

**Lampiran 1 : Tabel Form Tes *Grab Start***

<b>No</b>	<b>Nama</b>	<b>Grab Start</b>		
		<b>Kecepatan Awal (m/s)</b>	<b>Sudut Elevasi (derajat)</b>	<b>Jarak Horizontal Maksimal (meter)</b>
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Lampiran 2 : Tabel Distribusi *Grab Start*

No	Nama	Kecepatan Awal (m/s)	Sudut Elevasi (derajat)	Jarak Horizontal Maksimal (meter)
1	Gerdi Zulfitranto	3,67	51	2,5
2	Rizki Laras	4,12	30	3,3
3	M Rizky Ramadhan	4,47	48	3,17
4	Arief Rachman	4,86	33	3,28
5	Aji Firmansyah	3,92	40	2,95
6	Yudiantoro	4,45	31	3,55
7	M Hadyan Utoro	4,42	42	3,29
8	Aditiya Noval	4,51	45	3,26
9	Ramadhan Wisnugroho	4,8	46	3,45
10	Heru Miftakhudin	3,73	55	2,43
<b><math>\Sigma</math></b>		<b>42,95</b>	<b>421</b>	<b>31,18</b>
<b>Mean</b>		<b>4,295</b>	<b>42,1</b>	<b>3,12</b>
<b>Standar Deviasi</b>		<b>0,417</b>	<b>8,57</b>	<b>3,14</b>
<b>Median</b>		<b>4,44</b>	<b>43,5</b>	<b>3,27</b>
<b>Modus</b>		<b>4,16</b>	<b>47,65</b>	<b>2,71</b>

### Lampiran 3 : Perhitungan Instrumen *Grab Start*

#### Kecepatan Awal

1. Nilai tertinggi : 3,67
2. Nilai terendah : 4,86
3. Rentang : Nilai terendah – Nilai tertinggi  
: 4,86 – 3,67  
: 1,19
4. Rata-rata : 42,95 : 10  
: 4,295
5. Simpangan baku/SD :  $SD = \sqrt{\frac{n \sum X^2 - (\sum X)^2}{n(n-1)}}$   
:  $SD = \sqrt{\frac{10 \cdot 186,0421 - (42,95)^2}{10(10-1)}}$   
:  $SD = \sqrt{\frac{1860,421 - 1844,7025}{90}}$   
:  $SD = \sqrt{\frac{15,7185}{90}}$   
:  $SD = \sqrt{0,17465}$   
:  $SD = 0,417$

6. Median

$$: me = \frac{n_{ke 5} + n_{ke 6}}{2}$$

$$: me = \frac{4,42 + 4,45}{2}$$

$$: \frac{8,87}{2}$$

$$: 4,44$$

7. Modus

$$: mo = b + \left( \frac{b_1}{b_1 + b_2} \right) p$$

$$: 3,975 + \left( \frac{3}{3+2} \right) \cdot 0,3$$

$$: 3,975 + \left( \frac{3}{5} \right) \cdot 0,3$$

$$: 3,975 + (0,6 \cdot 0,3)$$

$$: 3,975 + 0,18$$

$$: 4,16$$

**Sudut Elevasi**

1. Nilai tertinggi : 55
2. Nilai terendah : 30
3. Rentang : Nilai tertinggi – Nilai terendah  
: 55 – 30  
: 25
4. Rata-rata : 421 : 10  
: 42,1
5. Simpangan baku/SD :  $SD = \sqrt{\frac{n \sum X^2 - (\sum X)^2}{n(n-1)}}$   
:  $SD = \sqrt{\frac{10 \cdot 18385 - (421)^2}{10(10-1)}}$   
:  $SD = \sqrt{\frac{183850 - 177241}{90}}$   
:  $SD = \sqrt{\frac{6609}{90}}$   
:  $SD = \sqrt{73,4333333333}$   
:  $SD = 8,57$

