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Nota di contenuto	FIRE AND SMOKE: UNDERSTANDING THE HAZARDS -- Copyright -- ACKNOWLEDGMENTS -- PREFACE -- Contents -- EXECUTIVE SUMMARY -- HAZARD ASSESSMENT VS. RISK ASSESSMENT -- ASSESSMENT OF FIRE HAZARD -- THE TESTING OF COMBUSTION-PRODUCT TOXICITY -- CONCLUSIONS AND RECOMMENDATIONS -- INTRODUCTION -- 1 FIRE DEATHS IN THE UNITED STATES -- SCOPE OF THE PROBLEM -- CAUSES OF FIRE DEATH -- THE CONTEMPORARY FIRE ENVIRONMENT -- 2 A PRIMER ON FIRE AND FIRE HAZARD -- THE BURNING PROCESS -- A TYPICAL COMPARTMENT FIRE -- FIRE HAZARD ASSESSMENT -- DEFINITIONS:RISK AND HAZARD -- QUANTIFYING HAZARD -- TIME NEEDED FOR ESCAPE -- TIME AVAILABLE FOR ESCAPE -- BURNING OF A SINGLE ITEM -- BURNING OF MULTIPLE ITEMS -- 3 STATUS OF FIRE HAZARD MODELS AND TEST METHODS -- INTRODUCTION -- DETECTION MODELS -- MODELS FOR TIME AVAILABLE FOR ESCAPE -- THE HARVARD MODELS -- OTHER TWO-LAYER MODELS -- FIELD MODELS -- EXAMPLE OF CALCULATIONS FOR MODEL FOR TAE -- MODELS FOR TIME NEEDED FOR ESCAPE -- TEST METHODS FOR MODEL

INPUT DATA -- BURNING RATE -- RATE OF PRODUCTION OF SMOKE AND TOXICANTS -- TOXICITY DATA -- IGNITABILITY -- SUMMARY -- 4 HAZARDS ASSOCIATED WITH FIRES -- HEAT -- OXYGEN DEPLETION -- SMOKE -- WATER -- PARTICLES (SOOT AND AEROSOLS) -- GASES -- Carbon Dioxide -- Carbon Monoxide -- Hydrogen Cyanide -- IRRITANTS -- Hydrogen Chloride -- Hydrogen Fluoride -- Sulfur Dioxide -- Nitrogen Dioxide -- Hydrogen Sulfide -- ALIPHATIC AND AROMATIC HYDROCARBONS -- FREE RADICALS -- INTERACTIONS AMONG COMPONENTS -- HEALTH EFFECTS OF SMOKE INHALATION ON HUMANS EXPOSED TO FIRES -- IMMEDIATE EFFECTS -- EARLY POSTEXPOSURE EFFECTS -- LONG-TERM SEQUELAE -- Long-Term Sequelae after Single Exposures -- Long-Term Sequelae after Repeated Exposures -- Cancer -- SUMMARY -- 5 LABORATORY METHODS FOR EVALUATION OF TOXIC POTENCY OF SMOKE -- USE OF COMBUSTION-PRODUCT TOXICITY TESTS: TO SCREEN OR NOT TO SCREEN. CHEMICAL ANALYSIS VS. BIOLOGIC ASSAY -- TEST METHODS THAT USE DEATH AS AN END POINT -- BIOASSAY OF SMOKE POTENCY -- LIMITATIONS IN USE OF BIOLOGIC DATA -- GERMAN DIN 53 436 METHOD -- NATIONAL BUREAU OF STANDARDS METHOD -- UNIVERSITY OF PITTSBURGH METHOD -- COMPARISON OF TEST METHODS -- Acute Toxicity -- Anatomic Changes -- Test Subjects -- Physical Test Characteristics -- Furnace Dimensions -- Heat Transfer and Oxygen Availability -- Heating Regimen -- Combustion Chamber Atmosphere -- Exposure System -- Physical Artifacts -- Comparison of Data from NBS and Pittsburgh Tests -- COMPARISON OF TEST METHODS WITH GUIDELINES FROM 1977 NATIONAL RESEARCH COUNCIL REPORT -- TEST METHODS THAT USE NONLETHAL END POINTS -- FACTORS THAT IMPEDE ESCAPE -- OBSERVATIONAL METHODS -- Motorized Activity Wheels -- Hind-Leg Flexion -- Sensory Irritation and Physiologic Stress -- OTHER METHODS -- Unsignaled-Shock Avoidance/Escapes -- Water-Reinforced Task -- Rotorod with Electrified Grill Floor -- Multisensory Conditioned Pole-Climb Avoidance -- Analysis of Use of Bronchoalveolar Lavage Fluid to Detect Acute Nonlethal Lung Toxicity -- SUMMARY -- 6 GUIDELINES FOR HAZARD ASSESSMENT: CASE STUDIES -- CASE STUDY 1: BURNING OF AN UPHOLSTERED CHAIR -- STEP 1: DEFINING SCENARIOS -- Environment -- Fuel and Ignition -- Conditions of Exposure -- STEP: COMPUTING TAE AS A FUNCTION OF FIRE AND SMOKE PROPERTIES -- Fire Model -- Burning of Upholstered Furniture -- Results of Calculations -- STEP 3: DECIDING ON MINIMAL ACCEPTABLE TAE -- STEP 4: SPECIFYING FIRE AND SMOKE PROPERTIES -- CASE STUDY 2: CONCEALED COMBUSTIBLE MATERIAL -- STEP 1: DEFINING SCENARIOS -- STEP 2: COMPUTING TAE AS FUNCTION OF FIRE AND SMOKE PROPERTIES -- Fire Buildup in Room -- Thermal Condition Behind Wall -- Response to Thermal Conditions Behind the Wall -- Contribution of Two Fires to Smoke. STEPS 3 AND 4: DECIDING ON MINIMAL ACCEPTABLE TAE AND SPECIFYING FIRE AND SMOKE PROPERTIES -- SUMMARY -- DEFINING THE SCENARIO -- RELATING TAE TO FIRE PROPERTIES OF MATERIALS -- SELECTING MINIMAL ACCEPTABLE TAE -- SPECIFYING PRODUCT PERFORMANCE -- REFERENCES.
