



Will HAZOP become extinct?

Erik Vanbriel | European Conference on Plant & Process Safety

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- PHA facilitator since 2006
- Expert Chemical Information
- ADR / IMDG / IATA Dangerous good advisor

- Bilfinger Tebodin, Technical Safety since 2012
- Bilfinger Tebodin, the consultancy and engineering company
- Part of the Bilfinger group, industrial service provider.

What makes HAZOP still exist today?

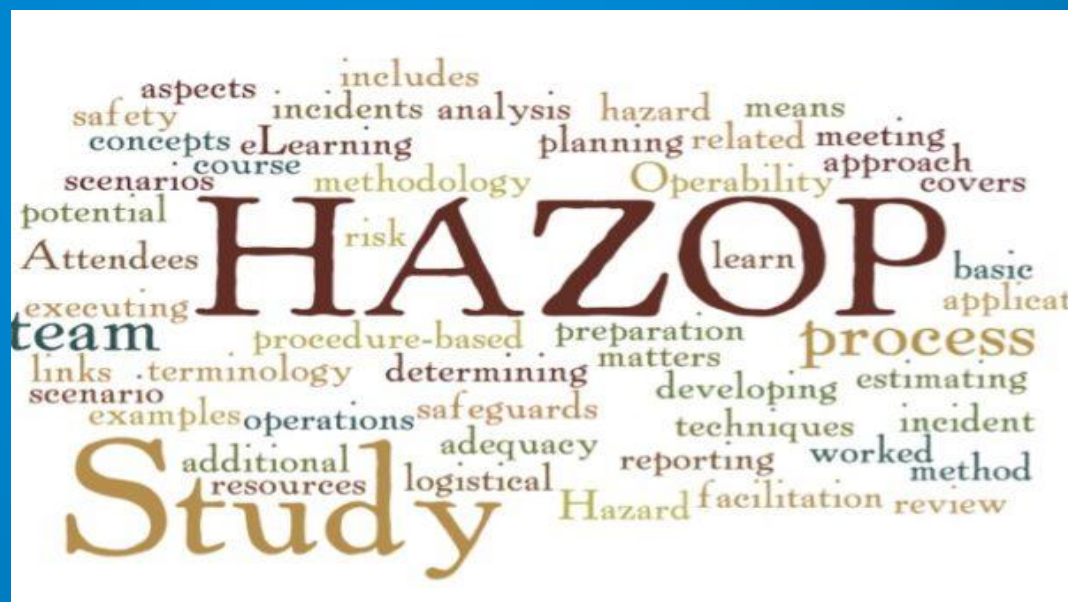
What are the challenges of tomorrow?

How might HAZOP adopt itself in the future?



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What makes HAZOP still exist today?



HAZOP: A qualitative technique based on “guide-words” to help provoke thoughts about the way deviations from the intended operating conditions can lead to hazardous situations or operability problems.

We still had process safety accidents over the last 60 years...
... but HAZOP was adjusted

- HAZARD STUDY steps 1 to 6 (ICI) to cover the lifecycle phases
- Including Human Factors
- Including all (simultaneous) operation modes / calamities
- Including Facility siting
- Including Risk evaluation / management
- Including LOPA criteria
- ...
- But always multidisciplinary

“Companies don’t have a memory, people do”.



Texas City BP Refinery explosion

The covid pandemic



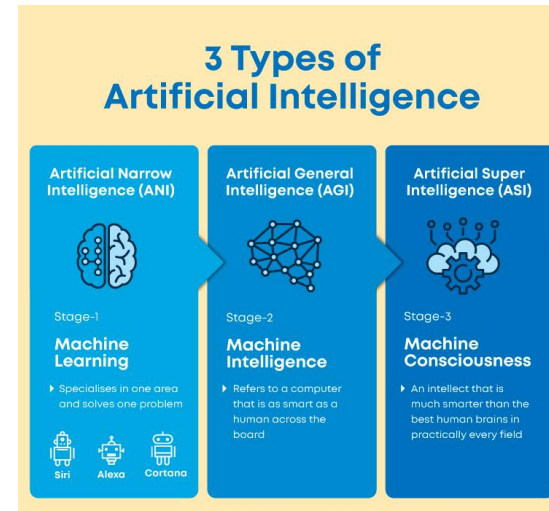


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What are the challenges of tomorrow?



