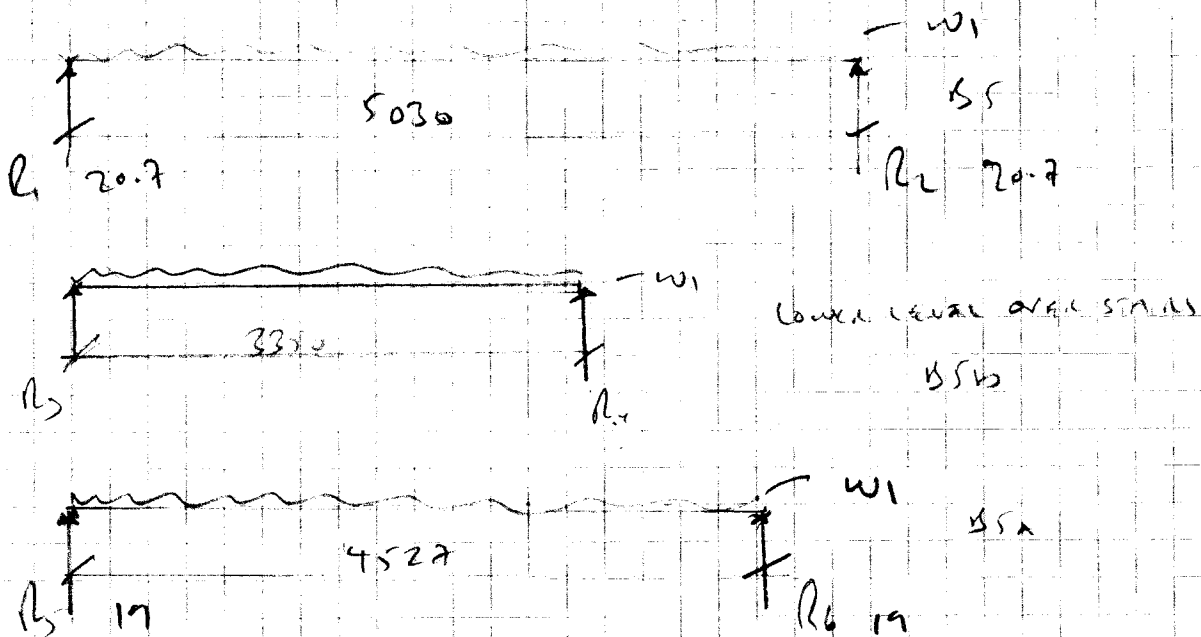


BEAMS B5, B5a & B5b

6/1



$$\begin{aligned}
 W_1 &= \text{Beam } B5, 3A, B5 = 8.25 \text{ kN/m} \\
 R_1, R_2 &= 20.7 \text{ kN} \quad \Delta_{max} = 26.1 \text{ kN/m} \\
 R_3 = R_4 &= 12.82 \text{ kN} \quad 19.39 \\
 R_5 &= 11.00 \text{ kN} \quad 21.8
 \end{aligned}$$

By inspection 254 x 146 jo @ 31 suffice for beams B5 & B5a

$$\begin{aligned}
 M_m &= \frac{5030}{33.5} = 150 \quad D/T = 20.1 \quad \rho_{oc} = 88
 \end{aligned}$$

$$M_e = \frac{88}{1000} \times 353.1 = 31 \text{ kN.m} \quad \text{ok}$$

$$\Delta = \frac{5 \times 8.25 \times 10^3 \times 5.03^4 \times 10^{-7}}{384 \times 0.21 \times 10^6 \times 4435 \times 10^4} = \frac{26406}{3580} = 7.4 \text{ mm} \quad \text{ok}$$

Beam B5b try FURTH beam of 2 x 700 x 100 bolted with 8mm plate

$$E_{steel} = 21,000$$

$$E_{timber} = 6600 \times 1.14 = 7524$$

$$E_{equivalent} \text{ timber} = \frac{(8 \times 210000)}{7524} + 100 = 324$$

$$M_{L} = \frac{324 \times 200^2}{6} \times \frac{7.5}{10^6} = 6.2 \text{ kN.m} < 19.39 \quad \text{No good}$$