

**AD 714640**

**DEVELOPMENT OF  
DIVISION LOGISTICS SYSTEM  
DIRECT EXCHANGE PROCEDURES**

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OFFICE OF THE DEPUTY CHIEF OF STAFF FOR LOGISTICS  
U S ARMY LOGISTICS DOCTRINE, SYSTEMS AND READINESS AGENCY  
NEW CUMBERLAND, PENNSYLVANIA**

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- a. Analyze the Army logistic System to plan and recommend logistic concepts, doctrine, and procedures for the mid-range and long-term future planning periods.
- b. Perform technical surveillance of Army logistic operations worldwide.
- c. Plan for and assist DCSLOG, DA in providing central direction and control for the development and maintenance of the Army logistic system and doctrine.

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ABSTRACT

LDSRA PROJECT 68-010

DEVELOPMENT OF DIVISION LOGISTICS SYSTEM  
DIRECT EXCHANGE PROCEDURES

The handling of the workload associated with turn-in and issue of certain reparable parts can be reduced and efficiency of maintenance improved through use, at the direct support unit (DSU) level, of a Department of Defense and Department of the Army approved technique called "Direct Exchange". This study spells out direct exchange concepts applicable to divisional DSU's in an automated environment.

TABLE OF CONTENTS

<u>TITLE</u>	<u>PAGE</u>
Abstract . . . . .	i
Table of Contents. . . . .	iii
Summary. . . . .	v
MAIN REPORT. . . . .	1
1. Problem. . . . .	1
2. Assumptions. . . . .	1
3. Facts Bearing on the Problem . . . . .	1
4. Discussion . . . . .	1
5. Conclusions. . . . .	24
6. Recommendations. . . . .	25
APPENDIXES	
A. References . . . . .	A-1
B. Distribution . . . . .	B-1

## SUMMARY

1. PROBLEM: To determine and prescribe Division Logistics System (DLOGS) Direct Exchange (DX) procedures that are compatible with Department of Defense (DOD) guidance and with the DLOGS automated system.

### 2. PURPOSE AND SCOPE:

a. The purpose of this study is to define and provide the basic direct exchange concept to be used by the headquarters and main, and forward support companies of division maintenance battalions.

b. This study is directed at resolving the requirement for immediate formulation of division maintenance battalion DX procedures for use in DLOGS divisions. The solution of the problem and resolution of the objectives was accomplished through use of documents such as: Report of Department of the Army (DA) Board of Inquiry (Brown Board), Department of Defense (DOD) Instructions, Army Regulations, Division Logistics Systems Test Final Reports (DLST), through use of individual experience, and through discussion with other experienced personnel.

### 3. DISCUSSION:

a. Department of Defense Instruction (DODI) 4140.20 and Army Regulations (AR) 711-16, 735-35, and TM 38-750 establishes DX as a supply function, sets controls over stockage levels of DX items and prescribes general rules for operation of DX activities. The DA Board of Inquiry, in 1966, recognized that there were some shortcomings in the present DX system, but concluded that the philosophy of DX was basically sound. The board made several recommendations in regard to DX operations. These recommendations were tested in the automated Division Logistics Systems Test (DLST) conducted in 1968. Based on the test results, the DA Chief of Staff recommended that:

(1) DX activities located within the division maintenance battalion be the only source of supply for items identified as DX.

(2) That the basic concepts of expanded DX be implemented Army-wide, and that the procedures used in the DLST be the basis for implementation.

b. Using the guidance listed in paragraph 3a above plus the Army Deputy Chief of Staff logistics guidance contained in Army Circulars 700-18, dated November 1969, and 750-34 dated 19 August 1970, the DCSLOG Army Logistics Doctrine, Systems and Readiness Agency has developed basic procedures for operation

## MAIN REPORT

1. PROBLEM: To determine and prescribe Division Logistics System (DLOGS) Direct Exchange Procedures that are compatible with DOD and DA guidance, and with the DLOGS automated system.

2. ASSUMPTIONS: None.

3. FACTS BEARING ON THE PROBLEM:

a. AR 750-5 states that direct support units (DSU) will provide a DX capability.

b. Lieutenant General Joseph M. Heiser, Jr., the Deputy Chief of Staff for Logistics has directed that the DX concept be implemented in the Division Logistics System on an accelerated schedule. In order to meet this schedule, functional concept and guidance must be formulated, coordinated, approved, printed and disseminated by 15 October 1970.

4. DISCUSSION: The following paragraphs describe the basic concepts and procedures for operation of the DX in divisional and other DSUs. A follow-on effort to this study will be preparation of user procedures by USACDC, which will prescribe the detailed manual operation of the DX function and its interface with the DLOGS automated program for repair parts supply support. The USACSC will then make any machine process changes required.

a. Current regulatory guidance.

(1) Department of Defense (DOD) Instruction 4140.20, Base Supply levels of Repairable Type Items, dated 26 August 1963, establishes the current policy for repairing repairable type parts at maintenance points. Army Regulations 711-16, dated 8 April 1966, and 735-35 dated 25 October 1965, implemented the DOD Instruction. These two regulations establish DX as a supply function, and set controls over stockage levels of DX items. The controlling factors are demand frequency and repair capability. The DX activities can be located in the maintenance facility.

(2) The DX activity functions as follows:

(a) Items authorized for DX stockage are normally limited to modules, components, assemblies and selected repair parts which have been designated as recoverable and/or repairable.

(b) Items initially selected for DX are those approved by AMC for DX and coded repairable/recoverable, which have a

of DX activities in DLOGS divisions. These procedures cover general requirements, establishment of the DX activity, selection and retention of DX items, stockage levels of DX items, replenishment of DX stocks, and issue and handling of DX items. It appears that DX can be implemented in DLOGS divisions with no need for additional manpower. Prototype installation in a division will verify or disprove this. A significant feature of these procedures is the fact that DX items will no longer be repaired in the forward support company shops. These items will be repaired only in the main support company's shops, or at higher echelons. Detailed discussion of each of these areas is contained in the "Main Report" section of this study. Upon receipt of DCSLOG approval of the content of this study, United States Army Combat Development Command (USACDC) will write the detailed functional operating procedures required for implementation of DX in DLOGS divisions. The USACDC is being tasked by The Adjutant General (TAG) letter to do this.

4. **PRINCIPAL CONCLUSIONS:** This study concludes that direct exchange of unserviceable reparable parts for replacement serviceable parts is an accepted and proven logistics support technique that has been promulgated by DODI and by AR's. This guidance, coupled with the results of DLST and the principles of logistic support as stated in Army Circulars 700-18, and 750-34, have been used in tailoring DX procedures to meet the requirements of divisions with automated DLOGS (Class IX Repair Parts Support Systems). The resultant DX procedures, as contained in the main report of this study, are simple and can be easily implemented with no expected increase in manpower requirements. Further, these procedures provide for flow of repair of DX items out of the forward support companies, back to the main support company's shops; and where necessary because of workload, back to the maintenance activity supporting the division.