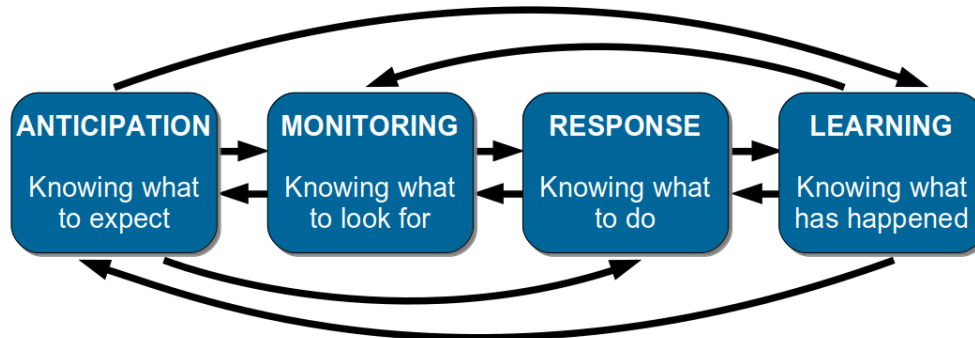
Digitization		Digitalization	
Definition	Converting data, documents and processes from analog to digital.	Transforming business processes by leveraging digital technologies, ultimately resulting in opportunities for efficiencies and increased revenue.	





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How might HAZOP adopt itself in the future?



What to expect

FROM:

Text based
Stand alone
Static
Linear
Probability
System based
Failure

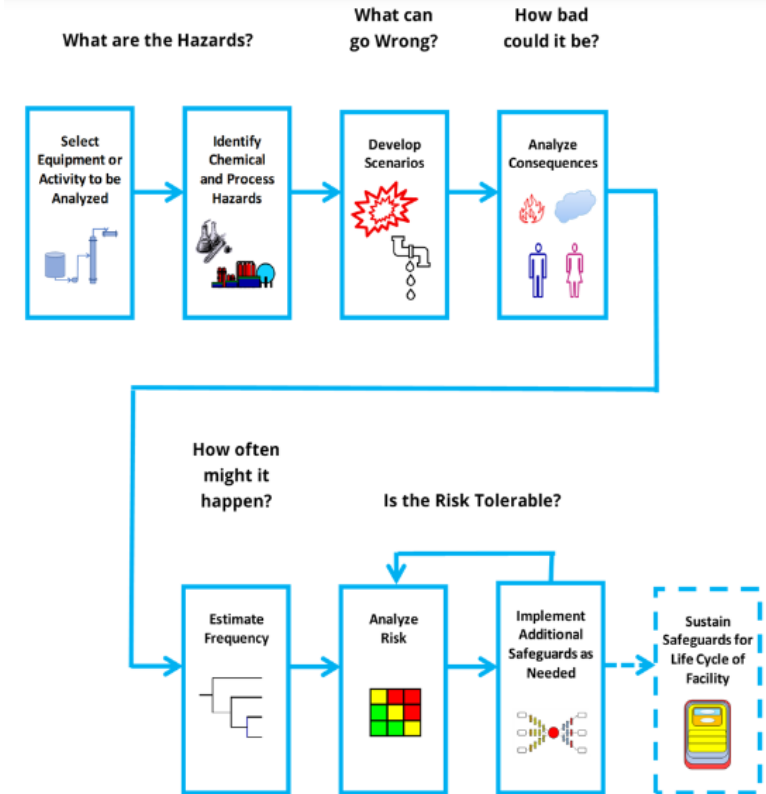
TO:

Model based
Integrated
Dynamic
Complex
Variability
Function based
Failure and Success



