Remote testing and inspection standard

FSI 2023 Amsterdam

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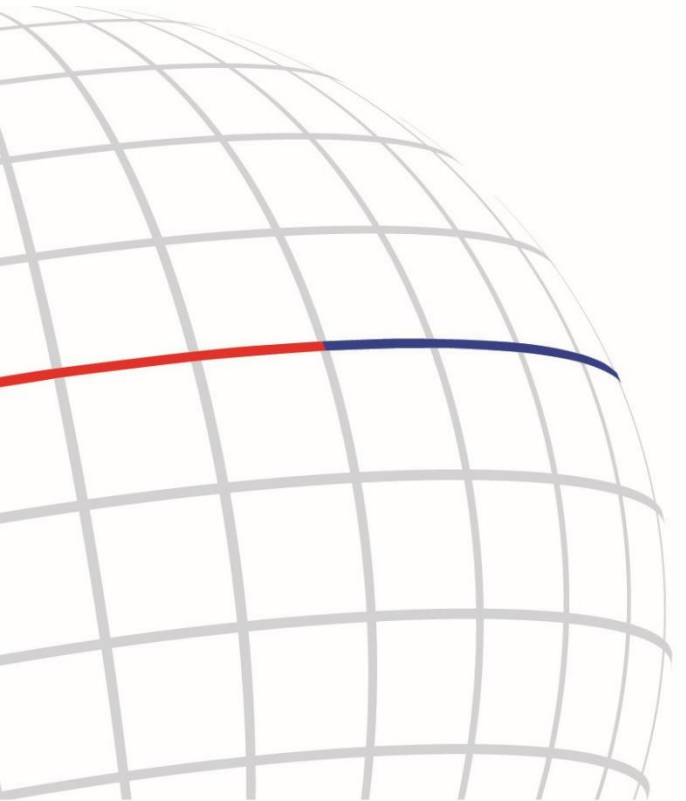
Fire Protection.

Agenda:

1) EN 50710 „Requirements for the provision of remote services“
2) Specific requirements for extinguishing systems
3) Possible conflict with TS 50136-10 „Alarm systems – Alarm transmission systems and equipment
4) The necessity of a system approach and not a component approach
5) The challenge to replace human perception by sensors and analytics
6) Insurance acceptance
7) Conclusion

1) EN 50710 „Requirements for the provision of remote services“



1) EN 50710 „Requirements for the provision of remote services“

- Responsible CENCLC JTC4 WG1
- Published in 2021
- Scope: “Fire safety systems” including, but not limited to:
  - Fire detection and fire alarm systems
  - Fixed firefighting systems
  - Smoke and heat control systems.

It does also cover “Security systems” including, but not limited to:

- Intruder and hold-up alarm systems
- Electronic access control systems
- External perimeter security systems and video surveillance systems including social alarm systems and emergency sound systems.