6. Median

$$: me = \frac{n_{ke 5} + n_{ke 6}}{2}$$

$$: me = \frac{42 + 45}{2}$$

$$: \frac{87}{2}$$

$$: 43,5$$

7. Modus

$$: mo = b + \left( \frac{b_1}{b_1 + b_2} \right) p$$

$$: 43,5 + \left( \frac{1}{1+1} \right) \cdot 8,3$$

$$: 43,5 + \left( \frac{1}{2} \right) \cdot 8,3$$

$$: 43,5 + (0,5 \cdot 8,3)$$

$$: 43,5 + 4,15$$

$$: 47,65$$

**Jarak Horizontal Maksimal**

1. Nilai tertinggi : 3,55
2. Nilai terendah : 2,43
3. Rentang : Nilai tertinggi – Nilai terendah  
: 3,55 – 2,43  
: 1,12
4. Rata-rata : 31,18 : 10  
: 3,12
5. Simpangan baku/SD :  $SD = \sqrt{\frac{n \sum X^2 - (\sum X)^2}{n(n-1)}}$   
:  $SD = \sqrt{\frac{10 \cdot 98,5114 - (31,18)^2}{10(10-1)}}$   
:  $SD = \sqrt{\frac{985,114 - 98,5114}{90}}$   
:  $SD = \sqrt{\frac{886,6026}{90}}$   
:  $SD = \sqrt{9,85114}$   
:  $SD = 3,14$

6. Median

$$: me = \frac{n_{ke 5} + n_{ke 6}}{2}$$

$$: me = \frac{3,26 + 3,28}{2}$$

$$: \frac{6,54}{2}$$

$$: 3,27$$

7. Modus

$$: mo = b + \left( \frac{b_1}{b_1 + b_2} \right) p$$

$$: 2,51 + \left( \frac{3}{3+1} \right) \cdot 0,28$$

$$: 2,51 + \left[ \left( \frac{4}{4} \right) \cdot 0,28 \right]$$

$$: 2,51 + (1 \cdot 0,20)$$

$$: 2,51 + 0,2$$

$$: 2,71$$

8. Jarak Horizontal Maksimal :  $\sqrt{V_o^2 \cos \alpha \cdot h}$ 

$$: \sqrt{(4,47)^2 \cos 48^\circ \cdot 0,75}$$

$$: \sqrt{19,9809 \cdot 0,67 \cdot 0,75}$$

$$: \sqrt{10,04040225}$$

$$: 3,17$$



**Lampiran 4 : Tabel Persentase dari masing-masing instrumen**

**Kecepatan Awal**

<b>Interval (m/s)</b>	<b>Frekuensi</b>	<b>Persentase</b>
4,60 – 4,9	3	30%
4,29 – 4,59	1	10%
3,98 – 4,28	4	40%
3,67 – 3,97	2	20%
$\Sigma$	10	100%

**Sudut Elevasi**

<b>Interval (derajat)</b>	<b>Frekuensi</b>	<b>Persentase</b>
30 - 36	3	30%
37 - 43	2	20%
44 - 50	3	30%
51 - 57	2	20%
$\Sigma$	10	100%

**Jarak Horizontal Maksimal**

<b>Interval (meter)</b>	<b>Frekuensi</b>	<b>Persentase</b>
2,43 – 2,71	2	20%
2,72 - 3	1	10%
3,01 – 3,29	4	40%
3,30 – 3,58	3	30%
$\Sigma$	10	100%

