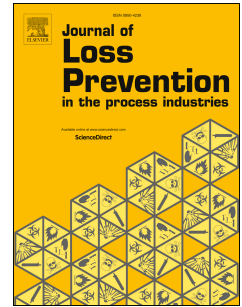


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Response of the buried steel pipeline caused by perilous rock impact: Parametric study

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Abstract One of threatening buried steel pipeline in bad geological regions is collapsed rock. Buckling behavior of a buried pipeline impacted by a perilous rock with spherical shape was investigated by numerical simulation. Effects of pipeline parameters (internal pressure, wall thickness, diameter, buried depth) and perilous rock parameters (impact velocity, radius, eccentric distance) on deformation, stress and strain of the buried pipeline were discussed. Buckling behaviors of the buried pipeline under transverse and longitudinal inclined impacts also were studied. The results show that cross section shape of the buried pipeline becomes to an oval, then to a peach shape, and finally to a crescent shape or gourd shape in the process of rock's impact. The deformation process of a buried pipeline can be divided into four stages. They are elastic deformation stage, buckling stage, elastic recovery stage and final deformation stage. Buckling mode of no-pressure pipeline is more serious than the pressure pipeline. The impact dent's length and depth increase with the decreasing of buried depth, wall thickness and internal pressure. But they increase with the increasing of impact velocity, perilous rock's radius and pipeline's diameter. The

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