<table>
<thead>
<tr>
<th>AD NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADB271624</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LIMITATION CHANGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TO:</td>
</tr>
<tr>
<td>Approved for public release; distribution is unlimited.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FROM:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution: Further dissemination only as directed by Army Tank-Automotive Command, Warren, MI 48397, MAR 1972, or higher DoD authority.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AUTHORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSS memo dtd 22 Mar 2013</td>
</tr>
</tbody>
</table>
TITLE: Transmission Cluster Gear (M151 Vehicle)

OBJECT:

Metallurgical evaluation.

MATERIAL SUBMITTED:

Quantity 1, P/N 8754341, Manufacturer American Motors General, Contract No. DAAE07-70-C-4861, Sub-contract: Chrysler-Spain, Submitted by AMSTA-QST.

TEST RESULTS:

1. Visual Examination:

The teeth of the 16 tooth gear area were chipped severely on front leading edge and slightly on the trailing edge. The faces of the other three gear sections revealed some wear but no visible damage. The roots of the teeth showed evidence of shot peening. The part number, 7536154, was found stamped into the rear surface face of the large gear segment.

2. Magnetic Particle Inspection:

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Crack Indications</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
3. **Hardness Test:** (See Table(s) __, __, __ )  
   Scale Used: **Rockwell "C" - R "A"**  
   Required:  
   - Surface Hardness: **RA 80-83**  
   - Core Hardness: **RC 25-38**  
   - Effective Case Depth: **.03" - .04"**  
   - Hardness at ____ Depth:  

<table>
<thead>
<tr>
<th>SAMPLE GEAR NO.</th>
<th>SURFACE HARDNESS</th>
<th>CORE HARDNESS</th>
<th>EFFECTIVE CASE DEPTH</th>
<th>HARDNESS AT DEPTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (16T)</td>
<td>RA 83</td>
<td>RC 36</td>
<td>PL .040&quot;, RL .036&quot;</td>
<td></td>
</tr>
<tr>
<td>2 (23T)</td>
<td>RA 80</td>
<td>RC 27</td>
<td>PL .034&quot;, RL .021&quot;</td>
<td></td>
</tr>
<tr>
<td>3 (39T)</td>
<td>RA 82</td>
<td>RC 27</td>
<td>PL .042&quot;, RL .026&quot;</td>
<td></td>
</tr>
<tr>
<td>4 (47T)</td>
<td>RA 81</td>
<td>RC 36</td>
<td>PL .044&quot;, RL .036&quot;</td>
<td></td>
</tr>
<tr>
<td>Ends</td>
<td>RA 81-84</td>
<td></td>
<td>Spec RA 81 min.</td>
<td></td>
</tr>
</tbody>
</table>

4. **Micro-Examination:**  
   **Microstructure, Required:** Case Harden - Marquench  

<table>
<thead>
<tr>
<th>SAMPLE NO.</th>
<th>CASE</th>
<th>CORE</th>
<th>CASE DEPTH INCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>All gears</td>
<td>Cementite on tips</td>
<td>Tempered low carbon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>temp. fine to med.</td>
<td>martensite with ferrite</td>
<td></td>
</tr>
<tr>
<td>segments</td>
<td>acicular martensite</td>
<td>and bainite at grain</td>
<td></td>
</tr>
<tr>
<td></td>
<td>with retained austenite</td>
<td>boundaries</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a little bainite on surface pitch to root</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. **Chemical Analysis:** (See Table(s) __, __, __ )  
   **Required Material:** 8620H, 8622H or 8720H  
   opt. 8622H, 8620H or 8720H  

<table>
<thead>
<tr>
<th>SAMPLE NO.</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8620H</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Inclosure 1
6. Additional Tests:

COMMENTS:

1. The case depth on gear 23T was below lower limit of .03" at the root line. The same was true for 39T gear.

2. The microstructure of the surface areas revealed a thin layer (.0008") of upper bainite. In addition, the cementite massive carbides on the tips are objectionable for impact loading as they are brittle.

All tests were conducted on equipment bearing current certification of calibration.

WRITTEN BY: R. BOYD

REVIEWED BY: F. N. KISBAN
C, Metals Sec

APPROVED BY: E. R. MACKIEWICZ
Actg C, Mat Br
CHEMICAL ANALYSIS

TO C, Metals Function
(AMSTA-RKMM)
ATTN: Mr. R. Boyd

25 February 1972
Mr. Rodgers/mk/31238

FROM Chemical & Spectrographic Unit

1. Sample: Gear Cluster RM1342B (PT-872)

2. Results:

<table>
<thead>
<tr>
<th>ELEMENT</th>
<th>GEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>.20</td>
</tr>
<tr>
<td>Sulfur</td>
<td>.023</td>
</tr>
<tr>
<td>Phosphorous</td>
<td>.008</td>
</tr>
<tr>
<td>Manganese</td>
<td>.90</td>
</tr>
<tr>
<td>Silicon</td>
<td>.22</td>
</tr>
<tr>
<td>Chromium</td>
<td>.61</td>
</tr>
<tr>
<td>Nickel</td>
<td>.23</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>Trace</td>
</tr>
</tbody>
</table>

Robert J. Rodgers
CHEMIST

APPROVED)

Inclosure 1
REQUEST FOR SERVICES  
(APR 01-1900)  

**TO**  
C, Program Execution Branch  
(AMSTA-RPE)  

**FROM**  
C, Test Br (AMSTA-QST)  
System Performance Assmt Div  
Product Assurance Directorate  

<table>
<thead>
<tr>
<th>Contract No.</th>
<th>AMCMS</th>
<th>CRN</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAAE07-70-C-4861</td>
<td>72111.2331</td>
<td>BM41342.B</td>
</tr>
</tbody>
</table>

**Contractor & Address**  
Ford Motor Company  

**Material**  
1 ea differential pinion shaft  
11660492  
1 ea gear hypoid bevel drive 11660493  
1 ea synchronizer insert 7059129  
1 ea insert retainer ring 7059128  
1 ea gear assy cluster 6754341  

**Tests Required**  
Evaluation of Metallurgical requirements to applicable part drawings and examination of damaged area  

Tests (or Inspections) are to be conducted under 02 Priority. In the event of any discrepancy or failure during test, delay or inability to meet the suspense date, notify this office, AMSTA-QST ATTN: Mr. DuBay or Mr. Finnie, ext. 2346 immediately by telephone and followed by DF within five days stating reason for delay or failure.  

