



1996/97 Explorer / Mountaineer P255/70R16 Tire Separation in GCC and Malaysia

Draft of 7/08/99

1. **PROBLEM DESCRIPTION** (what/when/extent)

A. While driving vehicle, the tire tread separated (belt edge separation) from the main carcass of the tire. The tire failure is discovered when the driver hears the tire tread hitting the wheel house or the tire goes flat.

Incidences to date:

18 incidences have occurred in Saudi Arabia, Oman, and Qatar combined

2 incidences have occurred in Malaysia (15" tire)

All of these failures have been tire tread separation, all on '96 and '97 vehicles, all at mileages between 15,200 km and 55,000 km (9,500 - 34,000 miles).

B. Firestone P255/70R16 A/T ROWL tire, part # F57A-1508-JA, construction code ST369J, date codes on tires built between 10/25/95 and 2/19/97. This tire size and construction is a regular production option on U.S. models and is the standard size tire on almost every exported Explorer/Mountaineer except the base model going to Japan and Korea.

C. Vehicles Affected:

Model Year (s)	Vehicle Lines	Vehicle Volume	Variants	Other Limiting Factors
<u>GCC</u>				
1996	Explorer	2109	4X4, 4 dr, 4.0L, Auto	P255/70R16 A/T ROWL tire
1997	Expl./Moun..	1821	4X4, 4 dr, 4.0L, Auto	P255/70R16 A/T ROWL tire
1998	Expl./Moun.	1231	4X4, 4 dr, 4.0L, Auto	P255/70R16 A/T ROWL tire
1999	Expl./Moun.	<u>TBD</u>	4X4, 4 dr, 4.0L, Auto	P255/70R16 A/T ROWL tire
		5161		
<u>Malaysia</u>				
1996	Explorer	0	4x4, 4 dr, 4.0L, Auto	P235/75R15 A/T ROWL tire
1997	Explorer	109	4x4, 4 dr, 4.0L, Auto	P235/75R15 A/T ROWL tire
1998	Explorer	<40	4x4, 4 dr, 4.0L, Auto	P255/70R16 A/T ROWL tire
1999	Explorer	<u><80</u>	4x4, 4 dr, 4.0L, Auto	P255/70R16 A/T ROWL tire
		229		

D. Markets Affected: Malaysia and GCC (Bahrain, Saudi Arabia, Oman, Qatar, Yemen, Jordan, Kuwait, Lebanon, Syria and United Arab Emirates).

E. CPSC Codes: 04.04.02.



2. DEFINE ROOT CAUSE

The root cause of the tire failures was determined to be tread separation from the tire carcass caused by one or more of the following contributing factors:

- A. Low inflation operating situation - causing internal tire damage resulting in tread separation.

Improper repair

Tire repairs being done using unapproved rope type plugs. This type of repairs leak air, unbeknownst to the customer.

Unintentional under-inflation condition (puncture, other leak)

Customer gets slow leak from puncture and drive on under-inflated tire.

Valve stem leakage due to customer not replacing cap (50% occurrence)

Continued / Repeated use while under-inflated (after off-road usage)

Customers let air out of tires to drive in the desert, then drive back to a gas station at high speed with under-inflated tires.

FoV recommends a lower tire pressure than we do (to improve skate) and vehicle is driven vehicle at Vmax for long distances with these "under-inflated" tires.

- B. Extended / Repeated use at high speed in high ambient temperatures

Tires are speed rated to run at rated speed (ie, 112 mph) for only a short period of time (20-30 minutes) before the tire starts to fail internally. Our customers in these countries are driving the Explorer as fast as 106 mph for hours, possibly several times a week, possibly every week of the year, for 3-4 years. Running the tires for long periods at high speeds have an accumulative affect on destroying the tire.

- C. Extended / Repeated use at overloaded conditions in high ambient temperatures

Third row seat added to GCC sold vehicles can put the vehicle rear gross axle weight (RGAWR) above the allowable designed by Ford. This puts added loading into the tire, thus generating more heat in addition to the high ambient operating conditions and possible high vehicle speeds. These all add up to speeding up the destruction to the tire internally.



D. Fatigue failure accelerated by high temperatures

The tire rubber internal bonds start to break down when exposed to high temperatures for extended periods of time. This in conjunction with dynamic cycling (driving at high speeds) (which imparts additional heat into the rubber) breaks more of these bonds between the rubber molecules and between the rubber and the steel belts. This weakening/breaking of the bonds between the steel belt and the rubber is where the tire tread separation starts and "unzips" the tread.

E. Fatigue failure accelerated by ozone exposure (in areas near oil fields, eastern Gulf cities)

The high ozone levels near oil fields or oil refineries chemically attacks the rubber and breaks down the bonds linking the rubber molecules. We see this condition on the outer upper sidewall and shoulder area of the tires as cracks. These cracks can cause tread separation or sidewall bulges.

