Natthun Laongthong 2007: Development of Learning Equipment for Flammability Limits. Master of Engineering (Fire Protection Engineering), Major Field: Fire Protection Engineering, Interdisciplinary Graduate Program. Thesis Advisor: Mr. Nattasak Boonme, Ph.D. 95 pages.

The objective of this thesis is to develop an apparatus for demonstrating ignition, and burning behaviors of premixed gases. The fuel gas mainly used in the experiment is LPG (Liquefied Petroleum Gas). The apparatus compartment was a rectangular box of 50 cm width 80 cm long and 75 cm height. The compartment frame was constructed with 2 mm thick stainless steel. Three compartment walls were installed with a 5 mm thick explosion proof glass for visual observation while one wall was installed with a stainless steel sheet which can be slid up for fresh air ventilation. A compartment roof was installed with a stainless steel sheet. The roof was uniquely designed to be able to detach from the compartment frame to relief pressure when the combustible gas was ignited. An electrical ignition source was placed on the compartment floor. The fuel gas was supplied via a small fuel port installed on the compartment floor. The amount of fuel supplied was carefully monitored by a control valve. To promote a uniform combustible mixture in the compartment, an electrical paddle was installed at the compartment floor near the fuel port.

The experimental results of ignition show fairly good agreement with the premixed flame ignition theory. The lower and upper flammable limits of combustible mixtures can be demonstrated with the proposed apparatus. Other compartment fire behaviors such as Backdraft can also be illustrated. The apparatus will enhance a learning process of fire safety personnel in order to develop a qualified fire safety staff for a building.

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