



Lampiran 1

Spesifikasi Alat Pengolahan yang Digunakan

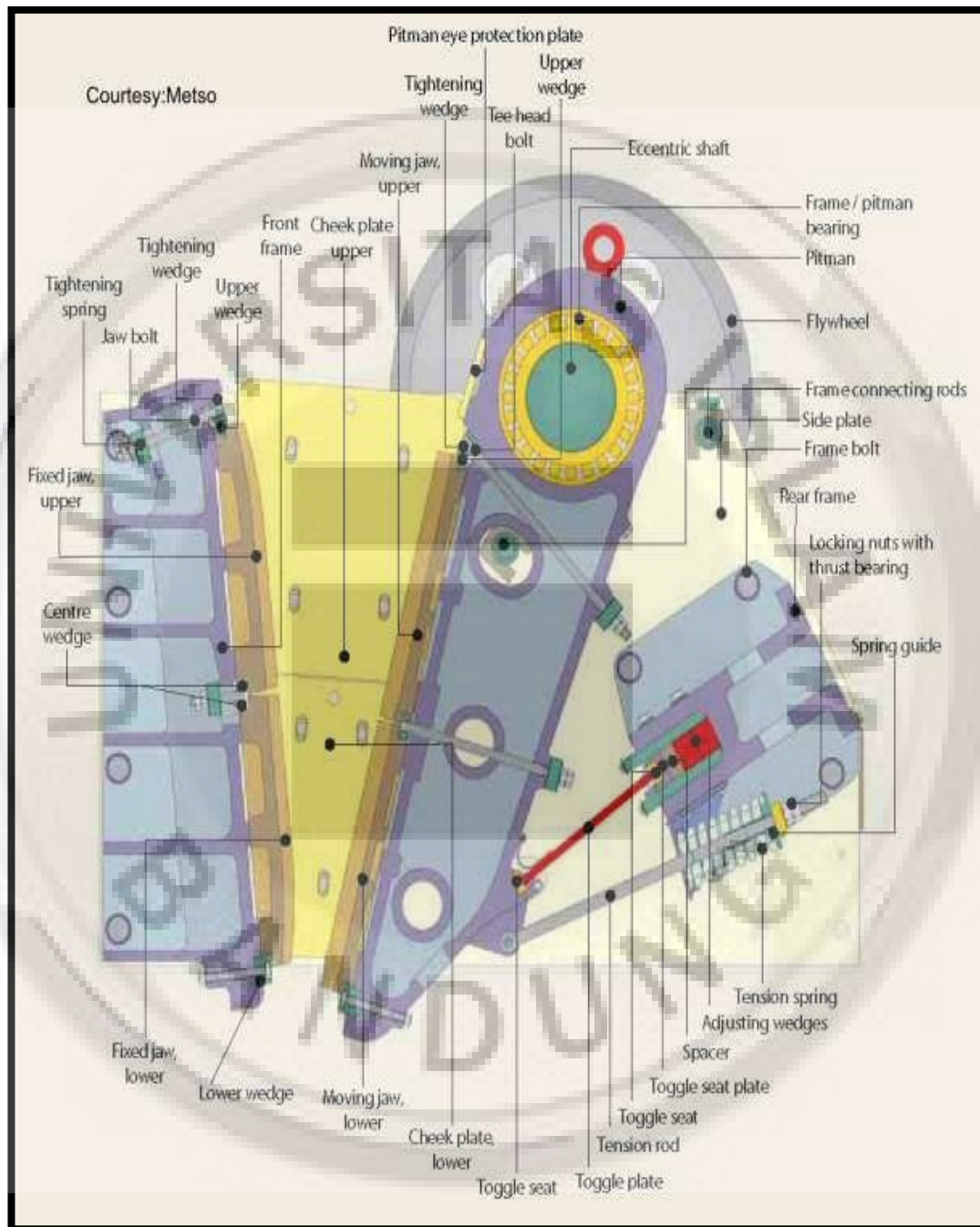
a. Jaw Crusher OTSUKA 6048 key Specifications :



- Feed Opening (mm) : 1500 mm x 1200 mm
- Max Feeding Size (mm) : 900 mm x 950 mm x 1200 mm
- Adjustment of Range Discharging Opening (mm) : 180 - 220 mm
- Capacity (t/h) : 500 ton/jam
- Daya motor (kw) : 220 Kw
- Amper maksimal motor : 395 A

| CSS | Mn Content | Mn Profile | Av. Power & Hyd Pressure | Speed Pulley (rpm) |
|----------------------------|------------|-------------|--------------------------|--------------------|
| CSS = 180 mm – 220 mm | 14 % Cr Mn | small teeth | 220 KW | 210 |
| Open Side Setting = 200 mm | | | | |
| 49 mm | 14 % Cr Mn | standard | 220 KW , 30 Psi | Max 12 rpm |
| 28 | 14 % Cr Mn | standard | 185 KW , 35 Psi | Max 12 rpm |
| 28 | 14 % Cr Mn | standard | 185 KW, 35 Psi | Max 12 rpm |

Bagian-bagian *Jaw Crusher*



Gambar
Bagian-Bagian Jaw Crusher

b. Belt Conveyor



Technical Data:

| Belt Width(mm) | Belt Length (m) /Power (Kw) | | Belt Speed(m/S) | Capacity(t/h) |
|----------------|-----------------------------|-------------------------------|-----------------|---------------|
| 400 | ≤12/1.5 | 12~20/2.2~4 20~25/3.5~7.5 | 1.3~1.6 | 40~80 |
| 500 | ≤12/3 | 12~20/4~5.5 20~30/ 5.5~7.5 | 1.3~1.6 | 40~80 |
| 650 | ≤12/4 | 12~20/5.5 20~30/7.5~11 | 1.3~1.6 | 131~323 |
| 800 | ≤6/4 | 6~15/5.5 15~30/7.5~15 | 1.3~1.6 | 278~546 |
| 1000 | ≤10/5.5 | 10~20/7.5~11 20~40/11~12 | 1.3~2.0 | 435~853 |
| 1200 | ≤10/7.5 | 10~20/11 20~40/15~30 | 1.3~2.0 | 655~1284 |

