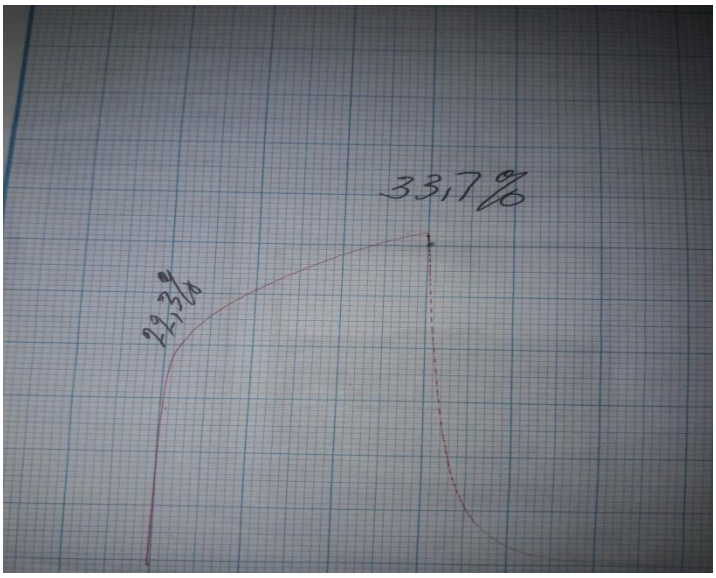
Lampiran 1. Perhitungan kekuatan tarik pada stainless stell 316L dengan variasi gas pelindung Argon dan CO_2

Perhitungan kekuatan tarik hasil lasan *stainless* 316L dengan gas pelindung argon pada specimen 1



1. Perhitungan luas penampang

   A_O= t x l

   A_O= 1 mm x 12 mm

   = 12 mm^2

2. Perhitungan *yield point*

   $P_y = \frac{t_y}{100}$ x P

   $P_y = \frac{33,7}{100}$ x 2000 kg

= 674 kg x 9,8 m/s^2

= 6605,2 kg.m/s^2

= 6605,2 N

3. Perhitungan tegangan luluh

$$\sigma_y = \frac{p_y}{A_O}$$

$$\sigma_y = \frac{6605{,}2\ \text{N}}{12\ \text{mm}^2}$$

= 5504,43 N/mm^2

= 5504,43 MPa

4. Perhitungan keuletan (Regangan)

$$e = \frac{L_i - L_o}{L_o} \times 100\%$$

$$e = \frac{53{,}2\ \text{mm} - 50\ \text{mm}}{50\ \text{mm}} \times 100\%$$

$$= \frac{3{,}2\ \text{mm}}{50\ \text{mm}} \times 100\%$$

= 6,4 %

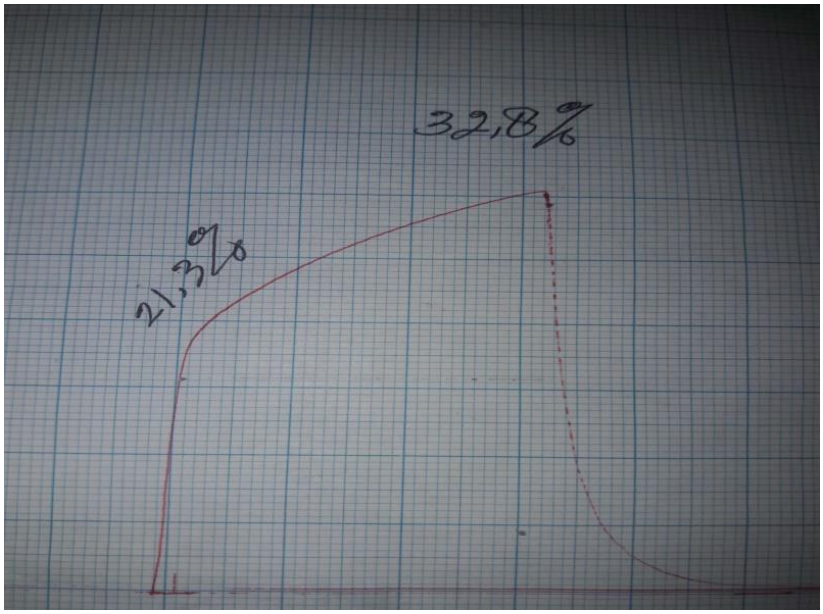
5. Perhitungan modulus elastisitas

$$E = \frac{\sigma_y}{e}$$

$$= \frac{5504{,}43\ \text{N/mm}^2}{6{,}4\%}$$

$$= 860{,}06\ \text{N/mm}^2$$

Perhitungan kekuatan tarik hasil lasan *stainless* 316L dengan gas pelindung argon pada specimen 2