5. **RECOMMENDATIONS:** It is recommended that:

a. The general DX procedures spelled out in this study be approved.

b. Upon DCSLOG approval of the DX guidance contained in this study, USACDC write the necessary detailed functional DLOGS DX procedures so implementation can begin in DLOGS divisions by 15 October 1970.

c. That DX be implemented in a selected DLOGS division on a pilot test basis to verify the concept, procedures and organizational changes involved.

d. After completion of the pilot test discussed above, DX then be implemented on an expedited basis.

turn in rate of 12 or more times per year (six times per year for retention).

(c) Lists of approved DX items are distributed to all supported units and activities authorized to utilize these stocks.

(d) DX item quantities issued to the DX activity will be transferred from automated accountable records to the DX accountable record, DA Form 3029R.

(e) Repairable items are turned in by the user to the DX activity through utilization of DA Form 2402, Exchange Tag (often referred to as a "shoe tag"). This is prescribed by AR 711-16, AR 735-35, and TM 38-750 to simplify and expedite the exchange of unserviceable parts, components or assemblies. The tag identifies the item throughout the exchange or repair process.

(f) The customer turns in the unserviceable recoverable DX item to the next higher supporting maintenance activity, and receives a serviceable item in return. The maintenance activity prepares a DA Form 2407, and schedules the item for repair or evacuates it to a higher level of maintenance.

(g) Items that the maintenance activity determines are non-repairable are returned to the DX activity, and from there they are turned in to the supporting supply activity or to property disposal, on DA Form 2765. Actual stockage levels will be determined by such factors as average repair rate, repair cycle time, number of days in a specific review period, average resupply (washout) rate, order ship time and a twenty-five percent safety factor.

b. DA Board of inquiry recommendations. This board in its investigations during 1966 recognized that there were some shortcomings in the present DX system, but concluded that the philosophy of DX is basically sound. The board recommended that:

(1) DA prescribe, in each direct support (DS) activity, the specific element that is responsible for operation of the DX section and for stockage of the kits used to repair recoverable items.

(2) Supply sections of DS maintenance companies be responsible for the control, operation, evacuation, disposal and management of recoverable items.

(3) DX operations be standardized world-wide.

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(4) Divisions repair only fast moving high demand recoverable items which the DS level is authorized to repair.

(5) No repair of recoverable items be done at organization or unit level.

(6) Division forward support companies repair fast moving high demand supported recoverable items which are on the prescribed load list (PLL) of organizations supported.

(7) Division main support companies also repair fast moving high demand supported recoverable items which are on the PLL of organizations supported, as well as handling overflow workload from forward support companies.

(8) DS maintenance companies be provided the facilities, tools and test equipment necessary to repair designated DX items.

c. Division logistics system test (DLST).

(1) The DX system tested in DLST and recommended for implementation as a part of DLOGS was a modified concept. The DA Board of Inquiry's recommendations were interpreted to mean that the DX item repair capability within a division be essentially equal to the workload generated. This, coupled with provision of spaces to handle the receipt and issue of DX items, resulted in a recommended increase in personnel strength of 46 spaces in the main support company and 15 spaces in each forward support company. The DLST also included stockage of some non-recoverable items to provide expedited delivery and reduction of equipment down time.

(2) The test showed that the tested DX procedures:

(a) Provided a significant increase in supply responsiveness.

(b) Were unanimously endorsed by commanders.

(c) Required certain changes.

(d) Were not the best for handling of selected nonrecoverable items.

d. Test recommendations.

(1) Test director recommendations.

(a) That the DX activity be the only authorized source of supply for items identified as DX.

(b) That the basic concepts of expanded DX be implemented Army-wide, and that recommended procedures and modified Tables of Organization and Equipment (TOE) be used as the basis for implementation.

(2) DA staff recommendations. The DA staff agreed with the recommendations contained in paragraph 4d(1) above, but did not agree with the test director's personnel and equipment requirements.

e. Deputy Chief of Staff logistics guidance. This guidance is contained in DA CIR's 700-18, dated 28 November 1969, "Issue of Supplies and Equipment, Logistics Improvement"; and 750-34, dated 19 August 1970, "Maintenance Support Positive (MS+) Army Maintenance For The Seventies". These circulars provide the following guidelines for operation of the Army Logistics System in the years to come:

(1) Achieve maximum operational readiness of equipment at the least effort to combat forces.

(2) Relieve front line units from as much of the equipment maintenance workload as is possible.

(3) Develop maintenance allocation charts which reorient maintenance functions to that level of maintenance where the repair effort can be performed in the most efficient, responsive and cost effective manner; and revise repair parts and special tool lists accordingly.

(4) Limit piece part repair, and reduce maintenance at organization and direct support unit level to replacement of assemblies, components and modules. Repair of DX items in support of organization maintenance will be held to a minimum.

(5) Backup DS and GS units will be primarily concerned with repair of end items. Those equipments requiring a wide range of bits and pieces, sophisticated tools and equipment, and high skill levels will be evacuated to depot maintenance shops.

f. DX System for DLOGS divisions.

(1) In DLOGS the Class IX repair parts support system stock accounting procedures are for the most part automated. In this environment the DX operation will still remain essentially a manual function. Certain selected repairable components and assemblies will be issued to units through use of direct exchange procedures. Under these procedures, using units deliver unserviceable DX items to their supporting supply section DX activity where they will immediately receive a serviceable item

in direct exchange (provided the items are in stock). The division Technical Supply Office (TSO) and Division Data Center (DDC) become involved in stockage level computations, replenishment of washed out items, acquisition to meet increased allowances and initial issue, and disposition of excesses.

(2) DX procedures are designed and installed to minimize equipment turn around time and administrative processing time. The DX activity will be a part of each division maintenance battalion support company supply section. Items selected for DX only will be stocked and stored in these DX activities. Only reparable parts on the division ASL will be selected for DX stockage.

(3) The TSO will be responsible for the operation of all DX activities in the division. He will select parts to be direct exchanged, and will publish updated lists semi-annually or as he deems necessary. Items will be listed by stock number, item description, end item application and authorized stock level. Copies of the list will be distributed to supported units. The division supply officer and the TSO will insure that reportable DX items are reported as required by AR 711-5, or by the Selected Items Management System (SIMS).

