

*Ford Motor Company*

*Rec'd 7/18/05*

Automotive Safety Office  
Environmental and Safety Engineering

July 7, 2005

Mr. Thomas Z. Cooper, Chief  
Vehicle Integrity Division  
Office of Defects Investigation Safety Assurance  
National Highway Traffic Safety Administration  
400 Seventh Street, S.W.  
Washington, D.C. 20590

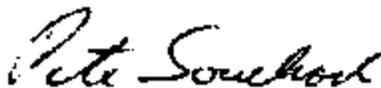
Dear Mr. Cooper:

Subject: EA05-004:NVS-212.pco

In a June 29, 2005 phone conversation with Mr. Peter Ong of your office Mr. Ong requested the results of a life cycle test on seat belt buckles that was conducted by Ford Motor Company (Ford) following our May 3, 2005 response to the subject inquiry. The testing was conducted to evaluate the life cycle performance of buckles from Ford's recall population that passed the original recall inspection. Two copies of the test report and functional evaluation method are attached.

Please feel free to contact me if you have any questions.

Sincerely,



Pete Souchock  
Manager  
Global Automotive Safety Compliance

Attachment



## **EA05-004: Seat Belt Buckles Unlatching Allegations**

### **Summary of Life Cycle Test of Field Returned Parts**

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To evaluate the life cycle performance of seat belt buckles from Ford's recall 01S21 population, Ford and TRW, the buckle supplier, collected buckles that had originally been evaluated and "passed" the recall inspection and subjected them to life cycle testing up to an equivalent of 200,000 miles. These buckles had remained in service since the recall was announced. Since TRW's test fixture was able to simultaneously evaluate up to six buckles, the following six buckles were selected for evaluation based on their originating vehicle line and the range of accumulated mileage. Each of these buckles was evaluated with, and passed, the recall inspection tool prior to the life cycle test.

MY	Model	VIN	MILEAGE AT REPAIR	Cycles to 150,000 miles @9.1 miles/cycle
2001	WINDSTAR	2FMZA51421E	40,819	12,020
2001	WINDSTAR	2FMZA51421E	47,839	11,248
2001	CROWN VICTORIA	2FAFP73W81	21,961	14,070
2001	GRAND MARQUIS	2MEFM76W1	17,461	14,566
2001	TOWN CAR	1LNHM81W1	32,587	12,801
2001	F-350	1FTSW30S71	13,065	15,048

These buckles were first evaluated to 150,000 equivalent miles of usage (the useful life referenced by ODI in EA95-021) taking into account the mileage that had been accumulated by each individual buckle in service. Ford used a 9.1 miles/cycle conversion factor that had previously been developed by the Office of Defects Investigations (ODI) in its closure paper for EA95-021. At the completion of 150,000 equivalent miles each buckle was evaluated with and successfully passed the recall inspection tool. All six buckles were then further tested up to an equivalent of 200,000 miles of usage. Again, all six successfully passed the recall inspection tool and were found to operate as designed.

