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Why Should You Avoid MTBF





a Measure

Common Use



Misleading



What We Measure
Matters

MTBF is not Reliability



Reliability Definition

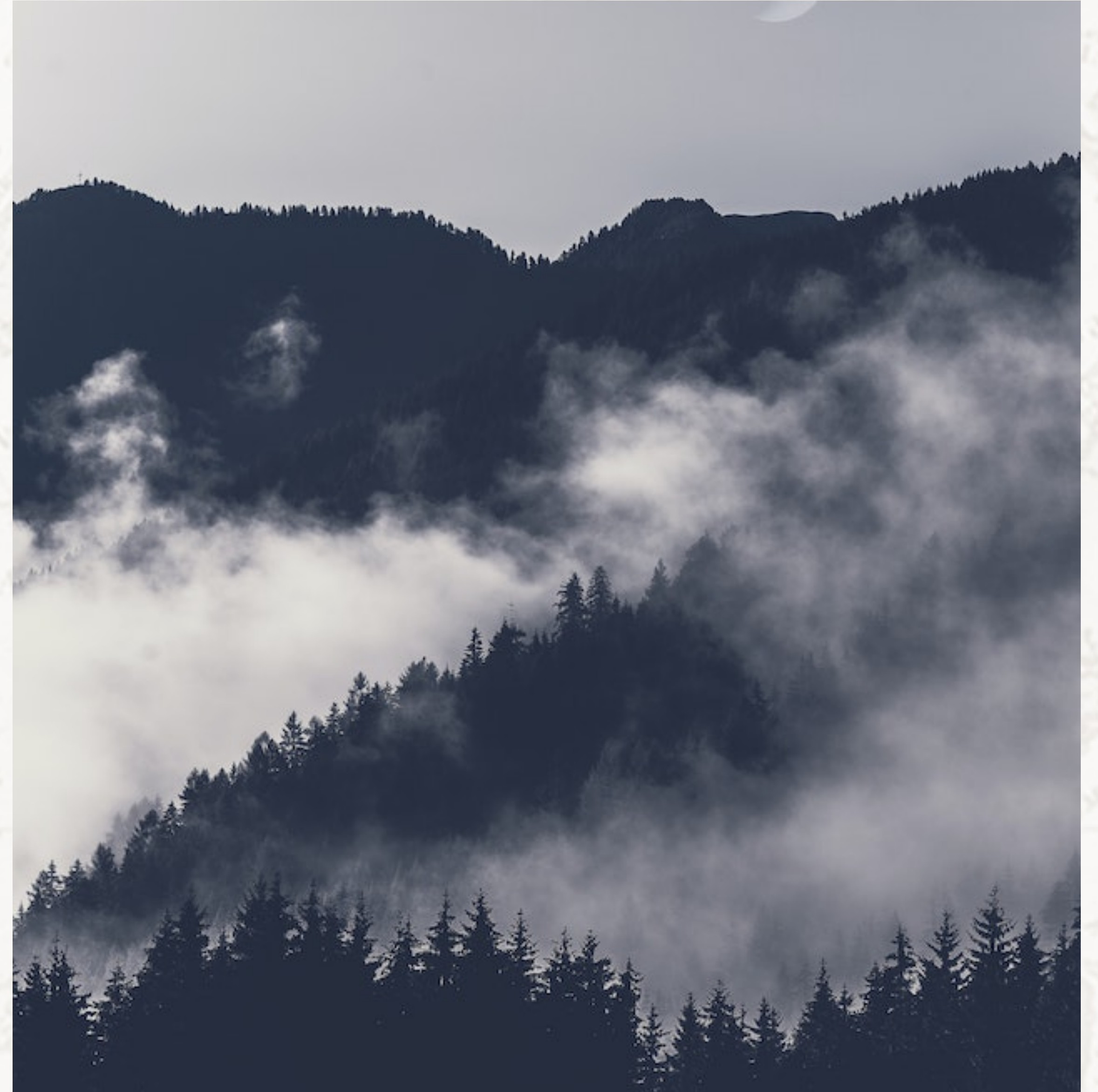
MTBF is not Reliability

Function

Environment/Use

Probability of Success

Duration



MTBF Defintion

MTBF is not Reliability

Average duration between failures

Total time / number of failures

“average time between system breakdowns”