All test and measuring equipment used on this project must be calibrated and must bear a current valid DA Label 80 (AMCR 700-9). Certification of calibration must be reflected in the final report.  

Request test reports be forwarded to C, Test Br (AMSTA-QST); upon completion of tests, materials to be disposed of through normal supply channels.  

**Laboratory AMSTA-RKNN**  
163 Hrs 185$  
Labor Estimate 30/6 $  
Actual Cost  

**Signature**  
William H. Carbary  

**NOTE:** If suspense date cannot be met, an interim reply is requested.  

**TO**  
FROM  

**Comments**  
COMPLETION DATE: 3-2-72  
ACTUAL HOURS USED: 163  
MATERIAL & EX. INKD:  
REPORT NO.: 11512 (PART 1-5)  
SIGNATURE:
MEMORANDUM FOR Defense Technical Information Center (DTIC-OQ), 8725 John J. Kingman Road, Fort Belvoir, VA 22060-6218

SUBJECT: Change of Classification Level to 4M151 Truck Documents


2. In accordance with the above reference, please change the classification and distribution level for the following documents:


      (1) The DTIC AD#: ADB271644
      (2) Title: M151 Transmission Clutch Hub Insert – P/N 7059129
      (3) Date of Document: 29 February 1972
      (4) New Distribution/Classification: Distribution A. Approved for public release; distribution is unlimited.
      (5) Reason for Change: This document has been reviewed for Operations Security (OPSEC) and has been deemed to contain no OPSEC concerns. The documents are for the M151 Truck that has not been in the military inventory since the early 1980s; the vehicle and associated documents are obsolete.
      (6) Date of Change: Immediately


      (1) The DTIC AD#: AD0474825
      (2) Title: ENGINEER DESIGN TEST OF TRUCK, UTILITY, 1/4-TON, 4X4, M151 (RIDE AND HANDLING CHARACTERISTICS)
      (3) Date of Document: 15 December 1965
SFAE-CSS
SUBJECT: Change of Classification Level to 4M151 Truck Documents

(4) New Distribution/Classification: Distribution A. Approved for public release; distribution is unlimited.

(5) Reason for Change: This document has been reviewed for OPSEC and has been deemed to contain no OPSEC concerns. The documents are for the M151 Truck that has not been in the military inventory since the early 1980s; the vehicle and associated documents are obsolete.

(6) Date of Change: Immediately


(1) The DTIC AD#: AD0857240

(2) Title: Product Improvement Test of Truck, Utility, 1/4-TON, 4X4, M151 Series with Modified Independent Rear Suspension System

(3) Date of Document: 27 June 1969

(4) New Distribution/Classification: Distribution A. Approved for public release; distribution is unlimited.

(5) Reason for Change: This document has been reviewed for OPSEC and has been deemed to contain no OPSEC concerns. The documents are for the M151 Truck that has not been in the military inventory since the early 1980s; the vehicle and associated documents are obsolete.

(6) Date of Change: Immediately


(1) The DTIC AD#: ADB273320

(2) Title: Bonded vs. Riveted Brake Lining Test

(3) Date of Document: 12 January 1977

(4) New Distribution/Classification: Distribution A. Approved for public release; distribution is unlimited.
SFAE-CSS
SUBJECT: Change of Classification Level to 4M151 Truck Documents

(5) Reason for Change: This document has been reviewed for OPSEC and has been deemed to contain no OPSEC concerns. The documents are for the M151 Truck that has not been in the military inventory since the early 1980s; the vehicle and associated documents are obsolete.

(6) Date of Change: Immediately

e. Document 5.

(1) The DTIC AD#: AD0810372

(2) Title: Product Improvement Test of Truck, Utility, 1/4-TON, 4X4, M151 Modified with Solid Rear Axle

(3) Date of Document: March 1967

(4) New Distribution/Classification: Distribution A. Approved for public release; distribution is unlimited.

(5) Reason for Change: This document has been reviewed for OPSEC and has been deemed to contain no OPSEC concerns. The documents are for the M151 Truck that has not been in the military inventory since the early 1980s; the vehicle and associated documents are obsolete.

(6) Date of Change: Immediately


(1) The DTIC AD#: ADB271624

(2) Title: Transmission Cluster Gear (M151 Vehicle)

(3) Date of Document: 06 March 1972

(4) New Distribution/Classification: Distribution A. Approved for public release; distribution is unlimited.

(5) Reason for Change: This document has been reviewed for OPSEC and has been deemed to contain no OPSEC concerns. The documents are for the M151 Truck that has not been in the military inventory since the early 1980s; the vehicle and associated documents are obsolete.
SFAE-CSS
SUBJECT: Change of Classification Level to 4M151 Truck Documents

(6) Date of Change: Immediately

3. The Point of Contact for this action is Robert Anick, Sr, email: robert.d.anick.civ@mail.mil or COM (586) 282-8448.

Kevin M. Fahey
Program Executive Officer,
Combat Support & Combat Service Support