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AN INVESTIGATION OF THE SERVICE WRITER METHODOLOGY IN
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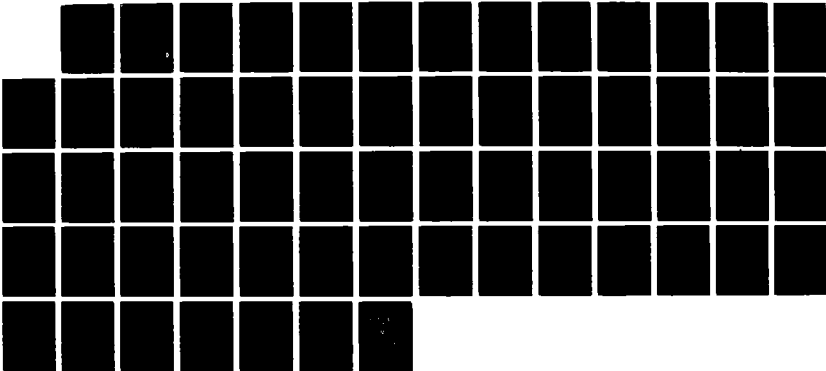
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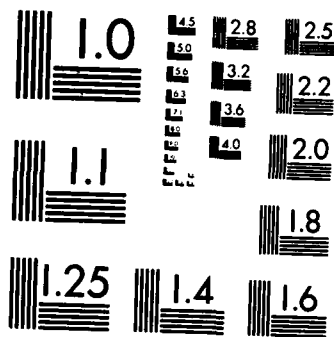
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An Investigation of the Service Writer Methodology in Directorate of Engineering and Housing Vehicle Maintenance Shops

by
Carla Mond Snyder
Todd O. Burger

This research was to determine the effects of the Service Writer Methodology on responsiveness and turnaround time in Directorate of Engineering and Housing (DEH) vehicle maintenance shops and to collect data on productive, indirect productive, and nonproductive time to be used in a draft staffing guide currently being developed. The process was investigated at the DEH maintenance activities at Fort Riley, KS and Fort Bragg, NC.

Contractor human factors engineers observed and recorded work activities and collected data on maintenance, labor, and parts costs. An analysis was then made to compare costs of the Service Writer process with those generated following the guidance of The Army Maintenance Management System (TAMMS). Test results show that the Service Writer Methodology reduced labor costs by 13.5 percent and total maintenance costs by 6.4 percent.

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FOREWORD

This research was performed for the Office of the Chief of Engineers (OCE) under the Operations and Maintenance, Army, Facilities Technology Applications Test Program. The research was directed by the U.S. Army Construction Engineering Research Laboratory (USA-CERL) and conducted by Arthur D. Little, Inc., Cambridge, MA. The Contract Order No. is DACA88-86-D-0015; Registration No. CERL-ES-85-262, #A014: Delivery Order No. 11, "Investigation of the Service Writer Operations in DEH Vehicle Maintenance Shops at Fort Bragg, NC and Fort Riley, KS." USA-CERL's Contract Monitor was Mr. Robert Blackmon. The OCE Technical Monitor was Mr. Walter Seip, DAEN-ZCF-B.

This investigation was performed by Carla Mond Snyder, Todd Burger, Kirk Goodall, Marion Wentworth, and Tom Parrish of Arthur D. Little, Inc. The Technical Editor was Gloria J. Wienke, Information Management Office.

The cooperation of the Directorate of Engineering and Housing (DEH) equipment maintenance personnel at Fort Bragg and Fort Riley is gratefully acknowledged.

COL Norman C. Hintz is Commander and Director of USA-CERL, and Dr. L. R. Shaffer is Technical Director.

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AN INVESTIGATION OF THE SERVICE WRITER METHODOLOGY IN DIRECTORATE OF ENGINEERING AND HOUSING VEHICLE MAINTENANCE SHOPS

1 INTRODUCTION

Background

Current work processes at maintenance activities involve redundant inspections and lack a central location for receipt and work authorization on a vehicle. Previous investigations of the Director of Engineering and Housing (DEH) equipment maintenance activities on U.S. Army installations indicated opportunities to increase the productivity of operations.¹ One opportunity was to use the Service Writer Methodology. This is a process in which an individual (the Service Writer) is the single initial point of contact between a vehicle operator and the maintenance organization, and a mechanic is responsible for analyzing the problem (inspecting the vehicle) and accomplishing the related work. The mechanic is also responsible for both the workmanship and timely completion of the job.

The Office of the Chief of Engineers (OCE) asked the U.S. Army Construction Engineering Research Laboratory (USA-CERL) to investigate this methodology and compare the results to a model employing The Army Maintenance Management System (TAMMS) as detailed in Department of the Army Pamphlet (DA PAM) 738-750.²

The obvious dissimilarities between the DEH equipment maintenance workforce and their troop unit soldier counterparts offers opportunities for increasing productivity of the workforce. The most dramatic difference is in work experience. TAMMS has a tactical orientation and must accommodate a young workforce of soldiers who recently graduated from their first exposure to equipment maintenance. Because journeyman level performance cannot be expected from these soldiers, additional supervision and quality control (inspection) is part of TAMMS. On the other hand, the average DEH mechanic is about 50 years old and has the maintenance expertise associated with years of experience. The Service Writer Methodology provides an opportunity to take full advantage of this expertise by placing more responsibility on the mechanics. Mechanics inspect the incoming vehicles, determine the work to be accomplished, perform the work, and check their work before releasing the vehicles to operators. This assignment of responsibilities eliminates the need for full-time inspectors and a formal inspection procedure, and results in reduced cost and improved turnaround time.

¹P. J. Tanner and K. R. Aytogu, *A Model for Analysis of Alternative Performance Structures for Vehicle Maintenance Functions of the U.S. Army Installation Directorates of Engineering and Housing*, Technical Report P-86/07/A169716 (DEH Equipment Maintenance Management, June 1986); P. J. Tanner and K. R. Aytogu, *Vehicle Maintenance Manpower Requirements for U.S. Army Installation Directorates of Engineering and Housing Based on Air Force, Navy, and Army Reserves' Staffing Techniques*, Interim Report P-86/09/A172181 (DEH Equipment Maintenance Management, July 1986).

²DA PAM 738-750, *The Army Maintenance Management System (TAMMS)*, Change 8 (Headquarters, Department of the Army [HQDA], 1 December 1983).

During FY86, current Army staffing guides for vehicle maintenance shops were compared with Air Force and Army Reserve staffing guides. During FY87, the investigation was extended to include Navy staffing guides. While some comparisons could be made, the data available from Army maintenance activities was insufficient to complete the comparisons and develop a draft staffing guide for the Army. Detailed field data collected and analyzed in this project will be used to satisfy part of the data required in the draft staffing guide.

Objectives

The objectives of this study were: (1) to determine the effects of the Service Writer process on responsiveness and turnaround time in the DEH vehicle maintenance shops, and (2) to collect data for estimating productive, indirect productive, and nonproductive time of maintenance activities performed by shop mechanics for use in a draft staffing guide currently under development.

Approach

The Service Writer concept was evaluated through a series of four tasks: (1) test planning, (2) development of test parameters, (3) data collection, and (4) data analysis.

The initial approach included collecting and combining performance data from two DEH installations to generate a representative sample of maintenance operations. Human factors engineers were to investigate vehicle maintenance operations at both installations through interviews and observations of actual operations. A copy of all maintenance work orders completed during the past 12 months was to be obtained from both installations. This information was to be analyzed to determine the number of unit and support repair tasks, labor costs, and parts costs.

Scope

This study is an analysis of the effect of the Service Writer concept on the responsiveness and turnaround time of DEH vehicle maintenance shops. It is not an investigation of shop management, repair methods, or the productivity of individual mechanics. This study is applicable to DEH shops performing maintenance with in-house mechanics.

Mode of Technology Transfer

Results of this analysis will be used to determine the appropriateness of the Service Writer concept for all DEH organizations. The results will be transferred through publication of this report and other documents prepared by OCE. Data on productive, indirect productive, and nonproductive time will be used in a draft staffing guide currently being developed.

2 METHODS

General

A realistic evaluation of the Service Writer concept would involve selecting a test installation, reorganizing the vehicle maintenance shop, and analyzing operations after a short period of time. However, such an approach would cause personnel problems and possibly bias the results. While seeking an alternative approach, an investigation of actual field operations identified Fort Bragg, NC and Fort Riley, KS as possible field sites since each activity had independently implemented a version of the Service Writer Methodology.

The TAMMS process for operating a vehicle maintenance shop was investigated with emphasis on identifying all activities, interfaces, decision points, and personnel responsibilities. The TAMMS process is illustrated in Figure A1. A description of the Service Writer concept (Figure A2) was detailed and compared with the TAMMS process to identify the differences.

Responsibilities of the Inspector in TAMMS are divided between the Service Writer and the Mechanics in the Service Writer concept. Army Regulation (AR) 750-1³ classifies maintenance work as either unit or support level maintenance. Unit level maintenance includes routine services and component replacement which require only small hand tools, no major diagnostic effort, and generally require few man-hours. Intermediate direct support level maintenance includes all nonroutine repairs that often require bench tools, significant diagnostic efforts, and more man-hours. Support level maintenance is often accomplished by another maintenance activity.

Selection of Test Site

During the test planning activities, vehicle maintenance operations were investigated at Fort Bragg, NC and Fort Riley, KS to determine if data from these installations would meet the the analysis requirements. Both installations were using a variation of the Service Writer concept.

The initial approach included collecting and analyzing data from both installations to reduce the possibility of site bias. However, this approach was not feasible due to the dissimilarities between the two installations. Specifically, the shops do not have a similar layout; the Fort Riley shop is located in a single building requiring minimum walking to reach all functional areas, and the Fort Bragg shop is located in several buildings. The Clerk/Service Writer is located in one building, maintenance is performed in several other buildings, and parts inventory is in yet another building. Because the process at Fort Bragg is longer due to the separation of functions, test results could not be directly compared to other installations. Therefore, Fort Riley was selected as the representative test site.

Operations at both shops were identified through interviews and observations. Flow charts describing the maintenance process at Fort Riley are shown in Figure A3. Allowing for the difference in functions, the processes are very similar.

³AR 750-1, *Army Materiel Maintenance Concepts and Policies*, Change 4 (HQDA, 1 May 1986).

Test Parameters and Duration

Test parameters were identified based on the requirement to determine:

1. The average total time (in hours) for a mechanic to complete inspection and repair of a unit level maintenance case, and
2. The average total time (in hours) for a mechanic to complete inspection and repair of a support level maintenance case.

The original program plan required 3 days of data collection in each shop for a combined test sample of 6 days. Because data from Fort Bragg would not be representative of most maintenance shops, the plan was changed to 6 days of data collection at Fort Riley.

Data Collection

Human factors engineers prepared the data collection plan for the study (Appendix B). The plan specified that two test engineers would observe and collect data for 6 work days. Six heavy mobile equipment repairers would be the test subjects. The plan also specified the data collection forms. The mechanic's activities were recorded as directly productive, indirectly productive, and nonproductive.* As additional activities were observed, they were added to the forms by the test engineers. The senior human factors engineer classified the additional tasks.

The field study was conducted during the week of 17 November 1986. Tables C1 and C2 present examples of the raw data collected during the field study. The following information was recorded at the top of each report:

Test Engineer's Name
Mechanic's Name
Date of Observation
Vehicle Being Maintained
Vehicle Type (Heavy Equipment, Automotive Equipment,
Seasonal Equipment, Generators)
Start Time
End Time
Maintenance Type (Unit or Support)

The operational data were collected by each observer monitoring the activities of one mechanic during an 8-hr working period. Activities were described by sequence number, time required to complete, productivity category, and a description of the activity. Additional space for comments was provided.

*Directly productive labor applies directly to the workload; i.e., the repair task. Indirectly productive labor, because it is incurred for common or joint objectives, is not readily subject to treatment as productive labor. Nonproductive is the time not expended on the workload (i.e., eating lunch and cleaning the work area or hands).

1986 Data Base

The Fort Riley DEH provided a data base containing the maintenance work orders completed in the shop over a 12-month period. The material contained 34 individual files formatted for FRAMEWORK, a PC-based spread sheet program. These files were translated into Lotus "WR1" Symphony format for the analysis. The steps involved in this process are depicted in Figure A4. Editing was limited to format changes needed to improve the consistency between files. The files reported approximately 16,000 repair tasks. The data is summarized in Appendix D.

Each task was coded as unit or support level maintenance using the criteria provided in AR 750-1. The coding was done at the repair task level. Service visits generally included more than one task and could require both unit and support level tasks. The data were then analyzed to determine the number of service visits for unit repair tasks only, for support repair tasks only, and for a combination of unit and support repair tasks. Results of this analysis are summarized in Table E1.

A total of 15,609 repair tasks were completed during 3,940 service visits (an average of 4 per visit). Of the 3,940 visits, 2,862 consisted only of unit repairs, 165 consisted only of support repairs, and 913 consisted of both unit and support repair tasks; hence, 1,078 visits had a support level component.

The data were analyzed to determine the effects of the Service Writer process on productivity in terms of:

1. The total annual cost of the mechanic's repair and inspection time for unit level cases
2. The total annual cost of the mechanic's repair and inspection time for support level case
3. The total annual cost of repair and inspection for the Service Writer process (sum of 1 and 2 above)
4. The total annual cost of the inspector's time for unit level cases if TAMMS was followed
5. The total annual cost of the mechanic's time for unit level cases if TAMMS was followed
6. The total annual cost associated with the inspector's time and mechanic's time for unit level cases if TAMMS was followed (sum of 4 and 5 above)
7. The total annual cost of inspector's time for support level cases if TAMMS was followed
8. The total annual cost of mechanic's time for support level cases if TAMMS was followed
9. The total annual cost associated with the inspector's and mechanic's time for support level cases if TAMMS was followed (sum of 7 and 8 above)
10. The total annual cost of inspection and repair if TAMMS was followed (sum of 6 and 9 above)

11. The cost savings resulting from the Service Writer process (difference between 10 and 3 above)
12. The percentage of annual savings resulting from the Service Writer process
13. The average percentage of indirectly productive time for a mechanic in an 8-hr working period
14. The average percentage of directly productive time for a mechanic in an 8-hr working period
15. The average percentage of nonproductive time for a mechanic in an 8-hr working period.

3 RESULTS AND ANALYSIS

Labor Costs

Frequently, the labor cost was not reported for a repair task, even though the task indicated that some labor had been expended. As a result, the reported labor cost, referred to in Table E2 as the "unadjusted labor dollars" does not reflect the total labor cost. Missing data were calculated by multiplying the relevant labor hours by the standard average labor rate of \$16.76. Table E3 summarizes total parts, labor hours, and adjusted labor dollars. Table E4 combines parts and adjusted labor dollars under unit and support maintenance categories.

Reconstruction of TAMMS Costs

Since actual field data was not available, the costs of the TAMMS process were reconstructed. The reconstruction process is outlined in Table E5. Beginning with current Service Writer data, costs related to inspection activities were deleted and estimates of inspections costs under TAMMS were incorporated. The following two approaches for identifying and estimating inspection costs from the Service Writer process costs were considered:

1. Assume the task descriptions of "inspection" and "diagnosis" in the 1986 records were accurate and included all inspection costs. Summarize the cost for these items and subtract it from the total cost of the Fort Riley operations
2. Determine the percentage of total costs pertaining to the inspection/diagnosis labor costs identified in the time-and-motion study and reduce the total annual cost accordingly.

The second approach was used in the analysis. Estimates of TAMMS repair costs were developed based on Service Writer costs less inspection costs, using the following criteria from Tanner and Aytogu, June 1986 and July 1986:

- When a service visit entailed only unit repair tasks, 1.5 hr were added to the labor effort for inspection
- When a service visit entailed only support repair tasks, 2 hr were added to the labor effort for inspection
- When a service visit entailed both unit and support repair tasks, 2 hr were added to the labor effort for inspection (not 3.5 hr)
- One "service visit" as reported on a completed work document was assumed to be equivalent to a "case" referred to in the "Vehicle Maintenance Manpower" report⁴ that provided the inspection time estimates on a per-case basis
- The standard average mechanic labor rate of \$16.76 was applied to the total inspection hours and the results were used to adjust the annual cost estimate.

⁴P. S. Tanner and K. R. Aytogu (July 1986).

The data were tested for a possible relationship between reduced inspection time and the quality of repair work performed. If, as a result of lowered inspection levels, vehicles required repeat repairs of the same subsystem due to poor workmanship, repair costs might actually increase using the Service Writer process. The 1986 data was reviewed to determine if any of the vehicles had an excessive number of service visits (Appendix F). On the average, four repair tasks were accomplished each visit. During the year, some vehicles had as few as 2 repair tasks while others had over 100 repair tasks performed. The repair records for the 10 vehicles with the highest number of repair tasks were reviewed. An effort was made to identify multiple repairs for the same problem over a period of a year. While the effort was hampered by inconsistent repair descriptions, there was no clear pattern to indicate a quality control problem. Based on these data, there is no evidence that the reduced inspection efforts inherent in the Service Writer process have led to increased failure rates or deterioration in the quality of service performed.

Comparison of Service Writer and TAMMS Costs

Based on the data gathered, total unit and support maintenance costs were compared (Table E6). The Service Writer Methodology reduced the total maintenance cost by 6.4 percent and labor cost by 13.5 percent at Fort Riley.

A Sensitivity Analysis

A sensitivity analysis was done on the estimated cost reductions. These numbers would not change significantly even if the estimate of current inspection effort were off by a large margin. For example, if Service Writer unit and support inspection costs were understated by 20 percent, the labor cost savings would fall from 13.5 to 12.8 percent. Similarly, the cost savings is relatively insensitive to the breakdown between support level and unit level repairs. If the fraction of support level repairs were underestimated by 20 percent, the labor cost savings would rise from 13.5 to 13.9 percent.

Time-and-Motion Observation Results

Time-and-motion observations from the Fort Riley vehicle maintenance shop are summarized in Table E7. Sixty seven percent of the mechanic's time was spent on unit repair tasks and nearly 5 percent of unit repair time was for inspection and diagnosis. Inspection and diagnosis time were approximately 1 percent of support repair time, reflecting both the higher labor content of support repair tasks and the greater ease of diagnosing major vehicle subsystem failures. Table E8 summarizes key findings; it is a simplified version of Table E7.

It should be noted that this data overstates the productivity of the mechanics due to the Hawthorne Effect and may require adjustment before being used in the draft staffing guide. (The Hawthorne Effect is the increased productivity observed in workers when they know they are being studied.)

4 CONCLUSIONS AND RECOMMENDATION

Conclusions

The Service Writer Methodology is viable and has reduced labor costs by 13.5 percent and total maintenance costs by 6.4 percent at Fort Riley, KS. The methodology decreases turnaround time and improves the responsiveness of the DEH shops to mission requirements.

The use of a Service Writer and increasing the responsibilities of the mechanics does not result in increased failure rates.

The process provides an opportunity for a better interface between the DEH and its customers through the Service Writer.

The study provided data on the distribution of the mechanic's time for use in the draft staffing guide. This data overstates the productivity of the mechanics and may require adjustment before further use.

Based on the observed conditions of data, a system should be developed and implemented for systematically collecting vehicle maintenance and failure data. This system should simplify the collection of maintenance management data, including the possible use of codes for repair tasks. Tracking the use of repair parts should also be included in the system.

Recommendation

The Service Writer process should be considered for incorporation into all DEH vehicle maintenance shop operations to reduce maintenance cost and turnaround time.

