Freighter Fire Suppression Risk & Cost Benefit Model

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OVERVIEW

Following in-flight fire occurrences on US registered freighter airplanes, where it is suspected that lithium batteries have had an involvement, the Federal Aviation Administration (FAA) AND Transport Canada have commissioned the development of Risk and Cost Benefit Models to evaluate potential mitigation strategies.

OBJECTIVES

The Broad Objectives of the Study are to:

- **Develop a Risk Model to assess the number of accidents likely to be experienced by the US fleet attributable to Freighter Fires**

- **Develop a Cost Benefit Model to assess Cost Benefit Ratios based on User Inputs for 7 Mitigation Strategies identified by the FAA**

MITIGATION STRATEGIES

1. Cargo Compartment Suppression
2. External Container Suppression
3. Internal Container Suppression
4. Fire Hardened Containers
5. Pallet Covers
6. Primary Lithium Battery Boxes
7. Secondary Lithium Battery Boxes

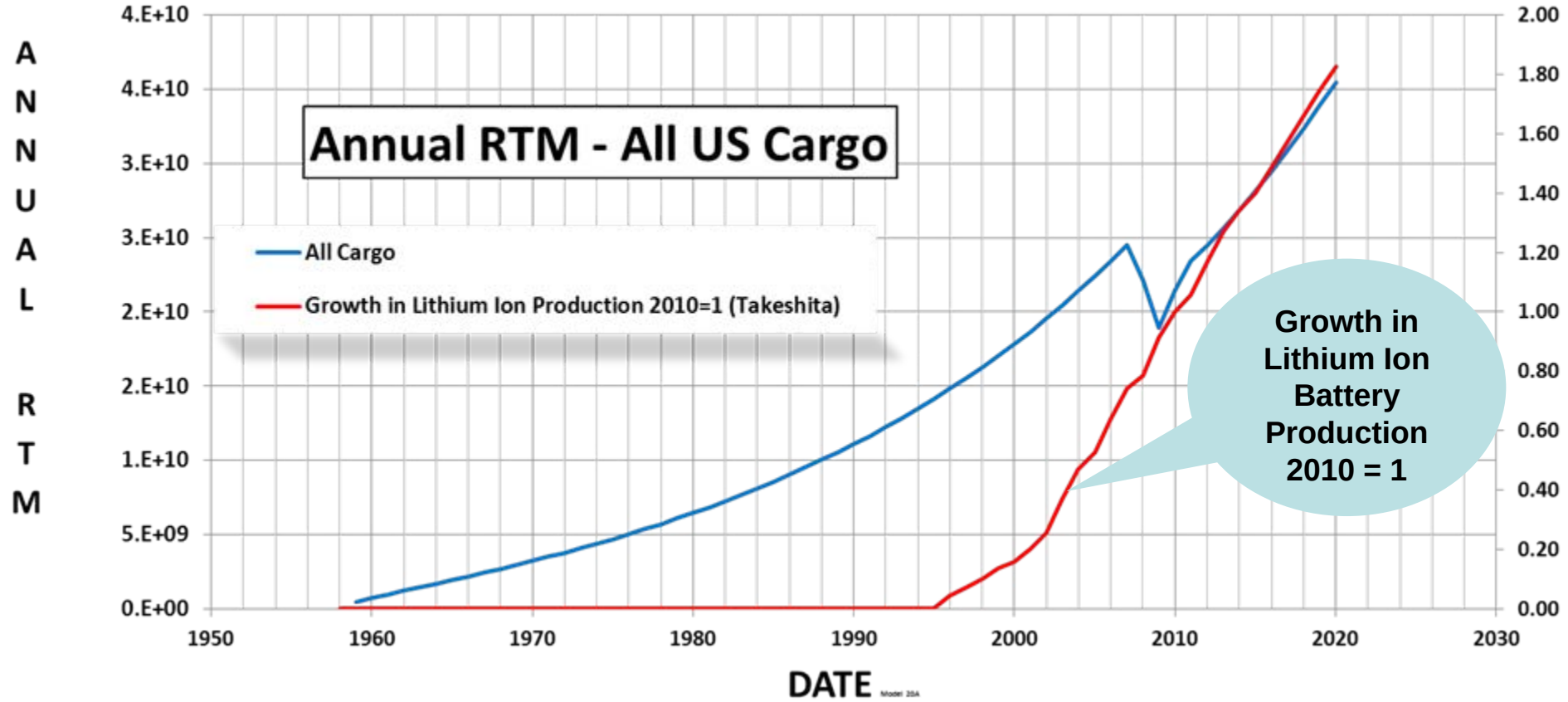
MODEL OVERVIEW

- A Monte Carlo Simulation model has been developed in Microsoft Excel
- The model considers each freighter airplane type in the 2010 US fleet individually and in combination
- The model assesses Cost Benefit Ratios and the likely future number of accidents, through to 2025 for any selected combination of proposed mitigation strategies.

