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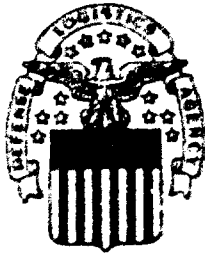
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DLA-90-P00111

Transportation Cost Analysis of Dallas, TX, EDDS Vendor Consolidation

OPERATIONS RESEARCH AND ECONOMIC ANALYSIS OFFICE



DEPARTMENT OF DEFENSE

DEFENSE LOGISTICS AGENCY

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DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
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May 1990

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FOREWORD

This report documents the results of a transportation cost analysis of vendor freight consolidation at the Dallas, TX Enhanced DLA Distribution System (EDDS) contractor operated facility for the ten-month period ending 31 December 1989. The study is the result of a request from the Directorate of Supply Operations, Transportation Division, EDDS Support Office (EDSSO) and is part of the continuing analysis of the EDDS implementation and operation.

Analysis showed that during the first 10 months of operation, vendor consolidation at Dallas, TX saved approximately \$85,024 in transportation expenditures. This figure includes losses incurred during the initial start-up period. During the last 3 months of operation, inbound tonnage averaged over 600,000 pounds per month while the estimated transportation savings were about \$35,000 monthly. Based on observed trends in the EDDS data for Dallas, transportation savings are expected to continue.

Christine L. Gallo
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CONTENTS

<u>Title</u>	<u>Page</u>
Foreword.....	iii
Contents.....	v
List of Tables.....	vii
List of Figures.....	ix
Executive Summary.....	xi
I. Background.....	1
II. Conclusions.....	1
III. Recommendations.....	1
IV. Study Approach.....	2
A. Purpose.....	2
B. Objective.....	2
V. Analysis.....	2
A. Inbound Shipment Characteristics.....	2
B. Outbound Shipment Characteristics.....	4
C. Cost Analysis.....	6

LIST OF TABLES

<u>Number</u>	<u>Title</u>	<u>Page</u>
1	Vendor Receipts by Month - Dallas, TX.....	4
2	Average Outbound Shipment Size in Pounds.....	4
3	Outbound Shipment Frequencies.....	5
4	Potential Consolidation Times.....	5
5	Depot Receipts - Mar to Dec 1989.....	6
6	Savings Projection for The Dallas, TX EDDS Site.....	7

LIST OF FIGURES

<u>Number</u>	<u>Title</u>	<u>Page</u>
1.....	EDDS Inbound Vendor Shipments.....	3
2.....	Inbound Vendor Tonnage.....	3

EXECUTIVE SUMMARY

Vendor consolidation under the Enhanced DLA Distribution System (EDDS) is the method of collecting small less-than-truckload (LTL) shipments from commercial vendors at or near origin and combining shipments to build larger LTL or truckload shipments for movement to the DLA supply depots for replenishment of inventory. Savings in transportation dollars are expected to accrue based on the difference in the cost of shipping many small LTL shipments direct to the depots versus collecting those same LTL shipments at a facility and consolidating them into one large LTL or truckload shipment for movement to the depots at lower volume prices. The savings should eventually be passed on to DLA in the form of lower item prices.

Analysis showed that under the current method of operation at the Dallas, TX EDDS facility, an estimated savings of \$85,024 resulted during the first 10 months of operation. However, during October, November, and December 1989 the Dallas EDDS site processed over 600,000 pounds monthly with an estimated monthly savings in transportation expenditures of about \$35,000. The EDDS contractor is consolidating, on average, just over 2 days based on the number of shipments per month to each destination. There appears to be potential for some increased consolidation based on the days available for holding inbound vendor shipments.

We recommend the following:

- o Pursue weekly shipments (based on 7 calendar days) from the EDDS site to each depot. This may require some modification to the existing contract but will result in the carrier maximizing trailer space utilization and will result in decreased outbound costs.

- o Continue to monitor carrier operations to ensure that maximum consolidation is maintained.

I. BACKGROUND

The Defense Logistics Agency's (DLA) Directorate of Supply Operations, Transportation Division (DLA-OT), Enhanced DLA Distribution System Support Office (EDSSO) requested a transportation cost analysis of vendor consolidation at the Dallas, TX Enhanced DLA Distribution System (EDDS) facility. The analysis covers vendor shipments destined for the 6 DLA supply depots between 1 March and 31 December 1989.

Vendor consolidation is the process of collecting small, less-than-truckload (LTL) shipments from commercial vendors at or near origin and combining these shipments to build larger LTL or truckload (TL) shipments for movement to the DLA supply depots to replenish inventory. Savings are expected to accrue based on the difference in the cost of shipping many small LTL shipments direct to the depots versus the cost of collecting those same LTL shipments at a facility at or near origin and consolidating them into one large LTL or TL shipment for movement to the depots at a lower volume rate.