1) EN 50710 „Requirements for the provision of remote services“

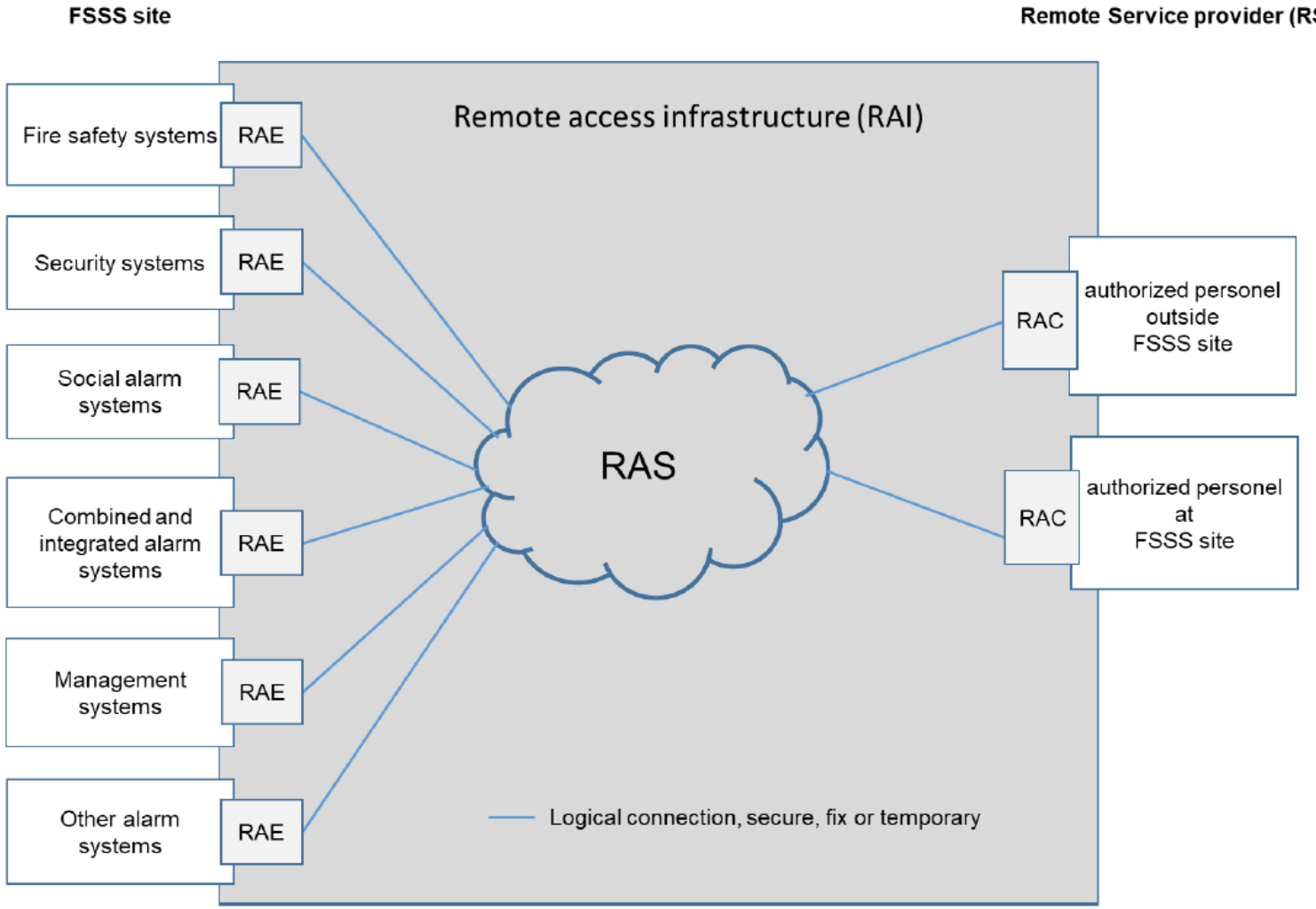
Structure of the standard:

- Common requirements:
  - Agreement and responsibility
  - RAI (remote access infrastructure) description and security requirements
  - Requirements for organization at FSSS (fire safety and/or security system) site
  - Requirement for organization at remote location
  - Requirements for the operation of remote services
  - Requirements for remote functions

- Application specific requirements:
  - …
  - Specific requirements for the use of remote services with fixed fire fighting systems
  - …

1) EN 50710 „Requirements for the provision of remote services“

RAI (remote access infrastructure) description from RAE (remote access endpoint) to RAC (remote access client)



1) EN 50710 „Requirements for the provision of remote services“

RAI (remote access infrastructure) security requirements:

- State of the art security measures:
  - Authentication
  - Authorization
  - Encryption
  - Substitution protection
  - Event logging and traceability
- Physical and logical connections part of the RAI:
  - Monitored securely for internet cyber security
  - Audited regularly for effective protection
- Remote access to the FSSS shall only be possible via a RAS (remote access server)

