

Surapong Supraditarporn 2013: A Numerical Simulation of Fire Evacuation of Mechanical Engineering Building via PyroSim and Pathfinder. Master of Engineering (Mechanical Engineering), Major Field: Mechanical Engineering, Department of Mechanical Engineering. Thesis Advisor: Assistant Professor Nathasak Boonmee, Ph.D. 77 pages.

This research presents a numerical simulation of fire evacuation of Mechanical Engineering Building via 2 CFD fire modeling programs; PyroSim 2010 and Pathfinder 2009. The objectives of this research are to investigate the building evacuation behavior when the building exit stairs are fully available and when some exit stairs are not available, and estimate the building evacuation time for each case. The Mechanical Engineering Building is a 5-story building with approximately height from ground to roof of 25 m. The building is 30 m wide and 60 m long. There are 2 exit stairs located at the center and at the side of the building. The building occupant load of 1477 persons was estimated according to NFPA 101 Life Safety Code.

The simulations via 2 programs were carried out for 3 cases; Case 1 all the building exit stair are available, Case 2 the exit stair at the center is not available, and Case 3 the exit stair at the side is not available. The study shows that when all the building exit stairs are available, the building evacuation times are 492 seconds (calculated with PyroSim 2010), and 322 seconds (calculated with Pathfinder 2009). In the case where only one exit stair is available, the building evacuation time may go up to 592 seconds (calculated with PyroSim 2010). The main reason that make the building evacuation time increases is due to congestion at the exit stair entrance on the 5th floor.

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Thesis Advisor's signature