	164.552.000.000	2.023.989.600	52.426.294.531
29	0,19	32,05	164.552.000.000	312.648.800	52.738.943.331
30	0,85	32,90	164.552.000.000	1.398.692.000	54.137.635.331
31	1,53	34,43	164.552.000.000	2.517.645.600	56.655.280.931
32	2,14	36,57	164.552.000.000	3.521.412.800	60.176.693.731
33	1,1	37,67	164.552.000.000	1.810.072.000	61.986.765.731
34	0,97	38,64	164.552.000.000	1.596.154.400	63.582.920.131
35	1,35	39,99	164.552.000.000	2.221.452.000	65.804.372.131
36	3,73	43,72	164.552.000.000	6.137.789.600	71.942.161.731
37	2,69	46,41	164.552.000.000	4.426.448.800	76.368.610.531
38	2,34	48,75	164.552.000.000	3.850.516.800	80.219.127.331
39	2,32	51,07	164.552.000.000	3.817.606.400	84.036.733.731
40	2,18	53,25	164.552.000.000	3.587.233.600	87.623.967.331
41	2,17	55,42	164.552.000.000	3.570.778.400	91.194.745.731
42	2,11	57,53	164.552.000.000	3.472.047.200	94.666.792.931
43	2,11	59,64	164.552.000.000	3.472.047.200	98.138.840.131
44	2,17	61,81	164.552.000.000	3.570.778.400	101.709.618.531
45	2,22	64,03	164.552.000.000	3.653.054.400	105.362.672.931
46	2,17	66,20	164.552.000.000	3.570.778.400	108.933.451.331
47	2,17	68,37	164.552.000.000	3.570.778.400	112.504.229.731
48	2,17	70,54	164.552.000.000	3.570.778.400	116.075.008.131

48	2,17	70,54	164.552.000.000	3.570.778.400	116.075.008.131
49	2,11	72,65	164.552.000.000	3.472.047.200	119.547.055.331
50	2,11	74,76	164.552.000.000	3.472.047.200	123.019.102.531
51	2,82	77,58	164.552.000.000	4.640.366.400	127.659.468.931
52	2,58	80,16	164.552.000.000	4.245.441.600	131.904.910.531
53	2,09	82,25	164.552.000.000	3.439.136.800	135.344.047.331
54	2,01	84,26	164.552.000.000	3.307.495.200	138.651.542.531
55	2,01	86,27	164.552.000.000	3.307.495.200	141.959.037.731
56	2,01	88,28	164.552.000.000	3.307.495.200	145.266.532.931
57	2,42	90,70	164.552.000.000	3.982.158.400	149.248.691.331
58	1,98	92,68	164.552.000.000	3.258.129.600	152.506.820.931
59	2,08	94,76	164.552.000.000	3.422.681.600	155.929.502.531
60	1,97	96,73	164.552.000.000	3.241.674.400	159.171.176.931
61	2,12	98,85	164.552.000.000	3.488.502.400	162.659.679.331
62	1,15	100,00	164.552.000.000	1.892.348.000	164.552.027.331



