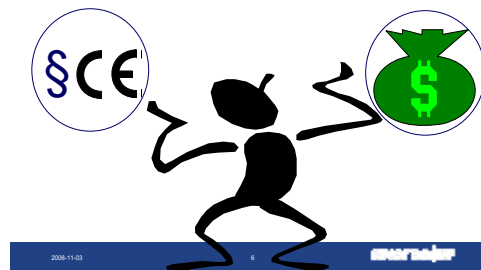




Standards in support of safer and more competitive workplaces

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How can it be shown that standards have supported safer and more competitive workplaces? Let me go back to the 1970's when my R&D work in the machine safety area started. I am also involved in the development of machine safety standards since 1988. When comparing a "generalized opinion" and demand from manufacturers and users before and after the 1990's, a dramatic change is seen;

- **the "generalized opinion" before the 1990's** was that safety will be an obstacle for practical use, it decreases the usefulness and output and generates a lot of costs
- **the "generalized opinion" after the 1990's** shows an increasing level of interest and demand for safety products, practical safety principles and safety knowledge.

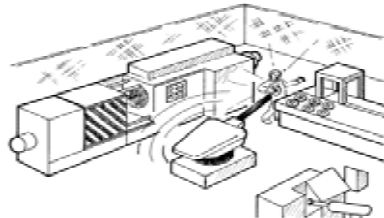
This dramatic change has a strong connection to the harmonized requirements and verification/ validation procedures set out in the international safety standards (and the EU-directives), which imply:

- a potentially increased market for a given product, which also leads to incentives for product development
- increased competition, which is a driving force to develop more powerful products, as well as safer and more competitive workplaces, and
- a price pressure because of the competition and very much larger batch size of safety products and demand of safety knowledge.

This dramatic change in opinion is an important market factor and demand for "*safer workplaces*". Those workplaces are often designed according to requirements in standards – developed in the light of requirements in relevant EU directives. Today we therefore have a lot of competitive European suppliers of more and more inventive safety products (e.g. safety PLCs), which also require being verified/validated.

Some examples are the basic standards for Risk Assessment (EN ISO 1412-1), General Principles for Design (EN ISO 12100 part 1 & 2) and Safety-Related Parts of Control Systems (EN ISO 13849-1) which set out the standardized and practical design requirements and how to verify/validate the products.

Risk assessment (EN ISO 14121-1) for identification and evaluation of hazards and production malfunctions



Production malfunctions are major underlying factors for accidents and production loss!



General principles for design (EN ISO 12100-1)

5 Strategy for risk reduction

5.1.5 For the continued safe operation of a machine, it is important that the protective measures allow its easy use and do not hinder its intended use.

Not doing this could lead to protective measures being bypassed in order to achieve maximum utility of the machine.



Production adapted safety - a key issue to achieve functional safety on the shop floor !

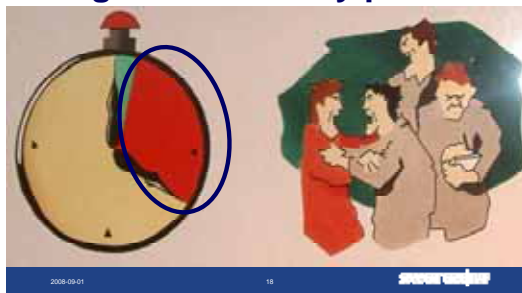


Fig. Kaianders Sempler

A quick and easy re-start ..



Slow and difficult re-start ! Design user-friendly products



Stop functions for safe and effective production !



Production stop function for preparation of an quick and easy re-start



Safety-related stop function initiated by safeguard (EN ISO 13849-1)



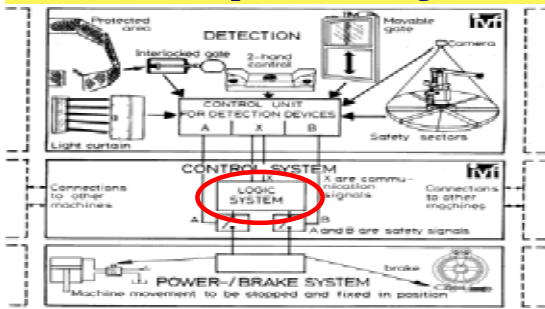
Emergency stop function (EN ISO 13850 EN 60204-1 EN ISO 13849-1)

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Production stop breaks at logic level

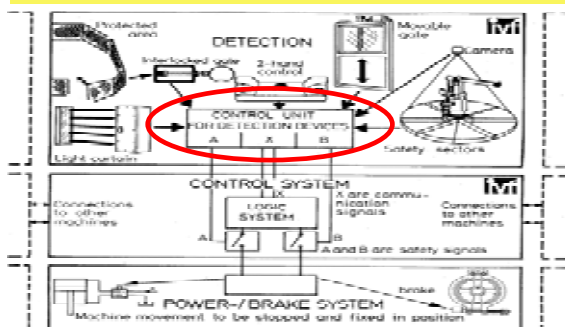


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Safety-related stop breaks at control level

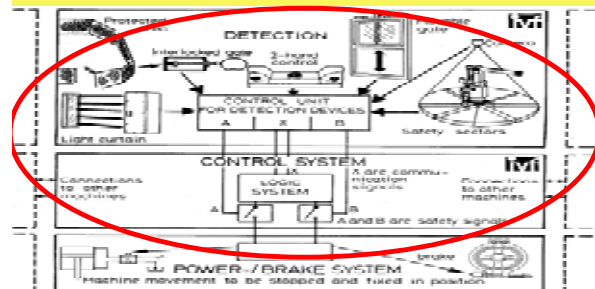


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Emergency stop breaks energy supply, i.e. "electrical dead machine"



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These standards and others will also support users with qualified guidance and knowledge for implementation of safety products and principles, in order to keep the safety level of the products when installed. For the achievement of "competitive workplaces" the application of safety requirements needs to be combined and balanced to the practical usefulness of the product – otherwise it is often a question of time until the safety will be bypassed.

The described approach for system thinking fits very well in the "Lean-concept", when, correct applied, includes the environmental factors – not only the effectiveness factors. This means that **safety and standardization** are fundamental "Lean-factors".

Lean production for less waste,
increased efficiency and safety
– work smarter not harder !



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Conclusion

Described system and development approach ends in solutions that integrate:

- functional safety solutions, in combination with
- efficient process/production systems, and
- operator-friendly work situations.

Thank you for your attention!