

## Abstract for New Stanford Hospital

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Keywords: Life Safety Code, RSET, ASET, Performance Based Design.

This report is the compiled culminating project for the Fire Protection Engineering Master's Program at Cal Poly, SLO. Addressed herein is the fire protection and life safety approach for the New Stanford Hospital in Palo Alto, California in accordance with the 2012 NFPA 101 – *Life Safety Code* and the 2016 California Building and Fire Codes. This includes review of building occupancies, construction type, fire-resistive ratings, means of egress, and fire protection systems. The objective of this report is to review the impact of major fire scenarios on life, property, and operations.

The New Stanford Hospital is a Type IA construction, seven-story high-rise with one below grade level. The primary occupancies are ambulatory healthcare, assembly, administration, and storage.

The building has an emergency voice alarm communication system and smoke detection throughout. There is a high-rise smoke control pressurization system and an atrium smoke control exhaust system. Passive smoke control and defend-in-place / occupant relocation egress is achieved by fire- and smoke-resistive rated construction. The building has an automatic sprinkler system and standpipes supported by a fire pump and an on-site water storage tank.

The design fire with the greatest impact is a fire in a storage room on an upper patient care level where non-ambulatory occupants rely upon hospital staff for their egress. High quantities of combustible storage, including plastics and cardboards, provide the fuel load. Smoke detection initiates occupant notification one minute after ignition. Automatic sprinklers suppress the fire two minutes after ignition thus reducing spread and creating a steady-state fire condition with a heat-release rate of 600 kW.

Fire modeling indicates smoke spread to cause insufficient visibility throughout the compartment after 20 minutes with an open storage room door. Realistically, this door would be self-closing with a 20-minute rating to prevent smoke spread. As many occupants on the patient care floors are anticipated to be non-ambulatory, staff-assisted patient egress would require approximately 5 minutes to evacuate the compartment, including time to detection and notification.

The required safe egress time (RSET) of 5 minutes is more than one-and-a-half times less than the worst-case available safe egress time (ASET) of 20 minutes. Based on the analysis, the building meets the performance-based design criteria for tenability and complies with the applicable codes and standards.

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*New Stanford Hospital, Photo by Author (10/30/2019)*