

Preface

Fire safety engineering in tunnels is essential in order to obtain good safety for tunnel users. The knowledge about fire safety in tunnels has increased over the past few decades due to both new research and analysis of real accidents. The aim of this book is to give researchers, engineers, and authorities worldwide a good insight into the fire phenomena in tunnels and the physics behind it. Guidance in calculation of important parameters such as heat release rates, critical velocity, spread of smoke gases and heat, temperatures, heat fluxes, fire spread, and flame lengths is given as well as the theories behind them. A comprehensive overview of how fires in vehicles develop and how different physical parameters such as flammability, ventilation, and geometry influence them is presented. The focus is not on the design aspects of fire safety in tunnels, although some parts are described. It is more about understanding the dynamics and developments of fires in tunnels and other underground constructions.

The tunnels are becoming more and more complex and the need for performance based design increases. The authors have found the need for presenting and gathering the latest knowledge on fire research and experience from different testing. Therefore, the emphasis is on engineering relations and physics of fires. This will provide good and solid background information which the readers can on their own hand, use in its daily research and engineering work.

The knowledge presented here comes very much from research that the authors have been involved in, but also from other large-scale experiments and practical experience. The book can also serve as a base for a university education for those who are interested to understand the basics of tunnel fire safety engineering using correlations and formulas obtained within different fields.

The book is divided into numerous chapters where the focus ranges from direct physical phenomena to advanced calculation models. The catastrophic fires that have occurred in tunnels are put into context of the subject of this book, namely fire dynamics in tunnels. These fires have raised the level of awareness about the problem and through experimental and theoretical work by many researchers around the world the knowledge level on the fire physics has increased

considerably. This knowledge needs to find its way to the engineers working with the problems on daily basis and, therefore, it is our hope that the book will serve as a platform for practicing engineers, researchers, and students dealing with fire safety in tunnels.

Borås 2014-07-06

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<http://www.springer.com/978-1-4939-2198-0>

Tunnel Fire Dynamics

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2015, XV, 504 p. 132 illus., 21 illus. in color., Hardcover

ISBN: 978-1-4939-2198-0