



**CHAIR:** Paola Russo, Sapienza University of Rome

**VENUE:** Faculty of Civil and Industrial Engineering, Sapienza University of Rome, Italy

Time	Sunday, June 15
16.00 / 19.00	Registration
17.30 / 19.30	Welcome cocktail
Time	Monday, June 16
08.30	Registration
	<b>Room Chiostro</b>
09.20/10.00	<p><b>Opening Session</b></p> <p><b>Paola Russo</b> Chair</p> <p><b>Carlo Massimo Casciola</b> Dean of the Faculty of Civil and Industrial Engineering, Sapienza University of Rome</p> <p><b>Paolo De Filippis</b> Head of Department of Chemical Engineering, Materials and Environment, Sapienza University of Rome</p> <p><b>Giulia Monteleone</b> Director of ENEA Dept. of Energy, Technologies and Renewable Energy Sources</p>

10.00/11.00	<b>PLENARY LECTURE</b> <b>Progress in Computational Hydrogen Safety: Overview of Selected Problems</b> Vladimir Molkov	
11.00/11.30	Coffee break and poster viewing	
11.30/12.20	<b>HIGHLIGHTED PRESENTATIONS</b> <b>HYDROGEN SAFETY</b>	
11.30/11.55	<b>Thermal effects in concrete slabs impacted by impinging hydrogen jet flames</b> <u>Markert Frank</u> , Sørensen Lars Schjøtt, Liu Wenqian, Gaathaug Andre Vagner, Lach Agnieszka W. 68	
11.55/12.20	<b>Numerical investigation on the pressure multi-peaks structure of a LH2 storage tank “BLEVE”</b> <u>Cirrone Donatella</u> , Makarov Dmitriy, Molkov Vladimir 112	
12.20/14.00	Lunch	
	<b>Room Chiostro</b>	<b>Room 1</b>
14.00/15.40	<b>HYDROGEN SAFETY I</b>	<b>BATTERY SAFETY I</b>
14.00/14.20	<b>Experimental results and comparison with FLIC model of delayed ignition of impinging under expanded hydrogen jet on pipe geometry in open atmosphere</b> <u>Lach Agnieszka</u> , Lundberg Joachim, Vågsæther Knut 119	<b>Unveiling the relationship between the energy released during thermal runaway of Li-ion cells and their stored electrical energy</b> Dubourg Sébastien, Rochard Thibaut, Marteau Daniel, <u>Bengaouer Alain</u> , Brun-Buisson David, Reytier Magali, Vincent Rémi 45
14.20/14.40	<b>Numerical modelling of dynamic flashing behaviour in the release of ammonia from pressurised vessel</b> Sivaraman Srinivas, Cirrone Donatella, <u>Makarov Dmitriy</u> , Truchot Benjamin, Molkov Vladimir 60	<b>Analysis of ventilation parameters for explosion risk mitigation in Li-ion battery rooms</b> <u>Olsø Brynhild Garberg</u> , Alonso Maria Justo, Risholt Birgit, Karchniwy Ewa Malgorzata 71