Week	Bobot Realisasi		Nilai Kontrak (RAB)	Earned Value (PV)	Earned Value (PV) Komulatif
	(%)	Kumulatif			
1	0,11	0,11	164.552.000.000	181.007.200	181.007.200
2	0,11	0,22	164.552.000.000	181.007.200	362.014.400
3	0,69	0,91	164.552.000.000	1.135.408.800	1.497.423.200
4	0,72	1,63	164.552.000.000	1.184.774.400	2.682.197.600
5	0,68	2,31	164.552.000.000	1.118.953.600	3.801.151.200
6	0,92	3,23	164.552.000.000	1.513.878.400	5.315.029.600
7	1,07	4,3	164.552.000.000	1.760.706.400	7.075.736.000
8	1,26	5,56	164.552.000.000	2.073.355.200	9.149.091.200
9	0,85	6,41	164.552.000.000	1.398.692.000	10.547.783.200
10	0,72	7,13	164.552.000.000	1.184.774.400	11.732.557.600
11	1,08	8,21	164.552.000.000	1.777.161.600	13.509.719.200
12	1,07	9,28	164.552.000.000	1.760.706.400	15.270.425.600
13	0,1	9,38	164.552.000.000	164.552.000	15.434.977.600
14	0,42	9,8	164.552.000.000	691.118.400	16.126.096.000
15	0,02	9,82	164.552.000.000	32.910.400	16.159.006.400
16	0,17	9,99	164.552.000.000	279.738.400	16.438.744.800
17	0,03	10,02	164.552.000.000	49.365.600	16.488.110.400
18	1,01	11,03	164.552.000.000	1.661.975.200	18.150.085.600
19	0,75	11,78	164.552.000.000	1.234.140.000	19.384.225.600
20	1,25	13,03	164.552.000.000	2.056.900.000	21.441.125.600
21	1,5	14,53	164.552.000.000	2.468.280.000	23.909.405.600
22	1,26	15,79	164.552.000.000	2.073.355.200	25.982.760.800
23	2,22	18,01	164.552.000.000	3.653.054.400	29.635.815.200
24	3,21	21,22	164.552.000.000	5.282.119.200	34.917.934.400
25	4,84	26,06	164.552.000.000	7.964.316.800	42.882.251.200
26	2,68	28,74	164.552.000.000	4.409.993.600	47.292.244.800
27	2,99	31,73	164.552.000.000	4.920.104.800	52.212.349.600
28	1,21	32,94	164.552.000.000	1.991.079.200	54.203.428.800
29	0,2	33,14	164.552.000.000	329.104.000	54.532.532.800
30	0,3	33,44	164.552.000.000	493.656.000	55.026.188.800
31	1,27	34,71	164.552.000.000	2.089.810.400	57.115.999.200
32	2,19	36,90	164.552.000.000	3.603.688.800	60.719.688.000
33	1,01	37,91	164.552.000.000	1.661.975.200	62.381.663.200
34	1,49	39,40	164.552.000.000	2.451.824.800	64.833.488.000
35	1,7	41,10	164.552.000.000	2.797.384.000	67.630.872.000
36	2,11	43,21	164.552.000.000	3.472.047.200	71.102.919.200
37	2,31	45,52	164.552.000.000	3.801.151.200	74.904.070.400
38	1,93	47,45	164.552.000.000	3.175.853.600	78.079.924.000
39	1,76	49,21	164.552.000.000	2.896.115.200	80.976.039.200
40	1,68	50,89	164.552.000.000	2.764.473.600	83.740.512.800
41	1,62	52,51	164.552.000.000	2.665.742.400	86.406.255.200
42	1,58	54,09	164.552.000.000	2.599.921.600	89.006.176.800
43	1,55	55,64	164.552.000.000	2.550.556.000	91.556.732.800
44	1,59	57,23	164.552.000.000	2.616.376.800	94.173.109.600
45	2,03	59,26	164.552.000.000	3.340.405.600	97.513.515.200
46	1,63	60,89	164.552.000.000	2.682.197.600	100.195.712.800
47	2,05	62,94	164.552.000.000	3.373.316.000	103.569.028.800
48	1,61	64,55	164.552.000.000	2.649.287.200	106.218.316.000
49					

