

(7.14) A 40-story high modern business building is supported by 0.9 m thick pillars of reinforced concrete. The insurance company must check that the number of iron bars are as many as required, and therefore they want to investigate the pillars by γ -radiography. What exposure times are required for (a) a small 200 GBq ^{60}Co source, (b) for a large 150 TBq source? Use the same film data as in 7.9.2.

$$x := 0.9 \cdot 100 \text{ cm} \qquad \log(A \cdot t) = 1.068 + 0.040 \cdot x \qquad \text{Eqn. (7.32)}$$

(a) $A := 200 \text{ GBq}$

$$t := \frac{10^{1.068 + 0.040 \cdot x}}{A} \qquad t = 232.793 \text{ hours} \qquad \frac{t}{24} = 9.7 \text{ days}$$

(b) $A := 150 \cdot 10^3 \text{ GBq}$

$$t := \frac{10^{1.068 + 0.040 \cdot x}}{A} \qquad t = 0.310 \text{ hours} \qquad t \cdot 60 = 18.6 \text{ minutes}$$