14.40/15.00	<b>The impact of hydrogen concentration on the explosion risk of a biogas-hydrogen-air mixture</b> <u>Kim Joonsik</u> , Kim Wookyung, Kang Chankyu, Park Byungjik, Yoon Unggi, Kim Yangkyun 20	<b>Comprehensive Modeling of Lithium-Ion Batteries Thermal Runaway Behavior</b> <u>Chakaroun Sirar</u> , Coste Pierre, de Persis Stéphanie, Bengaouer Alain, Cognard Jerome, Chaumeix Nabiha 81
15.00/15.20	<b>Safe operation of gas fires and cooker hobs on hydrogen</b> <u>Andrews G.E.</u> , Quinonez Ramon, Massey R., Phylaltou H.N., Wakeman R., Maxfield J., Smith S. 144	<b>Flame heat emissions in 18650-type lithium-ion battery thermal runaway with thermally active particles</b> <u>Sadeghi Hosein</u> , Restuccia Francesco 7
15.20/15.40	<b>Numerical Experiments on Flame Geometry and Thermal Heat Fluxes on Surfaces of New Hydrogen Trailer Using FDS Software</b> <u>Dréan Virginie</u> , Rengel Borja, Soubeyran Aurelien, Bernard Laurence, Paris Laurent, Guillaume Eric, Paping Philippe 37	<b>Exploring the thermal stability of NaNi<sub>1/3</sub>Fe<sub>1/3</sub>Mn<sub>1/3</sub>O<sub>2</sub> cathode for sodium ion batteries</b> <u>Gan Yixiu</u> , Gao Wei 33
15.40/16.10	<i>Coffee break and poster session</i>	
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16.10/16.30	<b>Understanding the conceptual sLH2 Refuelling Protocol: Importance of Restriction on the Initial Mass Flow Rate</b> Ebne-Abbasi Hazhir, <u>Makarov Dmitriy</u> , Molkov Vladimir 95	<b>Quantifying the Hazard from E-Scooter Explosions in a Residential Scale Compartment</b> <u>Fleischmann Charles</u> , Madrzykowski Daniel 140
16.30/16.50	<b>Enhancing Hydrogen Safety and Streamlining Permit Processes: A Preliminary Investigation into Permitting Hydrogen Refueling Stations in Norway</b> <u>Claussner Lucas</u> , Faisal Muhammad, Ustolin Federico 145	<b>State of the Art and Safety Challenges of Lithium-ion Batteries in Underground Mining Operations</b> <u>Jahn Wolfram</u> , Fernanda García, Caro Rodrigo, Ramirez Gonzalo, Rivera Juan de Dios, Walker-Ravenna Carlos 51
16.50/17.10	<b>Performance of standard and self-venting conformable hydrogen storage systems in fires</b> <u>Kashkarov Sergii</u> , Molkov Vladimir 49	<b>Characteristics of Gas Venting and Detection During Thermal Runaway of LiFePO<sub>4</sub> Battery</b> Huang Po-Hsun, Huang Yi-Peng, Yeh Li-Yu, Peng Hsiang-Ching, Tsai Hsiao-Yun, <u>Chen Jenq-Renn</u> 115

17.10/17.30	Operational safety analysis for prototype hydrogen production via PEM <u>Iorjani Sasan</u> , Testi Matteo 41	Physics-Based Model to Quantify the Fire Hazard of Lithium-Ion Batteries Based Energy Storage Systems Hodges Jonathan, Kapahi Anil, <u>Kraft Stefan</u> 42
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11.50/12.10	Can Fluidized Bed Reactor Technology Provide a Novel Solution for Measuring Dust Flammability/Explosion Parameters? <u>Di Benedetto Almerinda</u> , Portarapillo Maria, Sanchirico Roberto 122	Firebrands-Induced Cavity Development in Pressure Treated Wood Decking <u>Mohamed Mohamed</u> , Penman Trent, Filkov Alexander 25

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14.00/15.40	<b>INDUSTRY-SPECIFIC FIRE AND EXPLOSION RESEARCH: RENEWABLE ENERGY, AEROSPACE, OIL AND GAS, NUCLEAR, PROCESS INDUSTRY</b>	<b>WILDLAND FIRES II</b>
14.00/14.20	<b>Effects of Underwater Explosions: A Small-Scale Study with High-Speed Imaging</b> <u>Trelat Sophie</u> , Sturtzer Michel 56	<b>Review of the Interaction between Extreme Climate and the Wildfires Spread</b> <u>Ran Dezhi</u> , Wang Yu 83
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14.40/15.00	<b>Experimental Study of Burning Rate and Flame Pulsation of Fires Considering the Interactions between a Thin Layer Pool and an Oil Tank</b> <u>Fang Lulu</u> , Fang Jun, Hu Yong, Tao Shangqing 43	<b>Experimental and Numerical Study on Flashovers Induced by VOC Accumulations in Forest Valley</b> <u>Wang Hui Ying</u> , Jamaladdeen Rawaa, Coudour Bruno, Garo Jean Pierre 16

