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10th & 11th September 2024

Hosted by BOHS British Occupational Hygiene Society

AI Challenges and Opportunities for LEV

Bob Rajan (Retired HSE Occupational Hygiene Specialist)

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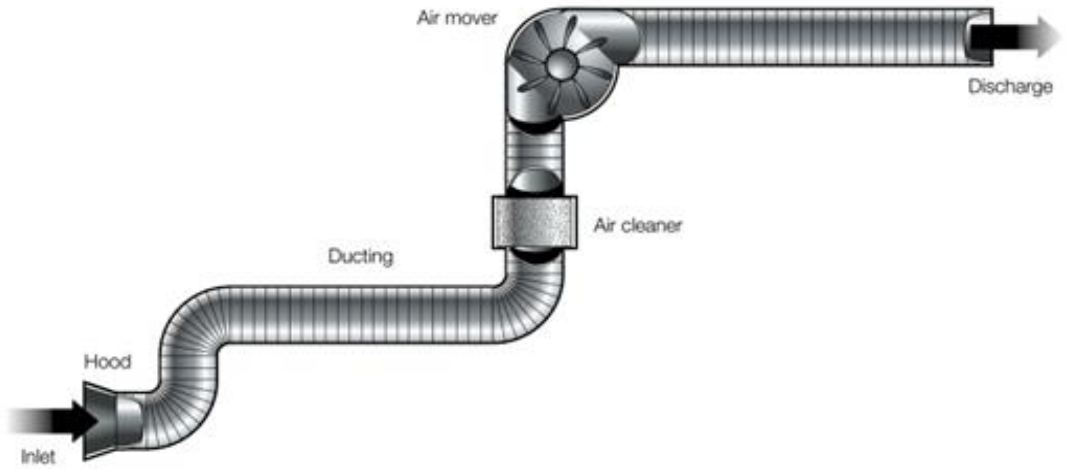
AI-assisted LEV Systems:

Specification, Design, Use, Testing and Maintenance.

Challenges and Opportunities.

Bob Rajan-Sithamparanadarajah OBE JP PhD



AI-assisted

Dedicated to:

Dr. Mark Piney, Dom Pocock, John Saunders and Late James Wheeler

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- ❑ **An Overview of AI in OSH**

- ❑ **A taster on AI-Assisted LEV Systems:**

Specification, Design, Use, Testing and Maintenance

Challenges and Opportunities

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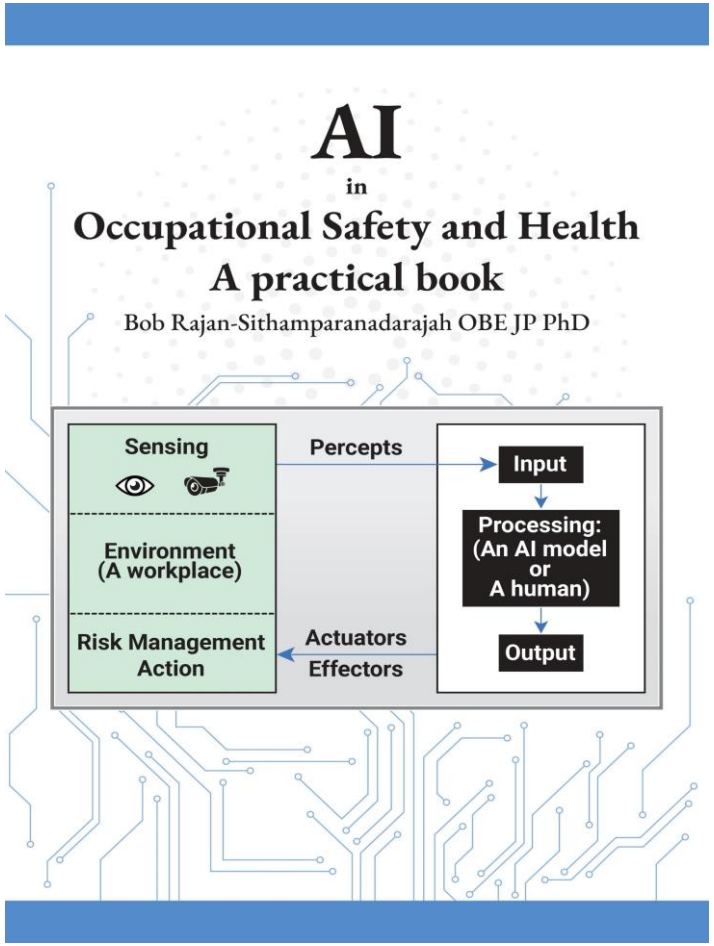
An Overview of



