

Wood-Concrete Sandwich Beam

StructOpt Project WS12/13

The Beam

Layers

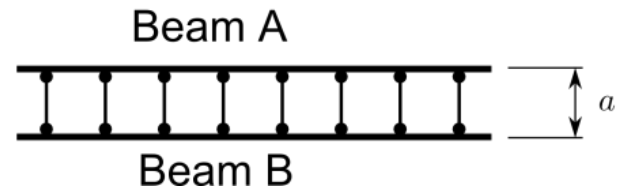
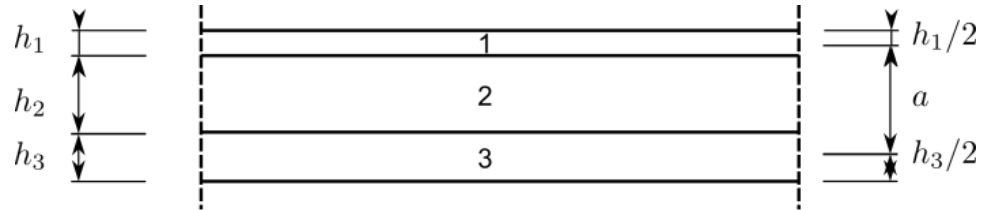
- 1: Concrete (SCC)
- 2: Wood-Concrete (Velox)
- 3: Wood (CLT)



The Analogy

Layers

- 1: Concrete (SCC)
- 2: Wood-Concrete (Velox)
- 3: Wood (CLT)

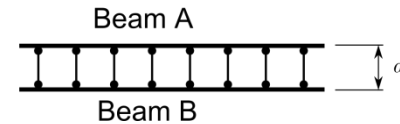
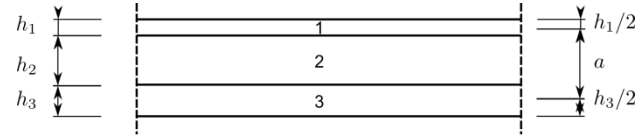


The Analogy

Beam A

$$EI_A = \sum E_i I_i$$

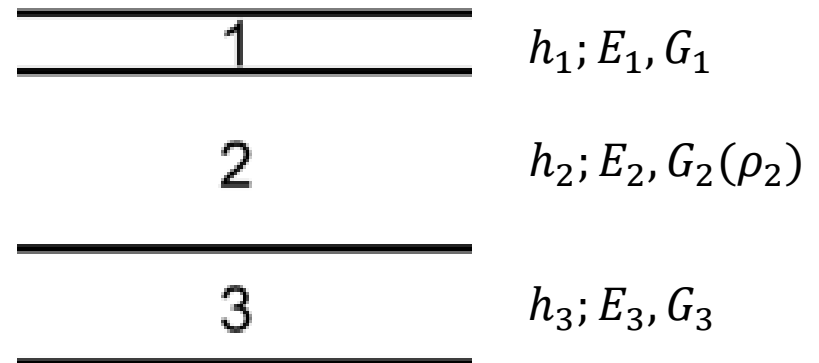
$$GA_A = \sum G_i A_i$$



Beam B

$$EI_B = \sum z_{s,i} E_i A_i$$

$$GA_B = S(c_i, G_i, a)$$



The Analogy

Objective function

$$\text{weight}(h_2, h_3, [\rho_2])$$

Constraints

$$w_{x=l/2} \leq \frac{l}{400}$$

1	$h_1; E_1, G_1$
2	$h_2; E_2, G_2(\rho_2)$
3	$h_3; E_3, G_3$

Goal: optimal dimensions
and minimum weight