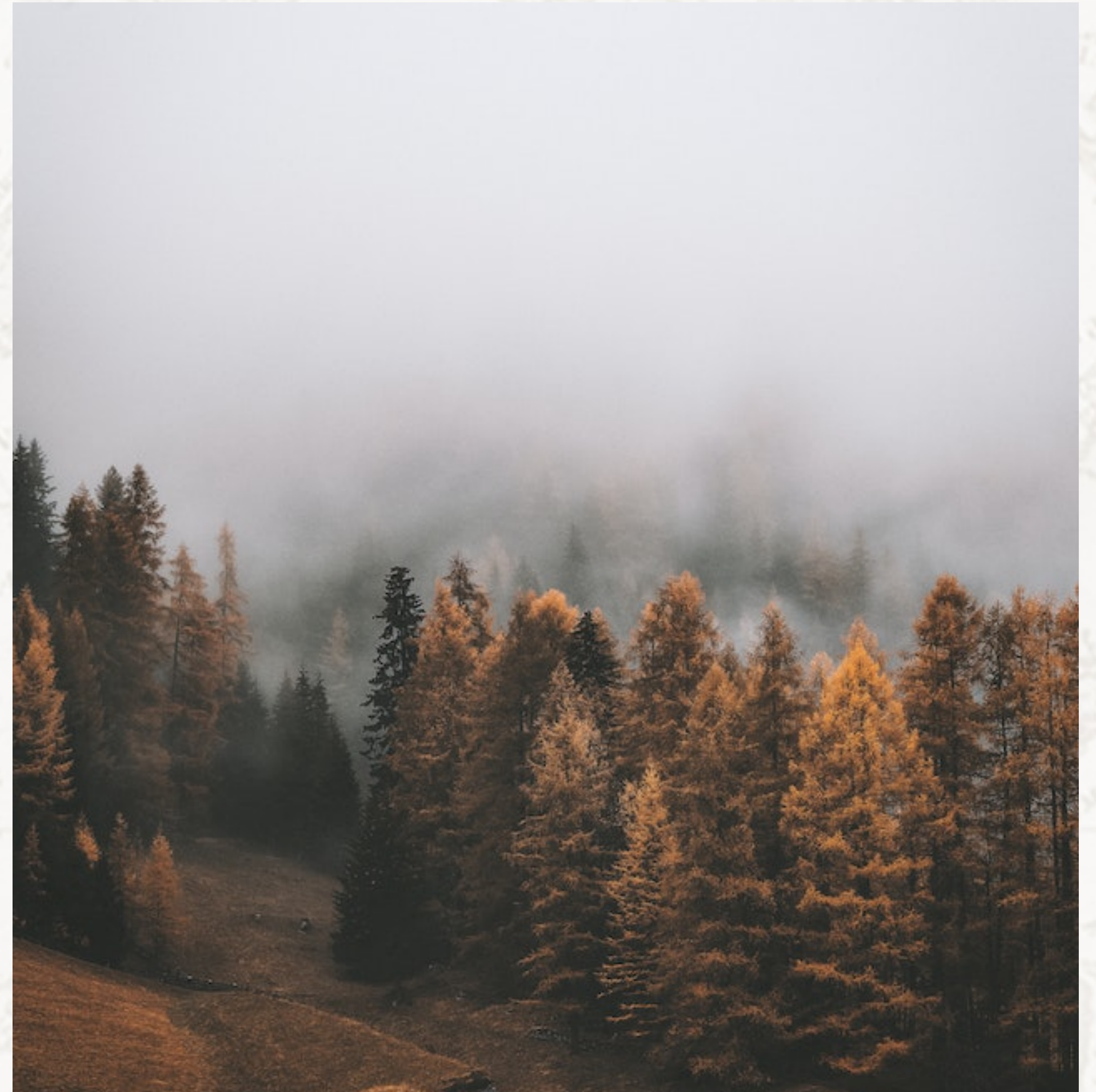
“amount of time, in hours, that an asset can run before it fails”

“average time that equipment is operating between breakdowns”

“inverse of MTBF is failure rate,”

“prediction of the time between the innate failures of a piece of machinery during normal operating hours”

“a measure of equipment R measured in equipment operating hours”



Misunderstanding

MTBF is not Reliability

Failure free period

50th' %ile

Duration

Flat part of the curve

Constant hazard rate

Reliability



The same for:

MTTF, MTBUR, etc

Estimating/Calculating MTBF



Parts Count Methods

Estimating/Calculating MTBF

If one assumes all part's time to failure distributions are exponential, we can simply add failure rates.