APPENDIX A: FLOW CHARTS

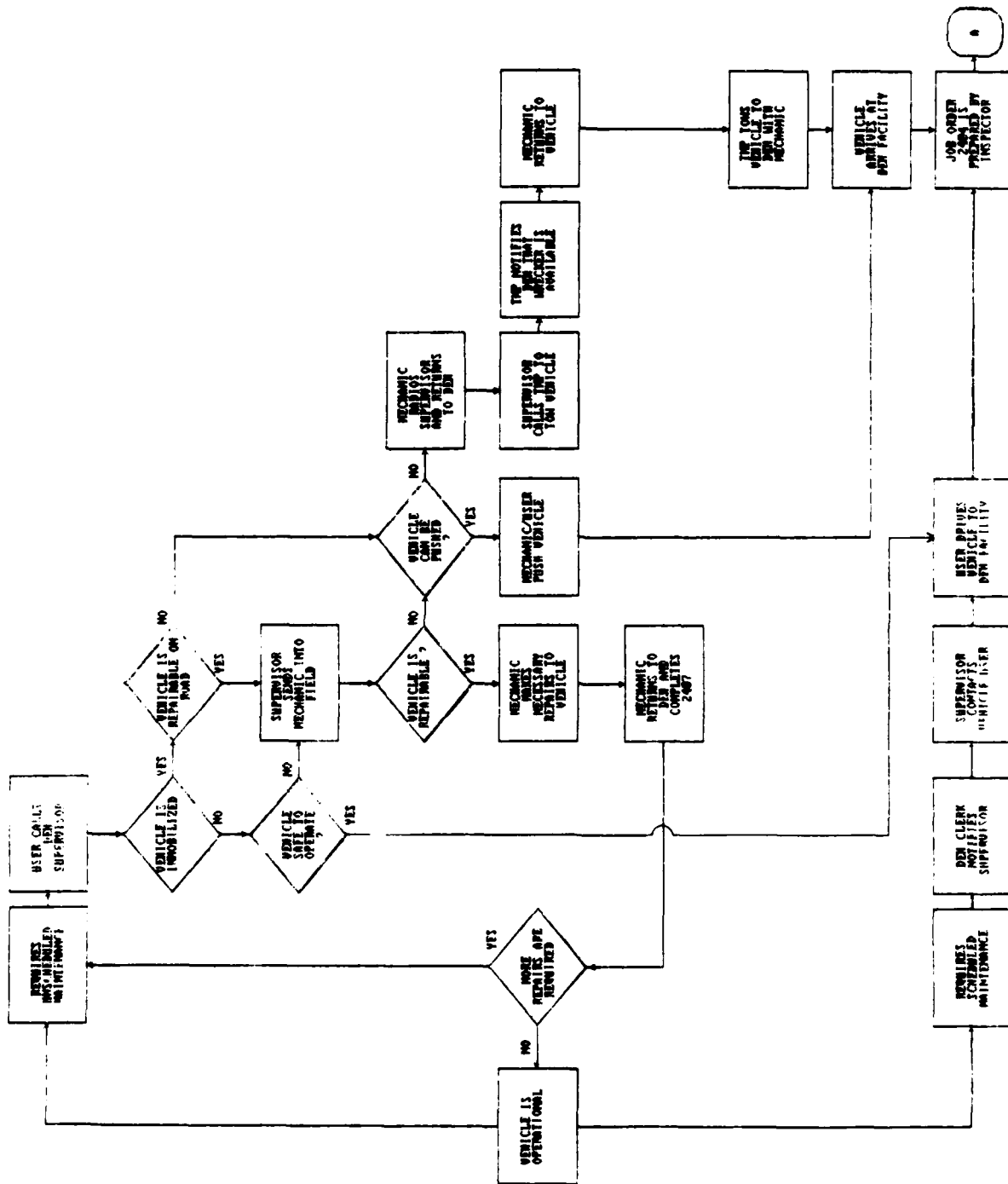


Figure A1. The Army Maintenance Management System (TAMMS) approach.

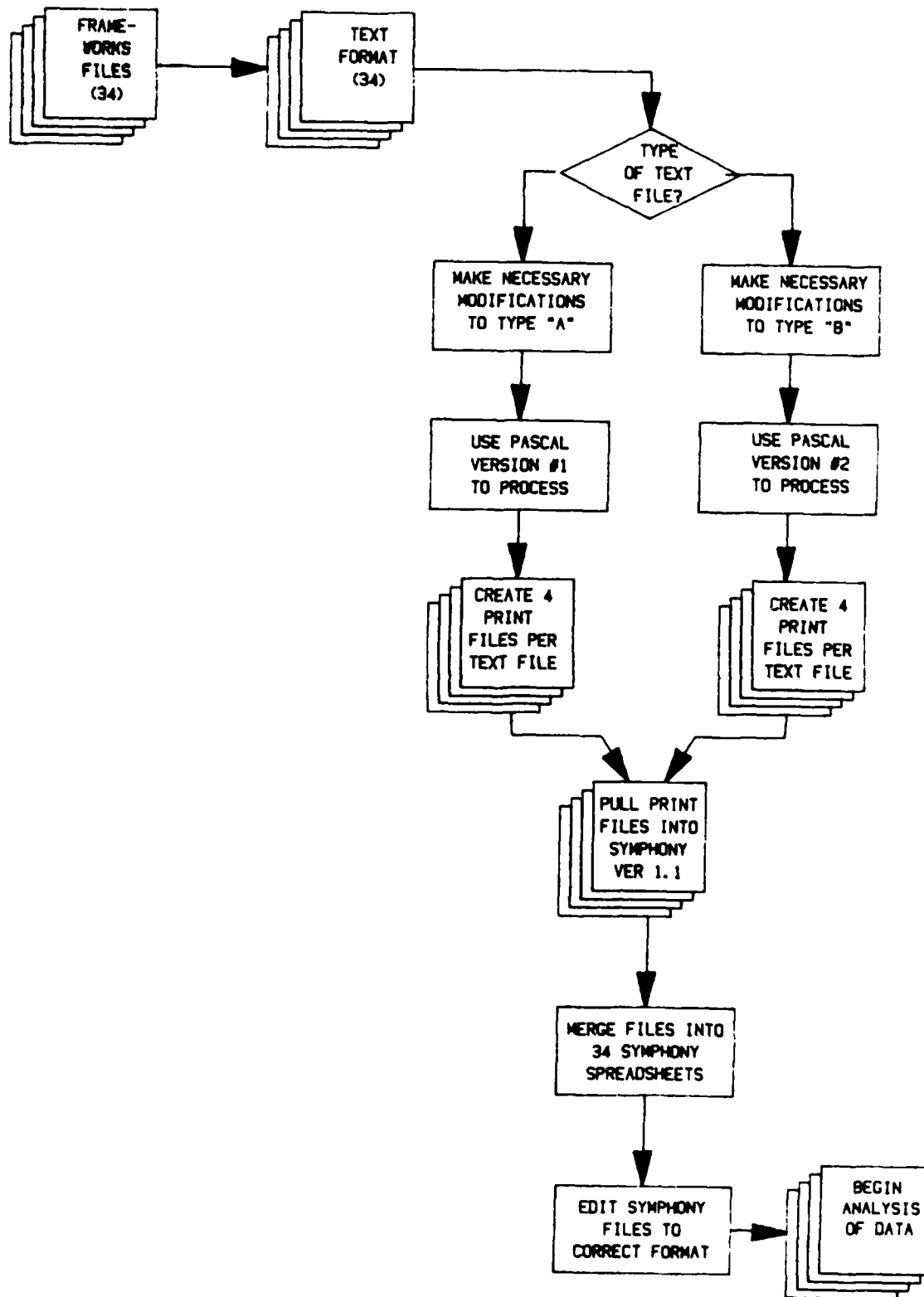


Figure A4. File processing flow for repair task data.

APPENDIX B: DATA COLLECTION PLAN

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INVESTIGATION OF THE SERVICE WRITER OPERATIONS IN
DEH VEHICLE MAINTENANCE SHOPS AT FORT RILEY, KS

Task 2, Data Collection Plan

Prepared for

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November 1986

INVESTIGATION OF SERVICE WRITER METHODOLOGY

DATA COLLECTION PLAN

1. INTRODUCTION

Investigations of the DEH equipment maintenance process at U.S. Army installations by the U.S. Army Construction Engineering Research Laboratory (USA-CERL) indicated opportunities to increase the productivity of the operations. Current work processes involve redundant inspections without a central location for receipt and work authorization on a vehicle. The Service Writer Methodology is a process by which an individual (the service writer) acts as the single initial point of contact between a vehicle operator and a maintenance organization. USA-CERL was tasked to investigate this methodology by studying the operations at Fort Bragg, NC and Fort Riley, KS. Based on the results of the initial field visits to these sites, it was decided that only Fort Riley would be included in this program.

2. PURPOSE

The purpose of this protocol is to define the data collection plan for developing estimates of productive, indirect productive and non-productive time for maintenance personnel.

3. OBJECTIVE

The objective of the field test is to provide data with which to develop estimates of staff time utilization for maintenance personnel as input to a staffing guide.

4. SCOPE

Fort Riley, KS will be the only test site for this activity. Data will be collected over a six day period by two test engineers from Arthur D. Little, Inc., Cambridge. The six heavy mobile equipment repairers (WG-5803-10) will be used as test subjects.

Productive, indirect productive, and non-productive time estimates will be obtained twice (see Table 1) for each of the maintenance personnel according to the data collection forms shown in Section 10 - Data Collection Forms. Depending on the work load conditions at Fort Riley during the week of testing, an effort will be made to obtain total time (in hours) for each of these mechanics to complete inspection and repair of both a unit and support level maintenance case.

5. TEST SCHEDULE

The test program is scheduled to begin on Monday, November 17, 1986 and proceed through Saturday, November 22, 1986. Monday through Friday testing will begin at 7:30 AM and conclude at 4:00 PM, whereas, on Saturday testing will proceed between 6:00 AM and 2:30 PM, to be consistent with the work shifts at Fort Riley. Table 1 depicts the idealized data collection schedule.

Again, it is noted that the ability to obtain data for both a unit and support level maintenance case for each mechanic is dependent on the nature of the work loading at Fort Riley during the week of November 17, 1986.

6. CERTIFICATION AND TEST RECORDS

At the conclusion of each day's testing, the data collection forms will be dated and initialed by the senior test engineer. Additional comments or observations on the testing will also be recorded, dated, and signed by the senior test engineer. Any photographs taken will also serve as test records. These records will be maintained by Arthur D. Little, Inc. for future reference and inspection by USA-CERL personnel.

TABLE 1

MAINTENANCE LEVEL CASE MIX

| <u>Day</u> | <u>Mechanic</u> | <u>Test Engineer</u> | <u>Maintenance Level Case</u> |
|------------|-----------------|----------------------|-------------------------------|
| Nov. 17 | 1 | 1 | 50% Unit; 50% Support |
| Nov. 17 | 2 | 2 | " Unit " " |
| Nov. 18 | 3 | 1 | " Unit " " |
| Nov. 18 | 4 | 2 | " Unit " " |
| Nov. 19 | 5 | 1 | " Unit " " |
| Nov. 19 | 6 | 2 | " Unit " " |
| Nov. 20 | 1 | 1 | " Support " " |
| Nov. 20 | 2 | 2 | " Support " " |
| Nov. 21 | 3 | 1 | " Support " " |
| Nov. 21 | 4 | 2 | " Support " " |
| Nov. 22 | 5 | 1 | " Support " " |
| Nov. 22 | 6 | 2 | " Support " " |

7. TEST CONDITIONS

Since testing will be done at the Fort Riley, KS vehicle maintenance facility, the test conditions will be standard ambient. Mid-day temperature readings will be obtained for each day of testing.

8. EQUIPMENT REQUIRED

Camera
2 Stop watches
Tape Measure
Data Collection Plan

9. PROTOCOL

As illustrated in Table 1, each test engineer will be assigned to a different mechanic each day of testing. Only the six heavy equipment repairers (WG-5803-10) will be used in this test program. The goal will be to obtain data, as per the forms described in Section 10, for both a unit and support level maintenance case for each mechanic. Achievement of this goal is strongly dependent on the work orders at Fort Riley during the week of November 17, 1986.

10. DATA COLLECTIONS FORMS

The forms that follow will be completed by the Arthur D. Little, Inc., test engineers during the course of the field test.

Test Engineer: _____

Date _____

Mechanic: _____

Vehicle: _____

HE SE AE G

Start Time: _____

End Time: _____

| <u>Task/Activity</u> | <u>Activity Order</u> | <u>Classification (P, IP, NP)</u> | <u>Time Elapsed</u> |
|--------------------------------|-----------------------|-----------------------------------|---------------------|
| Obtain work order | | IP | |
| Talk to vehicle operator | | IP | |
| Move vehicles | | IP | |
| Obtain bay | | IP | |
| Walk to tools | | NP | |
| Select tools | | IP | |
| Diagnose problem | | P | |
| Prepare work order | | IP | |
| Modify work order | | IP | |
| Walk to parts inventory | | NP | |
| Obtain parts | | P | |
| Complete parts inventory forms | | NP | |

DATA COLLECTION FORM (Continued)

| <u>Task/Activity</u> | <u>Activity Order</u> | <u>Classification (P, IP, NP)</u> | <u>Time Elapsed</u> |
|---|---------------------------|---------------------------------------|-------------------------|
| Wait for tools | | NP | |
| Position vehicle for access | | P | |
| Position self with respect to vehicle | | P | |
| Repair | | P | |
| Request/Wait for assistance | | NP | |
| Prepare vehicle for temporary storage | | NP | |
| Inspect vehicle | | IP | |
| Complete work order | | IP | |
| Return work order to process control clerk | | IP | |
| Replace tools | | NP | |
| Clean work area | | IP | |
| Store replaced parts | | NP | |
| Repair/oil tools | | IP | |
| Clean hands | | NP | |
| Coffee Break | | NP | |
| Lunch Break | | NP | |

APPENDIX C: SAMPLE DATA COLLECTION FORMS

Table C1

Raw Data Collected: Vehicle 1

| | |
|------------------------------|--|
| Carla | (Test Engineer's Name) |
| George | (Mechanics Name) |
| 11/20/86 | (Date of Observation) |
| Fire Truck | (Vehicle Being Maintained) |
| HE | (Vehicle Type: Heavy Equip, Automotive Equip, Seasonal Equip, Generators) |
| Start/7:37 | (Start Time) |
| End/10:54 | (End Time) |
| L-Maintenance/Unit Level | (Maintenance Type: Unit or Support) |
| Vehicle was started 11/19/86 | |

| Sequence No. | Time | Category* | Description | Comments |
|--------------|-------|-----------|---------------------------|---|
| 1 | 1.60 | NP | give assistance | |
| 2 | 3.45 | NP | go to/from welding shop | |
| 3 | 1.80 | NP | go to/from welding shop | |
| 4 | 0.40 | NP | talk to supervisor | |
| 5 | 2.10 | NP | give assistance | |
| 6 | 1.75 | IP | select tools | |
| 7 | 4.00 | P | repair | l maint |
| 8 | 1.90 | NP | turn on outlet | includes walking |
| 9 | 14.90 | P | repair | |
| 10 | 0.30 | NP | walk to/from tools | |
| 11 | 0.35 | NP | replace tools | |
| 12 | 0.40 | NP | give assistance | |
| 13 | 0.25 | NP | walk to/ from tools | |
| 14 | 0.40 | P | repair | |
| 15 | 0.40 | NP | walk to/from tools | |
| 16 | 0.60 | NP | walk to/from tools | |
| 17 | 0.65 | P | repair | |
| 18 | 0.20 | NP | walk to/from tools | |
| 19 | 0.20 | NP | walk to/from tools | |
| 20 | 5.70 | P | repair | supervisor inspected unit/water pump |
| 21 | 0.35 | NP | walk to parts inventory | |
| 22 | 2.30 | P | obtain parts | |
| 23 | 0.60 | NP | walk from parts inventory | |
| 24 | 0.45 | NP | move tool box | |
| 25 | 0.20 | IP | select tools | |
| 26 | 68.00 | P | repair | replace belt to water pump |

*P = Productive.

NP = Nonproductive.

IP = Indirect productive.

Table C1 (Cont'd)

| Sequence No. | Time | Category* | Description | Comments |
|--------------|-------|-----------|--|--|
| 27 | 0.69 | NP | clean hands | |
| 28 | 17.00 | NP | coffee break | |
| 29 | 1.35 | P | repair | |
| 30 | 1.35 | NP | give assistance | |
| 31 | 0.30 | NP | walk to parts inventory | |
| 32 | 4.00 | NP | complete parts inventory forms | |
| 33 | 0.90 | NP | walk from parts inventory | included talking to vehicle operator |
| 34 | 6.00 | P | repair | changed tasks/battery |
| 35 | 2.50 | IP | talk to vehicle operator | |
| 36 | 1.00 | IP | talk to welder | |
| 37 | 1.50 | IP | select tools | talked to someone about tool box/welding tools |
| 38 | 2.90 | P | repair | |
| 39 | 2.90 | IP | clean work area | |
| 40 | 3.10 | IP | inspect vehicle | |
| 41 | 2.00 | IP | prepare work order | |
| 42 | 0.55 | NP | give assistance | |
| 43 | 4.60 | P | repair | |
| 44 | 1.25 | IP | move vehicles | |
| 45 | 2.00 | P | repair | |
| 46 | 6.80 | IP | road test | have to let vehicle warm up |
| 47 | 2.00 | NP | walk to /from tools | |
| 48 | 3.10 | NP | locate lost tool | |
| 49 | 1.00 | NP | replace tool | |
| 50 | 2.80 | IP | complete work order | at office |
| 51 | 0.10 | IP | return work order to process control clerk | |
| 52 | 0.60 | NP | walk to parts inventory | |
| 53 | 6.60 | NP | order parts | |
| 54 | 0.60 | NP | walk from parts inventory | |

END OF VEHICLE FOR NOW

*P = Productive.

NP = Nonproductive.

IP = Indirect productive.

Table C2

Raw Data Collected: Vehicle 2

Carla
George
11/20/86
Fire Truck
HE

(Test Engineer's Name)
(Mechanics Name)
(Date of Observation)
(Vehicle Being Maintained)
(Vehicle Type: Heavy Equip, Automotive Equip,
(Seasonal Equip, Generators)
(Start Time)
(End Time)
Maintenance Type: Unit or Support)

Start/10:55
End/3:50
Maintenance/Unit level

| Sequence No. | Time | Category* | Description | Comments |
|--------------|-------|-----------|--------------------------------|--|
| 1 | 1.60 | IP | move vehicles | got work order earlier from operator/see #36 from earlier same day |
| 2 | 1.20 | NP | walk to parts inventory | |
| 3 | 7.30 | P | obtain parts | |
| 4 | 0.55 | NP | complete parts inventory forms | |
| 5 | 0.54 | NP | walk from parts inventory | |
| 6 | 4.50 | P | repair | lights checked |
| 7 | 0.35 | NP | walk to parts inventory | |
| 8 | 0.30 | P | obtain parts | |
| 9 | 0.35 | NP | walk from parts inventory | |
| 10 | 9.70 | P | repair | |
| 11 | 0.80 | NP | discard replaced parts | oil |
| 12 | 37.60 | P | repair | gauge replaced/begin tredle valve job |
| 13 | 1.45 | NP | clean hands | |
| 14 | 54.00 | NP | lunch break | colonel spoke |
| 15 | 23.60 | P | repair | tredle valve |
| 16 | 4.80 | NP | give assistance | plumber checking on work order |
| 17 | 2.00 | P | repair | |
| 18 | 0.20 | NP | walk to/from tools | |
| 19 | 0.05 | IP | select tools | |
| 20 | 0.25 | NP | walk to/from tools | |
| 21 | 23.00 | P | repair | |
| 22 | 1.60 | NP | walk to parts inventory | |
| 23 | 2.35 | P | obtain parts | couldn't find part |
| 24 | 0.80 | NP | look for a similar part | |
| 25 | 0.40 | NP | walk from parts inventory | |
| 26 | 2.00 | P | repair | |
| 27 | 1.00 | NP | give assistance | |
| 28 | 7.70 | P | repair | |
| 29 | 0.30 | NP | walk to/from tools | |

*P = Productive.
NP = Nonproductive.
IP = Indirect productive.

Table C2 (Cont'd)

| Sequence No. | Time | Category* | Description | Comments |
|--------------|-------|-----------|---------------------------------|----------|
| 30 | 0.10 | IP | select tools | |
| 31 | 0.35 | NP | walk to/from tools | |
| 32 | 17.50 | P | repair | |
| 33 | 1.30 | NP | clean hands | |
| 34 | 15.80 | NP | coffee break | |
| 35 | 11.00 | P | repair | |
| 36 | 0.45 | NP | walk to parts inventory | |
| 37 | 4.70 | NP | talk to inventory control clerk | |
| 38 | 0.45 | NP | walk from parts inventory | |
| 39 | 29.80 | P | repair | |
| 40 | 0.20 | NP | walk to/from tools | |
| 41 | 0.10 | IP | select tools | |
| 42 | 0.20 | NP | walk to/from tools | |
| 43 | 3.50 | P | repair | |
| 44 | 0.35 | NP | walk to/from tools | |
| 45 | 0.25 | IP | select tools | |
| 46 | 0.40 | NP | walk to/from tools | |
| 47 | 11.50 | P | repair | |
| 48 | 4.50 | IP | clean work area | |
| 49 | 0.50 | NP | complete LE form | |
| 50 | 2.45 | NP | clean hands | |

END OF DAY

*P = Productive.

NP = Nonproductive.

IP = Indirect productive.

