

LAMPIRAN

LAMPIRAN A
PERHITUNGAN CYCLE TIME ALAT GALI MUAT DAN ALAT
ANGKUT

1. Cycle Time

Setelah dilakukan pengamatan dan pengambilan data dilapangan didapatkan *cycle time* sebagai berikut.

a. Cycle Time Alat Gali Muat Actual

Cycle time alat muat *Excavator Hitachi 470* :

$$\begin{aligned} \text{Digging} &= 11.00 \text{ (s)} \\ \text{Swing load} &= 9.00 \text{ (s)} \\ \text{Dumping} &= 7.00 \text{ (s)} \\ \text{Swing empty} &= 6.00 \text{ (s)} \\ \text{CT} &= \text{Digging} + \text{Swing load} + \text{Dumping} + \text{Swing empty} \\ &= 11.00 + 9.00 + 7.00 + 6.00 \\ &= 33.00 \text{ (s)} \\ &= 0.55 \text{ menit} \end{aligned}$$

b. Cycle Time Alat Gali Muat Setelah Perbaikan

Cycle time alat muat *Excavator Hitachi 470* :

$$\begin{aligned} \text{Digging} &= 10.00 \text{ (s)} \\ \text{Swing load} &= 7.00 \text{ (s)} \\ \text{Dumping} &= 6.00 \text{ (s)} \\ \text{Swing empty} &= 5.00 \text{ (s)} \\ \text{CT} &= \text{Digging} + \text{Swing load} + \text{Dumping} + \text{Swing empty} \\ &= 10.00 + 7.00 + 6.00 + 5.00 \\ &= 28.00 \text{ (s)} \\ &= 0.46 \text{ menit} \end{aligned}$$

c. Cycle Time Alat Angkut Actual

Cycle time alat angkut Dump truck Dongfeng KC K37F dari loading point – ROM

<i>Average – Manuver</i>	= 0.45
<i>Loading</i>	= 6.60
<i>Hauling</i>	= 4.00
<i>Manuver dumping</i>	= 0.35
<i>Dumping</i>	= 0.40
<i>Hauling kosong</i>	= 3.43
<i>Delay</i>	= 0.30
<i>CT</i>	= <i>Manuver + Loading + Hauling + Manuver dumping + Dumping + Hauling kosong + Delay</i>
	= 0.45 + 5.60 + 4.00 + 0.35 + 0.40 + 3.43 + 0.30
	= 15.53 menit

d. Cycle Time Alat Angkut Setelah Perbaikan

Cycle time alat angkut Dump truck Dongfeng KC K37F dari loading point – ROM

<i>Average – Manuver</i>	= 0.45 (m)
<i>Loading</i>	= 5.60 (m)
<i>Hauling</i>	= 4.00 (m)
<i>Manuver dumping</i>	= 0.35 (m)
<i>Dumping</i>	= 0.40 (m)
<i>Hauling kosong</i>	= 3.43 (m)
<i>Delay</i>	= 0.29 (m)
<i>CT</i>	= <i>Manuver + Loading + Hauling + Manuver dumping + Dumping + Hauling kosong + Delay</i>

$$\begin{aligned} &= 0.45 + 5.60 + 4.00 + 0.35 + 0.40 + 3.43 + \\ &0.30 \\ &= 14.53 \text{ menit} \end{aligned}$$

LAMPIRAN B
PERHITUNGAN PRODUKTIVITAS ALAT GALI MUAT DAN ALAT
ANGKUT

1. Produktivitas Alat Gali Muat

Dari hasil perhitungan produktivitas alat gali muat *Excavator Hitachi 470* di pit elang pada bulan April didapatkan :

Diketahui :

<i>Digging</i>	= 10.00
<i>Swing isi</i>	= 7.00
<i>Dumping</i>	= 6.00
<i>Swing kosong</i>	= 5.00
<i>Cycle time CTm</i>	= 28.00
<i>Kb</i>	= 2.5 m ³
<i>Ff</i>	= 0.85
<i>PA</i>	= 0.94
<i>SF</i>	= 0.80
<i>CT</i>	= 28

