

Topical Peer Review II

Fire protection at nuclear installations

Topic of interest:

Inspection and functionality testing of fire dampers

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Aspects to be discussed

- 1. Approaches and methods used when testing and inspecting
 - 2. Frequencies and associated justification for dampers' inspections and tests
 - **3. Approach for design modifications/replacement of dampers**
- 4. Findings from inspection or testing of dampers

Expected outcome of discussion

- Overview of practices regarding dampers testing, dampers modification or replacement, approach for non-accessible dampers
- Better insights from national approaches to share experience and identify potential good practices or challenges

1. Approaches and methods used when testing and inspecting fire dampers

Actuation of opening/closure

Approaches reported in NAR (ex. Tricastin, France):

The fire dampers are closed:

- by passive systems (melting of fuse) to guarantee safety sectorisation;
- by interlocking to the fire detection system to minimise the propagation of cold smoke in the ZFAs, and to guarantee safety sectorisation;
- by pressing a pushbutton for the fire-fighting actions.
- a smoke control system



Powered by e.g.: melting fuse and gravity or springs, electrical motors or compressed air, controlled by data systems etc.



Question: How may the effectiveness of these trigging methods to be verified as part of the inspection/testing ?

1. Approaches and methods used when testing and inspecting fire dampers

How is movement, position and status verified

Methods reported in NARs:

- ✓ Using output from fire or operation control system, local control panel
- ✓ Visually through inspection holes, remotely controlled moveable cameras
- Installation on switches at "full open and closed positions"
- ✓ FRM II (DE): "special tool for improved inspections of fire dampers": please elaborate



CZ P. 111, 3.3.A.2.1: "Part of the dampers are designed so that when a temperature of 130 to 150° C is applied, the fire damper blade is "baked" - sealed in the pipe to prevent the spread of smoke." please elaborate



Question: how may this be improved ?

Passive fire protection



2. Frequencies and associated justification for dampers' inspections and tests

- The frequency of inspection/testing are based on the requirements of the installation
- Inspection/testing is mainly done approximately annually, but with large differences in frequency and extent.

Approaches reported in NARs:

- ✓ At CLAB in Sweden fire dampers are tested every 48 hours
- At Spanish NPPs the frequency depends on the type of the fire damper
 A functional actuation test is required every 18 or 24 months in case of Trox type
 dampers and every 10 years, with 10 % per year, for Louvre curtain fire dampers.

issue to discuss...What should be considered when deciding on a test frequency and extent ?

Passive fire protection



- **3.** Approach for design modifications/replacement of dampers
- Instead of simply replacing the failing parts, a better solution may sometimes be to redesign parts of the system or replacing some parts with more suitable or new type of components.
 Modifications of the damper location could allow a more adequate inspection and testing.

Approaches reported in NARs:

- ✓ Often a need for new functionalities makes a coordinated replacement of all or some of the fire dampers optimal, compared to retrofitting of existing
- Sometimes fire dampers are so worn out or impossible to inspect properly that replacement is the only real solution
- ✓ If more fire dampers are needed at an installation to improve fire safety, it may be impossible to attach old and new fire dampers to the same control system

issue to discuss: do you have other examples, or novel ways of overcoming the above challenges?

Passive fire protection

Inspection and functionality testing of fire dampers



4. Findings from inspection or testing of dampers

 During inspections and testing of fire dampers, something may be discovered that requires extensive changes at an installation – or when you check up on the inspections, possibly they might not have been performed at all – or just not properly documented

Approaches reported in NARs:

Cases

- ✓ Loss of integrity during worksites not recorded and undetected for years (F p.208, 900 MW series NPPs))
- Excessive closing times found during tests (F p.237, OSIRIS)
- ✓ Excessive closing times detected using new fire alarm system (CH p.90, Gösgen)
- ✓ Not fully closed because of weak springs (D p.46, FRM II)(CH p.18, Gösgen)
- ✓ Fire dampers found to be non-functional (UK p.243 and 285, Sellafield)

Do you have any relevant examples not mentioned here ?



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Thank you for your participation and contributions !