| CV | Panjang (M) | Lebar (mm) | Kecepatan / menit | Kemiringan | Motor/kw | Type gear box |
|------|-------------|------------|-------------------|------------|----------|---------------|
| CV 1 | 18,2 | 1200 | 0,20 | - | 37 | B3SH05A |
| CV 2 | 54 | 1200 | 1,12 | 18 | 55 | B3SH07A |
| CV 3 | 86,79 | 1200 | 1,51 | 16 | 37 | B3SH06A |
| CV 4 | 96 | 600 | 2,04 | - | 11 | K128M160MB4X |
| CV 5 | 100 | 1200 | 1,24 | 18 | 90 | B3SH09A |
| CV 6 | 75,34 | 900 | 1,36 | 18 | 55 | B3SH07A |
| CV 7 | 74 | 900 | 1,17 | - | 22 | B37A226B |
| CV 8 | 86,66 | 900 | 1,59 | - | 11 | K128M160MB4X |

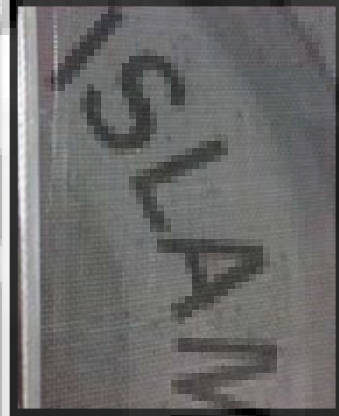
c. Screen 30 mm, 12 mm dan 8 mm



30 mm



12 mm



8 mm

| Screen Mesh / wire diameter |
|--------------------------------------|
| deck 1 = 65 mm |
| deck 2 = 30 mm / 8mm and 35 mm / 8mm |
| |
| deck 1 = 30 mm (25 mm – 29 mm) |
| deck 2 = 12 mm (9 mm – 11 mm) |
| deck 3 = 8 mm (0 – 8 mm) |
| |
| deck 1 = 30 mm (25 mm – 29 mm) |
| deck 2 = 12 mm (9 mm – 11 mm) |
| deck 3 = 8 mm (0 – 8 mm) |

d. Cone Crusher

Cone Secondary



Cone Tertiary 1 dan 2



- Cone Secondary : Merk OTSUKA CEC 1680
 - Feed Opening : 265 mm – 320 mm
 - Capacity (t/h) : 400 ton/jam
 - ax Feed Size : 180 mm x 260 mm x 365 mm
 - CSS : 49 mm
 - Out put feed : 45 mm – 60 mm
 - Kecepatan motor maksimal : 20 rpm
 - Daya motor : 220 kw
 - Amper maksimal motor : 395 A
- Cone Tertiary 1 dan 2 : Merk OTSUKA CSH 1500
 - Feed Opening : 90 mm – 130 mm
 - Max Feed Size : 75 mm x 105 mm x 1500 mm
 - Capacity (t/h) : 200 ton/jam
 - CSS : 25 mm
 - Out put feed : 25 mm – 28 mm
 - Kecepatan motor maksimal : 15 rpm
 - Daya motor : 185 kw
 - Amper maksimal motor : 335 A

e. Feeder Getar/Vibrating Grizzly Feeder (2 unit)



General Specifications

| | TF7220X5 | |
|--|------------------------------|-----------|
| Grizzly Section length | 115" | 2911 mm |
| Pan Length | 125" | 3183 mm |
| Operating Speed (RPM) | 800 | |
| Driven Sheave Size (OD) <i>(Included With Machine)</i> | 20,5" | 520" |
| Re Commended Drive Sheave Size (OD) | (with 50 HZ motor/1480 rpm) | |
| | 10,8" | 275,16" |
| V Belt Section | "C" | |
| No V Belts | 5 | |
| Re Commended V Bet Datum | 139" | 3528 mm |
| Replacement Bearing | 22332CAME4C4 | |
| Power Required (Electric) | 75 HP | 55Kw |
| Weight (Motor Excluded) | 26,558 Lbs | 12,072 kg |

Lampiran 2

Waktu Hambatan Crushing Plant

Shif 1 (Siang)

| No | Tanggal | Persiapan (Jam) | Pengisian Oli/Grease (Jam) | Perbaikan Alat (Jam) | Telat Pengisian (Jam) | Umpan Macet (Jam) | Hujan (Jam) | Ritase | Waktu Kerja tersedia | Waktu Kerja Efektif | Efisiensi (%) | Keteran gan |
|----|------------|--------------------|----------------------------------|----------------------------|-----------------------------|-------------------------|----------------|--------|----------------------------|---------------------------|------------------|----------------|
| 1 | 18/03/2014 | 0,2 | 0,3 | 0,5 | 0,5 | 0,5 | 0,5 | 164 | 9,5 | 7,5 | 78,94 | |
| 2 | 19/03/2014 | 0,2 | 0,3 | 0,5 | 2 | - | - | 106 | 9,5 | 6,5 | 68,42 | |
| 3 | 20/03/2014 | 0,2 | 0,3 | 0,5 | 1 | - | - | 152 | 9 | 7 | 77,77 | |
| 4 | 21/03/2014 | 0,2 | 0,3 | 1 | 1,5 | - | - | 135 | 8,5 | 6 | 70,58 | |
| 5 | 22/03/2014 | 0,2 | 0,3 | - | 0,5 | - | - | 201 | 9,5 | 8,5 | 89,47 | |
| 6 | 23/03/2014 | 0,2 | 0,3 | 1 | 1 | 0,5 | - | 163 | 9,5 | 6,5 | 68,42 | |
| 7 | 24/03/2014 | 0,2 | 0,3 | 1,5 | 0,5 | - | - | 170 | 9,5 | 7 | 73,68 | |
| 8 | 25/03/2014 | 0,2 | 0,3 | 0,5 | 1,5 | - | - | 171 | 9,5 | 7 | 73,68 | |
| 9 | 26/03/2014 | 0,2 | 0,3 | - | 1,5 | - | - | 197 | 9,5 | 7,5 | 78,94 | |
| 10 | 27/03/2014 | 0,2 | 0,3 | - | 2 | - | - | 173 | 9 | 6,5 | 72,22 | |
| 11 | 28/03/2014 | 0,2 | 0,3 | 1,5 | 1 | - | - | 142 | 8,5 | 6,5 | 76,47 | |
| 12 | 29/03/2014 | 0,2 | 0,3 | 0,5 | 1,5 | - | - | 166 | 9,5 | 7 | 73,68 | |
| 13 | 30/03/2014 | 0,2 | 0,3 | 1 | 0,5 | 1 | - | 108 | 9,5 | 6,5 | 68,42 | |
| 14 | 31/03/2014 | 0,2 | 0,3 | 1 | 1 | - | - | 139 | 9,5 | 7 | 73,68 | |
| 15 | 01/04/2014 | 0,2 | 0,3 | 0,5 | 1,5 | 1 | - | 151 | 9,5 | 6 | 63,15 | |
| 16 | 02/04/2014 | 0,2 | 0,3 | 0,5 | 1 | 0,5 | 0,5 | 140 | 9,5 | 6,5 | 68,42 | |

