1. **Data pengujian**

Tanggal : 31-08-2016  
Panjang lengan dinamometer : 22 cm = 0.22 m

<table>
<thead>
<tr>
<th>No</th>
<th>Bukaan Katup</th>
<th>Putaran (Rpm)</th>
<th>Gaya (N)</th>
<th>$H_s$ (m $H_0$)</th>
<th>$H_w$ (m)</th>
<th>Massa (Kg)</th>
<th>Torsi</th>
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<tbody>
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<td>$h_1$</td>
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<tr>
<td>Tanpa Beban</td>
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<td>0.11</td>
<td>0.065</td>
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Dengan Pemberian Beban

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<th>No</th>
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<td>7</td>
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<td>0.053</td>
<td>0.2</td>
<td>0.66</td>
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<tr>
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<td>0.075</td>
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<tr>
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<td>0.14</td>
<td>0.11</td>
<td>0.065</td>
<td>0</td>
</tr>
</tbody>
</table>

2. **Analisa Data**

Dari persamaan berikut :

$$Q = \left(\frac{8}{15}\right) C e \sqrt{2g \tan \frac{\theta}{2} he^{5}}$$

Tanpa beban :

1. $Q = \left(\frac{8}{15}\right) 0.299932 \sqrt{2.9,81 \tan \frac{90}{2}} (0,00965(0,065^{5}))$

   $= 0.0011 \text{ m}^3/\text{s}$

2. $Q = \left(\frac{8}{15}\right) 0.299932 \sqrt{2.9,81 \tan \frac{90}{2}} (0,00965 + 0,185^{5})$
3. **Perhitungan daya keluaran turbin**

\[ N_p = T \cdot \frac{2\pi n}{60} \]

**Tanpa beban :**

1. \( N_p = 0 \)
2. \( N_p = 1,06 \cdot \frac{2\pi \cdot 630,7}{60} = 69,8 \text{ Watt} \)
3. \( N_p = 1,12 \cdot \frac{2\pi \cdot 1788,5}{60} = 210,1 \text{ Watt} \)
4. \( Np = 1.64 \cdot \frac{2\pi \cdot 2563.5}{60} = 440.1 \text{ Watt} \)

5. \( Np = 1.77 \cdot \frac{2\pi \cdot 3473.5}{60} = 643.4 \text{ Watt} \)

**Dengan beban:**

6. \( Np = 1.90 \cdot \frac{2\pi \cdot 2720.5}{60} = 540.8 \text{ Watt} \)

7. \( Np = 1.42 \cdot \frac{2\pi \cdot 2518.5}{60} = 375.5 \text{ Watt} \)

8. \( Np = 1.40 \cdot \frac{2\pi \cdot 2240}{60} = 328.9 \text{ Watt} \)

9. \( Np = 1.19 \cdot \frac{2\pi \cdot 565.3}{60} = 70.2 \text{ Watt} \)

10. \( Np = 0 \)

**4. Perhitungan daya air**

\[ Na = \rho \cdot g \cdot Q \cdot h \]

**Tanpa beban:**

1. \( Na = 9810 \cdot 0.0011 \cdot 2.83 = 29.87 \text{ Watt} \)

2. \( Na = 9810 \cdot 0.0118 \cdot 2.83 = 327.99 \text{ Watt} \)

3. \( Na = 9810 \cdot 0.0160 \cdot 2.83 = 443.66 \text{ Watt} \)

4. \( Na = 9810 \cdot 0.0243 \cdot 2.83 = 674.05 \text{ Watt} \)

5. \( Na = 9810 \cdot 0.0243 \cdot 2.83 = 674.05 \text{ Watt} \)

**Dengan beban:**

6. \( Na = 9810 \cdot 0.0179 \cdot 2.83 = 495.89 \text{ Watt} \)

7. \( Na = 9810 \cdot 0.0169 \cdot 2.83 = 469.34 \text{ Watt} \)

8. \( Na = 9810 \cdot 0.0142 \cdot 2.83 = 394.87 \text{ Watt} \)

9. \( Na = 9810 \cdot 0.0090 \cdot 2.83 = 250.12 \text{ Watt} \)

10. \( Na = 9810 \cdot 0.0047 \cdot 2.83 = 130.54 \text{ Watt} \)

**5. Menghitung efisiensi Turbin**

\[ \eta = \left( \frac{Np}{Na} \right) \times 100 \% \]

**Tanpa beban:**
1. \( \eta = \left( \frac{0}{29.87} \right) \times 100 \% = 0 \% \)

2. \( \eta = \left( \frac{69.8}{327.99} \right) \times 100 \% = 21.3 \% \)

3. \( \eta = \left( \frac{210.1}{443.66} \right) \times 100 \% = 47.4 \% \)

4. \( \eta = \left( \frac{440.1}{674.05} \right) \times 100 \% = 65.3 \% \)

5. \( \eta = \left( \frac{643.4}{674.05} \right) \times 100 \% = 92.6 \% \)

Dengan beban:

6. \( \eta = \left( \frac{540.8}{495.89} \right) \times 100 \% = 97.3 \% \)

7. \( \eta = \left( \frac{375.5}{469.34} \right) \times 100 \% = 80.0 \% \)

8. \( \eta = \left( \frac{328.9}{394.87} \right) \times 100 \% = 83.3 \% \)

9. \( \eta = \left( \frac{70.2}{250.12} \right) \times 100 \% = 28.1 \% \)

10. \( \eta = \left( \frac{0}{130.54} \right) \times 100 \% = 0 \% \)
Keterangan:
A4FT UNPAS
Skala : 1 : 3
Satuan : mm
Tanggal : 28-08-2016
Nama : Yogi sumardi
NRP : 123030007
Diperiksa : 

FT UNPAS BATANG PENGHUBUNGAN A4
Keterangan:
A4FT UNPAS
Skala     : 1 : 5
Satuan   : mm
Tanggal : 28-08-2016
Nama        : Yogi Sumardi
NRP          : 123030007
Diperiksa  :

FT UNPAS     BATANG PENGHUBUNG  A4
Keterangan:
A4FT UNPAS
Skala : 1 : 3
Nama : Yogi sumardi
NRP : 123030007
Tanggal : 28-08-2016
Diperiksa :

FT UNPAS

BATANG PENGHUBUNG
Keterangan:
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Satuan: mm
Tanggal: 28-08-2016
Nama: Yogi Sumardi
NRP: 123030007

DUDUKAN BANTALAN
Keterangan:
Skala: 1 : 3
Satuan: mm
Tanggal: 28-08-2016
Nama: Yogi Sumardi
NRP: 123030007
Diperiksa: Beban Penyeimbang
Keterangan:

Skala : 1 : 3
Satuan : mm
Tanggal : 28-08-2016

Nama : Yogi sumardi
NRP : 123030007

Diperiksa :

FT UNPAS
POROS DINAMOMETER