

ArvinMeritor™

Fax Cover

To: Associate Administrator of Enforcement **From:** Debra Shumar

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Date: April 2, 2002

Subject: Defect Information Report

Enclosed:

- Second Amendment to September 2000, Defect Information Report, as amended on June 27, 2001, filed in accordance with 49 CFR Section 573.5, regarding certain Model 20-EDL Ball Sockets Manufactured by TRW and Sold to ArvinMeritor
- TRW Model 20-EDL Vehicle PPM Summary

April 2, 2002

National Highway Traffic Safety Administration
400 Seventh Street S.W.
Washington, D.C. 20590
Attention: Associate Administrator of Enforcement

Fax: 202-366-7882

Re: Second Amendment to September 2000, Defect Information Report, as amended on June 27, 2001, filed in accordance with 49 CFR §573.5, regarding certain Model 20-EDL Ball Sockets Manufactured by TRW and Sold to ArvinMeritor.

ArvinMeritor File: None

NHTSA File: 00E-047 (TRW)

Ladies & Gentlemen:

ArvinMeritor, Inc. submits this second amendment to its September 2000, Defect Information Report, as amended on June 27, 2001, in accordance with the requirements of The National Motor Vehicle Safety Act of 1966 as set forth in 49 CFR §573.5. The information is presented to correspond to the sub paragraphs of section §573.5(c).

Information Requested under §573.5(c)(1)

No change.

Information Requested under §573.5(c)(2)

This reports covers TRW Model 20-EDL Ball Socket Assemblies that were not otherwise covered by ArvinMeritor's initial Defect Information Report and the first amendment thereto. Specifically, the items of motor vehicle equipment affected by this amendment are Model 20-EDL Ball Socket Assemblies that TRW Commercial Steering Systems, a division of TRW, Inc. ("TRW") manufactured and shipped to ArvinMeritor from October 31, 1999 through May 12, 2000, and from June 12, 2000 through August 8, 2000; and that ArvinMeritor incorporated into axles it manufactured from October 31, 1999 through May 31, 2000 and from June 12, 2000 through August 31, 2000.

These dates are based on an analysis of TRW's and ArvinMeritor's manufacturing records, and are incremental to the dates identified in ArvinMeritor's initial Defect Information Report and the first amendment thereto.

Information Requested under §573.5(c)(3)

ArvinMeritor estimates that it incorporated into its axle assemblies approximately 119,000 Model 20-EDL Ball Socket Assemblies that TRW manufactured and shipped to ArvinMeritor from October 31, 1999 through May 12, 2000 and from June 12, 2000 through August 8, 2000. In addition, ArvinMeritor estimates that it incorporated into aftermarket products an additional 62,000 Model 20-EDL Ball Socket Assemblies that TRW manufactured and shipped to ArvinMeritor during those periods.

Information Requested under §573.5(c)(4)

The percentage of TRW Model 20-EDL Ball Socket Assemblies referenced above that are estimated to contain the condition described below is 100%.

Information Requested under §573.5(c)(5)

TRW Model 20-EDL Ball Socket Assemblies are primarily comprised of a ball stud, a socket, and a "floating" bearing that is free to move relative to both the inside of the socket and the ball stud.

In August 2000, TRW filed a Defect Information Report with NHTSA indicating that it was recalling Model 20-EDL Ball-Socket Assemblies that were manufactured between July 1999 and October 1999 because the bearings in those Assemblies had a case depth and/or micro hardness that were below specifications. TRW indicated this was a safety-related recall.

ArvinMeritor filed its September 2000 Defect Information Report based on the information provided by TRW in its August 2000 Defect Information Report.

In March 2001, TRW notified ArvinMeritor of additional separations involving 20-EDL Ball-Socket Assemblies that were manufactured outside the original campaign period. TRW indicated it was conducting further investigation into the root cause of those separations.

Based on that investigation, TRW notified ArvinMeritor on June 21, 2001 that it was be expanding the original recall period to cover 11 additional weeks of production. However, in its amendment to its August 2000 Defect Information Report, TRW limited the expanded period to 12K line haul tractor applications. TRW also proposed to handle the expansion as non-safety related, but NHTSA rejected this proposal.

On June 27, 2001, ArvinMeritor amended its September 2000 Defect Information Report to cover TRW's 11 additional weeks of production, but included all vehicle applications as a safety related recall. ArvinMeritor also informed NHTSA it was opening its own investigation into the integrity of 20-EDL Ball-Socket Assemblies that were not otherwise recalled.