MITIGATION FACTOR

Currently Assumed Mitigation Factor Values

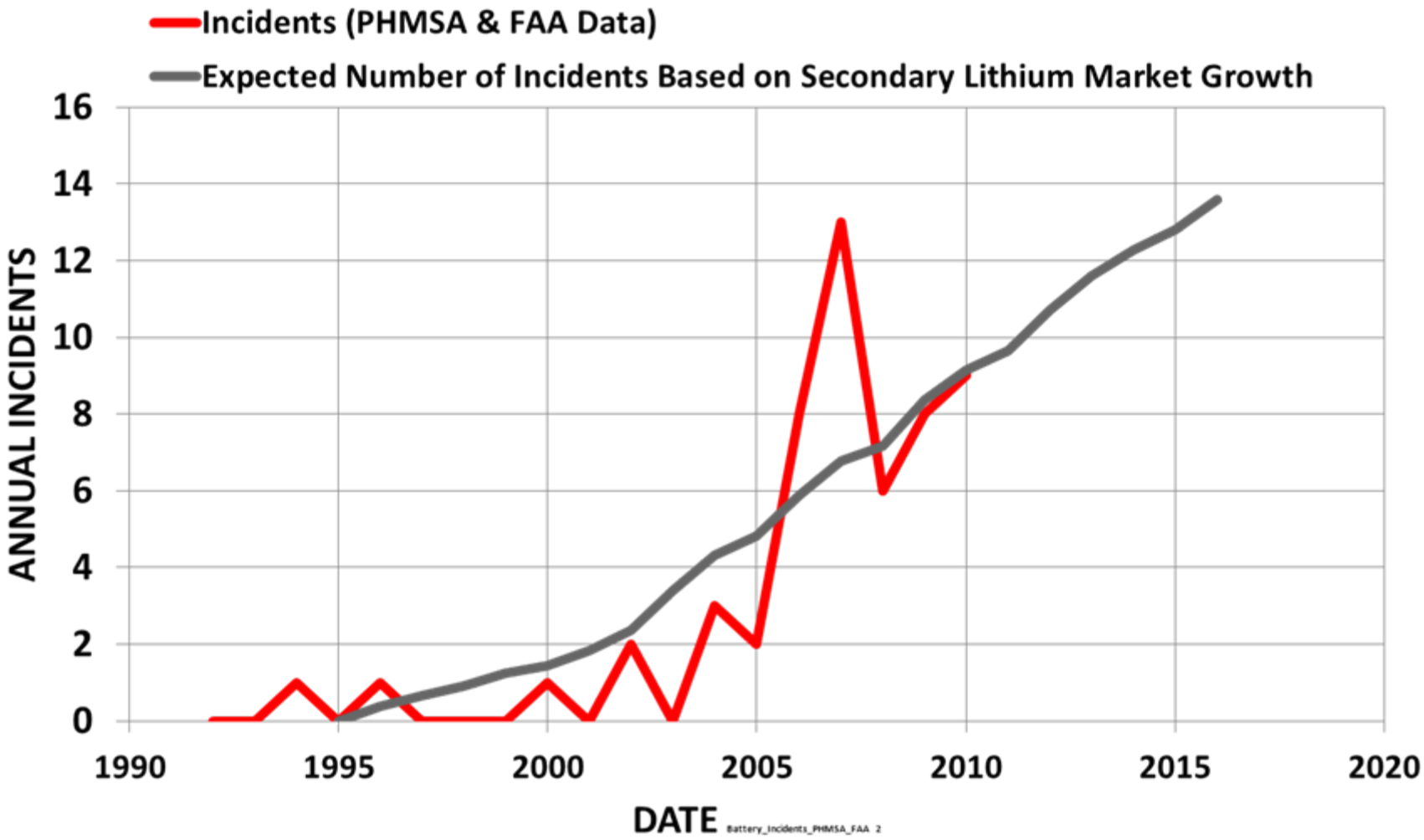
	Battery Cargo			Other Cargo		
	Containers	Pallets	Loose Cargo	Containers	Pallets	Loose Cargo
	0.55	0.4	0.05	0.65	0.3	0.05
Mitigation System	Effectiveness	Effectiveness	Effectiveness	Effectiveness	Effectiveness	Effectiveness
CARGO COMPARTMENT SUPPRESSION	0.95	0.95	0.95	0.95	0.95	0.95
EXTERNAL CONTAINER SUPPRESSION	0.8	0	0	0.9	0	0
INTERNAL CONTAINER SUPPRESSION	0.8	0	0	0.9	0	0
FIRE HARDENED CONTAINERS	0.95	0	0	0.95	0	0
PALLET COVERS	0	0.8	0	0	0.9	0
PRIMARY LITHIUM BATTERY BOXES	0.4	0.4	0.4	0	0	0
SECONDARY LITHIUM BATTERY BOXES	0.4	0.4	0.4	0	0	0



If there was no increase in the threat of freighter fires due to batteries

PERIOD	CUMULATIVE RTM	NUMBER OF FIRE ACCIDENTS
1967 - 2010	624×10^9	5
2011 - 2020	365×10^9	3

BATTERY FIRE RELATED INCIDENTS



FUTURE CARGO FIRE ACCIDENT PREDICTION FOR THE US FREIGHTER FLEET