Door Lock and Door Retention Components

A Canadian Perspective

September 3, 2002
Issue

- Testing procedure of door lock and door retention components are not sufficiently defined (especially sliding side door of minivan)

Goal

- To define a consistent testing procedure of door lock and door retention components for sliding side door on minivan
- Further door latch strength improvements
Field Cases

Rear cargo door failure one occupant was ejected

2000 Cadillac Escalade (CH12 1515)
Field Cases

Sliding side door separation and Rear cargo door failure
three occupants were ejected

2000 Chevrolet Venture
(LTVS 1296)
Field Cases

Seat anchorage failure followed by side door latch separation, one occupant partially ejected

2001 Pontiac Montana (SID4-1606)
Field Cases

Driver side door failure, one occupant was ejected

1997 Saturn SC2 (ASF2-1915)
Field Cases

Sliding side door failure, two occupants were ejected

1999 Oldsmobile Silhouette (LTVS-1273)
Field Cases

Rear door failure

1992 Ford Aerostar XL (LTVS-1206)
Field Cases

Rear door failure, one occupant was ejected

1993 Ford Aerostar XL (LTVS-1280)
Sliding Side Doors

- Review of the Push Vs. Pull test procedure
- Final set of test, Pull only
- Pin Latch
Pull Test

Inside view of the sliding door, pre-test

Inside view of the sliding door, post-test
Pull Test

Outside view of the sliding door, pre-test

Outside view of the sliding door, post-test

Force vs. Time (ms)

NSVAC | CMVSS 206(Tension) | FORD WINDSTAR 1999 TC 99-147

- ACT AHEAD/REAR ACT (SHL) - ACT AVANT/FRONT ACT (SHL) - Ramp Veh Ramp
Pull Test

Inside view of the sliding door after maximum load test

Outside view of the sliding door after maximum load test

Chart:

- Force vs. Load (Newton)
- Time vs. Load (Sec)
- Graph showing load vs. time for different conditions.

Legend:

- Range 107431g
- Acceleration 0.000247g
- Acceleration 0.000247g

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Pull Test

Outside view of the sliding door, pre-test

Outside view of the sliding door, post-test
Push Test

Inside view of the sliding door post-test

Inside view of the sliding door pre-test

NVSAC / CMVSS 209 FORD WINDSTAR 1998 TC98-545

Graph:

Force (N) vs Time (s)

Legend:
- ACT ARRIÈRE: REAR ACT (1014)
- ACT AVANT: FRONT ACT (1072)
- Range 20°F Range

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Push Test

Outside view of the sliding door pre-test

Outside view of the sliding door post-test

Graph showing the force vs. time (milliseconds) with various lines indicating different test conditions.

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Push Test

Outside view of the sliding door pre-test

Outside view of the sliding door post-test

Graph

NSVAC | CMV20 200 MAZDA MPV 2000 TC 09-102
Porta Gaschne/Compression Left Door

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Push Test

View of the test vehicle on the vehicle test structure
B Pillar Striker

Pre-test

Post-test

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B Pillar door latch

Pre-test

Post-test

20
B Pillar door latch

Pre-test

Post-test
In Conclusion ...

- Rear minivan and SUV hatch doors continue to fail in field
- Sliding side doors with pin type latches do not provide structural integrity