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30 April 1993

Via Telecopier

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Mr. Bill Reilly
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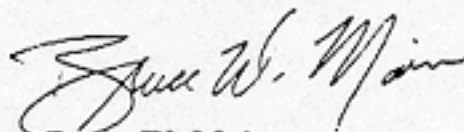
Gentlemen:

Attached please find an Executive Summary of our efforts and findings for this project. I have forwarded copies of the entire report under separate cover.

If you have any questions, please call me.

Very truly yours,

J.M. Miller Engineering, Inc.



Bruce W. Main

Miller Engineering, Inc.

MASTERLINK SEAT BELT ADJUSTER PRODUCT EVALUATION

EXECUTIVE SUMMARY

Overview

Miller Engineering was asked to examine and evaluate the Masterlink Marketing Seat Belt Adjuster. Masterlink indicated that two key design attributes were desired: movement of the shoulder harness off the occupant's neck and onto the occupant's shoulder, and quick release (failure) in the event of a crash. Our investigation consisted of:

- analyzing the hazards associated with this product,
- researching potentially applicable government and industry standards,
- researching product safety recall information,
- researching the literature concerning seat belt injuries and tension relieving/"comfort clip" type devices,
- conducting field investigations of potential uses, likely failure modes, and target purchasers,
- conducting independent tests of seat belt comfort, fit, and slack with the seat belt adjuster, and
- comparing the Masterlink design to competitor products.

The work conducted and the findings which resulted are documented in a separate report.

Several findings resulted from this research effort. The foundations for the findings are detailed in the report. Listed below is a summary of the findings.

Summary of Findings

The Masterlink Seat belt Adjuster offers the user increased comfort by repositioning the shoulder belt away from the neck and changing the angle of the belt across the upper body.

Our tests and investigations indicate that there is a portion of the motoring population, particularly women, who could potentially benefit from this type of device.

There are no government or industry standards which apply to this product.

NHTSA recognizes the potential benefits of a device which can increase seat belt use by providing increased comfort to users through additional belt slack.

NHTSA investigations have found no data to support the claim that Seat Belt Adjuster type devices are being misused to create excess slack, or that these types of devices cause real-world problems.

The data and findings from the literature indicate that:

- Seat Belt Adjuster type devices which can increase the slack in the shoulder belt do not lead to enhanced occupant injuries,
- increasing user comfort can positively affect seat belt usage rates, and
- Seat Belt Adjuster type devices have been associated with increased seat belt usage rates and reduced injury severity.

Based on the tests, there are two potential failure modes for the Masterlink Seat Belt Adjuster, both of which cause the device to open and allow the seat belt to function normally. Both failure modes are expected to be benign, e.g. the failure is not anticipated to cause or enhance injury to the user, nor is it expected to interfere with the restraint system.

This investigation has revealed that the current instructions should be revised and improved (currently in process).

The Seat Belt Adjuster may increase the total shoulder belt length in normal use. In some circumstances, the Seat Belt Adjuster will decrease the total shoulder belt length in normal use.

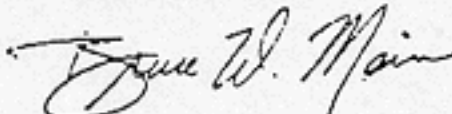
The current instruction to position the Seat Belt Adjuster no more than 3 inches from the buckle is generally not sufficient to afford the user greater comfort and should be revised.

X[↑] Based on our analyses, investigations, and tests, the Masterlink Seat Belt Adjuster represents a better design than the competitor's products. Particular advantages include that it permits the retraction system to function normally (versus the Auto Comfort design), and its lower strength (compared to the 3R design) will facilitate early release in the event of an accident.

Since no government or consensus standard exists for this type of product, a safety "certification" is not practical. However, the investigative and experimental data obtained during this project provide considerable support for this design.

Respectfully submitted,

J.M. Miller Engineering, Inc.



Bruce W. Main