

## LAMPIRAN

### Lampiran 1 Proses perhitungan torsi pompa air bahan bakar pertalite

$$\begin{aligned} 1. \quad W &= m \times g & T &= W \times d \\ &= 2,673 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 26,214 \text{ N} \times 0,26 \text{ m} \\ &= 26,214 \text{ N} & &= 6,815 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 2. \quad W &= m \times g & T &= W \times d \\ &= 3,318 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 32,54 \text{ N} \times 0,26 \text{ m} \\ &= 32,54 \text{ N} & &= 8,46 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 3. \quad W &= m \times g & T &= W \times d \\ &= 2,52 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 24,714 \times 0,26 \\ &= 24,714 \text{ N} & &= 6,425 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 4. \quad W &= m \times g & T &= W \times d \\ &= 1,941 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 19,035 \text{ N} \times 0,26 \text{ m} \\ &= 19,035 \text{ N} & &= 4,949 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 5. \quad W &= m \times g & T &= W \times d \\ &= 1,187 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 11,641 \text{ N} \times 0,26 \text{ m} \\ &= 11,641 \text{ N} & &= 4,768 \text{ N.m} \end{aligned}$$

Lampiran 2 Proses perhitungan torsi pompa air bahan bakar LPG

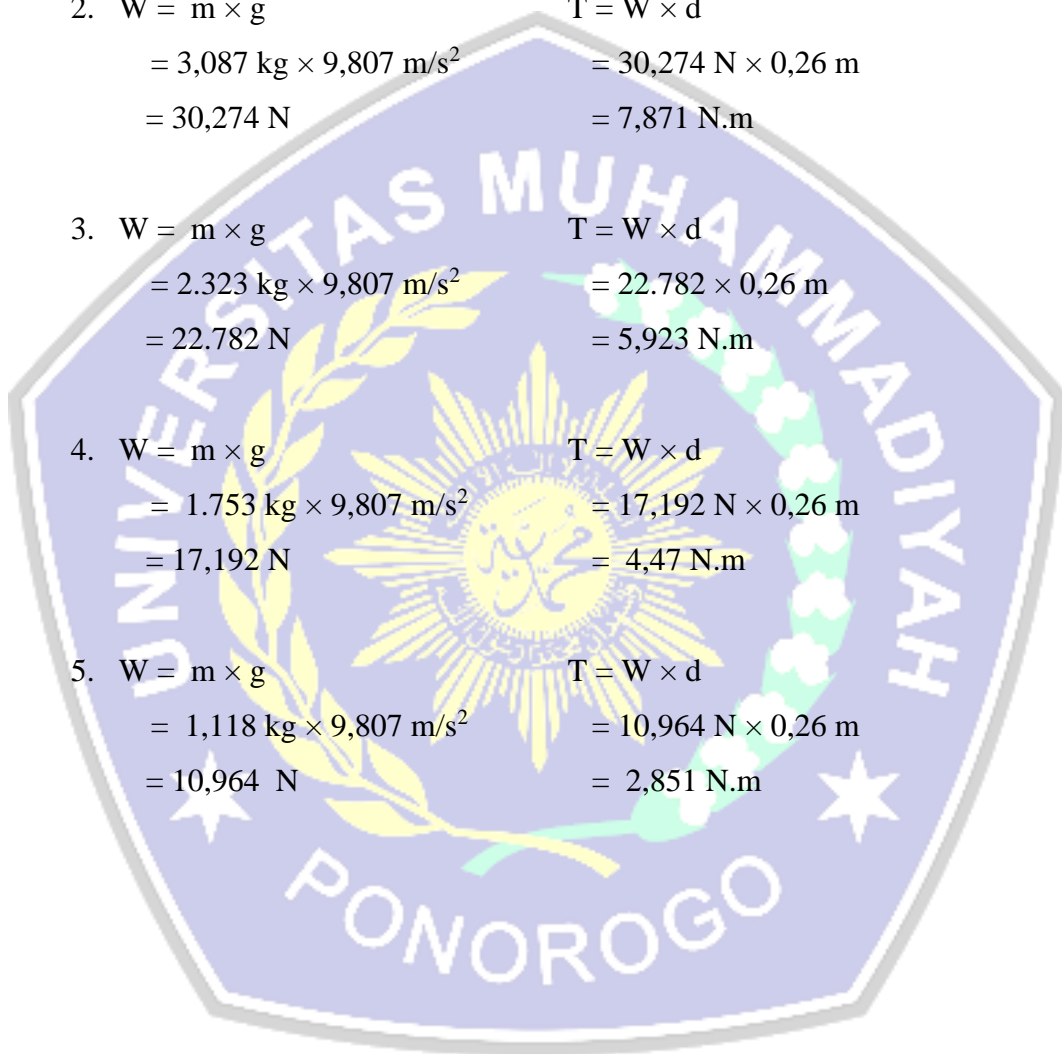
$$\begin{aligned} 1. \quad W &= m \times g & T &= W \times d \\ &= 2,447 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 23,998\text{N} \times 0,26 \text{ m} \\ &= 23,998 \text{ N} & &= 6,239 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 2. \quad W &= m \times g & T &= W \times d \\ &= 3,087 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 30,274 \text{ N} \times 0,26 \text{ m} \\ &= 30,274 \text{ N} & &= 7,871 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 3. \quad W &= m \times g & T &= W \times d \\ &= 2,323 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 22,782 \times 0,26 \text{ m} \\ &= 22,782 \text{ N} & &= 5,923 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 4. \quad W &= m \times g & T &= W \times d \\ &= 1,753 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 17,192 \text{ N} \times 0,26 \text{ m} \\ &= 17,192 \text{ N} & &= 4,47 \text{ N.m} \end{aligned}$$