APPENDIX D: TASK DESCRIPTION OF 10 VEHICLES WITH THE HIGHEST NUMBER OF REPAIR TASKS PERFORMED

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|-------------------------------|-----|--------|---------------------------------|
| 2 | 0316-6 | M Maint | 2 | 1904-6 | Adjust ball joint linkage |
| 2 | 0316-6 | M-Maint | 2 | 1904-6 | Replace ball joint |
| 2 | 0316-6 | Repair mirror | 2 | 1904-6 | Rpl ball joint |
| 2 | 0316-6 | Replace brake lite bulbs | 2 | 1919-6 | Replace tire |
| 2 | 0316-6 | Replace defroster | 2 | 1919-6 | Rpl tire |
| 2 | 0316-6 | Replace fan belts | 2 | 2518-6 | M Maint |
| 2 | 0316-6 | Replace fuel sender switch | 2 | 2518-6 | M-Maint |
| 2 | 0366-6 | Bleed brakes | 2 | 2518-6 | Replace tire |
| 2 | 0366-6 | Repair brake line | 2 | 2883-6 | Q-Maint |
| 2 | 0366-6 | Service Call | 2 | 2883-6 | Q-Maint |
| 2 | 0366-6 | Service call | 2 | 2967-6 | Replace rim assembly |
| 2 | 0536-6 | Checked u joints | 2 | 2967-6 | Rpl rim assembly |
| 2 | 0536-6 | M Maint | 2 | 3117-6 | Repair level control |
| 2 | 0536-6 | M-Maint | 2 | 3117-6 | Rpr level control |
| 2 | 0536-6 | Repair starter wire | 2 | 3242-6 | M Maint |
| 2 | 0623-6 | Repair air system | 2 | 3242-6 | M-Maint |
| 2 | 0623-6 | Rpr air system | 2 | 3242-6 | Repair transmisson rear output |
| 2 | 0641-6 | Drain water in tank | 2 | 3242-6 | Replace air cleaner |
| 2 | 0641-6 | Service Call | 2 | 3242-6 | Replace cushion assembly |
| 2 | 0641-6 | Service call | 2 | 3242-6 | Replace engine coolant |
| 2 | 0641-6 | Service treddle valve | 2 | 3242-6 | Replace engine oil |
| 2 | 0721-6 | Repair tire | 2 | 3242-6 | Replace engine oil filter |
| 2 | 0721-6 | Service Call | 2 | 3242-6 | Replace fuel filter |
| 2 | 0721-6 | Service call | 2 | 3242-6 | Replace fuel filters |
| 2 | 0760-6 | Repair door lock | 2 | 3242-6 | Replace hydraulic oil |
| 2 | 0760-6 | Rpr Door Lock | 2 | 3242-6 | Replace spider bearing assembly |
| 2 | 0768-6 | Adjust bucket levelers | 2 | 3242-6 | Replace tooth tip |
| 2 | 0768-6 | Check for hydraulic leaks | 2 | 3874-6 | Repair tire |
| 2 | 0768-6 | Repair wiring on brake lights | 2 | 3874-6 | Service Call |
| 2 | 0768-6 | Repair wiring on tail lights | 2 | 3874-6 | Service call |
| 2 | 0768-6 | Replace bulbs | 2 | 9999-9 | Repair lift lever |
| 2 | 0768-6 | Rpr wiring | 2 | 9999-9 | Rpr lift lever |
| 2 | 0876-6 | Checked for hydraulic leaks | 9 | 0061-6 | Q-Maint |
| 2 | 0876-6 | Q-Maint | 9 | 0061-6 | Q-Maint |
| 2 | 0876-6 | Q-Maint | 9 | 0061-6 | Replace master cylinder |
| 2 | 1010-6 | Bleed brakes | 9 | 0093-6 | Adjust left and right chain |
| 2 | 1010-6 | Bleed brakes | 9 | 0093-6 | Repair drive chain left side |
| 2 | 1010-6 | Remove and install bleecers | 9 | 0093-6 | Replace link |
| 2 | 1010-6 | Repair brakes | 9 | 0093-6 | Service Call |
| 2 | 1062-6 | M Maint | 9 | 0093-6 | Service call |
| 2 | 1062-6 | M-Maint | 9 | 0312-6 | Replace tire 700x15 |
| 2 | 1062-6 | Repair hydraulic hose | 9 | 0312-6 | Replace tube |
| 2 | 1062-6 | Replace bucket edge | 9 | 0312-6 | Rpl tire |
| 2 | 1062-6 | Replace bulb | 9 | 0460-6 | Repair flasher unit |
| 2 | 1062-6 | Replace dipstick | 9 | 0460-6 | Replace 3 prong switch |
| 2 | 1062-6 | Replace headlight | 9 | 0460-6 | Replace flasher |
| 2 | 1062-6 | Replace headlight arrangement | 9 | 0460-6 | Replace wiring |
| 2 | 1062-6 | Replace teeth | 9 | 0460-6 | Rpr flasher unit |
| 2 | 1062-6 | Replace teeth pin | 9 | 0656-6 | Adjust points and carburetor |
| 2 | 1062-6 | Replace tire | 9 | 0656-6 | Bleed brake system |
| 2 | 1062-6 | Replace washers | 9 | 0656-6 | Checked electrical wiring |
| 2 | 1399-6 | Bleed brakes | 9 | 0656-6 | Cleaned inside of engine compar |
| 2 | 1399-6 | M Maint | 9 | 0656-6 | Fixed wires on brake cylinders |
| 2 | 1399-6 | M-Maint | 9 | 0656-6 | Replace belt water pump |
| 2 | 1399-6 | Repair air line | 9 | 0656-6 | Replace chain main broom drive |
| 2 | 1399-6 | Replace brake cylinder group | 9 | 0656-6 | Replace chain main drive |
| 2 | 1399-6 | Replace bucket pivot pins | 9 | 0656-6 | Replace engine oil filter |
| 2 | 1399-6 | Replace tail light assembly | 9 | 0656-6 | Replace hydraulic filter |
| 2 | 1399-6 | Replace tire | 9 | 0656-6 | Replace main broom wafers |
| 2 | 1399-6 | Steam clean vehicle | 9 | 0656-6 | Replace seal quad |
| 2 | 1626-6 | Repair tire | 9 | 0656-6 | Replace sprocket bushing |
| 2 | 1626-6 | Replace valve stem | 9 | 0656-6 | Replace sprocket drive wheel |
| 2 | 1626-6 | Rpr tire | 9 | 0656-6 | Replace sprocket front drive |
| 2 | 1684-6 | Clean plug | 9 | 0656-6 | Rpr points/carburetor |
| 2 | 1684-6 | Weld bucket | 9 | 0656-6 | weld main broom lug |
| 2 | 1702-6 | Install registration numbers | 9 | 0912-6 | Adjust brake |
| 2 | 1702-6 | Q-Maint | 9 | 0912-6 | Adjust brake hydrovac |
| 2 | 1702-6 | Q-Maint | 9 | 1035-6 | Adjust hydraulic controls |
| 2 | 1702-6 | Repair rear glass frame | 9 | 1035-6 | Q-Maint |
| 2 | 1702-6 | Replace brake lite switch | 9 | 1035-6 | Q-Maint |
| 2 | 1702-6 | Replace door glass | 9 | 1035-6 | Replace hydraulic hose fittings |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|---------------------------------|-----|--------|---------------------------------|
| 9 | 1035-6 | Replace hydraulic hose | 9 | 2222-6 | Replace universal coupling |
| 9 | 1035-6 | Replace hydraulic oil | 9 | 2222-6 | Replace wheel |
| 9 | 1035-6 | Replace hydrovac cylinder(warna | 9 | 2222-6 | Rpl wheel |
| 9 | 1035-6 | Replace points | 9 | 2704-6 | Q-Maint |
| 9 | 1035-6 | Replace side broom | 9 | 2704-6 | Q-Maint |
| 9 | 1239-6 | Repair detent assembly | 9 | 2704-6 | Replace condensor |
| 9 | 1239-6 | Replace caution sign | 9 | 2704-6 | Replace plugs |
| 9 | 1239-6 | Replace left and right door gla | 9 | 2704-6 | Replace points |
| 9 | 1239-6 | Rpr detent assembly | 9 | 2704-6 | Replace side broom |
| 9 | 1542-6 | Repair stabilizer bar | 9 | 3104-6 | Adjust side and main broom chai |
| 9 | 1542-6 | Repair tire | 9 | 3104-6 | Adjust side broom cable |
| 9 | 1542-6 | Replace wiper motor | 9 | 3104-6 | Replace clearance lite markers |
| 9 | 1542-6 | Rpr tire | 9 | 3104-6 | Replace headlight |
| 9 | 1575-6 | Adjust clutch return spring | 9 | 3104-6 | Replace left hand rubber shoes |
| 9 | 1575-6 | Realign brake | 9 | 3104-6 | Replace left hand shoe assembly |
| 9 | 1575-6 | Realigned brake | 9 | 3104-6 | Replace lft hand rubber brg sto |
| 9 | 1575-6 | Repair stabilizer | 9 | 3104-6 | Replace main broom |
| 9 | 1575-6 | Replace clutch master cylinder | 9 | 3104-6 | Replace signal flasher |
| 9 | 1575-6 | Replace clutch slave cylinder | 9 | 3104-6 | Replace stop lite switch |
| 9 | 1718-6 | Replace side broom | 9 | 3104-6 | Replace switch assembly |
| 9 | 1718-6 | Service Call | 9 | 3104-6 | Replace tail and stop lite asse |
| 9 | 1822-6 | Adjust dirt shoe | 9 | 3104-6 | Replace turn signal switch asse |
| 9 | 1822-6 | Repair side broom guide | 9 | 3104-6 | Rpl main broom |
| 9 | 1822-6 | Replace 700x15HT tire | 9 | 3224-6 | Replace runner shoes |
| 9 | 1822-6 | Replace main broom | 9 | 3224-6 | Replace side broom |
| 9 | 1822-6 | Replace shoe runner front | 9 | 3224-6 | Rpl runner shoes |
| 9 | 1822-6 | Replace shoe runner rear | 9 | 3660-6 | Repair wiper motor aim |
| 9 | 1822-6 | Replace side broom | 9 | 3651-6 | Repair tire |
| 9 | 1822-6 | Weld side broom bolt | 9 | 3651-6 | Rpr tire |
| 9 | 1867-6 | Adjust slave cylinder linkage | 9 | 3685-6 | Repair rear tires |
| 9 | 1867-6 | Repair slave cylinder bracket | 9 | 3685-6 | Replace main broom |
| 9 | 1867-6 | Replace slave cylinder | 9 | 3685-6 | Replace rear tire |
| 9 | 1867-6 | Rpl fuel pump | 9 | 3685-6 | Replace rear wheel 15" |
| 9 | 1899-6 | Bleed brakes | 9 | 3685-6 | Replace side broom |
| 9 | 1899-6 | Install left rearview mirror | 9 | 3685-6 | Replace tube |
| 9 | 1899-6 | Lubricate vehicle | 9 | 3685-6 | Rpr tires |
| 9 | 1899-6 | Repair steering | 10 | 0095-6 | Repair tire |
| 9 | 1899-6 | Repair turn signal lever | 10 | 0095-6 | Repair tube 700x15 |
| 9 | 1899-6 | Repair wiring | 10 | 0095-6 | Rpr Tire |
| 9 | 1899-6 | Replace brake fluid | 10 | 0116-6 | Replace headlight |
| 9 | 1899-6 | Replace engine oil | 10 | 0116-6 | Replace main broom |
| 9 | 1899-6 | Replace engine oil filter | 10 | 0116-6 | Replace main broom drive sprock |
| 9 | 1899-6 | Replace indicator bulb | 10 | 0116-6 | Replace main broom rear sprock |
| 9 | 1899-6 | Replace intake gasket | 10 | 0116-6 | Replace runner dirt shoe |
| 9 | 1899-6 | Replace push rod gasket | 10 | 0116-6 | Replace signal flasher |
| 9 | 1982-6 | Replace main broom drum | 10 | 0116-6 | Rpl main broom |
| 9 | 1982-6 | Replace main broom side shaft b | 10 | 0477-6 | Q-Maint |
| 9 | 1982-6 | Rpl main broom | 10 | 0477-6 | Q-Maint |
| 9 | 2222-6 | Replace bolt and bushings side | 10 | 0477-6 | Replace clearance lights |
| 9 | 2222-6 | Replace clutch disc assembly | 10 | 0477-6 | Replace emergency brake band |
| 9 | 2222-6 | Replace emergency brake band | 10 | 0477-6 | Replace emergency brake drum |
| 9 | 2222-6 | Replace engine oil filter | 10 | 0477-6 | Replace exhaust manifold gasket |
| 9 | 2222-6 | Replace engine thermostat | 10 | 0477-6 | Replace master cylinder clutch |
| 9 | 2222-6 | Replace hydraulic filter | 10 | 0647-6 | Replace headlight |
| 9 | 2222-6 | Replace oil pan gasket | 10 | 0647-6 | Rpl headlight |
| 9 | 2222-6 | Replace pilot bearing fly wheel | 10 | 0668-6 | Q-Maint |
| 9 | 2222-6 | Replace pivot gear housing uppe | 10 | 0668-6 | Q-Maint |
| 9 | 2222-6 | Replace pivot shaft bearing sid | 10 | 0668-6 | Repair and reseal broom transfe |
| 9 | 2222-6 | Replace pressure plate | 10 | 0668-6 | Repair side window channels |
| 9 | 2222-6 | Replace seal | 10 | 0668-6 | Replace main broom drive chain |
| 9 | 2222-6 | Replace seal side broom | 10 | 0668-6 | Replace main broom drive sprock |
| 9 | 2222-6 | Replace seals side broom gear b | 10 | 0668-6 | Replace side broom drive sprock |
| 9 | 2222-6 | Replace shaft upper side broom | 10 | 1147-6 | Weld water tank |
| 9 | 2222-6 | Replace side broom bolt | 10 | 1147-6 | Weld water tank |
| 9 | 2222-6 | Replace side broom bottom shaft | 10 | 1153-6 | Replace hour meter |
| 9 | 2222-6 | Replace side broom drive shaft | 10 | 1153-6 | Rpl hour meter |
| 9 | 2222-6 | Replace side broom intermediate | 10 | 1189-6 | Replace side broom |
| 9 | 2222-6 | Replace side broom rack | 10 | 1189-6 | Rpl side broom |
| 9 | 2222-6 | Replace side broom sprocket | 10 | 1249-6 | Repair cam arm main broom |
| 9 | 2222-6 | Replace sleeve assy throw out b | 10 | 1249-6 | Repair dirt guard |
| 9 | 2222-6 | Replace tire 600x15 | 10 | 1249-6 | Replace main broom |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|-----------------------------------|-----|--------|---------------------------------|
| 10 | 1249-6 | Replace main broom core | 15 | 0172-6 | Service call |
| 10 | 1249-6 | Rpr cam arm | 15 | 0378-6 | Repair starter solenoid wire |
| 10 | 1450-6 | Adjust clutch | 15 | 0378-6 | Service Call |
| 10 | 1450-6 | Adjust steering | 15 | 0378-6 | Service call |
| 10 | 1450-6 | Install sheet metal | 15 | 0463-6 | Replace tilt cylinder hose on b |
| 10 | 1450-6 | Q-Maint | 15 | 0463-6 | Rpl tilt cyl |
| 10 | 1450-6 | Q-Maint | 15 | 0775-6 | Service Call |
| 10 | 1450-6 | Repair tire | 15 | 0775-6 | Service call |
| 10 | 1450-6 | Replace clutch disk | 15 | 0880-6 | Adjust brakes |
| 10 | 1450-6 | Replace drive chain side broom | 15 | 0880-6 | Q-Maint |
| 10 | 1450-6 | Replace drive sprocket | 15 | 0880-6 | Q-Maint |
| 10 | 1450-6 | Replace main broom drive chain | 15 | 0880-6 | Replace end bits |
| 10 | 1450-6 | Replace main broom drive shaft | 15 | 0880-6 | Rotate cutting edges |
| 10 | 1450-6 | Replace main broom drive sprocket | 15 | 0913-6 | Adjust arm |
| 10 | 1450-6 | Replace pilot bearing | 15 | 0913-6 | Adjust arm |
| 10 | 1450-6 | Replace pressure plate | 15 | 0913-6 | Remove and install dozer arm |
| 10 | 1450-6 | Replace PTO assembly | 15 | 0913-6 | Replace bits |
| 10 | 1450-6 | Replace side broom drive sprocket | 15 | 0913-6 | Weld dozer arm |
| 10 | 1450-6 | Replace throw out bearing | 15 | 1068-6 | Replace transmisson oil |
| 10 | 1450-6 | Replace thrust washer side broo | 15 | 1068-6 | Replace transmisson oil filter |
| 10 | 1450-6 | Replace transmisson | 15 | 1068-6 | Service Call |
| 10 | 1450-6 | Steam clean vehicle | 15 | 1068-6 | Service call |
| 10 | 1544-6 | Repair tire | 15 | 1411-6 | Service Call |
| 10 | 1544-6 | Rpr tire | 15 | 1411-6 | Service call |
| 10 | 2340-6 | Repair beacon light | 15 | 1430-6 | Replace hose and fittings |
| 10 | 2340-6 | Replace side broom shear pin | 15 | 1430-6 | Rpl hose |
| 10 | 2340-6 | Rpr beacon light | 15 | 1494-6 | Adjust all belts |
| 10 | 2705-6 | Replace condensor | 15 | 1494-6 | Service Call |
| 10 | 2705-6 | Replace ignition points | 15 | 1494-6 | Service call |
| 10 | 2705-6 | Replace main broom | 15 | 1607-6 | Adjust center arm |
| 10 | 2705-6 | Replace plugs | 15 | 1607-6 | Adjust dozer arm pins |
| 10 | 2705-6 | Rpl points & plugs | 15 | 1607-6 | Adjust dozer arm shims |
| 10 | 2941-6 | Adjust carb | 15 | 1607-6 | Install dozer arm caps |
| 10 | 2941-6 | Q-Maint | 15 | 1607-6 | Repair lock bolts and brackets |
| 10 | 2941-6 | Q-Maint | 15 | 1607-6 | Replace bolts |
| 10 | 2941-6 | Replace bulb | 15 | 1607-6 | Rpl bolt |
| 10 | 2941-6 | Replace carburetor | 15 | 1607-6 | Service call |
| 10 | 2941-6 | Replace drive chain side broom | 15 | 1710-6 | Adjust brakes |
| 10 | 2941-6 | Replace main broom | 15 | 1710-6 | Q-Maint |
| 10 | 2941-6 | Replace main broom drive chain | 15 | 1710-6 | Q-Maint |
| 10 | 2941-6 | Replace main broom shaft bearin | 15 | 1710-6 | Repair rock guards |
| 10 | 2941-6 | Replace runner dirt shoe | 15 | 1710-6 | Replace hydraulic hose tilt |
| 10 | 2941-6 | Replace side broom | 15 | 1710-6 | Replace hydraulic lift cylinder |
| 10 | 2941-6 | Replace side broom gear | 15 | 1710-6 | Service call |
| 10 | 2941-6 | Replace transfer gear box oil | 15 | 1750-6 | Adjust brakes |
| 10 | 2941-6 | Replace transfer gear box seal | 15 | 1750-6 | Service Call |
| 10 | 3384-6 | Adjust emerg brake | 15 | 1750-6 | Service call |
| 10 | 3384-6 | Adjust emergency brake | 15 | 2078-6 | Repair wire |
| 10 | 3384-6 | Replace attenator | 15 | 2078-6 | Service Call |
| 10 | 3384-6 | Replace hydraulic hoses | 15 | 2078-6 | Service call |
| 10 | 3384-6 | Replace hydraulic oil | 15 | 2329-6 | Q-Maint |
| 10 | 3384-6 | Replace side broom | 15 | 2329-6 | Replace left dozer bit |
| 10 | 3384-6 | Steam clean vehicle | 15 | 2329-6 | Replace lift cylinder pivot bea |
| 10 | 3660-6 | Repair rear tires | 15 | 2379-6 | Adjust steering linkage |
| 10 | 3660-6 | Replace gear box oil | 15 | 2379-6 | Adjust steering linkage |
| 10 | 3660-6 | Replace hydraulic pump | 15 | 2379-6 | Check charging system |
| 10 | 3660-6 | Replace rear tire | 15 | 2379-6 | Replace pin |
| 10 | 3660-6 | Replace rear wheel | 15 | 2379-6 | Replace roller bearing |
| 10 | 3660-6 | Replace side broom | 15 | 2379-6 | Service call |
| 10 | 3660-6 | Replace side broom seals | 15 | 2449-6 | Realign rear broom |
| 10 | 3660-6 | Replace side broom shaft lower | 15 | 2449-6 | Replace O-ring packing preforme |
| 10 | 3660-6 | Replace side broom shaft upper | 15 | 2449-6 | Replace transmisson fluid |
| 10 | 3660-6 | Replace side broom u-joint | 15 | 2449-6 | Replace transmisson hose |
| 10 | 3660-6 | Replace side clearance lens | 15 | 2449-6 | Service call |
| 10 | 3660-6 | Replace tube | 15 | 2501-6 | Repair fuel line |
| 10 | 3660-6 | Replace woodruff key size G | 15 | 2501-6 | Service call |
| 10 | 3660-6 | Rpr tire/wheel | 15 | 2501-6 | S-Maint |
| 10 | 3740-6 | Repair tire | 15 | 2585-5 | Replace plug |
| 10 | 3740-6 | Rpr tire | 15 | 2585-5 | Rpl plug |
| 15 | 0172-6 | Repair track | 15 | 2586-6 | Q-Maint |
| 15 | 0172-6 | Service Call | 15 | 2586-6 | Q-Maint |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|---------------------------------|-----|--------|---------------------------------|
| 15 | 2586-6 | Reinstall cylinder heads (rebu | 18 | 1048-6 | Rpl main broom |
| 15 | 2586-6 | Remove and install belly pan | 18 | 1188-6 | Repair indicator cable |
| 15 | 2586-6 | Remove and install radiator fan | 18 | 1188-6 | Rpr ind cable |
| 15 | 2586-6 | Remove, clean and install radia | 18 | 1230-6 | Install hour meter |
| 15 | 2586-6 | Replace 4-1/2" tubing | 18 | 1230-6 | Instl hour meter |
| 15 | 2586-6 | Replace bridge clamp | 18 | 1230-6 | Repair alternator wiring |
| 15 | 2586-6 | Replace cap air cleaner | 18 | 1230-6 | Repl ce alternator |
| 15 | 2586-6 | Replace clamp | 18 | 1230-6 | Repl:ce spark plug |
| 15 | 2586-6 | Replace coupling | 18 | 1340-6 | Adjust conveyor belt |
| 15 | 2586-6 | Replace cover bearing | 18 | 1340-6 | Adjust conveyor belt bearings |
| 15 | 2586-6 | Replace cylinder head gaskets | 18 | 1340-6 | Replace battery |
| 15 | 2586-6 | Replace element breather | 18 | 1340-6 | Replace distributor cap |
| 15 | 2586-6 | Replace exhaust stud to head | 18 | 1340-6 | Troubleshoot generator system |
| 15 | 2586-6 | Replace ferrule grooved | 18 | 1441-6 | Adjust clutch |
| 15 | 2586-6 | Replace fuel pressure gage | 18 | 1441-6 | Adjust clutch |
| 15 | 2586-6 | Replace gasket | 18 | 1441-6 | Realign rear broom chain |
| 15 | 2586-6 | Replace gasket exhaust manifold | 18 | 1441-6 | Reconnect alternator leads |
| 15 | 2586-6 | Replace gasket intake manifold | 18 | 1441-6 | Repair side broom chain |
| 15 | 2586-6 | Replace line assembly | 18 | 1441-6 | Replace side broom shear pin |
| 15 | 2586-6 | Replace locking plate | 18 | 1501-6 | Replace tube |
| 15 | 2586-6 | Replace magnet | 18 | 1501-6 | Rpl tube |
| 15 | 2586-6 | Replace O-ring | 18 | 1535-6 | Repair tire |
| 15 | 2586-6 | Replace packing preformed | 18 | 1535-6 | Rpr tire |
| 15 | 2586-6 | Replace pump oil transmission | 18 | 1576-6 | Checked hydraulics |
| 15 | 2586-6 | Replace push rod gasket complet | 18 | 1576-6 | Checked hydraulics |
| 15 | 2586-6 | Replace screen | 18 | 1576-6 | Replace chain drive belt |
| 15 | 2586-6 | Replace seal | 18 | 1576-6 | Replace hydraulic filter |
| 15 | 2586-6 | Replace seal plain encased | 18 | 1593-6 | Lubricate |
| 15 | 2586-6 | Replace seal ring metal | 18 | 1593-6 | Repair clutch |
| 15 | 2586-6 | Replace strainer assembly | 18 | 1593-6 | Replace hydraulic hose |
| 15 | 2586-6 | Replace thermostat | 18 | 1593-6 | Replace slave bracket |
| 15 | 2586-6 | Replace tube clamp | 18 | 1593-6 | Weld pressure plate |
| 15 | 2586-6 | Replace turbo charger assembly | 18 | 1648-6 | Bleed injectors |
| 15 | 2586-6 | Replace valve check | 18 | 1648-6 | Repair side broom guides |
| 15 | 2586-6 | Replace water distributor ferru | 18 | 1648-6 | Weld side broom guide pin |
| 15 | 2586-6 | Replace water distributor gaske | 18 | 1839-6 | Adjust dirt shoe |
| 15 | 2586-6 | Steam clean vehicle | 18 | 1839-6 | Repair dirt shoe |
| 15 | 2586-6 | Welding on tractor | 18 | 1839-6 | Repair guide bracket bolt |
| 15 | 2879-6 | Installed hydraulic lines for d | 18 | 1839-6 | Replace bolts in dirt shoe brac |
| 15 | 2879-6 | Inst/Rpl hydraulic lines | 18 | 1839-6 | Rpl pivot pin |
| 15 | 2879-6 | Remove & install frt grill, flo | 18 | 2010-6 | Adjust clutch |
| 15 | 2879-6 | Remove & install hood, exh stk, | 18 | 2010-6 | Adjust steering |
| 15 | 2879-6 | Replace alternator belt | 18 | 2010-6 | Align side broom |
| 15 | 2879-6 | Replace hydraulic oil | 18 | 2010-6 | Q-Maint |
| 15 | 2889-6 | Adjust fan belts | 18 | 2010-6 | Replace electrical terminals |
| 15 | 2889-6 | Adjust tracks | 18 | 2010-6 | Replace head light seal beam |
| 15 | 2889-6 | Install hyd lines for disconnec | 18 | 2010-6 | Replace main drive chain |
| 15 | 2889-6 | Install hydraulic quick disconn | 18 | 2010-6 | Replace main drive sprockets |
| 15 | 2889-6 | Plug hydraulic hose tilt | 18 | 2010-6 | Replace side light seal beam |
| 15 | 2889-6 | Q-Maint | 18 | 2010-6 | Replace turn signal assembly |
| 15 | 2889-6 | Q-Maint | 18 | 2242-6 | Repair tire |
| 15 | 2889-6 | Repair breather stack | 18 | 2242-6 | Rpr tire |
| 15 | 2889-6 | Repair door to track adj zert | 18 | 2300-6 | Align side broom |
| 15 | 2889-6 | Repair exhaust elbow and flange | 18 | 2300-6 | Align side broom rails |
| 15 | 2889-6 | Replace alternator belt | 18 | 2300-6 | Replace antifreeze |
| 15 | 2889-6 | Replace winch cable | 18 | 2300-6 | Replace condensor |
| 15 | 2889-6 | Replace winch oil | 18 | 2300-6 | Replace conveyor belt |
| 15 | 2889-6 | Weld hand rail | 18 | 2300-6 | Replace distributor point set |
| 15 | 2889-6 | Welded dirt guard brackets | 18 | 2300-6 | Replace lower conveyor roller b |
| 15 | 2910-6 | Repair headache rack (weld) | 18 | 2300-6 | Replace spark plug |
| 15 | 2910-6 | Replace oil switch | 18 | 2300-6 | Weld side broom guides |
| 15 | 2910-6 | Replace winch control cable | 18 | 2312-6 | Adjust emergency brake |
| 15 | 2910-6 | Service Call | 18 | 2312-6 | Adjust emergency brake |
| 15 | 2910-6 | Service call | 18 | 2312-6 | Adjust steering linkage |
| 15 | 3565-6 | Replace hose | 18 | 2428-6 | Engine compression test |
| 15 | 3565-6 | Service Call | 18 | 2428-6 | Realign rear broom |
| 15 | 3565-6 | Service call | 18 | 2428-6 | Remove and install side broom g |
| 15 | 3656-6 | Repair fuel line | 18 | 2428-6 | Replace engine oil |
| 15 | 3656-6 | Service Call | 18 | 2428-6 | Replace engine oil filter |
| 15 | 3656-6 | Service call | 18 | 2428-6 | Renlace seal beam |
| 18 | 1048-6 | Replace main broom | 18 | 2428-6 | Replace side broom coupling u;j |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|---------------------------------|-----|--------|--------------------------------|
| 18 | 2428-6 | Replace spark plug | 365 | 0336-6 | Replace adapter alcohol bottle |
| 18 | 2428-6 | Service Call | 365 | 0336-6 | Replace air comp base gasket |
| 18 | 2428-6 | Weld side cylinder pin | 365 | 0336-6 | Replace air comp base gasket |
| 18 | 2666-6 | Adjust engine timing | 365 | 0336-6 | Replace alternator |
| 18 | 2666-6 | Replace copper fuel hose | 365 | 0336-6 | Replace alternator |
| 18 | 2666-6 | Replace electrical connectors | 365 | 0336-6 | Replace clutch |
| 18 | 2666-6 | Replace engine oil | 365 | 0336-6 | Replace clutch |
| 18 | 2666-6 | Replace engine oil filter | 365 | 0336-6 | Replace defroster hose |
| 18 | 2666-6 | Replace fuel pump | 365 | 0336-6 | Replace defroster hose |
| 18 | 2666-6 | Replace hose clamps | 365 | 0336-6 | Replace fan belt |
| 18 | 2666-6 | Replace inline fuel filter | 365 | 0336-6 | Replace fan belt |
| 18 | 2666-6 | Replace main broom | 365 | 0336-6 | Replace flasher |
| 18 | 2666-6 | Replace side broom chain | 365 | 0336-6 | Replace flasher |
| 18 | 2666-6 | Replace spark plug | 365 | 0336-6 | Replace injector |
| 18 | 2666-6 | Rpr Engine | 365 | 0336-6 | Replace injector |
| 18 | 3126-5 | Install 1/4 flatwashers | 365 | 0336-6 | Replace oil line |
| 18 | 3126-5 | Install 1/4 hex nuts | 365 | 0336-6 | Replace oil line |
| 18 | 3126-5 | Install 1/4 lockwashers | 365 | 0336-6 | Replace oil switch |
| 18 | 3126-5 | Install 1/4x1/2 cap screws | 365 | 0336-6 | Replace oil switch |
| 18 | 3126-5 | Install conveyer belt | 365 | 0336-6 | Replace transmisson oil |
| 18 | 3126-5 | Install main broom | 365 | 0336-6 | Replace transmisson oil |
| 18 | 3126-5 | Q-Maint | 365 | 0764-6 | Adjust tailgate clamps |
| 18 | 3126-5 | Q-Maint | 365 | 0764-6 | Adjust tailgate clamps |
| 18 | 3126-5 | Repair light system | 365 | 0764-6 | Repair tailgate chains |
| 18 | 3126-5 | Repair point system | 365 | 0764-6 | Repair tailgate chains |
| 18 | 3126-5 | Replace alternator | 365 | 0788-6 | Rpr Tailgate Chains |
| 18 | 3126-5 | Replace battery | 365 | 0788-6 | Replace batteries |
| 18 | 3126-5 | Replace cap screw | 365 | 0788-6 | Replace batteries |
| 18 | 3126-5 | Replace convertor deflector lef | 365 | 0788-6 | Service Call |
| 18 | 3126-5 | Replace convertor deflector rig | 365 | 0788-6 | Service call |
| 18 | 3126-5 | Replace dirt shoe extension spr | 365 | 0788-6 | Service call |
| 18 | 3126-5 | Replace external side broom rin | 365 | 0839-6 | Charge Batteries |
| 18 | 3126-5 | Replace flange bearing over rol | 365 | 0839-6 | Charge batteries |
| 18 | 3126-5 | Replace flasher | 365 | 0885-6 | Charge batteries |
| 18 | 3126-5 | Replace fuel pump | 365 | 0885-6 | Repair tire |
| 18 | 3126-5 | Replace jack shaft side broom r | 365 | 0885-6 | Repair tire |
| 18 | 3126-5 | Replace master cylinder brake | 365 | 0897-6 | Rpr Tire |
| 18 | 3126-5 | Replace master cylinder clutch | 365 | 0897-6 | Weld Headache Rack |
| 18 | 3126-5 | Replace pivot gear hsing sb upp | 365 | 0897-6 | Weld headache rack |
| 18 | 3126-5 | Replace pivot housing side broo | 365 | 0897-6 | Weld headache rack |
| 18 | 3126-5 | Replace pivot housing side broo | 365 | 0910-6 | Repair power steering hose |
| 18 | 3126-5 | Replace seal | 365 | 0910-6 | Repair power steering hose |
| 18 | 3126-5 | Replace seal input shaft | 365 | 0910-6 | Replace steering fluid |
| 18 | 3126-5 | Replace side broom chain sprock | 365 | 0910-6 | Replace steering fluid |
| 18 | 3126-5 | Replace side broom pivot housin | 365 | 0910-6 | Rpr PS Hose |
| 18 | 3126-5 | Replace side broom seal | 365 | 0920-6 | Repair wheel (loose) |
| 18 | 3126-5 | Replace side broom spring | 365 | 0920-6 | Repair wheel (loose) |
| 18 | 3126-5 | Replace side lights | 365 | 0920-6 | Replace tire |
| 18 | 3126-5 | Replace signal flasher | 365 | 0920-6 | Replace tire |
| 18 | 3126-5 | Replace sprocket side broom dri | 365 | 0920-6 | Rpr wheel |
| 18 | 3126-5 | Replace turn signal assembly | 365 | 0920-6 | Weld chain holder |
| 18 | 3126-5 | Replace wafer core | 365 | 0920-6 | Weld chain holder |
| 18 | 3126-5 | Replace wiper clamp | 365 | 0920-6 | Weld tailgate |
| 18 | 3126-5 | Replace wiper convertor deflect | 365 | 0920-6 | Weld tailgate |
| 18 | 3126-5 | Weld hopper door brace | 365 | 0935-6 | Charge Battery |
| 18 | 3409-6 | Replace fittings | 365 | 0935-6 | Charge battery |
| 18 | 3409-6 | Replace hydraulic hose | 365 | 0935-6 | Charge battery |
| 18 | 3409-6 | Rpl fittings/hose | 365 | 0935-6 | Start truck |
| 18 | 3409-6 | Steam clean | 365 | 0935-6 | Start truck |
| 18 | 3673-6 | Repair tire | 365 | 1040-6 | Repair tire |
| 18 | 3673-6 | Rpr tire | 365 | 1040-6 | Repair tire |
| 18 | 3673-6 | Rpr tire | 365 | 1040-6 | Rpr Tire |
| 365 | 0336-6 | L Maint | 365 | 1044-6 | Repair/align tailgate |
| 365 | 0336-6 | L Maint | 365 | 1044-6 | Repair/align tailgate |
| 365 | 0336-6 | L Maint | 365 | 1044-6 | Replace bulb |
| 365 | 0336-6 | Repair air tank | 365 | 1044-6 | Replace bulb |
| 365 | 0336-6 | Repair air tank | 365 | 1044-6 | Rpr/Align Tailgate |
| 365 | 0336-6 | Repair horn button | 365 | 1044-6 | Adjust clutch |
| 365 | 0336-6 | Repair horn button | 365 | 1054-6 | Adjust clutch |
| 365 | 0336-6 | Repair idler arm | 365 | 1054-6 | Grease front end |
| 365 | 0336-6 | Repair idler arm | 365 | 1054-6 | Grease front end |
| 365 | 0336-6 | Replace adapter alcohol bottle | 365 | 1054-6 | Grease front end |

