Mobile furnace –

Cost-effective on-site fire resistance test

MOBILE FURNACE

Efectis is the first company in the world that is able to perform realistic fire resistance testing on-site using a mobile furnace. The brand name of the mobile furnace concept is the MobiFiRe, which stands for Mobile Fire Resistance.

Since its introduction in 2011, Efectis has further developed the concept and now serves the market with two different mobile furnaces: the MobiFiRe-ISO and MobiFiRe-RWS. The MobiFiRe-ISO is specially developed for testing according to the standard ISO fire curve or any other "low temperature" fire curve. The MobiFiRe-RWS enables high temperature fire testing up to the well-known HCM and RWS fire curves, with maximum temperatures of over 1350°C. In the mobile furnaces Efectis has combined its renowned expertise in fire resistance testing and on-site testing. The result of this is a fast and flexible setup which allows the fire test to be performed in a time frame of only a few hours after arrival on site.

- Real-time filming from within the mobile furnace allows continuous observation of the tested structure. This can be used to support the analysis of the test. Even more importantly, for concrete test objects observation of the structure enables an instant "stop" of the test when concrete spalling begins. Therefore the damage to the structure can be kept to a minimum. In most cases, only the first few millimetres of the concrete surface need to be repaired.
- The test surface of 1m^2 can be large enough to obtain reliable test results, but small enough to prevent unnecessary damage to the structure.
- Engineering tools and computer modelling can also be used when assessing the structure.
- The MobiFiRe-ISO and MobiFiRe-RWS furnaces can be applied to all kinds of structural elements, such as ceilings, floors, roofs and walls.
- Efectis can provide all the equipment necessary for on-site testing, including electricity supply and an elevation platform.
- Operation is safe and complies with the necessary safety rules and regulations.
- Fast and flexible setup and dismantling, which allows the fire test to be performed in only a few hours.
- The MobiFiRe service is flexible. Testing according to your specific wishes is always possible: just ask!

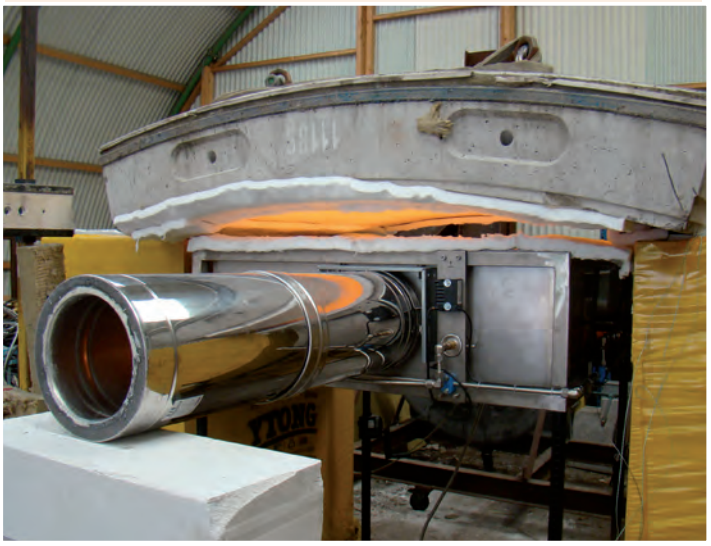
mobifire®

MOBILE LABORATORY

MOBILE FIRE TESTING LABORATORY, MIAMI, USA

For a tunnel project in Miami, Efectis set up a temporary mobile fire testing laboratory at the client's premises in Florida. The assignment for the Miami project was split into two parts. The first phase of the research aimed to determine the required insulation performance of passive fire protection systems, such that spalling of the concrete mix used in the tunnel would be prevented. The knowledge obtained regarding the thermal insulation requirements enabled Efectis to assess the performance of several passive fire protection systems in case of a tunnel fire. Based on the assessment of the passive fire protection systems the client was able to select the best solution.

- Avoid the cost of sending a team to witness a fire test.
- Cost-effective selection of passive fire protection system.
- Freedom to choose the testing location.