Penyelesaian :

$$\begin{aligned} PM &= \left(\frac{3600}{CTm} \times Kb \times Ff \times SF \times PA \right) \\ &= \left(\frac{3600}{28} \times 2,5 \times 0.85 \times 0.80 \times 0.94 \right) \\ &= 205.46 \text{ bcm/jam} \end{aligned}$$

2. Produktivitas Alat Angkut

Dari hasil hitungan produktivitas alat angkut *Dump truck Dongfeng KC K37F* di pit elang pada bulan April didapatkan :

<i>Manuver</i>	= 0.45
<i>Loading</i>	= 5.60
<i>Hauling</i>	= 4.00
<i>Manuver dumping</i>	= 0.35
<i>Dumping</i>	= 0.40
<i>Hauling kosong</i>	= 3.43
<i>Delay</i>	= 0.30
<i>Cycle time CTm</i>	= 14.53
<i>n</i>	= 12 <i>bucket</i>
<i>Kb</i>	= 2.5 m ³
<i>Ff</i>	= 0.85
<i>SF</i>	= 0.80
<i>PA</i>	= 0.94
<i>CT</i>	= 14.53

Penyelesaian :

$$\begin{aligned} Kt &= n \times Kb \times Ff \times SF \\ &= 12 \times 2.5 \times 0.85 \times 0.80 \\ &= 20.4 \text{ m}^3 \end{aligned}$$

$$\begin{aligned} Pa &= \left(\frac{60}{CTa} \times Kt \times PA \right) \\ &= \left(\frac{60}{14,53} \times 20.4 \times 0.94 \right) \\ &= 79.19 \text{ bcm/jam} \end{aligned}$$

LAMPIRAN C
PERHITUNGAN MATCH FACTOR ALAT GALI MUAT DAN ALAT
ANGKUT

1. Perhitungan *Match Factor*

Perhitungan alat gali muat *Excavator Hitachi 470* dengan alat angkut *Dump Truck* adalah :

Na	= 10 unit
Nm	= 4 unit
CTm	= 28 detik
CTa	= 14.53 menit
n	= 12 kali

Penyelesaian :

$$\begin{aligned}MF &= Na \times n \times (CTm)/Nm \times CTa \\ &= 10 \times 12 \times (28/60)/4 \times 14.53 \\ &= 0.96\end{aligned}$$

2. Perhitungan Waktu Kehilangan Kerja Alat

MF < 1, artinya alat gali muat bekerja kurang dari 100%, sedangkan alat angkut bekerja 100%. Karena jumlah alat angkut yang dilayani alat gali muat lebih sedikit dari pada alat gali muat dan alat gali muat harus menunggu alat angkut, sehingga terdapat waktu tunggu bagi alat gali muat karena menunggu alat angkut yang belum datang.

$$Wtm = Nm \times CTa/Na - CTm$$

$$Wtm = 4 \times 14.53/10 - 5.6$$

$$Wtm = 0.212 \text{ menit}$$

$$Wtm = 12.72 \text{ detik}$$

LAMPIRAN D
SPESIFIKASI ALAT GALI MUAT



Gambar D.1 *Excavator Hitachi 470*

Tabel D.1 Spesifikasi *Excavator Hitachi 470*

<i>Operating weight</i>	<i>48.500 kg</i>
<i>Gross power at engine speed</i>	<i>253 kW 2,000 rpm</i>
<i>Bucket capacity</i>	<i>2.2-2.5 m³</i>
<i>Overall leght</i>	<i>3490 mm</i>
<i>Overall weidth</i>	<i>4470 mm</i>
<i>Overall height</i>	<i>3545 mm</i>
<i>Engine</i>	<i>Isuzu</i>
<i>Capacity</i>	<i>2.5 m³</i>
<i>Fuel tank</i>	<i>725 l</i>
<i>Oil tank</i>	<i>557 l</i>

