Luca Marmo et al., J Forensic Res 2014, 5:6
http://dx.doi.org/10.4172/2157-7145.S1.013

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference on
Forensic Research and Technology
October 06-08, 2014 Hilton San Antonio Airport, USA

Reconstruction of the dynamics of a huge fire in a steel-rolling plant: Methods of investigation

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The authors of this paper are the technical experts that were entrusted by the Public Prosecutor to conduct the technical inquiry into the accident that occurred in the Thyssen Krupp plant in Torino on December 6, 2007. Here the inquiry methods are discussed and the main results of the investigation are presented. This was a complex accident which involved the unrolling unit of a pickling and annealing line. No previous similar accidents were reported in the literature. Hence this was an unusual accident that implied a complex investigation. From this episode very important lessons for the steel industry can be learnt. The fire first started as a small localized fire that induced the eight workers on duty to try to extinguish the fire. Suddenly, a violent jet fire occurred. Seven workers suffered very serious burns, one died instantaneously while the other six did during the next month. The investigation was multidisciplinary. The main aspects were: Data collection from PLC and their interpretation, material properties study, witnesses' collection, damages examination. Also some CFD simulations made using FDS were used to investigate the fire dynamics and the magnitude of the effects. Cross linking of the evidences was the main instrument that allowed distinguishing among the different hypothesis on the accident dynamics. Also this process lead to define the root causes of the accident and the weakness of the plant and of the management system of the company.

Biography

Luca Marmo is Professor of "Safety of industrial processes" at Politecnico di Torino. He is a Chemical Engineer and PhD in Chemical Engineering. Since 20 years he has worked as technical expert in Court. He investigated more than 100 fire and explosions that occurred in civil buildings and industrial plants. He has research experience in the field of chemical reactors, loss prevention and dust explosion. He is the Director of the Center for safety of flammable atmosphere of the Politecnico di Torino.

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