



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

ODI RESUME

Investigation: PE 14-030
Date Opened: 10/02/2014
Investigator: Chris Lash
Approver: Jennifer Timian
Subject: Electric power steering failure

Date Closed: 09/10/2015
Reviewer: Jeff Quandt

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: Ford Motor Company
Products: 2010-12 Ford Fusion, Lincoln MKZ and 2010-11 Mercury Milan
Population: 848,600

Problem Description: The Electric Power Assisted Steering (EPAS) can suddenly fail while driving, resulting in increased steering effort.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	1,127	1,687	2584**
Crashes/Fires:	8	32	40
Injury Incidents:	0	4	4
Number of Injuries:	0	4	4
Fatality Incidents:	0	0	0
Other*:	0	9,967	9,967

*Description of Other: Warranty claims for electric power steering repairs.

** Total eliminates duplicates received by ODI and manufacturer.

ACTION / SUMMARY INFORMATION

Action: This preliminary evaluation is closed. Ford recall 15V-340.

Summary:

The Office of Defects Investigation (ODI) opened a preliminary evaluation to investigate complaints of the loss of power steering while driving. The subject vehicles are equipped with a rack mounted Electric Power Assisted Steering (EPAS) unit. Some of the complaints alleged that the steering assist failed and resulted in increased steering efforts that contributed to a loss of control and in some cases a crash.

The EPAS system was manufactured by TRW Automotive for Ford and was designated as Generation I. These units were first produced and put into vehicle production in July 2008 beginning with the model year (MY) 2010 Ford Fusion and Mercury Milan. The system is comprised of a mechanical steering rack-and-pinion gear with torque sensor, electric assist motor, motor position sensor and a power steering control module (PSCM). The PSCM is self-monitoring and designed to detect faults within the system and can store diagnostic trouble codes (DTCs) if a problem is detected. There are 29 potential DTCs the system can detect. Many of these allow the system to go into reduced-assist steering mode by using the default vehicle speed signal should the live speed signal be lost, if voltage to EPAS system falls below 10.7 or goes above 17 volts, the temperature at the PSCM goes above 105C (221F), or if high friction is detected. Some DTCs will cause the system to go into manual steering mode (no assist).

On July 1, 2015, Ford filed a Defect Information Report (DIR) identifying a safety related defect in TRW GEN I EPAS systems installed in some of the subject vehicles (NHTSA Recall 15V-340, Ford No. 15S18). The DIR indicated that intermittent electrical connections caused by quality issues associated with conformal coat contamination and ribbon cable pin misalignment within the steering gear motor may lead to a loss of the motor position sensor signal, resulting

in a sudden loss of power assist while driving. The recall covers approximately 393,623 vehicles built from September 2010 through February 2012: 2011-12 Fusion built SEP 2010 - FEB 2012; 2011-12 Lincoln MKZ built SEP 2010 - FEB 2012; 2011 Milan built SEP 2010 - DEC 2010; 2011-13 Taurus built SEP 2010 - FEB 2012; 2011-13 Flex with 3.5L GTDI engine built SEP 2010 - FEB 2012; and 2011-13 MKS, MKT with 3.5L GTDI engine built SEP 2010 - FEB 2012. The repair consists of updating the PSCM software to prevent a loss of steering assist while driving. The revised software will provide audible and visual warnings to the driver. If one or more of the following DTCs are stored, C1B00-62, C200B-2F, C200B-61, C200B-62, C200C-2F, C200D-49, U0300-00, U2011-49, U2011-61, U3000-46, U3000-49, U3000-61, U3000-72, U3000-96, P07AE-09, the dealer will replace the EPAS system at no charge to the owner.

ODI's analysis of failure data for this PE identified a total of 2,584 complaints to ODI and Ford and 9,967 Ford warranty claims related to the alleged defect. The recalled vehicles account for 1,634 of the complaints and 7,311 of the warranty claims. ODI's analysis identified 40 complaints alleging crashes that may be related to loss of steering assist while driving, 20 of which involved vehicles included in Ford's recall. The information available for the alleged crashes were not sufficient to assess specific causes of the incidents or to verify EPAS malfunctions in each case. Most of the crashes were low-speed impacts with curbs or roadside objects resulting in wheel or minor body damage. None of the injury claims indicated medical attention was required. In addition, statistical modeling of the failure data by NHTSA's National Center for Statistics and Analysis projected 10-year failure rates of approximately 8-14 percent for the recalled vehicles and approximately 1 percent for the non-recalled subject vehicles. This investigation is closed. All ODI complaints associated with this closing resume are listed in the Attachment.