1. Perhitungan luas penampang

   A_O= t x l

   A_O= 1 mm x 12 mm

   = 12 mm^2

2. Perhitungan *yield point*

   $P_y = \frac{t_y}{100}$ x P

   $P_y = \frac{32,8}{100}$ x 2000 kg

   = 656 kg x 9,8 m/s^2

   = 6428,2 $kg.m/s^2$

   = 6428,2 N

3. Perhitungan tegangan luluh

$$\sigma_y = \frac{p_y}{A_O}$$

$$\sigma_y = \frac{6428{,}2\ \text{N}}{12\ \text{mm}^2}$$

$$= 535{,}68\ \text{N/mm}^2$$

$$= 535{,}68\ \text{MPa}$$

4. Perhitungan keuletan (Regangan)

$$e = \frac{L_i - L_o}{L_o} \times 100\%$$

$$e = \frac{53{,}4\ \text{mm} - 50\ \text{mm}}{50\ \text{mm}} \times 100\%$$

$$= \frac{3{,}4\ \text{mm}}{50\ \text{mm}} \times 100\%$$

$$= 6{,}8\ \%$$

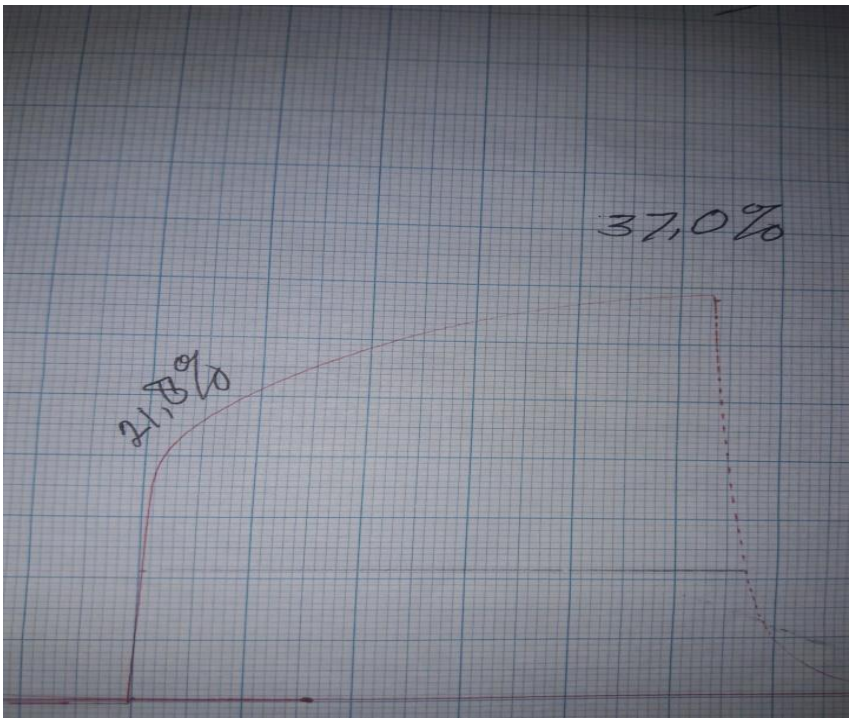
5. Perhitungan modulus elastisitas

$$E = \frac{\sigma_y}{e}$$

$$= \frac{535{,}68\ \text{N/mm}^2}{6{,}8\%}$$

$$= 78{,}77\ \text{N/mm}^2$$

Perhitungan kekuatan tarik hasil lasan *stainless* 316L dengan gas pelindung CO_2 pada specimen 1