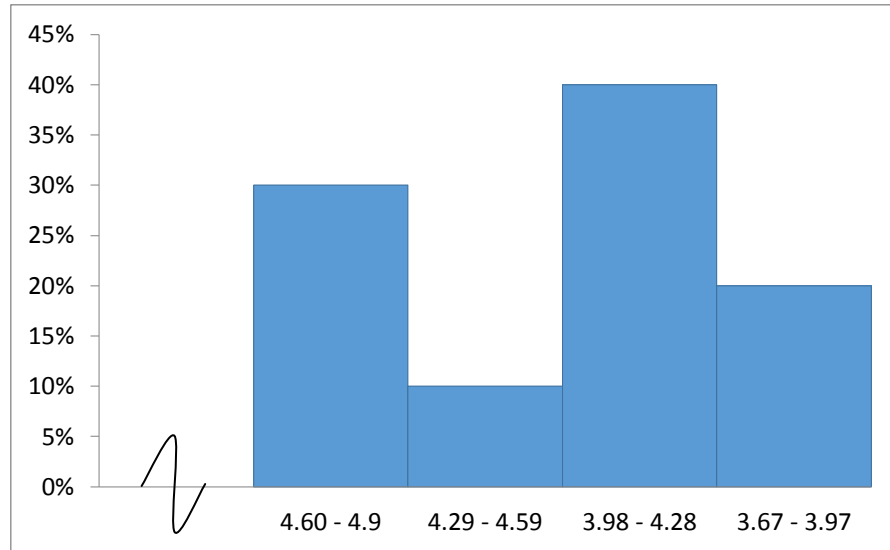
**Lampiran 5 : Tabel Nilai Rata-rata dari masing-masing komponen *Grab Start***

<b>No.</b>	<b>Komponen</b>	<b>Rata-rata</b>
1	Kecepatan awal	4,295 m/s
2	Sudut elevasi	42,1°
3	Jarak Horizontal	3,12 m

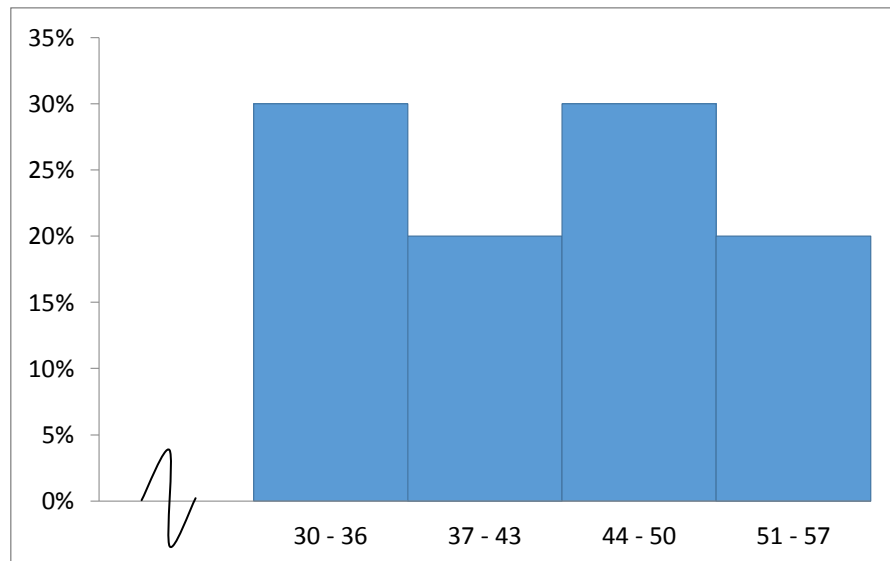
**Lampiran 6 : Tabel Nilai ideal dari masing-masing komponen *Grab Start***

<b>No.</b>	<b>Komponen</b>	<b>Rata-rata</b>
1	Kecepatan awal	4,74 m/s
2	Sudut elevasi	42° - 45°
3	Jarak Horizontal	3,12 m

