Abstract for the Federal Aviation Administration's Ninth Triennial International Aircraft Fire and Cabin Safety Conference

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Transport Canada (TC)'s Transportation of Dangerous Goods Safety Research and Analysis Branch researches and provides evidence-based recommendations to promote safety during the transportation of dangerous goods.

TC collaborated with the National Research Council of Canada (NRC) to research the performance-based packaging standard for the shipment of lithium batteries (a Class 9 dangerous good) as cargo on board aircraft. Presently, the SAE G-27 (AS6413) standard under development aims to determine a test method and best practices to qualify a battery package to be safely shipped by air. As participants of the SAE Technical Committee, TC and NRC's role is to identify areas of improvement within the draft test standard. Areas of research focused on the testing of several types of commonly shipped lithium cells and batteries in an effort to determine the applicability of the test methods being proposed. As part of this work, laboratory testing utilized separate lithium battery/cell chemistries and capacities. Lithium cells were packaged and placed in a sealed test chamber with a 0.3 m^3 prescribed free volume and induced into thermal-runaway by thermally distressing them. Different tests were performed at various cell states of charge. Thermocouples and voltage taps were placed on and adjacent to the ignition cell and nearby cells to monitor changes at cell and package level. Additionally, placement of video recording and infrared cameras were used to determine fragments and flame length during thermal runaway.

Recommendations on the use of witness panel materials, oxygen sensors, spark ignitor placement and use of a fan will be discussed. Comparison of physical lab test results to detailed computational fluid dynamics (CFD) modelling will also be presented.

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