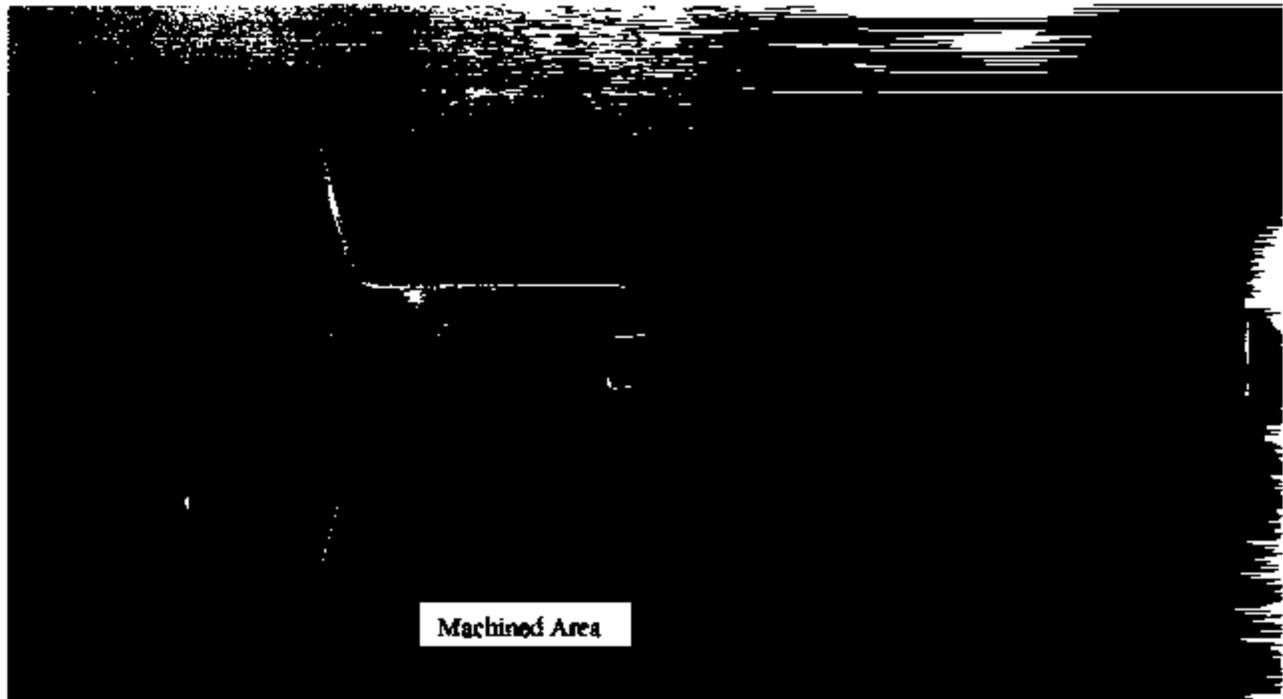
Attached is a description of the functional evaluation method that was used and a copy of the test summary.

# **Buckle Functional Evaluation and Cycling Method**

## **Functional Evaluation Method**

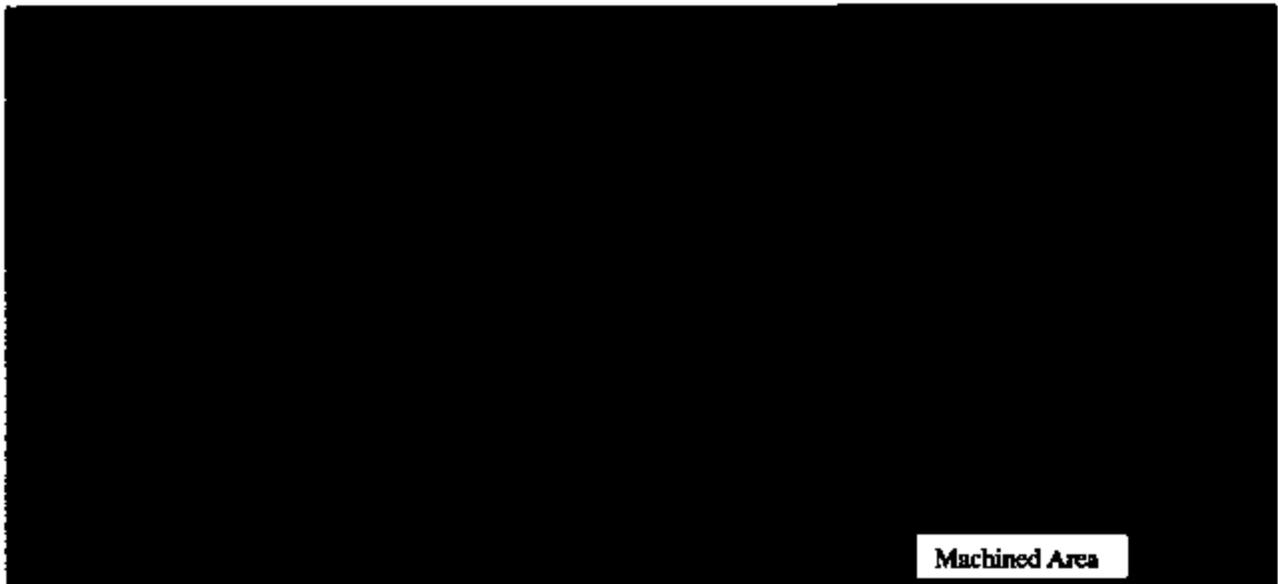
The selected buckles were functionally checked three times each in the as received state and after completion of the first and second cycle counts. The check was performed by hand with a minimum thickness tongue gage and the certified check gage. Both are designed with minimum latch plate material thickness to verify full engagement of the buckle latching mechanism.