Studies conducted by the DLA Operations Research and Economic Analysis Management Support Office (DORO) have shown that vendor consolidation has the potential to save considerable transportation dollars. Currently, any savings achieved through this program will be indirect since the vendor will ship to the EDDS facility free-on-board destination. DLA expects these savings will eventually be passed on through lower item prices. The scope of this report covers only the estimated transportation cost differential between direct shipment to a depot versus transshipment through EDDS. A determination as to whether DLA has received a reduction in contract prices is beyond the scope of this report.

II. CONCLUSIONS

Vendor consolidation at the Dallas, TX EDDS facility has resulted in an estimated net savings of \$85,024 during the first 10 months of operation. During the start-up period (first 4 months of operation), the site lost approximately \$28,251; however, as the tonnage increased, savings began to accrue and have continued to improve.

In addition, hold times at the EDDS site are long enough (with some slight contract modifications) to allow for a full week (7 calendar days) of consolidation to each depot destination. This will allow for the best possible trailer space utilization by the carrier.

III. RECOMMENDATIONS

o Pursue weekly shipments (based on 7 calendar days) from the EDDS site to each depot. This may require some modification to the existing contract but will result in the carrier maximizing trailer space utilization and will result in decreased outbound costs.

o Continue to monitor carrier operations to insure that maximum consolidation is maintained.

IV. STUDY APPROACH

A. Purpose. The purpose of this study is to determine if the vendor consolidation concept under the EDDS at Dallas, TX is a cost effective means of shipping vendor freight to the six DLA depots.

B. Objectives. The objectives are as follows:

1. To determine the characteristics of shipments into and out of the EDDS facility (mode and weight).
2. To estimate vendor shipping costs for both direct and EDDS shipments. Use the calculated costs to compare the two methods of shipment and determine the dollar cost differentials.
3. Identify any problems with consolidation at the EDDS site and offer recommendations for improvement.

V. ANALYSIS

A. Inbound Shipment Characteristics. Vendor shipments are moved into the EDDS site by three main methods of transportation, they are commercial motor carrier, private motor carrier, and small parcel carrier. These shipments can be categorized into two shipment types, LTL and small parcel. Figure 1 shows a breakdown of inbound shipments by aggregated weight, number of shipments, and average weight. Small parcels account for approximately 83 percent of the number of shipments (14,901 shipments) and 8 percent of the total shipment weight (242,185 pounds) received at the EDDS site. On the other hand, LTL freight amounts to about 17 percent of the number of shipments (2,983 shipments) and 92 percent of the total shipment weight (2,848,452 pounds).

Inbound tonnage has increased steadily over the 10 month period. Table 1 shows a breakdown of the tonnage for the period 1 March through 31 December 1989 for Dallas. Included in Table 1 are average weights for both LTL and small parcels. An average inbound LTL shipment weighed 954.89 pounds while inbound small parcels averaged 16.25 pounds. Figure 2 shows the information graphically.

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EDDS INBOUND VENDOR SHIPMENTS Dallas EDDS Site - Mar thru Dec, 1989

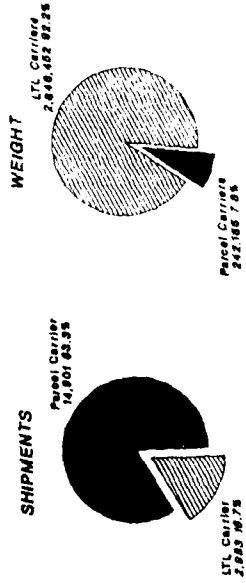


Figure 1

INBOUND VENDOR TONNAGE Dallas, TX EDDS Site

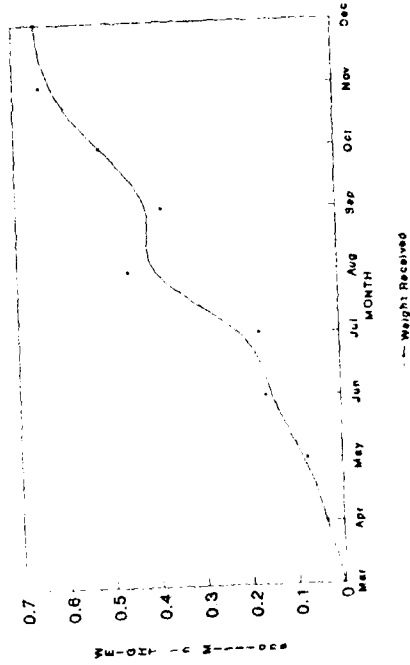


Figure 2

Table 1

VENDOR RECEIPTS BY MONTH - DALLAS, TX

<u>Month</u>	<u>Weight</u>	<u>Shipments</u>	<u>Average Weight</u>	
			<u>Parcels</u>	<u>LTL</u>
Mar	3,068	85	18.80	165.80
Apr	34,413	392	16.26	795.16
May	74,443	967	15.83	825.93
Jun	162,135	1,719	14.93	943.34
Jul	173,473	1,499	17.05	651.89
Aug	456,270	2,831	15.81	926.26
Sep	381,041	1,225	17.97	1,760.82
Oct	514,090	3,293	16.56	753.04
Nov	641,828	2,791	16.75	959.83
Dec	649,876	3,082	15.74	1,068.93
Total	3,090,637	17,884	16.25	954.89

