



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: EA 18-002
Prompted by:
Date Opened: 04/18/2018
Investigator: Robert Caple **Reviewer:** Scott Yon
Approver: Stephen Ridella
Subject: Extended Braking Distance

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Ford Motor Company
Products: MY 2006-2012 Fusion/MKZ & MY 2006-2011 Milan
Population: 1,030,000 (Estimated)
Problem Description: The brake pedal may lose pressure resulting in increased pedal travel and potentially increasing the stopping distance.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	544	244	735**
Crashes/Fires:	26	7	30**
Injury Incidents:	3	0	3
Number of Injuries:	3	0	3
Fatality Incidents:	0	0	0

** Total eliminates duplicates received by ODI and manufacturer.

ACTION / SUMMARY INFORMATION

Action: Upgrade PE17-016 to an Engineering Analysis.

Summary:

On December 20, 2016, the Office of Defects Investigation (ODI) opened Preliminary Evaluation (PE) 16-017 to investigate reports of braking concerns in model year 2007 through 2009 Ford Fusion and Mercury Milan vehicles. Complainants report that after an ABS braking event (caused by braking on a slippery or uneven surface) the brake pedal moved towards the floor and the distance in which the vehicle stopped increased beyond what was expected by the driver. The cause of the problem appears to be the Antilock Braking System (ABS) Hydraulic Control Unit (HCU), a component manufactured for Ford by Continental Automotive Systems. Hydraulic control valves within the HCU can experience corrosion and become stuck. In some cases, braking returns to normal when the valve(s) subsequently become unstuck. The intermittent condition proves difficult to diagnose and complainants report having several brake system components replaced only to have the condition return.

ODI has identified 544 reports submitted to the agency that relate to this issue in model year 2006-2012 Ford Fusion/ MKZ and MY 2006-2011 Mercury Milan, the subject vehicles. Complainants report an increase in pedal travel which in some cases resulted in going past expected stopping points or having to steer to avoid contacting another vehicle; twenty six report a crash with 3 injuries alleged. The Ford reports shown above, which are from PE16-017 and involved the scope discussed above, were similar in content and identified 7 crashes without injury.

During PE16-017, ODI was able to recover HCUs from some complaint vehicles, including some from the reported crashes. The recovered HCUs were sent to NHTSA's Vehicle Research and Test Center (VRTC) in East Liberty, Ohio for evaluation. VRTC was able to confirm stuck valves and corrosion of the zinc coated control valves, and it's testing indicates that HCU failures cause increases in pedal travel that may affect braking distance. According to Ford, newer version HCUs have a different coating on the affected valves that do not currently appear to be experiencing

corrosion.

In its response to ODI's information request letter, Ford described analysis of two failed HCUs removed from complainant vehicles. In both cases, a gelatinous material found inside the HCU prevented control valves from properly returning to the closed position after actuation. Ford found that an interaction between the valve coating and brake fluid was the likely source of the gelatinous material. It acknowledged that stuck valves can result in increased pedal travel but maintains the affected brake circuit will develop pressure and respond if the brake pedal is pressed sufficiently. While it has not identified an unreasonable risk to safety due to this issue, Ford states that it continues to investigate the possible causal and contributory factors including additional engineering evaluations and testing.

An Engineering Analysis has been opened to assess the scope, frequency, and safety-related consequence of the alleged defect. Based on information received during PE16-017, the scope of the investigation has been increased to include another model, the Lincoln MKZ, and to expand the model years of the subject vehicles.

The VOQs associated with the opening of this investigation, and which can be viewed at NHTSA.gov are:

