

A study on the minimum separation distances between building and high-pressured natural gas pipeline

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If the natural gas is accidentally released and ignited, the hazard distance associated with pipelines to people and property is known to range from under 20 m for a smaller pipeline at lower pressure, up to over 300m for a larger one at higher pressure. Therefore, the minimum separation distance is not meaning the safe separation distance from potential harm due to accident of pipeline but rather an added measure to reduce the probability of incident due to third party activity or anything else.

In this work, the consequences of accident have been studied by using reasonable accident scenarios based on historical accidents and the size of hole on the pipeline is analysed by using the fracture mechanism of natural gas pipeline. When the size of a hole on the pipeline is grater than a critical size, the pipeline may be ruptured by propagating the crack. The critical size is estimated under the design criteria of the steel pipeline for high pressured natural gas pipeline in Korea. By combining the results of consequence analysis and fracture mechanism analysis, we propose a reasonable criterion for the minimum separation distance between building and natural gas pipeline.