

## LAMPIRAN

Lampiran 1 Gambar Proses Produksi di PT.Borneo Iban Jaya Perkasa



Lampiran 2 Gambar Produk di PT.Borneo Iban Jaya Perkasa



### Lampiran 3 Perhitungan Uji Keseragaman Data

#### C. Bracket TV

##### 1. Operasi 1 (O-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{80,91}{15} = 5,39$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((5,81-5,39)^2+(5-5,39)^2+ \dots (5,43-5,39)^2)}{(15-1)}} = 0,29$$

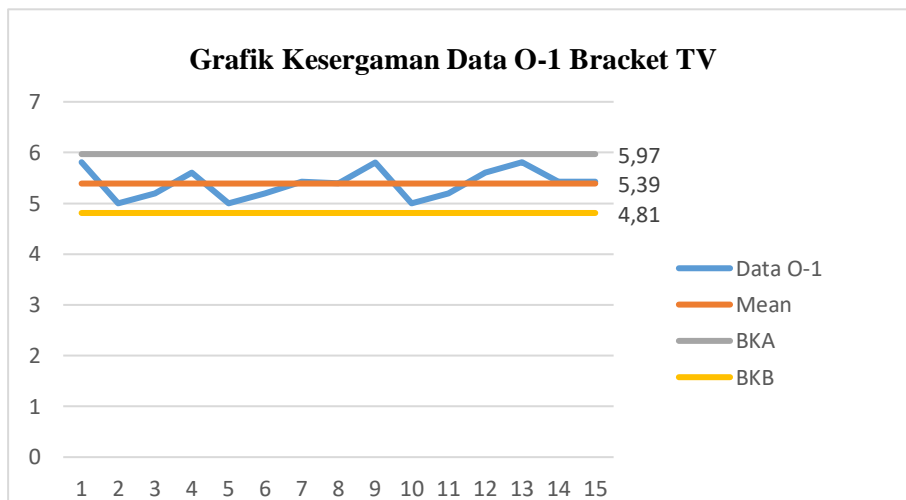
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,29}{5,39} \times 100\% = 0,05$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,05 \\ &= 95\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k. \delta = 5,39 + 2(0,29) = 5,97$$

$$\text{BKB} = \bar{x} - k. \delta = 5,39 - 2(0,29) = 4,81$$



##### 2. Operasi 2 (O-2)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{112,12}{15} = 7,47$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((7,8-7,47)^2+(7,8-7,47)^2+ \dots (7,6-7,47)^2)}{(15-1)}} = 0,29$$

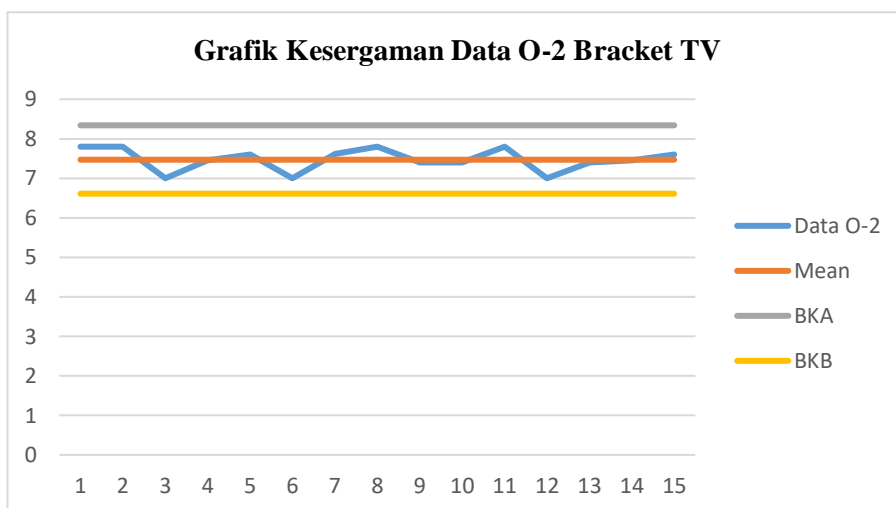
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,29}{7,47} \times 100\% = 0,04$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,04 \\ &= 0,96\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 7,47 + 2(0,29) = 8,34$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 7,47 - 2(0,29) = 6,61$$



### 3. Operasi 3 (O-3)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{107,8}{15} = 7,19$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((73-7,19)^2+(7,2-7,19)^2+ \dots (7,4-7,19)^2)}{(15-1)}} = 0,16$$

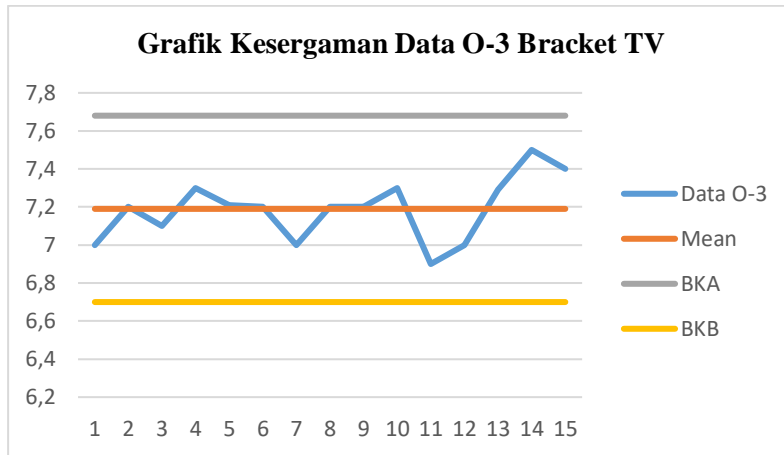
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,16}{7,19} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 7,19 + 2(0,16) = 7,68$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 7,19 - 2(0,16) = 6,7$$



#### 4. Operasi 4 (O-4)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{296,1}{15} = 19,74$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((19,7-19,74)^2+(19,8-19,74)^2+\dots+(19,7-19,74)^2)}{(15-1)}} = 0,12$$

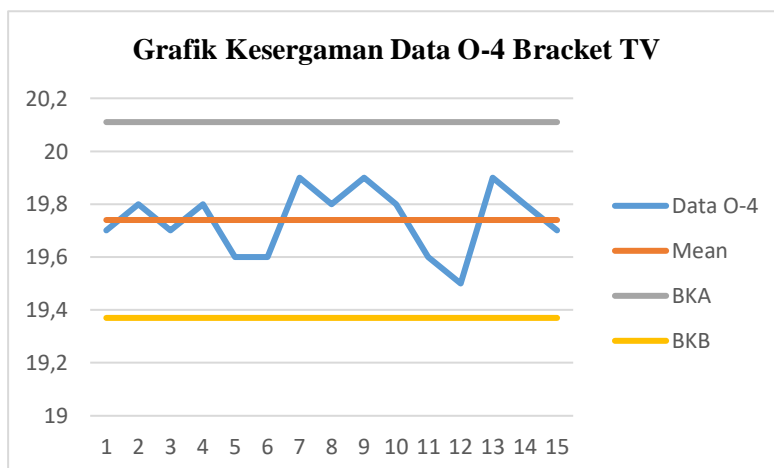
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,12}{19,74} \times 100\% = 0,01$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,01 = 99\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 19,74 + 2(0,12) = 20,11$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 19,74 - 2(0,12) = 19,37$$



## 5. Operasi 5 (O-5)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{53,08}{15} = 3,54$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((3,81-3,54)^2+(3,21-3,54)^2+ \dots (3,6-3,54)^2)}{(15-1)}} = 0,25$$

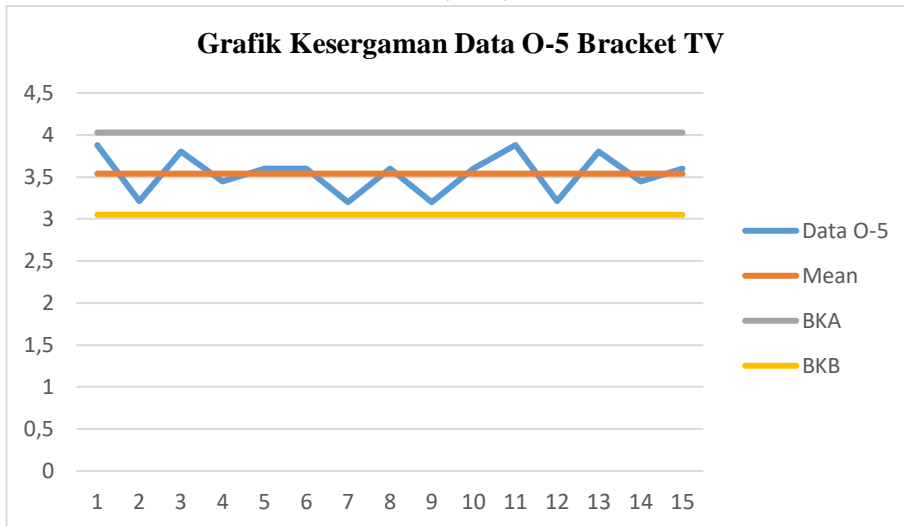
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,25}{3,54} \times 100\% = 0,07$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,07 \\ &= 93\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 3,54 + 2(0,25) = 4,03$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 3,54 - 2(0,25) = 3,05$$



## 6. Operasi 6 (O-6)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{109,28}{15} = 7,29$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((7,8-7,29)^2+(7,2-7,29)^2+ \dots (7,4-7,29)^2)}{(15-1)}} = 0,24$$

- Menghitung BKA dan BKB

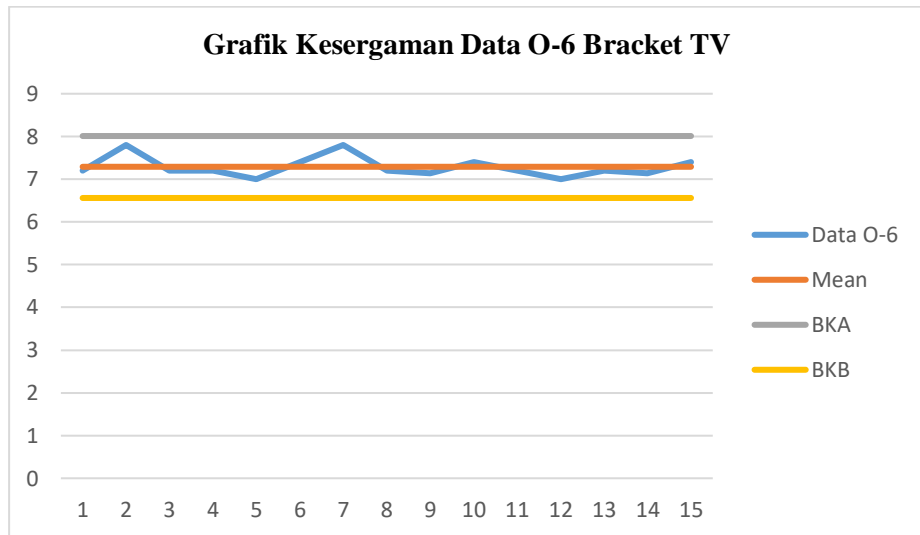
$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,03}{7,29} \times 100\% = 0,03$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,03$$

$$= 97\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 7,29 + 2(0,24) = 8,01$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 7,29 - 2(0,24) = 6,56$$



#### 7. Operasi 7 (O-7)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(X_i)}{n} = \frac{187,4}{15} = 12,49$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(X_i - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((12,2-12,49)^2 + (12,6-12,49)^2 + \dots + (12,49-12,49)^2)}{(15-1)}} = 0,19$$

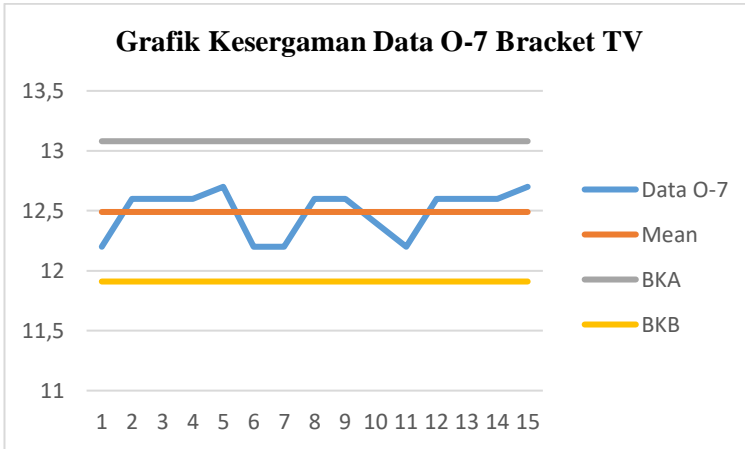
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,19}{12,49} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,02 = 98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 12,49 + 2(0,19) = 13,08$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 12,49 - 2(0,19) = 11,91$$



8. Operasi 8 (O-8)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{155,9}{15} = 10,39$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((10,8-10,39)^2+(10,2-10,39)^2+ \dots (10,2-10,39)^2)}{(15-1)}} = 0,21$$