1) EN 50710 „Requirements for the provision of remote services“

Requirement for organization at FSSS site:

- Communication at start, close of control and written functions:
  - Indication to the client
  - Direct contact

Requirements for organization at remote location:

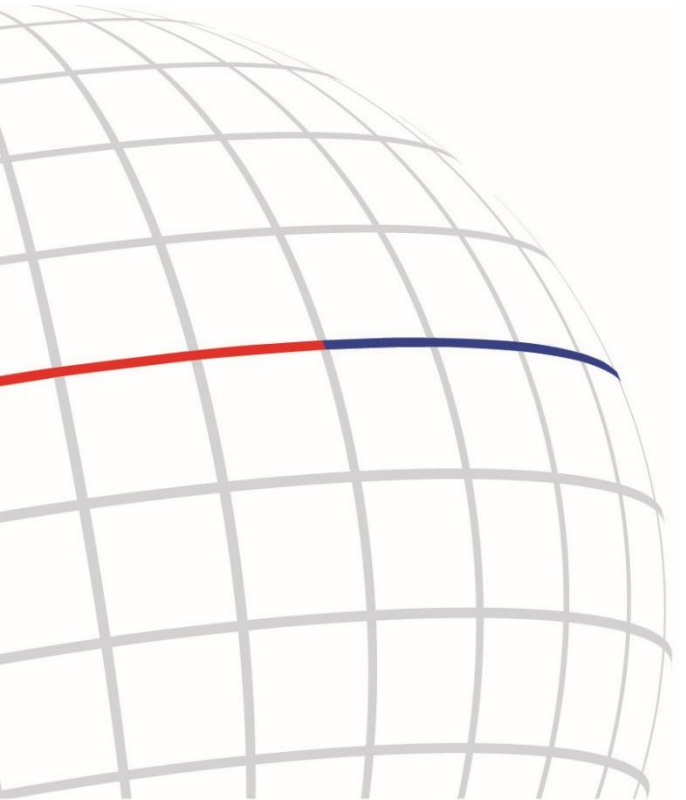
- Physical and logical connections part of the RAI:
  - Only authorized personnel permitted to access
  - System to authorize access shall be state of the art for the operation of remote services
- Impact assessment before remote service is conducted
- During remote service
  - In the event an alarm condition occurs, the execution of control or written functions must be terminated
  - Monitoring and alarm receiving centers shall be informed
  - A responsible person shall be present at site, where fire suppression / extinguishing systems are activated automatically

1) EN 50710 „Requirements for the provision of remote services“

Requirement for remote functions:

- Read functions:
  - No specific requirements for read functions
- Control functions:
  - Isolation/disablement of equipment
    - Displayed at site
    - Replace / re-enable the equipment in a period of time
    - Mitigation measures
- Write functions:
  - Changes that may cause the system to become non-operational, firmware update/upgrade or system reconfiguration
    - Adequate mitigation measures
    - At-site check of correct operation
    - “Roll back” function

2) Specific requirements for extinguishing systems



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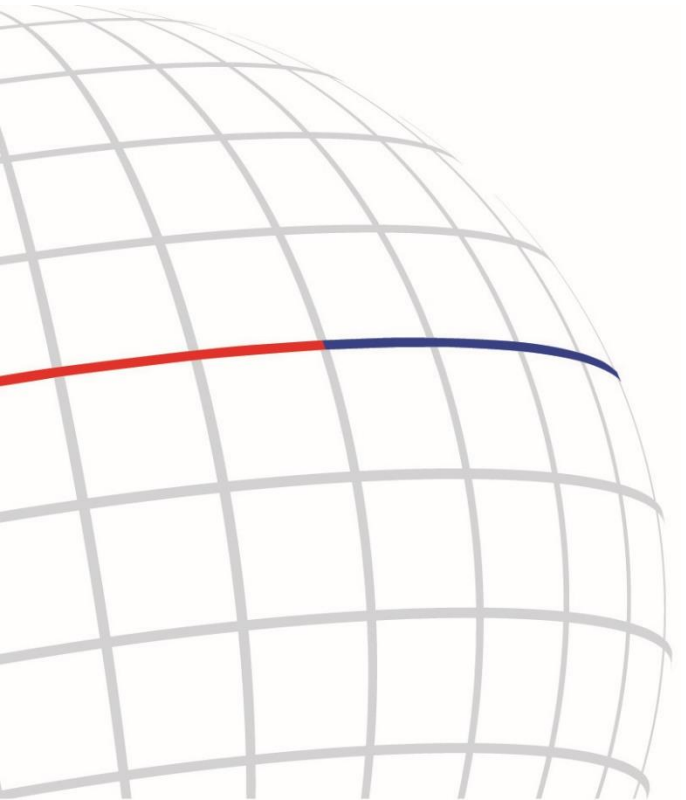
2) Specific requirements for extinguishing systems

