

Quantitative Risk Analysis of Explosion by CFD-Based Explosion Simulation

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In this research, we compared the safety of mixture fuel against existing fuel in the perspective of explosion risk that would be the biggest concern in the operation of new-energy stations. The explosion risk was analyzed and compared by three representative models: empirical model, phenomenological model, and a CFD-based model, in increased model complexity and computational efforts. Overpressures of explosion of mixture and existing fuel, respectively, showed similar results, in all three models. Thus, it seems like there is no additional risk in using mixture at the existing refueling facilities. CFD-based explosion simulation was useful in finding out the exact overpressure distribution and installation of prevention equipment if necessary. Also, results of CFD model are compared with matlab code that calculate a overpressure from TNT model and propagation of explosion overpressure.