The minimum thickness tongue is a production tongue that has reduced material thickness in the load bearing web of material that engages the load bearing component of the buckle assembly. The material is machined down to a thickness that ensures that the latching mechanism of the buckle has sufficient engagement with a production tongue to withstand the minimum force requirements. If the buckle latching mechanism does not have sufficient engagement the minimum thickness tongue gage is ejected from the buckle assembly. The minimum thickness tongue gage is shown in Picture # 1.



**Picture # 1**

The certified check gage is a gage designed with a tongue identical to that of the minimum thickness tongue; however, the gage inserts the minimum thickness tongue at a slow, controlled rate via a screw mechanism. The gage has a housing that the buckle is inserted into and the tongue is inserted into the buckle at a controlled rate using a screw until the buckle latches. If the buckle latching mechanism does not have sufficient engagement the certified gage will separate from the buckle assembly. The certified gage is shown in Picture # 2.



Picture # 2

### Buckle Cycling Method

The selected buckles were cycled to the requested cycle counts using the TRW standard buckle cycling machine. The buckle cycler is a computer controlled, pneumatically operated machine that can cycle up to 12 buckle assemblies simultaneously. The buckle assembly is in a nest that secures each buckle by the cover in a fixed position. One buckle cycle consists of the following. The tongue is driven into the buckle by a lever operated by a pneumatic cylinder until the buckle latches. The lever then moves out of the way so that if the buckle does not latch the tongue will be free to eject from the buckle under the force of the buckle ejector spring. The buckle is then unlatched by another pneumatically operated lever that depresses the pushbutton to full stroke allowing the tongue to eject free of the buckle. The function of the buckle is continuously monitored using proximity sensors that detect the position of the tongue and determine proper latching and unlatching characteristics. If the buckle malfunctions at any time, the computer records the malfunction and the exact cycle count at which it occurred. One station of the cycler is shown in Picture # 3.



Picture # 3



# Reliability Lab Test Request

Version 2.11

WA Test.GLB.005F01.04 Rev. 03/22/05

Item No.
05-06-3526

Requester:	
Work Phone:	
Home Phone:	
Pager / Cell:	
Alternate Contact:	
Alternates Phone:	

Project :	AC836
OEM:	FORD
Platform :	GENERIC
Test Desc.:	LIFE CYCLES WITH FUNCTIONAL CHECK
Test Type:	MISC.

Date Accepted By Test Lab:	3-Jun-2005	
Target Completion Date:	2-Jun-2005	
Test Series Completion Date:	9-Jun-2005	
Component(s)	BUCKLE	
NHTSA Seating Positions		
Part No.(s)	NPN	QTY. 6
ENERGETIC DEVICES	None	
TOTAL QTY.		6

Technician:	COLOMBO, DAVID
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Test Matrix Attached	<input type="checkbox"/> Yes	<input type="checkbox"/> No
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Samples for OEM Submission ?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
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Contact Duane Pearce to request hard copies of data associated with this test series. Ext. 7336

Retractor Type:	
Buckle Type:	RNS-4G

Test Requirements and Specifications		
Required Test	Specification No.	Revision
Buckles Cycles w/ Functional Check	No Specification	

Test Set-up Information		
In Car Positioning Requirements	Retractor	Sled On-set Rate
Forward Angle	Nominal Stowage	
Rearward Angle	Spool In	
Outboard Angle	Spool Out	
Inboard Angle	Left Hand <input type="checkbox"/> Right Hand <input type="checkbox"/>	

Miscellaneous Information
Cycle buckles to first cycle count. Stop and notify requester for functional evaluation.
Continue cycling buckles for additional cycle count and return to requester for evaluation.
Report should detail buckle label and cycle count for each. No other evaluation is required.