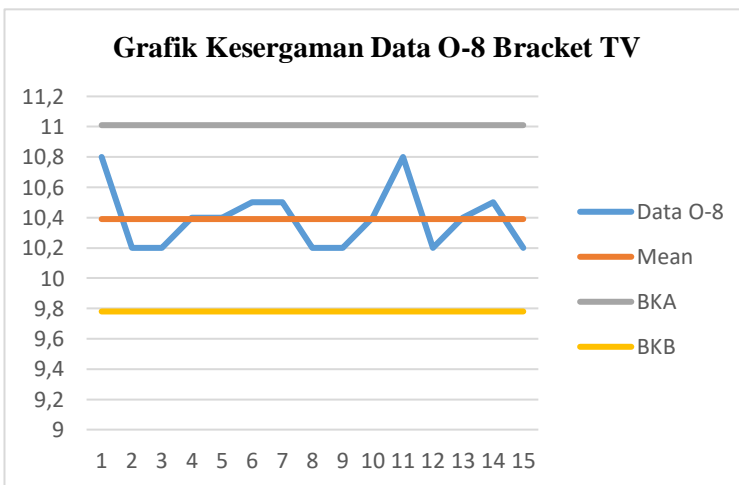
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,21}{10,39} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,02 = 98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 10,39 + 2(0,21) = 11,01$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 10,39 - 2(0,21) = 9,78$$





## 9. Operasi 9 (O-9)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{186,3}{15} = 12,42$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((12,8-12,42)^2+(12,4-12,42)^2+ \dots (12,5-12,42)^2)}{(15-1)}} = 0,25$$

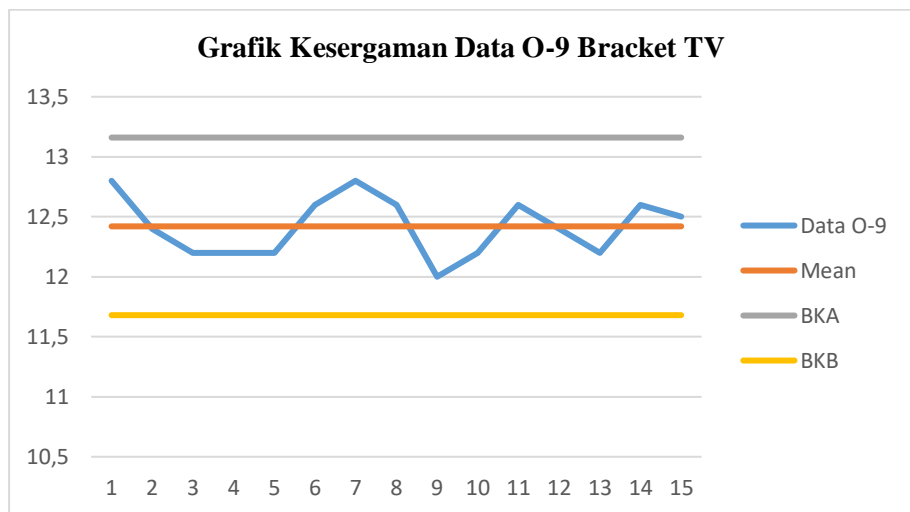
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,25}{12,42} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,02 = 98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 12,42 + 2(0,25) = 13,16$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 12,42 - 2(0,25) = 11,68$$



## 10. Operasi 10 (O-10)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{51,92}{15} = 3,46$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((3,2-3,46)^2+(3,6-3,46)^2+ \dots (3,6-3,46)^2)}{(15-1)}} = 0,25$$

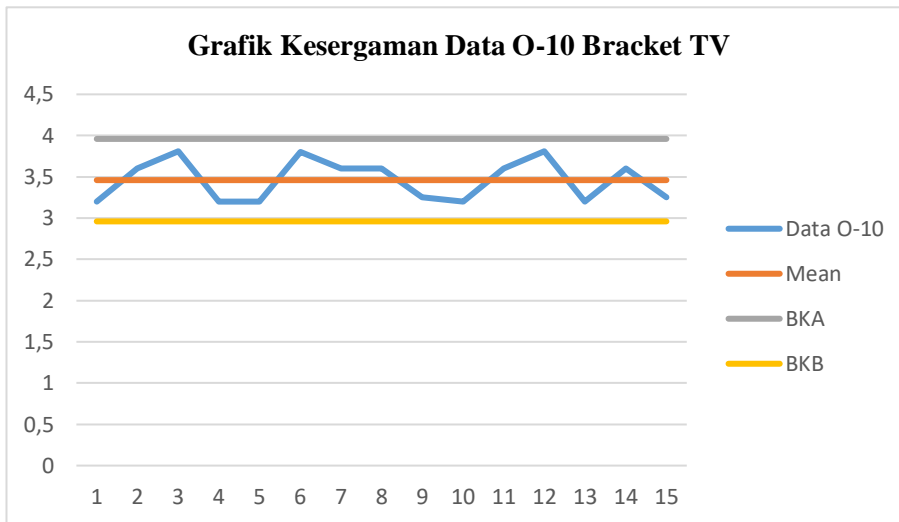
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,25}{3,46} \times 100\% = 0,07$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,07 \\ &= 93\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 3,46 + 2(0,25) = 3,96$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 3,46 - 2(0,25) = 2,96$$



### 11. Operasi 11 (O-11)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{65,68}{15} = 4,38$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((4,4-4,38)^2+(4,4-4,38)^2+ \dots (4,4-4,38)^2)}{(15-1)}} = 0,16$$

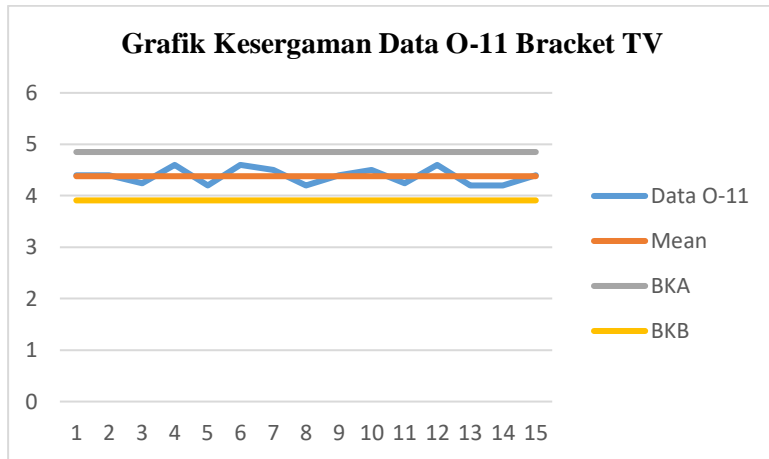
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,16}{4,38} \times 100\% = 0,04$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,04 \\ &= 96\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 4,38 + 2(0,16) = 4,85$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 4,38 - 2(0,16) = 3,91$$



### 12. Operasi 12 (O-12)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(X_i)}{n} = \frac{184,6}{15} = 12,31$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(X_i - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((12,6-12,31)^2 + (12,8-12,31)^2 + \dots + (12,4-12,31)^2)}{(15-1)}} = 0,28$$

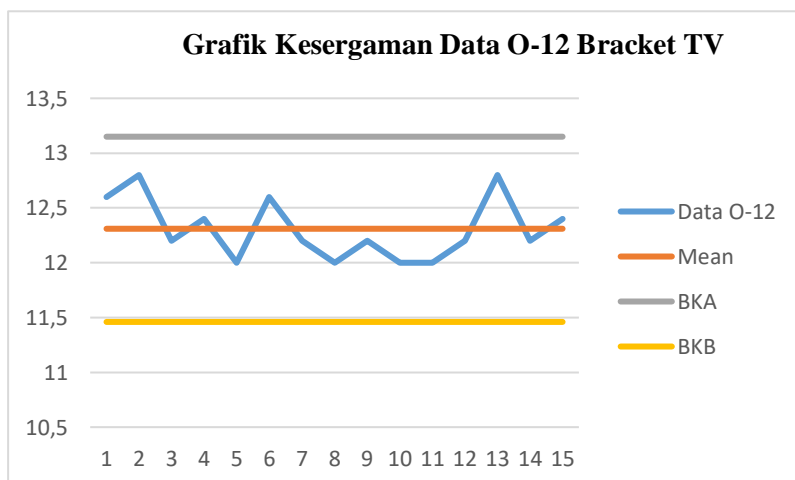
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,28}{12,31} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,02 = 98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 12,31 + 2(0,28) = 13,15$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 12,31 - 2(0,28) = 11,46$$



## 13. Operasi 13 (O-13)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{143,21}{15} = 9,55$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((9,23-9,55)^2+(9,6-9,55)^2+ \dots (9,74-9,55)^2)}{(15-1)}} = 0,22$$

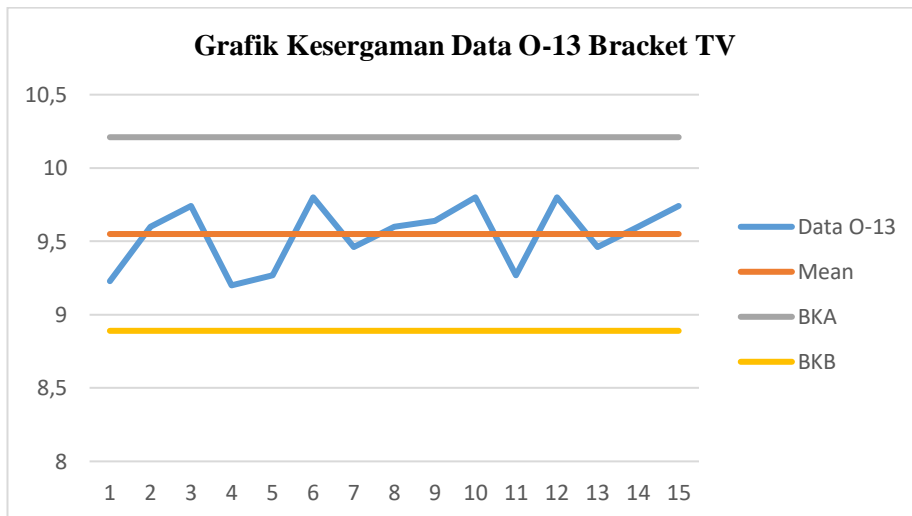
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,22}{9,55} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 9,55 + 2(0,22) = 10,21$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 9,55 - 2(0,22) = 8,89$$



## 14. Operasi (O-)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{52,56}{15} = 3,5$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((3,6-3,5)^2+(3,21-3,5)^2+ \dots (3,65-3,5)^2)}{(15-1)}} = 0,22$$

- Menghitung BKA dan BKB

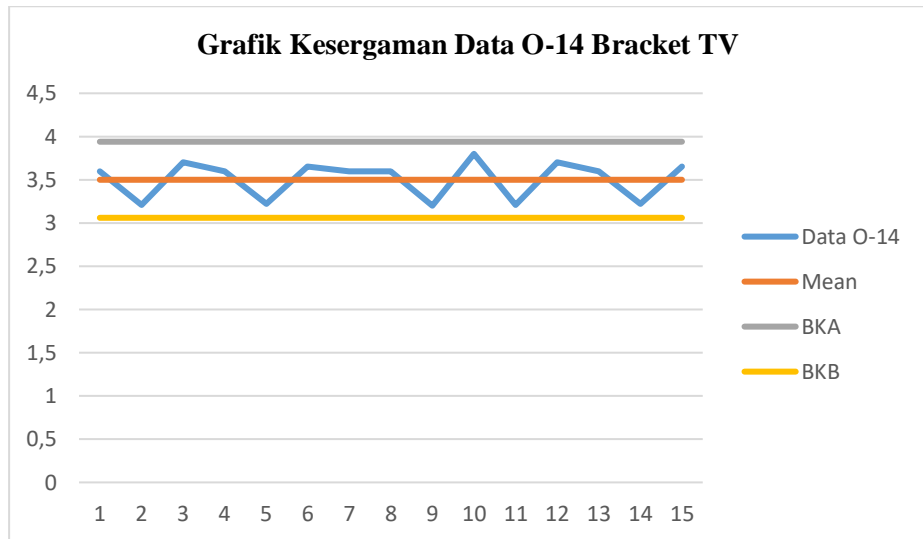
$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,22}{3,5} \times 100\% = 0,06$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,06$$

$$= 94\% \rightarrow k = 2$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 3,5 + 2(0,22) = 3,94$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 3,5 - 2(0,22) = 3,06$$



#### 15. Operasi 15 (O-15)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(X_i)}{n} = \frac{65,46}{15} = 4,36$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(X_i - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((4,39 - 4,36)^2 + (4,2 - 4,36)^2 + \dots + (4,24 - 4,36)^2)}{(15-1)}} = 0,24$$

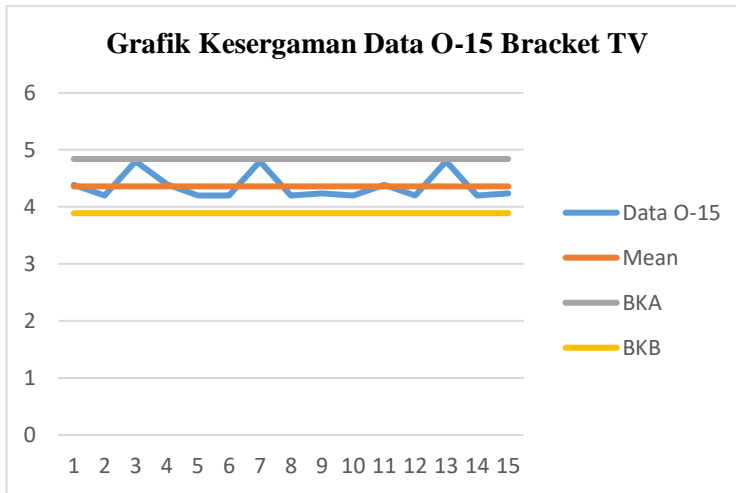
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,24}{4,36} \times 100\% = 0,05$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,05 \\ &= 95\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 4,36 + 2(0,24) = 4,84$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 4,36 - 2(0,24) = 3,89$$