(4) DX items are recoverable repair parts and assemblies such as carburetors, distributors, fuel pumps, generators, regulators and wheel brake cylinders. The number of such items on a main support company's DX list will range from about 40 to 100 items. The forward support company's lists will be smaller.

(5) Implementation of this DX concept will not create a new or additional workload. Its prototype installation in a DLOGS division will verify or disprove this.

(6) Unserviceable items received by the direct exchange activity of forward support companies should be submitted to the DX activity of the main support company, within one working day from time of receipt. Within one working day this activity will turn the items in to the main support company maintenance shop for repair. The DA Form 2402 will be initiated by the user and perpetuated by the forward support DX activity to transfer the item to the main support DX. Items found to be "not repairable this station" by the maintenance shop will be returned to the main support company direct exchange activity for turn-in/evacuation to the supporting supply activity.

(7) The scheduling for repair of DX items in main support company shops must be closely controlled so that concentration of effort is directed towards those parts that are in the shortest stockage position (parts and unserviceable items being available).

(8) Classification of DX parts as reparable/non-reparable will be done at the main support company shops.

(9) Items will not be removed from DX lists simply because repair parts kits are temporarily not available. Movement of items on and off the lists must be held to a minimum.

(10) Blocking codes in the Division Data Center (DDC) programs will identify DX items and preclude inadvertent requisitioning of them.

(11) Under the DLOGS DX concept those repairable parts which are on the division's DX list will be moved to and segregated in one set of bins which contain only DX items. These bins will be in a supply van; or could be in a building, when a division is in a garrison situation. In either event, they will be close to the supply section's country store and to the facility issuing the remaining Authorized Stockage List (ASL) items so that one stop repair parts support can be provided to units.

(12) Formal DX records will be kept only at the main support company DX activity, and in the TSO files.

(a) Items selected for DX will be issued to the main support company, and reissued by them to forward support companies as required. The issue to the main support company will drop the items from TSO's accountable records. But record of on-hand balances and issue replacement history, by support company and by total for the battalion, will be kept by the main support company on DA Form 3029R. This form will account for the items. It will reflect cumulative gains, losses, on-hand balances, repair rates and resupply and demand rates. This information can be used for automated asset reporting and stockage level determination. Levels will be recomputed no more often than quarterly, and no less than semiannually.

(b) The main support company DX activity will maintain record of gains, losses, on-hand balances, repair rates, resupply rates and repair cycle time data on DA Form 3029R (DX accounting record) in accordance with entries illustrated in figure 1. This form will be locally reproduced on 8 inch by 8 inch paper for compatibility with visible file equipment. Entries for forward support companies will be keyed "C", "D" and "E". Entries for transactions with units directly supported by the main support company will be coded "A". At the end of each month, transactions within each code will be recapped, as will total transactions for the battalion, and forwarded to the TSO for entry into the TSO files.

(c) Forward support companies may keep informal accounts of all of their DX transactions on DA Form 3029R.

Stock No. Service Stock								Stock No. UNSERVICEABLE					
Date	Docu-ment No.	Mainte-nance Request No.	Demands on Ext Source	Rec from Maint on DA Form 2407	GAIN	LOSS	Balance on Hand	Date	Docu-ment No.	Mainte-nance Request No.	GAIN	LOSS	Balance on Hand
MAY							38						0
4122	①					4	34	4122	②	031245	4		4
4129	③	031245		2	2		36	4129	④	031245		2	2
4129	⑤0044		2				36	4129	⑥0043	(TURN INTO SUP PART)		2	0
4135	⑦0044						38						
4135	0014		2				34						4
MAY	SUM		35	85									
BALANCE CARRIED FORWARD													
SUMMARY OF DEMANDS													
Review Period	MAY												
External Demands	35	←											
Number Repaired	85	←											

NOTE 1: ORDERING AND SHIPPING TIME (O/S) MAY BE DETERMINED BY SUBTRACTING THE JULIAN DATE 4129 FROM THE JULIAN DATE 4135 (TRANSACTIONS 5 AND 6). IN THIS INSTANCE THE O/S TIME WAS 6 DAYS. REPRESENTATIVE SAMPLING SHOULD BE MADE TO DETERMINE AN AVERAGE O/S TIME.

NOTE 2: REPAIR CYCLE TIME MAY BE DETERMINED BY SUBTRACTING THE JULIAN DATE 4122 FROM THE JULIAN DATE 4129 (TRANSACTIONS 2 AND 3). IN THIS INSTANCE THE REPAIR CYCLE TIME WAS 7 DAYS. REPRESENTATIVE SAMPLING SHOULD BE TAKEN EACH MONTH TO DETERMINE AN AVERAGE REPAIR CYCLE TIME.

Figure 1. DX Accounting record, DA Form 3029R

(d) From time to time, as determined by the TSO, spot checks will be made to verify turn around time averages for DX items.

(e) The TSO will process requests received from the main support company supply section for replenishment quantities required to replace items washed out of the system or lost. These demands will not be used by the TSO to compute stockage levels because they have already been entered on DA Form 3029R as direct exchange actions.

(13) DX lists will be limited to modules, components, assemblies and selected repair parts that have been assigned codes "R", "S", "T", or "U" in the recoverability column of the Army Master Data File (AMDF). Items must have a turn-in frequency of 12 times a year for selection and six for retention. Non-demand supported DX items which are critical to responsive maintenance support and unit mission accomplishment may be stocked on approval of the major command.

(14) Selection and subsequent retention of items meeting the criteria for DX will be accomplished by the TSO, with coordination of the maintenance personnel. Available data on demand and repair rates should be analyzed prior to final decision. This data may be available in maintenance records. Data for retention is available in DX records and in TSO files.

g. Stockage levels of DX items. The authorized stock level for DX items represents the total authorized to be on-hand, due-in and on work order at any one time. These stock levels may either be computed or obtained from tables. They are based upon the number of items required to support the repair and resupply cycles adjusted upward by a 25 percent safety factor. Computations are made as follows:

(1) Repair cycle.

(a) Using the most recent 12-month period, determine the total repair during the period by adding entries in the "Rec from Maint on DA Form 2407" column of the DA Form 3029R. Divide this sum by 12 to obtain the average monthly repair rate. (Where less than 12 months data are available, base the average monthly rate on the total repaired during the period divided by the months in the period).

(b) Determine the average repair cycle time in days by averaging the time intervals between the dates that DA Forms 2407 were submitted and the dates the repaired items were returned, as recorded on the DA Form 3029R. See note 2, figure 1. In computing this average, exclude transactions that have unusual, one-time delays caused by lack of parts, transit time or interruptions in the repair process.