| | | | | | | | | | | | | |
|----------|------------|-----------|------|-----------|----------|-----|-------|-------|----------|--------|---------|--------|
| 17 | 03/04/2014 | 0,2 | 0,3 | 0,5 | 0,5 | 0,5 | - | 160 | 9 | 7 | 77,77 | |
| 18 | 04/04/2014 | 0,2 | 0,3 | - | 1,5 | 1 | - | 128 | 8,5 | 5,5 | 64,7 | |
| 19 | 05/04/2014 | 0,2 | 0,3 | 0,5 | 3 | - | - | 127 | 9,5 | 5,5 | 57,83 | |
| 20 | 06/04/2014 | 0,2 | 0,3 | 0,5 | 1,5 | 0,5 | - | 141 | 9,5 | 6,5 | 68,42 | |
| 21 | 07/04/2014 | 0,2 | 0,3 | 0,5 | 1,5 | - | - | 171 | 9,5 | 7 | 73,68 | |
| 22 | 08/04/2014 | 0,2 | 0,3 | 0,5 | 2,5 | - | - | 135 | 9,5 | 6,5 | 68,42 | |
| 23 | 09/04/2014 | - | - | - | - | - | - | - | - | - | - | Pemilu |
| 24 | 10/04/2014 | 0,2 | 0,3 | - | 2,5 | 1 | - | 122 | 9,5 | 5,5 | 57,83 | |
| 25 | 11/04/2014 | 0,2 | 0,3 | - | 2 | - | - | 90 | 8,5 | 6 | 70,58 | |
| 26 | 12/04/2014 | 0,2 | 0,3 | 0,5 | 2 | - | - | 112 | 9,5 | 6,5 | 68,42 | |
| 27 | 13/04/2014 | 0,2 | 0,3 | 0,5 | 1,5 | 0,5 | - | 125 | 9,5 | 6,5 | 68,42 | |
| 28 | 14/04/2014 | 0,2 | 0,3 | - | 1,5 | 0,5 | - | 156 | 9,5 | 7 | 73,68 | |
| 29 | 15/04/2014 | 0,2 | 0,3 | - | 1 | 0,5 | - | 188 | 9,5 | 7,5 | 78,94 | |
| 30 | 16/04/2014 | 0,2 | 0,3 | - | 1,5 | 1 | - | 122 | 9,5 | 6,5 | 68,42 | |
| Σ | | 5,8 | 8,7 | 14 | 41 | 9 | 1 | 4255 | 530,5 | 193 | 2073,05 | |
| R | | 0,1933333 | 0,29 | 0,4666666 | 1,366667 | 0,3 | 0,033 | 141,8 | 17,68333 | 6,4333 | 69,102 | |

Sumber : Hasil pengamatan dan perhitungan.

Shif 2 (Malam)

Waktu Hambatan Crushing Plant

| No | Tanggal | Persiapan (Jam) | Pengisian Oli/Grease (Jam) | Perbaikan Alat (Jam) | Telat Pengisian (Jam) | Umpan Macet (Jam) | Hujan (Jam) | Ritase | Waktu Kerja tersedia | Waktu Kerja Efektif | Efesiensi (%) | Keterangan |
|----|------------|-----------------|----------------------------|----------------------|-----------------------|-------------------|-------------|--------|----------------------|---------------------|---------------|------------|
| 1 | 18/03/2014 | 0,5 | - | - | 0,5 | - | - | 157 | 8 | 7 | 87,5 | |
| 2 | 19/03/2014 | 0,5 | - | - | - | 2,5 | - | 91 | 8 | 5 | 62,5 | |
| 3 | 20/03/2014 | - | - | - | - | - | - | - | - | - | - | Libur |
| 4 | 21/03/2014 | 0,5 | - | 0,5 | 0,5 | 1 | - | 102 | 8 | 5,5 | 68,75 | |
| 5 | 22/03/2014 | 0,5 | - | 0,5 | 0,5 | 0,5 | - | 97 | 8 | 6 | 75 | |
| 6 | 23/03/2014 | 0,5 | - | 2 | 0,5 | 0,5 | - | 90 | 8 | 4,5 | 56,25 | |
| 7 | 24/03/2014 | 0,5 | - | 0,5 | 0,5 | - | - | 137 | 8 | 6,5 | 81,25 | |
| 8 | 25/03/2014 | 0,5 | - | 0,5 | 0,5 | - | 0,5 | 160 | 8 | 6 | 75 | |
| 9 | 26/03/2014 | 0,5 | - | 0,5 | 1 | - | - | 133 | 8 | 6 | 75 | |
| 10 | 27/03/2014 | - | - | - | - | - | - | - | - | - | - | Libur |
| 11 | 28/03/2014 | 0,5 | - | 2 | 0,5 | - | - | 98 | 8 | 5 | 62,5 | |
| 12 | 29/03/2014 | 0,5 | - | - | 0,5 | 2,5 | - | 96 | 8 | 4,5 | 56,25 | |
| 13 | 30/03/2014 | 0,5 | - | - | 0,5 | 0,5 | - | 110 | 8 | 6,5 | 81,25 | |
| 14 | 31/03/2014 | 0,5 | - | 0,5 | 0,5 | 3 | - | 61 | 8 | 3,5 | 43,75 | |
| 15 | 01/04/2014 | 0,5 | - | - | 1,5 | - | - | 130 | 8 | 6 | 75 | |
| 16 | 02/04/2014 | 0,5 | - | - | 0,5 | - | - | 167 | 8 | 7 | 87,5 | |
| 17 | 03/04/2014 | - | - | - | - | - | - | - | - | - | - | Libur |

