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## Investigation of the behavior of Liquid on Pressure in Buried Pipe under Blast

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### ABSTRACT

In this study, a parametric study on buried pipes under soil was performed as a result of blast loading. Effects of various parameters such as physical properties of water, oil, air, soil, pipe and T.N.T have been investigated. The arbitrary Lagrangian-Eulerian (ALE) method was employed using LS-DYNA software. The maximum pressure in a buried pipe explosive was seen when the angle was about 0° to 45° and the minimum pressure occurred when the angle was about 45° to 90°. Therefore, all figures in this study illustrate that pressure of fluid in buried pipes can help in stabilizing pipes.

**Keywords:** Buried pipe, ALE, Blast, Pressure, Ls-Dyna

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### 1. INTRODUCTION

Anirban studied the effect of surface blast on dry and cohesionless soil. He applied the ALE method and concluded that metal behavior of soil in the large deformation has an important parameter influence on analysis [1]. Liquid explosion tests are performed in large tunnels due to limited testing conditions, funding, methods, and other various reasons. So, many researchers carried out tests in vessels and pipelines with small scales in the laboratory [2]. Blanchard et al investigated explosions in an 18-m long DN150 closed pipe with a 90 bend. It was demonstrated that the bend in a long tunnel could obviously improve flame speeds and overpressures, as well as shorten the run-up distance to DDT [3]. The effect of variation in the distribution of liquid on explosion propagation characteristics was also investigated in experimental channels [4]. Various countries are actively exploring oil tank and oil and gas pipeline safety protection technology since the last century, by producing two types of explosion suppression materials or products such as metal [5].