

Using CFD to assess the impact of different design variations for a water mist system

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Bio: Max Lakkonen has over 20 years of engineering experience in fire protection, transportation and fluid power. The experience combines both strategic and operational tasks in the international business environment. Max has a Master degree in Mechanical engineering and Technical Licentiate post graduate degree in Automation. His career in fire protection is over 15 years and he is currently the managing director of the Institute for Applied Fire Safety Research (IFAB) GmbH, Germany. The key knowledge of Max is in water mist technology, performance-based design processes/tools, fire safety of transportation systems including rail and underground applications. Also, special hazards like protection of Lithium-Ion batteries are important part of his current work.

Max Lakkonen works in different associations and standard committees e.g. NFPA750, NFPA130 and NFPA502, ITA-COSUF Steering board and PIARC technical committee for tunnel safety. Additionally, Max is a member of the IWMA Scientific Council.

Abstract

The installation of water mist system, as any other, might require some assessments if the geometrical design parameters are different than in the approval tests. This is especially related to architecturally complex buildings where water mist systems typically are installed. Additionally there is often discussion on the impact of the forced ventilation system to water mist firefighting system. CFD offers a possibility to numerically analyze such variations or impacts. This paper focuses to this aspect. The paper details some possibilities how CFD can be used. The boundary conditions and important details of the water mist system are also explained.

The paper uses an example project where CFD has been used as an assessment tool. The project is related to a lobby area of high-rise building. The project had two challenges, the impact of higher installation height compared to the approval test, partly obstructed nozzle activation and the smoke extraction system. All these were included to the CFD-assessment and the results gave technical suggestions how to mitigate the impact of different technical variations.

Keywords: *water mist, CFD, assessment, installation*