### 16. Operasi 16 (O-16)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{112}{15} = 7,47$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((7,1-7,47)^2+(7,45-7,47)^2+ \dots (7,19-7,47)^2)}{(15-1)}} = 0,23$$

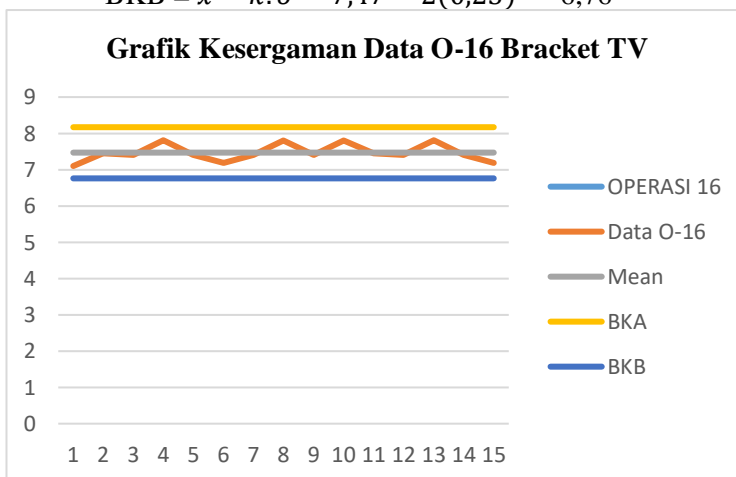
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,23}{7,47} \times 100\% = 0,03$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,03 = 97\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 7,47 + 2(0,23) = 8,17$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 7,47 - 2(0,23) = 6,76$$



## 17. Operasi 17 (O-17)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{950,6}{15} = 63,37$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((63,4-63,37)^2+(63,4-63,37)^2+ \dots (63-63,37)^2)}{(15-1)}} = 0,32$$

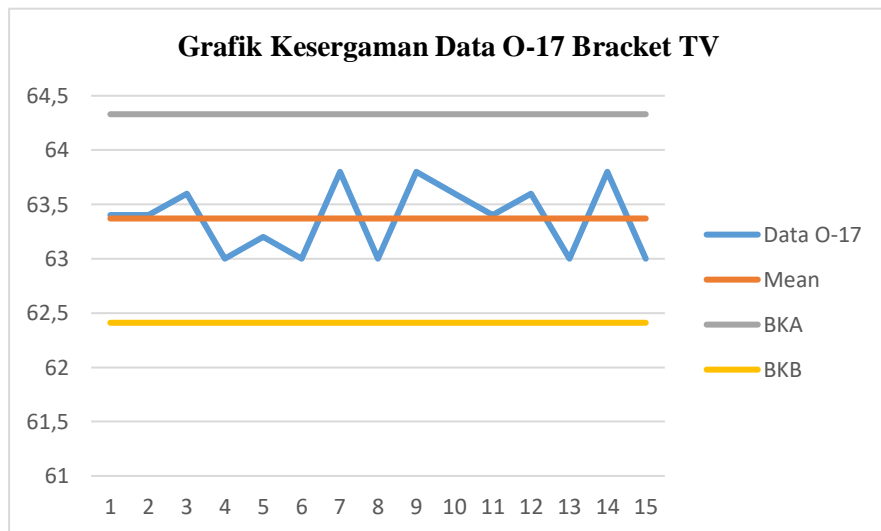
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,32}{63,37} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 63,37 + 2(0,32) = 64,33$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 63,37 - 2(0,32) = 62,41$$



## 18. Inspeksi (I-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{230}{15} = 15,33$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((15,2-15,33)^2+(15,3-15,33)^2+ \dots (15,2-15,33)^2)}{(15-1)}} = 0,28$$

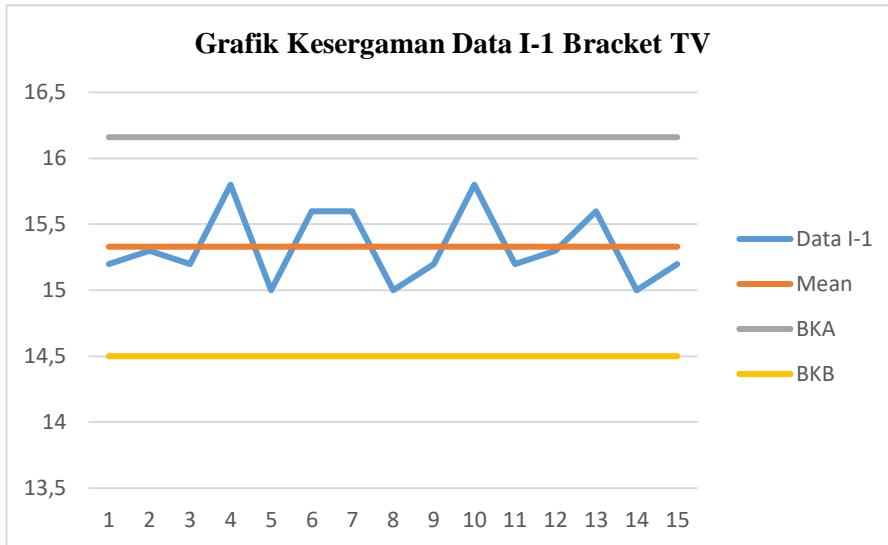
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,28}{15,33} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 15,33 + 2(0,28) = 16,16$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 15,33 - 2(0,28) = 14,5$$



### 19. Operasi 18 (O-18)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{695,5}{15} = 46,37$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((46-46,37)^2 + (46,4-46,37)^2 + \dots + (46,4-46,37)^2)}{(15-1)}} = 0,32$$

- Menghitung BKA dan BKB

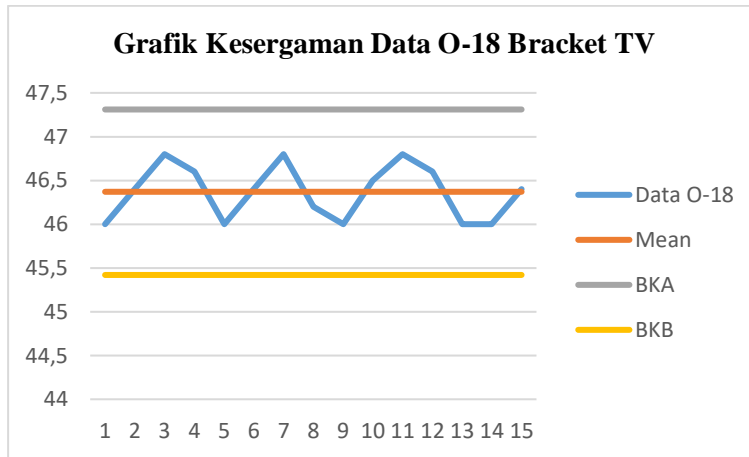
$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,32}{46,37} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 46,37 + 2(0,32) = 47,31$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 46,37 - 2(0,32) = 45,42$$





### 20. Operasi 18 (O-18)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{230,2}{15} = 15,35$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((15,2-15,35)^2+(15,3-15,35)^2+... (15,8-15,35)^2)}{(15-1)}} = 0,29$$

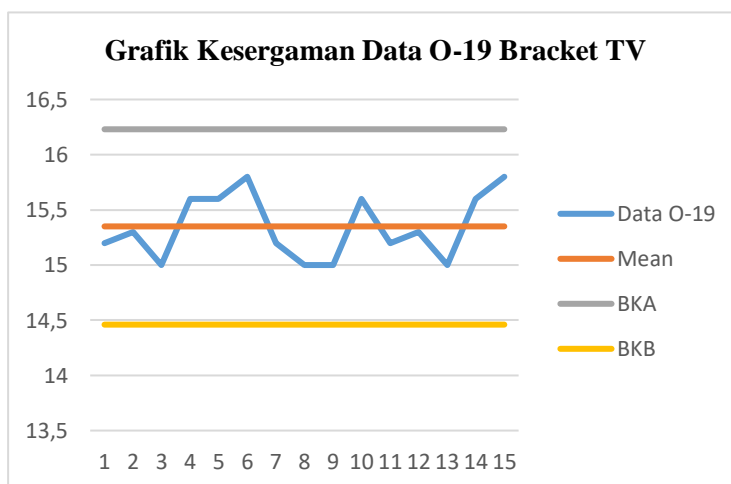
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,29}{15,35} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,02 = 98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 15,35 + 2(0,29) = 16,23$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 15,35 - 2(0,29) = 46,14$$



#### D. Terminal Salon

##### 1. Operasi 1 (O-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{212,7}{15} = 14,18$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((14-14,18)^2+(14,23-14,18)^2+ \dots (14,1-14,18)^2)}{(15-1)}} = 0,13$$

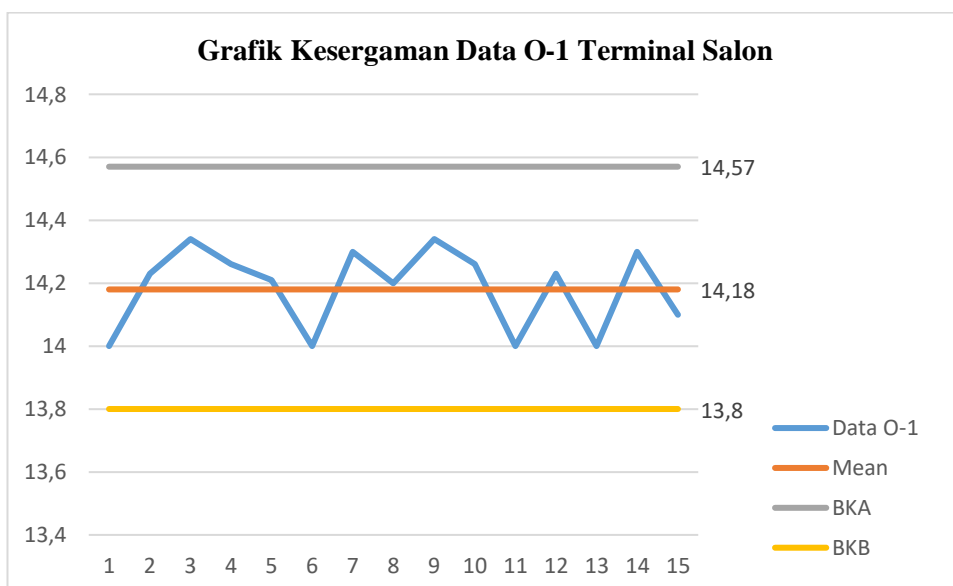
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,13}{14,18} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 14,18 + 2(0,13) = 14,57$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 14,18 - 2(0,13) = 13,8$$



##### 2. Operasi 2 (O-2)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{111,26}{15} = 7,42$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((7,6-7,42)^2+(7,5-7,42)^2+ \dots (7,53-7,42)^2)}{(15-1)}} = 0,23$$

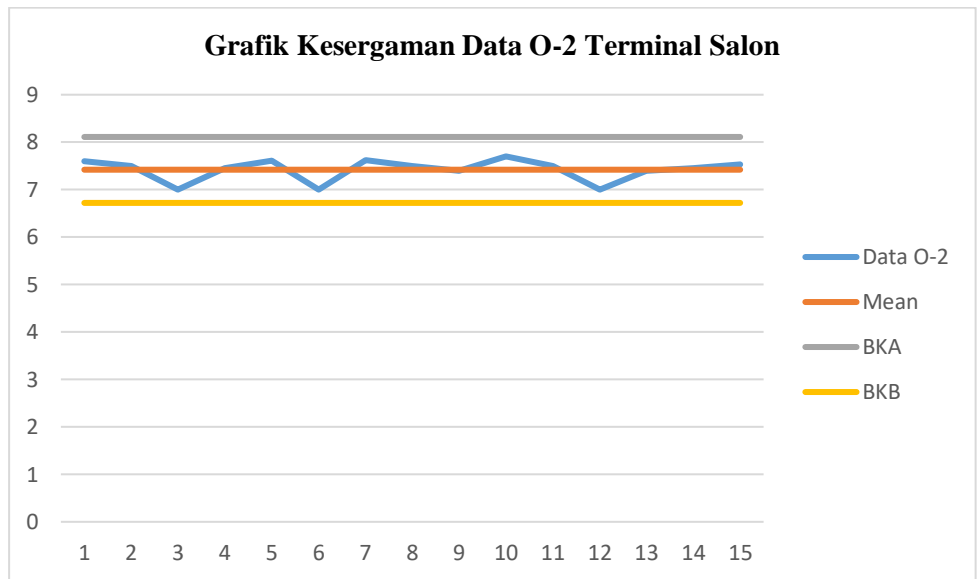
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,23}{7,42} \times 100\% = 0,03$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,03 \\ &= 97\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 7,42 + 2(0,23) = 8,11$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 7,42 - 2(0,23) = 6,72$$



### 3. Operasi 3 (O-3)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{145,27}{15} = 9,68$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((9,5-9,68)^2 + (9,7-9,68)^2 + \dots + (9,8-9,68)^2)}{(15-1)}} = 0,12$$

