

Time-variant fence monitoring system for detection of toxic and flammable gases using fixed and mobile sensors

곽동호, 신동일^{1,†}

명지대학교; ¹명지대학교 화학공학과

(dongil@mju.ac.kr[†])

It is important to monitor chemical plants to prevent big accident such as Gumi hydrofluoric acid leak. Huge chemical leak can affect not only inside of plant but also outside, even people who live near the plant. To prevent it, it is recommended to set up the fence monitoring system. It also can work as a secondary protection layer. We can cover all fences of plants with a large number of sensors, but both reliability and cost efficiency have to be considered simultaneously. In this study, we design a time-variant monitoring system using mobile sensors and placement optimization based on CFD simulation data. Stochastic programming is used to consider probability of each leak scenario. We use integer linear programming to decide the locations of sensors to minimize detecting time and maximize the number of scenarios covered by the system configuration. Based on the result of placement, we decide for which area we operate mobile sensor. We calculate average detecting time and coverage changing by the speed and start point of mobile sensor and make comparison according to the number of mobile sensors being used.