Based on its own engineering investigation, ArvinMeritor has now concluded that defects in TRW 20-EDL Ball-Socket Assemblies are caused by a less robust design of the bearing, which leads to higher wear rates and more rapid wear-out than previous TRW

designs. Specifically, the material specifications for the 20-EDL Ball-Socket Assemblies render the bearings in those assemblies more vulnerable to manufacturing variations that can result in inadequate case depth and hardness.

Information Requested under §573.5(c)(6)

In addition to the events described in the immediately preceding section, the following is a chronology of principal events leading to ArvinMeritor's determination:

June 2001 – March 2002: Several meetings were held with TRW to review its processing and field data (i.e., case hardness, case depth, furnace time at carbon set point, furnace carbon potential, end movement, separation rate) for the TRW 20-EDL Ball-Socket Assembly. The following information was learned during these meetings:

- * There have been 135 separations reported by the field that involved 20-EDL Ball-Socket Assemblies as of March 28, 2002.
- * Of that number, 19 separations involved 20-EDL Ball-Socket Assemblies not covered by TRW's August 2000 Defect Information Report or the June 21, 2001 amendment thereto. Also, four additional separations involved 20-EDL Ball-Socket Assemblies for which the date codes are not known, but are believed to have been produced by TRW in May 2000, based on vehicle build dates.
- * The 19 separations are distributed over ten weeks of production that are scattered throughout TRW's entire production run. The Vehicle PPM for these ten weeks range from 218 to 1059 ppm (see attached Vehicle PPM Summary).
- * Four separations have been confirmed on applications other than 12K linehaul tractors.
- * Data provided by TRW identified separations of 20-EDL Ball-Socket Assemblies where the case (micro) hardness of the bearing was 46 HRC and the case depth was 0.017 inch.
- * With respect to separations of 20-EDL Ball-Socket Assemblies not covered by ArvinMeritor's September 2000 Defect Information Report and the first amendment thereto, the case (micro) hardness of the bearings has ranged from 40.0 to 46.3 HRC, and the case depth of the bearing has ranged from 0.012 to 0.016 inch. The known mileage on these Assemblies ranged from 10,494 to 365,185 miles, with the average being 184,772 miles.

June 2001 – March 2002: ArvinMeritor performed a statistical comparison of end movement measurements of 201 TRW's 20-EDL Ball Socket Assembly and 635 TRW's 20-EDL Ball Socket Assembly. This comparison, which excluded special cause date codes, indicated there is a statistically significant difference between the end movements of the two assemblies. Specifically, ArvinMeritor's comparison

indicated that 20-EDL Ball Socket Assemblies have approximately two times greater end movement than 20-DL Ball Socket Assemblies.

ArvinMeritor's comparison also indicated a similar (2X) statistical difference when comparing end movement per mileage data and when comparing end movement of 20-DL Ball Socket Assemblies to 20-EDL Ball Socket Assemblies outside the previous two campaigns.

Information Requested under §573.5(c)(7)

This issue does not involve non-compliance with a motor vehicle standard.

Information Requested under §573.5(c)(8)

ArvinMeritor intends to advise vehicle manufacturers to notify owners of vehicles originally equipped with ArvinMeritor axle assemblies containing Model 20-EDL Ball Sockets to replace such sockets with appropriate size TRW DL ball-socket assemblies.

Following is an approximate schedule for the program:

May, 2002	Complete Notification to Affected Original Equipment Axle Assembly
June, 2002	Complete Notification to Affected Aftermarket Purchasers

We trust that the information provided in this document is fully responsive to the requirements of 49 CFR §573.5. All additions or modifications to any of the information given will be reported promptly to NHTSA. Any questions with respect to the information provided should be directed to the undersigned.