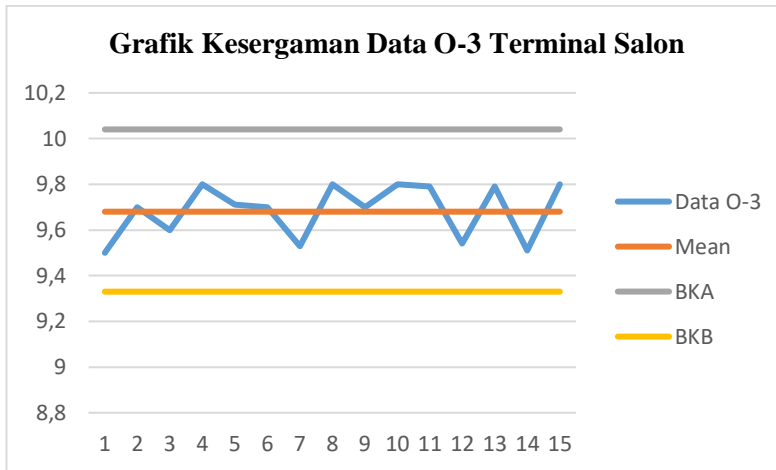
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,12}{9,68} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 9,68 + 2(0,12) = 10,04$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 9,68 - 2(0,12) = 9,33$$



#### 4. Operasi 4 (O-4)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{94,02}{15} = 6,27$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((6,41-6,27)^2+(6,22-6,27)^2+ \dots (6,12-6,27)^2)}{(15-1)}} = 0,14$$

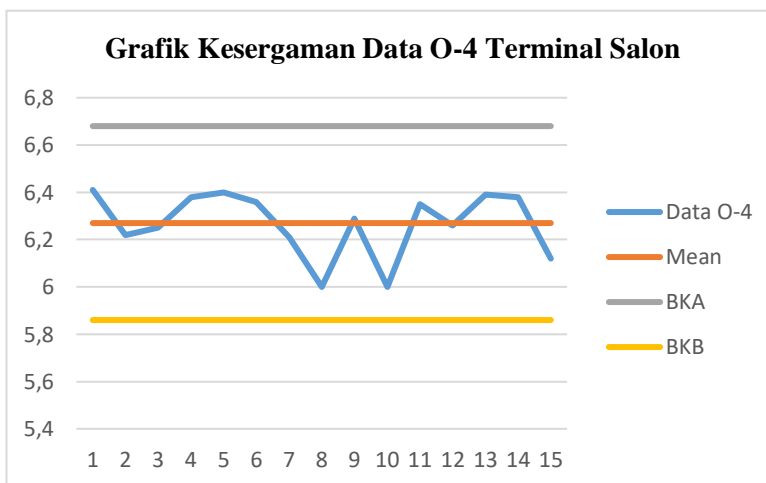
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,14}{6,27} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S \ 100\% - 0,02 = 98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 6,27 + 2(0,14) = 6,68$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 6,27 - 2(0,14) = 5,86$$



## 5. Operasi 5 (O-5)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{125,86}{15} = 8,39$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((8,5-8,39)^2+(8,42-8,39)^2+ \dots (8,36-8,39)^2)}{(15-1)}} = 0,08$$

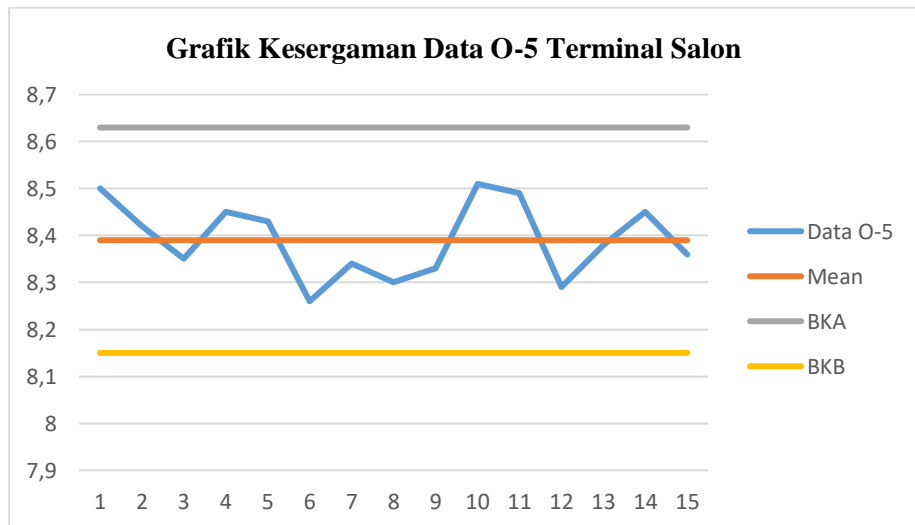
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,08}{8,39} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 8,39 + 2(0,08) = 8,63$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 8,39 - 2(0,08) = 8,15$$



## 6. Operasi 6 (O-6)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{125,43}{15} = 8,36$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((8,38-8,36)^2+(8,42-8,36)^2+ \dots (8,41-8,36)^2)}{(15-1)}} = 0,06$$

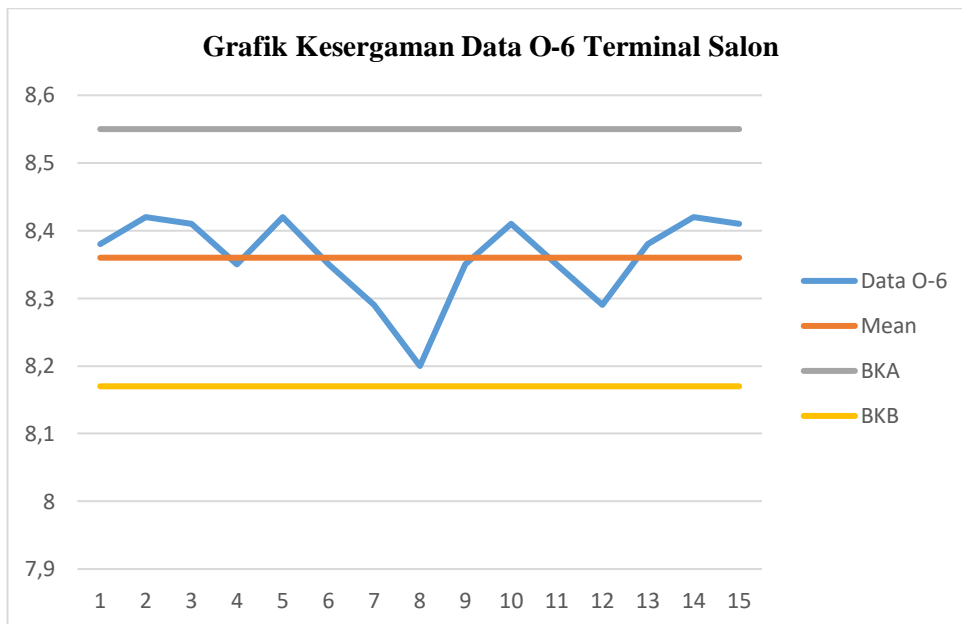
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,06}{8,36} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 8,36 + 2(0,06) = 8,55$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 8,36 - 2(0,06) = 8,17$$



#### 7. Operasi 7 (O-7)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{235,12}{15} = 15,67$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((15,51-15,67)^2 + (15,64-15,67)^2 + \dots + (15,8-15,67)^2)}{(15-1)}} = 0,12$$

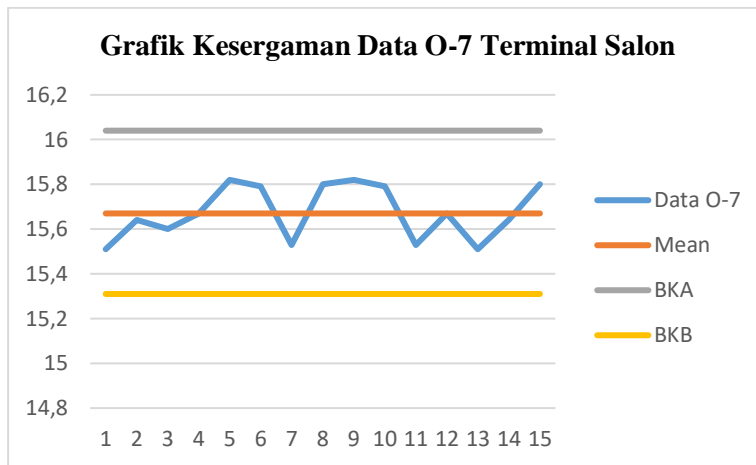
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,12}{15,67} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 15,67 + 2(0,12) = 16,04$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 15,67 - 2(0,12) = 15,31$$



### 8. Operasi 8 (O-8)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(X_i)}{n} = \frac{847,8}{15} = 56,52$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(X_i - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((56-56,52)^2 + (56,7-56,52)^2 + \dots + (56,7-56,52)^2)}{(15-1)}} = 0,34$$

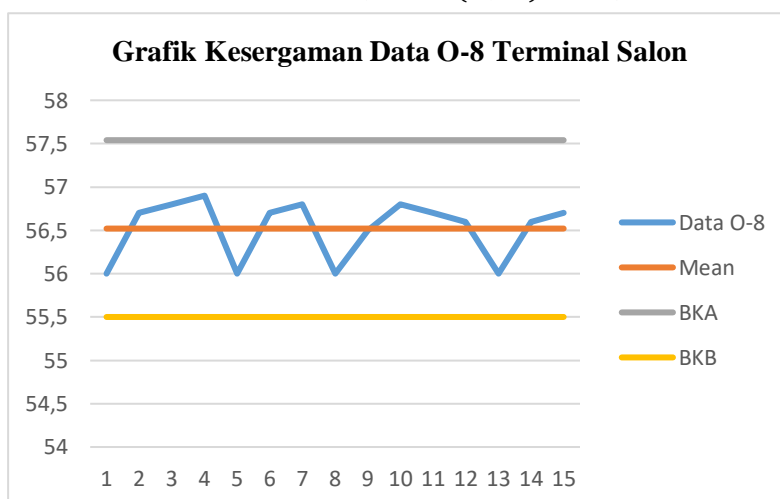
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,34}{56,52} \times 100\% = 0,01$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,01 = 99\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 56,52 + 2(0,34) = 57,54$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 56,52 - 2(0,34) = 55,5$$



## 9. Inspeksi 1 (I-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{139,87}{15} = 9,32$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((9,53-9,32)^2+(9,32-9,32)^2+... (9,53-9,32)^2)}{(15-1)}} = 0,14$$

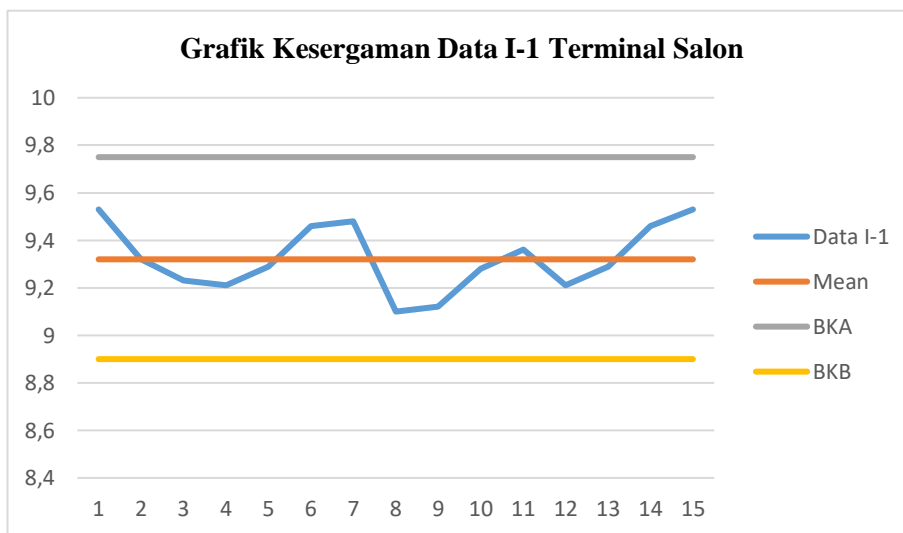
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,14}{9,32} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 9,32 + 2(0,14) = 9,75$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 9,32 - 2(0,14) = 8,9$$



## 10. Operasi 9 (O-9)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{621,4}{15} = 41,43$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((41,4-41,43)^2+(41,5-41,43)^2+... (41,2-41,43)^2)}{(15-1)}} = 0,27$$

- Menghitung BKA dan BKB

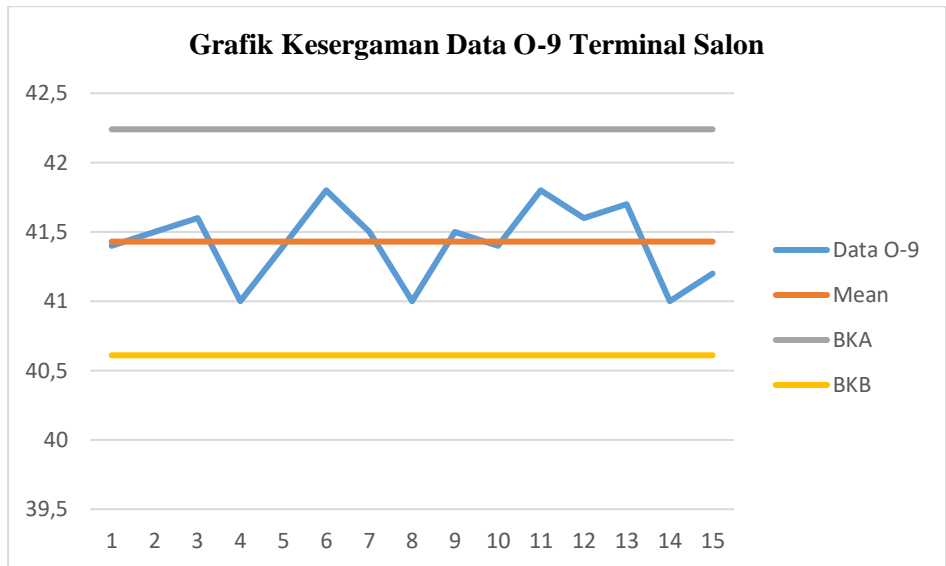
$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,27}{41,43} \times 100\% = 0,01$$



