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**A CASE STUDY OF NATURAL GAS EXPLOSION CHARACTERISTICS
IN A SEMI-CONFINED BUILDING**

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ABSTRACT

Natural gas is a widely used energy source in daily life and industrial production. However, gas explosion accident is not uncommon in the world, and often causes huge casualties and economic losses. Especially, the load magnitude would be sufficiently boosted when the gas explosion occurred in confined or semi-confined space. This paper takes the gas explosion accident that occurred on 13 June 2021 in a market in Shiyan China as an example to investigate the explosion load characteristics. First, the detailed building model was established and the gas cloud was distributed in line with the accident report. Thereafter, the gas cloud was ignited and the explosion process was simulated by FLACS, and the explosion load profile was obtained simultaneously. Finally, the simulated loads were compared with this predicted according to the TNT-equivalency method suggested by UFC 3-340-02. The results indicated that the building damage situation predicted by FLACS agrees well with the accident scenario. The TNT equivalency method overestimates the peak pressure seriously and gives a significantly distinct load profile compared to FLACS predicted load.

Keywords: Natural gas, explosion load characteristics, CFD