| FE# | DOC # | DESCRIPTION |
|-----|--------|---------------------------------|
| 365 | 1054-6 | Repair tie rod |
| 365 | 1054-6 | Repair tie rod |
| 365 | 1054-6 | Rpr Tie Rod |
| 365 | 1054-6 | Weld chain holder |
| 365 | 1054-6 | Weld chain holder |
| 365 | 1178-6 | A Maint |
| 365 | 1178-6 | A Maint |
| 365 | 1178-6 | A Maint |
| 365 | 1178-6 | Repair engine stop cable |
| 365 | 1178-6 | Repair engine stop cable |
| 365 | 1178-6 | Repair PTO U-joint |
| 365 | 1178-6 | Repair PTO U-joint |
| 365 | 1178-6 | Repair wiring |
| 365 | 1178-6 | Repair wiring |
| 365 | 1178-6 | Replace backup switch |
| 365 | 1178-6 | Replace backup switch |
| 365 | 1178-6 | Replace hoist zert |
| 365 | 1178-6 | Replace hoist zert |
| 365 | 1178-6 | Replace PTO packing |
| 365 | 1178-6 | Replace PTO packing |
| 365 | 1178-6 | Replace window handle crank |
| 365 | 1178-6 | Replace window handle crank |
| 365 | 1243-6 | Lubricate |
| 365 | 1243-6 | Lubricate |
| 365 | 1243-6 | Misc Mower Rpr |
| 365 | 1243-6 | Replace air pot |
| 365 | 1243-6 | Replace air pot |
| 365 | 1243-6 | Replace blower motor |
| 365 | 1243-6 | Replace blower motor |
| 365 | 1243-6 | Replace leaf spring |
| 365 | 1243-6 | Replace leaf spring |
| 365 | 1243-6 | Replace rear spring |
| 365 | 1243-6 | Replace rear spring |
| 365 | 1243-6 | Replace rear spring bolt |
| 365 | 1243-6 | Replace rear spring bolt |
| 365 | 1243-6 | Replace rear spring bracket |
| 365 | 1243-6 | Replace rear spring bracket |
| 365 | 1243-6 | Replace rear wheel seal |
| 365 | 1243-6 | Replace rear wheel seal |
| 365 | 1243-6 | Replace spider |
| 365 | 1243-6 | Replace spider |
| 365 | 1243-6 | Weld rear spring bracket |
| 365 | 1243-6 | Weld rear spring bracket |
| 365 | 1541-6 | Align Brake Can |
| 365 | 1541-6 | Align brake can |
| 365 | 1541-6 | Align brake can |
| 365 | 1594-6 | Repair battery cable |
| 365 | 1594-6 | Repair battery hold down |
| 365 | 1594-6 | Replace batteries |
| 365 | 1594-6 | Replace bulb |
| 365 | 1594-6 | Rpl Batteries |
| 365 | 1632-6 | Fabricate new tailgate |
| 365 | 1632-6 | Repair fuel tank |
| 365 | 1632-6 | Repair PTO shaft |
| 365 | 1632-6 | Replace clutch |
| 365 | 1632-6 | Replace front spring |
| 365 | 1632-6 | Replace PTO shaft seal |
| 365 | 1632-6 | Replace transmisson |
| 365 | 1632-6 | Replace transmisson fluid |
| 365 | 1632-6 | Rpr PTO Shaft |
| 365 | 1647-6 | Weld Rack |
| 365 | 1647-6 | Weld rack |
| 365 | 1686-6 | Repair muffler |
| 365 | 1686-6 | Repair tire |
| 365 | 1686-6 | Replace backup alarm |
| 365 | 1686-6 | Replace bulb |
| 365 | 1686-6 | Replace rear center spring bolt |
| 365 | 1686-6 | Weld Muffler |
| 365 | 1686-6 | Weld muffler |
| 365 | 1834-6 | Repair bumper |
| 365 | 1834-6 | Repair muffler |

