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PROCEEDINGS

Comparison of Results Used Smooth Particle Hydrodynamics Method and Lagrange Method Based on Segmental Uncoupled Charge

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ABSTRACT

SPH method is widely used to study the dynamic response of metal casing under explosive loading because of its superiority in simulating metal fracture phenomenon [1-3]. The distribution of the fragment from uncoupled charge structures with segmental shaped explosive were studied. The X-ray photographic images of fragmentation obtained from explosion experiment were compared with the numerical results based on SPH method and Lagrange method. The fragmentation shows that the numerical results based on the Lagrange method are in good agreement with the experimental results while some errors appear in results based on SPH method. The velocity of the fragments at the bottom of the casing in the SPH results is 28.4% lower than that of the experimental results and Lagrange results. The velocity distribution curve shows that surge of velocity appears in the range from -90° to – 85°, where the difference between two numerical methods occurred. In this paper, the differences between SPH method and Lagrange method were obtained and the mechanism of the differences involved is revealed. The conclusion provides a reference for the application of meshless methods in the research of metal materials under explosive loading.

KEYWORDS

SPH method; lagrange method; explosion; X-ray photography
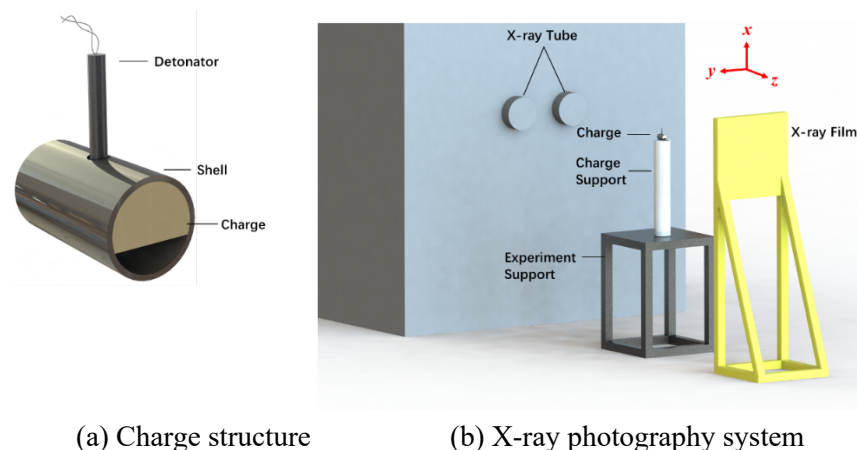
(a) Charge structure   (b) X-ray photography system
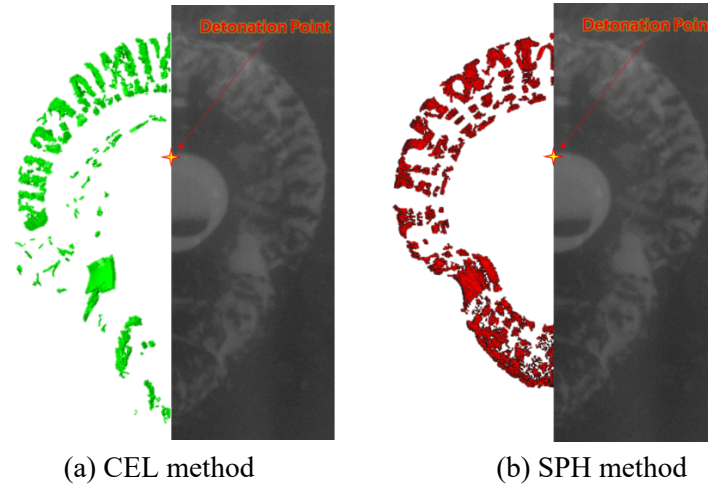
Figure 1: The schematic diagram of the experiment

(a) CEL method   (b) SPH method

Figure 2: Comparison between numerical results and experimental results

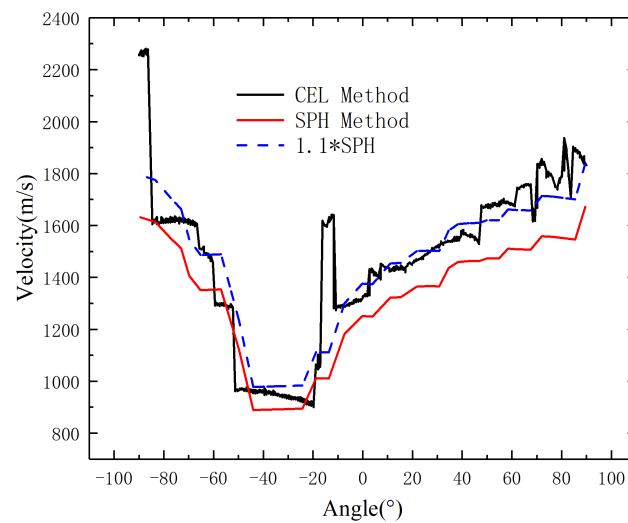**Figure 3:** Comparison of results between SPH method and CEL method

Figure 4: The schematic diagram of the experiment

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.

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