| | | | | | | | | | | | | |
|----|------------|-----------|---|-----------|------|------|-------|------|-----|-------|---------|--------|
| 18 | 04/04/2014 | 0,5 | - | 0,5 | 1,5 | - | - | 91 | 8 | 5,5 | 68,75 | |
| 19 | 05/04/2014 | 0,5 | - | - | - | 0,5 | - | 121 | 8 | 7 | 87,5 | |
| 20 | 06/04/2014 | 0,5 | - | 0,5 | 0,5 | 0,5 | - | 92 | 8 | 6 | 75 | |
| 21 | 07/04/2014 | 0,5 | - | 0,5 | 0,5 | 0,5 | - | 102 | 8 | 7 | 87,5 | |
| 22 | 08/04/2014 | 0,5 | - | 0,5 | 1 | 0,5 | - | 111 | 8 | 5,5 | 68,75 | |
| 23 | 09/04/2014 | - | - | - | - | - | - | - | - | - | - | Pemilu |
| 24 | 10/04/2014 | - | - | - | - | - | - | - | - | - | - | Libur |
| 25 | 11/04/2014 | 0,5 | - | 0,5 | - | 0,5 | - | 112 | 8 | 6,5 | 81,25 | |
| 26 | 12/04/2014 | 0,5 | - | - | 0,5 | 0,5 | - | 134 | 8 | 6,5 | 81,25 | |
| 27 | 13/04/2014 | 0,5 | - | - | 0,5 | 0,5 | - | 120 | 8 | 6,5 | 81,25 | |
| 28 | 14/04/2014 | 0,5 | - | 1,5 | 0,5 | 0,5 | - | 106 | 8 | 5 | 62,5 | |
| 29 | 15/04/2014 | 0,5 | - | 1 | 0,5 | 0,5 | - | 135 | 8 | 5,5 | 68,75 | |
| 30 | 16/04/2014 | 0,5 | - | 0,5 | - | 0,5 | - | 112 | 8 | 6,5 | 81,25 | |
| Σ | | 12,5 | - | 12,5 | 13,5 | 15,5 | 0,5 | 2865 | 200 | 146,5 | 1831,25 | |
| R | | 0,4166667 | - | 0,4166666 | 0,45 | 0,62 | 0,016 | 95,5 | 8 | 5,86 | 73,25 | |

Sumber : Hasil pengamatan dan perhitungan.

LAMPIRAN 3

Perolehan Ritase Dump Truk Sebelum Perbaikan

| NO | Tanggal | Perolehan ritase DT per shif | | |
|----|-----------|------------------------------|----------|-----------------------|
| | | Shift I | Shift II | Jumlah Shift I dan II |
| 1 | 01-Nop-13 | 2240 | 2180 | 4420 |
| 2 | 02-Nop-13 | 2120 | 1820 | 3940 |
| 3 | 03-Nop-13 | 2240 | 1740 | 3980 |
| 4 | 04-Nop-13 | 2120 | 2040 | 4160 |
| 5 | 05-Nop-13 | 2520 | 1940 | 4460 |
| 6 | 06-Nop-13 | 3260 | - | 3260 |
| 7 | 07-Nop-13 | 2460 | 1780 | 4240 |
| 8 | 08-Nop-13 | 1960 | 2020 | 3980 |
| 9 | 09-Nop-13 | 2620 | 1840 | 4460 |
| 10 | 10-Nop-13 | 1820 | 2220 | 4040 |
| 11 | 11-Nop-13 | 2360 | 1960 | 4320 |
| 12 | 12-Nop-13 | 2540 | 1820 | 4360 |
| 13 | 13-Nop-13 | 3780 | - | 3780 |
| 14 | 14-Nop-13 | 2780 | 1220 | 4000 |
| 15 | 15-Nop-13 | 2420 | 1580 | 4000 |
| 16 | 16-Nop-13 | 2140 | 1820 | 3960 |
| 17 | 17-Nop-13 | 2420 | 1680 | 4100 |
| 18 | 18-Nop-13 | 2560 | 1820 | 4380 |
| 19 | 19-Nop-13 | 2040 | 1780 | 3820 |
| 20 | 20-Nop-13 | 2820 | - | 2820 |
| 21 | 21-Nop-13 | 2140 | 2040 | 4180 |
| 22 | 22-Nop-13 | 2160 | 2220 | 4380 |
| 23 | 23-Nop-13 | 1860 | 1580 | 3440 |
| 24 | 24-Nop-13 | 2440 | 1620 | 4060 |
| 25 | 25-Nop-13 | 1800 | 2240 | 4040 |
| 26 | 26-Nop-13 | 1860 | 1740 | 3600 |
| 27 | 27-Nop-13 | 2600 | - | 2600 |
| 28 | 28-Nop-13 | 2340 | 1160 | 3500 |
| 29 | 29-Nop-13 | 2360 | 1520 | 3880 |
| 30 | 30-Nop-13 | 2140 | 1860 | 4000 |
| | | | | 118160 |