Earned Value

Actual Cost

Week	Actual Cost (ACWP)		Actual Cost (ACWP) Komulatif
1	141.514.720		141.514.720
2	360.533.432		502.048.152
3	545.160.776		1.047.208.928
4	1.379.274.864		2.426.483.792
5	1.939.080.768		4.365.564.560
6	1.018.741.432		5.384.305.992
7	1.076.334.632		6.460.640.624
8	2.073.519.752		8.534.160.376
9	1.443.450.144		9.977.610.520
10	1.706.897.896		11.684.508.416
11	1.071.891.728		12.756.400.144
12	1.629.064.800		14.385.464.944
13	1.612.609.600		15.998.074.544
14	1.010.678.384		17.008.752.928
15	1.415.147.200		18.423.900.128
16	1.332.212.992		19.756.113.120
17	1.332.212.992		21.088.326.112
18	2.181.630.416		23.269.956.528
19	2.346.511.520		25.616.468.048
20	5.283.600.168		30.900.068.216
21	5.040.063.208		35.940.131.424
22	6.356.972.864		42.297.104.288
23	3.530.463.160		45.827.567.448
24	2.722.019.184		48.549.586.632
25	2.587.415.648		51.137.002.280
26	2.108.569.328		53.245.571.608
27	2.744.562.808		55.990.134.416
28	4.108.863.440		60.098.997.856
29	1.780.617.192		61.879.615.048
30	2.551.872.416		64.431.487.464
31	1.842.982.400		66.274.469.864
32	1.523.586.968		67.798.056.832
33	1.523.586.968		69.321.643.800
34	2.007.534.400		71.329.178.200
35	1.760.887.407		73.090.065.607
36	1.889.550.616		74.979.616.223
37	2.657.679.352		77.637.295.575
38	2.791.789.232		80.429.084.807
39	2.779.776.936		83.208.861.743
40	2.686.805.056		85.895.666.799
41	2.851.357.056		88.747.023.855
42	2.686.805.056		91.433.828.911
43	2.762.828.080		94.196.656.991
44	2.931.000.224		97.127.657.215
45	2.762.169.872		99.889.827.087
46	2.929.025.600		102.818.852.687
47	2.762.169.872		105.581.022.559
48	3.584.929.872		109.165.952.431
49			

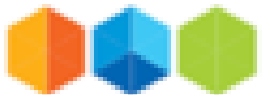


Schedule Variance (SV)

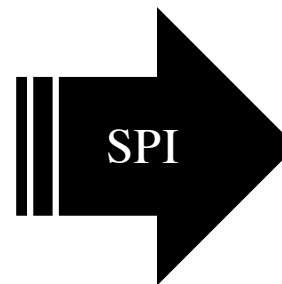
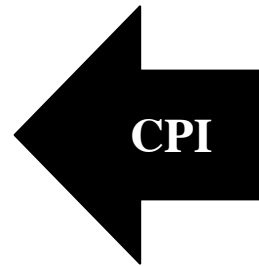
Week	Earned Value (EV)	Planned Value (PV)	Schedule Variance (SV)
1	181.007.200	197.462.400	-16.455.200
2	362.014.400	394.924.800	-32.910.400
3	1.497.423.200	1.480.968.000	16.455.200
4	2.682.197.600	2.649.287.200	32.910.400
5	3.801.151.200	3.537.868.000	263.283.200
6	5.315.029.600	5.315.029.600	0
7	7.075.736.000	7.108.646.400	-32.910.400
8	9.149.091.200	9.033.904.800	115.186.400
9	10.547.783.200	10.514.872.800	32.910.400
10	11.732.557.600	11.584.460.800	148.096.800
11	13.509.719.200	12.736.324.800	773.394.400
12	15.270.425.600	13.740.092.000	1.530.333.600
13	15.434.977.600	14.233.748.000	1.201.229.600
14	16.126.096.000	14.678.038.400	1.448.057.600
15	16.159.006.400	14.678.065.731	1.480.940.669
16	16.438.744.800	14.760.341.731	1.678.403.069
17	16.488.110.400	14.809.707.331	1.678.403.069
18	18.150.085.600	16.537.503.331	1.612.582.269
19	19.384.225.600	18.627.313.731	756.911.869
20	21.441.125.600	20.717.124.131	724.001.469
21	23.909.405.600	22.987.941.731	921.463.869
22	25.982.760.800	24.880.289.731	1.102.471.069
23	29.635.815.200	28.385.247.331	1.250.567.869
24	34.917.934.400	33.552.180.131	1.365.754.269
25	42.882.251.200	41.253.213.731	1.629.037.469
26	47.292.244.800	45.580.931.331	1.711.313.469
27	52.212.349.600	50.402.304.931	1.810.044.669
28	54.203.428.800	52.426.294.531	1.777.134.269
29	54.532.532.800	52.738.943.331	1.793.589.469
30	55.026.188.800	54.137.635.331	888.553.469
31	57.115.999.200	56.655.280.931	460.718.269
32	60.719.688.000	60.176.693.731	542.994.269
33	62.381.663.200	61.986.765.731	394.897.469
34	64.833.488.000	63.582.920.131	1.250.567.869
35	67.630.872.000	65.804.372.131	1.826.499.869
36	71.102.919.200	71.942.161.731	-839.242.531
37	74.904.070.400	76.368.610.531	-1.464.540.131
38	78.079.924.000	80.219.127.331	-2.139.203.331
39	80.976.039.200	84.036.733.731	-3.060.694.531
40	83.740.512.800	87.623.967.331	-3.883.454.531
41	86.406.255.200	91.194.745.731	-4.788.490.531
42	89.006.176.800	94.666.792.931	-5.660.616.131
43	91.556.732.800	98.138.840.131	-6.582.107.331
44	94.173.109.600	101.709.618.531	-7.536.508.931
45	97.513.515.200	105.362.672.931	-7.849.157.731
46	100.195.712.800	108.933.451.331	-8.737.738.531
47	103.569.028.800	112.504.229.731	-8.935.200.931
48	106.218.316.000	116.075.008.131	-9.856.692.131

