



ODI RESUME

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

Investigation: EA04-034
Prompted By: Consumer Complaints, RQ04-007
Date Opened: 12/21/2004 Date Closed: 03/08/2007
Principal Investigator: Scott Yon
Subject: Fracture of the steel wheel rim

Manufacturer: Ford Motor Company
Products: MY 2003 - 2005 Ford Crown Victoria Police Interceptor (CVPI)
Population: 109,664

Problem Description: The rim fractures under the tire bead with the potential for rapid air loss and a crash.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	59	201	218
Crashes/Fires:	2	2	2
Injury Incidents:	2	2	2
# Injuries:	3	3	3
Fatality Incidents:	0	0	0
# Fatalities:	0	0	0
Other*:	0	8,455	8,455

*Description of Other: Warranty claims ('M' and 'A' category) potentially involving rim fracture.

Action: Close this Engineering Analysis, Safety Recall 07V-079 (vehicles registered for police use only).

Engineer: D. Scott Yon

Date: 03/08/2007

Div. Chief: Jeffrey L. Quandt

Date: 03/08/2007

Office Dir.: Kathleen C. DeMeter

Date: 03/08/2007

Summary: Fracture (cracking) of the subject vehicle (SV) wheel, which was previously investigated under Preliminary Evaluation PE03-009 (Safety Recall 03V-279), occurs in the model year (MY) 2003 to 2005 Police Interceptor vehicles only; civilian specification and other MY vehicles are unaffected by this condition.

For the affected subject wheels, a fatigue crack occurs in the heat affected zone of the rim material adjacent to the circumferential weld that attaches the rim to the outboard wheel disc. The crack initiates under the outboard tire bead near the heel (where air leakage cannot be assured) and subsequently grows circumferentially through cyclic bending as the wheels rolls. Although the vast majority of rim cracks either presented no symptoms or were detected safely via recurring slow air leakage, ODI identified 6 incidents where rapid air leakage leading to a full or partial deflation of the tire was alleged. For these wheels, evidence indicated that multiple cracks had formed in different areas of the rim and subsequently grown together. Two of the incidents resulted in a crash, one during a high speed pursuit.

Although the minority of cases, Ford's assessments of field return wheels showed that multiple cracks exist in approximately 13 percent of the cracked wheels replaced under a Ford extended warranty program. With multiple cracks and as the area between the cracks is reduced by growth, a high stress condition (such as would occur in an aggressive vehicle maneuver during a high-speed pursuit) may cause the cracks to join together rapidly. If the cracks are of sufficient size, the structural integrity of the rim may be compromised resulting in rapid air loss and rim deformation. For police vehicle used at high speed, rapid deflation and loss of rim structural integrity affects vehicle control and may increase the risk of a crash. Fatigue is the fundamental fracture mechanism; therefore wheel fracture can be expected to occur (and at an increased incidence level) as long as the affected wheels remain in service.

In December 2004 (within MY 2005 SV production) Ford introduced a shot peen process into the manufacture of SV wheels. Shot peen wheels, which are identified by a unique part number stampings, have not exhibited fracture in police service to date. Under 07V-079, Ford will inspect SVs registered for police use and replace earlier design level wheels with shot peen wheels. Police agencies should be advised that MY 2005 vehicles built after December 2004 are not within the scope of this recall (since they were originally manufactured with shot peen wheels). Agencies should be diligent in insuring that non-shot peen wheels are removed from out-of-scope vehicles or other wheel supply inventories.