LAMPIRAN E
SPEKIFIKASI ALAT ANGKUT



Gambar E.1 *Dump Truck Dongfeng KC K37F*

Tabel E.1. Spesifikasi *Dump Truck Dongfeng KC K37F*

Kabin	KC <i>single sleeper</i>
<i>Frame</i> (mm)	300x90x(8+6)
Jarak Roda	1850+4600+1350
Dimensi	11350+2550+3450
Mesin	DCi420-40
Kotak Volume	30 m ³
Transmisi	12JSD200T
Rasio Poros Belakang	5.26
Tangki (L)	350
Suspensi	10/10/13
As roda depan (T)	Dongfeng DANA 9 tonx2
As roda belakang (T)	Dongfeng DANA 16 ton dengan redukasi hub x 2

LAMPIRAN F
CYCLE TIME EXCAVATOR HITACHI 470

Tabel F.1 *Cycle Time* Alat Gali Muat Actual

No	Gali (s)	Swing Isi (s)	Dumping (s)	Swing Kosong (s)	Total
1	11.03	9.07	7.15	6.06	33.31
2	9.67	9.01	7.00	6.03	31.71
3	11.00	9.03	7.09	6.02	33.14
4	11.11	9.00	6.94	6.11	33.16
5	11.09	8.87	6.00	5.87	31.83
6	11.10	8.45	7.12	6.18	32.85
7	10.55	9.09	7.15	5.98	32.77
8	11.03	9.03	7.00	5.92	32.98
9	11.16	8.77	7.09	5.96	32.98
10	11.09	8.92	6.78	5.90	32.69
11	11.01	9.01	6.99	6.01	33.02
12	11.10	8.89	6.90	6.07	32.96
13	11.08	8.92	7.01	6.13	33.14
14	11.05	8.98	7.09	6.23	33.35
15	10.57	9.02	6.91	6.02	32.52
16	11.12	9.06	6.95	5.56	32.69
17	11.20	9.01	7.18	5.32	32.71
18	11.18	8.94	7.10	6.18	33.40
19	11.11	9.00	7.11	6.10	33.32
20	11.16	9.00	7.04	5.93	33.13
21	11.00	9.11	7.09	5.90	33.10
22	11.22	9.09	7.19	6.01	33.51
23	11.02	9.18	7.01	6.07	33.28
24	11.09	8.87	6.78	5.99	32.73
25	11.05	9.10	6.88	6.19	33.22
26	11.00	9.11	7.12	6.14	33.37
27	11.00	9.10	7.19	6.04	33.33
28	11.03	9.12	7.14	5.96	33.25
29	11.08	9.16	7.07	5.99	33.30
30	11.11	9.10	7.01	6.19	33.41
31	11.01	9.00	7.12	6.02	33.15
32	11.1	9.00	7.15	5.56	32.81
33	10.87	9.11	7.00	5.32	32.30
34	11.01	9.09	7.09	6.18	33.37
35	11.09	9.18	6.78	6.10	33.15
36	11.10	8.87	6.99	5.93	32.89
37	11.09	9.01	6.90	5.90	32.90
38	11.05	9.03	7.01	5.97	33.06
39	10.57	9.00	7.09	6.08	32.74
40	11.12	8.87	6.91	5.98	32.88

41	11.14	8.45	7.15	5.97	32.71
42	11.16	9.12	7.00	5.96	33.24
43	11.11	9.03	7.09	5.90	33.13
44	11.09	9.01	6.94	6.01	33.05
45	11.10	9.08	6.00	6.07	32.25
46	10.69	9.08	7.21	6.13	33.11
47	11.02	8.95	7.09	6.23	33.29
48	10.77	9.15	7.08	6.14	33.14
49	10.98	9.12	7.14	6.11	33.35
50	11.12	9.02	7.15	6.17	33.46
Total	550.20	450.18	349.97	299.79	1650.14
<i>Average</i>	11.00	9.00	7.00	6.00	32.77