B. Outbound Shipment Characteristics. After vendor shipments arrive at the EDDS site they are consolidated into large LTL or TL shipments and forwarded to the DLA depot consignee on a routine basis. Outbound shipment weights should be considerably higher than the weights of shipments received from the vendors. Experience gained since the beginning of the vendor consolidation phase of EDDS has shown that carrier trailers will reach maximum cube utilization between 18,000 and 25,000 pounds depending on the product mix. Shipment frequencies should be relatively low but do depend on the distance and time needed to deliver the freight to the receiving depot within specified standards. Table 2 shows the average outbound shipment weight by month and receiving depot. Table 3 shows the corresponding outbound shipment frequencies.

Table 2

AVERAGE OUTBOUND SHIPMENT SIZE IN POUNDS

	<u>Richmond</u>	<u>Columbus</u>	<u>Mechburg</u>	<u>Tracy</u>	<u>Ogden</u>	<u>Memphis</u>
Mar	62	69	75	48	42	59
Apr	237	262	99	125	228	124
May	259	691	852	964	523	301
Jun	1,554	1,074	849	2,236	923	733
Jul	1,672	1,711	812	1,293	941	4,938
Aug	2,193	2,290	2,558	4,587	1,527	3,509
Sep	1,803	1,455	2,411	4,120	1,222	4,965
Oct	5,940	6,213	6,125	6,372	3,425	8,697
Nov	9,293	10,289	10,374	7,233	3,827	6,907
Dec	7,152	12,300	12,860	9,682	6,773	15,964

Table 3

OUTBOUND SHIPMENT FREQUENCIES

	<u>Richmond</u>	<u>Columbus</u>	<u>Mechburg</u>	<u>Tracy</u>	<u>Ogden</u>	<u>Memphis</u>	<u>Total</u>
Mar	10	16	2	6	11	8	53
Apr	14	15	8	11	15	12	75
May	19	15	13	13	19	20	99
Jun	25	22	18	19	27	24	135
Jul	22	19	20	18	24	18	121
Aug	34	27	27	26	34	24	172
Sep	32	24	27	25	32	19	159
Oct	18	11	13	21	21	9	93
Nov	9	8	11	19	19	9	75
Dec	9	9	9	15	15	8	65

The average weight per outbound shipment has increased steadily since March indicating that the carrier is consolidating better as experience is gained and the inbound weight increases. Corresponding outbound shipment frequencies over the same period of time have dropped to around nine per month to all of the depots except Ogden and Tracy. This is another indication that the carrier is achieving better consolidation.

Maximum consolidation can be reached if the carrier utilizes available hold times to fill its trailers. Table 4 shows a breakdown of transit times from the Dallas EDDS site to each of the depots. The transit times are total times and include time for consolidation and transit. Over-the-road transit times were calculated by taking the mileage from the EDDS site to each depot and dividing by 450 (450 represents the expected number of miles traveled per day by a motor carrier). Fractions of a day were rounded upward to the next whole day. Estimated hold times were then computed by subtracting the computed over-the-road transit time from the total transit time. As can be seen, estimated hold times give the carrier the potential to consolidate a minimum of one work week (based on 7 calendar days) for each depot with only slight modifications to total transit times in the current contract.

Table 4

POTENTIAL CONSOLIDATION TIMES

<u>DEPOT</u>	<u>TOTAL TRANSIT</u>	<u>EST TRANSIT OVER-THE-ROAD</u>	<u>POTENTIAL HOLD TIME</u>
Richmond	9	3	6
Columbus	9	3	6
Mechanicsburg	9	4	5
Tracy	9	3	6
Ogden	9	4	5
Memphis	9	2	7

Table 5 gives a breakdown of weight received by depot. Weights reflect that Tracy and Memphis received the most tonnage during the first 10 months of operation of EDDS at Dallas.