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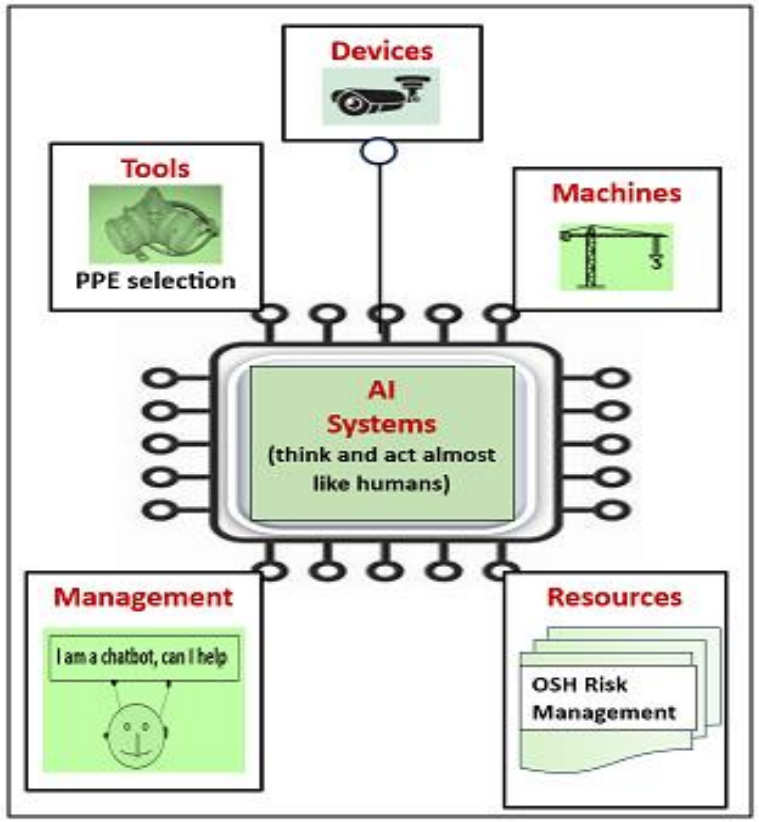
An Overview of AI in OSH – Application



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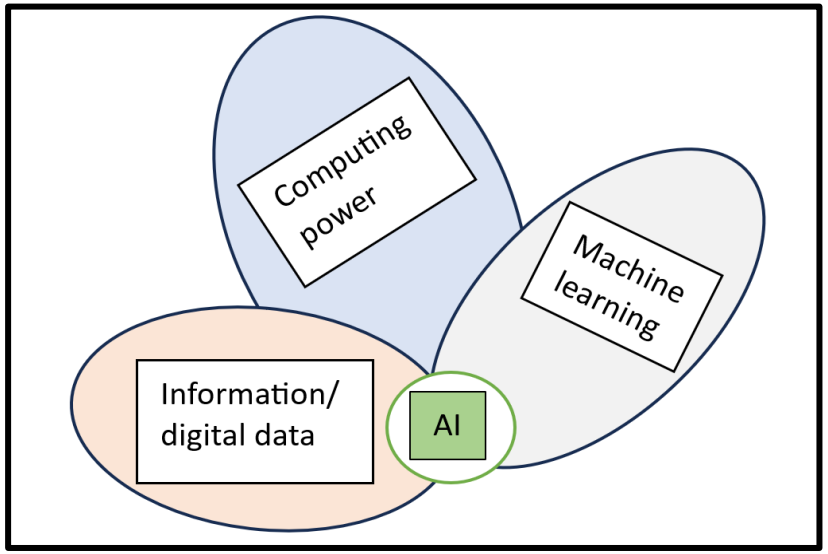
An Overview of AI in OSH – Technological Forces



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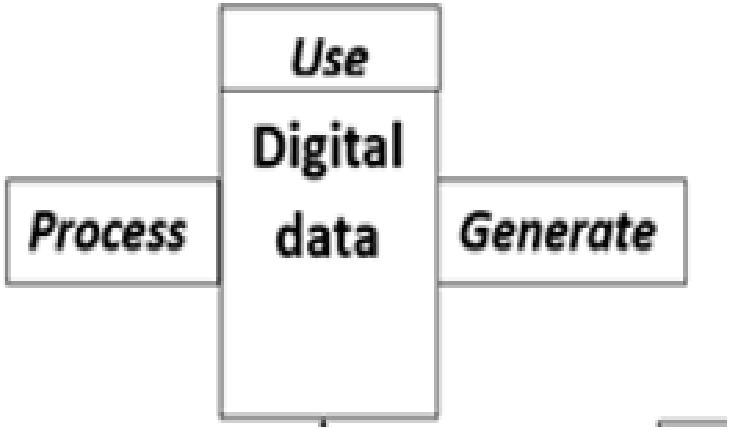
An Overview of AI in OSH – DATA



