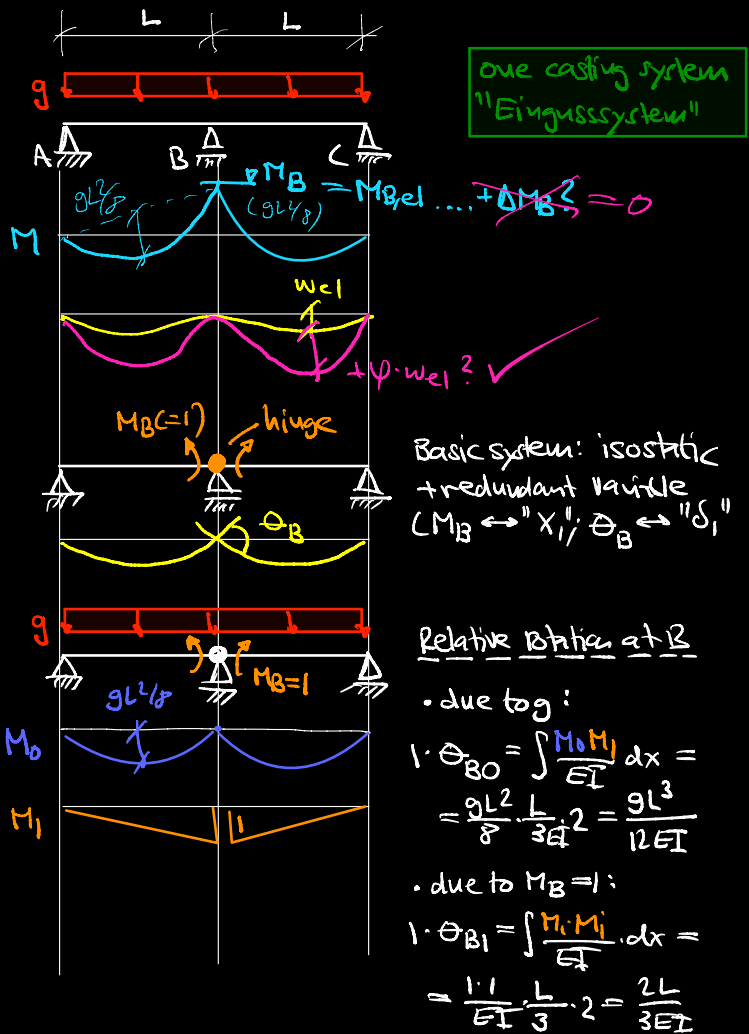


Effect of creep on two-span girder (cracked structure, i.e. prestressed concrete)
 Time dependent Force Method (Trust)



Short-term compatibility ($t=0$)

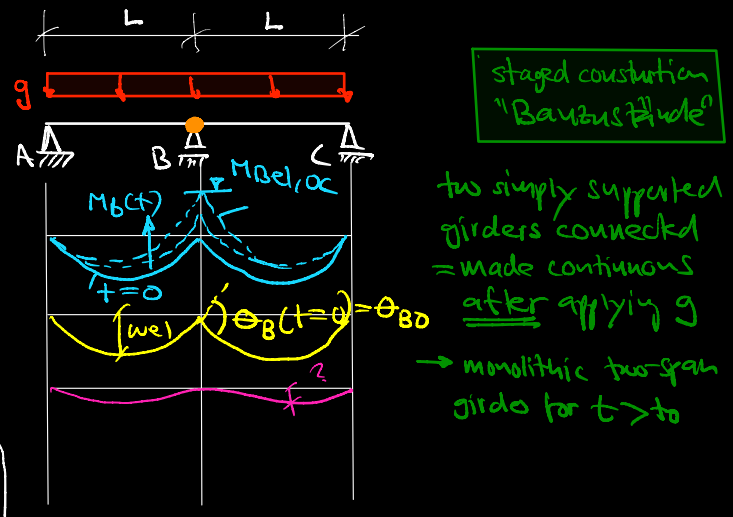
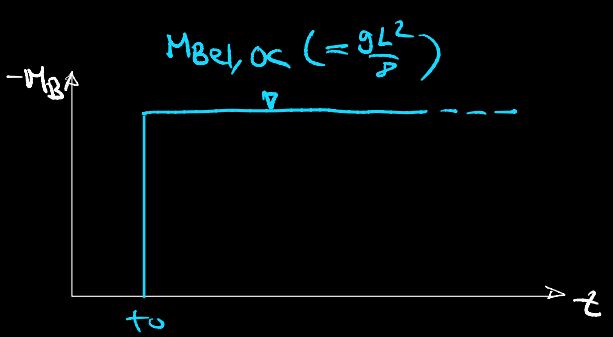
$$\Theta_B = \Theta_{B0} + M_B \cdot \Theta_{B1} \stackrel{!}{=} 0 \Rightarrow M_{B0, \alpha} = -\frac{\Theta_{B0}}{\Theta_{B1}} = -\frac{gL^2}{8}$$

time-dependent compatibility ($t > 0; \varphi = \varphi(t)$)

$$\Theta_B(t) = \Theta_{B0}(1+\varphi) + M_B(t) \cdot \Theta_{B1}(1+\varphi) + \Delta M_B(t) \cdot \Theta_{B1}(1+\varphi) = 0 \quad \frac{1}{1+\varphi}$$

$\Delta M_B(t) \equiv 0$

No redistribution of internal actions due to creep
 (deflections increase by $(1+\varphi)$)



same results as OC system:

$$\Theta_{B0} = \frac{gL^3}{12EI} \quad ; \quad \text{relative rotation ("kink") at B, at } t=0 \rightarrow \text{frozen for } t > t_0$$

$$\Theta_{B1} = \frac{2L}{3EI}$$

Short-term compatibility $t \leq t_0$

$$M_B(t_0) = 0; \quad \Theta_B(t_0) = \Theta_{B0}^*$$

time-dependent compatibility ($t > t_0; \varphi = \varphi(t)$)

$$\Theta_B(t) = \Theta_{B0}(1+\varphi) + M_B(t_0) \cdot \Theta_{B1}(1+\varphi) + \Delta M_B(t) \cdot \Theta_{B1}(1+\varphi) = \Theta_{B0}$$

$$\Theta_{B0} \cdot \varphi + \Delta M_B(t) \cdot \Theta_{B1}(1+\varphi) = 0$$

"Kink does not change"

$$\Rightarrow \Delta M_B(t) = M_B(t) = -\frac{\Theta_{B0} \cdot \varphi}{\Theta_{B1}(1+\varphi)} = M_{B0, \alpha} \cdot \frac{\varphi}{1+\varphi}$$

strong redistribution of internal actions towards one casting system!

$\varphi \approx 2; \quad \frac{\varphi}{1+\varphi} \approx 2/3$