Cost Variance (CV)

Week	Earned Value (EV)	Actual Cost (AC)	Cost Variance (CV)
1	181.007.200	141.514.720	39.492.480
2	362.014.400	502.048.152	-140.033.752
3	1.497.423.200	1.047.208.928	450.214.272
4	2.682.197.600	2.426.483.792	255.713.808
5	3.801.151.200	4.365.564.560	-564.413.360
6	5.315.029.600	5.384.305.992	-69.276.392
7	7.075.736.000	6.460.640.624	615.095.376
8	9.149.091.200	8.534.160.376	614.930.824
9	10.547.783.200	9.977.610.520	570.172.680
10	11.732.557.600	11.684.508.416	48.049.184
11	13.509.719.200	12.756.400.144	753.319.056
12	15.270.425.600	14.385.464.944	884.960.656
13	15.434.977.600	15.998.074.544	-563.096.944
14	16.126.096.000	17.008.752.928	-882.656.928
15	16.159.006.400	18.423.900.128	-2.264.893.728
16	16.438.744.800	19.756.113.120	-3.317.368.320
17	16.488.110.400	21.088.326.112	-4.600.215.712
18	18.150.085.600	23.269.956.528	-5.119.870.928
19	19.384.225.600	25.616.468.048	-6.232.242.448
20	21.441.125.600	30.900.068.216	-9.458.942.616
21	23.909.405.600	35.940.131.424	-12.030.725.824
22	25.982.760.800	42.297.104.288	-16.314.343.488
23	29.635.815.200	45.827.567.448	-16.191.752.248
24	34.917.934.400	48.549.586.632	-13.631.652.232
25	42.882.251.200	51.137.002.280	-8.254.751.080
26	47.292.244.800	53.245.571.608	-5.953.326.808
27	52.212.349.600	55.990.134.416	-3.777.784.816
28	54.203.428.800	60.098.997.856	-5.895.569.056
29	54.532.532.800	61.879.615.048	-7.347.082.248
30	55.026.188.800	64.431.487.464	-9.405.298.664
31	57.115.999.200	66.274.469.864	-9.158.470.664
32	60.719.688.000	67.798.056.832	-7.078.368.832
33	62.381.663.200	69.321.643.800	-6.939.980.600
34	64.833.488.000	71.329.178.200	-6.495.690.200
35	67.630.872.000	73.090.065.607	-5.459.193.607
36	71.102.919.200	74.979.616.223	-3.876.697.023
37	74.904.070.400	77.637.295.575	-2.733.225.175
38	78.079.924.000	80.429.084.807	-2.349.160.807
39	80.976.039.200	83.208.861.743	-2.232.822.543
40	83.740.512.800	85.895.666.799	-2.155.153.999
41	86.406.255.200	88.747.023.855	-2.340.768.655
42	89.006.176.800	91.433.828.911	-2.427.652.111
43	91.556.732.800	94.196.656.991	-2.639.924.191
44	94.173.109.600	97.127.657.215	-2.954.547.615
45	97.513.515.200	99.889.827.087	-2.376.311.887
46	100.195.712.800	102.818.852.687	-2.623.139.887
47	103.569.028.800	105.581.022.559	-2.011.993.759
48	106.218.316.000	109.165.952.431	-2.947.636.431