(c) Compute the repair cycle requirement using this formula:

$$\text{Repair Cycle Requirement} = \frac{\text{Monthly Repair Rate} \times \text{Repair Cycle (Days)}}{\text{Maintenance Workdays in Month}}$$

Example: Items are repaired at an average rate of 85 per month. The average repair cycle time is 10 days. The maintenance shop works 22 days in the month.

$$\text{Repair Cycle Requirement} = \frac{85 \times 10}{22} = 39 \text{ Items}$$

(2) Resupply cycle requirement.

(a) Using the most recent 12-month period, determine the total demands during the period by totaling demands in the "Demands on Ext. Source" column of the DA Form 3029R. Divide this sum by 12 to obtain the average monthly resupply rate. (This is the average quantity required monthly to replace "wash-outs". If less than 12-month data are available, base the average monthly rate on the total demanded during the period divided by the months in the period).

(b) Determine the average resupply cycle time in days by averaging the time intervals between dates that DA Forms 2765 were submitted and the dates the items were received, as recorded on the DA Form 3029R. (See note 1, figure 1).

(c) Compute the resupply cycle requirement using this formula:

$$\text{Resupply Cycle Requirement} = \frac{\text{Average Monthly Resupply Rate} \times \text{Resupply (Days)}}{30}$$

Example: An item has a monthly resupply rate of 35 and a resupply cycle of 10 days.

$$\text{Resupply Requirement} = \frac{35 \times 10}{30} = 12 \text{ Items}$$

(d) Compute the stock level using the following formula:

$$\text{Stock Level} = (\text{Rpr. Cycle Req.} + \text{Resupply Cycle Req.}) \times \text{Safety Factor.}$$

$$\text{Stock Level} = (39 + 12) \times 1.25 = 64 \text{ Items}$$

NOTE: 1.25 represents 25 percent Safety Factor.

(3) Stock levels using tables.

(a) Tables have been developed, based upon the above formulas, which permit stock levels to be determined without

mathematical computations. Three tables apply to stock levels of direct exchange items.

(b) Tables 1 and 2 are used to determine the repair cycle requirement. Table 1 will be used for maintenance shops working a 7-day week. Table 2 will be used for maintenance shops working a 5-1/2 day week. These tables cover repair cycles from 1 to 30 days and average monthly repair rates from 1 to 50. The repair cycle requirement is obtained from both tables in the same manner. Follow the line representing the average number of items repaired in the month, from left to right until it intersects with the column representing the number of days in the repair cycle. The number indicated at the point of intersect is the authorized repair cycle requirement, and includes a 25 percent safety factor.

(c) Table 3 is used to determine the resupply cycle requirement. This table covers resupply cycles from 1 to 30 days and average monthly resupply rates from 1 to 50. The resupply cycle requirement is obtained from this table by following the line representing the average monthly resupply rate from left to right until it intersects with the column representing the number of days in the resupply cycle. The number indicated at the point of intersect, without parenthesis, is the authorized resupply cycle requirement, to include a 25 percent safety factor. (The number in parenthesis is the reorder point and will be discussed later).

(d) To obtain the stock level, add the repair cycle requirement obtained from table 1 or 2 to the resupply cycle requirement obtained from table 3. The sum is the stock level, including a 25 percent safety factor.

(e) When the average monthly repair or resupply rate exceeds 50, tables 1, 2, and 3 can still be used by breaking the rate down into multiples that fit the table. For example, an item having a repair rate of 76 would require entering the table twice; once for 50, and again for 26. The sum of the two figures obtained from the table is the repair cycle requirement for the item.

h. Replenishment of DX stocks. DX items that the maintenance shops of the division main support company determine to be "not reparable this shop", or to be "salvage", will be returned to the main support company's supply section. The TSO will be notified of the item and the quantity, and he will provide the supply section with disposition instructions. Whenever the cumulative quantity of "washouts" equals the difference between the resupply cycle quantity and the reorder point quantity, obtained from table 3, the TSO will initiate replenishment action to the supply source supporting the division.

REPAIR CYCLE TIME (DAYS)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	
2	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	
3	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	
4	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	5	
5	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5	5	5	5	6	6	
6	1	1	1	2	2	2	3	3	3	3	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	7	7	7	
7	1	1	1	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	8	8	
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19	1	2	3	4	5	6	7	7	8	9	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	
20	1	2	3	4	5	6	7	8	8	10	10	11	12	13	14	15	16	16	17	18	19	20	21	22	23	24	25	26	27	28	
21	1	2	3	4	5	6	7	8	9	10	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
22	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
23	2	3	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
24	2	3	4	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
25	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31	31	
26	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31	32	33
27	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31	32	34
28	2	3	4	5	6	7	8	9	11	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	28	29	30	31	32	34	35
29	2	3	4	5	6	7	8	10	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	29	30	31	32	33	35	36
30	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	19	20	21	22	24	25	26	27	29	30	31	32	33	34	36	38
31	2	3	4	5	6	7	9	10	11	12	14	15	16	17	18	19	20	21	22	24	25	26	28	30	31	32	34	36	37	38	39
32	2	3	4	5	6	8	9	10	11	13	15	16	18	19	20	21	22	24	25	26	27	29	30	32	33	35	37	38	39	40	41
33	2	3	4	5	6	8	10	11	12	14	15	16	18	19	20	21	22	24	26	27	29	30	31	33	34	36	38	39	40	41	42
34	2	3	4	6	7	9	10	11	12	14	15	16	18	20	22	23	24	25	26	27	29	31	32	34	36	38	39	40	41	42	43
35	2	3	4	6	7	9	10	11	12	14	16	17	18	20	22	23	25	26	27	29	30	32	34	35	37	39	40	42	43	44	44
36	2	3	4	6	7	8	10	12	14	15	16	17	19	21	22	24	25	26	28	30	31	32	34	35	38	40	41	42	44	45	45
37	2	3	4	6	7	9	10	12	14	15	16	18	20	21	22	24	26	27	29	31	32	33	35	36	38	41	42	44	45	46	46
38	2	3	5	6	7	9	10	12	14	16	17	19	20	22	23	25	26	28	30	31	32	34	36	38	40	42	43	45	47	48	48
39	2	3	5	6	7	9	11	12	14	15	17	19	21	22	23	26	27	29	31	32	33	35	37	39	41	43	44	46	48	49	49
40	2	4	5	6	9	10	11	13	15	16	18	20	21	23	25	26	28	29	31	33	35	36	38	40	42	44	45	47	49	50	50
41	2	4	5	6	9	10	11	14	15	16	19	20	22	23	25	27	28	30	32	34	35	37	40	42	43	45	46	48	50	51	51
42	2	4	5	6	9	10	12	14	15	17	19	21	22	24	26	27	29	31	32	35	36	38	39	41	44	46	47	49	51	52	52
43	2	4	5	7	9	11	13	14	16	18	20	21	22	25	26	29	30	31	32	36	37	39	40	42	45	47	48	50	52	54	54
44	2	4	5	7	9	11	13	15	16	19	20	22	24	25	27	29	31	33	35	37	38	40	41	43	46	48	49	51	53	55	55
45	3	4	5	8	10	11	13	15	16	19	20	23	24	26	28	30	31	33	35	36	39	41	42	44	47	49	50	52	54	56	56
46	3	4	6	8	10	11	13	15	17	19	20	23	24	26	29	31	33	35	36	37	40	42	43	46	49	50	52	55	56	58	58
47	3	4	6	8	10	11	13	15	17	20	21	24	25	27	30	31	34	35	37	39	41	43	45	47	50	51	53	56	57	59	59
48	3	4	6	8	10	12	14	16	18	20	22	24	26	28	31	33	34	36	38	40	42	44	46	48	51	52	54	57	58	60	60
49	3	4	6	9	10	13	14	16	19	20	21	25	26	29	31	33	34	36	39	41	43	45	47	49	52	53	55	58	59	61	61
50	3	5	7	9	10	13	14	16	19	21	23	25	28	29	31	34	35	38	40	41	44	46	48	50	53	54	56	59	60	62	62

