

Safety in the future

Speaker name

Title

Title

Event

Date

Location



International
Electrotechnical
Commission

Safety in the workplace

2,78 million workers die each year from occupational accidents and work-related diseases.

SDGs recognize safety aspects.

New and complex safety requirements have emerged with the expansion of intelligent systems.

Need to place human safety at the centre of the new human-machine relationship.

Safety with intelligent machines

While AI, automation and digitalization can dramatically improve efficiency in the workplace and augment the capacity of human performance, the question arises:

Will machines become super-intelligent, leading to questions about how to keep humans safe?

Current safety practices

Safety risk approach aims to reduce risk to people and achieve tolerable levels of risk.

Safety management requires that safety experts, managers and their workers collaborate to achieve a safe and efficient production system.

Engineering excellence and safety have been at the forefront of the IEC activities for over a century.

Safety: at the core of IEC work

The IEC Advisory Committee on safety (ACOS) provides overall guidance to IEC TC/SCs on questions of safety.

IEC horizontal safety standards foster a consistent approach to groups of standards

- IEC Guide 104 defines rules for developing horizontal safety publications.

New trends impacting safety

Intelligent machines are the primary drivers of the digital transformation.

Concerns about privacy, data integrity, transparency and trustworthiness of new technologies.

Latest ICT developments enable organizations to gather real-time information on certain safety risks, especially between humans and machines.

Challenge for standardization

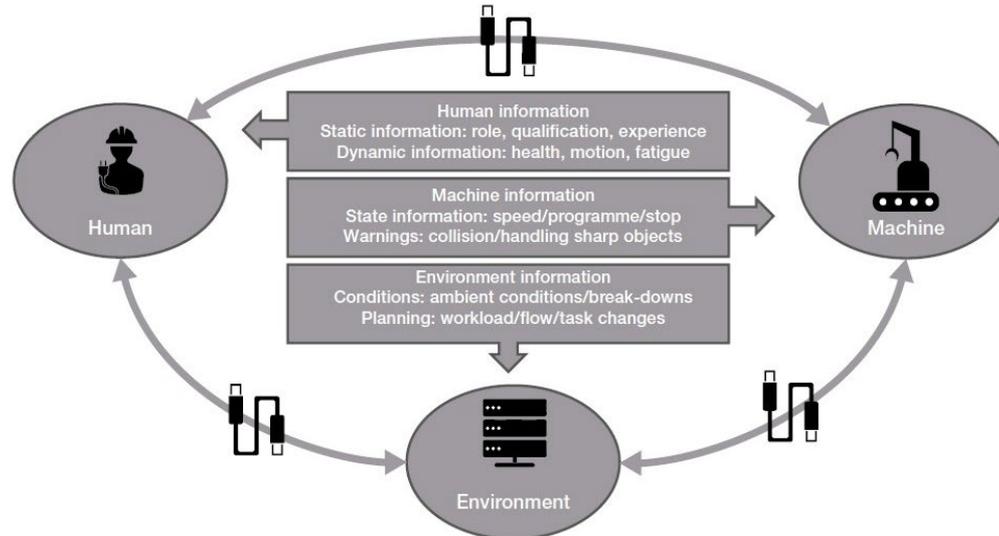
Need to address safety using a holistic approach.

Standards development may need to adopt different approaches:

- Collaborative safety
- Develop *performance-based* standards

Tripartite system for safety

- Humans, machines and the environment collaborate to ensure the future.



Information flows

Three kinds of information pass between the components of the system:

- **Human information**
- **Machine information**
- **Environment information**

Key enabling technologies

Current technologies

- Internet of Everything
- Ontology and semantic interoperability
- Assurance algorithms

New technologies

- Digital twins
- Real-time collision avoidance
- AI-assisted behavioural analysis

Cybersecurity: a necessity

- **ISO/IEC 27000 provides an overview of information security management systems.**
- **The goal of a new information security management system for industrial control systems is to combine integrity, availability, confidentiality and safety.**

Applying the tripartite system

Manufacturing

- **Conventional industrial robots usually separated from humans using barriers.**
- **Collaborative robots allow for direct interaction with humans using a cooperative approach.**
- **Robot assigned repetitive or physically taxing work while humans concentrate on task requiring manual dexterity.**

Applying the tripartite system

Construction

- **Cutting–edge sensing, lighting and AI technologies introduced to improve safety.**
- **Machinery and workers can be tracked, lighting ensures good visibility and can be used as an alarm system in noisy environments.**

Applying the tripartite system

Electrical power distribution systems

- **Metamorphosis in energy landscape poses challenges to the safety of electrical infrastructure.**
- **Innovative technologies can ensure resilience and safety.**
- **Cybersecurity threats on the rise.**

Role for standardization

- **Tripartite system for safety will require standardization.**
- **Standards will need to design technical systems that work seamlessly with people.**
- **Standardization bodies may need to widen and deepen horizontal coordination efforts on safety.**

Challenges for the future

- **Facilitating social responsibility.**
- **Standardization of an ecosystem of intelligent systems.**
- **Conformity assessment with intelligent agents.**
- **Achieving global safety excellence.**

Recommendations

- **Social goals should be established that aim to achieve safety through man-machine cooperation.**
- **A new concept of safety consider man's place in the system.**
- **Introduce “leading” indicators into when evaluating safety outcomes.**
- **Standards bodies need to expand and deepen their holistic approach to safety.**



Thank you!

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