Requirement for remote functions:

- Control functions:
  - At site authorization is necessary
  - Verification at site before any visual or acoustic information or conditions are reset
  - Release or lock of a fire extinguishing system shall not be initiated remotely
- Write functions:
  - At site authorization is necessary
  - Authorization and verifications shall be done by a designated and qualified person
  - Configuration changes that renders the system non-operational
    - Local measures for fire safety
  - Connection or another transmission fault
    - Last fully functional software version shall be restored
- Remote system checks:
  - Authorization is necessary
  - Authorization and verifications shall be done by a designated and qualified person
  - Typical examples: Alarm valve test, pump performance test

3) Possible conflict with TS 50136-10 „Alarm systems – Alarm transmission systems and equipment



3) Possible conflict with TS 50136-10 „Alarm systems – Alarm transmission systems and equipment”

CLC TC79 has written the TS 50136-10 „Alarm systems - Alarm transmission systems and equipment -- Part 10: Requirements for remote access”

The CLC TC79 sees various issues with EN 50710 „Requirements for the provision of remote services“:

- Multiple conflicts
  - EN 50710 was not aligned with TS 50136-10
  - EN 50710 contains additional or conflicting requirements
- Service document containing technical requirements
  - Technical requirements should only exist in technical standards
- Duplicate definitions
  - Remote access, Remote access client, Remote access endpoint, Remote access server
  - Session
- Incorrect usage of terminology, lack of clarity and irrelevant example

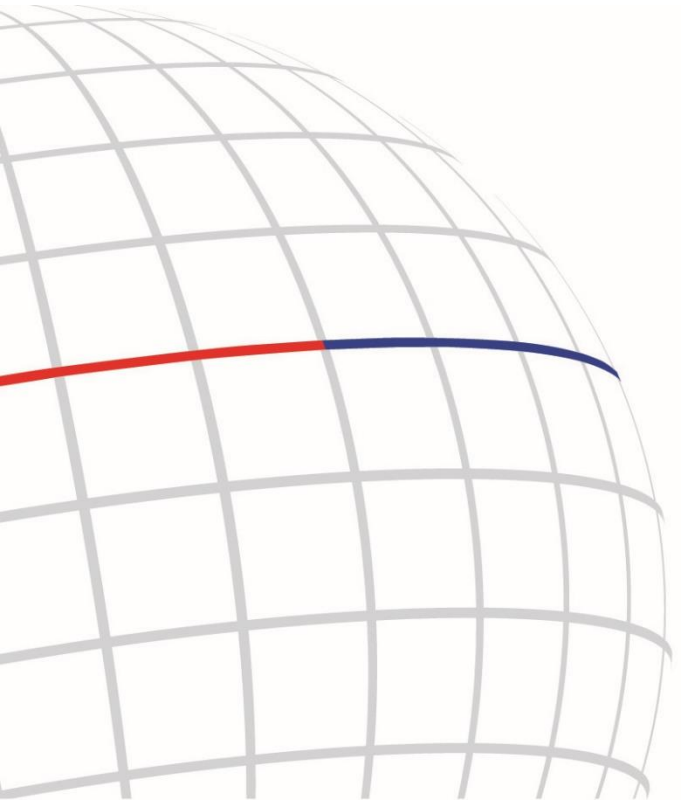
3) Possible conflict with TS 50136-10 „Alarm systems – Alarm transmission systems and equipment”

