

## Optimal multi-floor plant layout based on the mathematical programming

이창준\*

부경대학교 안전공학과

(changjunlee@pknu.ac.kr\*)

In the fields of researches associated with plant layout optimization, the main goal is to minimizing the costs of pipelines for connecting equipments. However, what is lacking of considerations in previous researches is to handle safety distances for preventing domino impacts on a complex plant. The mathematical programming formulation can be presented as considering safety distances and economic benefits for solving the multi-floor plant layout problem. Under the risks of physical explosion, the safety distance must be considered to generate more reasonable and safe plant layouts. To consider the safety distance, a consequence analysis is employed to calculate the probability curve for the explosions of all equipments. The objective function of this study is the combination of the costs (piping costs) and explosion impacts under a given process. MILP (Mixed Integer Linear Programming) solvers can be performed to determine the optimal multi-floor process plant layout. The liquefaction process of an LNG-FPSO is illustrated to verify the efficacy of this study.