Tabel F.2 *Cycle Time* Alat Gali Muat Setelah Perbaikan

No	Gali (s)	Swing Isi (s)	Dumping (s)	Swing Kosong (s)	Total
1	10.10	7.11	6.06	5.11	28.38
2	10.03	7.00	6.04	5.09	28.16
3	10.04	7.07	6.04	5.07	28.22
4	10.01	6.93	6.13	5.16	28.23
5	9.88	6.00	5.89	4.93	26.70
6	9.46	7.11	6.11	5.15	27.83
7	10.14	7.10	5.98	5.11	28.33
8	10.04	7.00	5.94	4.97	27.95
9	9.79	7.08	5.98	4.99	27.84
10	9.93	6.76	5.93	4.21	26.83
11	10.03	6.96	6.01	5.04	28.04
12	9.90	6.89	6.07	5.10	27.96
13	9.93	7.01	6.13	5.17	28.24
14	9.90	7.09	6.23	5.27	28.49
15	10.03	6.92	6.02	5.06	28.03
16	10.05	6.97	5.56	4.56	27.14
17	10.00	7.19	5.32	4.36	26.87
18	9.93	7.12	6.18	5.18	28.41
19	9.99	7.12	6.10	5.12	28.33
20	10.01	7.06	5.93	4.91	27.91
21	10.10	7.10	5.90	4.92	28.02
22	10.06	7.20	6.01	5.03	28.30
23	10.17	7.03	6.07	5.05	28.32
24	9.86	6.79	5.99	5.00	27.64
25	10.09	6.90	6.19	5.21	28.39
26	10.10	7.13	6.14	5.12	28.49
27	10.09	7.21	6.04	5.06	28.40
28	10.11	7.15	5.96	4.94	28.16
29	10.14	7.09	5.99	4.91	28.13
30	10.11	7.03	6.19	5.34	28.67
31	9.87	6.06	5.89	4.92	26.74
32	9.45	7.16	6.11	5.14	27.86
33	10.14	7.13	5.98	5.10	28.35
34	10.04	7.06	5.94	4.96	28.00
35	9.79	7.14	5.98	4.98	27.89
36	9.93	6.98	5.93	4.21	27.05
37	10.03	7.01	6.01	5.04	28.09
38	9.90	6.94	6.07	5.10	28.01
39	9.93	7.06	6.13	5.17	28.29
40	9.90	7.14	6.23	5.27	28.54
41	10.03	6.97	6.02	5.06	28.08
42	10.05	7.02	5.56	4.56	27.19
43	10.00	7.16	5.32	4.36	26.84
44	10.10	7.15	6.06	5.11	28.42
45	10.03	7.05	6.04	5.09	28.21

46	10.04	7.12	6.04	5.07	28.27
47	10.01	6.98	6.13	5.16	28.28
48	9.88	6.05	5.89	4.93	26.75
49	10.09	6.95	6.19	5.21	28.44
50	10.10	7.17	6.14	5.12	28.53
Total	499.33	349.42	299.79	249.70	1398.24
<i>Average</i>	10.00	7.00	6.00	5.00	28.01

