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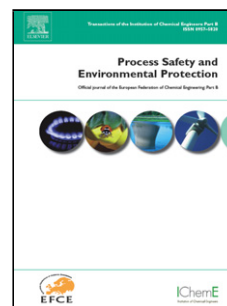
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# Buckling failure of a buried pipeline subjected to ground explosions

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## Highlights

- Bulking mode of buried pipeline under ground explosion was investigated.
- Buried pipeline in rock layer is more prone to failure than in soil layer.
- A dent appears on the upper part of the buried pipeline under explosion load.
- The pipeline deformation process only lasted for 0.03s.
- Empirical formulas can be used to predict the pipeline's strain and dent rate.

**Abstract:** Ground explosions are one of the threats to the structural integrities of buried pipelines. To investigate failure modes of buried pipelines subjected to ground explosions, numerical calculation models of buried pipelines in soil and rock layers were established. The stress, strain, plastic deformation and failure modes of the buried pipeline were investigated. The effects of the explosion magnitude, diameter-thickness ratio, burial depth, explosion height and explosion offset on the failure behaviour of the pipeline in the rock layer were studied. The results showed that the pipeline deformation process only lasted for 0.03s. The high stress zone and plastic strain zone were present in the upper part of the

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