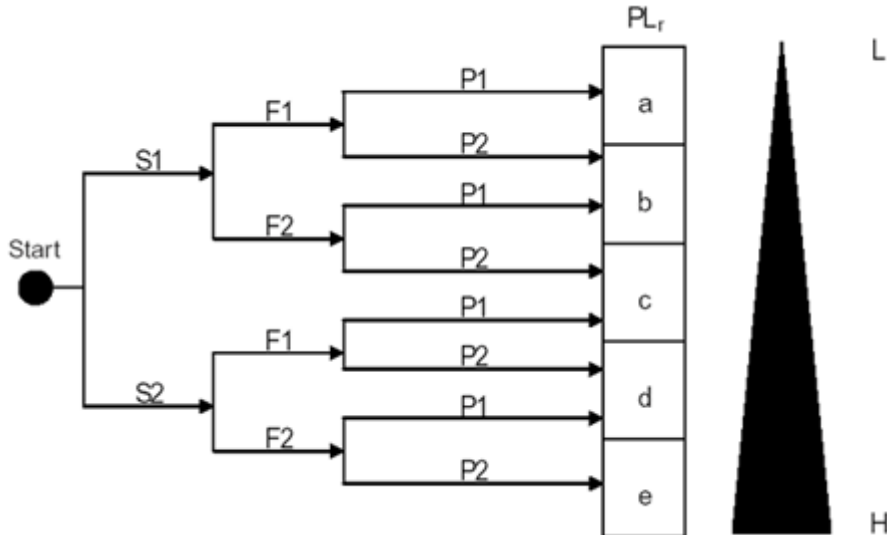


Box item 4

ISO13849-1 – determining the probability of failure

Riskgraph for determining the PLr for each safety function:



Risk parameters:

S Severity of potential injury

S1 Light (usually reversible injury)

S2 Serious (usually irreversible injury including death)

F Frequency and/or duration of the exposure to hazard

F1 Seldom to not very frequent and/or exposure to hazard is brief

F2 Frequent to continuous and/or exposure to hazard is long

P Possibility of preventing the hazard or limiting the harm

P1 Possible under certain conditions

P2 Scarcely possible

Performance level (PL) in accordance with EN ISO 13849-1

Performance Level (PL)	Average probability of a failure to danger per hour [1/h]
a	$\geq 10^{-5}$ to $< 10^{-4}$
b	$\geq 3 \times 10^{-6}$ to $< 10^{-5}$
c	$\geq 10^{-6}$ to $< 3 \times 10^{-6}$
d	$\geq 10^{-7}$ to $< 10^{-6}$
e	$\geq 10^{-8}$ to $< 10^{-7}$

Basically, ISO13849-1 assumes that there will always be a failure. ISO 14121 has an additional element, highlighted, that includes historical information about occurrence. Something may never have happened, after all.

ISO 14121-1:2007(E)

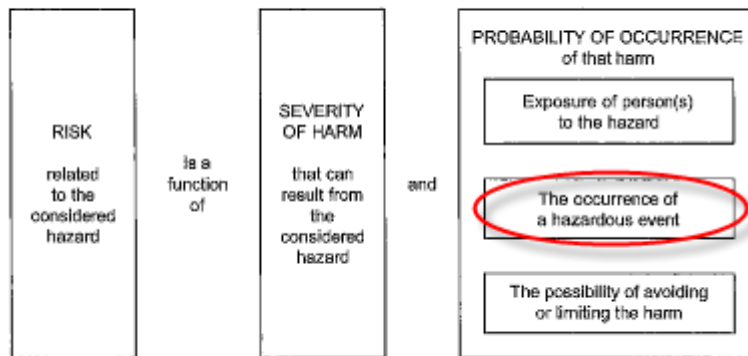


Figure 2 — Elements of risk