

Firefighter Self Contained Breathing Apparatus Air Management

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The main objective of this research is to quantify the relationship between physiological demands of critical fire fighting tasks in large commercial structures and the ability to safely meet those demands with the limited air supply of the self contained breathing apparatus (SCBA). Each year, fire fighters are injured or killed after running out of air while trapped in a burning structure. Management of air supply becomes increasingly important as the distance between breathable atmospheric air and the fire fighter lengthens. High rise buildings, subway systems and box stores pose a particular challenge to fire fighters and the management of air supply. The City of Toronto has the second highest total of above and below grade structures in North America, thus crew safety while meeting the challenges of these environments is of primary concern. The Toronto Fire Services approached the University of Waterloo for assistance in obtaining quantitative measurements with an objective of developing a plan to improve safety for all fire fighters who must work under these conditions. The research objectives are: (1) To adapt the specific SCBA used by the Toronto Fire Services to quantify ventilation and metabolic demand. (2) To monitor the physiological demands and determine the breathable air requirements of critical fire fighting tasks during a high rise, subway and box store fires. (3) To work with the Toronto Fire Services in the development of appropriate work strategies for preventing asphyxiation with fire fighting in large commercial structures.

The Toronto Fire Services and the University of Waterloo have applied for funding to conduct this study that will benefit all firefighters. Applications have been submitted to the Technical Standards Working Group and the Workplace Safety Insurance Board for grant money.