PE14-030 Close VOQ List – Recalled Vehicles

10395866	10399185	10402935	10411672	10416504	10417157	10420780	10433090	10444572	10449562
10456904	10457186	10459162	10459681	10459756	10460058	10462191	10462367	10463902	10464613
10465189	10466086	10465858	10467040	10469733	10470741	10470803	10471310	10472576	10473125
10474599	10475287	10478381	10478493	10480909	10481492	10484079	10490091	10503220	10504797
10505498	10509137	10509906	10510164	10510445	10511479	10511635	10511871	10514112	10519701
10520093	10520848	10521453	10521463	10521637	10521887	10522129	10522195	10522717	10522934
10523055	10523208	10523487	10523795	10524041	10524075	10524083	10524707	10525385	10525754
10525913	10526374	10526288	10526341	10531651	10532065	10532938	10532993	10533125	10533250
10533309	10533512	10533610	10533718	10533891	10534199	10534739	10535028	10535337	10535847
10535875	10536632	10536371	10536412	10537022	10537165	10537542	10537623	10538074	10538225
10538570	10538624	10541850	10541775	10541854	10541941	10542056	10542190	10543106	10543236
10543874	10544390	10546142	10546393	10547182	10547294	10547594	10547661	10548290	10548911
10549612	10549831	10552944	10553184	10553622	10553761	10554156	10554265	10554439	10555396
10556897	10557384	10557675	10558404	10558517	10558660	10559657	10560588	10560832	10561337
10561941	10562391	10564481	10565155	10565406	10568032	10568124	10568675	10569095	10569336
10577036	10577642	10578115	10578699	10579483	10579652	10583252	10583577	10584529	10584760
10585731	10585759	10586141	10587044	10587133	10587175	10592254	10592349	10593526	10594127
10594382	10594643	10594745	10594983	10594985	10595317	10595512	10595761	10595967	10596411
10596603	10596760	10597405	10598258	10598609	10598612	10598766	10599066	10604472	10604640
10604893	10605026	10605173	10605395	10605401	10605607	10605646	10605747	10606067	10606104
10606142	10606341	10606392	10606463	10606482	10606818	10607358	10607700	10607830	10607917
10608094	10608207	10608592	10608698	10609066	10609318	10609757	10609773	10609782	10609877
10610284	10610510	10610551	10610596	10610720	10610841	10610937	10611273	10611392	10614511
10614644	10615138	10615157	10615188	10615499	10615526	10615912	10616868	10617212	10617802
10617831	10618045	10618078	10618363	10618458	10618592	10618915	10619316	10619492	10619548
10620699	10620769	10621014	10621248	10621436	10621560	10621866	10622014	10622587	10622660
10625774	10625847	10625860	10625893	10626224	10626380	10626497	10626821	10627028	10627996
10628233	10628687	10628789	10628882	10628928	10628966	10629243	10629849	10630079	10630277
10630497	10630736	10631377	10631618	10631661	10631698	10632263	10632720	10632738	10632747
10632954	10633134	10633403	10633753	10637059	10637486	10638392	10639207	10639500	10639546
10639710	10640338	10640347	10640502	10640534	10640717	10640737	10640767	10641125	10641619
10641621	10641649	10641651	10641677	10641722	10641784	10641819	10641828	10641865	10641872
10641882	10641902	10641914	10641921	10641925	10641935	10641976	10641982	10641996	10642011
10642028	10643125	10643132	10643134	10643140	10643142	10643160	10640997	10643224	10643328
10643398	10643406	10643480	10644273	10644300	10644332	10644383	10644390	10644393	10644436
10644449	10644543	10644803	10648141	10648466	10648602	10648668	10648987	10649241	10649339
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10649131	10651026	10651106	10651574	10651771	10651778	10651839	10651895	10652202	10652469
10654404	10652543	10652568	10653080	10653028	10653507	10653476	10653489	10653523	10653537
10653574	10653787	10654232	10655076	10655159	10655222	10655387	10655360	10658833	10658906