$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 41,43 + 2(0,27) = 42,24$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 41,43 - 2(0,27) = 40,61$$



## E. Pedal Rem

### 1. Operasi 1 (O-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{170,8}{15} = 11,39$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((11,8-11,39)^2+(11,9-11,39)^2+ \dots (11-11,39)^2)}{(15-1)}} = 0,30$$

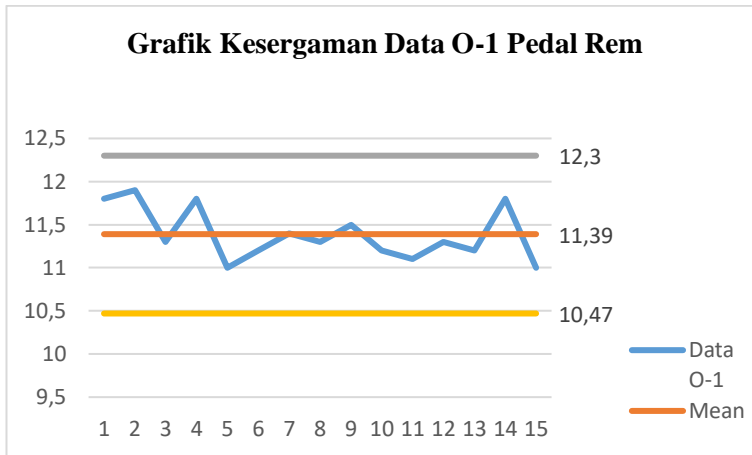
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,30}{11,39} \times 100\% = 0,03$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,03 \\ &= 97\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 11,39 + 2(0,30) = 12,3$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 11,39 - 2(0,30) = 10,47$$



## 2. Operasi 2 (O-2)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{96,72}{15} = 6,45$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((6-6,45)^2+(6,9-6,45)^2+\dots+(6,49-6,45)^2)}{(15-1)}} = 0,33$$

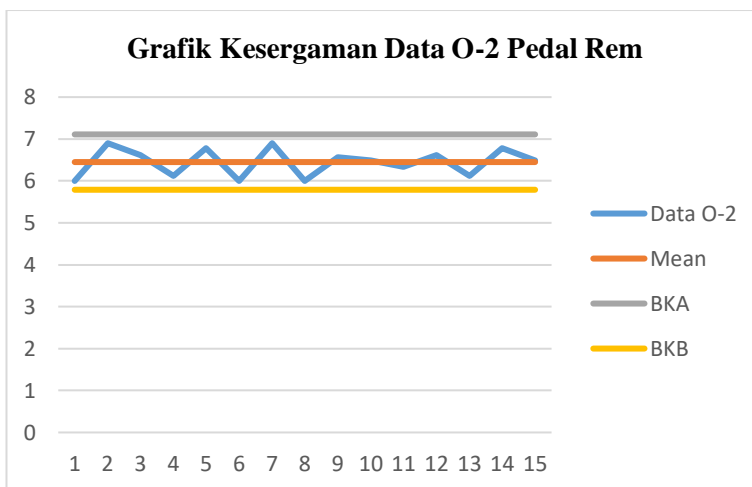
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,33}{6,45} \times 100\% = 0,05$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,05 = 95\% \rightarrow k = 2$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 6,45 + 2(0,33) = 7,11$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 6,45 - 2(0,33) = 5,79$$



## 3. Operasi 3 (O-3)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{80,48}{15} = 5,37$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((5,99-5,37)^2+(5-5,37)^2+ \dots (5,4-5,37)^2)}{(15-1)}} = 0,28$$

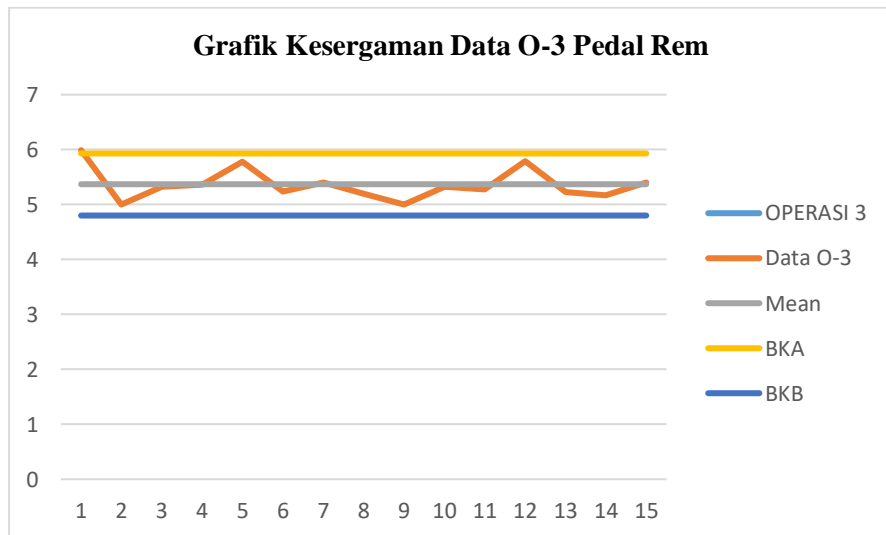
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,28}{5,37} \times 100\% = 0,05$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,05 \\ &= 95\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k. \delta = 5,37 + 2(0,28) = 5,93$$

$$\text{BKB} = \bar{x} - k. \delta = 5,37 - 2(0,28) = 4,8$$



## 4. Operasi 4 (O-4)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{57,76}{15} = 3,85$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((3,92-3,85)^2+(3,85-3,85)^2+ \dots (3,85-3,85)^2)}{(15-1)}} = 0,09$$

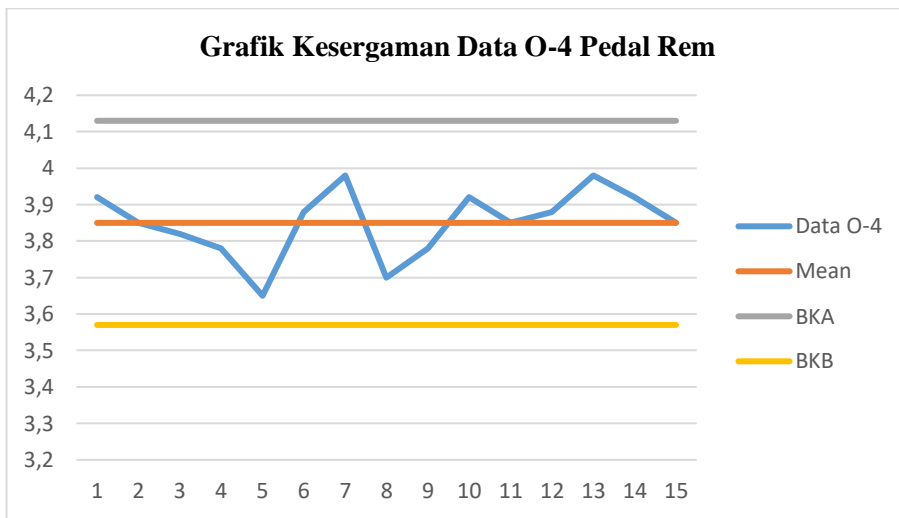
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,09}{3,85} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 3,85 + 2(0,09) = 4,13$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 3,85 - 2(0,09) = 3,57$$



#### 5. Operasi 5 (O-5)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{125,93}{15} = 8,4$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((8,4-8,4)^2+(8,68-8,4)^2+...+(8,31-8,4)^2)}{(15-1)}} = 0,17$$

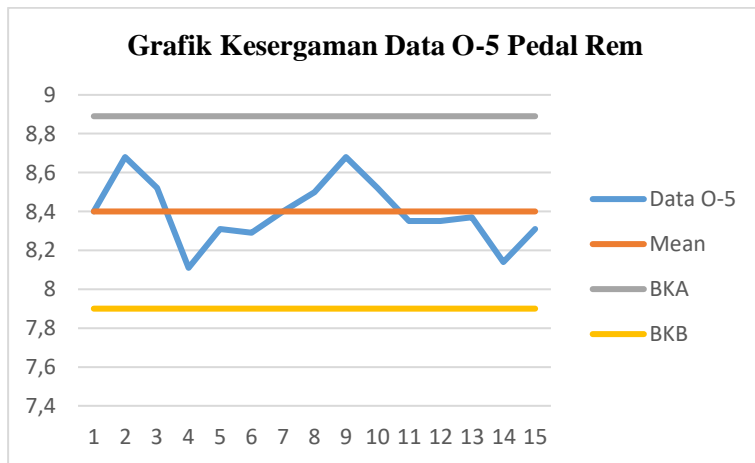
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,17}{8,4} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 8,4 + 2(0,17) = 8,89$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 8,4 - 2(0,17) = 7,9$$



#### 6. Operasi 6 (O-6)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(X_i)}{n} = \frac{156,14}{15} = 10,41$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(X_i - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((10,17-10,41)^2 + (10,27-10,41)^2 + \dots + (10,23-10,41)^2)}{(15-1)}} = 0,27$$

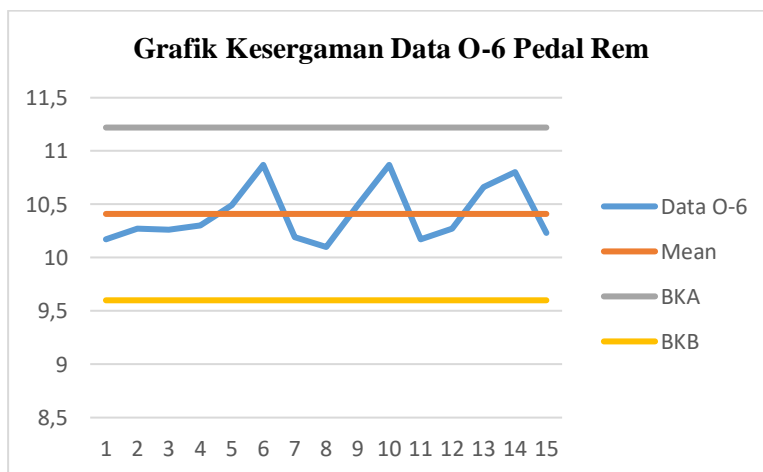
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,27}{10,41} \times 100\% = 0,03$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,03 = 97\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 10,41 + 2(0,27) = 11,22$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 10,41 - 2(0,27) = 9,6$$



## 7. Operasi 7 (O-7)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{99,55}{15} = 6,64$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((6,32-6,64)^2+(6,38-6,64)^2+ \dots (6,78-6,64)^2)}{(15-1)}} = 0,22$$

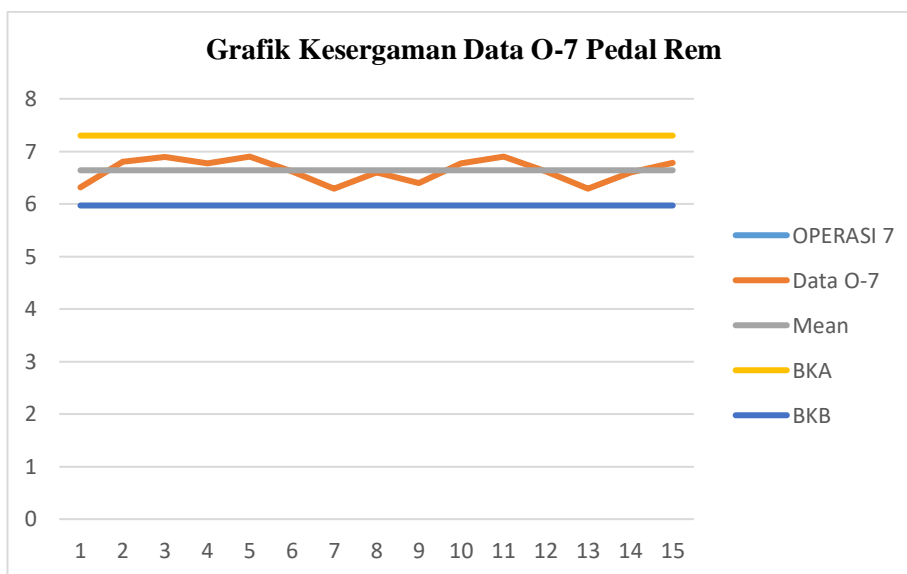
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,22}{6,64} \times 100\% = 0,03$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,03 \\ &= 97\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 6,64 + 2(0,22) = 7,30$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 6,64 - 2(0,22) = 5,97$$



## 8. Operasi 8 (O-8)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{125,56}{15} = 8,37$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((8,57-8,37)^2+(8-8,37)^2+ \dots (8,9-8,37)^2)}{(15-1)}} = 0,25$$