15.00/15.20	<b>Full-scale pool fire plume characteristics in the 800 kV transformer station surrounded by the U-shaped firewalls</b> <u>Zhu Xiaolong</u> , Zhao Jiangyue, Hu Shi, Cheng Kaige, Pan Chuanyu, Wang Xishi 32	<b>Quantifying Burning Dynamics in Wildland Surface Fires: An Experimental and Computational Analysis</b> <u>Ziazi Reza</u> , Selvaraj Muthu Kumaran, Porwal Sumukh, Singh Abhinandan, Simeoni Albert 101
15.20/15.40	<b>Inspection activity after a major accident: the case of handling flammable substances</b> <u>Marrazzo Romualdo</u> , Bragatto Paolo 6	<b>CFD Modeling of Wildfire Suppression Operations: A Case Study of Ischia Island</b> <u>Galuppi Marta</u> , Berardi Davide, Lombardi Mara 15
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16.10/16.30	<b>Combustible Dust Management: Regulatory Frameworks and best practices to improve safety in the industries</b> <u>Panico Alessandro</u> , Tonelli Giovanni 116	<b>Flame spread in large compartment experiments: comparison of Obora and CodeRed</b> <u>Mitchell Harry</u> , Rackauskaite Egle, Amin Rikesh, Kotsovinos Panagiotis, Rein Guillermo 65
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09.00/10.00	<b>PLENARY LECTURE</b> <b>Computational Fluid Dynamics from Explosion of Atomic Bomb to New Concept of Space Propulsion</b> Akiko Matsuo	
10.00/10.50	<b>HIGHLIGHTED PRESENTATIONS</b> <b>FIRE AND EXPLOSION MODELLING IN COMPUTER CODES</b>	
10.00/10.25	<b>Uncertainty of Calorimetry Measurement for Medium-scale Fire Experiments</b> Chaudhari Dushyant M, <u>Dow Nicholas</u> 97	
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11.40/12.00	<b>A mesoscale CFD model to simulate wood combustion</b> Banagiri Shrikar, Khadakkar Ishanee, Parameswaran Manjunath, Meadows Joseph, <u>Lattimer Brian</u> 100	<b>Blast effect of sand-buried explosive charges</b> <u>Sturtzer Michel</u> , Trélat Sophie, Gilbert Franck 58

12.00/12.20	<b>Numerical Investigation on Blast Waves of Atomic Bombing of Nagasaki</b> <u>Nakajima Kenta</u> , Matsuo Akiko 24	<b>Effects of obstacle tilted angle and blockage ratio on the vented ethanol-gasoline vapor explosion in a small-scale channel</b> <u>Zhao Jiang Yue</u> , Pan Chuan Yu, Wang Xi shi 28
12.20/12.40	<b>Modeling Monodispersed Water Droplets in Hydrogen Deflagration using OpenFOAM</b> <u>Lande Anne Marie</u> , Lundberg Joachim, Henriksen Mathias 99	<b>Effect of Vent Geometry on Dust Explosion Venting Efficiency</b> <u>Bloching Marius</u> , Boeck Lorenz R., Lottermann Johannes, Becker Dominik, Bunse Roland, Slaunwhite Jeramy, Siwek Richard 72
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14.00/14.25	<b>Experimental observations of Shock-flame interaction</b> Roque Ccacya Anthony, Idir Mahmoud, <u>Chaumeix Nabiha</u> 125	
14.25/14.50	<b>Predictions of Blast Pressure Intensity in Open Space Gas Explosions</b> <u>Dobashi Ritsu</u> , Kaneko Kazumasa, Mogi Toshio 85	
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14.50/16.10	<b>FIRE AND EXPLOSION MODELLING IN COMPUTER CODES II + EVACUATION</b>	<b>DEFLAGRATION, DDT, DETONATION AND THEIR MITIGATION II</b>
14.50/15.10	<b>Modeling Occupant Risk during Fire Growth and Evacuation using a System Dynamics Approach</b> <u>Dueñas Santana Julio Ariel</u> , Van Coile Ruben, Salzano Ernesto, Di Benedetto Almerinda 30	<b>Experimental and theoretical study on the explosion venting behaviors of ammonia/hydrogen/air in a large aspect ratio duct</b> <u>Yu Jialing</u> , Cheng Kaige, Wang Xishi 129