$$\begin{aligned} 5. \quad W &= m \times g & T &= W \times d \\ &= 1,118 \text{ kg} \times 9,807 \text{ m/s}^2 & &= 10,964 \text{ N} \times 0,26 \text{ m} \\ &= 10,964 \text{ N} & &= 2,851 \text{ N.m} \end{aligned}$$



Lampiran 3 Proses perhitungan daya pompa air bahan bakar pertalite

$$\begin{aligned} 1. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 2000 \text{ rpm} \times 6.815 \text{ Nm})/60000 \\ &= 1,427 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 2. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 2400 \text{ rpm} \times 8.46 \text{ Nm})/60000 \\ &= 2,126 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 3. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 2800 \text{ rpm} \times 6.425 \text{ Nm})/60000 \\ &= 1,884 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 4. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 3200 \text{ rpm} \times 4.949 \text{ Nm})/60000 \\ &= 1,658 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 5. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 3600 \text{ rpm} \times 3.027 \text{ Nm})/60000 \\ &= 1,141 \text{ Kw} \end{aligned}$$



Lampiran 4 Proses perhitungan daya pompa air bahan bakar LPG

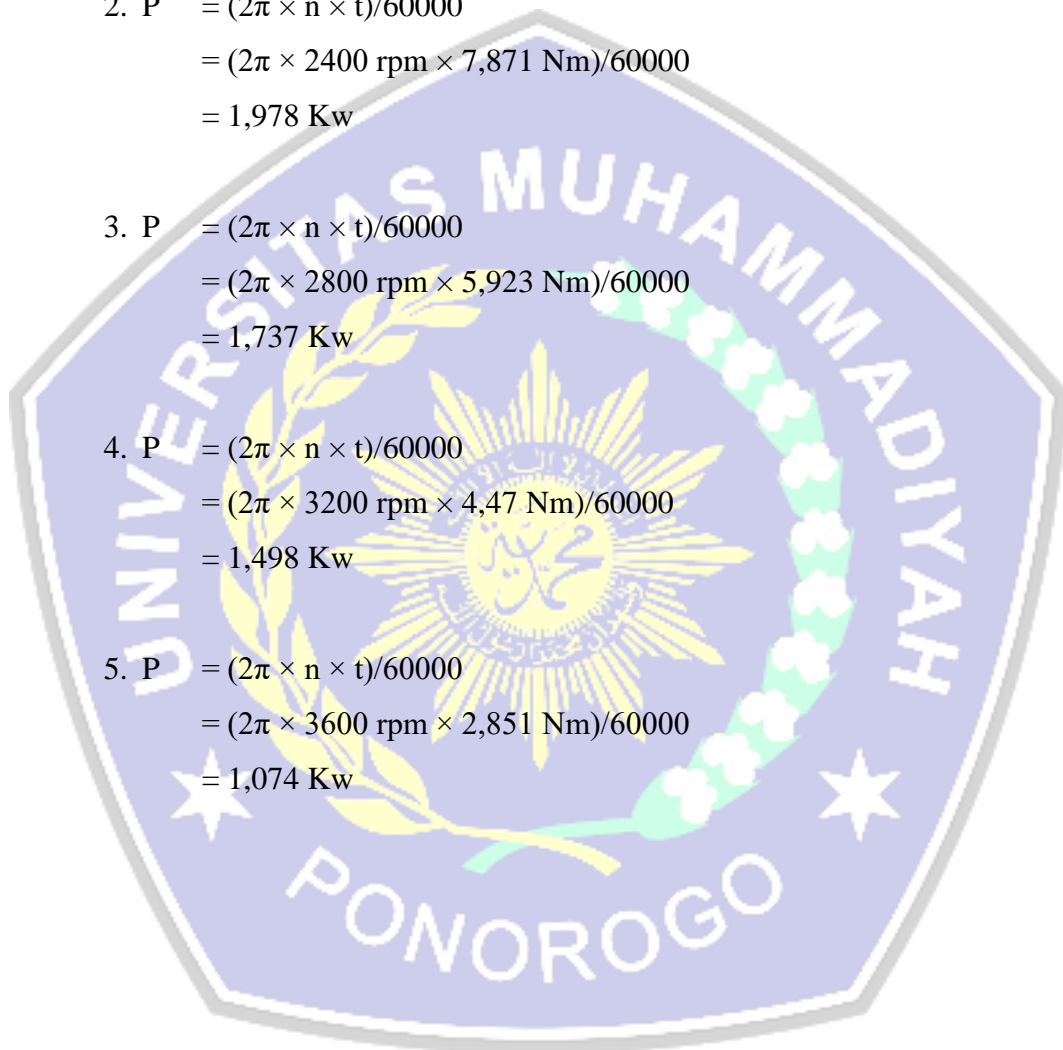
$$\begin{aligned} 1. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 2000 \text{ rpm} \times 6,239 \text{ Nm})/60000 \\ &= 1,307 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 2. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 2400 \text{ rpm} \times 7,871 \text{ Nm})/60000 \\ &= 1,978 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 3. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 2800 \text{ rpm} \times 5,923 \text{ Nm})/60000 \\ &= 1,737 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 4. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 3200 \text{ rpm} \times 4,47 \text{ Nm})/60000 \\ &= 1,498 \text{ Kw} \end{aligned}$$

$$\begin{aligned} 5. P &= (2\pi \times n \times t)/60000 \\ &= (2\pi \times 3600 \text{ rpm} \times 2,851 \text{ Nm})/60000 \\ &= 1,074 \text{ Kw} \end{aligned}$$