Table 1. Repair cycle requirement

**DIRECT EXCHANGE STORAGE TABLE**  
**REPAIR CYCLE REQUIREMENT**  
**(BASED ON 22 DAY WORKMONTH IN MAINTENANCE ACTIVITY)**

REPAIR CYCLE TIME (DAYS)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	1	1	1	1	1	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	1	1	1	1	2	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
5	1	1	2	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
7	1	1	2	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
8	1	1	2	2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
9	1	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
10	1	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
11	1	2	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
12	1	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
13	1	2	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
14	1	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
15	1	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
16	1	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
17	1	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
18	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
19	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Table 2. (1 of 3) Average monthly repair rate

DIRECT EXCHANGE STOCKAGE TABLE  
REPAIR CYCLE REQUIREMENT  
(BASED ON 22 DAY WORKMONTH IN MAINTENANCE ACTIVITY)

REPAIR CYCLE TIME (DAYS)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
21	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
22	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
23	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
24	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
25	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
26	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
27	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
28	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
29	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
30	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
31	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
32	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
34	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
35	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
36	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
37	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
38	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
39	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
40	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33

Table 2. (2 of 3) Average monthly repair rate

DIRECT EXCHANGE STORAGE TABLE  
REPAIR CYCLE REQUIREMENT  
(BASED ON 22 DAY WORKMONTH IN MAINTENANCE ACTIVITY)

REPAIR CYCLE TIME DAYS)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
41	3	5	7	10	12	14	17	19	21	24	26	28	31	33	35	38	40	42	45	47	49	52	54	56	59	61	63	66	68	70
42	3	5	8	10	12	15	17	20	22	24	27	29	32	34	36	39	41	43	46	48	51	53	55	58	60	63	65	67	70	72
43	3	5	8	10	13	15	18	20	22	25	27	30	32	35	37	40	42	44	47	49	52	54	57	59	62	64	66	69	71	74
44	3	5	8	10	13	15	18	20	23	25	28	30	33	35	38	40	43	45	48	50	53	55	58	60	63	65	68	70	73	75
45	3	6	8	11	13	16	18	21	24	26	29	31	34	36	39	41	44	47	49	52	54	57	59	62	64	67	70	72	75	77
46	3	6	8	11	14	16	19	21	24	27	29	32	34	37	40	42	45	48	50	53	55	58	61	63	66	68	71	74	76	79
47	3	6	9	11	14	17	19	22	25	27	30	33	35	38	41	43	46	49	51	54	57	59	62	65	67	70	73	75	78	81
48	3	6	9	11	14	17	20	22	25	28	30	33	36	39	41	44	47	50	52	55	58	60	63	66	69	71	74	77	80	82
49	3	6	9	12	14	17	20	23	26	28	31	34	37	39	42	45	48	51	53	56	59	62	65	67	70	73	76	78	81	84
50	3	6	9	12	15	18	20	23	26	29	32	35	37	40	43	46	49	52	54	57	60	63	66	69	72	74	77	80	83	86

Table 2. (3 of 3) Average monthly repair rate



12	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(4) 7	(5) 8	(5) 9	(6) 10	(6) 11	(7) 12	(7) 13	(8) 14	(8) 15	(9) 16	(9) 17	(10) 18	(10) 19	(10) 20
13	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
14	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
15	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
16	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
17	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
18	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
19	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
20	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
21	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
22	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
23	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20
24	(1) 2	(1) 2	(2) 3	(3) 4	(4) 5	(4) 6	(5) 7	(5) 8	(6) 9	(6) 10	(7) 11	(7) 12	(8) 13	(8) 14	(9) 15	(9) 16	(10) 17	(10) 18	(11) 19	(11) 20

