June 14, 2024

Respected Sophie Shulman
Deputy Administrator
National Highway Traffic Safety Administration
1200 New Jersey Avenue, SE
Washington, D.C. 20590

Re: Re: Comment from Blue Bird Body Company on Notice of Proposed Rulemaking (NPRM) - FMVSS No. 305a Electric-Powered Vehicles

Dear Sophie Shulman,

Blue Bird Body Company appreciates the platform NHTSA has provided us to express our comments pertaining to the published FMVSS 305a NPRM.

Since 1927, Blue Bird Body Company has continued to set industry standards with our innovative design and manufacturing capabilities. At Blue Bird, the safety of school children is at the center of all that we do. We are singularly focused on building and selling school buses that customers wants and value, and that keeps the worlds most precious cargo safe.

Blue Bird has more than 1,500 employees, Georgia-based manufacturing facilities and an extensive network of Dealers and Parts & Service facilities throughout North America. Its global presence can be seen in more than 60 countries through sales into Africa, Asia, the Caribbean, Latin America, Europe and the Middle East.

Blue Bird offers the following comments detailing our position on crash testing requirements listed in the FMVSS 305a NPRM:

The agency is not adopting the provision in GTR No. 20 that conducts mechanical integrity and mechanical shock tests (component-level) for light vehicles and for heavy school buses. NHTSA believes that post-crash safety is better evaluated at a system level in a crash test than in component-level tests. Currently there are crash tests for light vehicles and school buses, thus, NHTSA proposes to conduct post-crash safety after the specified crash tests.

Blue Bird believes that component level testing would be far superior than vehicle testing. As long as the requirements are kept at the component level, it will be up to the battery experts/suppliers to meet the

requirements and they can continue to meet them as battery designs change. The battery suppliers are the experts over these components and are very familiar with requirements set forth.

If this proposal moves forward with crash testing as it is currently written, we could be subject to endless crash testing now and in the future. As we know, electric vehicle battery technology is evolving at a rapid pace. Blue Bird plans to incorporate the evolving technology in our products when it results in a more robust, better performing, product for our customers. Blue Bird does not wish to be stymied by crash test requirements that could delay introducing better and safer battery technology in our products for our customers. For example: If we offer three different types of battery packs (difference in packaging, range, performance etc.) then as per this testing we would have to crash test all three buses adding undue burden and expense on the manufacturers.

NHTSA seeks comment on the inclusion of a post-crash electrolyte leakage requirement in FMVSS No. 305a and the necessity and relevance of such a requirement for current EVs.

Electrolyte in a battery can be in Liquid, gelled and dry formats. Electrolytes can also be a polymer, solid ceramic and molten salts. Blue Bird cannot always interpret that electrolyte will be in liquid form and the crash testing will provide us information on the amount of electrolyte leaked during crash. In a lot of cases the electrolytes are added with additives. This is ensuring stability of anodes. These additives are even difficult to trace when doing a forensic evaluation.

NHTSA recognizes that FMVSS No. 305 currently does not apply to nor has a crash test requirement for heavy school buses. When FMVSS No. 305 was first promulgated in September 2000, NHTSA decided not to apply proposed FMVSS No. 305 to heavy school buses. NHTSA made this decision after agreeing with commenters that applying the standard to the vehicles at that time could have substantial effect, in terms of cost and weight, on heavy school buses and potentially restrict further development.

Given the development of the technology and practicability of designing and producing heavy electric school buses, NHTSA tentatively concludes it is appropriate to adopt requirements to ensure post-crash safety of heavy electric school buses and maintain the current high level of safety of heavy school buses.

Blue Bird believes NHTSA's document reads very much like they see battery technology as pretty much fully developed into a lithium-ion battery which is not the case. In 2000 NHTSA excluded the application of FMVSS 305 crash test standards to school buses out of fear of restricting further development. But now, at a time when the evolution of EV's is at its highest level ever, the limitations have been removed and the standard applies. Blue Bird thinks NHTSA should rethink their position and apply the same logic to the present-day battery technology evolution.

Further to the assumption of the stability of battery technology, the inclusion of multiple post-crash requirements makes this testing more burdensome than FMVSS 301. This makes it clear what changes

could potentially affect the outcome of the test, and more reasonable to determine worst case impact locations. Whereas the proposed 305a standard is proposing four different post-crash requirements. The predictability of the outcome related to all of these requirements is difficult to nearly impossible.

Blue Bird's main comment is that the complexity of the system, and multiple requirements leads to prohibitive full vehicle, destructive crash tests with unpredictable and potentially unrepeatable results. Full vehicle testing could halt EV advancement in the school bus industry. Component level testing and requirements brings the improved safety while still allowing for fast paced development of electrification of heavy-duty school buses.

Evolving battery design technology impacts many areas of battery construction that could result in an endless cycle of crash testing and post-crash requirement criteria. For example:

Types of cells:

The type of cells contained in the battery module is also vital and changes the strength of the battery during crash testing. Pouch cells can deliver more current and can be made to fit any shape whereas cylindrical cells are strong and have good dissipation characteristics. Prismatic cells are unique, the electrode sheets are already inside the casing and the casing can add more strength. Prismatic cells when stacked can release more energy at once whereas when flattened can offer more durability. The way pouch cells, prismatic cells and cylindrical cells react to crash is totally unique and different.

Type of cooling:

There are different ways of cooling strategies that can be adapted to cool the battery.
1. Air Cooling, this uses ambient air to cool the battery.
2. Phase Change Cooling, using the cooling fluid's latent heat of vaporization.
3. Liquid cooling, where the battery is submerged into the coolant or where the coolant passes through system of pipes.

Battery Pack Construction:

If the battery packs are arranged in series or parallel affects the strength of the battery pack. These battery packs can be modified to accommodate the needs of the manufacturer and the space constraints they might have. There are some instances where additional battery packs might be installed in the vehicle if the customer requests enhanced range.

With the proposed crashed testing, manufacturers must crash a school bus when chemistry of the battery is changed or if the manufacturer has battery packs available which uses different chemical compositions. This isn't a practical approach. With the speed at which battery technology is changing, this would add extreme complexity in bringing new battery packs into implementation to support additional range.

With the proposed crashed testing, manufacturers must crash a school bus when battery cooling strategies are changed. As and when we learn more about battery performance, manufacturers try to optimize the

cooling strategy to bring the best out of the battery. With this requirement it may remove the flexibility to improve our cooling strategy.

With the proposed crashed testing, manufacturers must crash a school bus whenever there is change in battery cell construction and battery pack configuration.

Currently the battery manufacturers and suppliers do perform vibration, shock, impact tests to assess performance of their new battery design and structure. They also perform capacity tests to understand the performance of batteries under excess load and different temperature gradients. By having component level testing we will not add any additional burden on OEM's nor battery manufacturers. We feel this would help manufacturers to focus on introducing safer and better performing energy storage systems as and when they become available. Thus, helping the speed of electrifying American school buses.

We look forward to working with NHTSA to continue enhancing the safety of school buses. If there are any questions, comments or concerns please do not hesitate to contact Sumanth Balesh at 478-993-5093, or Sumanth.balesh@blue-bird.com.

Respectfully submitted,

BLUE BIRD

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