PREFACE

The current practice in the European Union is that safety, including fire safety, is nationally managed, and requirements are determined by each country's specific experiences. While the political motivations for this approach are obvious, and local circumstances vary between countries, it can easily lead to similar processes having to be re-researched and re-invented country by country. In the context of the European Union, fire safety requirements are based on EU Regulation 305/2011. This document, published by the European Parliament and Council, sets out harmonised conditions for the marketing of construction products as an essential requirement for construction works. In Annex I of this document the basic requirements for mechanical resistance, stability and fire safety are summarised. Construction works must be designed and built in such a way that, in the event of fire: The load-bearing capacity of the construction can be assumed for a specific period of time; The generation and spread of fire and smoke within the works are limited; The spread of the fire to neighbouring construction works is limited; Occupants can leave the works or be rescued by other means; The safety of rescue teams is taken into consideration. The load-bearing capacity of the construction may be modelled on the principles summarised in the parts of the structural Eurocodes which deal with fire. The introduction of common standards in areas related to fire safety, it seems obvious that in such an important area the sharing of experience and research should be facilitated, and hence the need for networks in the COST model.

However, the need for integration has a further dimension. Fire engineering researchers tend to specialise in areas such as fire dynamics, structural fire engineering, active/passive fire protection, environmental protection or human response. Since the background sciences of these disciplines are different there is little interaction between them. Practitioners, including fire engineers, building/fire control authorities, and fire-fighters tend to consider fire safety as a whole, but lack in-depth awareness of recent advances in research and are outside the academic research networks. Through encouraging the exchange of information on different aspects of fire engineering and response between researchers in different countries, the COST TU0904 network "Integrated Fire Engineering and Response" was set up with the intention of fostering an awareness of the current state of the art, and to avoid continual repetition of research. The non-research fire safety community should benefit from exposure to advanced research findings, discussion with researchers, and the sharing of best practice. The input from this community gives researchers an awareness of real-world constraints, and an appreciation of where new research and standards are needed.

The TU0904 Action divides its membership loosely into three themed Working Groups, although clearly its overall mission of promoting integration means that these groups interact on many of the key activities. The Working Groups are: WG1 (Fire Behaviour and Life Safety)which focuses on the behaviour and effects of fire in buildings, combining this research-based knowledge

with the most effective means of protecting human life against the occurrence of fire in the built environment. This includes active fire-fighting measures and the effects of building form on the inherent risk to inhabitants. WG2 (Structural safety) covers the response of different building types to fires and the rapidly-developing research field of structural fire engineering, including new materials and technologies and the effectiveness of passive protection measures. Crucial problems of structural fire engineering concern change of use of buildings and the current imperatives of robustness, sustainability, energy saving and protection of the environment after fire. WG3 (Integrated Design) brings together design, practice and research across the disciplines of fire in the built environment. In structural design this includes integration of fire resistance with all the other functional requirements of a building, from conceptual design onwards, rather than simply adding fire protection after all other processes are complete. Active input from practitioners, regulators and fire-fighters through this group has been vital to the success of the Action.

The Action started in March 2010, and now has 22 nations of the EU, plus New Zealand, among its participants. Its first deliverable, a State of the Art Report attempted to bring together the current state of research, mainly in the participating countries but set into the context of knowledge world-wide. The second deliverable, the Proceedings of the Action's conference in April 2011, allowed the Action to be informed by current research findings from both within and outside the Action. The third deliverable, a volume of Case Studies, presented state-of-the-art examples of current best practice in performance-based practical fire engineering design, based on recent research knowledge. These explained the decision processes, scientific assumptions and practical constraints, as well as the ways in which different aspects of fire engineering were integrated into practice. The fourth deliverable, on Fire Brigade Reports and Investigations, consisted of contributions on the organisation of national fire and rescue arrangements in different EU countries, comparisons of national statistics, recommendations for questions to be included in standardised national fire fighters' reports, and lessons gained from experience of particular disasters.

This volume consists of the Proceedings of the Action's second Conference, held in Prague on 19-20 April 2013. The current activity of the Action, which is visible in the Proceedings, is focused on production of a series of Benchmark Studies, for use by researchers and practitioners. Remaining deliverables of the Action will be contributions to the future development of the fire-related Eurocodes and the educational dimension in the area of structural fire design.

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