F. Please check the applicable item(s) in each category:

- Type: Design Manufacturing Vehicle Assembly

 Other (Specify - Customer - air pressure or Road Hazard -Puncture)

- System: Body Chassis Cooling Fuel Electrical Engine

 Glass Restraints Transmission/Axle

 Vehicle Label/Publications Emissions Control

 OBD Other (Field repair procedures)

- Symptom: Brake Control Emission Compliance

 Other Regulatory Compliance Driveability/No Start

 Engine Speed Control/Unexpected Movement Fire

 Steering Control Occupant Restraint Personal Injury

 Visibility Warranty Avoidance /Customer Satisfaction

 Other (Vehicle damage)



3. PROBLEM INVESTIGATION/VERIFICATION DATA

A. Lab tests -

Running Special High Speed Testing at Reduced Pressures on:

The current 16" tire, severe duty 16" tire for Australia, H-rated tire for EAO, and 6 competitive vehicle tires (Dunlop, Bridgestone, Yokohama, Goodyear, and Michelin) that are sold in the GCC countries. The findings are that all the tires failed at about the same interval for the same speed rated tire. The only exception is the Dunlop tire that ran an additional 2 speed steps as if the tire was really an H-rated tire instead of an S-rated as labeled.

B. Vehicle tests - None

C. Plant/supplier reports - Supplier (Bridgestone/Firestone of Japan) has been contacted in Japan for Malaysia incidents, and U.S. office has been contacted on GCC incidents. Ford Explorer OPD Engineering has been contacted on all three region incidences.

D. Quality Indicator System - 2 CQIS reports have been received on Malaysia incidents.

E. Field reports - 18 from GCC

2 from Malaysia

F. Parts sales — Tires are not sold thru Ford dealers. Therefore no service parts count is available on problem tires.

G. Number of accidents/fines and injuries: 18 accidents in GCC

7 fatalities, 8 minor injuries, 2 unknown injury

2 incidences, no reported injuries in Malaysia.

4. Actions Taken in Production; Interim (Containment) and/or Permanent

A. Corrective actions - None at this time.

B. Notification - None at this time.

C. Provide WERS alert number - None at this time.

D. Component batch issues - None at this time.

5. VERIFY EFFECTIVENESS OF CORRECTIVE ACTIONS

A. A. No corrective action taken yet.



6. ESTIMATED PRODUCTION AND PROBLEM STATISTICS (MAGNITUDE OF CONCERN)

A. Production Involved

VEHICLES AFFECTED (BY MODEL AND MODEL YEAR)	ASSEMBLY PLANTS* (INCLUDING KNOCK DOWN OPERATIONS)	VEHICLE PRODUCTION DATES		POTENTIALLY AFFECTED UNITS	
		FROM	UP TO AND INCLUDING	NUMBER OF UNITS	ESTIMATED PERCENTAGE OF VEHICLES THAT CONTAIN THE CONDITION
1996/98 Explorer / Mountaineer	LAP	8/1/95	7/30/98	5390	N/A %
1996/99 Explorer	SLAP	8/1/95	7/30/99	0	0 %
1999 Explorer / Mountaineer	LAP	8/1/98	7/30/99	TBD	N/A %

B. Melanie Gumz of WDMO (GCC) and Diana Glass from Q&PL New Markets (Malaysia)

7. AFTERMARKET PARTS

- A. Released for Service: part is released for service but Ford does not stock any tires for service.
- B. Tires are not stocked by depot or by Ford dealers. Firestone must determine whether they want to purge their inventory of tires at their distributor and tire stores in these export regions.

8. ASSESSMENT OF EFFECT ON VEHICLE OPERATION

This particular tire failure has resulted in customers losing control of their vehicles with reported roll over conditions, however, we don't have definite information on the actual cause of the accidents.

Roll over conditions are a result of the vehicle going off the road into soft soil conditions, from changing road coefficients of friction (ie, wet to dry) or when the wheel digs into the pavement or ground and the vehicle rolls.



9. DESCRIPTION OF CONCERN SOLUTION AND PARTS REQUIREMENTS (FIELD SERVICE ACTIONS)

Short Term Actions:

- A. **PRIME** - Have the dealers replace all the tires on every Explorer/Mountaineer after 20,000 miles (32,000 km) or 18 months after the build date (not sold date) (whichever is shorter) with the carryover Firestone Wilderness P255/70R16 A/T tires. This will assure that tires have not been in the field long enough to experience these heat related failures.
- B. Same as above but have the dealers replace the tires with our "Special Service" Firestone Wilderness P255/70R16 A/T tire as they become available. We do not have enough of these tires in the GCC region, and Firestone is capacity constrained at this time to be able to support the GCC region with enough tires (~21,000 needed) for this potential action.
- C. Explorer OPD Chassis Engrg. is working on proving out 2 tires that the GCC markets have recommend for their conditions. It will take Engineering 2-3 weeks to prove out these 2 tires (Goodyear Wrangler RT/S, and Bridgestone Dueler AT) are safe for the vehicle before we recommend fitment to the vehicle as a dealer fix.

Long Term Actions:

- A. No long term prime action has been assessed yet.
- B. Test processes, plant complexity, market wants and other factors will be thoroughly considered in developing a long term action.
 - A test procedure needs to be developed by RVT to access one tire over another for this harsh operating environment.
 - Assembly plant complexity needs to be addressed (LAP has no room for another tire)
 - Market wants need to be addressed (GCC region does not want a Firestone tire)
 - Should all Ford trucks investigate the capabilities of the tires being exported to GCC region.
 - U152 and all other SUV's should have Low Tire Pressure Warning systems fitted when shipped to GCC region.