ecma INTERNATIONAL

ECMA-287

Safety of Electronic Equipment

Safeguards to reduce harmful exposure to energy sources

Ecma TC12

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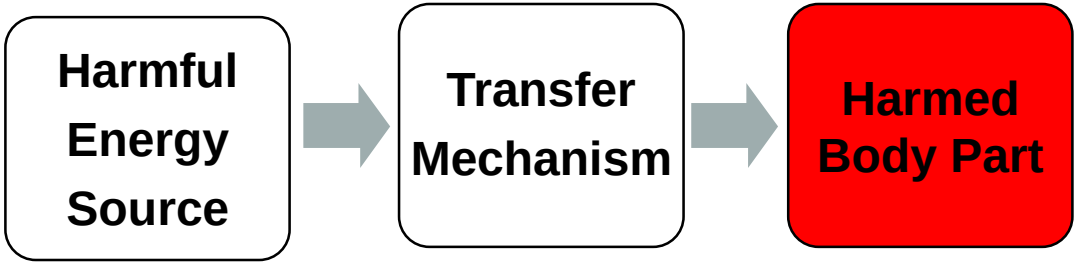
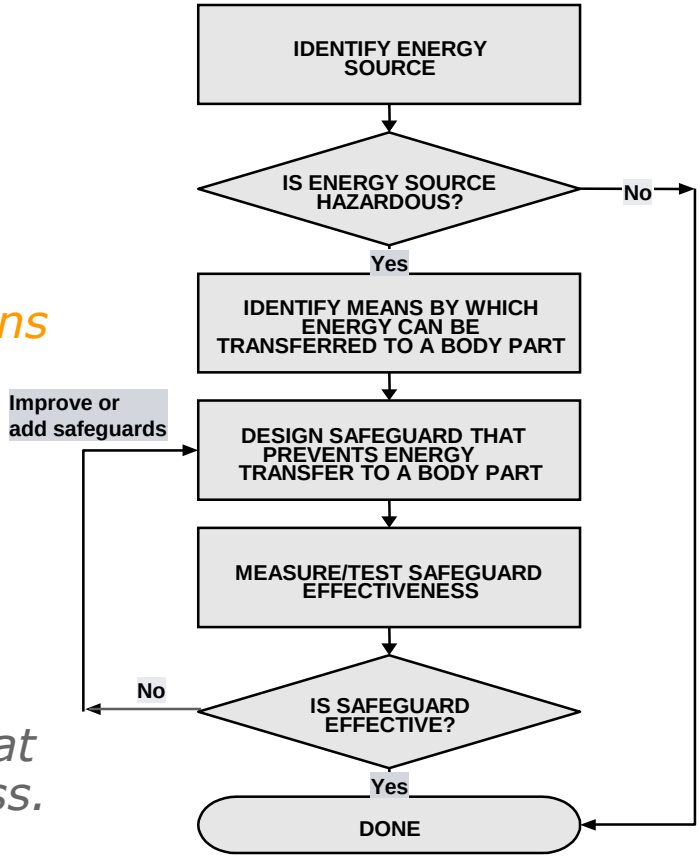
Harm Model



Safety Model

Procedure:

- *Identify Injury harm or hazards*
- *Identify energy sources and energy transfer means*
- *Specify safeguards:*
  - Rationale (why),
  - Requirements (performance),
  - and function (what it does)
- *Specify criteria and/or construction parameters for conformance tests that demonstrate effectiveness.*



HBSE Practices used for ECMA-287:

- *Risk Analysis and Field Experience review used to:*
  - Develop Performance Based Criteria and
  - Acceptable Construction Criteria.
- *Hypotheses confirmed in laboratory tests*

Note that Risk Analysis considers both the:

- *Event probability and*
- *its consequences.*

Hazard Based Safety Engineering Benefits

ECMA-287:

- Eases the market introduction of new technology;
- Unified standard for a broad range of products;
- Minimises national or regional differences;
- Increases Design Freedom;
- Increases stability due to technology independence;
- Provides rationale for basis of requirements;
- Increases 'User friendliness' and usability due to (conformance based) type test nature
  - Useful for designers;
  - Suitable to assess conformance by suppliers, purchasers and certifiers (but NOT a certification document).

Former Product Safety standards:

- Were too diverse: safety requirements differed widely due to emerge of „Multi-Media-Equipment" products in the mid 90's
- Changed too frequently because:
  - design oriented rather than performance based
  - Maintenance cycles required for any technology evolution
- Were not always based on sound engineering principles
- Were lacking for some product families
- Were difficult to use (Cross references)

Broad Industry Participation in Ecma TC12

Note, VDE and SEMKO also contributed to the ECMA-287 development.

ECMA-287 facts:

- To large extent technology *independent* Safety Standard;
- Scope is ICT and CE equipement rated less than 600 V rms;
- Covers products currently under the scopes of IEC 60065 and 60950-X;
- New safety standard (NOT a merger of IEC 60065 and 60950-1);
- Ecma International Technical Committee 12 draft, based on IEC basic safety publications and *HBSE* (Hazard Based Safety Engineering) principles;
- Freely and electronically available here: ECMA-287;
- Contributed to IEC TC 108 for further elaboration.

Hazard Categories:

- Electric Shock
- Fire
- Burn
- Mechanical
- Chemical
- Radiation

Electric Shock Hazard Subjects

Electric Shock Injury

- *Hazardous and non-hazardous values of energy sources (voltage/current/time/frequency, contact area, etc.)*

Safeguards

- *Insulation Coordination (creepage, clearance, solid insulation)*
- *Protective Earthing*
- *Components, barriers, enclosures*

Fire Hazards (property damage)

- *Define hazardous and non-hazardous values of energy sources (voltage, power, time, candle flame, etc.)*

Safeguards

- *Component and material selection*
- *Functional insulation*
- *Barriers, separation, enclosures, etc.*

Burn Injury (high temperatures, molten metal, high frequency)

- *Hazardous and non-hazardous values of energy sources (temperature, heat transfer, time, contact area, etc.)*

Safeguards

- *Component and material selection*
- *Thermal insulation*
- *Barriers, separation, enclosures, etc.*

Note: Chemical Hazards cover Burn injury from chemicals

Mechanical Hazard Subjects

Mechanical related injury

- *Sharp edges and corners*
- *Hazardous moving parts*
- *Implosion/Explosion*
- *Instability*
- *Integrity of mounting means*

Safeguards

- *Components, barriers, separation, guards, enclosures*

Radiation Hazard Subjects

Radiation related injury

- *Ionizing radiation*
- *Non-ionizing radiation*

Safeguards

- *ECMA-287 refers to existing IEC standards that address some aspects of non-ionizing radiation.*
- *IEC is developing and standardising safeguards for other aspects of non-ionizing radiation. Ecma TC12 will consider referring those standards in future editions of ECMA-287.*

Chemical Hazard Subjects

Chemical related injury (burns, toxicity, explosion)

- *Hazardous and non-hazardous values.*

Safeguards

- *Component and material selection*
- *Containment, ventilation*
- *Barriers, separation, etc.*

Safeguard properties

- *Chemical resistance*
- *Compatibility*

Section Format

Clause

- *States objective of clause*

Defines limits between hazardous and non-hazardous

Specifies principal safeguards

- *Location of safeguard*
- *Safeguard parameters*
- *Safeguard parameter tests/construction*

Specifies supplemental safeguards

- *Location of safeguard*
- *Safeguard parameters*
- *Safeguard parameter tests/construction*

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