LAMPIRAN G

CYCLE TIME DUMP TRUCK DONGFENG KC K37F

Tabel G.1 *Cycle Time Alat Gali Angkut Actual*

No	Manuver Loading (m)	Loading (m)	Hauling (m)	Manuver Dumping (m)	Dumping (m)	Hauling Empty (m)	Delay (m)	Total (m)
	T1	T2	T3	T4	T5	T6		
1	0.42	6.50	4.10	0.33	0.41	3.44	0.29	15.20
2	0.45	6.58	4.12	0.35	0.39	3.42	0.31	15.31
3	0.45	6.56	4.28	0.35	0.40	3.40	0.32	15.44
4	0.41	6.63	4.17	0.34	0.41	3.39	0.32	15.35
5	0.47	7.39	3.59	0.36	0.39	3.57	0.27	15.77
6	0.46	6.58	3.55	0.29	0.43	3.41	0.29	14.72
7	0.49	6.59	4.01	0.35	0.42	3.47	0.31	15.33
8	0.51	6.59	4.09	0.36	0.37	3.57	0.33	15.49
9	0.47	7.10	4.03	0.30	0.38	3.42	0.30	15.70
10	0.44	6.56	3.49	0.30	0.41	3.40	0.30	14.60
11	0.47	6.59	4.02	0.31	0.42	3.49	0.31	15.30
12	0.43	6.57	4.21	0.32	0.43	3.41	0.32	15.37
13	0.46	7.01	3.58	0.37	0.41	3.19	0.29	15.02
14	0.45	6.52	3.59	0.36	0.42	3.24	0.30	14.58
15	0.45	6.59	4.00	0.34	0.41	3.44	0.34	15.23
16	0.43	6.53	4.39	0.32	0.42	3.40	0.32	15.49
17	0.47	6.55	4.08	0.33	0.40	3.40	0.26	15.23
18	0.51	6.37	4.09	0.35	0.38	3.42	0.30	15.12
19	0.45	6.59	4.20	0.31	0.40	3.39	0.31	15.34
20	0.44	6.39	4.00	0.29	0.42	3.44	0.29	14.98
21	0.52	6.46	3.58	0.34	0.41	3.47	0.30	14.78
22	0.46	6.42	3.37	0.32	0.37	3.20	0.32	14.14
23	0.45	6.58	4.05	0.33	0.39	3.56	0.31	15.36
24	0.50	6.46	4.31	0.70	0.40	3.45	0.29	15.82
25	0.39	6.57	4.19	0.33	0.39	3.58	0.30	15.45
26	0.40	6.51	4.27	0.29	0.40	3.52	0.29	15.39
27	0.41	5.59	4.30	0.35	0.41	3.49	0.35	14.55
28	0.43	7.50	4.10	0.35	0.43	3.39	0.31	16.20
29	0.44	6.58	4.22	0.35	0.44	3.57	0.28	15.60
30	0.46	6.55	4.12	0.37	0.35	3.48	0.30	15.33
31	0.45	7.39	3.59	0.36	0.39	3.55	0.26	15.73
32	0.43	6.58	3.55	0.29	0.43	3.39	0.28	14.67
33	0.47	6.59	4.01	0.35	0.42	3.45	0.30	15.29
34	0.51	6.59	4.09	0.36	0.37	3.57	0.32	15.49
35	0.45	7.10	4.03	0.30	0.39	3.40	0.30	15.67
36	0.44	6.56	3.48	0.30	0.41	3.39	0.30	14.58
37	0.52	6.59	4.01	0.31	0.42	3.47	0.31	15.32
38	0.46	6.57	4.20	0.32	0.43	3.39	0.32	15.37
39	0.45	7.01	3.57	0.37	0.40	3.17	0.29	14.97

40	0.43	6.52	3.58	0.36	0.41	3.21	0.30	14.51
41	0.39	6.46	4.00	0.34	0.39	3.41	0.34	14.99
42	0.41	6.42	4.10	0.33	0.43	3.41	0.29	15.10
43	0.45	6.58	4.12	0.35	0.39	3.39	0.31	15.28
44	0.46	6.46	4.28	0.35	0.40	3.38	0.32	15.33
45	0.49	6.57	4.17	0.34	0.42	3.37	0.32	15.36
46	0.51	6.51	4.19	0.33	0.39	3.56	0.30	15.49
47	0.47	5.59	4.27	0.29	0.40	3.5-	0.29	11.02
48	0.44	7.50	4.27	0.35	0.41	3.47	0.35	16.44
49	0.47	6.58	4.10	0.36	0.43	3.37	0.31	15.31
50	0.43	6.61	4.02	0.35	0.42	3.55	0.28	15.38
Total	22.72	330.79	199.73	17.07	20.26	167.92	15.22	301.30
<i>Average</i>	0.45	6.60	4.00	0.35	0.40	3.43	0.30	15.53