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10658946	10659112	10659198	10659352	10659692	10659704	10659950	10660557	10660487	10660542
10661110	10661328	10662615	10662903	10662993	10663522	10663742	10664015	10664033	10658476
10664401	10666963	10667020	10667240	10667574	10667854	10668329	10668432	10668620	10668773
10668715	10668882	10669235	10669256	10669365	10669466	10669477	10669975	10669984	10670316
10670496	10671504	10671534	10671913	10672516	10672874	10676144	10676181	10676326	10676389
10676645	10678286	10678375	10678858	10679000	10679587	10679641	10679823	10679915	10680258
10680366	10681884	10682216	10682313	10682431	10682681	10683434	10683518	10683612	10683625
10683873	10684167	10684220	10689873	10689949	10690169	10690210	10690634	10691198	10691313
10691352	10691581	10691590	10691602	10691848	10693089	10693100	10693145	10693326	10693401
10693725	10693899	10693976	10694070	10694205	10694268	10694356	10694361	10694836	10694753
10694939	10694985	10695160	10695101	10695135	10695210	10695251	10695283	10701285	10701528
10702027	10702296	10702431	10702409	10702551	10703002	10703447	10703479	10703988	10704246
10704709	10704654	10704912	10705034	10705078	10705185	10705594	10705730	10705852	10706048
10706332	10706337	10706457	10706582	10706721	10712407	10712628	10712861	10712964	10713210
10713215	10713217	10713228	10713456	10713535	10713683	10713769	10713817	10713850	10713959
10714118	10714173	10714383	10714421	10714500	10714506	10714755	10715039	10715301	10715342
10715588	10715804	10715807	10715848	10716026	10716066	10716144	10716631	10716823	10716845
10716852	10716957	10716958	10716997	10717090	10717193	10717197	10717234	10717319	10717486
10717541	10717594	10717790	10717905	10721046	10721072	10721268	10721378	10721724	10721747
10721818	10722296	10722387	10722473	10722500	10723253	10723530	10723737	10723757	10723857
10723891	10724445	10724451	10724664	10725055	10725457	10725667	10726649	10726749	10730168
10730329	10730662	10731489							

PE14-030 Close VOQ List – Not Recalled Vehicles

10334562	10339693	10363555	10373154	10402306	10427502	10460240	10462376	10464678	10465753
10468154	10475281	10475717	10478781	10479689	10481506	10481999	10482479	10483356	10483868
10484572	10485824	10486128	10487934	10489139	10490689	10491485	10493146	10493552	10498328
10503609	10504461	10504897	10507476	10508967	10509103	10509717	10510290	10510661	10511476
10511498	10511654	10513606	10514771	10516153	10520151	10520201	10520469	10522041	10523675
10523971	10524000	10524401	10525462	10525894	10525903	10531890	10531940	10532810	10532948
10533152	10533433	10534555	10534918	10535200	10536222	10536773	10537398	10537917	10538247
10538446	10538588	10542756	10542796	10543668	10544508	10544986	10545140	10546484	10547128
10547238	10549310	10551896	10551922	10552631	10553209	10553491	10555431	10555668	10555771
10556040	10556421	10556572	10557014	10557230	10557363	10557456	10557630	10557974	10558252
10559955	10560311	10560462	10560523	10560596	10560630	10561528	10561628	10561706	10561850
10562527	10562963	10563255	10563626	10565505	10566216	10566279	10566664	10566747	10566995
10567132	10568752	10569075	10572623	10572948	10573250	10573661	10574111	10576228	10576452
10577265	10578765	10582845	10583528	10584092	10584114	10584905	10586344	10586445	10588317
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10620760	10620981	10621302	10622020	10622112	10622312	10626397	10626494	10627331	10628676
10629557	10629920	10630820	10631064	10631129	10631370	10631584	10632180	10632719	10633212
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10641912	10641917	10641933	10641947	10641990	10643344	10643426	10643461	10643490	10643682
10643765	10644268	10644276	10644294	10644335	10644529	10644921	10648209	10648307	10648819
10648832	10649409	10649496	10649663	10649965	10649984	10650240	10650294	10650437	10650619
10650694	10650700	10650842	10650859	10651267	10651543	10651551	10651642	10651870	10652039
10652186	10652210	10652248	10652329	10652504	10652532	10652699	10652954	10653160	10653790
10654017	10654042	10654183	10654566	10654799	10655390	10658549	10658569	10658811	10658953
10658969	10659110	10659147	10659776	10659938	10660118	10660172	10660351	10660721	10661283
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10664735	10667129	10667371	10667450	10667484	10667486	10667548	10667875	10668592	10668797
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10672952	10673048	10676786	10676879	10677116	10678707	10678739	10678786	10678896	10679204
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10691779	10691863	10691895	10692168	10692463	10692868	10693198	10693439	10693598	10693720
10693793	10693876	10693916	10694065	10694132	10694179	10694343	10695388	10695542	10700776
10700910	10701283	10701364	10701568	10701829	10702167	10702360	10702713	10702810	10702832
10703267	10703820	10703860	10704200	10705246	10705621	10705626	10705748	10706186	10711761
10712029	10712382	10712882	10712986	10713966	10714210	10715498	10715735	10715777	10716269
10716403	10716497	10716864	10717226	10721097	10721400	10721501	10721545	10721643	10721860
10721907	10721919	10722033	10722041	10722071	10722081	10722262	10722307	10722390	10722438

PE14-030 Close VOQ List – Not Recalled Vehicles

10722495	10722529	10722549	10722938	10723427	10723520	10723760	10723941	10724025	10724053
10724083	10724401	10724527	10724556	10725130	10725177	10725359	10725516	10725715	10725779
10726838	10726961	10730241	10730405	10730771	10731158	10731536			