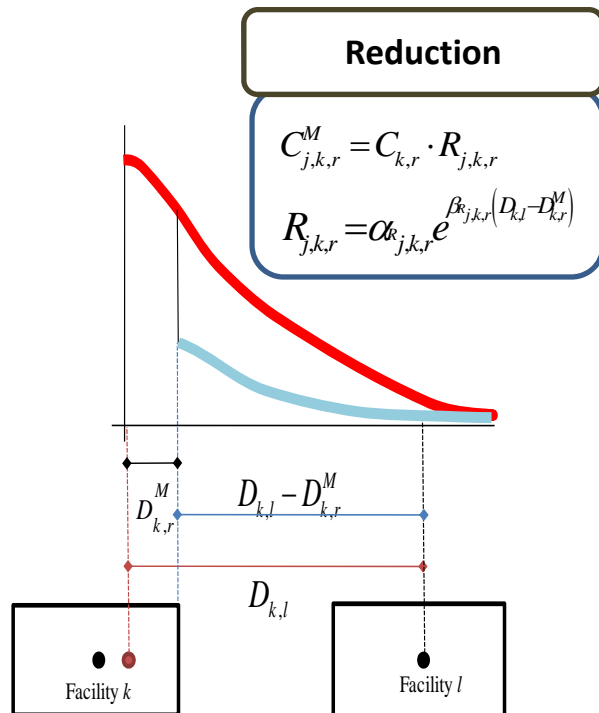


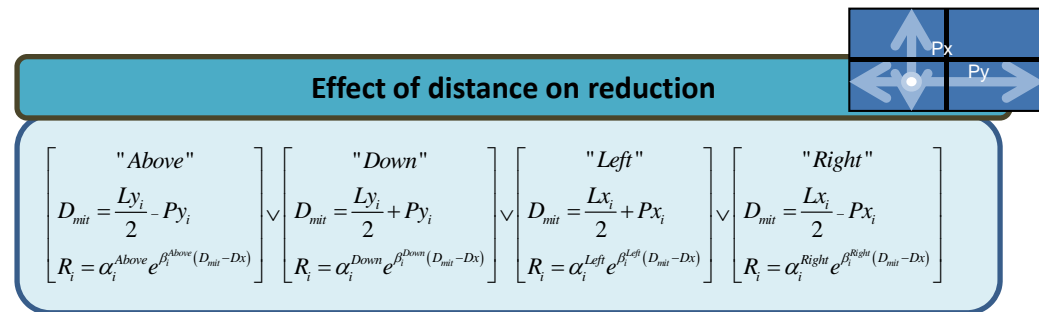
Introduction

Accidental toxic gas releases directly affect people in a plant, thus it is important for occupied facilities to be distributed safely. The facility layout depends on the concentration in the space calculated by dispersion models. However, facilities allocation would be too far away from the point source to avoid any damage on the personal. On the other hand the distance between the occupied facilities and the point of release could be reduced with using mitigation devices. In this study mitigation devices (*i.e.* water curtains) are modeled to reduce the concentration as well as the land of layout.

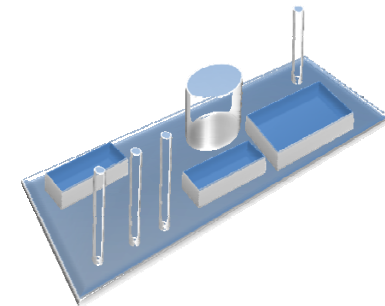
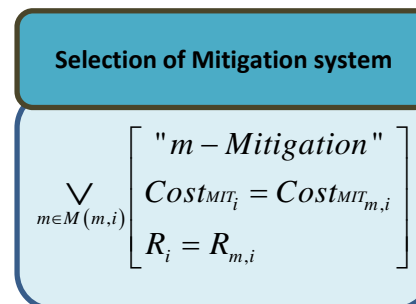
1. Computing Reduction function



2. Allocation of Release Point inside the facility



3. Which mitigation system optimizes the objective function?



Objective Function

$$\min \sum_i Cost_{MIT_i} + Cost_{LAND} + Cost_{PIPE} + Cost_{PER} \sum_{i \in r_i(s,i)} f_i P_i$$

s.t.

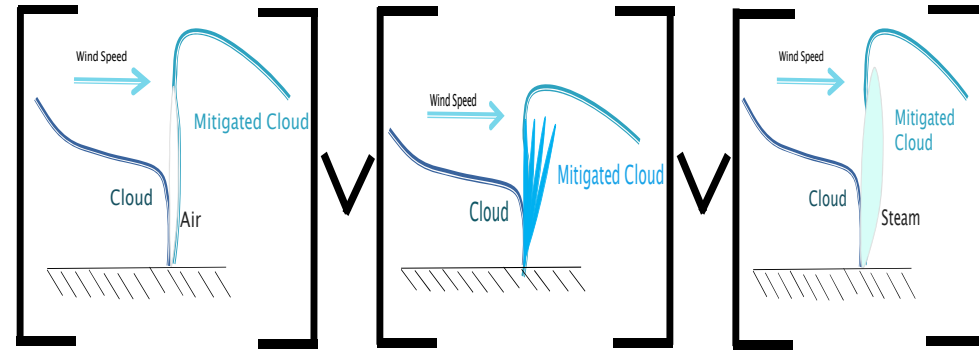
$$Cost_{LAND} = C_L A_X A_Y$$

$$Cost_{PIPE} = C_P \sum_{(a,b) \in M(a,b)} D_{a,b}$$

$$D_{a,b}^2 = (x_a - x_b)^2 + (y_a - y_b)^2$$

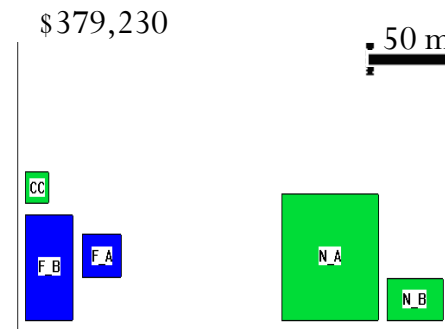
$$A_X = \max \left\{ \frac{Lx_i}{2} + x_i \right\}$$

$$A_Y = \max \left\{ \frac{Ly_i}{2} + y_i \right\}$$

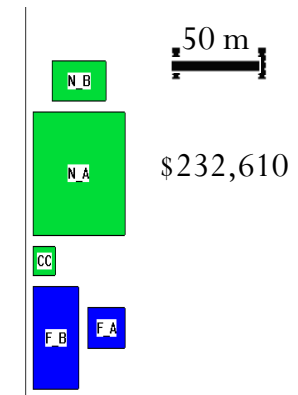


Results and conclusion

The use of Mitigation systems in facility layout with toxic release significantly reduces the distance between facilities. Even, several solvers from GAMS interface have been compared to obtain a best solution.



Mitigation Off



Mitigation On