CLC TC79 proposes the following route to remove the issue:

- Remove all technical requirements from EN 50710
  - Secure remote services shall be performed over a connection that meets the recommendations of TS50136-10
  - Once 50136-10 is elevated to an EN, secure remote services shall be performed over a connection that meets the requirements of EN50136-10

- Currently there is no intention to change EN 50710
  - The standard is more specific for the various safety and security systems
  - The focus is on providing remote services
  - Any alignment might be considered for the next revision

4) The necessity of a system approach and not a component approach



4) The necessity of a system approach and not a component approach

Remote testing and inspection of a sprinkler system:

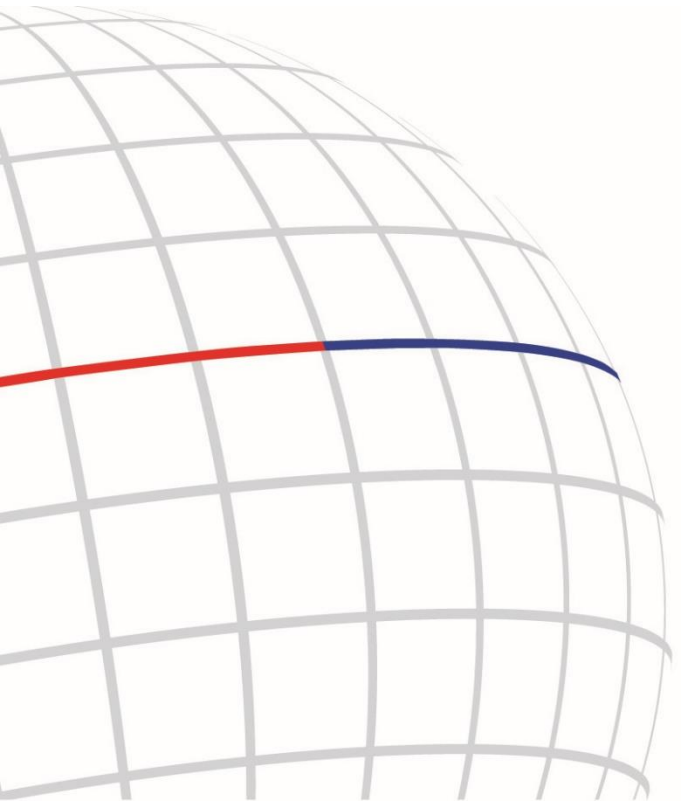
- The general aspect of system engineering:
  - Failure modes are not considered on a component basis but on the system
  - Example solenoid valve:
    - Solenoid valve to test the leakage of a dry pipe system
    - Solenoid valve to activate a deluge valve

- Testing of a component needs to consider the condition of the system:
  - Two types of criteria need to be separated:
    - Fixed criteria:
      Room temperature range
      Allowed maximum vibration etc.
    - Project specific criteria:
      Outlet pressure of the pump etc.

4) The necessity of a system approach and not a component approach

- Testing of a component needs to consider the condition of the system:
  - Before testing starts, alarm transmission to the fire brigade need to be interrupted
  - Criteria to decide to start the test:
    - Room temperature
    - Energy supply
    - …
  - Criteria to decide to abort a running test:
    - Pipework vibration
    - Water in the sprinkler house
    - …
  - Fire situation during a running test
    - Immediately switch back to normal working condition