LAMPIRAN 4

Jumlah Jam Kerja Dan Perolehan Ritase Dump truk Setelah Perbaikan

| NO | Tanggal | Jam kerja dalam satu hari | | Jumlah | Perolehan ritase DT per shif | | |
|----|-----------|---------------------------|----------|-------------|------------------------------|----------|-----------------------|
| | | Shift I | Shift II | | Shift I | Shift II | Jumlah Shift I dan II |
| 1 | 18-Mar-14 | 7,5 | 7 | 13,5 | 3280 | 3140 | 6420 |
| 2 | 19-Mar-14 | 6,5 | 5 | 10,5 | 2120 | 1820 | 3940 |
| 3 | 20-Mar-14 | 7 | - | 7 | 3040 | - | 3040 |
| 4 | 21-Mar-14 | 6 | 5,5 | 10,5 | 2700 | 2040 | 4740 |
| 5 | 22-Mar-14 | 8,5 | 6 | 13,5 | 4020 | 1940 | 5960 |
| 6 | 23-Mar-14 | 6,5 | 4,5 | 10 | 3260 | 1800 | 5060 |
| 7 | 24-Mar-14 | 7 | 6,5 | 12,5 | 3400 | 2740 | 6140 |
| 8 | 25-Mar-14 | 7 | 6 | 12 | 3420 | 3200 | 6620 |
| 9 | 26-Mar-14 | 7,5 | 6 | 12,5 | 3940 | 2660 | 6600 |
| 10 | 27-Mar-14 | 6,5 | - | 6,5 | 3460 | - | 3460 |
| 11 | 28-Mar-14 | 6,5 | 5,4 | 10,5 | 2840 | 1960 | 4800 |
| 12 | 29-Mar-14 | 7 | 4,5 | 10,5 | 3320 | 1820 | 5140 |
| 13 | 30-Mar-14 | 6,5 | 6,5 | 12 | 2160 | 2200 | 4360 |
| 14 | 31-Mar-14 | 7 | 3,5 | 9,5 | 2780 | 1220 | 4000 |
| 15 | 01-Apr-14 | 6 | 6 | 11 | 3020 | 2600 | 5620 |
| 16 | 02-Apr-14 | 6,5 | 7 | 12,5 | 2800 | 3340 | 6140 |
| 17 | 03-Apr-14 | 7 | - | 7 | 3200 | - | 3200 |
| 18 | 04-Apr-14 | 5,5 | 5,5 | 10 | 2560 | 1820 | 4380 |
| 19 | 05-Apr-14 | 5,5 | 7 | 11,5 | 2540 | 2420 | 4960 |
| 20 | 06-Apr-14 | 6,5 | 6 | 11,5 | 2820 | 1840 | 4660 |
| 21 | 07-Apr-14 | 7 | 7 | 13 | 3420 | 2040 | 5460 |
| 22 | 08-Apr-14 | 6,5 | 5,5 | 11 | 2700 | 2220 | 4920 |
| 23 | 09-Apr-14 | - | - | - | - | - | 0 |
| 24 | 10-Apr-14 | 5,5 | - | 5,5 | 2440 | - | 2440 |
| 25 | 11-Apr-14 | 6 | 6,5 | 11,5 | 1800 | 2240 | 4040 |
| 26 | 12-Apr-14 | 6,5 | 6,5 | 12 | 2240 | 2680 | 4920 |
| 27 | 13-Apr-14 | 6,5 | 6,5 | 12 | 2500 | 2400 | 4900 |
| 28 | 14-Apr-14 | 7 | 5 | 11 | 3120 | 2120 | 5240 |
| 29 | 15-Apr-14 | 7,5 | 5,5 | 12 | 3760 | 2700 | 6460 |
| 30 | 16-Apr-14 | 6,5 | 6,5 | 12 | 3060 | 2620 | 5680 |
| | | Σ | | 314,5 | | | 143300 |
| | | R | | 10,84482759 | | | 4941,37931 |

Lampiran 5

Data Produksi Dan Penjualan Sebelum Perbaikan

| NO | Tanggal | Produksi | | | Penjualan | | |
|----|-----------|-----------|-----------|-----------|------------|------------|-----------|
| | | Per hari | | | | | |
| | | Split | Abu | Sirtu | Split | Abu | Sirtu |
| 1 | 01-Nop-13 | 2.445,00 | 1.134,00 | 740 | 3.026,340 | 179,648 | 163,856 |
| 2 | 02-Nop-13 | 2.155,75 | 1.320,50 | 410 | 2.240,610 | 409,328 | 270,144 |
| 3 | 03-Nop-13 | 2.168,00 | 1.321,44 | 369,44 | 1.776,255 | 1.124,016 | 180,224 |
| 4 | 04-Nop-13 | 2.357,60 | 1.432,16 | 343,2 | 3.703,515 | 407,296 | 493,680 |
| 5 | 05-Nop-13 | 2.880,00 | 1.132,16 | 344,16 | 3.168,555 | 354,032 | 523,040 |
| 6 | 06-Nop-13 | 1.890,00 | 772 | 336 | 2.599,125 | 99,360 | 357,520 |
| 7 | 07-Nop-13 | 2.357,60 | 1.432,16 | 343,2 | 1.918,320 | 197,856 | 490,544 |
| 8 | 08-Nop-13 | 2.079,00 | 1.270,96 | 554,4 | 2.387,220 | 241,584 | 203,136 |
| 9 | 09-Nop-13 | 2.357,60 | 1.532,16 | 543,2 | 1.388,055 | 219,904 | 248,464 |
| 10 | 10-Nop-13 | 2.157,60 | 1.452,16 | 353,2 | 3.240,885 | 279,024 | 168,336 |
| 11 | 11-Nop-13 | 2.780,00 | 1.132,16 | 344,16 | 3.585,660 | 449,632 | 181,424 |
| 12 | 12-Nop-13 | 2.455,00 | 1.136,00 | 720 | 3.957,285 | 1.041,088 | 463,792 |
| 13 | 13-Nop-13 | 2.068,00 | 1.281,44 | 369,44 | 1.350,765 | 285,872 | 303,856 |
| 14 | 14-Nop-13 | 2.255,75 | 1.300,50 | 410 | 2.311,995 | 385,888 | 332,272 |
| 15 | 15-Nop-13 | 2.265,75 | 1.290,50 | 410 | 2.457,330 | 86,336 | 220,192 |
| 16 | 16-Nop-13 | 2.179,00 | 1.260,96 | 395 | 2.420,295 | 254,096 | 364,768 |
| 17 | 17-Nop-13 | 2.257,60 | 1.432,16 | 343,2 | 4.487,895 | 360,880 | 194,000 |
| 18 | 18-Nop-13 | 2.780,00 | 1.232,16 | 304,16 | 4.134,660 | 978,464 | 282,960 |
| 19 | 19-Nop-13 | 2.138,00 | 1.281,44 | 369,44 | 3.352,980 | 301,024 | 69,600 |
| 20 | 20-Nop-13 | 1.757,70 | 625,92 | 413,36 | 2.459,295 | 624,992 | 241,328 |
| 21 | 21-Nop-13 | 2.357,60 | 1.432,16 | 343,2 | 2.313,105 | 122,416 | 561,504 |
| 22 | 22-Nop-13 | 2.455,00 | 1.136,00 | 720 | 3.312,810 | 192,912 | 248,336 |
| 23 | 23-Nop-13 | 1.838,00 | 1.261,44 | 309,44 | 2.881,515 | 239,808 | 196,000 |
| 24 | 24-Nop-13 | 2.257,60 | 1.432,16 | 323,2 | 4.316,445 | 370,832 | 283,968 |
| 25 | 25-Nop-13 | 2.157,60 | 1.452,16 | 353,2 | 3.571,470 | 378,576 | 384,048 |
| 26 | 26-Nop-13 | 2.038,00 | 1.181,44 | 329,44 | 2.173,290 | 684,128 | 264,992 |
| 27 | 27-Nop-13 | 1.707,70 | 515,92 | 353,36 | 2.173,935 | 552,176 | 360,800 |
| 28 | 28-Nop-13 | 2.038,00 | 1.031,44 | 339,44 | 2.241,420 | 659,104 | 473,520 |
| 29 | 29-Nop-13 | 2.057,60 | 1.352,16 | 383,2 | 3.204,015 | 467,840 | 367,424 |
| 30 | 30-Nop-13 | 2.157,60 | 1.442,16 | 343,2 | 2.854,005 | 148,128 | 81,568 |
| | ∑ | 66.849,65 | 37.009,98 | 12.213,24 | 85.009,050 | 12.096,240 | 8.975,296 |
| | R | 2.228,32 | 1.233,67 | 407,108 | 2.833,64 | 403,21 | 299,18 |
| | | | ∑ | 3.869,10 | | | |