15.10/15.30	<b>A Comparative Analysis of Response Surface Methodology (RSM) and Artificial Neural Networks (ANN) for Predicting Detection Time in Ship Passenger Evacuation</b> <u>Pratama Tezar</u> , Sunaryo Sunaryo 93	<b>DDT in Hydrogen/methane/oxygen Mixtures</b> <u>Ciccarelli Gaby</u> , Chuanyu Pan, Xishi Wang 162
15.30/15.50		<b>Analytical Study of Developing Combustion to Explosion for Explosion Protection Decision Support Systems</b> Volkov Victor 107
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<b>10.00/10.50</b>	<b>HIGHLIGHTED PRESENTATIONS</b> <b>FUNDAMENTALS OF FIRES AND EXPLOSIONS</b>	
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10.25/10.50	<b>IR-Based Analysis of Flame Spread in Open and Ceilinged Room Corner Fire Experiments</b> <u>Belt Alexander</u> , De Lannoye Karen, Fehr Marc, Arnold Lukas 133	
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11.40/12.00	<b>Physical mechanism of formation and evolution of tulip flames: the role of flame-pressure waves collisions and tubes aspect ratios</b> <u>Mikhail Liberman</u> , Qian Chengeng 4	<b>Experimental Study of Aerosol Fire Protection in Enclosure with Openings</b> <u>Zhou Xiangyang</u> , White James, Fuglsby Jason 22
12.00/12.20	<b>Neural network for real-time estimation of solid phase pyrolysis parameters</b> <u>Lázaro David</u> , Lázaro Mariano, Alvear Daniel, Jiménez Miguel A., Morgado Eugenia 61	<b>Inert Gas Extinguishing Systems: Emphasizing Extinguishment</b> <u>Zimak Jon</u> , Simeoni Albert 40
12.20/12.40	<b>Biohydrogen Production from Biowaste: Assessment of the Flammability of Bioreactors Gaseous Mixtures</b> <u>Russo Paola</u> , Lancia Maria Chiara, Lauri Roberto, Gottardo M., Valentino Francesco 150	<b>Comparative Evaluation of Water Foam and Mist Systems in Suppressing Wood Pallet Fires within Road Tunnels</b> <u>Berardi Davide</u> , Galuppi Marta, Lombardi Mara, Stantero Luca, Boffa Natalino, Bezzi Francesco 17
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14.00/14.50	<b>HIGHLIGHTED PRESENTATIONS</b> <b>HYDROGEN SAFETY</b>	

14.00/14.25	<b>Assessment of the distance of effects based on engineering models for a new design of hydrogen trailer</b> <u>Soubeyran Aurélien</u> , Bernard Laurence, Drean Virginie, Rengel Borja, Papin Philippe, Paris Laurent 64	
14.25/14.50	<b>An Experimental Study on the Effect of Equipment Hatch Size on Explosion during Deflagration of Hydrogen-Air Mixture in a Semi-Confined Space</b> <u>Yoon Unggi</u> , Kim Joonsik, Park Byungjik, Hwang Inju, Kim Wookyoung, Kim Yangkyun 57	
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14.50/15.10	<b>Critical Diameter and Flame Stability in Hydrogen-Methane Mixtures</b> Kazemi Mina, Brennan Sile, <u>Molkov Vladimir</u> 62	<b>Advancing on the Flame Spread over electrical wires predictions by using Machine Learning with data categorization and augmentation strategies</b> <u>Rivera Jose</u> , San Martin Daniel, Fernandez-Pello Carlos, Gollner Michael J, Olson Sandra 23
15.10/15.30	<b>Numerical Study on Diffusion Characteristics of Leaked Hydrogen and Associated Safety in the Underground Space with Hydrogen Facilities</b> <u>Shin Hong-Cheol</u> , Hwang Inju, Seo Hyeonseok 124	<b>Experimental analysis of required ignition times of unattended incidents in kitchens</b> <u>Alonso Ipiña Alain</u> , Alvear Portilla Daniel, Lázaro-Urrutia Mariano 67
15.30/15.50	<b>Validation of FDS and FLACS-Fire Codes Against Radiation from Free Horizontal Hydrogen Jet Fires</b> <u>Rengel Borja</u> , Dréan Virginie, Paris Laurent, Guillaume Eric 36	<b>Pyrolysis of Pine in a Nitrogen Atmosphere using the Cone Calorimeter</b> Irshad Aysha, <u>Andrews Gordon</u> , Phylaktou Horodotos, Gibbs Bernard 123
15.50/16.10	<i>Coffee break and poster session</i>	
<b>16.10/17.10</b>	<b>CRITICAL AND TRANSIENT COMBUSTION PHENOMENA II</b>	<b>BATTERY SAFETY III</b>