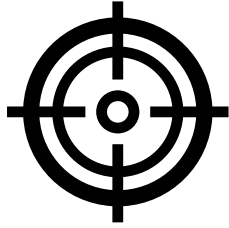


Week	Earned Value (EV)	Actual Cost (ACWP)	CPI
1	181.007.200	141.514.720	1,28
2	362.014.400	502.048.152	0,72
3	1.497.423.200	1.047.208.928	1,43
4	2.682.197.600	2.426.483.792	1,11
5	3.801.151.200	4.365.564.560	0,87
6	5.315.029.600	5.384.305.992	0,99
7	7.075.736.000	6.460.640.624	1,10
8	9.149.091.200	8.534.160.376	1,07
9	10.547.783.200	9.977.610.520	1,06
10	11.732.557.600	11.684.508.416	1,00
11	13.509.719.200	12.756.400.144	1,06
12	15.270.425.600	14.385.464.944	1,06
13	15.434.977.600	15.998.074.544	0,96
14	16.126.096.000	17.008.752.928	0,95
15	16.159.006.400	18.423.900.128	0,88
16	16.438.744.800	19.756.113.120	0,83
17	16.488.110.400	21.088.326.112	0,78
18	18.150.085.600	23.269.956.528	0,78
19	19.384.225.600	25.616.468.048	0,76
20	21.441.125.600	30.900.068.216	0,69
21	23.909.405.600	35.940.131.424	0,67
22	25.982.760.800	42.297.104.288	0,61
23	29.635.815.200	45.827.567.448	0,65
24	34.917.934.400	48.549.586.632	0,72
25	42.882.251.200	51.137.002.280	0,84
26	47.292.244.800	53.245.571.608	0,89
27	52.212.349.600	55.990.134.416	0,93
28	54.203.428.800	60.098.997.856	0,90
29	54.532.532.800	61.879.615.048	0,88
30	55.026.188.800	64.431.487.464	0,85
31	57.115.999.200	66.274.469.864	0,86
32	60.719.688.000	67.798.056.832	0,90
33	62.381.663.200	69.321.643.800	0,90
34	64.833.488.000	71.329.178.200	0,91
35	67.630.872.000	73.090.065.607	0,93
36	71.102.919.200	74.979.616.223	0,95
37	74.904.070.400	77.637.295.575	0,96
38	78.079.924.000	80.429.084.807	0,97
39	80.976.039.200	83.208.861.743	0,97
40	83.740.512.800	85.895.666.799	0,97
41	86.406.255.200	88.747.023.855	0,97
42	89.006.176.800	91.433.828.911	0,97
43	91.556.732.800	94.196.656.991	0,97
44	94.173.109.600	97.127.657.215	0,97
45	97.513.515.200	99.889.827.087	0,98
46	100.195.712.800	102.818.852.687	0,97
47	103.569.028.800	105.581.022.559	0,98
48	106.218.316.000	109.165.952.431	0,97
49			



Week	Earned Value (EV)	Planned Value (PV)/(BCWS)	SPI
1	181.007.200	197.462.400	0,92
2	362.014.400	394.924.800	0,92
3	1.497.423.200	1.480.968.000	1,01
4	2.682.197.600	2.649.287.200	1,01
5	3.801.151.200	3.537.868.000	1,07
6	5.315.029.600	5.315.029.600	1,00
7	7.075.736.000	7.108.646.400	1,00
8	9.149.091.200	9.033.904.800	1,01
9	10.547.783.200	10.514.872.800	1,00
10	11.732.557.600	11.584.460.800	1,01
11	13.509.719.200	12.736.324.800	1,06
12	15.270.425.600	13.740.092.000	1,11
13	15.434.977.600	14.233.748.000	1,08
14	16.126.096.000	14.678.038.400	1,10
15	16.159.006.400	14.678.065.731	1,10
16	16.438.744.800	14.760.341.731	1,11
17	16.488.110.400	14.809.707.331	1,11
18	18.150.085.600	16.537.503.331	1,10
19	19.384.225.600	18.627.313.731	1,04
20	21.441.125.600	20.717.124.131	1,03
21	23.909.405.600	22.987.941.731	1,04
22	25.982.760.800	24.880.289.731	1,04
23	29.635.815.200	28.385.247.331	1,04
24	34.917.934.400	33.552.180.131	1,04
25	42.882.251.200	41.253.213.731	1,04
26	47.292.244.800	45.580.931.331	1,04
27	52.212.349.600	50.402.304.931	1,04
28	54.203.428.800	52.426.294.531	1,03
29	54.532.532.800	52.738.943.331	1,03
30	55.026.188.800	54.137.635.331	1,02
31	57.115.999.200	56.655.280.931	1,01
32	60.719.688.000	60.176.693.731	1,01
33	62.381.663.200	61.986.765.731	1,01
34	64.833.488.000	63.582.920.131	1,02
35	67.630.872.000	65.804.372.131	1,03
36	71.102.919.200	71.942.161.731	0,99
37	74.904.070.400	76.368.610.531	0,98
38	78.079.924.000	80.219.127.331	0,97
39	80.976.039.200	84.036.733.731	0,96
40	83.740.512.800	87.623.967.331	0,96
41	86.406.255.200	91.194.745.731	0,95
42	89.006.176.800	94.666.792.931	0,94
43	91.556.732.800	98.138.840.131	0,93
44	94.173.109.600	101.709.618.531	0,93
45	97.513.515.200	105.362.672.931	0,93
46	100.195.712.800	108.933.451.331	0,92
47	103.569.028.800	112.504.229.731	0,92
48	106.218.316.000	116.075.008.131	0,92
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Varian Schedule