| FE# | DOC # | DESCRIPTION |
|-----|--------|---------------------------------|
| 365 | 1834-6 | Replace fuel filter |
| 365 | 1865-6 | Rpr Muffler |
| 365 | 1937-6 | Replace U-joint |
| 365 | 1937-6 | Service Call |
| 365 | 1937-6 | Service call |
| 365 | 1973-6 | Repair muffler |
| 365 | 1973-6 | Rpr Muffler |
| 365 | 1995-6 | Replace exhaust/muffler |
| 365 | 1995-6 | Rpl Exhaust/Muffler |
| 365 | 2094-6 | Replace pod |
| 365 | 2094-6 | Rpl Pod |
| 365 | 2113-6 | Repair tire |
| 365 | 2113-6 | Rpr Tire |
| 365 | 2130-6 | Adjust clutch |
| 365 | 2130-6 | Check front end |
| 365 | 2130-6 | Check rear spring bolt |
| 365 | 2130-6 | Replace tire |
| 365 | 2130-6 | Rpl Tire |
| 365 | 2228-6 | L Maint |
| 365 | 2228-6 | L Maint |
| 365 | 2228-6 | Repair engine stop cable |
| 365 | 2228-6 | Repair spring |
| 365 | 2228-6 | Replace front sheel lug studs |
| 365 | 2228-6 | Replace front wheel lug nut |
| 365 | 2228-6 | Replace L/F spring center bolt |
| 365 | 2280-6 | Weld Tailgate/Bracket |
| 365 | 2280-6 | Weld tailgate/bracket |
| 365 | 2304-6 | Repair exhaust pipe |
| 365 | 2304-6 | Repair right door |
| 365 | 2304-6 | Replace starter |
| 365 | 2304-6 | Rpl Starter |
| 365 | 2321-6 | Check front end |
| 365 | 2321-6 | Repair L/Front wheel bearing |
| 365 | 2321-6 | Repair spring shackle |
| 365 | 2321-6 | Repair tailgate |
| 365 | 2321-6 | Repair tire |
| 365 | 2321-6 | Rpr Tailgate |
| 365 | 2589-6 | Repair tires |
| 365 | 2589-6 | Service Call |
| 365 | 2589-6 | Service call |
| 365 | 3060-6 | Reweld Headache Rack |
| 365 | 3060-6 | Reweld headache rack |
| 365 | 3075-6 | Repair tire |
| 365 | 3075-6 | Rpr Tire |
| 365 | 3105-6 | Adjust clutch |
| 365 | 3105-6 | Replace fuel filters |
| 365 | 3105-6 | Replace fuse |
| 365 | 3105-6 | Rpl Fuel Filters |
| 365 | 3182-6 | Reface flywheel |
| 365 | 3182-6 | Repair air tank |
| 365 | 3182-6 | Repair ether bottle bracket |
| 365 | 3182-6 | Replace clutch |
| 365 | 3182-6 | Replace grease zerk |
| 365 | 3182-6 | Replace transmisson |
| 365 | 3182-6 | S Maint |
| 365 | 3182-6 | S Maint |
| 365 | 3221-6 | Repair wiring to fuel oil sende |
| 365 | 3221-6 | Service Call |
| 365 | 3221-6 | Service call |
| 365 | 3253-6 | Repair electrical connection |
| 365 | 3253-6 | Service Call |
| 365 | 3253-6 | Service call |
| 365 | 3301-6 | Add transmisson oil |
| 365 | 3301-6 | Adj Clutch |
| 365 | 3301-6 | Adjust clutch |
| 365 | 3301-6 | Tighten speedometer cable |
| 365 | 3385-6 | Greased bed/springs |
| 365 | 3385-6 | Replace bulb |
| 365 | 3385-6 | Replace pins |
| 365 | 3385-6 | Replace spring |
| 365 | 3385-6 | Replace U-bolts |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|--------------------------------|-----|--------|---------------------------------|
| 367 | 0880-6 | Repair tailgate | 365 | 3385-6 | Rpl Spring |
| 367 | 0880-6 | Repair temperature gage | 365 | 3569-6 | Add oil |
| 367 | 0880-6 | Repair temperature gage | 365 | 3569-6 | Check oil pressure |
| 367 | 0880-6 | Repair tire | 365 | 3569-6 | Checked wiring |
| 367 | 0880-6 | Repair tire | 365 | 3569-6 | Replace bulb |
| 367 | 0880-6 | Replace fuel filter | 365 | 3569-6 | Replace oil pressure gage (used |
| 367 | 0880-6 | Replace fuel filter | 365 | 3569-6 | Replace oil sending unit |
| 367 | 0880-6 | Replace PTO U-joint | 365 | 3569-6 | Rpl Oil Sending Unit |
| 367 | 0880-6 | Replace PTO U-joint | 365 | 3682-6 | Fabricate pin for tailgate |
| 367 | 0880-6 | Replace speedometer cable | 365 | 3682-6 | Repair rear springs |
| 367 | 0880-6 | Replace speedometer cable | 365 | 3682-6 | Repair tailgate |
| 367 | 0880-6 | Replace transmission | 365 | 3682-6 | Replace brake valve (off 367) |
| 367 | 0880-6 | Replace transmission | 365 | 3682-6 | Replace rear spring bolts |
| 367 | 0880-6 | Rpl Transmission | 365 | 3682-6 | Rpr Tailgate |
| 367 | 1045-6 | Repair/align tailgate | 365 | 3682-6 | weld hanger |
| 367 | 1045-6 | Repair/align tailgate | 365 | 3768-6 | Repair tire |
| 367 | 1045-6 | Replace bulb | 365 | 3768-6 | Rpr Tire |
| 367 | 1045-6 | Replace bulb | 365 | 3950-6 | Adjust front brake pad |
| 367 | 1045-6 | Replace shaft pins | 365 | 3950-6 | Replace copper tubing |
| 367 | 1045-6 | Replace shaft pins | 365 | 3950-6 | Rpl Copper Tubing |
| 367 | 1045-6 | Replace tailgate pins | 367 | 0020-6 | A Maint |
| 367 | 1045-6 | Replace tailgate pins | 367 | 0020-6 | A Maint |
| 367 | 1045-6 | Rpr/Align Tailgate | 367 | 0020-6 | A Maint |
| 367 | 1248-6 | Replace heater motor (off 365) | 367 | 0020-6 | Manufactured snow plow mount |
| 367 | 1248-6 | Replace heater motor (off 365) | 367 | 0020-6 | Manufactured snow plow mount |
| 367 | 1248-6 | Rpl Heater Motor | 367 | 0020-6 | Replace bulb |
| 367 | 1258-6 | Repair engine shut off | 367 | 0020-6 | Replace bulb |
| 367 | 1258-6 | Repair engine shut off | 367 | 0020-6 | Replace rear wheel seal |
| 367 | 1258-6 | Repair tire | 367 | 0020-6 | Replace rear wheel seal |
| 367 | 1258-6 | Repair tire | 367 | 0194-6 | Replace tire |
| 367 | 1258-6 | Replace tire | 367 | 0194-6 | Replace tire |
| 367 | 1258-6 | Replace tire | 367 | 0194-6 | Rpl Tire |
| 367 | 1258-6 | Weld Tailgate | 367 | 0455-6 | Add transmission oil |
| 367 | 1258-6 | Weld tailgate | 367 | 0455-6 | Add transmission oil |
| 367 | 1258-6 | Weld tailgate | 367 | 0455-6 | Replace clutch |
| 367 | 1346-6 | Replace tire | 367 | 0455-6 | Replace clutch |
| 367 | 1346-6 | Replace tire | 367 | 0455-6 | Replace seals in PTO |
| 367 | 1346-6 | Rpl Tires | 367 | 0455-6 | Replace seals in PTO |
| 367 | 1419-6 | Adjust tailgate latches | 367 | 0455-6 | Replace tie rod |
| 367 | 1419-6 | Adjust tailgate latches | 367 | 0455-6 | Replace tie rod |
| 367 | 1419-6 | Repair tailgate | 367 | 0455-6 | Replace transmission |
| 367 | 1419-6 | Repair tailgate | 367 | 0455-6 | Replace transmission |
| 367 | 1419-6 | Rpr Tailgate | 367 | 0455-6 | Rpl Transmission |
| 367 | 1420-6 | Repair tailgate linkage | 367 | 0558-6 | Repair heater wire |
| 367 | 1420-6 | Repair tailgate linkage | 367 | 0558-6 | Repair heater wire |
| 367 | 1420-6 | Rpr Tailgate Linkage | 367 | 0558-6 | Repair PTO key |
| 367 | 1443-6 | Repair tire | 367 | 0558-6 | Repair PTO key |
| 367 | 1443-6 | Repair tire | 367 | 0558-6 | Repair PTO U-joint |
| 367 | 1443-6 | Rpr Tire | 367 | 0558-6 | Repair PTO U-joint |
| 367 | 1458-6 | Replace differential oil | 367 | 0558-6 | Replace battery (used) |
| 367 | 1458-6 | Replace differential oil | 367 | 0558-6 | Replace battery (used) |
| 367 | 1458-6 | Replace transmission fluid | 367 | 0558-6 | Rpr PTO U-Joints |
| 367 | 1458-6 | Replace transmission fluid | 367 | 0615-6 | Tighten Alternator Belt |
| 367 | 1458-6 | Rpl Transmission Oil | 367 | 0615-6 | Tighten alternator belt |
| 367 | 1499-6 | Repair tire | 367 | 0615-6 | Tighten alternator belt |
| 367 | 1499-6 | Repair tire | 367 | 0645-6 | Repair speedometer cable |
| 367 | 1499-6 | Replace fuel filter | 367 | 0645-6 | Repair speedometer cable |
| 367 | 1499-6 | Replace fuel filter | 367 | 0645-6 | Repair tire |
| 367 | 1499-6 | Rpr Tire | 367 | 0645-6 | Repair tire |
| 367 | 1526-6 | Cut ear off (tailgate) | 367 | 0645-6 | Replace fuel filter |
| 367 | 1526-6 | Cut ear off (tailgate) | 367 | 0645-6 | Replace fuel filter |
| 367 | 1526-6 | Service Batteries | 367 | 0645-6 | Rpr Speedometer Cable |
| 367 | 1526-6 | Service batteries | 367 | 0710-6 | Repair tire |
| 367 | 1526-6 | Service batteries | 367 | 0710-6 | Repair tire |
| 367 | 1589-6 | Repair tire | 367 | 0710-6 | Rpr Tire |
| 367 | 1589-6 | Repair tire | 367 | 0801-6 | Repair tire |
| 367 | 1589-6 | Rpr Tire | 367 | 0801-6 | Repair tire |
| 367 | 1628-6 | Repair tire | 367 | 0801-6 | Rpr Tire |
| 367 | 1628-6 | Repair tire | 367 | 0880-6 | Adjust clutch |
| 367 | 1628-6 | Rpr Tire | 367 | 0880-6 | Adjust clutch |
| 367 | 1746-6 | Fabricate new tailgate | 367 | 0880-6 | Repair tailgate |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|-----------------------------|-----|--------|---------------------------------|
| 367 | 1746-6 | Fabricate new tailgate | 367 | 2450-6 | Service call |
| 367 | 1746-6 | Misc Auto Rpr | 367 | 2450-6 | Service call |
| 367 | 1746-6 | Repair heads | 367 | 2497-6 | Replace antifreeze |
| 367 | 1746-6 | Repair heads | 367 | 2497-6 | Replace antifreeze |
| 367 | 1746-6 | Repair light bracket | 367 | 2497-6 | Replace radiator |
| 367 | 1746-6 | Repair light bracket | 367 | 2497-6 | Replace radiator |
| 367 | 1746-6 | Repair tail light | 367 | 2497-6 | Rpl Radiator |
| 367 | 1746-6 | Repair tail light | 367 | 2712-6 | Adjust brakes |
| 367 | 1746-6 | Repair tailgate bracket | 367 | 2712-6 | Adjust brakes |
| 367 | 1746-6 | Repair tailgate bracket | 367 | 2712-6 | Repair bed linkage |
| 367 | 1746-6 | Replace clutch pad | 367 | 2712-6 | Repair bed linkage |
| 367 | 1746-6 | Replace clutch pad | 367 | 2712-6 | Repair spider |
| 367 | 1746-6 | Replace dump linkage | 367 | 2712-6 | Repair spider |
| 367 | 1746-6 | Replace dump linkage | 367 | 2712-6 | Repair tie rod |
| 367 | 1746-6 | Replace exhaust system | 367 | 2712-6 | Repair tie rod |
| 367 | 1746-6 | Replace exhaust system | 367 | 2712-6 | Replace camshaft bracket (used) |
| 367 | 1746-6 | Replace gasket set | 367 | 2712-6 | Replace camshaft bracket (used) |
| 367 | 1746-6 | Replace gasket set | 367 | 2712-6 | Replace muffler |
| 367 | 1746-6 | Replace lamp | 367 | 2712-6 | Replace muffler |
| 367 | 1746-6 | Replace lamp | 367 | 2712-6 | Replace muffler clamp |
| 367 | 1746-6 | Replace muffler clamp | 367 | 2712-6 | Replace muffler clamp |
| 367 | 1746-6 | Replace muffler clamp | 367 | 2712-6 | Replace tail pipe |
| 367 | 1746-6 | Replace spring front | 367 | 2712-6 | Replace tail pipe |
| 367 | 1746-6 | Replace spring front | 367 | 2712-6 | Replace transmission oil |
| 367 | 1746-6 | S Maint | 367 | 2712-6 | Replace transmission oil |
| 367 | 1746-6 | S Maint | 367 | 2712-6 | Rpl Muffler/Misc Rpr |
| 367 | 1746-6 | Weld chain holder | 367 | 2762-6 | Repair hose |
| 367 | 1746-6 | Weld chain holder | 367 | 2762-6 | Repair hose |
| 367 | 1752-6 | Adjust door | 367 | 2762-6 | Repair injection line |
| 367 | 1752-6 | Adjust door | 367 | 2762-6 | Repair injection line |
| 367 | 1752-6 | L Maint | 367 | 2762-6 | Repair wiring |
| 367 | 1752-6 | L Maint | 367 | 2762-6 | Repair wiring |
| 367 | 1752-6 | L Maint | 367 | 2762-6 | Replace fuel filter |
| 367 | 1752-6 | Repair bed tailgate linkage | 367 | 2762-6 | Replace fuel filter |
| 367 | 1752-6 | Repair bed tailgate linkage | 367 | 2762-6 | Rpr Injection Line |
| 367 | 1752-6 | Repair clearance lette | 367 | 2773-6 | Overheating |
| 367 | 1752-6 | Repair clearance lette | 367 | 2773-6 | Overheating |
| 367 | 1752-6 | Replace clearance lite | 367 | 2773-6 | Overheating |
| 367 | 1752-6 | Replace clearance lite | 367 | 3162-5 | Repair tire |
| 367 | 1752-6 | Replace door | 367 | 3162-5 | Repair tire |
| 367 | 1752-6 | Replace door | 367 | 3162-6 | Rpr Tire |
| 367 | 1752-6 | Replace heat gage | 367 | 3284-6 | L Maint |
| 367 | 1752-6 | Replace heat gage | 367 | 3284-6 | L Maint |
| 367 | 2390-6 | Repair muffler | 367 | 3284-6 | L Maint |
| 367 | 2390-6 | Repair muffler | 367 | 3294-6 | S Maint |
| 367 | 2390-6 | Repair muffler bracket | 367 | 3297-6 | Replace belt tension spring |
| 367 | 2390-6 | Repair muffler bracket | 367 | 3297-6 | Replace belt tension spring |
| 367 | 2390-6 | Rpr Muffler | 367 | 3297-6 | Rpl Belt Tension Spring |
| 367 | 2390-6 | Weld pipe to muffler | 367 | 3300-6 | Replace ether bottle |
| 367 | 2390-6 | Weld pipe to muffler | 367 | 3300-6 | Replace ether bottle |
| 367 | 2421-6 | Replace battery | 367 | 3300-6 | Replace spring |
| 367 | 2421-6 | Replace battery | 367 | 3300-6 | Replace spring |
| 367 | 2421-6 | Service Call | 367 | 3300-6 | Rpl Ether Bottle |
| 367 | 2421-6 | Service call | 367 | 3346-6 | Adjust clutch |
| 367 | 2421-6 | Service call | 367 | 3346-6 | Adjust clutch |
| 367 | 2441-6 | Repair tire | 367 | 3346-6 | Replace bearing 2 |
| 367 | 2441-6 | Repair tire | 367 | 3346-6 | Replace bearing 2 |
| 367 | 2441-6 | Rpr Tire | 367 | 3346-6 | Replace lock washer |
| 367 | 2450-6 | Repair radiator cap | 367 | 3346-6 | Replace lock washer |
| 367 | 2450-6 | Repair radiator cap | 367 | 3346-6 | Replace transmission |
| 367 | 2450-6 | Replace antifreeze | 367 | 3346-6 | Replace transmission |
| 367 | 2450-6 | Replace antifreeze | 367 | 3346-6 | Replace transmission oil |
| 367 | 2450-6 | Replace heater hose | 367 | 3346-6 | Replace transmission oil |
| 367 | 2450-6 | Replace heater hose | 367 | 3346-6 | Replace window crank bracket (u |
| 367 | 2450-6 | Replace hose | 367 | 3346-6 | Replace window crank bracket (u |
| 367 | 2450-6 | Replace hose | 367 | 3346-6 | Rpl Transmission |
| 367 | 2450-6 | Replace radiator cap | 367 | 3404-6 | Adjust clutch |
| 367 | 2450-6 | Replace radiator cap | 367 | 3404-6 | Adjust clutch |
| 367 | 2450-6 | Replace thermostat | 367 | 3404-6 | Misc Auto Rpr |
| 367 | 2450-6 | Replace thermostat | 367 | 3404-6 | Replace O-ring |
| 367 | 2450-6 | Service Call | 367 | 3404-6 | Replace O-ring |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|---------------------------------|-----|--------|-----------------------------|
| 367 | 3404-6 | Replace rear seal | 375 | 0320-6 | Replace plug wires |
| 367 | 3404-6 | Replace rear seal | 375 | 0320-6 | Replace PTO U-joints |
| 367 | 3404-6 | Replace rear seal on trans (use | 375 | 0320-6 | Replace PTO U-joints |
| 367 | 3404-6 | Replace rear seal on trans (use | 375 | 0320-6 | Replace solenoid relay |
| 367 | 3404-6 | Replace transmisson oil | 375 | 0320-6 | Replace solenoid relay |
| 367 | 3404-6 | Replace transmisson oil | 375 | 0320-6 | Replace spark plug |
| 367 | 3404-6 | Replace u-joint | 375 | 0320-6 | Replace spark plug |
| 367 | 3404-6 | Replace u-joint | 375 | 0320-6 | Reroute fuel line |
| 367 | 3568-6 | Replace compressor | 375 | 0320-6 | Reroute fuel line |
| 367 | 3568-6 | Replace compressor | 375 | 0476-6 | Check charging system |
| 367 | 3568-6 | Replace oil line fitting (used) | 375 | 0476-6 | Check charging system |
| 367 | 3568-6 | Replace oil line fitting (used) | 375 | 0476-6 | Replace battery |
| 367 | 3568-6 | Replace oil line (used) | 375 | 0476-6 | Replace battery |
| 367 | 3568-6 | Replace oil line (used) | 375 | 0476-6 | Rpl Battery |
| 367 | 3568-6 | Rpl Compressor | 375 | 0565-6 | Lubricate |
| 367 | 3575-6 | Repair PTO shaft | 375 | 0565-6 | Lubricate |
| 367 | 3575-6 | Repair PTO shaft | 375 | 0565-6 | Misc Auto Rpr |
| 367 | 3575-6 | Replace u-joint yoke key | 375 | 0565-6 | Repair bracket |
| 367 | 3575-6 | Replace u-joint yoke key | 375 | 0565-6 | Repair bracket |
| 367 | 3575-6 | Rpr PTO Shaft | 375 | 0565-6 | Replace bulbs |
| 375 | 0004-6 | A Maint | 375 | 0565-6 | Replace bulbs |
| 375 | 0004-6 | A Maint | 375 | 0565-6 | Replace dimmer switch |
| 375 | 0004-6 | A Maint | 375 | 0565-6 | Replace dimmer switch |
| 375 | 0004-6 | Install sand spreader | 375 | 0565-6 | Replace oil/filter (engine) |
| 375 | 0004-6 | Install sand spreader | 375 | 0565-6 | Replace oil/filter (engine) |
| 375 | 0004-6 | Repair 2-speed wiring | 375 | 0565-6 | Replace red light assy |
| 375 | 0004-6 | Repair 2-speed wiring | 375 | 0565-6 | Replace reflector |
| 375 | 0004-6 | Replace front wheel bearing | 375 | 0565-6 | Replace reflector |
| 375 | 0004-6 | Replace front wheel bearing | 375 | 0565-6 | Replace tail light assy |
| 375 | 0004-6 | Replace front wheel cone | 375 | 0565-6 | Replace tail light assy |
| 375 | 0004-6 | Replace front wheel cone | 375 | 0565-6 | Replace thermostats |
| 375 | 0004-6 | Replace quick coupler for sprea | 375 | 0565-6 | Replace thermostats |
| 375 | 0004-6 | Replace quick coupler for sprea | 375 | 0597-6 | Install Light |
| 375 | 0004-6 | Replace starter | 375 | 0597-6 | Install light |
| 375 | 0004-6 | Replace starter | 375 | 0597-6 | Install light |
| 375 | 0004-6 | Replace tail light assy | 375 | 0617-6 | Replace distributor |
| 375 | 0004-6 | Replace tail light assy | 375 | 0617-6 | Replace distributor |
| 375 | 0004-6 | Replace voltage regulator | 375 | 0617-6 | Rpl Distributor |
| 375 | 0004-6 | Replace voltage regulator | 375 | 0716-6 | Check parts |
| 375 | 0174-6 | Repair exhaust | 375 | 0716-6 | Check parts |
| 375 | 0174-6 | Repair exhaust | 375 | 0716-6 | Chk Parts |
| 375 | 0174-6 | Rpr Exhaust | 375 | 0809-6 | Adjust alternator belt |
| 375 | 0298-6 | Repair carburetor | 375 | 0809-6 | Adjust alternator belt |
| 375 | 0298-6 | Repair carburetor | 375 | 0809-6 | Check charging system |
| 375 | 0298-6 | Repair points | 375 | 0809-6 | Check charging system |
| 375 | 0298-6 | Repair points | 375 | 0809-6 | Chk Charging Sys |
| 375 | 0298-6 | Replace air cleaner | 375 | 0983-6 | Adjust carburetor |
| 375 | 0298-6 | Replace air cleaner | 375 | 0983-6 | Adjust carburetor |
| 375 | 0298-6 | Replace condensor | 375 | 0983-6 | L Maint |
| 375 | 0298-6 | Replace condensor | 375 | 0983-6 | L Maint |
| 375 | 0298-6 | Replace distributor | 375 | 0983-6 | L Maint |
| 375 | 0298-6 | Replace distributor | 375 | 0983-6 | Repair PTO shaft |
| 375 | 0298-6 | Replace ignition points | 375 | 0983-6 | Repair PTO shaft |
| 375 | 0298-6 | Replace ignition points | 375 | 0983-6 | Replace compressor filter |
| 375 | 0298-6 | Rpr Carburetor | 375 | 0983-6 | Replace compressor filter |
| 375 | 0320-6 | Clean carburetor | 375 | 0983-6 | Replace exhaust clamp |
| 375 | 0320-6 | Clean carburetor | 375 | 0983-6 | Replace exhaust clamp |
| 375 | 0320-6 | Misc Auto Rpr | 375 | 0983-6 | Replace exhaust gasket |
| 375 | 0320-6 | Rebuild carburetor | 375 | 0983-6 | Replace exhaust gasket |
| 375 | 0320-6 | Rebuild carburetor | 375 | 0983-6 | Replace exhaust pipe |
| 375 | 0320-6 | Repair tire | 375 | 0983-6 | Replace exhaust pipe |
| 375 | 0320-6 | Repair tire | 375 | 0983-6 | Replace upper radiator hose |
| 375 | 0320-6 | Replace air filter | 375 | 0983-6 | Replace upper radiator hose |
| 375 | 0320-6 | Replace air filter | 375 | 1195-6 | Repair dump bed/tailgate |
| 375 | 0320-6 | Replace distributor | 375 | 1195-6 | Repair dump bed/tailgate |
| 375 | 0320-6 | Replace distributor | 375 | 1195-6 | Replace seat |
| 375 | 0320-6 | Replace fuel filter | 375 | 1195-6 | Replace seat |
| 375 | 0320-6 | Replace fuel filter | 375 | 1195-6 | Rpr Bed/Tailgate |
| 375 | 0320-6 | Replace in line fuel filter | 375 | 1418-6 | Replace heater motor |
| 375 | 0320-6 | Replace in line fuel filter | 375 | 1418-6 | Replace heater motor |
| 375 | 0320-6 | Replace plug wires | | | |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|-------------------------------|-----|--------|-------------------------|
| 375 | 1418-6 | Rpl Heater Motor | 393 | 0232-6 | L Maint |
| 375 | 1456-6 | Adjust timing | 393 | 0232-6 | L Maint |
| 375 | 1456-6 | Adjust timing | 393 | 0232-6 | L Maint |
| 375 | 1456-6 | Misc Auto Rpr | 393 | 0232-6 | Repair muffler clamp |
| 375 | 1456-6 | Replac air filter | 393 | 0232-6 | Repair muffler clamp |
| 375 | 1456-6 | Replac air filter | 393 | 0232-6 | Repair tire |
| 375 | 1456-6 | Replace fuel filter | 393 | 0232-6 | Repair tire |
| 375 | 1456-6 | Replace fuel filter | 393 | 0232-6 | Repair wiring |
| 375 | 1456-6 | Replace spark plugs | 393 | 0232-6 | Repair wiring |
| 375 | 1456-6 | Replace spark plugs | 393 | 0232-6 | Replace plugs |
| 375 | 1775-6 | Adj Emergency Brake | 393 | 0232-6 | Replace plugs |
| 375 | 1775-6 | Adjust emergency brake | 393 | 0232-6 | Replce manifold bolt |
| 375 | 1775-6 | Adjust emergency brake | 393 | 0232-6 | Replce manifold bolt |
| 375 | 1828-6 | Adjust clutch | 393 | 0442-6 | Adjust clutch |
| 375 | 1828-6 | Adjust clutch | 393 | 0442-6 | Adjust clutch |
| 375 | 1828-6 | Repair tailgate | 393 | 0442-6 | Repair carburetor |
| 375 | 1828-6 | Repair tailgate | 393 | 0442-6 | Repair carburetor |
| 375 | 1828-6 | Rpr Tailgate | 393 | 0442-6 | Repair wiring |
| 375 | 2121-6 | Repair tire | 393 | 0442-6 | Repair wiring |
| 375 | 2121-6 | Repair tire | 393 | 0442-6 | Replace cylinder key |
| 375 | 2121-6 | Rpr Tire | 393 | 0442-6 | Replace cylinder key |
| 375 | 2143-6 | Repair muffler | 393 | 0442-6 | Replace ignition switch |
| 375 | 2143-6 | Repair muffler | 393 | 0442-6 | Replace ignition switch |
| 375 | 2143-6 | S Maint | 393 | 0442-6 | Replace tail/stop lamp |
| 375 | 2143-6 | S Maint | 393 | 0442-6 | Replace tail/stop lamp |
| 375 | 2143-6 | S Maint | 393 | 0442-6 | Service Call |
| 375 | 2220-6 | Add oil | 393 | 0442-6 | Service call |
| 375 | 2220-6 | Add oil | 393 | 0442-6 | Service call |
| 375 | 2220-6 | Adjust parking brakes | 393 | 0568-6 | Repair defroster hose |
| 375 | 2220-6 | Adjust parking brakes | 393 | 0568-6 | Repair defroster hose |
| 375 | 2220-6 | Misc Auto Rpr | 393 | 0568-6 | Replace plug |
| 375 | 2220-6 | Repair muffler | 393 | 0568-6 | Replace plug |
| 375 | 2220-6 | Repair muffler | 393 | 0568-6 | Replace plug wires |
| 375 | 2220-6 | Tighten all transmisson bolts | 393 | 0568-6 | Replace plug wires |
| 375 | 2220-6 | Tighten all transmisson bolts | 393 | 0568-6 | Replace points |
| 375 | 2468-6 | Install heater shut off | 393 | 0568-6 | Replace points |
| 375 | 2468-6 | Install heater shut off | 393 | 0568-6 | Rpr Defroster Hose |
| 375 | 2468-6 | Repair PTO Shaft | 393 | 0616-6 | Replace distributor cap |
| 375 | 2468-6 | Repair PTO Shaft | 393 | 0616-6 | Replace distributor cap |
| 375 | 2468-6 | Repair PTO shaft bracket | 393 | 0616-6 | Replace spark plug |
| 375 | 2468-6 | Repair PTO shaft bracket | 393 | 0616-6 | Replace spark plug |
| 375 | 2468-6 | Rpr PTO Shaft | 393 | 0616-6 | Replace starter |
| 375 | 2644-6 | Repair clutch linkage | 393 | 0616-6 | Replace starter |
| 375 | 2644-6 | Repair clutch linkage | 393 | 0616-6 | Rpl Starter |
| 375 | 2644-6 | Rpr Clutch Linkage | 393 | 0767-6 | Tune Engine |
| 375 | 2921-6 | Adjust carburetor | 393 | 0767-6 | Tune engine |
| 375 | 2921-6 | Adjust carburetor | 393 | 0767-6 | Tune engine |
| 375 | 2921-6 | Misc Auto Rpr | 393 | 1117-6 | Replace tiretibe |
| 375 | 2921-6 | Repair wiring to horn | 393 | 1117-6 | Replace tiretibe |
| 375 | 2921-6 | Repair wiring to horn | 393 | 1117-6 | Service Call |
| 375 | 2921-6 | Replace bearing | 393 | 1117-6 | Service call |
| 375 | 2921-6 | Replace bearing | 393 | 1117-6 | Service call |
| 375 | 2921-6 | Replace diaphragm | 393 | 1233-6 | Replace u-joint |
| 375 | 2921-6 | Replace diaphragm | 393 | 1233-6 | Replace u-joint |
| 375 | 2921-6 | Replace plugs | 393 | 1233-6 | Rpl U-Joint |
| 375 | 2921-6 | Replace plugs | 393 | 1261-6 | Repair tire |
| 375 | 2921-6 | Sun test | 393 | 1261-6 | Repair tire |
| 375 | 2921-6 | Sun test | 393 | 1261-6 | Rpr Tire |
| 375 | 3209-6 | L Maint | 393 | 1490-6 | Tune Engine |
| 375 | 3209-6 | L Maint | 393 | 1490-6 | Tune engine |
| 375 | 3209-6 | L Maint | 393 | 1490-6 | Tune engine |
| 375 | 3243-6 | Replace bolt/lock washer | 393 | 1546-6 | Repair PTO linkage |
| 375 | 3243-6 | Replace bolt/lock washer | 393 | 1546-6 | Repair PTO linkage |
| 375 | 3243-6 | Steam Clean | 393 | 1546-6 | Repalce u-joint |
| 375 | 3243-6 | Steam clean | 393 | 1546-6 | Repalce u-joint |
| 375 | 3243-6 | Steam clean | 393 | 1546-6 | Replace yoke |
| 375 | 3243-6 | Tighten transmisson bolts | 393 | 1546-6 | Replace yoke |
| 375 | 3243-6 | Tighten transmisson bolts | 393 | 1546-6 | Rpr PTO Linkage |
| 375 | 3536-6 | Tighten Bolts | 393 | 1637-6 | Repair emergency brake |
| 375 | 3536-6 | Tighten bolts | 393 | 1637-6 | Repair emergency brake |
| 375 | 3536-6 | Tighten bolts | 393 | 1637-6 | Repair fuel filter |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|------------------------------|-----|--------|--------------------------|
| 393 | 1637-6 | Repair fuel filter | 393 | 3045-6 | Service Call |
| 393 | 1637-6 | Repair muffler bracket | 393 | 3045-6 | Service call |
| 393 | 1637-6 | Repair muffler bracket | 393 | 3045-6 | Service call |
| 393 | 1637-6 | Replace condenser | 393 | 3054-6 | Lubricate |
| 393 | 1637-6 | Replace condenser | 393 | 3054-6 | Lubricate |
| 393 | 1637-6 | Replace points | 393 | 3054-6 | Replace battery clamp |
| 393 | 1637-6 | Replace points | 393 | 3054-6 | Replace battery clamp |
| 393 | 1637-6 | Rpr Emergency Brake | 393 | 3054-6 | Replace clutch |
| 393 | 1637-6 | Service call | 393 | 3054-6 | Replace clutch |
| 393 | 1637-6 | Service call | 393 | 3054-6 | Replace drive cap |
| 393 | 1732-6 | Repair heater motor | 393 | 3054-6 | Replace drive cap |
| 393 | 1732-6 | Repair heater motor | 393 | 3054-6 | Replace gasket |
| 393 | 1732-6 | Repair lights | 393 | 3054-6 | Replace gasket |
| 393 | 1732-6 | Repair lights | 393 | 3054-6 | Replace oil |
| 393 | 1732-6 | Repair power steering line | 393 | 3054-6 | Replace oil |
| 393 | 1732-6 | Repair power steering line | 393 | 3054-6 | Replace oil filter |
| 393 | 1732-6 | Repair wiring | 393 | 3054-6 | Replace oil filter |
| 393 | 1732-6 | Repair wiring | 393 | 3054-6 | Replace seal |
| 393 | 1732-6 | Repalce transmisson | 393 | 3054-6 | Replace seal |
| 393 | 1732-6 | Repalce transmisson | 393 | 3054-6 | Replace snap ring |
| 393 | 1732-6 | Replace muffler | 393 | 3054-6 | Replace snap ring |
| 393 | 1732-6 | Replace muffler | 393 | 3054-6 | Rpl Clutch |
| 393 | 1732-6 | Replace parking brake drum | 393 | 3168-6 | Adj Brakes |
| 393 | 1732-6 | Replace parking brake drum | 393 | 3168-6 | Adjust brakes |
| 393 | 1732-6 | Replace parking brake lining | 393 | 3168-6 | Adjust brakes |
| 393 | 1732-6 | Replace parking brake lining | 393 | 3168-6 | Adjust spreader pump |
| 393 | 1732-6 | Replace spark plug | 393 | 3168-6 | Adjust spreader pump |
| 393 | 1732-6 | Replace spark plug | 393 | 3277-6 | CK Rear Brake |
| 393 | 1732-6 | S Maint | 393 | 3448-6 | Adj Brakes |
| 393 | 1732-6 | S Maint | 393 | 3448-6 | Adjust brakes |
| 393 | 1732-6 | S Maint | 393 | 3448-6 | Adjust brakes |
| 393 | 1759-6 | Repair clutch | 393 | 3448-6 | Replace hyd cyl ram bolt |
| 393 | 1759-6 | Repair clutch | 393 | 3448-6 | Replace hyd cyl ram bolt |
| 393 | 1759-6 | Repair hoses | 393 | 3549-6 | Repair tire |
| 393 | 1759-6 | Repair hoses | 393 | 3549-6 | Repair tire |
| 393 | 1759-6 | Replace tail light | 393 | 3549-6 | Wash Mower |
| 393 | 1759-6 | Replace tail light | 393 | 3661-6 | A Maint |
| 393 | 1759-6 | Service Left Cylinder | 393 | 3661-6 | A Maint |
| 393 | 1759-6 | Service left cyliner | 393 | 3661-6 | A Maint |
| 393 | 1759-6 | Service left cyliner | 393 | 3661-6 | Repair tail light wiring |
| 393 | 1852-6 | Repair tire | 393 | 3661-6 | Repair tail light wiring |
| 393 | 1852-6 | Repair tire | 393 | 3661-6 | Repair tire |
| 393 | 1852-6 | Rpr Tire | 393 | 3661-6 | Repair tire |
| 393 | 2054-6 | Service Call | 393 | 3661-6 | Repair transmisson |
| 393 | 2161-6 | L Maint | 393 | 3661-6 | Repair transmisson |
| 393 | 2161-6 | L Maint | 393 | 3661-6 | Replace dimmer switch |
| 393 | 2161-6 | L Maint | 393 | 3661-6 | Replace dimmer switch |
| 393 | 2161-6 | Repair tie rod | 393 | 3661-6 | Replace head light wire |
| 393 | 2161-6 | Repair tie rod | 393 | 3661-6 | Replace head light wire |
| 393 | 2161-6 | Repair wiring | 393 | 3661-6 | Replace muffler clamp |
| 393 | 2161-6 | Repair wiring | 393 | 3661-6 | Replace muffler clamp |
| 393 | 2765-6 | Repair air line | 393 | 3661-6 | Weld tail gate |
| 393 | 2765-6 | Repair air line | 393 | 3661-6 | Weld tail gate |
| 393 | 2765-6 | Replace key | 393 | 3777-6 | Chech rear brake |
| 393 | 2765-6 | Replace key | 393 | 3777-6 | Chech rear brake |
| 393 | 2765-6 | Rpl Key | 476 | 0014-6 | Repair tire |
| 393 | 3020-6 | Add hydraulic oil | 476 | 0014-6 | Replace wheel seal |
| 393 | 3020-6 | Add hydraulic oil | 476 | 0014-6 | Rpl Wheel Seal |
| 393 | 3020-6 | Repair hydraulic line | 476 | 0019-6 | Replace wheel seal |
| 393 | 3020-6 | Repair hydraulic line | 476 | 0019-6 | Rpl Wheel Seal |
| 393 | 3020-6 | Repair PTO shaft | 476 | 0124-6 | Repair tire |
| 393 | 3020-6 | Repair PTO shaft | 476 | 0124-6 | Replace spark plug |
| 393 | 3020-6 | Repair wiring | 476 | 0124-6 | Rpl Spark Plug |
| 393 | 3020-6 | Repair wiring | 476 | 0139-6 | Service Call |
| 393 | 3020-6 | Replace bulb | 476 | 0139-6 | Service Call |
| 393 | 3020-6 | Replace bulb | 476 | 0225-6 | Misc Auto Rpr |
| 393 | 3020-6 | Replace seal | 476 | 0225-6 | Repack bearing |
| 393 | 3020-6 | Replace seal | 476 | 0225-6 | Repair tire |
| 393 | 3020-6 | Rpr Hydraulic Line | 476 | 0225-6 | Replace bearing seal |
| 393 | 3045-6 | Clean points/dist cap | 476 | 0225-6 | Replace eye bolt |
| 393 | 3045-6 | Clean points/dist cap | 476 | 0225-6 | Replace wheel motor |