Lampiran 6

Data Produksi Dan Penjualan Setelah Perbaikan

| NO | Tanggal | Produksi | | | Penjualan | | |
|----|-----------|------------|-----------|-----------|-----------|----------|----------|
| | | Per hari | | | | | |
| | | Split | Abu | Sirtu | Split | Abu | Sirtu |
| 1 | 18-Mar-14 | 3.465,00 | 1.554,00 | 840,00 | 4.134,660 | 978,464 | 282,960 |
| 2 | 19-Mar-14 | 3.543,75 | 1.596,00 | 420,00 | 3.352,980 | 301,024 | 69,600 |
| 3 | 20-Mar-14 | 2.268,00 | 1.021,44 | 349,44 | 2.459,295 | 624,992 | 241,328 |
| 4 | 21-Mar-14 | 3.477,60 | 1.532,16 | 403,20 | 2.313,105 | 122,416 | 561,504 |
| 5 | 22-Mar-14 | 3.780,00 | 1.532,16 | 524,16 | 3.312,810 | 192,912 | 248,336 |
| 6 | 23-Mar-14 | 2.835,00 | 1.276,80 | 436,80 | 2.881,515 | 239,808 | 196,000 |
| 7 | 24-Mar-14 | 4.082,40 | 1.496,88 | 589,68 | 4.316,445 | 370,832 | 283,968 |
| 8 | 25-Mar-14 | 3.792,60 | 1.552,32 | 611,52 | 3.571,470 | 378,576 | 384,048 |
| 9 | 26-Mar-14 | 3.880,80 | 1.646,40 | 611,52 | 2.173,290 | 684,128 | 264,992 |
| 10 | 27-Mar-14 | 2.160,90 | 870,24 | 235,20 | 2.173,935 | 552,176 | 360,800 |
| 11 | 28-Mar-14 | 3.175,20 | 1.340,64 | 529,20 | 2.241,420 | 659,104 | 473,520 |
| 12 | 29-Mar-14 | 3.685,50 | 1.659,84 | 655,20 | 3.204,015 | 467,840 | 367,424 |
| 13 | 30-Mar-14 | 3.326,40 | 1.411,20 | 403,20 | 2.854,005 | 148,128 | 81,568 |
| 14 | 31-Mar-14 | 3.288,60 | 1.370,88 | 322,56 | 3.962,205 | 456,368 | 338,976 |
| 15 | 01-Apr-14 | 1.890,00 | 672,00 | 336,00 | 3.770,475 | 479,936 | 460,608 |
| 16 | 02-Apr-14 | 2.079,00 | 960,96 | 554,40 | 3.923,460 | 727,232 | 220,384 |
| 17 | 03-Apr-14 | 1.701,00 | 806,40 | 504,00 | 2.029,215 | 383,072 | 237,504 |
| 18 | 04-Apr-14 | 3.099,60 | 1.411,20 | 806,40 | 2.492,475 | 135,120 | 500,992 |
| 19 | 05-Apr-14 | 2.721,60 | 1.330,56 | 806,40 | 2.984,505 | 625,584 | 336,160 |
| 20 | 06-Apr-14 | 3.515,40 | 1.491,84 | 846,72 | 2.602,755 | 242,384 | 815,168 |
| 21 | 07-Apr-14 | 3.661,88 | 1.554,00 | 882,00 | 3.424,410 | 683,712 | 477,744 |
| 22 | 08-Apr-14 | 3.969,00 | 1.740,48 | 987,84 | 2.455,875 | 147,664 | 402,480 |
| 23 | 09-Apr-14 | - | - | - | 2.173,320 | 164,320 | 62,832 |
| 24 | 10-Apr-14 | 1.757,70 | 745,92 | 423,36 | - | 138,096 | 157,040 |
| 25 | 11-Apr-14 | 3.260,25 | 1.429,68 | 772,80 | - | 222,544 | 235,216 |
| 26 | 12-Apr-14 | 3.685,50 | 1.616,16 | 873,60 | - | 76,400 | 247,600 |
| 27 | 13-Apr-14 | 3.726,45 | 1.572,48 | 436,80 | 2.636,460 | 126,432 | 303,152 |
| 28 | 14-Apr-14 | 3.504,38 | 1.512,00 | 420,00 | 4.470,135 | 495,264 | 242,864 |
| 29 | 15-Apr-14 | 3.644,55 | 1.572,48 | 436,80 | 4.215,870 | 178,208 | 290,192 |
| 30 | 16-Apr-14 | 3.685,50 | 1.616,16 | 393,12 | 2.924,895 | 320,688 | 302,064 |
| | Σ | 92.663,550 | 39.893,28 | 8.326,08 | 52.674,30 | 7.767,01 | 5.073,52 |
| | R | 3.088,785 | 1.329,78 | 277,54 | 1.755,81 | 258,90 | 169,12 |
| | | | Σ | 4.696,097 | | | |