16.10/16.30	<b>Measuring the External Heat Release Rate from a Large-Scale Fire Compartment using Computer Vision</b> Amin Rikesh, <u>Mitchell Harry</u> , Kotsovinos Panagiotis, Rein Guillermo 52	<b>Quantitative Investigation of Immersion Cooling Agents for Thermal Runaway Suppression</b> <u>Zhang Lei</u> , Liu Yanhui, Ye Congliang, Zhou Yuxin, Su Yanghan, Huang Xinyan 47
16.30/16.50	<b>Fire Behaviour of Biopolymer Soaked by Flammable solvents</b> <u>De Liso Benedetta Anna</u> , Pio Gianmaria, Salzano Ernesto 18	<b>Fire behaviour tests for lithium-ion batteries: A systematic review of battery characteristics, fire test conditions and fire properties</b> <u>Sanfeliu Melia Cristina</u> , Steen-Hansen Anne, Meraner Christoph 87
16.50/17.10	<b>Measurement of Hot Surface Ignition Temperature of Some Low Global Warming Potential (GWP) Refrigerants and Their Blends</b> <u>Imamura Tomohiko</u> , Sawayama Tomoki, Hayamizu Hiroki 53	<b>Measurement of total and temporal heat generation carried by ejected and non-ejected contents during thermal runaway of 18650 lithium-ion batteries</b> Garg Priya, <u>Xiong Gang</u> , Gagnon Lauren, Zeng Dong, Wang Yi, Barlow Robert 91
19.30/22.30	Social Dinner	
Time	Friday, June 20	
	Room Chiostro	
09.15/10.15	<b>PLENARY LECTURE</b> <b>Field-scale Experiments of Wildfires for Fire Behavior</b> Albert Simeoni	
10.15/10.35	<b>Greetings and Introduction to the Activities of the Italian Fire Corps</b> Eros Mannino Chief of National Fire and Rescue Corps	
10.35/11.00	Coffee break	
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<b>11.00/11.50</b>	<b>HIGHLIGHTED PRESENTATIONS</b> <b>BATTERY SAFETY</b>	
11.00/11.25	<b>Insights on thermal runaway and fire propagation in a lithium-ion battery energy storage system</b> <u>Cuevas Juan</u> , Zeng Dong, Wang Yi 44	
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<b>11.50/12.40</b>	<b>WILDLAND FIRES III</b>	<b>BATTERY SAFETY IV</b>
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12.10/12.20	<b>Laboratory Investigation of Smouldering Combustion of Boreal Peat from Thurso UK: Effect of Particle Size</b> <u>Mulyasih Hafizha</u> , Tarasi Dimitra, Voulgarakis Apostolos, Rein Guillermo 94	<b>Flammability properties of Lithium-ion battery vent gas under different intial conditions</b> Ubaldi Sofia, <u>Russo Paola</u> 121
12.20/12.40	<b>Ignition and Spread of Smouldering in Subantarctic Peat from Falkland Islands</b> <u>Walker-Ravena Carlos</u> , Mulyasih Hafizha, Elliott Andy, Rein Guillermo 108	<b>Numerical Modeling of Premixed Combustion and Flame Acceleration of Li-ion Battery Thermal Runaway Gases</b> <u>Alison Paul</u> , Beccantini Alberto, Kudriakov Sergey, Bengaouer Alain, Tenaud Christian 35
<b>12.40/13.15</b>	<b>Closing session. Best presentation/poster awards</b>	