Studies and evidence confirm such predictions do not reflect reality.



Testing

Estimating/Calculating MTBF

χ^2 distribution commonly recommended for MTBF test planning.

Total time / number of failures

let's play a game



Field Data

Estimating/Calculating MTBF

Estimate total time and count failures – easy.

What to count? early failures and obvious wear out?

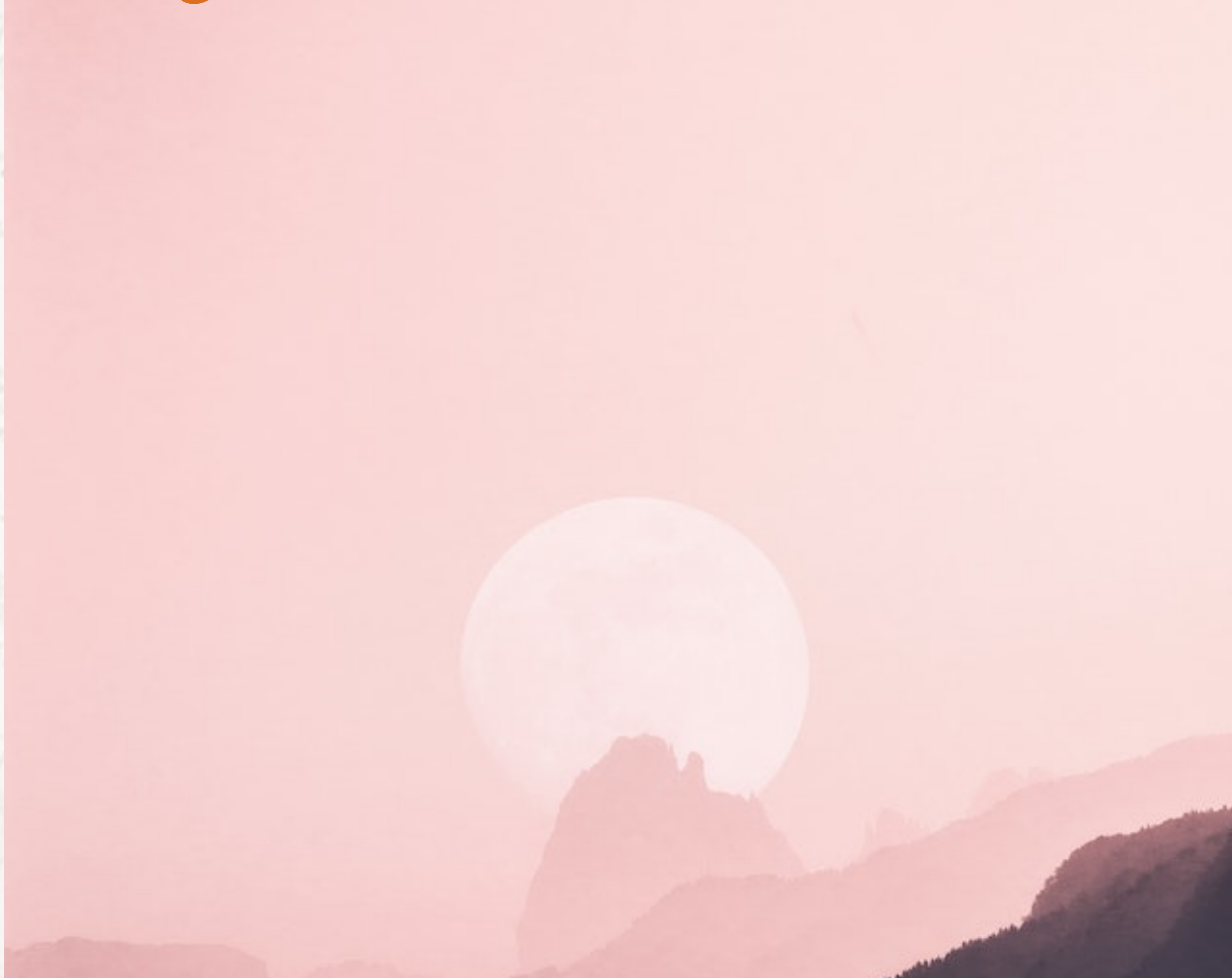
Time to failure patterns obscured



But wait, we also try

to use MTBF

Using MTBF



Component Selection

Using MTBF

Point estimate

How calculated matters