LAMPIRAN 7
PERHITUNGAN

a. Efisiensi Alat Jaw Crusher

Perhitungan Shif 1

$$W_e = W_p - W_h$$

Keterangan :

W_e = Waktu kerja efektif

W_p = Waktu kerja Produktif

W_h = Waktu Hambatan

Jadi $W_e = 8,8 \text{ jam} - 2,153 \text{ jam}$

$$= 6,647 \text{ jam}$$

$$E = \frac{W_e}{W_p} \times 100 \%$$

Jadi Efisiensi Jaw Crusher Shif 1 adalah :

$$E = \frac{6,647}{8,8} \times 100 \%$$

$$= 75,53 \%$$

Maka Efisiensi dari Jaw Crusher Shif 1 adalah **75,53 %**

Shif II

$$W_e = W_p - W_h$$

$$= 8 \text{ jam} - 1,502 \text{ jam}$$

$$= 6,498 \text{ jam}$$

Jadi Efisiensi shif II adalah :

$$E = \frac{6,498}{8} \times 100 \% \\ = 81,22 \%$$

Maka Efisiensi dari *Jaw Crusher* Shif II adalah **81,22 %**

b. Perhitungan % produk masing – masing screen :

$$\text{Screen + 30 mm} = \frac{200}{4896,105} \times 100 \% = 4,08 \%$$

$$\text{Screen -30 mm + 12 mm} = \frac{277,54}{4896,105} \times 100 \% = 5,67 \%$$

$$\text{Screen -12 mm + 8 mm} = \frac{3088,785}{4896,105} \times 100 \% = 63,09 \%$$

$$\text{Screen – 8 mm} = \frac{1329,78}{4896,105} \times 100 \% = 27,16 \%$$

c. Perhitungan Belt Conveyor

CV 1

$$Q = 60 \times A \times v \times q \times s \times E \\ = 60 \text{ menit} \times 0,0654 \text{ m}^2 \times 91 \text{ m/menit} \times 2,64 \text{ ton/m}^3 \times 1 \times 0,6934 \\ = 653,66 \text{ ton/jam}$$

$$A = K (0,9 - 0,05)^2 \\ = 0,0906 \times (0,85)^2 \\ = 0,0906 \times 0,7225 \\ = 0,0654 \text{ m}^2$$

CV 2

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,1074 \text{ m}^2 \times 48,21 \text{ m/menit} \times 2,64 \text{ ton/m}^3 \times 0,85 \times 0,6934 \\
 &= 483,39 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K (0,9 - 0,05)^2 \\
 &= 0,1486 \times (0,85)^2 \\
 &= 0,1486 \times 0,7225 \\
 &= 0,1074 \text{ m}^2
 \end{aligned}$$

$$\begin{aligned}
 K &= 0,1538 - \frac{20-18}{20-15} \times (0,1538 - 0,1408) \\
 &= 0,1538 - \frac{2}{5} \times (0,013) \\
 &= 0,1486
 \end{aligned}$$

CV 3

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,1036 \text{ m}^2 \times 57,86 \text{ m/menit} \times 2,64 \text{ ton/m}^3 \times 0,89 \times 0,6934 \\
 &= 577,080 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K (0,9 - 0,05)^2 \\
 &= 0,1434 \times (0,85)^2 \\
 &= 0,1434 \times 0,7225 \\
 &= 0,1036 \text{ m}^2
 \end{aligned}$$

$$\begin{aligned}
 K &= 0,1538 - \frac{20-16}{20-15} \times (0,1538 - 0,1408) \\
 &= 0,1538 - \frac{4}{5} \times (0,013) \\
 &= 0,1434
 \end{aligned}$$

CV 4 (Sirtu)

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,0654 \text{ m}^2 \times 30,476 \text{ m/menit} \times 1,6 \text{ ton/m}^3 \times 1 \times 0,6934 \\
 &= 132,675 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K(0,9 - 0,05)^2 \\
 &= 0,0906 (0,85)^2 \\
 &= 0,0906 \times 0,7225 \\
 &= 0,0654 \text{ m}^2
 \end{aligned}$$

CV 5

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,1074 \text{ m}^2 \times 80,645 \text{ m/menit} \times 1,8 \text{ ton/m}^3 \times 0,85 \times 0,6934 \\
 &= 551,325 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K(0,9 - 0,05)^2 \\
 &= 0,1486(0,85)^2 \\
 &= 0,1486 \times 0,7225 \\
 &= 0,1074 \text{ m}^2
 \end{aligned}$$

$$\begin{aligned}
 K &= 0,1538 - \frac{20-18}{20-15} \times (0,1538-0,1408) \\
 &= 0,1538 - \frac{2}{5} \times (0,013) \\
 &= 0,1486
 \end{aligned}$$

CV 6

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,1074 \text{ m}^2 \times 55,39 \text{ m/menit} \times 1,8 \text{ ton/m}^3 \times 0,85 \times 0,6934 \\
 &= 378,671 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K(0,9 - 0,05)^2 \\
 &= 0,1486(0,85)^2 \\
 &= 0,1486 \times 0,7225 \\
 &= 0,1074 \text{ m}^2
 \end{aligned}$$

$$\begin{aligned}
 K &= 0,1538 - \frac{20-18}{20-15} \times (0,1538 - 0,1408) \\
 &= 0,1538 - \frac{2}{5} \times (0,013) \\
 &= 0,1486
 \end{aligned}$$

CV 7 (abu batu)