| FE# | DOC # | DESCRIPTION | FE# | DOC # | DESCRIPTION |
|-----|--------|-------------------------------|-----|--------|--------------------------------|
| 476 | 0225-6 | Replace wheel seal | 476 | 2528-6 | Adjust valves |
| 476 | 0317-6 | Adjust carburetor | 476 | 2528-6 | Clean/lap valves |
| 476 | 0317-6 | Replace strut camper | 476 | 2528-6 | Misc Auto Rpr |
| 476 | 0317-6 | Service Call | 476 | 2528-6 | Replace engine oil |
| 476 | 0317-6 | Service Call | 476 | 2528-6 | Replace fuel cap/gage |
| 476 | 0379-6 | Clean all terminal connectors | 476 | 2528-6 | Replace muffler clamp |
| 476 | 0379-6 | Replace battery | 476 | 2528-6 | Replace oil filter |
| 476 | 0379-6 | Rpl Battery | 476 | 2625-6 | Add engine oil |
| 476 | 1421-6 | Q Maint | 476 | 2625-6 | Adjust carburetor |
| 476 | 1421-6 | Q Maint | 476 | 2625-6 | Rebuilt fuel pump |
| 476 | 1421-6 | Rebuild engine | 476 | 2625-6 | Repair blade shaft |
| 476 | 1421-6 | Replace bushing tail wheel | 476 | 2625-6 | Replace carburetor |
| 476 | 1421-6 | Replace caster arm | 476 | 2625-6 | Replace cutter blade |
| 476 | 1421-6 | Replace choke control | 476 | 2625-6 | Rpl Carburetor |
| 476 | 1421-6 | Replace fuel gage/cap | 476 | 2662-6 | Replace deck spring |
| 476 | 1421-6 | Replace hyd oil filter | 476 | 2662-6 | Rpl Deck Spring |
| 476 | 1421-6 | Replace spring control rod | 476 | 2698-6 | Misc Auto Rpr |
| 476 | 1421-6 | Replace switch clutch | 476 | 2698-6 | Repair regulator wire |
| 476 | 1421-6 | Replace wiring harness | 476 | 2698-6 | Replace bearing |
| 476 | 1421-6 | Sharpen blades | 476 | 2698-6 | Replace blade |
| 476 | 1466-6 | Q Maint | 476 | 2698-6 | Replace regulator |
| 476 | 1466-6 | Q Maint | 476 | 2698-6 | Replace spindle shaft |
| 476 | 1876-6 | Misc Auto Rpr | 476 | 2698-6 | Replace wheel motor |
| 476 | 1876-6 | Replace coil assy | 476 | 2755-6 | Misc Auto Rpr |
| 476 | 1876-6 | Replace condensor | 476 | 2755-6 | Replace deck spring hangers |
| 476 | 1876-6 | Replace gear box oil | 476 | 2755-6 | Replace tail wheel |
| 476 | 1876-6 | Replace point plunger | 476 | 2755-6 | Replace tail wheel rim |
| 476 | 1876-6 | Replace point set | 476 | 2764-6 | Q Maint |
| 476 | 1980-6 | Replace ignition switch | 476 | 2764-6 | Q Maint |
| 476 | 1980-6 | Service Call | 476 | 2764-6 | Replace blade |
| 476 | 1980-6 | Service Call | 476 | 2764-6 | Replace blade saddle |
| 476 | 2013-6 | Repair wire | 476 | 2764-6 | Replace cutter housing bearing |
| 476 | 2013-6 | Rpr Wire | 476 | 2764-6 | Replace spindle shaft |
| 476 | 2062-6 | Repair tire | 476 | 2876-6 | Repair ground wire |
| 476 | 2062-6 | Rpr Tire | 476 | 2876-6 | Service Call |
| 476 | 2108-6 | Repair wires | 476 | 2876-6 | Service Call |
| 476 | 2108-6 | Rpr Wires | 476 | 2896-6 | Q Maint |
| 476 | 2131-6 | Adjust carburetor | 476 | 2896-6 | Q Maint |
| 476 | 2131-6 | Replace cable throttle | 476 | 2896-6 | Replace blade |
| 476 | 2131-6 | Rpl Cable Throttle | 476 | 2896-6 | Replace blade shaft spindle |
| 476 | 2145-6 | Repair starter switch | 476 | 2935-6 | Replace starter motor (used) |
| 476 | 2145-6 | Replace washer | 476 | 2935-6 | Service Call |
| 476 | 2145-6 | Rpr Starter Switch | 476 | 2935-6 | Service Call |
| 476 | 2179-6 | Replace tail wheel | 476 | 3036-6 | Adjust steering |
| 476 | 2179-6 | Rpl Tail Wheel | 476 | 3036-6 | Q Maint |
| 476 | 2262-6 | Replace carburetor | 476 | 3036-6 | Q Maint |
| 476 | 2262-6 | Rpl Carburetor | 476 | 3036-6 | Repair deck blades |
| 476 | 2262-6 | Service battery | 476 | 3036-6 | Replace muffler |
| 476 | 2273-6 | Q Maint | 476 | 3036-6 | Rpr Deck Blades |
| 476 | 2273-6 | Q Maint | 476 | 3155-6 | Replace clamp |
| 476 | 2273-6 | Replace fuel line | 476 | 3155-6 | Replace muffler |
| 476 | 2273-6 | Replace fuel pump | 476 | 3155-6 | Rpl Muffler |
| 476 | 2273-6 | Weld hood | 476 | 3179-6 | Adjust steering |
| 476 | 2351-6 | Add engine oil | 476 | 3179-6 | Q Maint |
| 476 | 2351-6 | Misc Auto Rpr | 476 | 3179-6 | Q Maint |
| 476 | 2351-6 | Rebuild governor mag | 476 | 3179-6 | Weld deck |
| 476 | 2351-6 | Replace coil | 476 | 3179-6 | Weld seat |
| 476 | 2351-6 | Replace ignition points | 476 | 3281-6 | Repair steering |
| 476 | 2351-6 | Replace rod breaker plunger | 476 | 3281-6 | Replace camper thrust |
| 476 | 2351-6 | Replace spark plug | 476 | 3281-6 | Replace turnbuckle |
| 476 | 2351-6 | Weld holes in fender | 476 | 3281-6 | Rpl Turnbuckle/Thrust |
| 476 | 2403-6 | Repair tire | 476 | 3343-6 | Adjust carburetor |
| 476 | 2403-6 | Replace balde | 476 | 3343-6 | Q Maint |
| 476 | 2403-6 | Replace balde bolt | 476 | 3343-6 | Q Maint |
| 476 | 2403-6 | Replace tail wheel assy | 476 | 3343-6 | Repair deck arm |
| 476 | 2403-6 | Rpl Tail Wheel Assy | 476 | 3343-6 | Repair tire |
| 476 | 2432-6 | Q Maint | 476 | 3343-6 | Replace lock link |
| 476 | 2432-6 | Q Maint | 476 | 3343-6 | Replace lock pin |
| 476 | 2432-6 | Replace muffler clamp | 476 | 3343-6 | Replace spring |
| 476 | 2494-6 | Weld Seat Frame | 476 | 3388-6 | Repair ground wire |
| 476 | 2494-6 | Weld seat frame | 476 | 3388-6 | Rpr Ground Wire |

| FE# | DOC # | DESCRIPTION |
|-----|--------|--------------------------------|
| 476 | 3513-6 | Rebuild Engine |
| 476 | 3513-6 | Rebuild engine |
| 476 | 3513-6 | Repair tire |
| 476 | 3786-6 | Replace oil switch |
| 476 | 3786-6 | Rpl Oil Switch |
| 476 | 3791-6 | Repair tire |
| 476 | 3791-6 | Rpr Tire |
| 476 | 3806-6 | Replace regulator |
| 476 | 3806-6 | Rpl Regulator/Weld Deck |
| 476 | 3806-6 | Troubleshoot |
| 476 | 3806-6 | Weld deck |
| 476 | 3825-6 | Repair regulator wires |
| 476 | 3825-6 | Replace blade |
| 476 | 3825-6 | Replace spark plug |
| 476 | 3825-6 | Replace tail wheel caster fork |
| 476 | 3825-6 | Service Call |
| 476 | 3825-6 | Service Call |
| 476 | 3955-6 | Adjust carburetor |
| 476 | 3955-6 | Adjust steering |
| 476 | 3955-6 | Q Maint |
| 476 | 3955-6 | Q Maint |
| 476 | 3955-6 | Replace belts |
| 476 | 3955-6 | Replace regulator |
| 476 | 3955-6 | Replace turnbuckle |
| 476 | 3955-6 | Replace washer |
| 476 | 3955-6 | Weld deck |