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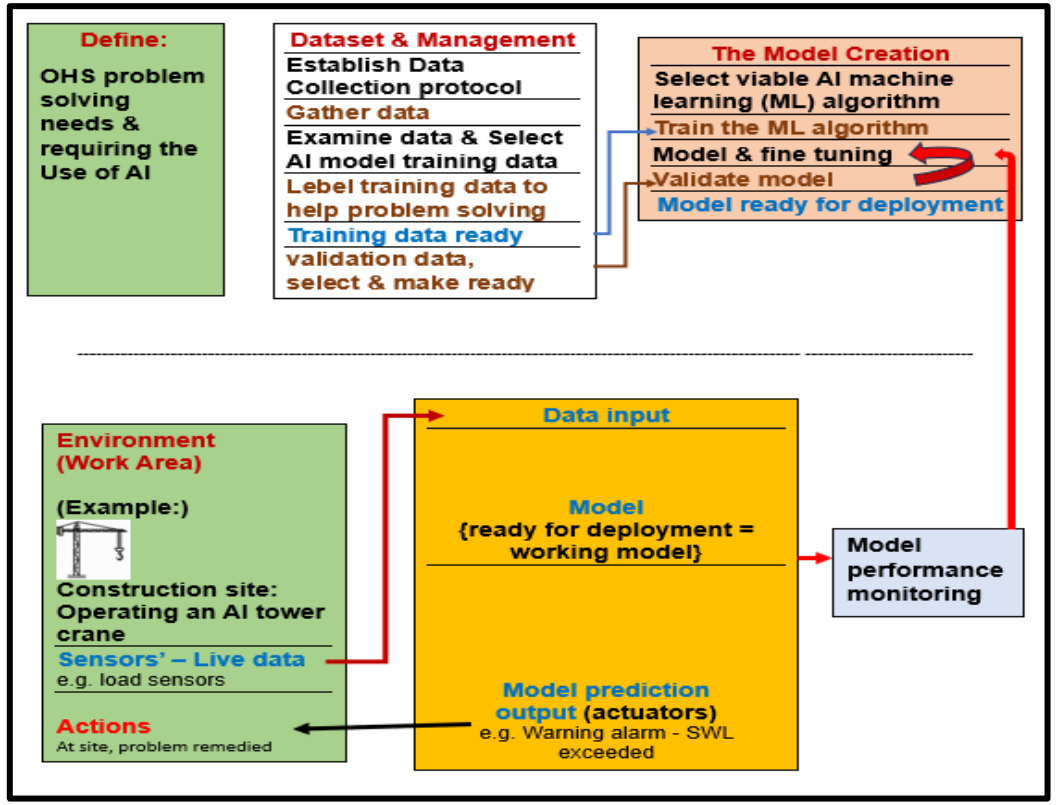
An Overview of AI in OSH – AI Model



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An Overview of AI in OSH

–

Humans & AI models

- Bias
- Poor accuracy and precision
- Mistaken interpretation of data
- Wrongful data clustering etc. etc.
- Wrong answers
- Fake
- Hallucinate

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AI-assisted LEV Systems

Rule-based AIs

- Expert crafted rules
- Do not remember inputs used earlier

Generative type AIs

- Use deep learning & processing
- Use large amounts of data
- Remember previous inputs

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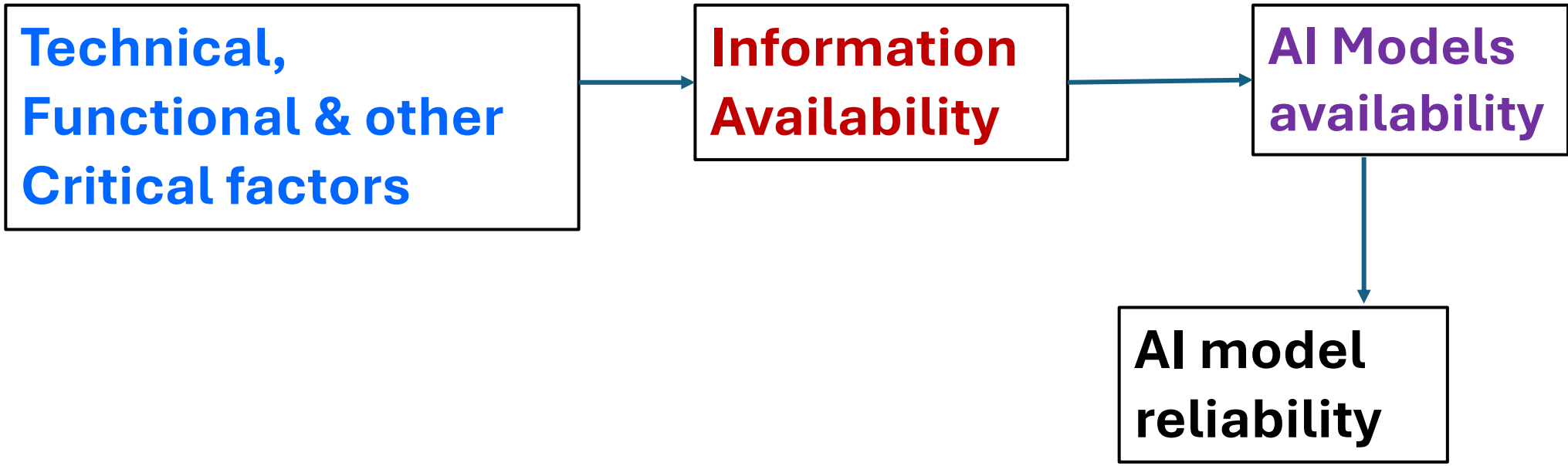
AI-assisted LEV Systems:
Specification and Design