Week	Varians Schedule				Varians Cost			
	EV	PV	Hasil	Simbol	EV	AC	Hasil	Simbol
1	181.007.200	197.462.400	-16.455.200	Negatif	181.007.200	141.514.720	39.492.480	Positif
2	181.007.200	197.462.400	-16.455.200	Negatif	181.007.200	360.533.432	-179.526.232	Negatif
3	1.135.408.800	1.086.043.200	49.365.600	Positif	1.135.408.800	545.160.776	590.248.024	Positif
4	1.184.774.400	1.168.319.200	16.455.200	Positif	1.184.774.400	1.379.274.864	-194.500.464	Positif
5	1.118.953.600	888.580.800	230.372.800	Positif	1.118.953.600	1.939.080.768	-820.127.168	Negatif
6	1.513.878.400	1.777.161.600	-263.283.200	Negatif	1.513.878.400	1.018.741.432	495.136.968	Positif
7	1.760.706.400	1.793.616.800	-32.910.400	Negatif	1.760.706.400	1.076.334.632	684.371.768	Positif
8	2.073.355.200	1.925.258.400	148.096.800	Positif	2.073.355.200	2.073.519.752	-164.552	Negatif
9	1.398.692.000	1.480.968.000	-82.276.000	Negatif	1.398.692.000	1.443.450.144	-44.758.144	Negatif
10	1.184.774.400	1.069.588.000	115.186.400	Positif	1.184.774.400	1.706.897.896	-522.123.496	Negatif
11	1.777.161.600	1.151.864.000	625.297.600	Positif	1.777.161.600	1.071.891.728	705.269.872	Positif
12	1.760.706.400	1.003.767.200	756.939.200	Positif	1.760.706.400	1.629.064.800	131.641.600	Positif
13	164.552.000	493.656.000	-329.104.000	Negatif	164.552.000	1.612.609.600	-1.448.057.600	Negatif
14	691.118.400	444.290.400	246.828.000	Positif	691.118.400	1.010.678.384	-319.559.984	Negatif
15	32.910.400	27.331	32.883.069	Positif	32.910.400	1.415.147.200	-1.382.236.800	Negatif
16	279.738.400	82.276.000	197.462.400	Positif	279.738.400	1.332.212.992	-1.052.474.592	Negatif
17	49.365.600	49.365.600	0	Positif	49.365.600	1.332.212.992	-1.282.847.392	Negatif
18	1.661.975.200	1.727.796.000	-65.820.800	Negatif	1.661.975.200	2.181.630.416	-519.655.216	Negatif
19	1.234.140.000	2.089.810.400	-855.670.400	Negatif	1.234.140.000	2.346.511.520	-1.112.371.520	Negatif
20	2.056.900.000	2.089.810.400	-32.910.400	Negatif	2.056.900.000	5.283.600.168	-3.226.700.168	Negatif
21	2.468.280.000	2.270.817.600	197.462.400	Positif	2.468.280.000	5.040.063.208	-2.571.783.208	Negatif
22	2.073.355.200	1.892.348.000	181.007.200	Positif	2.073.355.200	6.356.972.864	-4.283.617.664	Negatif
23	3.653.054.400	3.504.957.600	148.096.800	Positif	3.653.054.400	3.530.463.160	122.591.240	Positif
24	5.282.119.200	5.166.932.800	115.186.400	Positif	5.282.119.200	2.722.019.184	2.560.100.016	Positif
25	7.964.316.800	7.701.033.600	263.283.200	Positif	7.964.316.800	2.587.415.648	5.376.901.152	Positif