APPENDIX E: SUMMARY DATA TABLES

Table E1

Breakdown of Service Visits

| Data Files | Service Visits | | | | Repair Tasks | |
|-------------------|-----------------------|------------------|---------------------|--------------------------------|---------------------|----------------------|
| | Total Visits | Unit Only | Support Only | Both Unit & Support | Unit Tasks | Support Tasks |
| 1 | 906 | 686 | 46 | 174 | 2,436 | 387 |
| 2 | 1,047 | 753 | 51 | 243 | 3,099 | 636 |
| 3 | 767 | 560 | 26 | 181 | 3,078 | 517 |
| 4 | 859 | 613 | 30 | 216 | 3,201 | 615 |
| 5 | <u>361</u> | <u>250</u> | <u>12</u> | <u>99</u> | <u>1,393</u> | <u>247</u> |
| | 3,940 | 2,862 | 165 | 913 | 13,207 | 2,402 |

Table E2

Vehicle Maintenance Labor Hours and Costs for Fort Riley, KS (1986)

| FILE NAME | UNIT LABOR HOURS | SUPPORT LABOR HOURS | TOTAL LABOR HOURS | UNIT LABOR DOLLARS | | SUPPORT LABOR DOLLARS | | TOTAL ADJ LABOR DOLLARS |
|--------------|---------------------|------------------------|----------------------|--------------------|-----------|-----------------------|-----------|-------------------------------|
| | | | | UNADJ | ADJUSTED | UNADJ | ADJUSTED | |
| #2_ORG_M | 1,583.93 | 514.60 | 2,098.53 | \$26,490 | \$26,547 | \$8,625 | \$8,625 | \$35,171 |
| #3_ORG_M | 547.50 | 260.40 | 807.90 | \$9,192 | \$9,176 | \$4,365 | \$4,364 | \$13,540 |
| BECKY_OR | 1,410.00 | 585.20 | 1,995.20 | \$99 | \$23,632 | \$0 | \$9,808 | \$33,440 |
| C_ORG_MA | 951.60 | 509.80 | 1,461.40 | \$9 | \$15,949 | \$0 | \$8,544 | \$24,493 |
| D_ORG_MA | 984.80 | 457.50 | 1,442.30 | \$437 | \$16,505 | \$14 | \$7,668 | \$24,173 |
| E_ORG_MA | 525.50 | 258.85 | 784.35 | \$5 | \$8,807 | \$6 | \$4,338 | \$13,146 |
| F_ORG_MA | 402.90 | 252.70 | 655.60 | \$44 | \$6,753 | \$7 | \$4,235 | \$10,988 |
| G_ORG_MA | 494.89 | 176.50 | 671.39 | \$150 | \$8,294 | \$0 | \$2,958 | \$11,252 |
| H_ORG_MA | 514.00 | 271.49 | 785.49 | \$0 | \$8,615 | \$0 | \$4,550 | \$13,165 |
| I_ORG_MA | 582.95 | 79.50 | 662.45 | \$0 | \$9,770 | \$0 | \$1,332 | \$11,103 |
| J_ORG_MA | 478.10 | 228.90 | 707.00 | \$0 | \$8,013 | \$0 | \$3,836 | \$11,849 |
| K_ORG_MA | 510.00 | 433.60 | 943.60 | \$0 | \$8,548 | \$0 | \$7,267 | \$15,815 |
| L_ORG_MA | 545.10 | 282.00 | 827.10 | \$3 | \$9,136 | \$76 | \$4,726 | \$13,862 |
| MAIN1 | 4,050.60 | 597.30 | 4,647.90 | \$73,057 | \$67,888 | \$10,011 | \$10,011 | \$77,899 |
| MAIN2 | 1,389.40 | 605.80 | 1,995.20 | \$99 | \$23,286 | \$0 | \$10,153 | \$33,440 |
| MAIN3 | 1,023.00 | 478.60 | 1,501.60 | \$60 | \$17,145 | \$620 | \$8,021 | \$25,167 |
| M_ORG_MA | 532.57 | 141.70 | 674.27 | \$28 | \$8,926 | \$0 | \$2,375 | \$11,301 |
| G_ORG | 501.90 | 159.00 | 660.90 | \$8,412 | \$8,412 | \$2,638 | \$2,665 | \$11,077 |
| H_ORG | 574.90 | 189.40 | 764.30 | \$9,635 | \$9,635 | \$2,856 | \$3,174 | \$12,810 |
| I_ORG | 624.75 | 26.00 | 650.75 | \$10,533 | \$10,471 | \$436 | \$436 | \$10,907 |
| J_ORG_OR | 566.00 | 145.50 | 711.50 | \$9,486 | \$9,486 | \$2,439 | \$2,439 | \$11,925 |
| K_ORG_OR | 664.80 | 277.80 | 942.60 | \$11,159 | \$11,142 | \$4,656 | \$4,656 | \$15,798 |
| L_ORG_OR | 645.60 | 181.50 | 827.10 | \$10,820 | \$10,820 | \$3,042 | \$3,042 | \$13,862 |
| L_ORG_MA | 2.00 | 0.00 | 2.00 | \$0 | \$34 | \$0 | \$0 | \$34 |
| M_ORG_OR | 516.77 | 157.50 | 674.27 | \$8,661 | \$8,661 | \$2,640 | \$2,640 | \$11,301 |
| M_ORG_MA | 517.57 | 157.20 | 674.77 | \$0 | \$8,674 | \$0 | \$2,635 | \$11,309 |
| N_ORG_OR | 612.80 | 41.00 | 653.80 | \$10,271 | \$10,271 | \$687 | \$687 | \$10,958 |
| N_ORG_MA | 477.80 | 167.00 | 644.80 | \$0 | \$8,008 | \$0 | \$2,799 | \$10,807 |
| O_ORG_MA | 615.70 | 148.50 | 764.20 | \$0 | \$10,319 | \$0 | \$2,489 | \$12,808 |
| O_ORG_OR | 682.70 | 79.50 | 762.20 | \$11,442 | \$11,442 | \$1,332 | \$1,332 | \$12,774 |
| P_ORG_M | 448.70 | 243.00 | 691.70 | \$0 | \$7,520 | \$0 | \$4,073 | \$11,593 |
| P_ORG_OR | 556.90 | 130.30 | 687.20 | \$9,334 | \$9,334 | \$2,184 | \$2,184 | \$11,517 |
| Q_ORG_OR | 268.50 | 1.30 | 269.80 | \$4,433 | \$4,500 | \$22 | \$22 | \$4,522 |
| Q_ORG_MA | 240.00 | 25.80 | 265.80 | \$0 | \$4,022 | \$0 | \$432 | \$4,455 |
| <hr/> | | | | | | | | |
| | 25,044.23 | 8,264.74 | 33,308.97 | \$213,857 | \$419,741 | \$46,654 | \$138,517 | \$558,258 |
| <hr/> | | | | | | | | |
| | | | | 50.95% | 75.19% | 33.68% | 24.81% | 100.00% |

UNADJUSTED AS A PERCENT OF ADJUSTED
ACTUAL AS A PERCENT OF TOTAL

Table E3

Vehicle Maintenance Parts and Labor Dollars and Labor Hours for Fort Riley, KS (1986)

| FILE NAME | PARTS DOLLARS | | | LABOR HOURS | | | LABOR DOLLARS | | |
|--------------|------------------|------------------|------------------|---------------|--------------|---------------|------------------|------------------|------------------|
| | UNIT | SUPPORT | TOTAL | UNIT | SUPPORT | TOTAL | UNIT | SUPPORT | TOTAL |
| #2_ORG_M | \$34,870 | \$16,561 | \$51,432 | 1,584 | 515 | 2,099 | \$26,547 | \$8,625 | \$35,171 |
| #3_ORG_M | \$8,576 | \$3,477 | \$12,054 | 548 | 260 | 808 | \$9,176 | \$4,364 | \$13,540 |
| BECKY-OR | \$43,260 | \$27,081 | \$70,340 | 1,410 | 585 | 1,995 | \$23,632 | \$9,808 | \$33,440 |
| C_ORG_MA | \$15,749 | \$9,439 | \$25,187 | 952 | 510 | 1,461 | \$15,949 | \$8,544 | \$24,493 |
| D_ORG_MA | \$19,023 | \$21,896 | \$40,919 | 985 | 458 | 1,442 | \$16,505 | \$7,668 | \$24,173 |
| E_ORG_MA | \$5,792 | \$6,621 | \$12,412 | 526 | 259 | 784 | \$8,807 | \$4,338 | \$13,146 |
| F_ORG_MA | \$4,137 | \$5,394 | \$9,531 | 403 | 253 | 656 | \$6,753 | \$4,235 | \$10,988 |
| G_ORG_MA | \$6,676 | \$3,318 | \$9,993 | 495 | 177 | 671 | \$8,294 | \$2,958 | \$11,252 |
| H_ORG_MA | \$4,873 | \$2,898 | \$7,772 | 514 | 271 | 785 | \$8,615 | \$4,550 | \$13,165 |
| I_ORG_MA | \$6,437 | \$1,973 | \$8,410 | 583 | 80 | 662 | \$9,770 | \$1,332 | \$11,103 |
| J_ORG_MA | \$5,957 | \$7,497 | \$13,454 | 478 | 229 | 707 | \$8,013 | \$3,836 | \$11,849 |
| K_ORG_MA | \$8,783 | \$13,438 | \$22,221 | 510 | 434 | 944 | \$8,548 | \$7,267 | \$15,815 |
| L_ORG_MA | \$6,649 | \$7,016 | \$13,665 | 545 | 282 | 827 | \$9,136 | \$4,726 | \$13,862 |
| MAIN1 | \$106,501 | \$27,894 | \$134,395 | 4,051 | 597 | 4,648 | \$67,888 | \$10,011 | \$77,899 |
| MAIN2 | \$42,344 | \$27,997 | \$70,340 | 1,389 | 606 | 1,995 | \$23,286 | \$10,153 | \$33,440 |
| MAIN3 | \$16,356 | \$21,822 | \$38,178 | 1,023 | 479 | 1,502 | \$17,145 | \$8,021 | \$25,167 |
| M_ORG_MA | \$7,220 | \$4,447 | \$11,668 | 533 | 142 | 674 | \$8,926 | \$2,375 | \$11,301 |
| G_ORG | \$6,311 | \$3,767 | \$10,078 | 502 | 159 | 661 | \$8,412 | \$2,665 | \$11,077 |
| H_ORG | \$5,121 | \$2,902 | \$8,023 | 575 | 189 | 764 | \$9,635 | \$3,174 | \$12,810 |
| I_ORG | \$7,847 | \$505 | \$8,352 | 625 | 26 | 651 | \$10,471 | \$436 | \$10,907 |
| J_ORG_OR | \$7,743 | \$1,942 | \$9,685 | 566 | 146 | 712 | \$9,486 | \$2,439 | \$11,925 |
| K_ORG_OR | \$8,869 | \$3,482 | \$12,352 | 665 | 278 | 943 | \$11,142 | \$4,656 | \$15,798 |
| L_ORG_OR | \$8,086 | \$5,639 | \$13,725 | 646 | 182 | 827 | \$10,820 | \$3,042 | \$13,862 |
| L_ORG_MA | \$0 | \$0 | \$0 | 2 | 0 | 2 | \$34 | \$0 | \$34 |
| M_ORG_OR | \$5,587 | \$1,505 | \$7,092 | 517 | 158 | 674 | \$8,661 | \$2,640 | \$11,301 |
| M_ORG_MA | \$7,481 | \$4,214 | \$11,695 | 518 | 157 | 675 | \$8,674 | \$2,635 | \$11,309 |
| N_ORG_OR | \$6,702 | \$258 | \$6,960 | 613 | 41 | 654 | \$10,271 | \$687 | \$10,958 |
| N_ORG_MA | \$4,944 | \$4,159 | \$9,103 | 478 | 167 | 645 | \$8,008 | \$2,799 | \$10,807 |
| O_ORG_MA | \$6,292 | \$2,114 | \$8,406 | 616 | 149 | 764 | \$10,319 | \$2,489 | \$12,808 |
| O_ORG_OR | \$7,932 | \$644 | \$8,576 | 683 | 80 | 762 | \$11,442 | \$1,332 | \$12,774 |
| P_ORG_M | \$4,955 | \$12,570 | \$17,525 | 449 | 243 | 692 | \$7,520 | \$4,073 | \$11,593 |
| P_ORG_OR | \$10,689 | \$2,929 | \$13,618 | 557 | 130 | 687 | \$9,334 | \$2,184 | \$11,517 |
| Q_ORG_OR | \$4,094 | \$0 | \$4,094 | 269 | 1 | 270 | \$4,500 | \$22 | \$4,522 |
| Q_ORG_MA | \$3,607 | \$488 | \$4,094 | 240 | 26 | 266 | \$4,022 | \$432 | \$4,455 |
| TOTAL | \$449,465 | \$255,887 | \$705,352 | 25,044 | 8,265 | 33,309 | \$419,741 | \$138,517 | \$558,258 |
| | 64% | 36% | 100% | 75% | 25% | 100% | 75% | 25% | 100% |

PERCENT OF TOTAL

Table E4

Vehicle Maintenance Unit and Support Costs for Fort Riley, KS (1986)

| FILE NAME | UNIT | | | SUPPORT | | | TOTAL |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|
| | PARTS \$ | LABOR \$ | TOTAL \$ | PARTS \$ | LABOR \$ | TOTAL \$ | UNIT & SUPPORT \$ |
| #2_ORG_M | \$34,870 | \$26,547 | \$61,417 | \$16,561 | \$8,625 | \$25,186 | \$86,603 |
| #3_ORG_M | \$8,576 | \$9,176 | \$17,753 | \$3,477 | \$4,364 | \$7,842 | \$25,594 |
| BECKY-OR | \$43,260 | \$23,632 | \$66,891 | \$27,081 | \$9,808 | \$36,889 | \$103,780 |
| C_ORG_MA | \$15,749 | \$15,949 | \$31,698 | \$9,439 | \$8,544 | \$17,983 | \$49,680 |
| D_ORG_MA | \$19,023 | \$16,505 | \$35,528 | \$21,896 | \$7,668 | \$29,564 | \$65,092 |
| E_ORG_MA | \$5,792 | \$8,807 | \$14,599 | \$6,621 | \$4,338 | \$10,959 | \$25,558 |
| F_ORG_MA | \$4,137 | \$6,753 | \$10,890 | \$5,394 | \$4,235 | \$9,629 | \$20,519 |
| G_ORG_MA | \$6,676 | \$8,294 | \$14,970 | \$3,318 | \$2,958 | \$6,276 | \$21,246 |
| H_ORG_MA | \$4,873 | \$8,615 | \$13,488 | \$2,898 | \$4,550 | \$7,448 | \$20,936 |
| I_ORG_MA | \$6,437 | \$9,770 | \$16,207 | \$1,973 | \$1,332 | \$3,306 | \$19,512 |
| J_ORG_MA | \$5,957 | \$8,013 | \$13,970 | \$7,497 | \$3,836 | \$11,334 | \$25,303 |
| K_ORG_MA | \$8,783 | \$8,548 | \$17,331 | \$13,438 | \$7,267 | \$20,705 | \$38,036 |
| L_ORG_MA | \$6,649 | \$9,136 | \$15,785 | \$7,016 | \$4,726 | \$11,743 | \$27,528 |
| MAIN1 | \$106,501 | \$67,888 | \$174,390 | \$27,894 | \$10,011 | \$37,905 | \$212,294 |
| MAIN2 | \$42,344 | \$23,286 | \$65,630 | \$27,997 | \$10,153 | \$38,150 | \$103,780 |
| MAIN3 | \$16,356 | \$17,145 | \$33,502 | \$21,822 | \$8,021 | \$29,843 | \$63,345 |
| M_ORG_MA | \$7,220 | \$8,926 | \$16,146 | \$4,447 | \$2,375 | \$6,822 | \$22,968 |
| G_ORG | \$6,311 | \$8,412 | \$14,722 | \$3,767 | \$2,665 | \$6,432 | \$21,155 |
| H_ORG | \$5,121 | \$9,635 | \$14,757 | \$2,902 | \$3,174 | \$6,076 | \$20,833 |
| I_ORG | \$7,847 | \$10,471 | \$18,318 | \$505 | \$436 | \$941 | \$19,259 |
| J_ORG | \$7,743 | \$9,486 | \$17,229 | \$1,942 | \$2,439 | \$4,381 | \$21,610 |
| K_ORG | \$8,869 | \$11,142 | \$20,011 | \$3,482 | \$4,656 | \$8,138 | \$28,150 |
| L_ORG | \$8,086 | \$10,820 | \$18,906 | \$5,639 | \$3,042 | \$8,681 | \$27,587 |
| L_ORG_MA | \$0 | \$34 | \$34 | \$0 | \$0 | \$0 | \$34 |
| M_ORG_OR | \$5,587 | \$8,661 | \$14,248 | \$1,505 | \$2,640 | \$4,145 | \$18,393 |
| M_ORG_MA | \$7,481 | \$8,674 | \$16,156 | \$4,214 | \$2,635 | \$6,848 | \$23,004 |
| N_ORG_OR | \$6,702 | \$10,271 | \$16,973 | \$258 | \$687 | \$945 | \$17,918 |
| N_ORG_MA | \$4,944 | \$8,008 | \$12,952 | \$4,159 | \$2,799 | \$6,958 | \$19,910 |
| O_ORG_MA | \$6,292 | \$10,319 | \$16,612 | \$2,114 | \$2,489 | \$4,603 | \$21,214 |
| O_ORG_OR | \$7,932 | \$11,442 | \$19,374 | \$644 | \$1,332 | \$1,976 | \$21,350 |
| P_ORG_M | \$4,955 | \$7,520 | \$12,476 | \$12,570 | \$4,073 | \$16,643 | \$29,118 |
| P_ORG_OR | \$10,689 | \$9,334 | \$20,023 | \$2,929 | \$2,184 | \$5,113 | \$25,135 |
| Q_ORG_ORG | \$4,094 | \$4,500 | \$8,594 | \$0 | \$22 | \$22 | \$8,616 |
| Q_ORG_MA | \$3,607 | \$4,022 | \$7,629 | \$488 | \$432 | \$920 | \$8,549 |
| <hr/> | | | | | | | |
| | \$449,465 | \$419,741 | \$869,207 | \$255,887 | \$138,517 | \$394,404 | \$1,263,610 |
| <hr/> | | | | | | | |

68.79%

31.21%

ACTUAL AS A PERCENT OF TOTAL

Table E5

Reconstruction of TAMMS Process Costs

| Step* | Item | Value | Source |
|-------|---|------------------------------|------------|
| 4. | Unit repair cases | 2,862 | [Table E1] |
| | Inspection hours per repair** | <u>x 1.5</u> | |
| | Total unit inspection hours | 4293 | |
| | Labor rate*** | <u>x \$16.76</u> \$71,951 | |
| 5. | Unit repair and inspection hours | 419,741 | [Table E4] |
| | Total unit repair hours less inspection time percentage based on 6 day survey (100 - 4.75) | <u>95.25%</u> 399,803 | [Table E7] |
| 6. | Value in "4" above | 71,951 | |
| | Value in "5" above | 399,803 | |
| | Total unit repairs | 471,754 | |
| 7. | Support only plus both support and unit repair cases | 1,078 | [Table E1] |
| | Inspection hours per repair | 2 | |
| | Total support inspection hours | 2,156 | |
| | Labor rate | <u>x \$16.76</u> \$36,136 | |
| 8. | Support repair and inspection hours | 138,517 | [Table E4] |
| | Total support repair hours less inspection time percentage based on six day survey (100 - 0.91) | <u>9.09%</u> 137,256 | [Table E7] |
| 9. | Value in "7" above | 36,135 | |
| | Value in "8" above | 137,256 | |
| | Total support repairs | 173,391 | |

*Step number corresponds to the steps outlined in Chapter 2.