1. Perhitungan luas penampang

   A_O= t x l

   A_O= 1 mm x 12 mm

   = 12 mm^2

2. Perhitungan *yield point*

$P_y = \frac{t_y}{100}$ x P

$P_y = \frac{37,0}{100}$ x 2000 kg

= 740 kg x 9,8 m/s^2

= 7252 N

3. Perhitungan tegangan luluh

$$\sigma_y = \frac{p_y}{A_O}$$

$$\sigma_y = \frac{7252\ N}{12\ mm^2}$$

= 604,33 N/mm^2

= 604,33 MPa

4. Perhitungan keuletan (Regangan)

$$e = \frac{L_i - L_o}{L_o} \times 100\%$$

$$e = \frac{55,7\ mm - 50\ mm}{50\ mm} \times 100\%$$

$$= \frac{5,7\ mm}{50\ mm} \times 100\%$$

= 10,96%

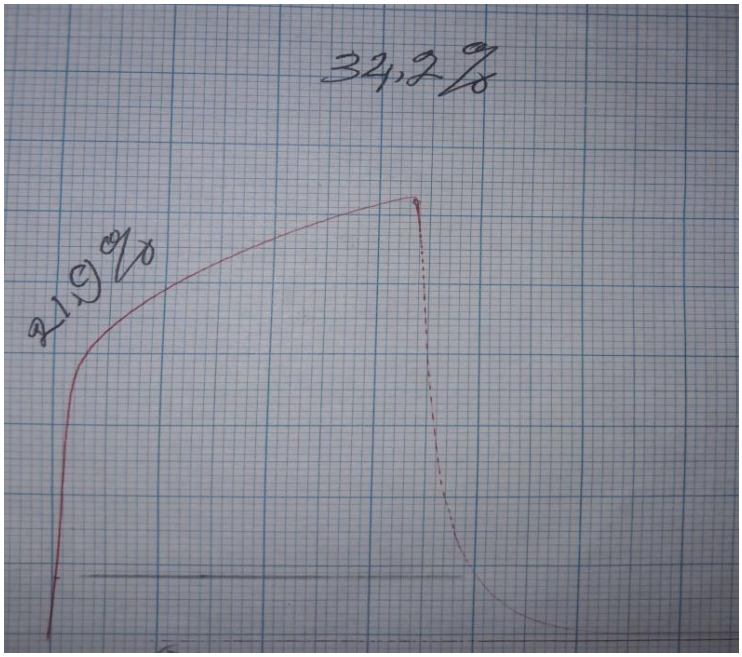
5. Perhitungan modulus elastisitas

$$E = \frac{\sigma_y}{e}$$

$$= \frac{604,33\ N/mm^2}{6,8\%}$$

$= 88{,}87\ \mathrm{N/mm^2}$

Perhitungan kekuatan tarik hasil lasan *stainless* 316L dengan gas pelindung CO_2 pada specimen 2



1. Perhitungan luas penampang

   $A_O = t \times l$

   $A_O = 1\ \mathrm{mm} \times 12\ \mathrm{mm}$

   $= 12\ \mathrm{mm^2}$

2. Perhitungan *yield point*

   $P_y = \frac{t_y}{100} \times P$

   $P_y = \frac{34{,}2}{100} \times 2000\ \mathrm{kg}$

= 684 kg x 9,8 m/s^2

= 6703,2 $kg.m/s^2$

= 6703,2 N

3. Perhitungan tegangan luluh

$$\sigma_y = \frac{p_y}{A_O}$$

$$\sigma_y = \frac{6703{,}2\ N}{12\ mm^2}$$

= 558,6 N/mm^2

= 558,6 MPa

4. Perhitungan keuletan (Regangan)

$$e = \frac{L_i - L_o}{L_o} \times 100\%$$

$$e = \frac{54{,}00\ mm - 50\ mm}{50\ mm} \times 100\%$$

$$= \frac{4\ mm}{50\ mm} \times 100\%$$

= 8 %

5. Perhitungan modulus elastisitas

$$E = \frac{\sigma_y}{e}$$

$$= \frac{558{,}6\ N/mm^2}{8\%}$$

$$= 69{,}82\ N/mm^2$$

Lampiran 2 pengujian kekerasan