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,0654 \text{ m}^2 \times 33,46 \text{ m/menit} \times 1,6 \text{ ton/m}^3 \times 1 \times 0,6934 \\
 &= 145,67 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K(0,9 - 0,05)^2 \\
 &= 0,0906 (0,85)^2 \\
 &= 0,0906 \times 0,7225 \\
 &= 0,0654 \text{ m}^2
 \end{aligned}$$

CV 8 (split)

$$\begin{aligned}
 Q &= 60 \times A \times v \times q \times s \times E \\
 &= 60 \text{ menit} \times 0,0654 \text{ m}^2 \times 54,81 \text{ m/menit} \times 1,6 \text{ ton/m}^3 \times 1 \times 0,6934 \\
 &= 238,61 \text{ ton/jam}
 \end{aligned}$$

$$\begin{aligned}
 A &= K(0,9 - 0,05)^2 \\
 &= 0,0906 (0,85)^2 \\
 &= 0,0906 \times 0,7225 \\
 &= 0,0654 \text{ m}^2
 \end{aligned}$$

Jadi produksi conveyor terutama conveyor no 4,7, dan 8 yaitu sebagai berikut :

Conveyor no 4 yaitu Sirtu menghasilkan produksi / bulan adalah sebesar :

$$\begin{aligned}
 \text{Target produksi sehari} &= 132,675 \text{ ton/jam} \times 11,65 \\
 &= 1.545,66 \text{ ton/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Target Produksi sebulan} &= 1.545,66 \text{ ton/hari} \times 29 \\
 &= 44.824,14 \text{ ton/bulan}
 \end{aligned}$$

Conveyor no 7 yaitu Abu batu menghasilkan produksi / bulan adalah sebesar

$$\begin{aligned}
 \text{Target produksi sehari} &= 145,67 \text{ ton/jam} \times 11,65 \\
 &= 1.697,05 \text{ ton/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Target Produksi sebulan} &= 1.697,05 \text{ ton/hari} \times 29 \\
 &= 49.214,45 \text{ ton/bulan}
 \end{aligned}$$

Conveyor no 8 yaitu Split menghasilkan produksi / bulan adalah sebesar :

$$\begin{aligned}
 \text{Target produksi sehari} &= 238,61 \text{ ton/jam} \times 11,65 \\
 &= 2.779,80 \text{ ton/hari}
 \end{aligned}$$

$$\begin{aligned}
 \text{Target Produksi sebulan} &= 2.779,80 \text{ ton/hari} \times 29 \\
 &= 80.614,2 \text{ ton/bulan}
 \end{aligned}$$

d. Persentase Kehilangan Dengan Target Produksi Sebelum Perbaikan

Sirtu (- 30 mm) : 12.213,24 ton/bulan

Split (- 30 + 8 mm) : 66.849,65 ton/bulan

Abu (- 8 mm) : 37.009,98 ton/bulan

Jumlah : 116.072,87 ton/bulan

Faktor kehilangan : 118.160 - 116.072,87 = 2087,13 ton/bulan

Perhitungan % Produk

$$\text{Sirtu (- 30 mm)} = \frac{12.213,24}{118.160} \times 100\% = 10,34 \%$$

$$\text{Split (- 30 + 8 mm)} = \frac{66.849,65}{118.160} \times 100\% = 56,57 \%$$

$$\text{Abu (- 8 mm)} = \frac{37.009,98}{118.160} \times 100\% = 31,33 \%$$

$$\text{Kehilangan} = \frac{116.072,87}{118.160} \times 100\% = 1,76 \%$$

Jumlah = 100 %

e. Persentase Kehilangan Dengan Target Produksi Setelah Perbaikan

Sirtu (- 30 mm) : 8.326,08 ton/bulan

Split (- 30 + 8 mm) : 92.663,550 ton/bulan

Abu (- 8 mm) : 39.893,28 ton/bulan

Jumlah : 140.882,91 ton/bulan

Faktor kehilangan : 143.300 - 140.882,91 = 2.417,09 ton/bulan

Perhitungan % Produk

$$\begin{aligned}
 \text{Sirtu (- 30 mm)} &= \frac{8.326,08}{143.300} \times 100\% = 5,81 \% \\
 \text{Split (- 30 + 8 mm)} &= \frac{92.663,550}{143.300} \times 100\% = 64,66 \% \\
 \text{Abu (- 8 mm)} &= \frac{39.893,28}{143.300} \times 100\% = 27,84 \% \\
 \text{Kehilangan} &= \frac{140.882,91}{143.300} \times 100\% = 1,69 \% \\
 \text{Jumlah} &= 100 \%
 \end{aligned}$$

f. Mechanical Power Tansmission

$$S1 = \text{For Driver Rotational Speed} \quad S1 = \frac{P2 \times S2}{P1}$$

Diketahui :

P1 Driver Pitch Diameter sebelum perbaikan : 65 cm x 0,394 = 25,61 in

P1 Driver Pitch Diameter setelah perbaikan : 75 cm x 0,394 = 29,55 in

P2 Driver Pitch Diameter (roda gila) : 208 cm x 0,394 = 81,952 in

S2 Driver Shaft Speed sebelum perbaikan : 190 rpm

S2 Driver Shaft Speed setelah perbaikan : 210 rpm

Jawab :

$$\begin{aligned}
 S1 &= \frac{81,952 \text{ in} \times 190 \text{ rpm}}{25,61 \text{ in}} = 608 \text{ rpm (Sebelum Perbaikan)} \\
 S1 &= \frac{81,952 \text{ in} \times 210 \text{ rpm}}{29,55 \text{ in}} = 582,4 \text{ rpm (Setelah Perbaikan)}
 \end{aligned}$$

To Fine Driven Shaft Speed (S2)

$$S2 = \frac{P1 \times S1}{P2}$$

$$S2 = \frac{25,61 \text{ in} \times 608 \text{ rpm}}{81,952 \text{ in}} = 190 \text{ rpm (Sebelum Perbaikan)}$$

$$S2 = \frac{29,55 \text{ in} \times 582,4 \text{ rpm}}{81,952 \text{ in}} = 210 \text{ rpm (Setelah Perbaikan)}$$

