Let $X_1, \ldots, X_n$ 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 $\tau = X_{\text{min}} - 0$) given by the law of the minimum

$$M_n = \min\{X_1, \ldots, X_n\}.$$  \hfill (1)

We then calculate the function

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

where

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

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

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

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

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

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