CHARACTERISTICS OF THE MOBIFIRE SERVICE

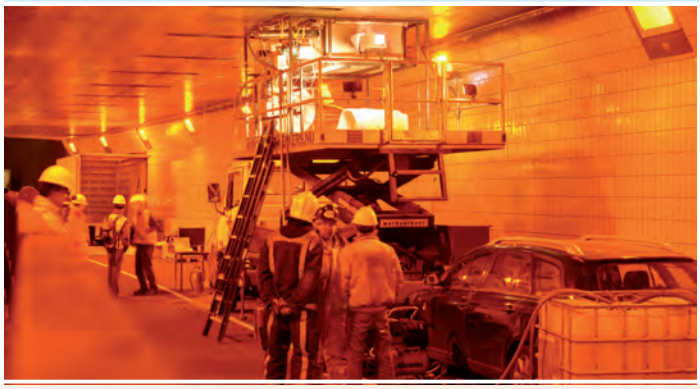
- Testing under ***realistic circumstances***
- For existing structures the ***costs are reduced*** compared to a fire test in a laboratory
- Possibility to test ***immovable existing structures***, such as monuments and tunnels
- New way of testing possible to select a ***cost-effective fire protection system***
- For existing structures, no necessity of 90 days drying time of concrete slabs
- Easy testing of ***different alternative fire resistance solutions*** in real applications
- Avoid the cost of sending a team to witness a fire test

TUNNEL CASES

MAASTUNNEL, ROTTERDAM, THE NETHERLANDS

For the assessment of the current fire resistance of the oldest immersed tunnel in the Netherlands, the Maastunnel, the MobiFiRe-RWS furnace was developed. The main question concerned whether a false ceiling structure in the tunnel could add fire resistance to the main tunnel structure. In order to answer this question, tests with both an ISO-834 standard fire curve and the RWS fire curve were carried out.

- First test in the world conducted with mobile furnace under RWS fire curve conditions.
- Two tests performed in a time frame of only 6 hours including setup and dismantling.
- Video recordings from inside the furnace.
- Test on a tunnel ceiling at 5 meter height using an elevation platform.



LA DÉFENSE, PARIS, FRANCE

For a major tunnel renovation project in Paris, the tunnel wall construction was tested according to the 120 minutes HCM fire curve (maximum temperature of 1300ºC) in order to assess the structural stability of the tunnel before renovation. In the subsequent structural analysis the results of the fire test were used as input.

- Test on a concrete tunnel wall.
- The structural stability of the tunnel was assessed based on the information obtained regarding spalling.

TUNNEL CASES

BEVERENTUNNEL, ANTWERP, BELGIUM

The Beverentunnel is an old railway tunnel that was scheduled to be renovated after decades of being out of service. The main question here was whether the performance of the proposed passive fire protection system would be sufficient to prevent the concrete lining from spalling and whether the system would meet the thermal insulation criteria.

- Assessment of concrete spalling of the tunnel lining by on-site simulation of expected concrete interface temperature curve.
- Four on-site tests (two hours each) at different locations in the tunnel during a period of two working days.
- By selecting a number of different locations within the tunnel it was possible to represent the entire structure.

BUILDING CASE

VENRAY TOWN HALL, THE NETHERLANDS

It is hardly practical to transport a representative part of a monumental building to a test facility, but as of now, it is possible to bring the test facility to the monument. The mobile furnace was transported to Venray to test the fire resistance characteristics of old wood-fibre cement boards. The main question was: What is the fire resistance of the floor construction and does this comply to present fire safety regulations?

- First test in the world with mobile furnace in a building structure.
- Assessment of fire resistance characteristics of old wood-fibre cement boards.

Efectis

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Efectis Nederland BV is the Centre for Fire Safety in the Netherlands.
The centre offers a portfolio of services that complement and strengthen each other:

- testing & certification
- speciality testing
- calculations & modelling
- consultancy & courses
- regulations & assessments

Within the field of testing there are three specializations:

- reaction to fire testing
- resistance to fire testing
- speciality testing and reconstruction (forensic research)