Table 3. (2 of 4) Monthly resupply rate

25	(1) (2) (3) (4) (5) (6) (7) (8) (9) (9) (10) (10) (11) (12) (12) (13) (14) (14) (15) (15) (16) (17) (17) (18) (19) (19) (20)
	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 26 27 28 29 30 31 32
26	(1) (2) (3) (4) (5) (6) (7) (8) (8) (9) (10) (10) (11) (11) (12) (13) (13) (14) (15) (15) (16) (17) (17) (18) (19) (19) (20) (21)
	2 3 4 5 6 7 8 9 10 11 12 14 15 16 17 18 19 20 21 22 23 24 25 27 28 29 30 31 32 33
27	(1) (2) (3) (4) (5) (6) (7) (8) (9) (9) (10) (11) (11) (12) (13) (13) (14) (15) (15) (16) (17) (17) (18) (19) (19) (20) (21) (21)
	2 3 4 5 6 7 8 10 11 12 13 14 15 16 17 19 20 21 22 23 24 25 26 28 29 30 31 32 33 34
28	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (10) (11) (12) (12) (13) (14) (14) (15) (16) (16) (17) (18) (19) (19) (20) (21) (21) (22)
	2 3 4 5 6 8 9 10 11 12 13 15 16 17 18 19 20 22 23 24 25 26 27 29 30 31 32 33 34 36
29	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (11) (12) (13) (13) (14) (15) (16) (16) (17) (18) (19) (19) (20) (21) (21) (22) (23)
	2 3 4 5 7 8 9 10 11 13 14 15 16 17 19 20 21 22 23 25 26 27 28 30 31 32 33 34 36 37
30	(1) (2) (3) (4) (5) (6) (7) (8) (9) (9) (10) (11) (12) (13) (14) (15) (15) (16) (17) (18) (18) (19) (20) (21) (21) (22) (23) (24)
	2 3 4 6 7 8 9 11 12 13 14 16 17 18 19 21 22 23 24 26 27 28 29 31 32 33 34 36 37 38
31	(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (23) (24) (24)
	2 3 4 6 7 8 10 11 12 13 15 16 17 19 20 21 22 24 25 26 28 29 30 32 33 34 35 37 38 39
32	(1) (2) (4) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (23) (24) (25)
	2 3 5 6 7 9 10 11 13 14 15 17 18 19 21 22 23 25 26 27 29 30 31 33 34 35 37 38 39 41
33	(1) (2) (4) (4) (5) (6) (7) (8) (9) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (23) (24) (25) (26)
	2 3 5 6 7 9 10 12 13 14 16 17 18 20 21 23 24 25 27 28 29 31 32 34 35 36 38 39 40 42
34	(1) (2) (4) (4) (5) (6) (7) (8) (9) (10) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (23) (25) (26) (27)
	2 3 5 6 8 9 10 12 13 15 16 18 19 20 22 23 25 26 27 29 30 32 33 35 36 37 39 40 42 43
35	(1) (2) (4) (5) (6) (7) (8) (9) (10) (11) (12) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27)
	2 3 5 6 8 9 11 12 14 15 17 18 19 21 22 24 25 27 28 30 31 33 34 36 37 38 40 41 43 44
36	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28)
	2 4 5 7 8 10 11 13 14 16 17 19 20 22 23 25 26 28 29 31 32 34 35 37 38 40 42 43 44 46
37	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29)
	2 4 5 7 8 10 11 13 14 16 17 19 21 22 24 25 27 28 30 31 33 34 36 38 39 41 42 44 45 47
38	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30)
	2 4 5 7 8 10 12 13 15 16 18 20 21 23 24 26 27 29 31 32 34 35 37 39 40 42 43 45 46 48

Table 3. (3 of 4) Monthly resupply rate

39	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30)
	2 4 5 7 9 10 12 14 15 17 18 20 22 23 25 27 28 30 31 33 35 36 38 40 41 43 44 46 48 49
40	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31)
	2 4 6 7 9 11 12 14 16 17 19 21 22 24 26 27 29 31 32 34 36 37 39 41 42 44 46 47 49 51
41	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32)
	2 4 6 7 9 11 12 14 16 18 19 21 23 24 26 28 30 31 33 35 36 38 40 42 43 45 47 48 50 52
42	(1) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33)
	2 4 6 8 9 11 13 15 16 18 20 22 23 25 27 29 30 32 34 36 37 39 41 43 44 46 48 50 51 53
43	(1) (3) (4) (5) (6) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33)
	2 4 6 8 9 11 13 15 17 18 20 22 24 26 27 29 31 33 35 36 38 40 42 44 45 47 49 51 52 54
44	(1) (3) (4) (5) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (18) (19) (20) (21) (22) (23) (24) (25) (26) (28) (29) (30) (31) (32) (33) (34)
	2 4 6 8 10 12 13 15 17 19 21 23 24 26 28 30 32 34 35 37 39 41 43 45 46 48 50 52 54 56
45	(1) (3) (4) (6) (7) (8) (9) (10) (11) (12) (13) (15) (16) (17) (18) (19) (20) (21) (22) (24) (25) (26) (27) (28) (29) (30) (31) (33) (34) (35)
	2 4 6 8 10 12 14 16 17 19 21 23 25 27 29 31 32 34 36 38 40 42 44 46 47 49 51 53 55 57
46	(1) (3) (5) (6) (7) (8) (9) (10) (11) (13) (14) (15) (16) (17) (18) (19) (21) (22) (23) (24) (25) (26) (28) (29) (30) (31) (32) (33) (34) (36)
	2 4 6 10 12 14 16 18 20 22 24 25 27 29 31 33 35 37 39 41 43 45 47 48 50 52 54 56 58
47	(1) (3) (5) (6) (7) (8) (9) (10) (12) (13) (14) (15) (16) (18) (19) (20) (21) (22) (23) (25) (26) (27) (28) (29) (30) (32) (33) (34) (35) (36)
	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 49 51 53 55 57 59
48	(2) (4) (5) (6) (7) (8) (10) (11) (12) (13) (14) (16) (17) (18) (19) (20) (22) (23) (24) (25) (26) (28) (29) (30) (31) (32) (34) (35) (36) (37)
	3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61
49	(2) (4) (5) (6) (7) (8) (10) (11) (12) (13) (15) (16) (17) (18) (19) (21) (22) (23) (24) (26) (27) (28) (29) (31) (32) (33) (34) (35) (37) (38)
	3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 50 52 54 56 58 60 62
50	(2) (4) (5) (6) (7) (9) (10) (11) (12) (14) (15) (16) (17) (19) (20) (21) (22) (24) (25) (26) (27) (29) (30) (31) (32) (34) (35) (36) (37) (39)
	3 5 7 9 11 13 15 17 19 21 23 26 28 30 32 34 36 38 41 42 44 46 48 51 53 55 57 59 61 63

Table 3. (4 of 4) Monthly resupply rate

i. Issue and handling of DX items.

(1) Supported units obtain serviceable DX items from the DX activity of the support company supply section on which they are based for support. When a unit mechanic needs a DX part to accomplish a repair, he will go to the unit parts clerk to get it. He will turn in the unserviceable part, and if authorized by the appropriate technical manual (TM) for repair at organization level, the parts clerk will accept the part tagged with DA Form 2402, figure 2. If the part is stocked in the unit (organization service stock), and is in stock, the serviceable replacement item will be immediately issued. If the item is not stocked, or is not on hand, when the parts clerk makes his next run to the maintenance battalion supply section, he will carry the unserviceable DX items to the supply section DX activity where he will receive serviceable items in exchange. At this time, the supply section DX clerk will check to see that the unit has:

(a) Cleaned the part and taped all fittings in accordance with TSO instructions.

(b) Attached to the DX item a properly prepared DA Form 2402 "Exchange tag", often referred to as a "shoe tag".