5) The challenge to replace human perception by sensors and analytics



5) The challenge to replace human perception by sensors and analytics

The task is easy to define: Enable the system to act autonomous

- Necessity to anticipate what might happen during a test
  - Example pump start
    - Wrong inlet pressure
    - Wrong outlet pressure
    - Wrong energy consumption
    - Gate valves closed
    - Leakage
    - …

5) The challenge to replace human perception by sensors and analytics

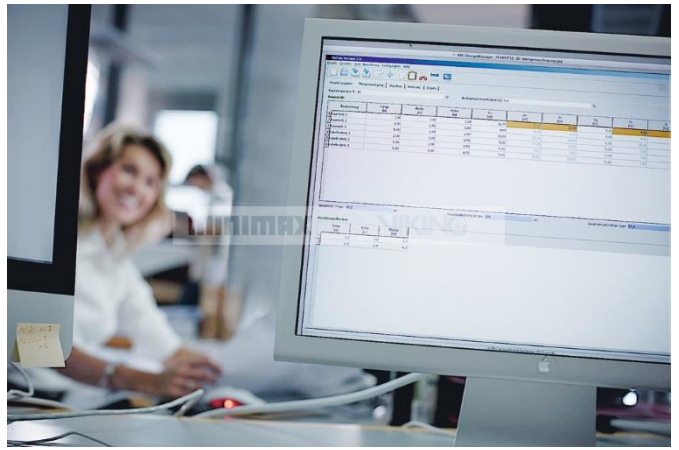
- The systems needs to recognize what a human being at site would have observed
  - Hard limits
    - Pump performance
    - Operating point of alarm switch
    - …
  - Tendencies
    - Increasing pipework leakage
    - Increasing pump temperature
    - …

5) The challenge to replace human perception by sensors and analytics

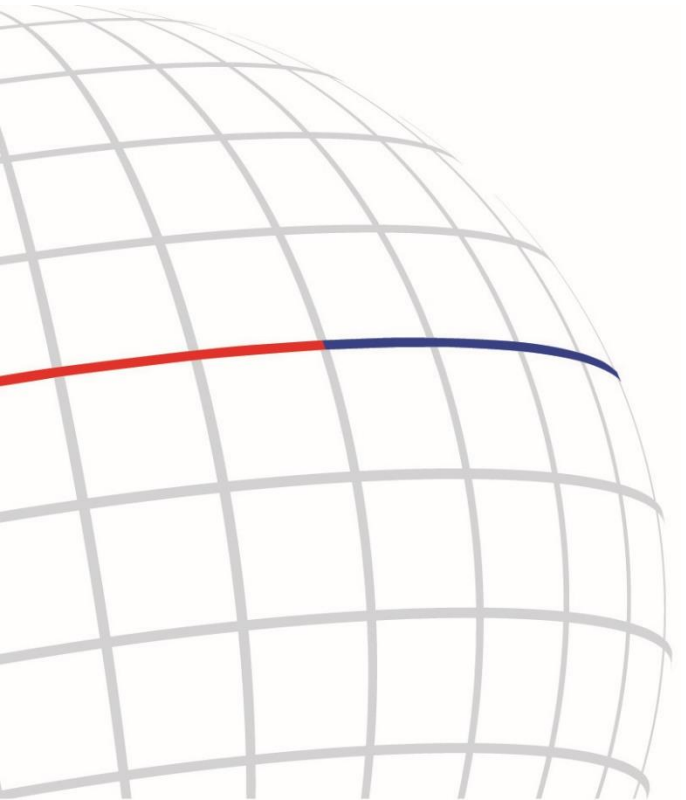
The sensors might also provide new information:

- A system without previous known abnormality might now have noticeable problems
  - Unrecognized deviations might be:
    - Leakage in dry pipes
    - Pump temperature
    - Pump / pipe vibration
    - …
  - This is not the problem of the automatic inspection and testing system
    - Nevertheless it might reduce acceptance of automatic inspection and testing

- AI (Artificial Intelligence) could help to process all the data
  - Therefore first a lot of data need to be collected
  - It is then possible to start with analytics
    - Recognize tendencies
    - Provide prediction
    - …
  - One advantage would be to provide preventive maintenance



