

FIRE PROTECTION OF BRIDGE CABLE SYSTEMS

The project will investigate and develop an applicable conceptual design approach for fire protection of cable systems on bridges by use of intumescent coating systems.

Intumescent coatings are a coating type, which swells and creates an isolation layer when exposed to high temperatures. The coating, which is a thick film coating, is widely used within building industry and petro-chemical industry.

Over recent years, a number of severe truck fires of which several have occurred on bridges in Denmark as well as outside Denmark. Experiences show that such fires may have a strength development equivalent to hydrocarbon fire with temperatures up to around to 1100-1200°C.

The fire risk is particular large for cable borne bridges where cable elements are vital for the structural integrity of the bridge. This has been the reason for carrying out fire protection of the main cables on Ny Lillebæltsbro and on the main cable of the Store Bæltsbroen, Østbro. The conventional approach is to use fire protection mats when protecting bridge cables.

The objective of this project is to investigate and obtain a design guide for the use of intumescent fire protection coating as an alternative to use of fire insulation mats on main suspension bridge cables. This may be a more flexible concept, which can be used on new as well as existing bridges for instance in connection with planned corrosion protection of the cables.

Once a fire protection concept has been developed for a main cable system, it could also be transferred to hangers on suspension bridges and cable stays on cable stay bridges.

The project will investigate four different concepts by modelling and laboratory testing. To fulfil our objectives, the project program will include the clarification of following:

1. How efficient is the intumescent fire coating applied on a main cable in protecting the main cable steel from being exposed to a critical temperatures with loss of bearing capacity?
2. How robust is the intumescent coating against mechanical damages from e.g. tools, equipment and inspection vehicles as well as weather exposure?
3. Which solution is the most effective solution regarding life cycle costs?

The project is expected to be carried out within the duration of a year and will end up with a general conceptual design approach for fire protection of cable systems on bridges.