



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**

# ODI RESUME

**Investigation:** EA 15-005  
**Prompted by:**  
**Date Opened:** 09/28/2015  
**Investigator:** Chris Lash **Reviewer:** Jeff Quandt  
**Approver:** Jennifer Timian  
**Subject:** Front Brake Hose Failure

## MANUFACTURER & PRODUCT INFORMATION

**Manufacturer:** Ford Motor Company  
**Products:** 2015 Ford Explorer Police Interceptor  
**Population:** 20,275  
**Problem Description:** The front brake hoses may fail at the caliper-end crimp fitting due to thermal degradation produced by certain severe duty cycles.

## FAILURE REPORT SUMMARY

|                            | ODI | Manufacturer | Total |
|----------------------------|-----|--------------|-------|
| <b>Complaints:</b>         | 5   | 7            | 7**   |
| <b>Crashes/Fires:</b>      | 0   | 0            | 0     |
| <b>Injury Incidents:</b>   | 0   | 0            | 0     |
| <b>Fatality Incidents:</b> | 0   | 0            | 0     |
| <b>Other*:</b>             | 0   | 11           | 11    |

\*Description of Other: Warranty claims related to front hose assembly failures

\*\* Total eliminates duplicates received by ODI and manufacturer.

## ACTION / SUMMARY INFORMATION

**Action:** Engineering Analysis has been opened.

### Summary:

On April 29, 2015, the Office of Defects Investigation (ODI) opened PE15-017 to investigate reports of low-mileage failures of front brake jounce hoses in model year (MY) 2015 Ford Explorer Police Interceptor vehicles operated as training vehicles by the City of Sacramento, California (ODI VOQ No. 10705832). To date, the Sacramento police fleet has reported a total of 7 front hose failures in 5 different Explorer Police Interceptor vehicles used for its Emergency Vehicle Operation Course (EVOC) training. Most of the failures occurred within the first few miles of service on a closed course used for the EVOC program, which includes evasive accident avoidance and pursuit maneuver training. The hose assemblies either leaked at, or pulled completely free from, the caliper-end attachment where the hose is crimped to the steel end fitting. Most of the failures resulted in a sudden loss of braking performance that caused the vehicle to run off the intended course. None of the failures resulted in any crashes, injuries or property damage.

The subject MY 2015 hose assemblies are similar in design to hoses used on MY 2013 through 2014 Explorer Police Interceptor and civilian vehicles. The 5 vehicles used by Sacramento EVOC have all been repaired using MY 2016 front hose assemblies that have been changed to incorporate a short steel tube attached to the caliper end banjo block. No failures have been experienced by the Sacramento fleet to date in the other 37 MY 2014-2015 Explorer Police Interceptor vehicles (2 MY 2014 and 35 MY 2015) used by the fleet in regular law enforcement duty cycles unrelated to the EVOC training. In its response to ODI's information request letter for PE15-017, Ford provided information about 2 additional failures reported by other fleets, including 1 involving a Sacramento Regional Transit vehicle that occurred while being driven on the street.

Based on its analysis of failed parts returned from the Sacramento fleet and the fleet's EVOC training duty cycle, Ford

attributes the Sacramento fleet hose failures to excessive temperatures produced during "hot-soak" portions of the EVOC training duty cycle (when the vehicles are stationary after hard braking exercises, with no cooling air flow through the brake rotor vents and across the other brake components). During testing conducted to replicate the EVOC duty cycle, Ford measured temperatures at the subject crimp fittings that exceeded the design limits of the brake hose material after several successive training intervals and hot soaks. Ford has provided the Sacramento fleet with modified replacement hose assemblies for all of its MY 2014-15 Explorer Police Interceptor vehicles. The replacement hose assemblies were developed for use in MY 2016 Explorer vehicles and were modified slightly to accommodate the addition of a ride height sensor in those vehicles. The revised assemblies have an additional length of brake pipe between the caliper end connection and the subject crimp ferrule that results in additional heat dissipation and makes the assemblies more robust to the severe thermal effects experienced during the EVOC testing (the hose material is the same in both assemblies). Ford believes that the excessive temperatures experienced at the crimp fitting in the subject vehicles are unique to the EVOC duty cycle, have not been observed in the standard on-road severe duty cycle testing performed by Ford and police fleets who routinely conduct such testing and are not likely to occur in service usage for on-road Explorer Police Interceptor vehicles.

An Engineering Analysis has been opened to conduct testing and further assess the scope, frequency and safety-related consequences of the alleged defect in the subject vehicles.