6) Insurance acceptance



6) Insurance acceptance

The acceptance from the insurance side is generally high:

- Insurance see an improvement of the quality of the regular testing
  - The tests will be carried out regularly
  - The results are clearly documented

- Nevertheless some challenges need to be solved
  - In general it is not allowed to automatically stop a running sprinkler pump
    - The system needs to ensure the intended functionality during a fire incident
  - In general it is also not allowed to automatically suppress the alarm transmission
    - Special fail safe solution is necessary
  - VdS does not allow internet access to the operation of a sprinkler system
    - All automatic inspection and testing need to run locally
    - All configuration and settings need to be done at site

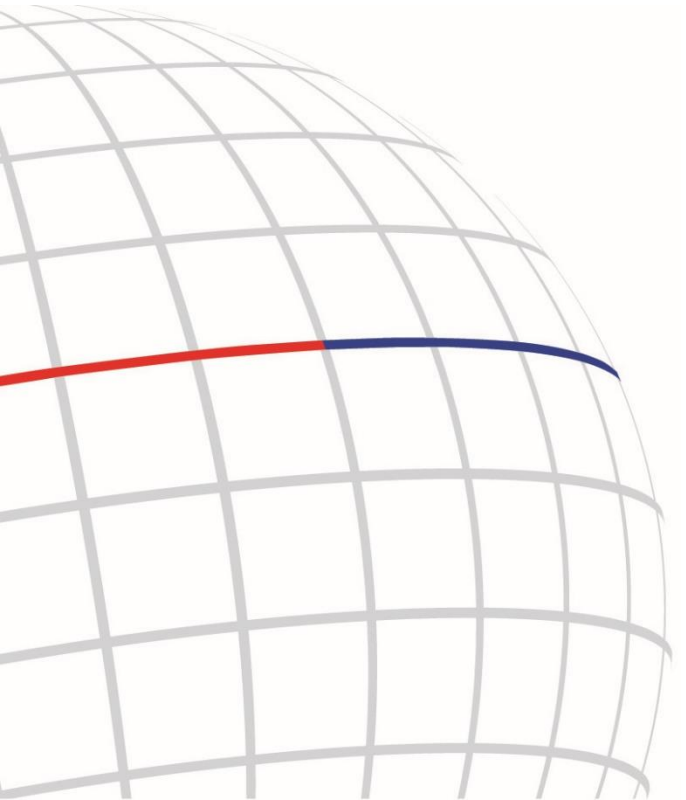
6) Insurance acceptance

The approval process:

- VdS approval structure
  - Component approval
  - Cloud approval
  - System approval

- First FM approval guideline draft for fire pump monitoring and automated testing:
  - The current structure covers:
    - General requirements including cyber security
    - Performance testing requirements:
      - Fire pump monitoring
      - Fire pump testing
    - Operational requirements:
      - Quality control
      - Audits
      - Manufacturer responsibilities

7) Conclusion



7) Conclusion

The remote testing and inspection means challenges and opportunities:

- Challenges
  - Technical solutions
    - Sounder check
    - Pump shaft seal
    - Components from different supplier with different interfaces (e.g. pump, compressor, electronic control panel)
  - Cyber security
    - Cyber security act
      - security of network and information systems
      - essential for the maintenance of critical societal and/or economic activities
    - EN standard remote service / remote access
    - FM requirements
    - VdS requirements
  - Business model
    - Customer benefits

7) Conclusion

The remote testing and inspection means challenges and opportunities:

- Opportunities
  - Increased reliability
    - Condition monitoring
    - Regular checks
    - Reduced down time, faster reaction time
    - Complete automatic documentation
  - Cost reduction
    - Reduced labor hours customer employee
    - Reduced travel expenses service employee
    - Maintenance before failure
  - Comfort
    - Data available at any location in real time

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