Lampiran 5 Proses perhitungan debit pompa air berbahan bakar pertalite

Diketahui: Volume drum air = 200 liter =  $0,2 \text{ m}^3$

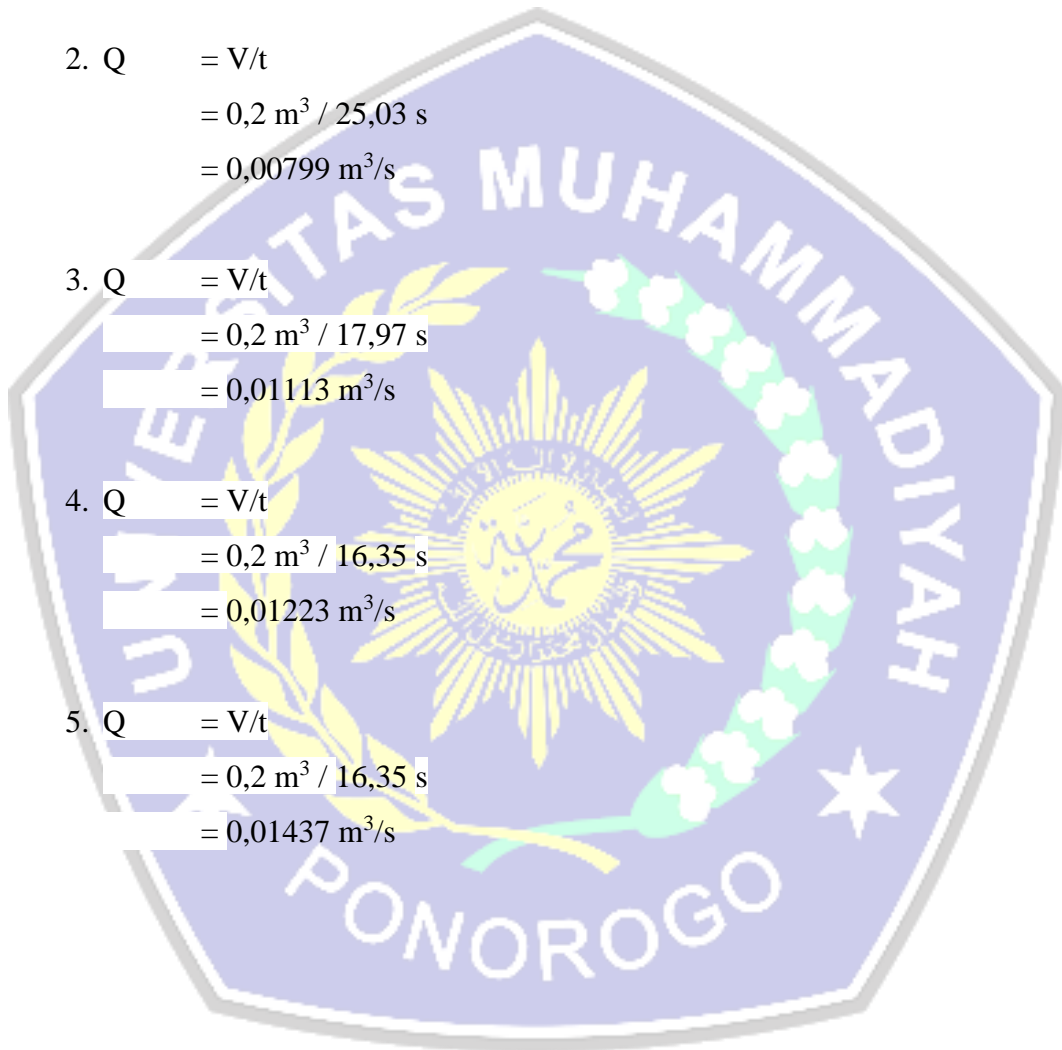
$$\begin{aligned} 1. Q &= V/t \\ &= 0,2 \text{ m}^3 / 31,18 \text{ s} \\ &= 0,00641 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 2. Q &= V/t \\ &= 0,2 \text{ m}^3 / 25,03 \text{ s} \\ &= 0,00799 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 3. Q &= V/t \\ &= 0,2 \text{ m}^3 / 17,97 \text{ s} \\ &= 0,01113 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 4. Q &= V/t \\ &= 0,2 \text{ m}^3 / 16,35 \text{ s} \\ &= 0,01223 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 5. Q &= V/t \\ &= 0,2 \text{ m}^3 / 16,35 \text{ s} \\ &= 0,01437 \text{ m}^3/\text{s} \end{aligned}$$



