REMOVAL OF MESH PANELS FROM SAFETY FENCES (PERIMETER GUARDS)

Under which conditions may mesh panels be removed from safety fences (so called "perimeter guards")? This question is frequently asked by both machinery manufacturers and companies operating machinery and plant systems.

ROLES CONCERNING SAFETY FENCES

AXELENT is the manufacturer of the elements that form a safety fence around machinery. However, we are not designing the machinery or plant system itself nor its safety concept. In virtually all cases Axelent is not responsible for determining the correct height, position and safety distance of the fencing to the machinery, for instance. Therefore, Axelent cannot provide a universally applicable guideline for the removal of mesh panels from safety fencing, as this is the responsibility of the machinery designer and/or the company operating the machinery or plant system.

THE MACHINERY DESIGNER will have to determine all the above details concerning safety fencing in course of his design process. The same is true concerning safe shut-down of the machinery or plant system. It is clear under European law and standards that stationary guards such as safety fencing must not be removed or side-stepped during any of the operating phases of the machinery (normal operation in any operating mode, setting, remedy of frequent faults/malfunctions, maintenance procedures that require the machine to be powered etc.). The machinery designer will therefore need to assess the risks that could be incurred when a person enters the area enclosed by a safety fence. He also needs to develop suitable shut-down procedures for the machinery or plant system (a so called "lock-out/tag-out" strategy).

THE COMPANY operating the machinery or plant system will have to adapt the "lock-out/tag-out" strategy for the machinery or plant system based on the local needs as part of a workplace-related hazard analysis. Thereafter the company operating the machinery or plant system will need to enforce the strategy as well as authorize and instruct their personnel.

Matthias Schulz

Matthias Schulz is an independent machine safety consultant with 25 years of experience cooperating in a joint venture with Axelent in Sweden and Germany.

Matthias is the author of our popular Safety Book that guides you through laws, regulations, EU directives, requirements and certifications.

Are you interested in a copy?
Contact your local sales representative.

> Not just anyone should be allowed to remove fencing panels.

Axelent Safety

CITATIONS OF THE BASIC RULES FROM THE MACHINERY DIRECTIVE AND APPLICABLE EUROPEAN STANDARDS

The following sections of the Machinery Directive and European Standards have a bearing on the question of whether, when and under which conditions mesh panels may be removed from safety fencing. We do not claim that this listing is complete. Depending on the application and country of use additional requirements may be found in national or local regulations.

MACHINERY DIRECTIVE 2006/42/EC:

- Annex I 1.3.8.1 and 1.3.8.2 require that moving parts causing hazard must not be accessible during operation, as far as this is possible. Thus, guards must only be removed, when the machinery is not operating.
- Annex I 1.4.1 requires that it must not be easy to by-pass guards or render them non-operational. Thus, the tools required to remove guards should not be available to just anyone, where possible.
- Annex I 1.4.2 has a bearing on the removal of guards. It must be possible with tools only. The Axelent X-key is a tool and even a special one, that is not easily copied and can thus be reserved to only a few users.
- Annex I 1.6.3 requires that machinery is separated from all energy sources before maintenance work.

EN ISO 14120:2015 "SAFETY OF MACHINERY – GUARDS – GENERAL REQUIREMENTS FOR THE DESIGN AND CONSTRUCTION OF FIXED AND MOVABLE GUARDS"

- **5.3.9 REMOVAL OF FIXED GUARDS**

Demountable fixed parts of guards shall only be removable with the use of a tool.

- **3.7 TOOL**
  - o implement such as a key or wrench designed to open and close a fastener.
- **3.8 USE OF A TOOL**
  - o action by a person under known and predetermined circumstances as part of a safe working procedure.

- **6.4.4.1 WHERE ACCESS IS REQUIRED FOR MACHINE SETTING, PROCESS CORRECTION OR MAINTENANCE**

The following types of guard should be used:

…

b) Fixed guard only, if the foreseeable frequency of access is low (e.g. less than once per week), its replacement is easy and its removal and replacement are carried out under a safe system of work[1].

- **8.5 REMOVAL OF GUARDS**

Information shall be provided indicating actions to be taken before guards are removed, for example machine power isolation, dissipation of stored energy, and procedures for the removal of guards.

The information shall also prescribe requirements on procedures for the removal of guards, including

- appropriate use of a tool (see 3.7 and 3.8) and
- safe working procedure[1].

- **8.6 INSPECTION AND MAINTENANCE**

Details shall be provided of inspections required to identify defects and the maintenance required. This shall include the following, as appropriate:

- loss of or damage to any part of the guard, especially where this leads to deterioration of safety
- performance, for example redution of impact resistance from scratches to glazing materials;
- deformed or damaged part to be repaired or replaced if the damage has negative influence on safety;
- replacement of wearing parts;
- correct operation of interlocks;
- degradation of jointing or fixing points;
- degradation by corrosion, temperature change, embrittlement, or chemical attack;
- satisfactory operation and lubrication, if necessary, of moving parts;
- modification of safety distances and aperture sizes;
- degradation of acoustic performance, if applicable.

The information for use shall include a warning that fixings for guards (e.g. bolts, screws) should only be replaced with fixings of the same or an equivalent type, e.g. fixing requiring the use of a tool (see 3.7 and 3.8).

EN ISO 12100 SAFETY OF MACHINERY - GENERAL PRINCIPLES FOR DESIGN - RISK ASSESSMENT AND RISK REDUCTION

The standard clearly shows that some "protective measures" must be taken by the user of machinery (that is an individual or an enterprise operating machinery). This is particularly required concerning "safe working procedures, supervision, permit-to-work systems;" (see sections 3.19 and 4 Figure 2).

[1] A safe system of work is a formal procedure which results from systematic examination of a task in order to identify all the hazards. It defines safe methods to ensure that hazards are eliminated or risks minimised. A safe system of work is needed when hazards cannot be physically eliminated and some elements of risk remain. (quoted from UK Occupational Safety & Health Council Guidebook "Safe Systems of Work", January 2004)

TEMPLATE FOR INSTRUCTIONS THAT MAY BE GIVEN TO OPERATORS

Note! The following template is a suggestion/recommendation that will have to be checked, altered, reduced or extended by the machinery manufacturer and/or the company operating the machinery/plant system based on a risk assessment or hazard analysis.

REMOVAL OF MESH PANELS IN SAFETY FENCING:

» Stop all machinery behind the safety fencing and disconnect it from all sources of energy supply, before removing any element(s) of the fence (electric, pneumatic, other energy sources).

» Lock all separating devices using padlocks, for instance (main switch(es), shut-off cock(s) for compressed-air supply, and where needed other switches and valves for other energy sources. The machinery manufacturer or company operating may wish to add other specific requirements such as for depressurising of pressure vessels, locking/blocking of axes subjected to gravity, dissipation of other residual or stored energy, removal or extraction of harmful substances etc.)

» Fence elements must be removed exclusively by personnel that has been expressly authorised to do so by the employer/company operating the machinery/system.

» Keep the X-Key in a safe place. It should not remain at the workplace near the machinery, where it would be available to any operator.

» Before restarting the machinery/system all fence elements must be reinstalled and the entire fencing and other safety devices must be inspected by a trained safety specialist.