Varian Schedule

Week	Varians Schedule				Varians Cost			
	EV	PV	Hasil	Simbol	EV	AC	Hasil	Simbol
26	4.409.993.600	4.327.717.600	82.276.000	Positif	4.409.993.600	2.108.569.328	2.301.424.272	Positif
27	4.920.104.800	4.821.373.600	98.731.200	Positif	4.920.104.800	2.744.562.808	2.175.541.992	Positif
28	1.991.079.200	2.023.989.600	-32.910.400	Negatif	1.991.079.200	4.108.863.440	-2.117.784.240	Negatif
29	329.104.000	312.648.800	16.455.200	Positif	329.104.000	1.780.617.192	-1.451.513.192	Negatif
30	493.656.000	1.398.692.000	-905.036.000	Negatif	493.656.000	2.551.872.416	-2.058.216.416	Negatif
31	2.089.810.400	2.517.645.600	-427.835.200	Negatif	2.089.810.400	1.842.982.400	246.828.000	Positif
32	3.603.688.800	3.521.412.800	82.276.000	Positif	3.603.688.800	1.523.586.968	2.080.101.832	Positif
33	1.661.975.200	1.810.072.000	-148.096.800	Negatif	1.661.975.200	1.523.586.968	138.388.232	Positif
34	2.451.824.800	1.596.154.400	855.670.400	Positif	2.451.824.800	2.007.534.400	444.290.400	Positif
35	2.797.384.000	2.221.452.000	575.932.000	Positif	2.797.384.000	1.760.887.407	1.036.496.593	Positif
36	3.472.047.200	6.137.789.600	-2.665.742.400	Negatif	3.472.047.200	1.889.550.616	1.582.496.584	Positif
37	3.801.151.200	4.426.448.800	-625.297.600	Negatif	3.801.151.200	2.657.679.352	1.143.471.848	Positif
38	3.175.853.600	3.850.516.800	-674.663.200	Negatif	3.175.853.600	2.791.789.232	384.064.368	Positif
39	2.896.115.200	3.817.606.400	-921.491.200	Negatif	2.896.115.200	2.779.776.936	116.338.264	Positif
40	2.764.473.600	3.587.233.600	-822.760.000	Negatif	2.764.473.600	2.686.805.056	77.668.544	Positif
41	2.665.742.400	3.570.778.400	-905.036.000	Negatif	2.665.742.400	2.851.357.056	-185.614.656	Negatif
42	2.599.921.600	3.472.047.200	-872.125.600	Negatif	2.599.921.600	2.686.805.056	-86.883.456	Negatif
43	2.550.556.000	3.472.047.200	-921.491.200	Negatif	2.550.556.000	2.762.828.080	-212.272.080	Negatif
44	2.616.376.800	3.570.778.400	-954.401.600	Negatif	2.616.376.800	2.931.000.224	-314.623.424	Negatif
45	3.340.405.600	3.653.054.400	-312.648.800	Negatif	3.340.405.600	2.762.169.872	578.235.728	Positif
46	2.682.197.600	3.570.778.400	-888.580.800	Negatif	2.682.197.600	2.929.025.600	-246.828.000	Negatif
47	3.373.316.000	3.570.778.400	-197.462.400	Negatif	3.373.316.000	2.762.169.872	611.146.128	Positif
48	2.649.287.200	3.570.778.400	-921.491.200	Negatif	2.649.287.200	3.584.929.872	-935.642.672	Negatif
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TERIMA KASIH