Respectfully Submitted,

ArvinMeritor



Debra L. Shumar
Sr. Vice-President,
Quality and Continuous Improvement

TRW Model 20-EDL Vehicle PPM Summary

Blue = Original Campaign

Under Campaign

Red = Expanded ARM Campaign

Code	# X Tubes Shipped	U	F	S	WS	I	V	GM	M	K	P	# Ends Separated	Vehicle %	Vehicle PPM
9F2	4284						2					2	0.05%	466.9
9F3	3859						2					2	0.05%	518.3
9F4	2603	1	2				1			1		5	0.19%	1920.9
9G1	939											0	0.00%	0.0
9G2	3658											0	0.00%	0.0
9G3	3724		5	2			3					10	0.27%	2685.3
9G4	4294											0	0.00%	0.0
9H1	5987						1					1	0.02%	167.0
9H2	3909	1					1					2	0.05%	511.6
9H3	2922											0	0.00%	0.0
9H4	5223											0	0.00%	0.0
9H5	7313	1	1	1			1					4	0.05%	547.0
9J1 *	3115			1	1		1					3	0.10%	963.1
9J2 *	5717		5	5	1					5		16	0.28%	2798.7
9J3 *	4616						3					3	0.06%	649.9
9J4 *	4809											0	0.00%	0.0
9K1	6278						3			1		4	0.06%	637.1
9K2	8578											0	0.00%	0.0
9K3	5227	1	1				2					4	0.08%	765.3
9K4 *	5278		1	2			6		1			10	0.19%	1894.7
9L1	5436		2									2	0.04%	367.9
9L2	4577		1									1	0.02%	218.5
9L3	3809	1				1						2	0.05%	525.1
9L4	2572											0	0.00%	0.0
9L5	5448											0	0.00%	0.0
9M1	5263											0	0.00%	0.0
9M2	4017									2		2	0.05%	497.9
9M3	1886											0	0.00%	0.0
99 Total	125341	5	18	11	2	1	26	0	1	9	0	73	0.06%	582.4

* Special Manufacturing Cause Date Codes

PPM's are based on TRW 20-EDL OEM Shipment Quantities to ArvinMeritor

Green - Separations reported occurred in Australia (1WS-9J2 & 2K-9M2)

U = Unknown
 F = Freightliner
 S = Sterling
 WS = Western Star
 I = International
 V = Volvo
 GM = GM
 M = Mack
 K = Kenworth
 P = Peterbilt

TRW Model 20-EDL Vehicle PPM Summary

Blue = Original Campaign

Under Campaign

Red = Expanded ARM Campaign

Code	# X Tubes Shipped	U	F	S	WS	I	V	GM	M	K	P	# Ends Separated	Vehicle %	Vehicle PPM
0A1	3118											0	0.00%	0.0
0A2	2826											0	0.00%	0.0
0A3	4680											0	0.00%	0.0
0A4	4113											0	0.00%	0.0
0A5	2800											0	0.00%	0.0
0B1	3898											0	0.00%	0.0
0B2	3914											0	0.00%	0.0
0B3	3757											0	0.00%	0.0
0B4	4079											0	0.00%	0.0
0C1	3662											0	0.00%	0.0
0C2	3707	1		1								2	0.05%	539.5
0C3	4186											0	0.00%	0.0
0C4	3816											0	0.00%	0.0
0D1	3353						1					1	0.03%	298.2
0D2	2910						1					1	0.03%	343.6
0D3	3492		1									1	0.03%	286.4
0D4	3603											0	0.00%	0.0
0E1	3244	1	1									2	0.06%	616.5
0E2	3776	1	2				1					4	0.11%	1059.3
0E3 *	3323	2	15	2		3	11		1		2	36	1.08%	10833.6
0E4 *	3200	3	3				2		1	1		10	0.31%	3125.0
0E5	2495											0	0.00%	0.0
0F1	2389		2	1			1					4	0.17%	1674.3
0F2	3866											0	0.00%	0.0
0F3	3469											0	0.00%	0.0
0F4	3674											0	0.00%	0.0
0G1	297											0	0.00%	0.0
0G2	1767											0	0.00%	0.0
0G3	3635											0	0.00%	0.0
0G4	2141											0	0.00%	0.0
0G5	160											0	0.00%	0.0
0H1	104											0	0.00%	0.0
0H2 **	0								1			1	#DIV/0!	#DIV/0!
Unk-0E?	N/A		4									4	#VALUE!	#VALUE!
00 Total	99454	8	24	4	0	3	17	0	3	1	2	62	0.06%	623.4

** Tie rod off a Dana axle

Overall TOTAL	224795	13	42	15	2	4	43	0	4	10	2	135	0.06%	600.5
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In addition to the 0H2 (M), 1 confirmed 0E4 (M), 9F4 (K), and 9H5 (U) may be on Dana Axles because they are no longer on the separation list TRW gave to ArvinMeritor.

20 are on TRW's or ARM's reported list versus their confirmed list
 Reported only are in 9F4 (2F), 9K3 (1U), 9K4 (1S), 9L2 (1F), 9L3 (1U+1I), 9M2 (2K)
 0C2 (1U), 0E1 (1U), 0E2 (1U), 0E3 (4F), 0E4 (2U), and 0F1 (1F).