Table 5

DEPOT RECEIPTS - MAR TO DEC 1989

<u>DEPOT</u>	<u>SHPTS</u>	<u>WEIGHT</u>
Richmond	192	471,680
Columbus	166	429,636
Mechanicsburg	148	487,184
Tracy	173	718,655
Ogden	217	398,971
Memphis	151	561,147
Total	1,047	3,067,273

C. Cost Analysis. Cost comparison of EDDS versus non-EDDS shipments necessitates that the data be processed into three files. The first covers shipments from the vendor to the EDDS site for consolidation. This file is built by aggregating the EDDS history file for Dallas by inbound bill number. The second file incorporates shipments made from the EDDS site to each of the DLA depots. This file is built by aggregating the EDDS history file on outbound government bill of lading (GBL) number. By combining the shipments in both files, movement through the EDDS system is emulated. A third file was built from the EDDS history file which simulated shipment of the same material on a direct basis from vendor origin to the DLA depot consignee. Direct shipments were aggregated by inbound bill number, depot destination, and contract number. The total number of EDDS shipments was 17,884 while the number of direct shipments was estimated at 20,593. The difference of 2,709 in the number of shipments between EDDS and non-EDDS reflects a secondary level of consolidation being accomplished at the vendor origin, i.e. - more than one depot's freight on the same bill going to the EDDS site.

Once the files were built, they were rated using a program designed to individually rate each shipment with the appropriate rate tables. Direct LTL shipments were rated with commercial class rates at class 50 with a 10 percent discount. LTL shipments from vendor to the EDDS site for consolidation were also rated at class 50 with a 10 percent discount. The rate level and discount are based on samples of inbound vendor shipments taken at the New York, NY EDDS site and the Defense Depot located at Richmond, Va. Small parcels were rated using United Parcel Service (UPS) surface parcel rates. Consolidated shipments from the EDDS site to the depots were rated using the applicable government tenders. After completing the rating process, cost data were compiled and are shown in Table 6.

Table 6

SAVINGS PROJECTION FOR THE DALLAS, TX EDDS SITE
March through December 1989

MONTH	EDDS		TOTAL	DIRECT	SAVINGS
	IN	OUT			
Mar	749	7,995	8,744	1,223	(7,521)
Apr	4,241	11,273	15,514	5,769	(9,745)
May	9,241	17,169	26,410	20,187	(6,223)
Jun	18,804	28,573	47,377	42,615	(4,765)
Jul	22,222	29,405	51,627	52,306	679
Aug	49,733	55,041	104,774	116,197	11,423
Sep	32,954	49,838	82,792	79,927	(2,865)
Oct	60,389	51,725	112,114	145,265	33,151
Nov	67,073	49,362	116,435	152,960	36,525
Dec	65,959	56,850	122,809	157,171	34,362
Total	331,365	357,231	688,596	773,620	85,024

During the first 4 months of operation approximately \$21,867 was lost due to low tonnages. However, as the inbound weight increased and consolidation at the site improved the site began to save money except for the month of September. The September loss appears to be an erroneous result based on bad data recorded in the inbound bill number field. Several attempts to have the data corrected by the carrier were pursued with inadequate results. In order to maintain consistency, September was retained in the analysis despite being suspect.

During the October through December time frame, savings amounted to \$104,038. The problems with initial start-up appear to have been overcome and the estimated savings seem to be consistent. If consolidation can be increased by utilizing hold times of 7 calendar days (see Table 4), savings can be expected to increase. Sensitivity analysis was not performed since it has already been shown in similar studies that maximum consolidation significantly increases savings. The EDDSSO's goal is to obtain maximum consolidation wherever possible.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE May 1990	3. REPORT TYPE AND DATES COVERED Final	
4. TITLE AND SUBTITLE Transportation Cost Analysis of Dallas, TX, EDDS Vendor Consolidation		5. FUNDING NUMBERS	
6. AUTHOR(S) Charles F. Myers II			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) HQ Defense Logistics Agency Operations Research and Economic Analysis Office (DLA-LO) Cameron Station Alexandria, VA 22304-6100		8. PERFORMING ORGANIZATION REPORT NUMBER DLA-90-P00111	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Defense Logistics Agency Cameron Station Alexandria, VA 22304-6100		10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES			
12a. DISTRIBUTION/AVAILABILITY STATEMENT Public Release; Unlimited Distribution		12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) This is a transportation cost analysis of vendor freight consolidation at the Dallas, TX, Enhanced DLA Distribution System (EDDS) contractor operated facility for the 10-month period ending 31 December 1989. Analysis showed that during the first 10 months of operation, vendor consolidation at Dallas, TX, saved approximately \$85,024 in transportation expenditures. This figure includes losses incurred during the initial start-up period. During the last 3 months of operation, inbound tonnage averaged over 600,000 pounds per month while the estimated transportation savings were about \$35,000 monthly. Based on observed trends in the EDDS data for Dallas, transportation savings are expected to continue.			
14. SUBJECT TERMS transportation, cost analysis, freight, distribution			15. NUMBER OF PAGES 26
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT