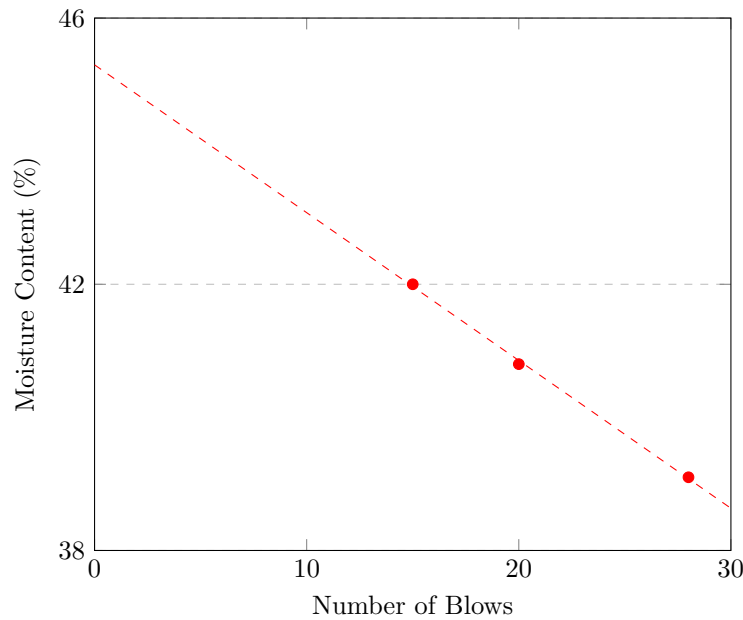


### Question 4.3

Below is the flow curve:



The equation of the trendline is  $y = -0.2221x + 45.297$ , found in Excel. The liquid limit was found at  $N = x = 25$ :

$$LL = y = -0.2221 \times 25 + 45.297 = \boxed{39.74}$$

The plasticity index is obtained using the following:

$$PI = LL - PL = 39.74\% - 18.7\% = \boxed{21}$$

### Question 4.4

Given that the moisture content is 26%, the liquid and plastic limits from the previous question are used in the following equation:

$$LI = \frac{w - PL}{LL - PL} = \frac{26\% - 18.7\%}{39.7\% - 18.7\%} = \boxed{0.35}$$

### Question 4.8

Using  $d = 17$  mm and  $w = 28.5\%$ , equation 4.5 is used first:

$$LL = \frac{w}{0.77 \times \log(d)} = \frac{28.5\%}{0.77 \times \log(17\text{mm})} = \boxed{30.08}$$

Using  $d = 17$  mm and  $w = 28.5\%$ , equation 4.6 is used next:

$$LL = \frac{w}{0.65 + 0.0175 \times d} = \frac{28.5\%}{0.65 + 0.0175 \times (17\text{mm})} = \boxed{30.08}$$

Using  $d = 17$  mm and  $w = 28.5\%$ , equation 4.7 is used last:

$$LL = w \times \left(\frac{20}{d}\right)^{0.33} = 28.5\% \times \left(\frac{20}{17\text{mm}}\right)^{0.33} = \boxed{30.07}$$

## Question 4.10

Using  $LL = 61\%$  and  $CF = 54\%$ , equation 10 is used to determine the plastic limit:

$$PL = 0.04 \times LL + 0.26 \times CF + 10 = 0.04 \times 61\% + 0.26 \times 54\% + 10 = \boxed{26.48}$$

Using  $LL = 61\%$  and  $CF = 54\%$ , equation 11 is used to determine the plastic index:

$$PL = 0.96 \times LL - 0.26 \times CF - 10 = 0.96 \times 61\% - 0.26 \times 54\% - 10 = \boxed{34.52}$$

Using  $LL = 61\%$  and  $CF = 54\%$ , equation 19 is used to determine the activity:

$$A = \frac{0.96 \times LL - 0.26 \times CF - 10}{CF} = \frac{0.96 \times 61\% - 0.26 \times 54\% - 10}{54\%} = \boxed{0.64}$$