What to look for

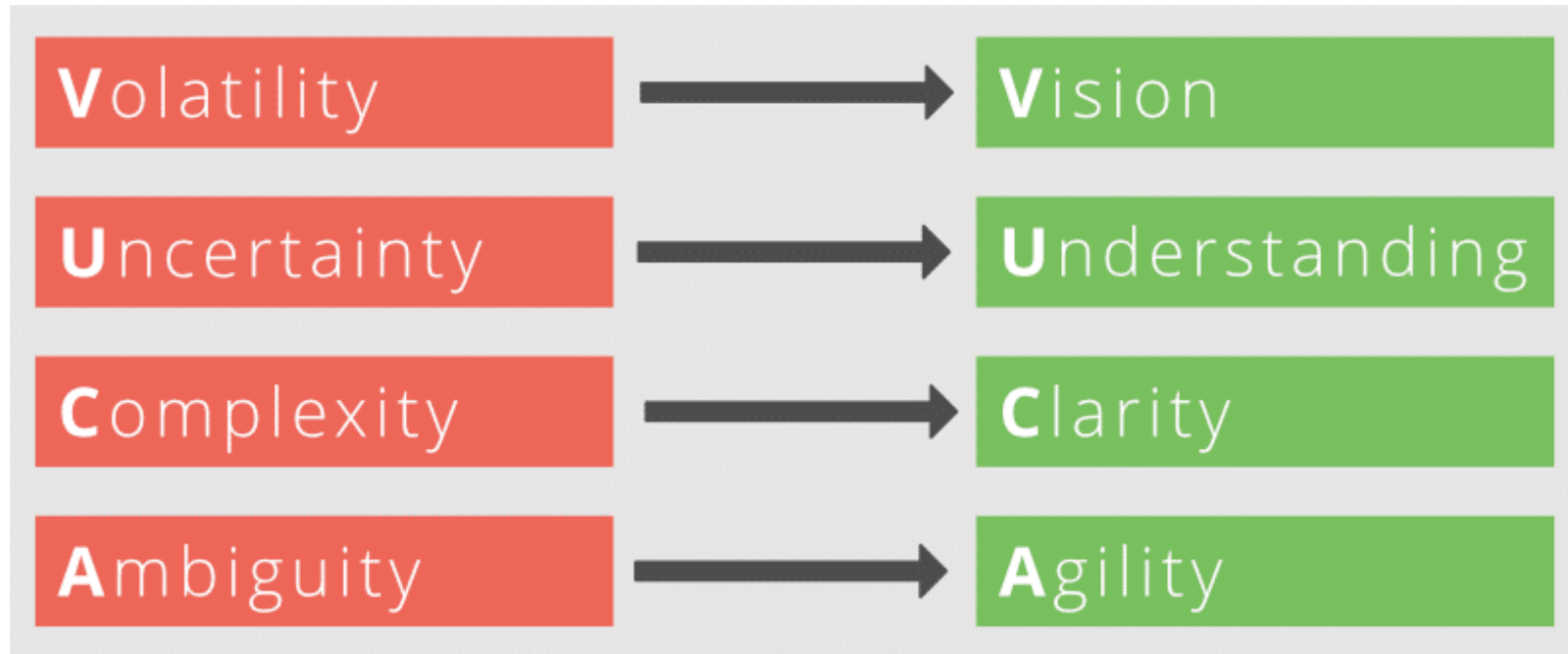
- Platform / databases
- Document Management Systems
- Plant Engineering Systems
- Integrated with other company systems and processes
- Libraries with typical installations, data elements, failure modes
- Effect calculations
- Bayesian network / Digital twins
- Big data, LoRa IoT
- Dynamic Risk Assessments
- Artificial Intelligence
- Machine Learning



Source: Risk Analysis Screening Tool (RAST) and Chemical Hazard Engineering Fundamentals (CHEF) | AIChE

Knowing what to do

How to respond to this VUCA world



Knowing what has happened



Thanks for your attention



Questions?

**WE
MAKE
IDEAS
WORK**

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