Tabel G.2 *Cycle Time* Alat Gali Angkut Setelah Perbaikan

No	<i>Manuver Loading</i> (m)	<i>Loading</i> (m)	<i>Hauling</i> (m)	<i>Manuver Dumping</i> (m)	<i>Dumping</i> (m)	<i>Hauling Empty</i> (m)	<i>Delay</i> (m)	Total (m)
	T1	T2	T3	T4	T5	T6		
1	0.43	5.56	4.10	0.33	0.41	3.44	0.29	14.27
2	0.47	5.20	4.12	0.35	0.39	3.42	0.31	13.95
3	0.45	6.12	4.28	0.35	0.40	3.40	0.26	15.00
4	0.43	5.45	4.17	0.34	0.41	3.39	0.28	14.19
5	0.47	5.52	3.59	0.36	0.39	3.57	0.27	13.90
6	0.48	5.25	3.55	0.29	0.43	3.41	0.29	13.41
7	0.49	6.04	4.01	0.35	0.42	3.47	0.31	14.78
8	0.49	5.54	4.09	0.36	0.37	3.57	0.28	14.42
9	0.47	5.34	4.03	0.30	0.38	3.42	0.29	13.94
10	0.46	5.16	3.49	0.30	0.41	3.40	0.30	13.22
11	0.47	5.12	4.02	0.31	0.42	3.49	0.31	13.83
12	0.44	5.45	4.21	0.32	0.43	3.41	0.26	14.26
13	0.46	5.50	3.58	0.37	0.41	3.19	0.29	13.51
14	0.47	5.45	3.59	0.36	0.42	3.24	0.30	13.53
15	0.45	5.59	4.00	0.34	0.41	3.44	0.28	14.23
16	0.44	5.53	4.39	0.32	0.42	3.40	0.28	14.50
17	0.47	5.56	4.08	0.33	0.40	3.40	0.26	14.24
18	0.49	6.07	4.09	0.35	0.38	3.42	0.30	14.80
19	0.45	5.55	4.20	0.31	0.40	3.39	0.31	14.30
20	0.44	5.17	4.00	0.29	0.42	3.44	0.29	13.76
21	0.49	5.49	3.58	0.34	0.41	3.47	0.30	13.78
22	0.46	5.42	3.37	0.32	0.37	3.20	0.27	13.14
23	0.45	5.52	4.05	0.33	0.39	3.56	0.31	14.30
24	0.49	5.46	4.31	0.70	0.40	3.45	0.29	14.81
25	0.39	5.52	4.19	0.33	0.39	3.58	0.30	14.40
26	0.40	5.51	4.27	0.29	0.40	3.52	0.29	14.39
27	0.41	6.03	4.30	0.35	0.41	3.49	0.26	14.99
28	0.43	6.07	4.10	0.35	0.43	3.39	0.28	14.77
29	0.44	5.58	4.22	0.35	0.44	3.57	0.28	14.60
30	0.46	5.55	4.12	0.37	0.35	3.48	0.30	14.33
31	0.48	5.25	3.59	0.30	0.43	3.41	0.29	13.46
32	0.49	6.06	4.03	0.36	0.42	3.47	0.27	14.83
33	0.49	5.56	4.11	0.37	0.37	3.57	0.26	14.47
34	0.47	5.36	4.05	0.30	0.38	3.42	0.28	13.98
35	0.46	5.16	3.56	0.30	0.41	3.40	0.29	13.29
36	0.42	5.12	4.04	0.31	0.42	3.49	0.27	13.80
37	0.44	5.11	4.21	0.32	0.43	3.41	0.28	13.92
38	0.46	6.01	3.58	0.37	0.41	3.19	0.29	14.02
39	0.47	6.00	3.59	0.36	0.42	3.24	0.30	14.08
40	0.45	5.57	4.13	0.34	0.41	3.44	0.30	14.34
41	0.44	6.06	4.39	0.32	0.42	3.40	0.28	15.03