**"Inspection hour" as previously defined.

***"Labor rate" as previously defined.

Table E6

Comparison of Service Writer and TAMMS Process Costs

| Service Writer Process | Labor Only | Parts | Parts & Labor |
|--|-------------------|--------------|--------------------------|
| Total annual cost of mechanic repair and inspection time unit level cases (from Table 5) | 419,741 | 449,465 | 869,207 |
| Support level cases (from Table 5) | 138,517 | 255,887 | 394,404 |
| Total all cases | 558,258 | 705,352 | 1,263,610 |
| TAMMS Process | | | |
| Total annual cost of unit level costs (from Table 7) | | | |
| Inspection | 71,951 | | |
| Repairs | 399,803 | | |
| Total unit level | 471,754 | | |
| Total annual cost of support level costs (from Table 7) | | | |
| Inspection | 36,135 | | |
| Repairs | 137,256 | | |
| Total support level | 173,391 | | |
| Total unit and support costs | 645,145 | 705,352 | 1,350,497 |
| TAMMS Process less Service Writer Process | 86,887 | | 86,887 |
| Percent Savings | 13.5% | | 6.4% |

Table E7

**Analysis of Time-In-Motion Observations By Repair Type
And Type Of Maintenance Action**

| Description of Value | Comments | Pro- ductive | Non- productive | Indirect Productive | Total Time | Inspection* Time |
|--|-------------------|-----------------|--------------------|------------------------|---------------|---------------------|
| Total Time, by Component (%) | Unit + Support | 55.56 | 32.26 | 11.94 | 100.00 | 3.51 |
| Total Support (Hours) | Support | 17.13 | 9.25 | 3.20 | 29.77 | 0.27 |
| Support Time, by Component (%) | Support | 57.55 | 31.08 | 10.74 | 100.00 | 0.91 |
| Total Unit (Hours) | Unit | 34.18 | 20.54 | 7.82 | 62.58 | 2.97 |
| Unit Time, by Component (%) | Unit | 54.62 | 32.82 | 12.50 | 100.00 | 4.75 |
| Unit as a Percent of Total Time (%) | | 66.61 | 68.94 | 70.98 | 67.76 | 91.66 |

*Inspection time is included with productive time.

Table E8

Summary of Time-And-Motion Study

| | Productive | | Nonproductive | Indirect Productive | Total Time |
|--------------|------------|-------|---------------|---------------------|---------------|
| | Inspection | Other | | | |
| All Repairs* | 4** | 52 | 32 | 12 | 100 |
| Unit | 1 | 50 | 33 | 12 | 100 |
| Support | 1 | 57 | 31 | 11 | 100 |

*All repairs are a weighted average of unit and support level maintenance cases.

**Values are percentages.

APPENDIX F: JOB FREQUENCY BY VEHICLE NUMBER AND NUMBER OF JOBS PERFORMED

| Job Frequency | | | | Job Frequency | | | |
|---------------------|-----------|------------------------------------|-----------|---------------------|-----------|------------------------------------|-----------|
| Sorted by Vehicle # | | Sorted by Number of Jobs Performed | | Sorted by Vehicle # | | Sorted by Number of Jobs Performed | |
| FE# | # of Jobs | FE# | # of Jobs | FE# | # of Jobs | FE# | # of Jobs |
| 1 | 157 | 59 | 2 | 76 | 4 | 53 | 8 |
| 2 | 188 | 71 | 2 | 80 | 6 | 81 | 8 |
| 3 | 89 | 74 | 2 | 81 | 8 | 83 | 8 |
| 4 | 63 | 103 | 2 | 82 | 14 | 86 | 8 |
| 6 | 121 | 118 | 2 | 83 | 8 | 134 | 8 |
| 8 | 5 | 141 | 2 | 85 | 26 | 152 | 8 |
| 9 | 270 | 153 | 2 | 86 | 8 | 190 | 8 |
| 10 | 191 | 163 | 2 | 87 | 7 | 213 | 8 |
| 11 | 81 | 204 | 2 | 88 | 6 | 291 | 8 |
| 12 | 12 | 239 | 2 | 89 | 13 | 332 | 8 |
| 13 | 129 | 490 | 2 | 92 | 3 | 377 | 8 |
| 14 | 108 | 503 | 2 | 93 | 16 | 437 | 8 |
| 15 | 261 | 73 | 3 | 101 | 79 | 470 | 8 |
| 16 | 41 | 92 | 3 | 102 | 55 | 484 | 8 |
| 17 | 59 | 117 | 3 | 103 | 2 | 485 | 8 |
| 18 | 247 | 137 | 3 | 104 | 52 | 487 | 8 |
| 19 | 152 | 139 | 3 | 106 | 63 | 68 | 9 |
| 20 | 39 | 240 | 3 | 107 | 91 | 115 | 9 |
| 23 | 57 | 311 | 3 | 108 | 50 | 158 | 9 |
| 24 | 182 | 344 | 3 | 109 | 14 | 166 | 9 |
| 25 | 146 | 345 | 3 | 110 | 6 | 171 | 9 |
| 27 | 66 | 346 | 3 | 111 | 6 | 177 | 9 |
| 28 | 53 | 347 | 3 | 112 | 11 | 283 | 9 |
| 29 | 36 | 348 | 3 | 113 | 28 | 336 | 9 |
| 30 | 8 | 66 | 4 | 114 | 13 | 426 | 9 |
| 31 | 35 | 67 | 4 | 115 | 9 | 473 | 9 |
| 32 | 68 | 76 | 4 | 116 | 7 | 36 | 10 |
| 33 | 64 | 130 | 4 | 117 | 3 | 38 | 10 |
| 34 | 68 | 135 | 4 | 118 | 2 | 225 | 10 |
| 35 | 54 | 136 | 4 | 119 | 5 | 289 | 10 |
| 36 | 10 | 140 | 4 | 120 | 101 | 308 | 10 |
| 37 | 47 | 143 | 4 | 121 | 73 | 424 | 10 |
| 38 | 10 | 223 | 4 | 122 | 80 | 439 | 10 |
| 39 | 104 | 227 | 4 | 123 | 80 | 459 | 10 |
| 40 | 45 | 232 | 4 | 124 | 13 | 489 | 10 |
| 41 | 38 | 502 | 4 | 125 | 7 | 112 | 11 |
| 42 | 43 | 8 | 5 | 126 | 54 | 132 | 11 |
| 43 | 61 | 119 | 5 | 127 | 62 | 219 | 11 |
| 44 | 85 | 157 | 5 | 130 | 4 | 230 | 11 |
| 46 | 56 | 160 | 5 | 131 | 20 | 253 | 11 |
| 47 | 48 | 222 | 5 | 132 | 11 | 273 | 11 |
| 48 | 39 | 235 | 5 | 133 | 13 | 282 | 11 |
| 49 | 57 | 69 | 6 | 134 | 8 | 287 | 11 |
| 50 | 33 | 75 | 6 | 135 | 4 | 288 | 11 |
| 51 | 23 | 80 | 6 | 136 | 4 | 417 | 11 |
| 52 | 44 | 88 | 6 | 137 | 3 | 444 | 11 |
| 53 | 8 | 110 | 6 | 138 | 24 | 450 | 11 |
| 54 | 57 | 111 | 6 | 139 | 3 | 12 | 12 |
| 55 | 84 | 176 | 6 | 140 | 4 | 224 | 12 |
| 56 | 54 | 205 | 6 | 141 | 2 | 277 | 12 |
| 57 | 32 | 231 | 6 | 143 | 4 | 343 | 12 |
| 59 | 2 | 441 | 6 | 145 | 36 | 378 | 12 |
| 60 | 47 | 475 | 6 | 146 | 43 | 401 | 12 |
| 61 | 105 | 491 | 6 | 147 | 15 | 425 | 12 |
| 62 | 58 | 72 | 7 | 150 | 115 | 436 | 12 |
| 63 | 26 | 87 | 7 | 152 | 8 | 89 | 13 |
| 64 | 16 | 116 | 7 | 153 | 2 | 114 | 13 |
| 66 | 4 | 125 | 7 | 154 | 17 | 124 | 13 |
| 67 | 4 | 159 | 7 | 155 | 16 | 133 | 13 |
| 68 | 9 | 165 | 7 | 157 | 5 | 221 | 13 |
| 69 | 6 | 220 | 7 | 158 | 9 | 286 | 13 |
| 71 | 2 | 388 | 7 | 159 | 7 | 337 | 13 |
| 72 | 7 | 453 | 7 | 160 | 5 | 427 | 13 |
| 73 | 3 | 472 | 7 | 161 | 18 | 474 | 13 |
| 74 | 2 | 488 | 7 | 162 | 26 | 481 | 13 |
| 75 | 6 | 30 | 8 | 163 | 2 | 82 | 14 |

Job Frequency

Job Frequency

| Sorted by Vehicle # | | Sorted by Number of Jobs Performed | |
|---------------------|-----------|------------------------------------|-----------|
| FE# | # of Jobs | FE# | # of Jobs |
| 165 | 7 | 109 | 14 |
| 166 | 9 | 292 | 14 |
| 170 | 18 | 329 | 14 |
| 171 | 9 | 385 | 14 |
| 176 | 6 | 438 | 14 |
| 177 | 9 | 147 | 15 |
| 178 | 60 | 290 | 15 |
| 179 | 111 | 300 | 15 |
| 180 | 58 | 307 | 15 |
| 181 | 69 | 419 | 15 |
| 182 | 109 | 429 | 15 |
| 183 | 137 | 460 | 15 |
| 184 | 158 | 461 | 15 |
| 185 | 114 | 462 | 15 |
| 186 | 132 | 64 | 16 |
| 187 | 117 | 93 | 16 |
| 188 | 50 | 155 | 16 |
| 189 | 56 | 294 | 16 |
| 190 | 8 | 430 | 16 |
| 191 | 92 | 431 | 16 |
| 192 | 43 | 454 | 16 |
| 193 | 35 | 154 | 17 |
| 194 | 95 | 247 | 17 |
| 195 | 34 | 257 | 17 |
| 196 | 27 | 293 | 17 |
| 198 | 48 | 381 | 17 |
| 202 | 30 | 161 | 18 |
| 204 | 2 | 170 | 18 |
| 205 | 6 | 280 | 18 |
| 213 | 8 | 312 | 18 |
| 219 | 11 | 316 | 18 |
| 220 | 7 | 321 | 18 |
| 221 | 13 | 386 | 18 |
| 222 | 5 | 248 | 19 |
| 223 | 4 | 275 | 19 |
| 224 | 12 | 357 | 19 |
| 225 | 10 | 370 | 19 |
| 226 | 21 | 380 | 19 |
| 227 | 4 | 387 | 19 |
| 230 | 11 | 440 | 19 |
| 231 | 6 | 452 | 19 |
| 232 | 4 | 131 | 20 |
| 235 | 5 | 414 | 20 |
| 239 | 2 | 421 | 20 |
| 240 | 3 | 451 | 20 |
| 245 | 62 | 466 | 20 |
| 246 | 21 | 483 | 20 |
| 247 | 17 | 226 | 21 |
| 248 | 19 | 246 | 21 |
| 249 | 32 | 252 | 21 |
| 250 | 36 | 308 | 21 |
| 251 | 23 | 323 | 21 |
| 252 | 21 | 330 | 21 |
| 253 | 11 | 342 | 21 |
| 254 | 36 | 382 | 21 |
| 255 | 23 | 415 | 21 |
| 256 | 34 | 464 | 21 |
| 257 | 17 | 467 | 21 |
| 258 | 30 | 469 | 21 |
| 259 | 25 | 383 | 22 |
| 260 | 32 | 455 | 22 |
| 262 | 33 | 468 | 22 |
| 263 | 63 | 51 | 23 |
| 264 | 30 | 251 | 23 |
| 265 | 30 | 255 | 23 |
| 266 | 63 | 267 | 23 |

| Sorted by Vehicle # | | Sorted by Number of Jobs Performed | |
|---------------------|-----------|------------------------------------|-----------|
| FE# | # of Jobs | FE# | # of Jobs |
| 267 | 23 | 281 | 23 |
| 268 | 63 | 501 | 23 |
| 273 | 11 | 138 | 24 |
| 274 | 24 | 274 | 24 |
| 275 | 19 | 276 | 24 |
| 276 | 24 | 309 | 24 |
| 277 | 12 | 410 | 24 |
| 278 | 27 | 433 | 24 |
| 279 | 26 | 259 | 25 |
| 280 | 18 | 465 | 25 |
| 281 | 23 | 63 | 26 |
| 282 | 11 | 85 | 26 |
| 283 | 9 | 162 | 26 |
| 284 | 36 | 279 | 26 |
| 286 | 13 | 317 | 26 |
| 287 | 11 | 324 | 26 |
| 288 | 11 | 334 | 26 |
| 289 | 10 | 373 | 26 |
| 290 | 15 | 447 | 26 |
| 291 | 8 | 482 | 26 |
| 292 | 14 | 196 | 27 |
| 293 | 17 | 278 | 27 |
| 294 | 16 | 310 | 27 |
| 296 | 83 | 384 | 27 |
| 300 | 15 | 400 | 27 |
| 301 | 63 | 416 | 27 |
| 302 | 31 | 418 | 27 |
| 303 | 46 | 432 | 27 |
| 305 | 153 | 457 | 27 |
| 306 | 29 | 113 | 28 |
| 307 | 15 | 327 | 28 |
| 308 | 21 | 423 | 28 |
| 308 | 10 | 446 | 28 |
| 309 | 24 | 306 | 29 |
| 310 | 27 | 319 | 29 |
| 311 | 3 | 202 | 30 |
| 312 | 18 | 258 | 30 |
| 313 | 45 | 264 | 30 |
| 314 | 47 | 265 | 30 |
| 315 | 34 | 445 | 30 |
| 316 | 18 | 448 | 30 |
| 317 | 26 | 302 | 31 |
| 318 | 39 | 320 | 31 |
| 319 | 29 | 358 | 31 |
| 320 | 31 | 369 | 31 |
| 321 | 18 | 407 | 31 |
| 322 | 38 | 57 | 32 |
| 323 | 21 | 249 | 32 |
| 324 | 26 | 260 | 32 |
| 325 | 38 | 471 | 32 |
| 326 | 34 | 50 | 33 |
| 327 | 28 | 262 | 33 |
| 328 | 40 | 356 | 33 |
| 329 | 14 | 195 | 34 |
| 330 | 21 | 256 | 34 |
| 331 | 58 | 315 | 34 |
| 332 | 8 | 326 | 34 |
| 333 | 43 | 493 | 34 |
| 334 | 26 | 497 | 34 |
| 336 | 9 | 31 | 35 |
| 337 | 13 | 193 | 35 |
| 339 | 53 | 428 | 35 |
| 340 | 50 | 29 | 36 |
| 341 | 94 | 145 | 36 |
| 342 | 21 | 250 | 36 |
| 343 | 12 | 254 | 36 |

Job Frequency

| Sorted by Vehicle # | | Sorted by Number of Jobs Performed | |
|---------------------|-----------|------------------------------------|-----------|
| FE# | # of Jobs | FE# | # of Jobs |
| 344 | 3 | 284 | 36 |
| 345 | 3 | 403 | 36 |
| 346 | 3 | 495 | 36 |
| 347 | 3 | 496 | 36 |
| 348 | 3 | 449 | 37 |
| 349 | 166 | 41 | 38 |
| 350 | 112 | 322 | 38 |
| 351 | 129 | 325 | 38 |
| 352 | 53 | 20 | 39 |
| 353 | 92 | 48 | 39 |
| 354 | 112 | 318 | 39 |
| 356 | 33 | 498 | 39 |
| 357 | 19 | 328 | 40 |
| 358 | 31 | 379 | 40 |
| 359 | 140 | 408 | 40 |
| 360 | 131 | 16 | 41 |
| 361 | 72 | 422 | 41 |
| 364 | 46 | 456 | 41 |
| 365 | 243 | 42 | 43 |
| 366 | 109 | 146 | 43 |
| 367 | 286 | 192 | 43 |
| 368 | 44 | 333 | 43 |
| 369 | 31 | 52 | 44 |
| 370 | 19 | 368 | 44 |
| 371 | 44 | 371 | 44 |
| 372 | 46 | 463 | 44 |
| 373 | 26 | 492 | 44 |
| 374 | 47 | 494 | 44 |
| 375 | 193 | 40 | 45 |
| 376 | 55 | 313 | 45 |
| 377 | 8 | 420 | 45 |
| 378 | 12 | 303 | 46 |
| 379 | 40 | 364 | 46 |
| 380 | 19 | 372 | 46 |
| 381 | 17 | 37 | 47 |
| 382 | 21 | 60 | 47 |
| 383 | 22 | 314 | 47 |
| 384 | 27 | 374 | 47 |
| 385 | 14 | 47 | 48 |
| 386 | 18 | 198 | 48 |
| 387 | 19 | 396 | 48 |
| 388 | 7 | 413 | 48 |
| 389 | 84 | 435 | 48 |
| 390 | 90 | 108 | 50 |
| 391 | 178 | 188 | 50 |
| 392 | 116 | 340 | 50 |
| 393 | 197 | 399 | 51 |
| 394 | 65 | 458 | 51 |
| 395 | 83 | 104 | 52 |
| 396 | 48 | 28 | 53 |
| 397 | 123 | 339 | 53 |
| 398 | 83 | 352 | 53 |
| 399 | 51 | 499 | 53 |
| 400 | 27 | 35 | 54 |
| 401 | 12 | 56 | 54 |
| 403 | 36 | 126 | 54 |
| 405 | 74 | 434 | 54 |
| 406 | 128 | 102 | 55 |
| 407 | 31 | 376 | 55 |
| 408 | 40 | 500 | 55 |
| 410 | 24 | 46 | 56 |
| 411 | 61 | 189 | 56 |
| 413 | 48 | 23 | 57 |
| 414 | 20 | 49 | 57 |
| 415 | 21 | 54 | 57 |
| 416 | 27 | 478 | 57 |

Job Frequency

| Sorted by Vehicle # | | Sorted by Number of Jobs Performed | |
|---------------------|-----------|------------------------------------|-----------|
| FE# | # of Jobs | FE# | # of Jobs |
| 417 | 11 | 62 | 58 |
| 418 | 27 | 180 | 58 |
| 419 | 15 | 331 | 58 |
| 420 | 45 | 17 | 59 |
| 421 | 20 | 178 | 60 |
| 422 | 41 | 43 | 61 |
| 423 | 28 | 411 | 61 |
| 424 | 10 | 127 | 62 |
| 425 | 12 | 245 | 62 |
| 426 | 9 | 4 | 63 |
| 427 | 13 | 106 | 63 |
| 428 | 35 | 263 | 63 |
| 429 | 15 | 266 | 63 |
| 430 | 16 | 268 | 63 |
| 431 | 16 | 301 | 63 |
| 432 | 27 | 33 | 64 |
| 433 | 24 | 394 | 65 |
| 434 | 54 | 480 | 65 |
| 435 | 48 | 27 | 66 |
| 436 | 12 | 32 | 68 |
| 437 | 8 | 34 | 68 |
| 438 | 14 | 181 | 69 |
| 439 | 10 | 361 | 72 |
| 440 | 19 | 121 | 73 |
| 441 | 6 | 405 | 74 |
| 444 | 11 | 101 | 79 |
| 445 | 30 | 122 | 80 |
| 446 | 28 | 123 | 80 |
| 447 | 26 | 11 | 81 |
| 448 | 30 | 296 | 83 |
| 449 | 37 | 395 | 83 |
| 450 | 11 | 398 | 83 |
| 451 | 20 | 55 | 84 |
| 452 | 19 | 389 | 84 |
| 453 | 7 | 44 | 85 |
| 454 | 16 | 3 | 89 |
| 455 | 22 | 390 | 90 |
| 456 | 41 | 107 | 91 |
| 457 | 27 | 191 | 92 |
| 458 | 51 | 353 | 92 |
| 459 | 10 | 341 | 94 |
| 460 | 15 | 194 | 95 |
| 461 | 15 | 120 | 101 |
| 462 | 15 | 39 | 104 |
| 463 | 44 | 61 | 105 |
| 464 | 21 | 14 | 108 |
| 465 | 25 | 182 | 109 |
| 466 | 20 | 366 | 109 |
| 467 | 21 | 179 | 111 |
| 468 | 22 | 350 | 112 |
| 469 | 21 | 354 | 112 |
| 470 | 8 | 185 | 114 |
| 471 | 32 | 150 | 115 |
| 472 | 7 | 392 | 116 |
| 473 | 9 | 187 | 117 |
| 474 | 13 | 6 | 121 |
| 475 | 6 | 397 | 123 |
| 476 | 184 | 406 | 128 |
| 477 | 153 | 13 | 129 |
| 478 | 57 | 351 | 129 |
| 479 | 183 | 360 | 131 |
| 480 | 65 | 186 | 132 |
| 481 | 13 | 183 | 137 |
| 482 | 26 | 359 | 140 |
| 483 | 20 | 25 | 146 |
| 484 | 8 | 19 | 152 |

Job Frequency

| Sorted by Vehicle # | | Sorted by Number of Jobs Performed | |
|---------------------|-----------|---------------------------------------|-----------|
| FE# | # of Jobs | FE# | # of Jobs |
| 485 | 8 | 305 | 153 |
| 487 | 8 | 477 | 153 |
| 488 | 7 | 1 | 157 |
| 489 | 10 | 184 | 158 |
| 490 | 2 | 349 | 166 |
| 491 | 6 | 391 | 178 |
| 492 | 44 | 24 | 182 |
| 493 | 34 | 479 | 183 |
| 494 | 44 | 476 | 184 |
| 495 | 36 | 2 | 188 |
| 496 | 36 | 10 | 191 |
| 497 | 34 | 375 | 193 |
| 498 | 39 | 393 | 197 |
| 499 | 53 | 365 | 243 |
| 500 | 55 | 18 | 247 |
| 501 | 23 | 15 | 261 |
| 502 | 4 | 9 | 270 |
| 503 | 2 | 367 | 286 |
| | 16,738 | | 16,738 |

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