(2) Entries will be made on the form, as shown in figure 2. In addition, the Issue Priority Designator (IPD) of the item will be placed in the upper right hand corner of each section of the form. Section 1 remains with the item at all times, to assure identification of the item until it is repaired and issued. It also identifies the item as serviceable after it has been repaired. In the DLOGS DX system, sections 2, 3 and 4 will be used as follows:

(a) When a unit receives a like serviceable part at the time of turn-in of a tagged unserviceable item, no receipt portion will be detached or given to the unit. In the event an immediate exchange is not possible the bottom portion of the tag (number 4 portion) is detached, initialed by the DX clerk, and given to the unit parts clerk as proof that such an item is due-out to the unit. The tag is held by the unit until a like serviceable item becomes available, at which time the receipt tag is exchanged for the item.

(b) In like manner when a forward support company supply section turns in an unserviceable DX item to the main support company supply section, and no replacement is available, the bottom section of the tag is given to the supply clerk turning the item in. It then serves as a due-out to the supply section and is surrendered when the item is received. Also, when the

EXCHANGE TAG (TM 38-730)	
1. SUPPORT AGENCY <b>C. A 52<sup>nd</sup> MAINT BN</b>	2. DATE <b>3120</b>
3. UNIT OR ORGANIZATION <b>12<sup>th</sup> MP G. 8<sup>th</sup> MECH DIV</b>	
4. FSN <b>2910-737-2509</b>	
5. NOUN NOMENCLATURE <b>CARBURETOR</b>	
6. EIR EXHIBIT EXCHANGE <input checked="" type="checkbox"/>	7. REPAIRED DATE <b>3134</b> INITIALS <b>CCB</b>
END ITEM IDENT <b>TRUCK 1/4 TON, WILLYS</b>	8. NOUN NOMENCLATURE/MANUFACTURER <b>TRUCK 1/4 TON, WILLYS</b>
9. MODEL <b>M 38A1</b>	10. SERIAL/LOT NO. <b>9B1874</b>

DA FORM 2402, 1 JAN 64 PREVIOUS EDITION IS OBSOLETE.

11. UNIT OR ORGANIZATION <b>12<sup>th</sup> MP G. 8<sup>th</sup> MECH DIV</b>	ITEM <b>CARBURETOR</b>
12. FSN <b>2910-737-2509</b>	DATE SUBMITTED <b>3121</b>
END ITEM IDENT <b>TRUCK 1/4 TON, WILLYS</b>	13. NOUN NOMENCLATURE/MANUFACTURER <b>TRUCK 1/4 TON, WILLYS</b>
	14. SERIAL/LOT NUMBER <b>9B1874</b>

(Detached from DA Form 2402)

15. UNIT OR ORGANIZATION <b>12<sup>th</sup> MP G. 8<sup>th</sup> MECH DIV</b>	ITEM <b>CARBURETOR</b>
16. FSN <b>2910-737-2509</b>	DATE SUBMITTED <b>3122</b>
END ITEM IDENT <b>TRUCK 1/4 TON, WILLYS</b>	17. NOUN NOMENCLATURE/MANUFACTURER <b>TRUCK 1/4 TON, WILLYS</b>
	18. SERIAL/LOT NUMBER <b>9B1874</b>

(Detached from DA Form 2402)

19. NOUN NOMENCLATURE <b>CARBURETOR</b>	
20. FSN <b>2910-737-2509</b>	DATE SUBMITTED <b>3122</b>
END ITEM IDENT <b>TRUCK 1/4 TON, WILLYS</b>	21. NOUN NOMENCLATURE/MANUFACTURER <b>TRUCK 1/4 TON, WILLYS</b>
	22. SERIAL/LOT NUMBER <b>9B1874</b>

(Detached from DA Form 2402)

23. DATE MFG/LAST OVERHAUL <b>3024</b>	24. MANUFACTURER OR OVERHAUL ACTIVITY <b>52<sup>nd</sup> MAINT BN</b>
25. FAILURE DETECTED DURING <input type="checkbox"/> HANDLING CODE B <input type="checkbox"/> INSPECTION/TEST CODE C <input checked="" type="checkbox"/> NORMAL OPERATION CODE D	
26. FIRST INDICATION OF TROUBLE A <input type="checkbox"/> INOPERATIVE CODE 088 C <input type="checkbox"/> LOW PERFORMANCE CODE 387 D <input type="checkbox"/> NOISY CODE 098 F <input checked="" type="checkbox"/> OUT OF ADJUSTMENT CODE 790 G <input type="checkbox"/> OVERHEATING CODE 259 I <input type="checkbox"/> OTHER CODE 099	
27. DESCRIBE DEFICIENCIES OR SYMPTOMS  <b>Will not adjust for idle.</b>	

Enter date and initials in block 7 when repair is completed.

- INSTRUCTIONS**  
(Fill in all blocks and attach to item for exchange)
- BLOCKS**
- Support Agency - Service or Support Agency where part is to be exchanged.
  - Date - Current date.
  - 11, 15. Unit or Organization - Designate.
  - 12, 16, 20. FSN - Federal stock number of unserviceable item.
  19. Noun Nomenclature - Enter correct.
  - Check only when EIR has been submitted and part is tagged for exhibit, or check when direct exchange is required.
  - Enter date and initials when repair is completed.
  - 13, 17, 21. Enter nomenclature of end item and manufacturer.
  - Model - Enter model of the end item.
  - 10, 14, 18, 22. Serial/Lot Number - Enter end item serial/lot number. Lot number pertains to munitions only.
- DATE SUBMITTED** - Enter date item is received at echelon concerned.

Figure 2. (1 of 2) Exchange tag, DA Form 2402

The unserviceable part or assembly will be identified by completing DA Form 2402 as follows:

- (a) Block 1. Enter the support agency where the item is to be exchanged.
- (b) Block 2. Enter date part was prepared for exchange.
- (c) Blocks 3, 11, and 15. Enter unit or organization originating the exchange.
- (d) Blocks 4, 12, 16, and 20. Enter the Federal stock number of the unserviceable item.
- (e) Blocks 5 and 19. Noun Nomenclature block on sections 1 and 4--enter the nomenclature of the item, e.g., carburetor, generator, starter, etc.
- (f) Block 6. If the item is for exchange, place an "X" in the space provided for "Exchange"; if the item is an exhibit to an EIR place an "X" in the space provided for "EIR Exhibit."
- (g) Blocks 8, 13, 17, and 21 "noun nomenclature/manufacturer". Enter the nomenclature and manufacturer of the end item from which the unserviceable item was removed.
- (h) Block 9. Enter the model of the equipment from which the item was removed, e.g., M151, M211, M38A1, Electronic Equipment Modules, etc.
- (i) Blocks 10, 14, 18, and 22. Enter the end item serial number from which the unserviceable item was removed.
- (j) "Date submitted" block on section 2, 3, and 4. Enter Julian date item is presented for exchange.
- (k) Block 23. Enter date of manufacture or last overhaul, when available.
- (l) Block 24. Enter name of manufacturer or overhaul activity.
- (m) Block 25. Enter an "X" in the space provided which best identifies when failure was detected.
- (n) Block 26. Enter an "X" in the space provided which best identifies first indication of trouble.
- (o) Block 27. Utilizing the information available on DA Form 2404, describe briefly and clearly the symptoms relating to the failure of the item, e.g., carburetor will not adjust for idle.