10455572, 10467597, 10469486, 10480952, 10489124, 10514752, 10533506, 10558633, 10559710, 10587183, 10588569, 10594697, 10618242, 10618330, 10629520, 10629592, 10639014, 10640257, 10641156, 10641549, 10641941, 10644354, 10650630, 10653180, 10653400, 10655357, 10658960, 10670396, 10672699, 10680357, 10680363, 10683872, 10690056, 10690173, 10692468, 10694951, 10712615, 10713269, 10721041, 10730359, 10745073, 10749892, 10759975, 10760343, 10779110, 10783662, 10785218, 10787563, 10787755, 10789062, 10789437, 10789637, 10789689, 10790504, 10794803, 10806755, 10807637, 10807655, 10808346, 10810060, 10811083, 10811561, 10818601, 10819862, 10820307, 10822164, 10823422, 10824708, 10824987, 10825433, 10836359, 10937743, 10937745, 10937748, 10937757, 10937758, 10937760, 10937764, 10937782, 10836561, 10837758, 10840288, 10845863, 10852553, 10854702, 10854765, 10860086, 10862114, 10862775, 10863054, 10863161, 10863250, 10865169, 10865450, 10870186, 10873218, 10874967, 10875748, 10875760, 10876335, 10881298, 10883508, 10883561, 10887635, 10888626, 10892944, 10894432, 10894501, 10897356, 10899417, 10903135, 10903875, 10905557, 10906293, 10907093, 10907122, 10911159, 10915773, 10916749, 10916867, 10917229, 10920381, 10920642, 10920650, 10923968, 10924188, 10924287, 10925296, 10925894, 10926036, 10928668, 10929495, 10929499, 10929668, 10934454, 10934590, 10934917, 10935394, 10936078, 10937058, 10937579, 10937599, 10937620, 10937635, 10937640, 10937648, 10937660, 10937706, 10937725, 10937728, 10937797, 10937798, 10937802, 10937807, 10937811, 10937812, 10937815, 10937819, 10937831, 10937837, 10937838, 10937846, 10937854, 10937859, 10937860, 10937862, 10937864, 10937868, 10937871, 10937894, 10937895, 10937902, 10937909, 10937918, 10937919, 10937933, 10937941, 10937951, 10937955, 10937959, 10937964, 10938013, 10938014, 10938015, 10938016, 10938023, 10938313, 10938320, 10938324, 10938326, 10938341, 10938342, 10938343, 10938346, 10938348, 10938355, 10938365, 10938367, 10938376, 10938377, 10938389, 10938394, 10938405, 10938410, 10938411, 10938414, 10938428, 10938442, 10938447, 10938451, 10938462, 10938468, 10938469, 10938474, 10938475, 10938483, 10938485, 10938489, 10938497, 10938519, 10938534, 10938538, 10938548, 10938553, 10938568, 10938570, 10938576, 10938579, 10938615, 10938639, 10938662, 10938678, 10938708, 10938712, 10938738, 10938771, 10938774, 10938817, 10938833, 10938839, 10938846, 10938853, 10938882, 10938986, 10938993, 10938998, 10939056, 10939061, 10939110, 10939116, 10939117, 10939121, 10939140, 10939214, 10939230, 10939243, 10939267, 10939272, 10939274, 10939287, 10939456, 10939468, 10939480, 10939482, 10939484, 10939513, 10939524, 10939660, 10939663, 10939711, 10939715, 10939749, 10939770, 10939779, 10939792, 10939853, 10939897, 10939938, 10939956, 10939988, 10939989, 10940056, 10940095, 10940150, 10940172, 10940182, 10940209, 10940219, 10940306, 10940313, 10940326, 10940381, 10943692, 10943807, 10943842, 10943878, 10943973, 10943983, 10944011, 10944032, 10944045, 10944058, 10944100, 10944114, 10944121, 10944298, 10944338, 10944408, 10944413, 10944489, 10944490, 10944562, 10944616, 10945003, 10945052, 10945223, 10945237, 10945291, 10945386, 10945423, 10945485, 10945827, 10945869, 10946143, 10946155, 10946327, 10946567, 10946680, 10946848, 10946956, 10947061, 10947062, 10947310, 10947319, 10947398, 10947446, 10947635, 10947818, 10947838, 10947887, 10948108, 10948359, 10948499, 10948525, 10948874, 10949025, 10949034, 10949037, 10949159, 10949624, 10949645, 10949685, 10949698, 10949872, 10949928, 10950024, 10950151, 10950203, 10950300, 10950456, 10954019, 10954159, 10954612, 10955004, 10955225, 10955665, 10956122, 10956421, 10956597, 10957738, 10958323, 10958326, 10958413, 10958571, 10958710, 10958746, 10959081, 10959154, 10959589, 10959725, 10959973, 10965733, 10965803, 10966345, 10966363, 10966376, 10967302, 10967475, 10968500, 10968590, 10968996, 10969005, 10969627, 10969655, 10969877, 10970531, 10971094, 10971738, 10972059, 10978550, 10979447, 10979625, 10979994, 10980410, 10980868, 10980955, 10980982, 10981513, 10981685, 10982990, 10983416, 10983789, 10983913, 10984264, 10984616, 10985648, 10985799, 10985958, 10985982, 10986094, 10990599, 10990698, 10990787,

Engineering Analysis Open Resume Attachment

10990856, 10991898, 10992413, 10992621, 10992650, 10993396, 10995428, 11000517, 11000532, 11000627, 11000908, 11001254, 11001551, 11002639, 11003657, 11003746, 11004144, 11004247, 11004669, 11005026, 11006429, 11006599, 11010113, 11010404, 11012018, 11012051, 11012799, 11012851, 11013020, 11013303, 11014504, 11014603, 11014783, 11014996, 11015220, 11015649, 11015872, 11015987, 11016217, 11016329, 11016377, 11016548, 11019171, 11019263, 11020214, 11020435, 11021017, 11021204, 11022361, 11022784, 11023749, 11023792, 11024114, 11024733, 11024842, 11025059, 11025261, 11025413, 11030023, 11030702, 11031380, 11031624, 11031813, 11031982, 11032067, 11032215, 11032310, 11032986, 11033498, 11034889, 11035795, 11035905, 11039309, 11039319, 11041608, 11041937, 11042184, 11043261, 11043582, 11044395, 11044835, 11045291, 11045770, 11045871, 11047162, 11047814, 11048072, 11048359, 11048468, 11048518, 11048675, 11051652, 11051673, 11052018, 11052385, 11052673, 11052981, 11053422, 11053635, 11053854, 11053858, 11053896, 11054075, 11054186, 11054191, 11054450, 11054929, 11055049, 11055161, 11055202, 11055346, 11055636, 11056313, 11056358, 11056645, 11056875, 11057088, 11057816, 11057856, 11057998, 11058201

Crash VOQs included in above list: 10641156, 10690173, 10819862, 10852553, 10928668, 10937941, 10938013, 10938320, 10938367, 10938678, 10939468, 10939480, 10939484, 10939938, 10940172, 10945237, 10947635, 10957738, 10985958, 10992413, 10993396, 11019171, 11024733, 11031380, 11045871, 11047814