## POSTERS

Poster Session June 16 and 17

Poster number	Title	Authors
1	<b>171 - Development of a hydrogen fire burner for testing aircraft materials and components</b>	Hidalgo Juan P., Dier Florence, Carrascal Jeronimo
2	<b>172 - Experimental study on reducing overpressure of hydrogen gas explosion using water mist</b>	Park Byoungjik, Kim Yangkyun, Yoon Unggi, Kim Joonsik
3	<b>173 - Experimental and Analytical Study on Hydrogen-air Deflagrations in Open Atmosphere</b>	Yangkyun Kim, Park Byungjik, Yoon Woonggi, Kim JoonSik, Hwang In-Ju, Wookyung Kim
4	<b>142 - Investigating the Thermal Hazard to the Immediate Surroundings of a Burning Electric Vehicle</b>	Dehghani Parham, DiDomizio Matthew, Sauer Nathaniel, Barowy Adam
5	<b>158 - Quantitative Analysis of Flames Generated by Li-ion Battery Thermal Runaway</b>	Sponem Léa, Bengaouer Alain, Dubourg Sébastien, Kawka Sébastien, Koudriakov Sergey, Reytier Magali
6	<b>159 - A simplified methodology to enhance efficiency in numerical simulation of thermal runaway in Li-ion batteries for safety applications</b>	Yhuel Emilie, Bengaouer Alain, Kawka Sebastien
7	<b>156 - CFD-based Risk Analysis in Natech Scenarios for Hythane distribution infrastructure</b>	Capasso Elena
8	<b>160 - When Lightning Strikes: Risk Analysis of a Major Accident at the Matanzas Hydrocarbon Facility</b>	Dueñas Santana J.A, Salzano E., Di Benedetto A., Van Coile R.
9	<b>126 - CFD SIMULATIONS OF H<sub>2</sub>/CH<sub>4</sub>/H<sub>2</sub>S DISPERSION AND CONSEQUENCES FOR THE RISK ANALYSIS OF LARGE SCALE H<sub>2</sub> STORAGE</b>	Enicchiario Domenico, Portarapillo Maria, Polidoro Franco, Di Benedetto Almerinda
10	<b>128 - Risk assessment of Integrated Fuel Cell Systems for Rail Transport</b>	Portarapillo Maria, Bellucci Sessa Augusto, Di Benedetto Almerinda

11	<b>143 - On Measurements, and Modeling of Diffusion Flames Temperatures Aboard the International Space Station</b>	Dehghani Parham
12	<b>176 - Lift-off and blowout behavior of non-premixed turbulent jet flames with hydrogen-blended natural gas under sub-atmospheric pressure</b>	Tang Fei, Zhu Nannan, Fan Xinyang, Peng Xinyu, Hu Longhua
13	<b>170 - Overpressure Resistance in Structures Subject to Energetic Materials Deflagrations</b>	Paquet Frederick, Paquet Mario
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2	<b>167 - Estimation of Fuel Characteristics and Adaptation of Fuel Maps for the WRF-SFIRE Model in Tropical Peatlands</b>	Katashima Kei, Kobayashi Takuma, Takayama Naru, Segah Hendrik
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6	<b>106 - Analysis of vented dust explosions in large silos using CFD simulations</b>	Varela Alejandro, Tascón Alberto
7	<b>118 - High-Confinement Explosion Analysis in a Residential Building: A Comparative Study of TNO Model Estimates and Real Gas Consumption Data</b>	Puccia Vincenzo
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