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AI-assisted LEV Systems:

Specification, Design

Technical, Functional, & other Critical Factors

Work

Work environment

Worker-related

Substance-related

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AI-assisted LEV Systems:

Specification, Design

Why enhanced expert collaboration?
Why consortium with Mechanical Engineers?

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AI-assisted LEV Systems:

Specification, Design

Another challenge

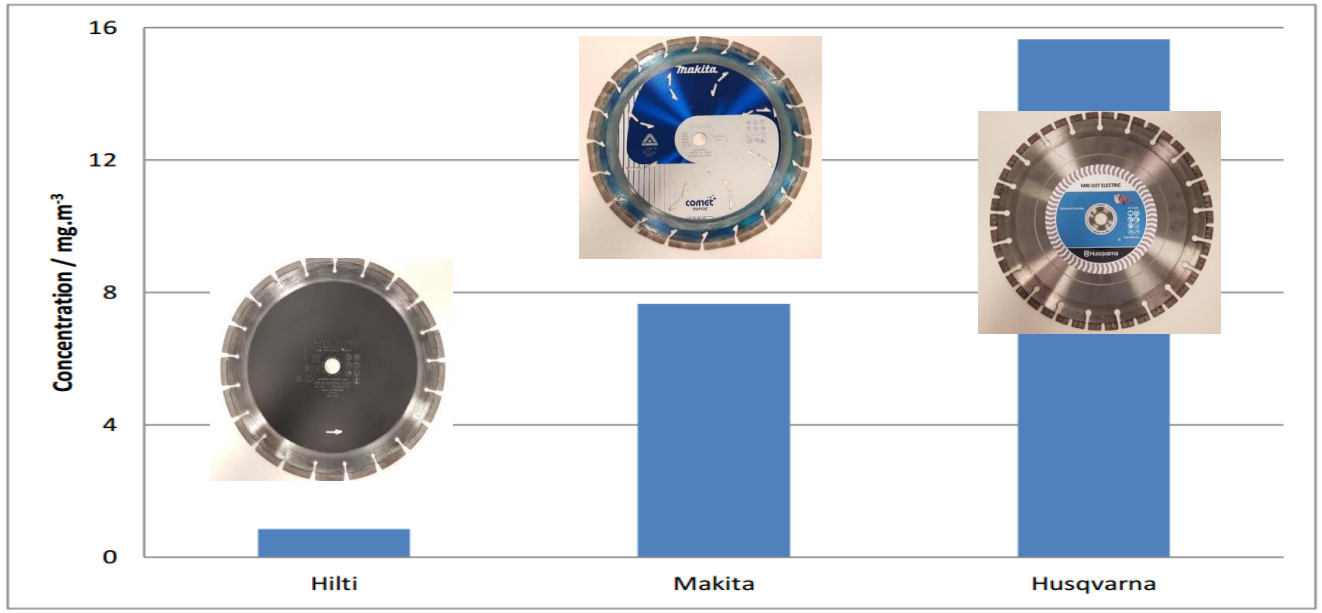

Figure 4 Plot of mean respirable dust concentrations in the breathing zone

Source: HSE - Report Number: MC/2019/06

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AI-assisted LEV Systems:
Use and Testing

- For simplicity, ease of operation could use an AI- rule-based systems

- Adrian Sims will present on sensors and monitoring

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AI-assisted LEV Systems:
Maintenance

Digital Twin based AI systems could be used

The system at work with sensors

A digital twin in a computer and connected to the real system on the left via a LAN or internet to monitor performance, and schedule maintenance.

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AI-assisted LEV Systems:
Specification, Design, Use, Testing and Maintenance.

AI systems/models need and use should be determined on a case-by-case and with due diligence.