Lampiran 6 proses perhitungan debit pompa air berbahan bakar LPG

Diketahui: Volume drum air = 200 liter =  $0,2 \text{ m}^3$

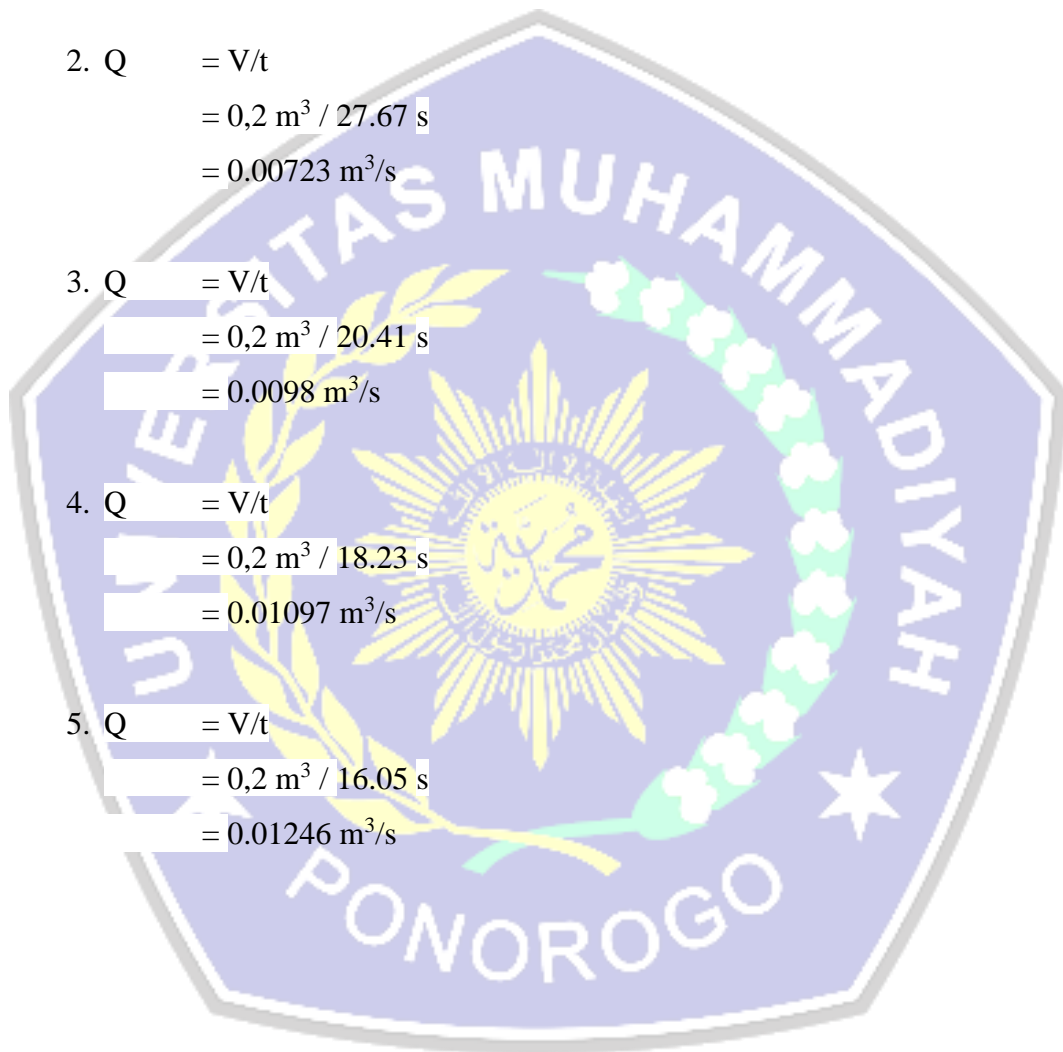
$$\begin{aligned} 1. Q &= V/t \\ &= 0,2 \text{ m}^3 / 35,83 \text{ s} \\ &= 0.00558 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 2. Q &= V/t \\ &= 0,2 \text{ m}^3 / 27.67 \text{ s} \\ &= 0.00723 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 3. Q &= V/t \\ &= 0,2 \text{ m}^3 / 20.41 \text{ s} \\ &= 0.0098 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 4. Q &= V/t \\ &= 0,2 \text{ m}^3 / 18.23 \text{ s} \\ &= 0.01097 \text{ m}^3/\text{s} \end{aligned}$$