42	0.47	5.59	4.08	0.33	0.40	3.40	0.26	14.27
43	0.49	6.07	4.09	0.35	0.38	3.42	0.30	14.80
44	0.45	6.09	4.20	0.31	0.40	3.39	0.31	14.84
45	0.44	5.17	4.00	0.29	0.42	3.44	0.28	13.76
46	0.43	5.54	4.10	0.33	0.41	3.44	0.29	14.25
47	0.47	5.20	4.12	0.35	0.39	3.42	0.31	13.95
48	0.45	6.03	4.28	0.35	0.40	3.40	0.29	14.91
49	0.49	5.58	4.08	0.34	0.41	3.47	0.30	14.37
50	0.46	5.42	3.39	0.32	0.37	3.30	0.32	13.26
Total	22.86	278.27	199.72	16.98	20.21	171.14	0.29	709.18
<i>Average</i>	0.45	5.60	4.00	0.35	0.40	3.43	0.29	14.53

LAMPIRAN H
BUCKET FILL FACTOR

Tabel H.1 *Bucket Fill Factor*

No	Kapasitas Nyata (M ³)	Kapasitas Manjung (M ³)	Faktor Pengisian (%)
1	2.14	2.5	86
2	2.12	2.5	85
3	2.15	2.5	86
4	2.13	2.5	85
5	2.15	2.5	86
6	2.14	2.5	86
7	2.15	2.5	86
8	2.13	2.5	85
9	2.13	2.5	85
10	2.16	2.5	86
11	2.13	2.5	85
12	2.15	2.5	86
13	2.12	2.5	85
14	2.15	2.5	86
15	2.10	2.5	84
16	2.11	2.5	84
17	2.12	2.5	85
18	2.14	2.5	86
19	2.13	2.5	85
20	2.16	2.5	86
21	2.14	2.5	86
22	2.14	2.5	86
23	2.11	2.5	85
24	2.13	2.5	85
25	2.11	2.5	84
26	2.13	2.5	85
27	2.12	2.5	85
28	2.13	2.5	85
29	2.14	2.5	86
30	2.13	2.5	85
Rata-rata	2.13	2.5	85.32

LAMPIRAN I DOKUMENTASI



Lampiran I.1 Dokumentasi

LAMPIRAN J
BUKTI PENELITIAN



PT MANAMBANG MUARA ENIM

SURAT KETERANGAN

No: 014/MME-HRSITE/V/2022

Yang bertandatangan di bawah ini menerangkan bahwa :

Nama : **ALIP SUMANTRI**
Tempat, Tgl Lahir : Baturaja, 29 Juni 2000
Pendidikan : S1 / ITN Yogyakarta
N I M : 710018074

Telah selesai melakukan TA (Tugas Akhir) pada perusahaan PT Manambang Muara Enim dengan judul : *Analisis Kebutuhan Dump Truck pada Hauling Batubara di Site Darmo untuk Mencapai Target Produksi Batubara Tahun 2022 di PT. Manambang Muara Enim Sumatera Selatan* terhitung 25 Maret 2022 - 24 Mei 2022 dengan hasil **Cukup (60.17)**

Demikian surat keterangan ini dibuat untuk dipergunakan sebagaimana mestinya

Darmo, 30 Mei 2022

FELINUS R. MANAÖ
HCGA Manager

PT MANAMBANG MUARA ENIM

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