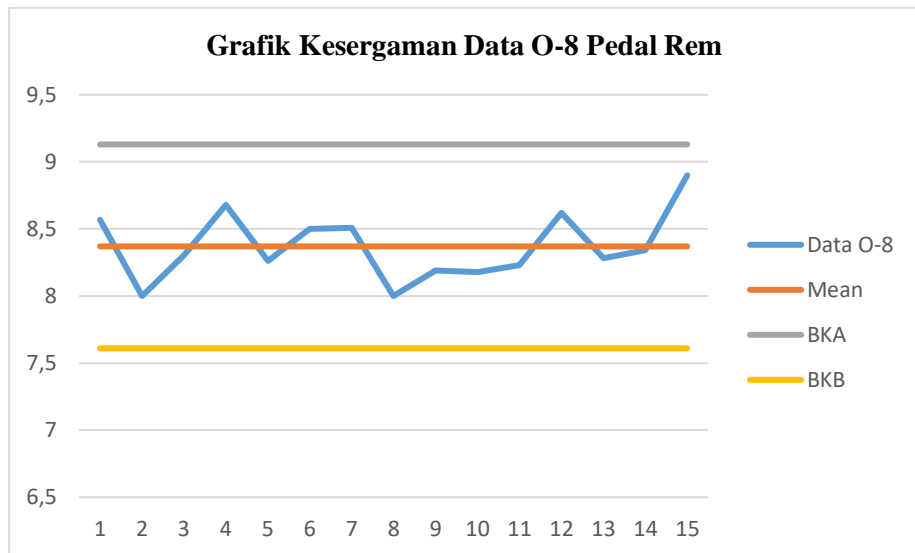
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,25}{8,37} \times 100\% = 0,03$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,03 \\ &= 97\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 8,37 + 2(0,25) = 9,13$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 8,37 - 2(0,25) = 7,61$$



#### 9. Operasi 9 (O-9)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{82,42}{15} = 5,49$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((5-5,49)^2 + (5,9-5,49)^2 + \dots + (5,99-5,49)^2)}{(15-1)}} = 0,34$$

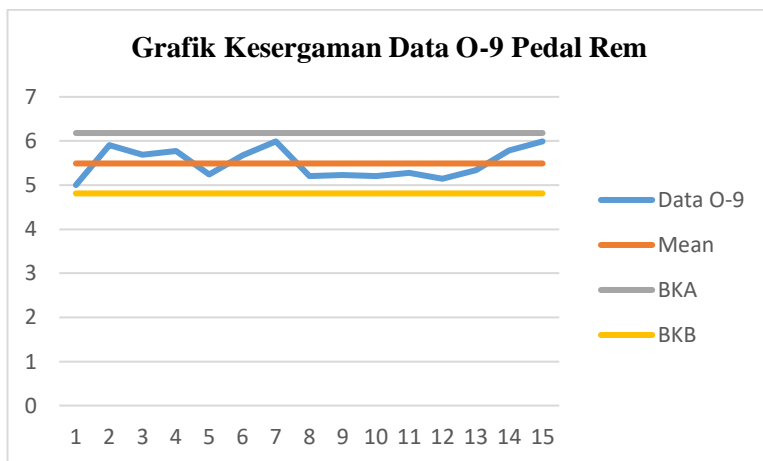
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,34}{5,49} \times 100\% = 0,06$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,06 \\ &= 94\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 5,49 + 2(0,34) = 6,18$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 5,49 - 2(0,34) = 4,81$$



#### 10. Operasi 10 (O-10)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{111,81}{15} = 7,45$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((7,56-7,45)^2+(7,49-7,45)^2+ \dots (7,27-7,45)^2)}{(15-1)}} = 0,18$$

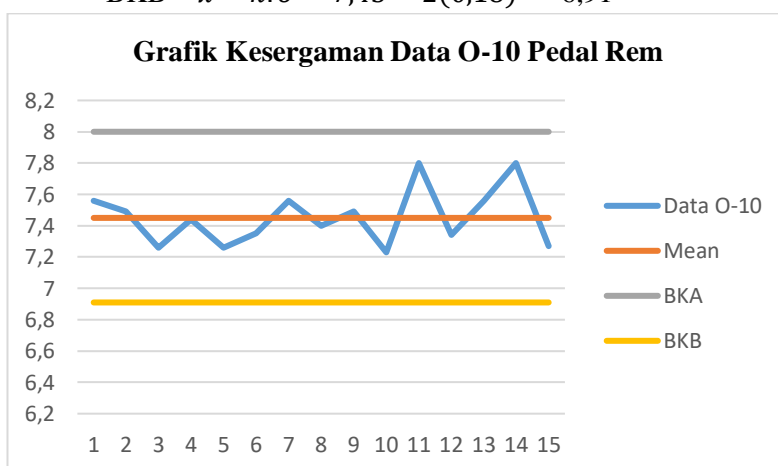
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,18}{7,45} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 7,45 + 2(0,18) = 8$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 7,45 - 2(0,18) = 6,91$$





## 11. Operasi 11 (O-11)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{65,58}{15} = 4,37$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((4,12-4,37)^2+(4,66-4,37)^2+ \dots (4,25-4,37)^2)}{(15-1)}} = 0,23$$

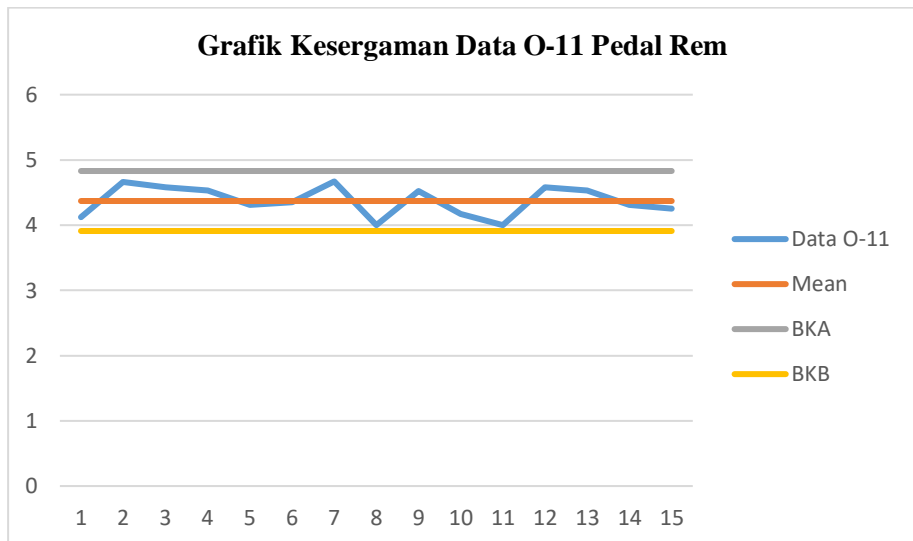
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,23}{4,37} \times 100\% = 0,05$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,05 \\ = 95\% \rightarrow k = 2$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 4,37 + 2(0,23) = 4,83$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 4,37 - 2(0,23) = 3,91$$



## 12. Operasi 12 (O-12)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{426,06}{15} = 28,4$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((28,59-28,4)^2+(28,1-28,4)^2+ \dots (28,15-28,4)^2)}{(15-1)}} = 0,26$$

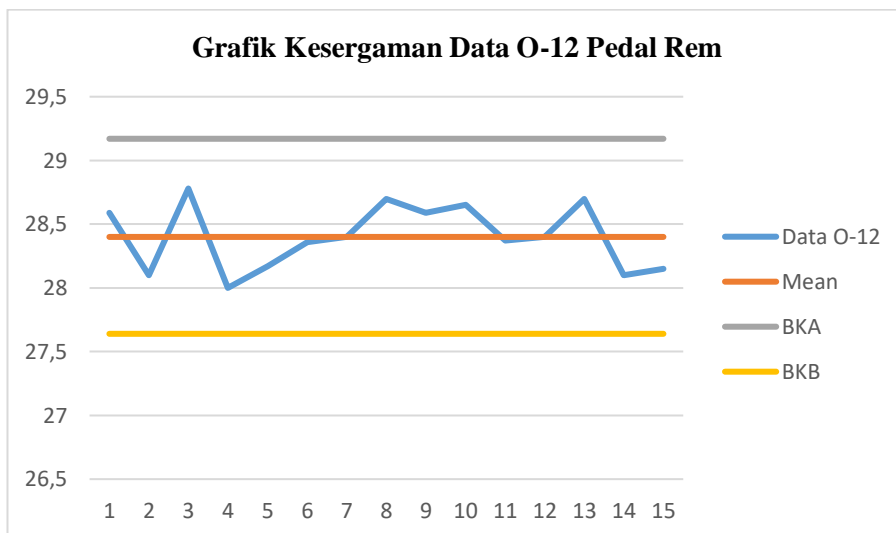
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,26}{28,4} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 28,4 + 2(0,26) = 29,17$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 28,4 - 2(0,26) = 27,64$$



### 13. Inspeksi 1 (I-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{170,36}{15} = 11,36$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((11-11,36)^2 + (11,29-11,36)^2 + \dots + (11,27)^2)}{(15-1)}} = 0,25$$

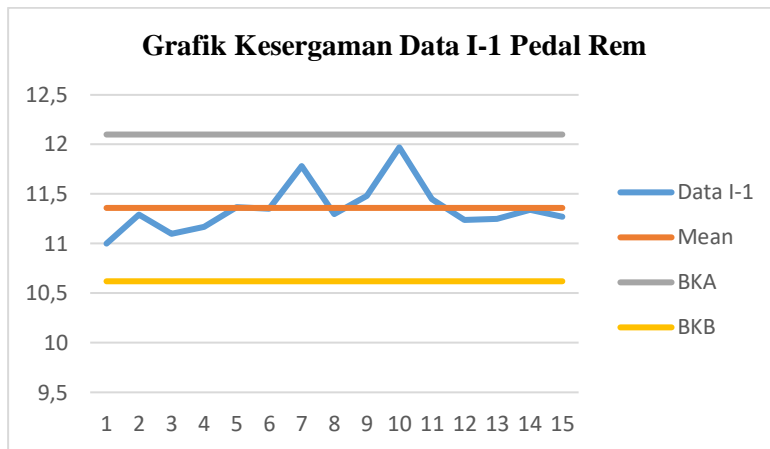
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,25}{11,36} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 11,36 + 2(0,25) = 12,1$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 11,36 - 2(0,25) = 10,62$$



#### 14. Operasi 13 (O-13)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(X_i)}{n} = \frac{215,95}{15} = 14,4$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(X_i - \bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((14,31-14,4)^2 + (14,22-14,4)^2 + \dots + (14,99-14,4)^2)}{(15-1)}} = 0,32$$

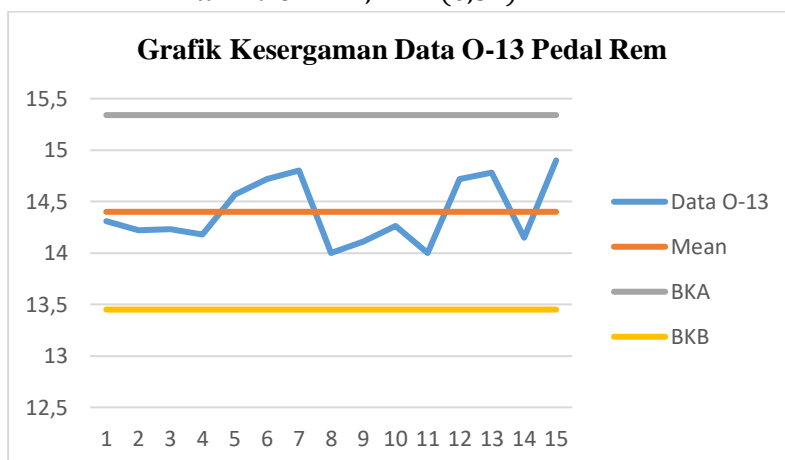
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,32}{14,4} \times 100\% = 0,02$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,02 \\ &= 98\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 14,4 + 2(0,32) =$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 14,4 - 2(0,32) =$$



## F. Seal Spacer

## 1. Operasi 1 (O-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{245,67}{15} = 16,38$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((16,12-16,38)^2+(16,22-16,38)^2+... (16,45-16,38)^2)}{(15-1)}} = 0,25$$

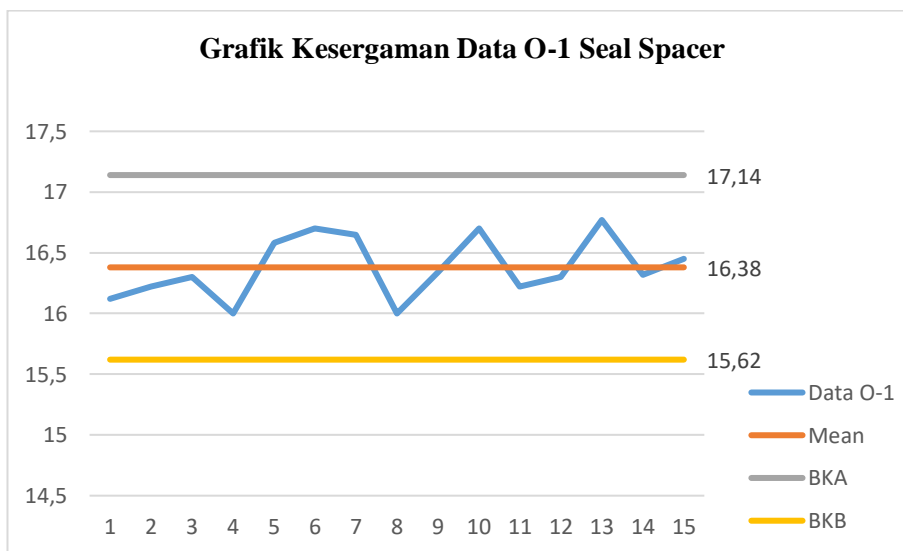
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,25}{16,38} \times 100\% = 0,02$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,02 = 0,98\% \rightarrow k = 3$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 16,38 + 2(0,25) = 17,14$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 16,38 - 2(0,25) = 15,62$$



