

1. Record Nr.	UNISA996464396703316
Autore	Stefko Jozef
Titolo	Model fire in a two-storey timber building // Jozef Štefko, Anton Osvald, Linda Makovická Osvaldová, Pavol Sedlák, Jaroslava Štefková
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2021
ISBN	3-030-82205-2
Edizione	[1st ed. 2021.]
Descrizione fisica	1 online resource (XXIII, 82 p.) : 113 illus., 85 illus. in color
Collana	SpringerBriefs in Fire, , 2193-6609
Disciplina	628.922
Soggetti	Fire testing Fires Fire Science, Hazard Control, Building Safety Building Construction and Design Light-weight Construction, Steel and Timber Construction Wood, fabric, and textiles
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Preface -- Foreword -- List of Symbols -- 1.0 A Building and a Fire -- 2.0 Wood – a Combustible Building Material -- 2.1 General Characteristics of Wood -- 2.2 Wood Degradation by Heat Impact (By Fire) -- 2.2.1 Thermal Degradation of Main Wood Components -- 2.2.2 Wood Microscopic Structure Changes by High-Temperature Stress -- 2.2.3 Wood Macroscopic Structure Changes by High-Temperature Stress -- 2.2.4 Physical Properties of Thermally Degraded Wood -- 2.2.5 Mechanical Properties of Thermally Degraded Wood -- 2.2.5.1 Temperature Impact to Bending Strength and to Bending Modulus of Elasticity -- 2.2.5.2 Temperature Impact to Tension Strength and MOE at Tension Parallel to Grain -- 2.2.5.3 Temperature Impact to Wood Compression Properties Parallel to Grain -- 2.2.5.4 Temperature Effect on Shear Strength of Wood -- 2.2.5.5 Charring Rate Effect to Mechanical Properties of Wood in General -- 2.3 Fire Resistance of Wooden Structures -- 2.4 Eurocode 5 -- 2.4.1 Origin and Development of Eurocode Standards Programme -- 2.4.2 Related European Standards -- 2.4.3 Design Principles -- 2.4.4. Examples -- 2.5

Conclusion -- 3.0 Full-Size Fire Test of a Wooden Structure -- 3.1 The Concept of the Full-Size Tests -- 3.2 Structural Fire Test Scheme of Two-Storey Building -- 3.3 Construction Process of the Fire-Tested Two-Storey Building -- 3.4 Photos of the Test Structural Fire -- 3.5 The Fire Assessment -- 3.5.1 The Fire Assessment – Ground Floor -- 3.5.2 The Fire Assessment – First Floor -- 3.5.3 The Temperature Assessment – the East External Wall -- 3.5.4 The Temperature Assessment – the West External Wall -- 3.5.5 The Temperature Assessment – the North External Wall -- 3.5.6 The Temperature Assessment – the South External Wall -- 4.0 Summary of the Experiment.

---

## Sommario/riassunto

This book addresses the performance of a multi-storey timber building subjected to a model fire that represents a real, potentially devastating internal fire. Readers will learn about factors concerning fire hazards in buildings; the mechanisms of how fires start and spread; and the degrading impact of fire on wood and wood-based materials, especially their mechanical properties. The book also discusses the fire resistance of timber buildings and the design principles for fire safety, summarised in Eurocodes. In turn, a fire test on a full-size wooden structure demonstrates the principles discussed. The test makes up an essential part of the book, as to its individual steps: the development, planning, execution and subsequent assessment. This is complemented by detailed temperature monitoring at hundreds of individual spots and the reaction of the wood constructions, illustrated in extensive photo documentation. The temperature and fire development presented there show the fire's initial mechanism and its further behaviour in a wood construction. The test proved the feasibility of fire protection and safe design of timber buildings, offering insights that can be generally applied in research, material and construction development. Accordingly, the book will be especially useful for architects, building and fire engineers, as well as researchers dealing with the fire performance of timber buildings.

---