Figure 2. (2 of 2) Exchange tag, DA Form 2402

main support company supply section turns in an unserviceable DX item to its supporting maintenance shop and no replacement is available, the bottom section will be retained by the main support company as a due-out, to be relinquished when the item becomes available.

(c) When a part, or component, to which the DA Form 2402 has been attached is installed on an equipment, or is disposed of, the form will be removed and destroyed.

(d) Sections of this form, used as receipts, will be destroyed after the exchange transactions are completed.

(3) For items submitted on DA Form 2402, when serviceable stock is available, the DX activity will exchange the items. When serviceable stock or substitute items are not available the DX activity will accept the unserviceable part and return section 4 of the DA Form 2402 to the unit as an informal due-out. Upon receipt of the items, they will be released by the DX activity in IPD sequence, highest priority first.

(4) For IPD 09-20 Requirements:

(a) On the next run to the main support company, the item will be turned in. If a replacement part is in stock there, it will be immediately issued to the forward support company DX clerk.

(b) If the part is not in stock, the main support company DX clerk will initial the last section of the exchange tag and give it to the forward support company representative. This section will serve as a due-out until the item becomes available and is issued.

(5) For IPD 01-08 Requirements:

(a) As in paragraph 4i(4) above, the item will be turned in to the main support company DX activity. If a replacement is immediately available, it will be received and in turn issued to the unit.

(b) If a replacement item is not in stock at the main support company, the clerk there will initial part 3 of the exchange tag and return it to the forward support company to serve as a due-out. The main support company clerk will then call the supporting maintenance shop. If a repaired item will be available within the next 48 hours, its movement to the requesting unit will be expedited. If not, part 2 of the exchange tag will be sent to the TSO with a statement on the back side saying that "the item is not available in DX stock". This

will be initiated by the DX clerk. The TSO will check with the next higher supporting unit for availability of the item. If it is not available, Hi-Priority requisition action will be initiated. When the item is received, it will be issued as explained in paragraph 4i(3) above.

(6) These same main support company procedures will apply to items received from the units it directly supports.

(7) The DX lists of forward support companies do not include all items that are on the main support companies list. When units turn in items that are only on the main support company's list, forward support companies will accept the unserviceable part and handle the transaction in accordance with procedures contained in paragraphs 4i(4), (5), and (6) above.

(8) When DX items are not in stock, and immediate exchange cannot be provided, requests for the items will be initiated. However, prior to the receipt of an item as the result of a specific request, like items may be received from repair or as a result of replenishment requisitions previously submitted. In such instances the main support company will release them in IPD sequence by date, highest priority first. Forward support company DX activities will act in the same manner. The priority request will be kept open at the main support company, and when the item is received it will be placed in stock.

(9) When additional DX items are authorized as a result of a change, i.e., initial issue, the items will be requested by use of DA Form 2765. A statement will be entered on the back of the form explaining the basis for issue, signed by the unit commander or the unit supply officer. If stock is available, the DX activity receiving the request will issue the item. If the issue was made by a forward support company, the DA Form 2765 submitted by the unit will be forwarded to the main support company, with a notation entered on the rear "item issued". This entry will be initialed by the DX clerk. The main support company will, in turn, issue the item to the forward support company and post it as a transaction to DA Form 3029R as a loss and as a demand on an external source. The main support company will then forward the DA Form 2765 to the TSO for editing and processing through the DDC in order to generate a requisition on the division's supporting supply activity. Then, upon receipt of the item it will be placed in the main support company's DX stock.

(10) If stock is not available.

(a) When a forward support company DX activity receives

a request, DA Form 2765 for a DX item from a unit, and the item is not in stock, the activity will establish a due-out for the item, and send the unit's 2765 to the main support company.

(b) If item is available at the main support company it will be issued to the forward support company concerned, and then to the requesting unit. At the main support company it will be posted to DA Form 3029R as a loss, and as a demand on an external source. Upon receipt of the item it will be placed in the main support company's DX stock.

(c) If the item is not in stock in the main support company, the DA Form 2765 for the item will be forwarded to the TSO for processing through the DDC and initiation of a request on the supporting supply source. The same posting as described in paragraph 4i (10) (b) above will take place. Upon receipt the item will be issued to the forward support company or unit that requested it.

(d) The procedures contained in paragraph 4i (1) and (2) above for issue of receipts from repair and replenishment requisitions also apply here.

j. Stock not available. When the unserviceable item is not available and an equipment is not operationally ready supply (NORS) because of lack of the item, the unit concerned will submit a DA Form 2765 request in accordance with DLOGS high priority requisition procedures. A statement explaining the basis for issue will be entered on the reverse side of the form, signed by the unit commander or his supply officer.

k. Items unserviceable other than fair wear and tear. Items turned in for direct exchange that are determined to be unserviceable through other than fair wear and tear will be exchanged, provided the turn-in is supported by the signed statement of the supported unit commander that action required by AR 735-11 has been initiated.

l. Retention and disposition of excess. Excesses, resulting from recomputations of levels, that can be reduced to the authorized stock level within 90 days, may be retained by the direct exchange activity and reduced by attrition. Stocks excess to the above retention criteria, and all items deleted from the direct exchange list, will be turned in to the supply account and reported for disposition.

5. CONCLUSION: Direct exchange of unserviceable reparable parts for serviceable items is an accepted and proven logistic support technique that has been promulgated by DOD instructions and Army regulations. This, as well as the results of the division logistics system test and guidance contained in the

principles of logistics support for the next time frame, as stated by LTG Joseph M. Heiser, Jr., the Deputy Chief of Staff for Logistics, have been used in tailoring DX procedures to the requirements of divisions with automated Class IX repair parts support. The resultant procedures, as contained in this study, are simple; and can be easily implemented with no expected increase in manpower requirements. Further, these procedures provide for movement of repair of DX items out of the forward support companies back to the main support company, and where necessary because of workload/skills, back to the maintenance activity supporting the division.

6. RECOMMENDATION: It is recommended that:

a. The general DX procedures outlined in this study be approved.

b. USACDC write appropriate detailed functional DLOGS DX procedures.

c. USACSC then make any machine process changes that are necessary.

d. That DX be then implemented in DLOGS divisions on an expedited basis.

## APPENDIX A

### REFERENCES

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APPENDIX B

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