# LAMPIRAN

Berikut ini adalah perhitungan beban penekanan dari metrik ton yang diubah menjadi MPa :

Beban penekanan = 20 Ton

Diameter alas penekanan = 33mm = 0,033m

Tekanan yang digunakan = 70MPa

Rumus Tekanan

$P = \frac{F}{A}$

$A = \pi \cdot r^2$

$= 3{,}14 \cdot 0{,}0165^2 m$

$= 0{,}0008557 m^2$

$F = P \cdot A$

$F = 70MPa \cdot 0{,}0008557 m^2$

$F = 59.899kg$ dimana 1 kg = 9,81 *Newton*

$F = \frac{59.899}{9{,}81}$

$F = \frac{6.105{,}912kg}{1000kg}$

$F = 6{,}1059$ Ton

Jadi beban penekanan 70MPa sama dengan 6,1059 Ton

# LAMPIRAN

# PERHITUNGAN REGRESI LINEAR

1. Regresi Paduan Kekerasan

| Paduan (%) | Hasil Uji Kekerasan(HV) | XY | $X^2$ |
|---|---|---|---|
| 27 | 159,799 | 4314,573 | 729 |
| 27 | 159,278 | 4300,506 | 729 |
| 27 | 158,249 | 4272,723 | 729 |
| 26 | 157,46 | 4093,96 | 676 |
| 26 | 156,253 | 4062,578 | 676 |
| 26 | 156,082 | 4058,132 | 676 |
| 25 | 155,791 | 3894,775 | 625 |
| 25 | 154,87 | 3871,75 | 625 |
| 25 | 154,233 | 3855,825 | 625 |

Diketahui :

| | |
|---|---|
| n | 9 |
| ∑ XY | 36724,822 |
| ∑ Y | 1412,015 |
| ∑ X | 234 |
| ∑ $x^2$ | 6090 |
| $(\sum X)^2$ | 54756 |

Persamaan:

$$b = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2}$$

$$a = \frac{\sum Y \sum X^2 - \sum X \sum XY}{n\sum X^2 - (\sum X)^2}$$

penyelesaian :

$$b = \frac{(9\ x\ 36724{,}822) - (234\ x\ 1412{,}015)}{(9\ x\ 6090) - (54756)}$$

$$= \frac{330523{,}398 - 330412}{54810 - 54756}$$

$$= \frac{111{,}888}{54}$$

$$= 2{,}072$$

$$a = \frac{(1412.015\ x\ 6090) - (234\ x\ 36724.822)}{(9\ x\ 6090) - (54756)}$$

$$= \frac{8599171{,}35 - 8593608}{54810 - 54756}$$

$$= \frac{5563{,}002}{54}$$

$$= 103{,}0185556$$

2. Regresi Penekanan Kekerasan

| Penekanan (MPa) | Hasil Uji Kekerasan (HV) | XY | $X^2$ |
|---|---|---|---|
| 70 | 159,799 | 11185,93 | 4900 |
| 65 | 159,278 | 10353,07 | 4225 |
| 60 | 158,249 | 9494,94 | 3600 |
| 70 | 157,46 | 11022,2 | 4900 |
| 65 | 156,253 | 10156,45 | 4225 |
| 60 | 156,082 | 9364,92 | 3600 |
| 70 | 155,791 | 10905,37 | 4900 |
| 65 | 154,87 | 10066,55 | 4225 |
| 60 | 154,233 | 9253,98 | 3600 |

Diketahui :

| | |
|---|---|
| n | 9 |
| $\sum$ XY | 91803,405 |
| $\sum$ Y | 1412,015 |
| $\sum$ X | 585 |
| $\sum x^2$ | 38175 |
| $(\sum X)^2$ | 342225 |

Persamaan :

$$b = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2}$$

$$a = \frac{\sum Y \sum X^2 - \sum X \sum XY}{n\sum X^2 - (\sum X)^2}$$

penyelesaian :

$$b = \frac{826230{,}645 - 826028{,}78}{343575 - 342225}$$

$$= \frac{201{,}87}{1350}$$

$$= 0{,}149533333$$

$$a = \frac{53903672{,}63 - 53704992}{343575 - 342225}$$

$$= \frac{198680{,}7}{1350}$$

$$= 147{,}1708889$$

3. Regresi Paaduan *Impact*

| Paduan (%) | Harga *Impact* (joule/mm$^2$) | XY | $X^2$ |
|---|---|---|---|
| 27 | 1,6058 | 43,3566 | 729 |
| 27 | 1,5993 | 43,1811 | 729 |
| 27 | 1,5993 | 43,1811 | 729 |
| 26 | 1,5881 | 41,2906 | 676 |
| 26 | 1,5836 | 41,1736 | 676 |
| 26 | 1,5655 | 40,703 | 676 |
| 25 | 1,5655 | 39,1375 | 625 |
| 25 | 1,5539 | 38,8475 | 625 |
| 25 | 1,5376 | 38,44 | 625 |

Diketahui :

| | |
|---|---|
| n | 9 |
| $\sum$ XY | 369,311 |
| $\sum$ Y | 14,1986 |
| $\sum$ X | 234 |
| $\sum x^2$ | 6090 |
| $(\sum X)^2$ | 54756 |

Persamaan :

$$b = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2}$$

$$a = \frac{\sum Y \sum X^2 - \sum X \sum XY}{n\sum X^2 - (\sum X)^2}$$

penyelesaian :

$$b = \frac{3323,799 - 3322,47}{54810 - 54756}$$

$$= \frac{1,3266}{54}$$

$$= 0,02456667$$

$$a = \frac{86469,474 - 86418,8}{54810 - 54756}$$

$$= \frac{50,7}{54}$$

$$= 0,93888889$$

4. Regresi Penekanan *Impact*

| Penekanan (MPa) | Harga *Impact* (joule/mm$^2$) | XY | $X^2$ |
|---|---|---|---|
| 70 | 1,6058 | 112,406 | 4900 |
| 65 | 1,5993 | 103,9545 | 4225 |
| 60 | 1,5993 | 95,958 | 3600 |
| 70 | 1,5881 | 111,167 | 4900 |
| 65 | 1,5836 | 102,934 | 4225 |
| 60 | 1,5655 | 93,93 | 3600 |
| 70 | 1,5655 | 109,585 | 4900 |
| 65 | 1,5539 | 101,0035 | 4225 |
| 60 | 1,5376 | 92,256 | 3600 |

Diketahui :

| | |
|---|---|
| n | 9 |
| $\sum XY$ | 923,194 |
| $\sum Y$ | 14,1986 |
| $\sum X$ | 585 |
| $\sum x^2$ | 38175 |
| $(\sum X)^2$ | 342225 |

Persamaan :

$$b = \frac{n\sum XY - \sum X \sum Y}{n\sum X^2 - (\sum X)^2}$$

$$a = \frac{\sum Y \sum X^2 - \sum X \sum XY}{n\sum X^2 - (\sum X)^2}$$

Penyelesaian :

$$b = \frac{8308{,}746 - 8306{,}18}{343575 - 342225}$$

$$= \frac{2{,}565}{1350}$$

$$= 0{,}0019$$

$$a = \frac{542031{,}56 - 540068}{343575 - 342225}$$

$$= \frac{1963{,}065}{1350}$$

$$= 1{,}4541222$$