

Minimally invasive on-site rapid test of intumescent for enhanced structural fire protection

Background

If an architecture is realized using visible steel elements, this may be visually appealing or particularly functional (e.g. in ceiling constructions and supporting structures), however sufficient fire resistance must be ensured in the event of a fire. Open surfaces heat up and collapse much faster than, for example, constructions surrounded by concrete.

Problem

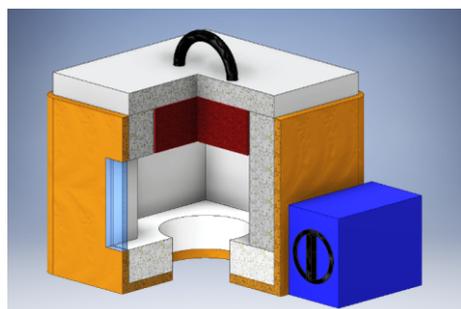
The behavior of intumescent has so far been determined by examining test specimens in a laboratory. This means that a subsequent inspection can only be carried out by taking a sample from the existing structure, which naturally causes damage to the structure and is therefore difficult to implement in practice.

Solution

A simple and reliable solution is now offered by a test system developed at the Karlsruhe Institute of Technology (KIT). It can be used directly on site and does not damage the supporting structure. A handy test chamber is placed directly on the spot of the supporting structure to be tested and then a corresponding test is carried out. Predefined conditions can be set for the chamber. Subsequently, only the tested spot has to be recoated.

This way, future tests required under building law can be carried out inexpensively and based on reliable data, which helps to avoid expensive and possibly premature preventive renovations.

The recurring fire safety test can now be carried out directly on site in a minimally invasive manner. Uncomplicated and reliable testing in existing buildings is now possible.



CAD model of the first prototype design of the hand-held device for on-site testing of intumescent [Picture: KIT].

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Development Status

Prototype / TRL5

Patent Situation

EP 3599460 B1 granted
EP 3599460 B1 (FR, GB, CH)
validated
DE 502019001214.6 validated

Reference ID

18/037TLB

Service

TLB GmbH manages inventions until they are marketable and offers companies opportunities for license and collaboration agreements. In this case we are also looking for cooperation partners for a further development of the first prototype.

Advantages

- Test carried out directly at the building / on site
- Flexible hand-held device designed for mobile use
- Minimally invasive (a surface of approx. Ø 40 mm must be recoated)
- No structural damage to the building

Application

In order to increase fire resistance duration, intumescent are used which, in the event of heating up, create an insulating layer through foam formation between the burnt gas and the material surface.

The foaming behavior of such coatings and thus their fire safety function may degrade over time due to climate and chemical weathering. Therefore, reliable testing is important to guarantee the required fire safety properties or to improve them as required.