

**CSF**

GARAGE TRANSFERS --  
DATA PROCESSING APPLICATION

# 365 - 67

AUTHOR: G. MADER



# COMMUNITY SYSTEMS FOUNDATION

ANN ARBOR • BALTIMORE • INDIANAPOLIS

CENTRAL OFFICE  
111 N. Main Street  
Ann Arbor, Michigan 48106  
313-761-1846

August 28, 1967

To: Mr. Guy C. Larcum, Jr.  
City Administrator  
City of Ann Arbor  
Ann Arbor, Michigan

From: COMMUNITY SYSTEMS FOUNDATION

Subject: A Detailed Analysis Concerning the Feasibility and Benefits  
of Automating the Garage Transfers Accounting Function.

Previous CSF studies have documented the entire present accounting system. This report presents the results of an analysis concerned with automating a disbursements process, garage transfers.

During the study, assistance and cooperation was received from Mr. Don Borut, Assistant Administrator, and Mr. George Sweet, Data Processing Supervisor.

We hope that the results of this analysis will contribute to the progress made toward the implementation of accounting operations to EDP.

Respectively submitted,

Gerald H. Mader  
Project Engineer

GHM/sf

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## SUMMARY

This proposal recommends that the disbursements associated with services rendered by the City Garage be converted to data processing. To facilitate the actual implementation, the same documents used to initiate the transfer of costs process in the present system (i.e. gas-oil, and repair tickets) are used in the proposed system.

### Cost Benefits

A cost analysis has revealed that the labor cost of the proposed system will be \$2,744 per year less than the labor cost of the present system. The total cost (equipment plus labor) will be \$2,172 per year less in the proposed system. Presently, the labor cost associated with processing these transfers is approximately \$304 per month. For the automated system, the process cost, which includes labor and machine rental costs, is approximately \$123 per month.

### Labor Savings

In the present system one-half of a clerk's time is spent processing garage transfers and maintaining equipment records. This time is eliminated in the proposed system. Therefore, one-half of a clerk's time can be re-assigned to alleviate other clerical burdens in the controller's office. Upon calculating the projected equipment utilization for the present data processed application plus the garage transfers application, it was learned that the proposed application can be easily absorbed. Consequently, the costs (i.e. machine rental and labor) associated with the proposed system are already being incurred. This fact amplifies the labor savings benefit associated with implementing the proposed system.

### Time Savings

Due to the excessive processing time involved under the present system, garage transfers are a primary contributor to the delay in preparing monthly financial reports. Automating the transfer of garage expenditures means that these reports will be produced faster.

Also, we propose that in the transfer process the actual money shift be transacted and then the transfer slip sent to the departments for verification. This change would lead to a 2 to 5 day reduction in the time lag involved in producing the monthly reports.

### Reporting Efficiency Benefits

The proposed system eliminates reporting inefficiencies by combining two documents produced during the present process (Garage Work Sheet and Individual Equipment Record) into one data processed printout. This will enable the Individual Equipment Record which is not consistently maintained to be automatically kept up to date.

### Future Benefits

The proposed system lays the ground work for increased control associated with garage purchases through future implementation of inventory and pricing controls. These controls would help eliminate the possibility of lost revenue through pilferage or price collusion.

In addition, the control methods along with the elimination of labor charge extensions could help alleviate the existing clerical burden at the garage.

## INTRODUCTION

Previous studies have outlined the entire present manual accounting system, Analysis of Electronic Data Processing, B. Burkhalter, D. Harris, March 14, 1966; so that portions of that system could be automated in a logical fashion. The overall objective behind automating the accounting system is to curtail clerical costs, free managerial time from clerical activities, and to provide budgetary reports by the 10th of the month. An automated system for the Receipts Journal was documented in a previous report (Detailed Analysis of Accounting Procedures and Their Application to Electronic Data Processing, B. Burkhalter, R. Laird, February 27, 1967) disbursements system has been accomplished, including garage, revolving equipment, revolving office supplies, revolving supplies, payables to vendors, and payroll.