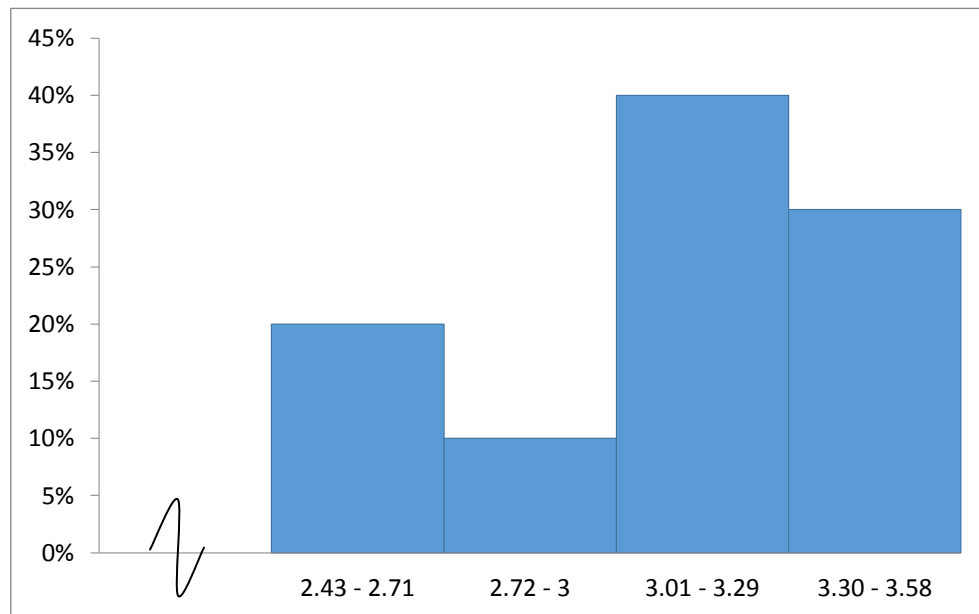
**Lampiran 7 : Histogram Rata-rata Lompat *Grab Start* Atlet KOP Renang Universitas Negeri Jakarta**



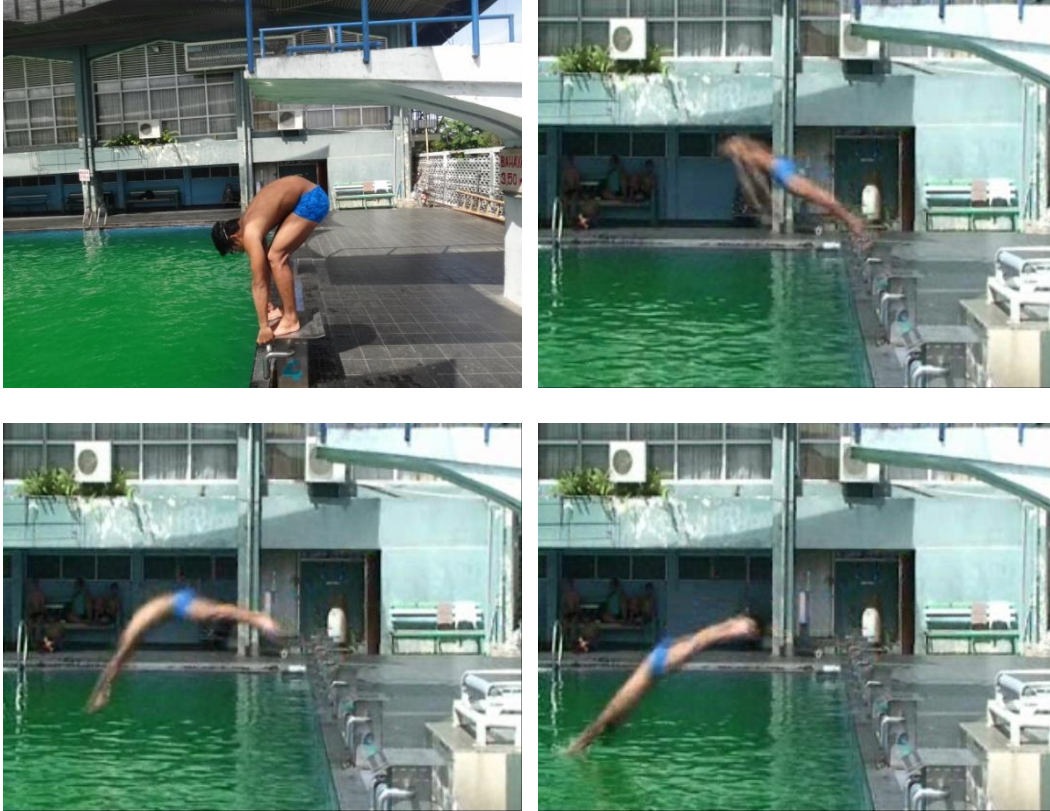
Gambar 11 : Histogram rata-rata kecepatan awal lompat *grab start* pada atlet KOP Renang Universitas Negeri Jakarta