Ask for time to failure distribution
and supporting evidence

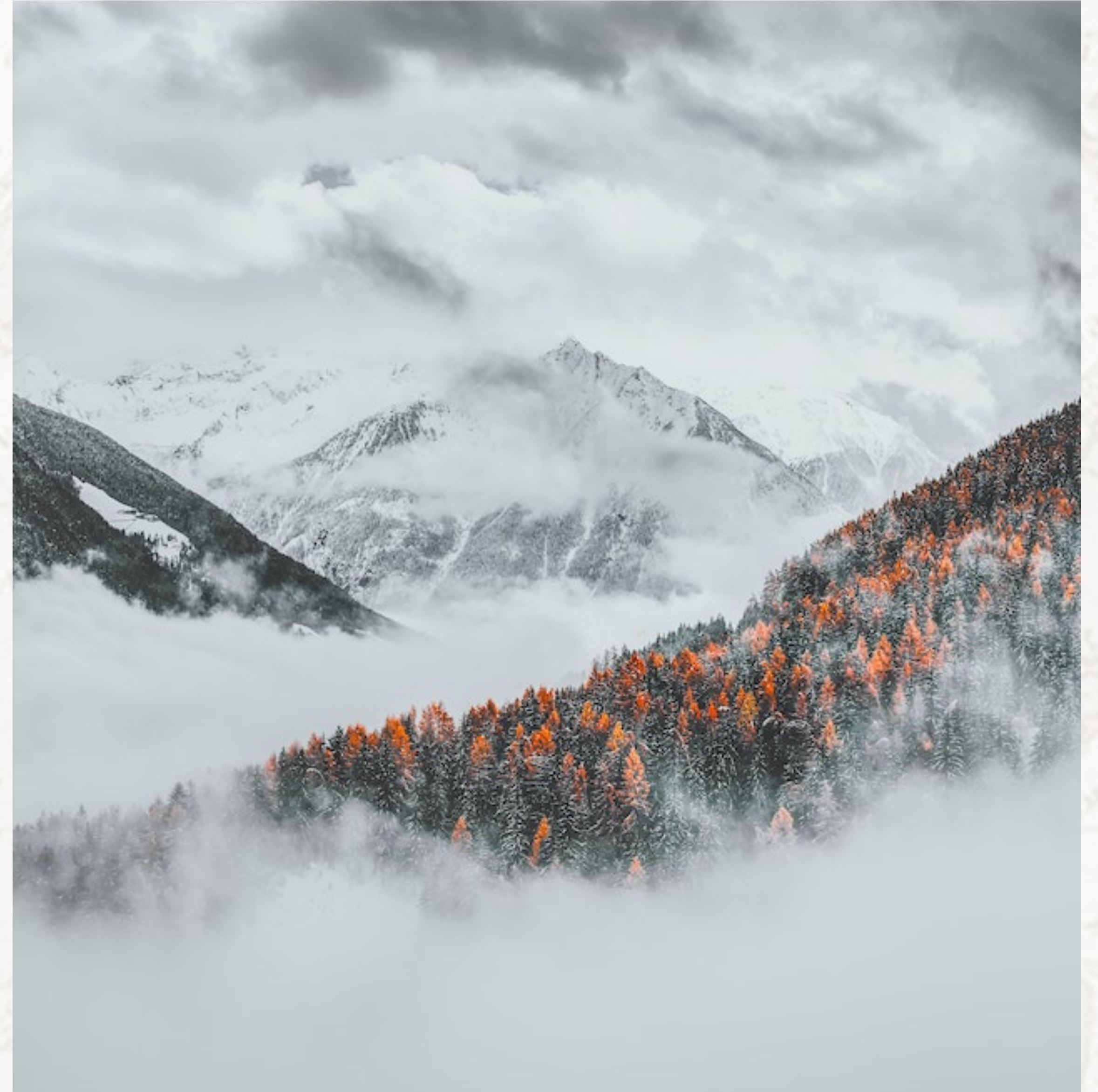


Data Analysis

Estimating/Calculating MTBF

Are we really interested in the average inverse failure rate only?

Plotting monthly MTBF is a poor substitute for proper analysis



Monitoring Performance

Estimating/Calculating MTBF

For maintenance planning – if all we have/use if MTBF – run to failure is the only option

Slow to detect meaningful changes



In short, please

don't use MTBF

Additional Comments and Questions

Thanks

see more at AccendoReliability.com