## 2. Operasi 2 (O-2)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{50,77}{15} = 3,38$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((3,12-3,38)^2+(3-3,38)^2+... (3,76-3,38)^2)}{(15-1)}} = 0,27$$

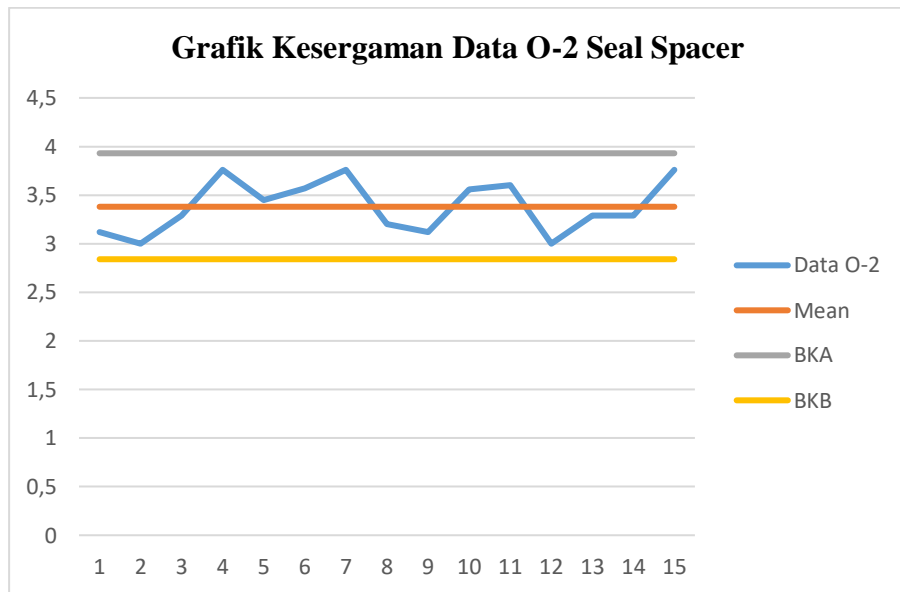
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,27}{3,38} \times 100\% = 0,08$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,08 \\ &= 92\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 3,38 + 2(0,27) = 3,93$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 3,38 - 2(0,27) = 2,84$$



### 3. Operasi 3 (O-3)

- Menghitung Rata-rata

$$\bar{x} = \frac{\Sigma(Xi)}{n} = \frac{83,29}{15} = 5,55$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\Sigma(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\Sigma((5-5,55)^2+(5,59-5,55)^2+ \dots (5,68-5,55)^2)}{(15-1)}} = 0,35$$

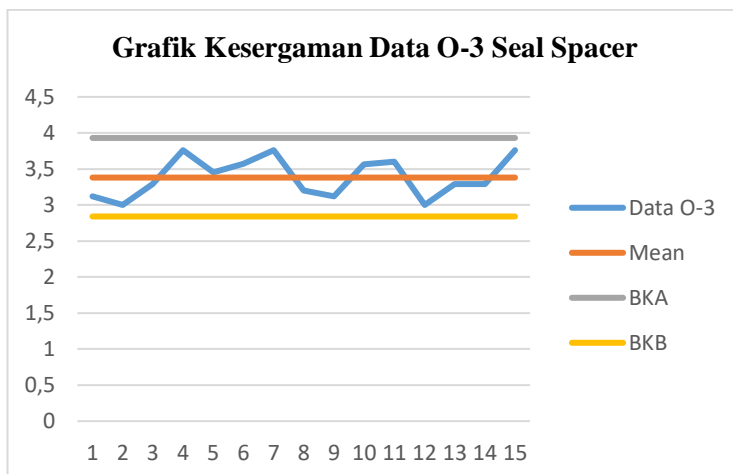
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,35}{5,55} \times 100\% = 0,06$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,06 \\ &= 94\% \rightarrow k = 2 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 5,55 + 2(0,35) = 6,25$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 5,55 - 2(0,35) = 4,86$$



#### 4. Inspeksi 1 (I-1)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{36,95}{15} = 2,46$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((2,14-2,46)^2+(2,83-2,46)^2+ \dots (2,3-2,46)^2)}{(15-1)}} = 0,31$$

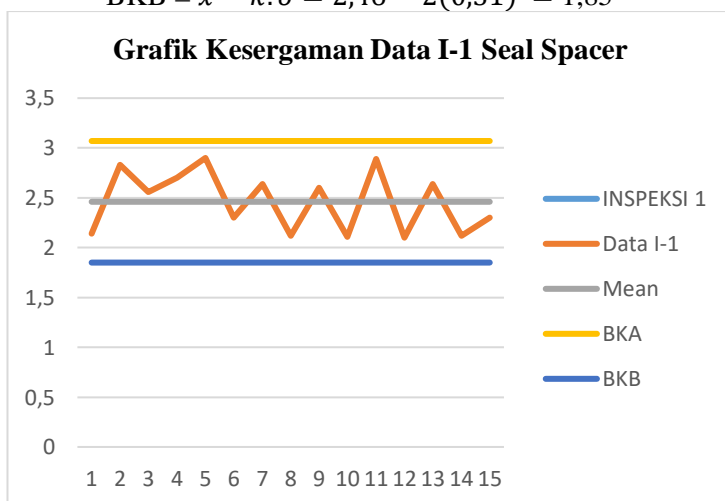
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,31}{2,46} \times 100\% = 0,12$$

$$\text{Tingkat Kepercayaan (CL)} = 100\% - S = 100\% - 0,12 = 0,88\% \rightarrow k = 2$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 2,46 + 2(0,31) = 3,07$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 2,46 - 2(0,31) = 1,85$$



## 5. Operasi 4 (O-4)

- Menghitung Rata-rata

$$\bar{x} = \frac{\sum(Xi)}{n} = \frac{276,47}{15} = 18,43$$

- Menghitung Standar deviasi

$$\delta = \sqrt{\frac{\sum(Xi-\bar{x})^2}{(n-1)}} = \sqrt{\frac{\sum((18,5-18,43)^2+(18,34-18,43)^2+ \dots (18,7-18,43)^2)}{(15-1)}} = 0,22$$

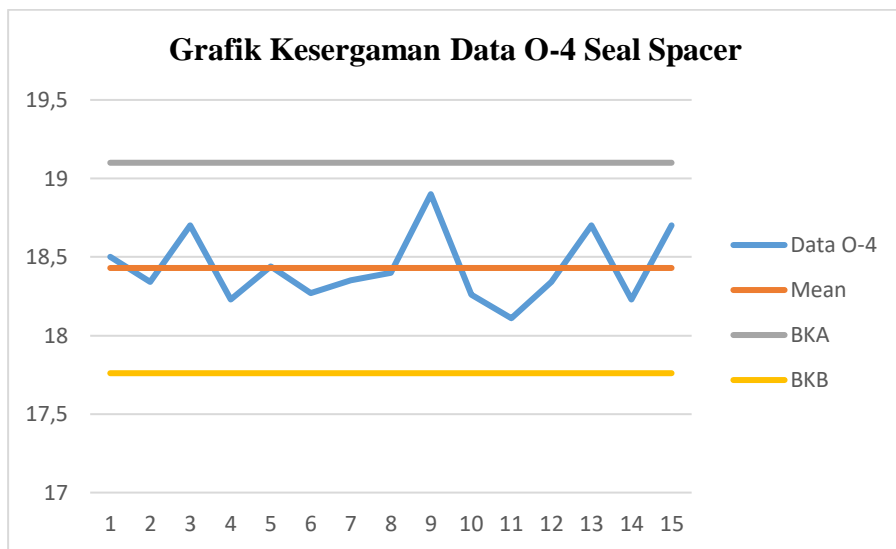
- Menghitung BKA dan BKB

$$\text{Tingkat Ketelitian (S)} = \frac{\delta}{\bar{x}} \times 100\% = \frac{0,22}{18,43} \times 100\% = 0,01$$

$$\begin{aligned} \text{Tingkat Kepercayaan (CL)} &= 100\% - S = 100\% - 0,01 \\ &= 99\% \rightarrow k = 3 \end{aligned}$$

$$\text{BKA} = \bar{x} + k \cdot \delta = 18,43 + 2(0,22) = 19,1$$

$$\text{BKB} = \bar{x} - k \cdot \delta = 18,43 - 2(0,22) = 17,76$$



## Lampiran 3 Perhitungan Uji Kecukupan Data

## A. Bracket TV

1. 
$$N' \text{ (Operasi 1)} = \left[ \frac{\frac{2}{0,05} \sqrt{(15 \times 437,61) - 6546,43}}{80,91} \right]^2 = 4,32$$
2. 
$$N' \text{ (Operasi 2)} = \left[ \frac{\frac{3}{0,04} \sqrt{(15 \times 839,23) - 12570,89}}{112,12} \right]^2 = 7,85$$
3. 
$$N' \text{ (Operasi 3)} = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 775,1) - 11620,84}}{107,8} \right]^2 = 10,91$$
4. 
$$N' \text{ (Operasi 4)} = \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 5845,23) - 87675,21}}{296,1} \right]^2 = 3,33$$
5. 
$$N' \text{ (Operasi 5)} = \left[ \frac{\frac{2}{0,07} \sqrt{(15 \times 188,68) - 2817,49}}{53,08} \right]^2 = 3,69$$
6. 
$$N' \text{ (Operasi 6)} = \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 796,96) - 11942,12}}{109,29} \right]^2 = 10,27$$
7. 
$$N' \text{ (Operasi 7)} = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 2341,78) - 35118,76}}{187,4} \right]^2 = 5,09$$
8. 
$$N' \text{ (Operasi 8)} = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 1620,91) - 24304,81}}{155,9} \right]^2 = 8,18$$
9. 
$$N' \text{ (Operasi 9)} = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 2314,69) - 34707,69}}{186,3} \right]^2 = 8,21$$
10. 
$$N' \text{ (Operasi 10)} = \left[ \frac{\frac{2}{0,07} \sqrt{(15 \times 180,6) - 2695,69}}{51,92} \right]^2 = 4,02$$
11. 
$$N' \text{ (Operasi 11)} = \left[ \frac{\frac{3}{0,04} \sqrt{(15 \times 287,94) - 4313,86}}{65,68} \right]^2 = 6,74$$
12. 
$$N' \text{ (Operasi 12)} = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 2272,92) - 34077,16}}{184,6} \right]^2 = 10,99$$
13. 
$$N' \text{ (Operasi 13)} = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 1367,95) - 20509,1}}{143,21} \right]^2 = 11,08$$
14. 
$$N' \text{ (Operasi 14)} = \left[ \frac{\frac{2}{0,06} \sqrt{(15 \times 184,85) - 2762,55}}{52,56} \right]^2 = 4,1$$
15. 
$$N' \text{ (Operasi 15)} = \left[ \frac{\frac{2}{0,05} \sqrt{(15 \times 286,46) - 4285,01}}{65,46} \right]^2 = 4,44$$



$$\begin{aligned}
 16. \quad N' \text{ (Operasi 16)} &= \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 837,04) - 12544}}{112} \right]^2 = 9,24 \\
 17. \quad N' \text{ (Operasi 17)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 60244,12) - 903640,36}}{950,6} \right]^2 = 2,14 \\
 18. \quad N' \text{ (Inspeksi 1)} &= \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 3527,74) - 52900}}{230} \right]^2 = 6,85 \\
 19. \quad N' \text{ (Operasi 18)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 32249,41) - 483720,25}}{695,5} \right]^2 = 3,89 \\
 20. \quad N' \text{ (Operasi 19)} &= \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 3534,02) - 52992,04}}{230,2} \right]^2 = 7,75
 \end{aligned}$$

## B. Terminal Salon

$$\begin{aligned}
 1. \quad N' \text{ (Operasi 1)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 3018,31) - 45271,07}}{212,77} \right]^2 = 7 \\
 2. \quad N' \text{ (Operasi 2)} &= \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 826) - 12378,79}}{111,26} \right]^2 = 9,09 \\
 3. \quad N' \text{ (Operasi 3)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 1407,08) - 21103,37}}{145,27} \right]^2 = 12,37 \\
 4. \quad N' \text{ (Operasi 4)} &= \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 589,58) - 8839,76}}{94,02} \right]^2 = 10,11 \\
 5. \quad N' \text{ (Operasi 5)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 1056,14) - 15840,74}}{125,86} \right]^2 = 7,66 \\
 6. \quad N' \text{ (Operasi 6)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 1048,9) - 15732,68}}{125,43} \right]^2 = 4,71 \\
 7. \quad N' \text{ (Operasi 7)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 3685,63) - 55281,41}}{235,12} \right]^2 = 4,99 \\
 8. \quad N' \text{ (Operasi 8)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 47919,26) - 718764,84}}{847,8} \right]^2 = 3,01 \\
 9. \quad N' \text{ (Inspeksi 1)} &= \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 1304,52) - 19563,62}}{139,87} \right]^2 = 4,8 \\
 10. \quad N' \text{ (Operasi 9)} &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 25743,56) - 386137,96}}{621,4} \right]^2 = 3,6
 \end{aligned}$$

