

## Dangerous Goods Panel Working Group on Energy Storage Devices

DATE: June 23, 2022

TIME: 0800 – 1000 EDT

LOCATION: Virtual – TEAMS

### **Introduction**

The rapporteur of the Energy Storage Devices Working Group, Mr. Duane Pfund held the second meeting of the 2022-2023 biennium virtually on June 23, 2022. Mr. Pfund reviewed the work plan and the report of the previous meeting.

### **Existing Bowtie Analyses**

Jamie Lessard (U.S. FAA) rapporteur of the Safe Carriage of Goods Specific Working Group (SCGSWG) reviewed their progress on a similar bowtie analysis of carriage of lithium batteries in the cabin. This analysis considers a passenger aircraft with multiple pilots and multiple crewmembers. The top event in this analysis is a lithium battery thermal runaway in the cabin with fires of various severity representing the primary consequences. Threats that could cause the top event include non-compliant batteries, damaged or defective batteries or electronic devices, external short circuits of lithium batteries, and charging/discharging of batteries. It was noted that the top event and the main branches of the bowtie (threats and consequences) remained stable throughout the development. Much of the discussion centered around the controls (barriers to prevent the occurrence of the top event). Future analyses are expected to focus on lithium battery thermal runaway events in different scenarios and locations including: the cockpit, a helicopter, single pilot operations with no passengers, cargo, and checked baggage. The United Kingdom Civil Aviation Authority also developed a bowtie on lithium batteries and an example bowtie is found in the Guidance for Safe Operations involving Aeroplane Cargo Compartments (Doc. 10102).

Working group members noted that the threats (identified as blue boxes) on the left side of the carriage of lithium batteries in the cabin bowtie are focused on the battery and as such are similar to those for lithium battery powered equipment offered as cargo. These similarities could help accelerate the process of developing a bowtie focused on carriage of lithium battery powered equipment as cargo. While there was general agreement that many of the threats were similar, the controls are different, and more controls potentially exist for carriage as cargo. This would be the topic of future discussion.

### **Weighting/Scoring**

The discussion then pivoted toward how the bowtie analysis could inform future recommendations. The bowtie in its most basic form provides an illustration of threats, controls, escalating and mitigating factors and consequences of a discrete event. This can help identify gaps but could possibly be used also to identify the effectiveness of controls and mitigating measures. This could be done by applying a scoring mechanism to quantify the effectiveness of controls and weight the value of various controls. This could increase the value of the analysis.

This level of analysis depends on the availability of data and requires certain informed assumptions.

The group should identify the types of information needed, for example cargo volumes, and frequency of adverse events and request information to better inform the analysis.

**Next Steps:**

The group agreed to a two-step progress. Step 1 – Draft a bowtie analysis with threats, controls, and consequences. Step 2– Consider a scoring mechanism to quantify the safety risk probability based on the value and effectiveness of each control.

Jamie Lessard provided a few comments on developing the bowtie for the good of the working group:

- Specialized software is essential to efficient bowtie development and urged the group to utilize the software.
- Focused meetings with a smaller group to fill-in the boxes then share with the larger group for discussion were effective.
- Track the changes with explanations on why certain changes were made to the bowtie.

**Action Items:**

Duane will contact the UK CAA to obtain existing bowtie analyses to assist in the initial development of a bowtie for this group.

Dick, Devan, and Virgilio will identify data needed to inform weighting criteria.

Next meeting tentative first or second week of August. A poll with potential dates will be circulated.