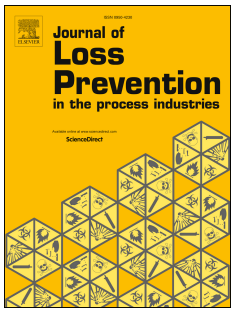
Accepted Manuscript



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PII: S0950-4230(17)30320-0

DOI: 10.1016/j.jlp.2017.06.021

Reference: JLPP 3549

To appear in: *Journal of Loss Prevention in the Process Industries*

Received Date: 31 March 2017

Revised Date: 27 June 2017

Accepted Date: 30 June 2017

Please cite this article as: Fouchier, C., Laboureur, D., Youinou, L., Lapebie, E., Buchlin, J.M., Experimental investigation of blast wave propagation in an urban environment, *Journal of Loss Prevention in the Process Industries* (2017), doi: 10.1016/j.jlp.2017.06.021.

Experimental investigation of blast wave propagation in an urban environment

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Abstract

Experimental studies of blast propagation in urban environments are described in the literature, but only a few studies at laboratory scale were found while this scale option represents an economical and safe approach. Experimental investigations on blast wave propagation in a complex environment using gram-range explosive charges are proposed in this paper.

Five experimental configurations, built with wood boxes on a 2.8 m wood table, are tested in a 1:200 reduced scale using three types of condensed phase explosives. Several characteristics of the explosives are given: the geometry of the explosion, the repeatability, and the TNT equivalent.

An overview of impacts of a complex environment on the blast wave characteristics is proposed. The urban configurations investigated are the straight street, the T-junction, the cross junction, and the channeling. Investigations on reduced-scale effects on blast measurement and characteristics are detailed.

Keywords: Blast wave, explosions, lab-scale experiments, TNT

1. Introduction

As long as explosives represent a threat, understanding the explosion mechanism and its consequences in cities will remain an important issue. Examples of tragedies caused by explosions are numerous. The Oklahoma terrorist attack, United States, 1995, is one of them. A truck filled with handmade explosive exploded, heavily damaging the Alfred P. Murrah Federal Building. The effect