This document reports a proposed automated system for disbursements emanating from the garage only. Several advantages accrue by automating a portion of the accounting system at a time, as is being done with the Receipts Journal, and we recommend be done with the garage disbursements. First, benefits of implementing the partial system accrue sooner than if we waited until the entire system design was completed. Also, the problems of implementation are spread out over a period of time, thus making better use of available manpower and providing for feedback in both the design and implementation phases.

## PRESENT SYSTEM

The city garage has the primary function of servicing and maintaining city owned vehicles. This function entails providing gas and oil plus other fuels and lubricants for all city owned vehicles (except Water Department vehicles) and five county vehicles. In addition, the garage provides a repair service and supplies (i.e. tires, batteries, oil filters, etc.) for all city owned vehicles. Other services include tool repair and any operation that utilizes available equipment in the garage.<sup>1</sup>

### Garage Activities

When a vehicle obtains fuel or lubrication, the servicing is accomplished in an analogous manner to that of a commercial service station. The transaction is recorded on a gas-oil ticket (see the appendix, page 1) noting department, vehicle, volume received, dollar amount (for gasoline only) mileage, and name of attendant. The driver signs the ticket and is given a copy. The originals are retained, totalled by gallons and sent along with the tapes to the Controller's Office at the end of the day.

The repair and supply service involves providing the labor and parts for repairs or subletting the repair job.

Washing of vehicles, tires, and miscellaneous supplies are also provided. These services are recorded on a repair ticket (see the appendix, page 2). This ticket indicates department, vehicle, labor charge, quantity, description and cost of parts, and supplies or sublet costs. This ticket is also used to indicate tool repair and other non-vehicle supply items provided. In the situation involving these non-vehicle services the job number or account number is shown on the repair ticket. The garage retains two copies of the repair ticket on the back of which a complete repair breakdown is recorded (i.e. employee, operation number, cost, elapsed time, part number and quantity.) The remaining two copies are sent to the department and the Controller's Office respectively.

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<sup>1</sup> A descriptive flow chart of the present system can be found in the appendix, page 9.

### Controller's Office Activities

At the end of the month the clerk in the Controller's Office verifies the gasoline and repair charges. The gasoline totals prepared at the garage are compared with the totals run by the clerk. The individual charges on the repair tickets are totalled by the clerk and verified with the totals provided by the garage.

These tickets are sorted by department and vehicle within the department. Extensions for fuels and lubricants are calculated; space rental charges are added for specific Public Works Vehicles; gas tax is calculated for county vehicles. The various gas, oil, and repair categories are totalled and charges per vehicle are entered on a work sheet (see the appendix, page 3). A functional classification is assigned to each vehicle. Departmental totals are obtained and transferred onto a "within-the-same-fund" transfer sheet (Inter-Department Transfer) or an invoice indicating an "outside-the-same-fund" transfer sheet (Sales Report).<sup>1</sup> These sheets may show division or job totals and various charge breakdowns, depending on the department involved.

Transfer sheets are sent to the departments for verification with the departments records of garage expenses. Upon their return intra fund transfers are recorded in Transfer Journal, Appropriations Ledger, and Cost Accounting Ledger. Inter fund transfers are handled as if they were charges for purchase from outside vendors. Consequently, a check is written for the amount of the transfer, recorded in Disbursements Journal, in the Appropriations Ledger, and in Cost Accounting Ledger. Intra and inter fund transfers are then recorded in the General Ledger.

An auxiliary record is kept on the cost incurred by each vehicle owned by the city. The Individual Equipment Record (see the appendix, pages 6 and 7) contains all the monthly maintenance charges shown on the work sheet plus rentals earned by vehicles in the revolving equipment account.<sup>2</sup> Usage on miles and hours run is also recorded. The rental earned and hours run figures are obtained from a data processed revolving equipment print-out. The mileage figure is provided by the departments upon the request of the Controller's Office.

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<sup>1</sup> Examples of these sheets are exhibited in the appendix, pages 4 and 5.

<sup>2</sup> Gas and oil expenses for Water Department vehicles are sent monthly since that department fuels its own vehicles.