## C. Pedal Rem

$$1. \quad N' (\text{Operasi 1}) = \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 1946,14) - 29172,64}}{170,80} \right]^2 = 6,67$$

$$2. \quad N' (\text{Operasi 2}) = \left[ \frac{\frac{2}{0,05} \sqrt{(15 \times 625,19) - 9354,76}}{96,72} \right]^2 = 3,95$$

$$3. \quad N' (\text{Operasi 3}) = \left[ \frac{\frac{2}{0,05} \sqrt{(15 \times 432,92) - 6477,03}}{80,48} \right]^2 = 4,16$$

$$4. \quad N' (\text{Operasi 4}) = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 222,54) - 3336,22}}{57,76} \right]^2 = 12,49$$

$$5. \quad N' (\text{Operasi 5}) = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 1057,61) - 15858,36}}{125,93} \right]^2 = 8,11$$

$$6. \quad N' (\text{Operasi 6}) = \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 1626,33) - 24379,7}}{156,14} \right]^2 = 6,25$$

$$7. \quad N' (\text{Operasi 7}) = \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 661,37) - 9910,2}}{99,55} \right]^2 = 10,38$$

$$8. \quad N' (\text{Operasi 8}) = \left[ \frac{\frac{3}{0,03} \sqrt{(15 \times 1051,92) - 15765,31}}{125,56} \right]^2 = 8,6$$

$$9. \quad N' (\text{Operasi 9}) = \left[ \frac{\frac{2}{0,06} \sqrt{(15 \times 454,5) - 6793,06}}{82,42} \right]^2 = 4$$

$$10. \quad N' (\text{Operasi 10}) = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 833,89) - 12501,48}}{111,81} \right]^2 = 12,47$$

$$11. \quad N' (\text{Operasi 11}) = \left[ \frac{\frac{2}{0,05} \sqrt{(15 \times 287,45) - 4300,74}}{65,58} \right]^2 = 4,1$$

$$12. \quad N' (\text{Operasi 12}) = \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 12102,73) - 181527,12}}{426,06} \right]^2 = 6,82$$

$$13. \quad N' (\text{Operasi 13}) = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 1935,68) - 29022,53}}{170,36} \right]^2 = 9,86$$

$$14. \quad N' (\text{Operasi 14}) = \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 3110,35) - 46634,4}}{215,96} \right]^2 = 10,07$$

## D. Seal Spacer

$$\begin{aligned}
 1. \quad N' (\text{Operasi 1}) &= \left[ \frac{\frac{3}{0,02} \sqrt{(15 \times 4024,48 - 60353,75)}}{245,67} \right]^2 = 5,03 \\
 2. \quad N' (\text{Operasi 2}) &= \left[ \frac{\frac{2}{0,08} \sqrt{(15 \times 172,87) - 2577,59}}{50,77} \right]^2 = 3,77 \\
 3. \quad N' (\text{Operasi 3}) &= \left[ \frac{\frac{2}{0,06} \sqrt{(15 \times 464,16) - 6937,22}}{83,29} \right]^2 = 4,03 \\
 4. \quad N' (\text{Inspeksi 1}) &= \left[ \frac{\frac{2}{0,12} \sqrt{(15 \times 92,32) - 1365,3}}{36,95} \right]^2 = 3,98 \\
 5. \quad N' (\text{Operasi 4}) &= \left[ \frac{\frac{3}{0,01} \sqrt{(15 \times 5096,42) - 76435,66}}{276,47} \right]^2 = 12,45
 \end{aligned}$$

Lampiran 5 Tabel Rekapitulasi Perhitungan Waktu Normal Produk Bracket TV

	O-1	O-2	O-3	O-4	O-5	O-6	O-7	O-8	O-9	O-10	O-11	O-12	O-13	O-14	O-15	O-16	O-17	I-1	O-18	O-19
Waktu rata-rata	80.9	112.1	107.8	296.1	53.1	109.3	187.4	155.9	186.3	51.9	65.7	184.6	143.2	52.6	65.5	112	950.6	230	695.5	230.2
Skill	0.06	0.11	0.06	0.13	0.03	0.13	0.13	0.03	0.03	0.03	0.15	0.13	0.13	0.13	0.06	0.13	0.03	0.13	0.15	0.13
Effort	0.02	0.05	0.02	0.08	0.02	0.05	0.1	0.05	0.1	0.05	0.08	0.05	0.05	0.05	0.02	0.08	0.02	0.05	0.08	0.1
Condition	0.04	0.04	0.01	0.02	0.02	0.06	0.04	0	0	0.02	0.04	0.06	0.06	0.06	0.01	0.02	0.02	0.06	0.04	0.04
Consistency	0.03	0.03	0.03	0.03	0.1	0.03	0.01	0.04	0.03	0.01	0.03	0.03	0.03	0.03	0.03	0.03	0.1	0.03	0.03	0.01
Total	0.15	0.23	0.12	0.26	0.17	0.27	0.28	0.16	0.16	0.11	0.3	0.27	0.27	0.27	0.12	0.26	0.17	0.27	0.3	0.28
Performance Rating	1.15	1.23	1.12	1.26	1.17	1.27	1.28	1.16	1.16	1.11	1.3	1.27	1.27	1.27	1.12	1.26	1.17	1.27	1.3	1.28
Waktu Normal	6.20	9.19	8.05	24.87	4.14	9.25	15.99	12.06	14.41	3.84	5.69	15.63	12.13	4.45	4.89	9.41	74.15	16.60	60.28	19.64

Lampiran 6 Tabel Rekapitulasi Perhitungan Waktu Normal Produk Terminal Salon

	O-1	O-2	O-3	O-4	O-5	O-6	O-7	O-8	I-1	O-9
Waktu rata-rata	14.18	7.42	9.68	6.27	8.39	8.36	15.67	56.52	9.32	41.43
Skill	0.06	0.13	0.03	0.06	0.03	0.11	0.03	0.13	0.15	0.13
Effort	0.02	0.05	0.02	0.02	0.05	0.05	0.1	0.1	0.08	0.08
Condition	0.01	0.06	0.02	0.04	0.02	0.04	0.03	0.04	0.04	0.02
Consistency	0.03	0.03	0.1	0.03	0.01	0.03	0.03	0.01	0.03	0.03
Total	0.12	0.27	0.17	0.15	0.11	0.23	0.19	0.28	0.3	0.26
Performance Rating	1.12	1.27	1.17	1.15	1.11	1.23	1.19	1.28	1.3	1.26
Waktu Normal	15.89	9.42	11.33	7.21	9.31	10.29	18.65	72.35	12.12	52.20

Lampiran 7 Tabel Rekapitulasi Perhitungan Waktu Normal Produk Pedal Rem

	O-1	O-2	O-3	O-4	O-5	O-6	O-7	O-8	O-9	O-10	O-11	O-12	I-1	O-13
Waktu rata- rata	11.39	6.45	5.37	3.85	8.40	10.41	6.64	8.37	5.49	7.45	4.37	28.40	11.36	0.13
Skill	0.06	0.03	0.13	0.13	0.06	0.03	0.13	0.03	0.06	0.15	0.03	0.11	0.13	0.05
Effort	0.05	0.02	0.08	0.10	0.02	0.10	0.05	0.05	0.02	0.08	0.05	0.05	0.1	0.06
Condition	0.04	0.02	0.02	0.04	0.04	0.03	0.06	0.02	0.01	0.04	0.02	0.04	0.04	0.03
Consistency	0.01	0.10	0.03	0.01	0.03	0.03	0.03	0.01	0.03	0.03	0.01	0.03	0.01	0.27
Total	0.16	0.17	0.26	0.28	0.15	0.19	0.27	0.11	0.12	0.3	0.11	0.23	0.28	1.27
Performance Rating	1.16	1.17	1.26	1.28	1.15	1.19	1.27	1.11	1.12	1.3	1.11	1.23	1.28	18.28
Waktu Normal	13.21	7.54	6.76	4.93	9.65	12.39	8.43	9.29	6.15	9.69	4.85	34.94	14.54	0.13

Lampiran 8 Tabel Rekapitulasi Perhitungan Waktu Normal Produk Seal Spacer

	O-1	O-2	O-3	I-1	O-4
Waktu rata- rata	16.38	3.38	5.55	2.46	18.43
Skill	0.11	0.13	0.13	0.03	0.03
Effort	0.05	0.1	0.05	0.02	0.05
Condition	0.04	0.04	0.06	0.02	0.02
Consistency	0.03	0.01	0.03	0.1	0.01
Total	0.23	0.28	0.27	0.17	0.11
Performance Rating	1.23	1.28	1.27	1.17	1.11
Waktu Normal	20.14	4.33	7.05	2.88	20.46

## Lampiran 9 Bukti ACC Lembar Revisi Sidang

UNIVERSITAS 17 AGUSTUS 1945 SURABAYA  
FAKULTAS TEKNIK  
PROGRAM STUDI TEKNIK INDUSTRI

REVISI SIDANG TUGAS AKHIR

NAMA : Dhiya'ul Hanifah  
NBI : 1411800084  
JUDUL : PERENCANAAN KAPASITAS PRODUKSI UNTUK MEMENUHI PERMINTAAN KONSUMEN PADA HOME INDUSTRIAL SANDAL (STUDI KASUS: PT. BORNEO IBAN JAYA PERKASA)  
BATAS BIMBINGAN REVISI : 1 Minggu setelah Sidang

NO	URAIAN	BAB	HALAMAN	NO	URAIAN	BAB	HALAMAN
1.	Kapasitas produksi tersebutnya ibaratnya, harus di revisi biar bisa jelas pengaruh kapasitas tersebut!			1	Tabel 4.58 dan 4.59		
				2	rumusan masalah dan tujuan		


Telah Direvisi  
Dosen Penguji 1,

  
Ir. Mochammad Sugih, MM


Dosen Penguji 2,

  
Herlina, ST., MT.

Surabaya, 07 Juni 2022  
Mengetahui  
Dosen Pembimbing,

  
Ir. Siti Mundari, MT

## Lampiran 10 Lembar Bimbingan Tugas Akhir




**JURNAL BIMBINGAN TUGAS AKHIR  
PRODI TEKNIK INDUSTRI  
SEMESTER GENAP 2021/2022**

**Nama :** Dhyo'ul Hanifah

**NBI :** 1411800084

**Judul Penelitian :** Perencanaan Kapasitas Produksi Untuk Memenuhi permintaan konsumen



**Dosen Pembimbing:** Ir. Siti Mundari, MT.

No.	Tanggal	Materi Bimbingan	Catatan Pembimbing	Paraf Pembimbing
1.	23/02/22	Bab 1 (latar belakang masalah)	Memperbaiki foto <sup>3</sup> , dan menjelaskan masalah	f.
2.	02/03/22	Tinjau lagi masalah	lebih menjelaskan masalah & solusi yg cocok	f.
3.	05/03/22	landasan teori	Melanjutkan bab 2 & mengganti solusi dengan lingk	f.
4.	11/03/22	Bab 1 dan Bab 2	Memperbaiki Foto <sup>3</sup> /penulisan di bab 1 dan menambahkan HPP di Bab 2	f.
5.	15/03/22	Bab 1 dan Bab 3	Memperbaiki permasalahan, tujuan, flowchart dan tahapan penelitian	f.
6.	16/03/22	Bab 1 dan Bab 3	Memperbaiki perumusan masalah dan flowchart, jadwal pemilihan	f.
7.	09/04/22	Bab 4	Memperbaiki OPC menggunakan waktu standar	f.
8.	15/04/22	Bab 4	Memperbaiki perencanaan agregat & OPC	f.
9.	23/04/22	Bab 4	Memperbaiki perencanaan agregat menggunakan metode transportasi	f.
10.	09/05/22	Bab 4	Menghitung perencanaan agregat terpisah untuk tahun 2021 dan 2022	f.
11.	14/05/22	Bab 4	Membandingkan biaya real dan memperbaiki disagregasi	f.
12.	20/05/22	Bab 4	Menambahkan solusi untuk kekurangan kapasitas	f.
13.	23/05/22	Bab 4	Memperbaiki Alternatif persediaan	f.
14.	28/05/22	Bab 4	Memperbaiki perhitungan Alternatif 2	f.
15.	30/05/22	Bab 4	Menambahkan total biaya produksi	f.
16.	31/05/22	Bab 5	Memperbaiki bab 5 sesuai rumusan masalah	f.
17.	01/06/22	Abstrak	Memperbaiki abstrak dan ACC	f.

## Lampiran 11 Surat Balasan Perusahaan

**PT. BORNEO IBAN JAYA PERKASA**

Aneka Jasa Logam - Plong & Produksi Accessories - sparepart dll  
Jl. Kolonel Sugiono No. 29 Ngingas Selatan Waru - Sidoarjo  
Telp. 0813-3201-0640,0838-5078-0804,0812-5989-6884

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Nomor : 011 / BIJP / III / 2022

Sidoarjo, 19 Maret 2022

Lampiran : -

Hal : Persetujuan penelitian tugas akhir

Kepada Yth,  
Dekan Fakultas Teknik  
Universitas 17 Agustus 1945  
Surabaya

Dengan Hormat,

Sehubungan dengan pengajuan penelitian tugas akhir mahasiswi :

Nama : Dhiya'ul Hanifah NBI : 1411800084

maka dengan ini kami memberi persetujuan untuk dilaksanakan tugas tersebut.

Demikian surat persetujuan ini kami sampaikan. Atas perhatiannya kami ucapkan terima kasih.

Hormat Kami



**Mashudi**

Direktur / Pimpinan