$$\begin{aligned} 5. Q &= V/t \\ &= 0,2 \text{ m}^3 / 16.05 \text{ s} \\ &= 0.01246 \text{ m}^3/\text{s} \end{aligned}$$



## Lampiran 7 Proses perhitungan konsumsi bahan bakar pertalite

Diketahui: Massa jenis bahan bakar pertalite = 0,715 g/ml

1. Massa = volume  $\times$  massa jenis  
= 4,7 ml  $\times$  0,715 g/ml  
= 3,3605 g

2. Massa = volume  $\times$  massa jenis  
= 5,18 ml  $\times$  0,715 g/ml  
= 3,7037 g

3. Massa = volume  $\times$  massa jenis  
= 5,58 ml  $\times$  0,715 g/ml  
= 3,9897 g

4. Massa = volume  $\times$  massa jenis  
= 7,44 ml  $\times$  0,715 g/ml  
= 5,3196 g

5. Massa = volume  $\times$  massa jenis  
= 8,04 ml  $\times$  0,715 g/ml  
= 5,7486 g



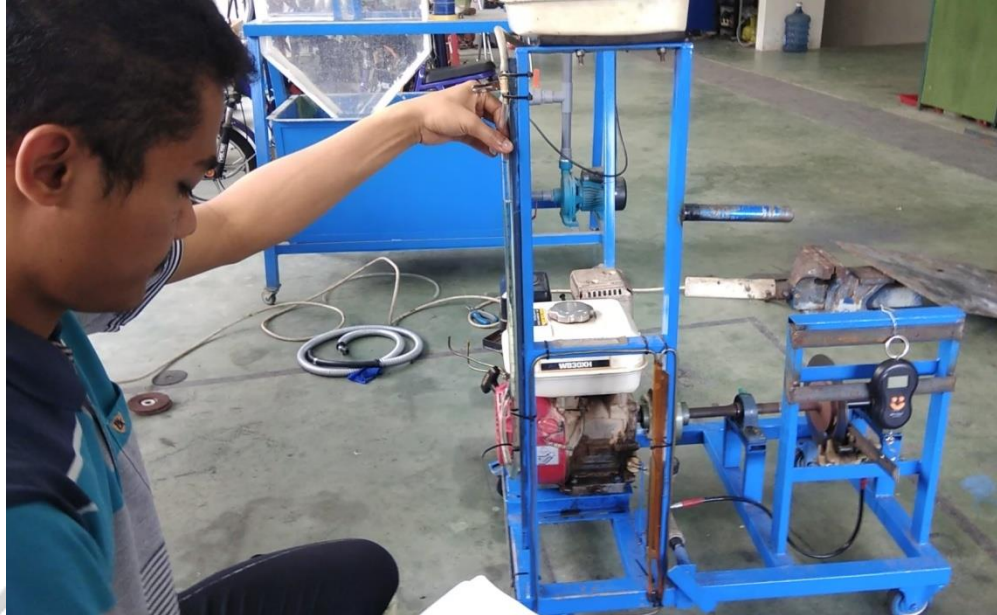


Lampiran 8 Dokumentasi pengujian torsi dan daya





Lampiran 9 Dokumentasi pengujian konsumsi bahan bakar



Lampiran 8 Dokumentasi pengujian debit air





Lampiran 9 Dokumentasi pengujian emisi gas buang