Gambar 12 : Histogram rata-rata sudut elevasi lompat *grab start* pada atlet KOP Renang Universitas Negeri Jakarta



Gambar 13 : Histogram rata-rata jarak horizontal maksimal lompat *grab start* pada atlet KOP Renang Universitas Negeri Jakarta

**Lampiran 8 : Dokumentasi Penelitian**

Gambar 14 : Posisi Lompatan *Grab Start*  
Sumber : Dokumentasi Pribadi, Desember 2014

**Lampiran 9 : Gambar Hasil Pengolahan Kinovea**

Gambar Hasil Pengolahan Kinovea (Kecepatan Awal)



Gambar 15 : Kecepatan Awal  
Suber : Dokumentasi Pribadi, Desember 2014

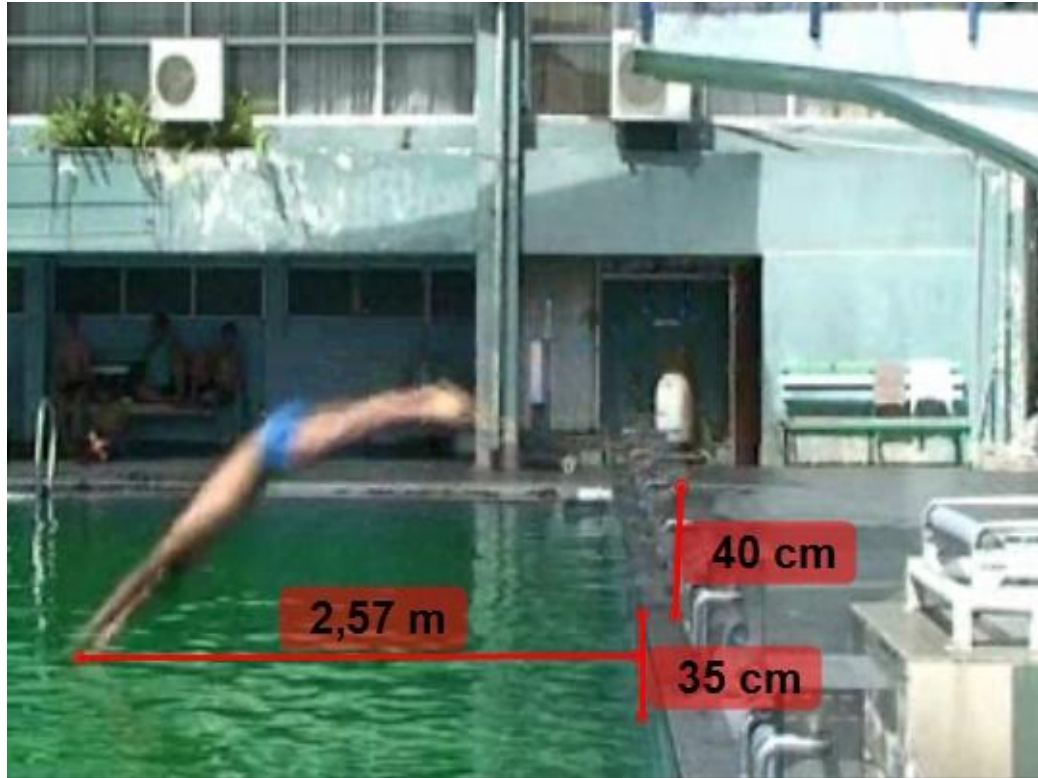
Gambar Hasil Pengolahan Kinovea (Sudut Elevasi)



Gambar 16 : Sudut Elevasi  
Sumber : Dokumentasi Pribadi, Desember 2014



Gambar Hasil Pengolahan Kinovea (Jarak Horizontal Maksimal)



Gambar 17 : Jarak Horizontal Maksimal  
Sumber : Dokumentasi Pribadi, Desember 2014