A Study on Design Procedure for Efficient Depressurization System in High Pressure Hydrocarbon Processing Facilities

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Fire and/or exothermic runaway reactions usually occur in high pressure hydrocarbon processing facilities which can cause the failure of equipment. To reduce this risk, the emergency depressurization system is normally installed on these equipment. In this study, an integrated design procedure is proposed for efficient depressurization system design. First of all, by using qualitative risk assessment"HAZOP Study" to assess fire and/or exothermic runaway reactions occurrence, thereby discussing the necessity of system installation; Secondly, through estimation of equipment rupture time during fire and/or exothermic runaway reactions to confirm installation of system; Thirdly, emergency depressurization rate is decided which is used for depressurization system sizing and confirmation of flare capacity, and temperature experienced by equipment and piping during depressurization is also checked which is used for material selections. By using this procedure, not only the emergency depressurization system can be designed efficiently, but also the plant safety can be improved. The study was conducted with help of computer program HYSYS using rigorous dynamic model to reduce the effort required.