Let $X_1, ..., X_n$ be independent variables following the same law $X$, e.g. uniform on $[0, T]$. This example is for a surface where $t_{aban} = 0$.

We look for the minimum value of $X$ (which gives $\tau = X_{min} - 0$) given by the law of the minimum

$$M_n = \min\{X1, ...X_n\}. \quad (1)$$

We then calculate the function

$$F_{M_n}(\tau) = 1 - P(M_n > \tau), \quad (2)$$

where

$$P(M_n > t) = P(x_i > t \text{ for any } 1 \leq i \leq n) = P(x > \tau)^n, \quad (3)$$

if and only if all $X_i$ are $> \tau$ and independent.

For the uniform law on $[0, T]$:

$$P(X > \tau) = 1 - \frac{\tau}{T}. \quad (4)$$

And so, provided $\frac{\tau}{T} \ll 1$, we get the following exponential repartition function

$$P(M_n > \tau) = \left(1 - \frac{\tau}{T}\right)^n \simeq \mathrm{e}^{-\frac{\tau}{T}n}. \quad (5)$$