## PROPOSED SYSTEM

There were three criteria which guided our thinking in designing an effective garage transfer system.

1. Design an economical time saving data processing application.
2. Minimize related procedural changes to facilitate implementation.
3. Enact system changes not directly related to electronic data processing to increase system efficiency.

The proposed garage transfer system was designed to minimize present procedural changes related to the recording of transfers while still implementing an economical time saving application. By minimizing procedural changes related to this application, the proposed data processing system can be more easily incorporated into the present accounting scheme.

### Input

The inputs to the system, gas-oil and repair tickets, contain the same information as in the present system only exhibited in slightly different form.

Instead of writing the department and vehicle on the gas-oil ticket the attendant writes the functional classification associated with the vehicle along with the vehicle number. Also, to ease the keypunching process, the line item charges (i.e. gas, oil, antifreeze, etc.) should be pre-coded on the ticket. The repair tickets are handled in an analogous manner.

### Processing

Gas-oil and repair tickets along with garage tape totals are sent to the Controller's Office daily as in the present system but they go directly to Data Processing. The philosophy involved here is that the Data Processing Staff is assuming the role of the clerk, presently performing the accounting tasks. Rather than an extension of accounting, data processing is accounting in that it replaces work presently performed manually in the accounting function.

In data processing charges are keypunched and verified. After the month's gasoline changes have been accumulated, the gallons are tabulated and verified with the totals received from the garage. This process avoids the duplication of manually tabulation (i.e. by the garages and accounting clerk) but still makes certain that the garage and data processing agree on costs charged at the garage.

At this point, various sorting, collating, and tabulating operations needed to produce the output are performed.

### Output

The same information used in preparing intra and inter fund transfer slips which is presently recorded on the Garage Work Sheet, is obtained in the proposed system along with the equipment cost information needed for the Individual Equipment Record. The difference is that these documents are combined into one data processing print-out, the Garage Disbursement Record (see the appendix, page 8).

The true impact of the proposed system lies in the economies gained in labor time and report efficiency.

### Labor

The labor involved in recording and processing garage transfers under the present system is as follows:

<u>Operation</u>	<u>Man-time (Hrs/mo.)</u>
Sort and verify gas-oil, and repair tickets	30
Calculate extentions, obtain totals and enter on garage work sheet	28
Maintain Equipment Log	<u>16</u>
	74

This time represents approximately one-half of a clerk's monthly productive time.

The machine processing times under the proposed system are as follows:

<u>Machine</u>		<u>Hrs/mo.</u>
Keypunch	(024)	12:00
Verifier	(026)	12:00
Sorter	(083)	1:45
Collator	(085)	:20
Printer	(407)	6:30
Reproducer	(519)	6:30
Interpreter	(557)	:55
Calculator	(602)	1:45

Using the utilization information found in the CSF Report, Analysis of Electronic Data Processing, March 14, 1966, the projected machine utilization for the existing data processing applications plus the garage disbursements are as follows:

Machine Utilization (%)

<u>Machine</u>	<u>Daily</u>	<u>Daily and Month End</u>
024	39.1	27.4
056	47.7	29.0
083	13.7	17.9
085	20.7	21.3
407	61.0	65.4
519	18.7	19.6
557	14.1	15.2
602	19.0	19.6

Therefore, the existing equipment is more than adequate to absorb the garage transfers application. Since this application can be absorbed, one-half of a clerical man-month can be reassigned to alleviate existing clerical burdens in the Controller's Office.

### Time

The time savings realized arises from three sources, elimination of the clerk as a control, the inherent characteristic of an automated system, and the implementation of a change in the present procedure of sending transfer slips to the departments.

In the present system the clerk is used as a control mechanism for verifying garage tabulations on repair tickets. This control processes is replaced by the verification of punch cards in the automated system. The proposed system uses each individual line item charge and to obtain vehicle expenses and therefore, garage totals on the repair tickets are irrelevant.

The time involved in performing the garage transfer on Unit Record Equipment is approximately 42 hours per month. This amounts to a time savings of 32 hours per month when compared to the present manual processing time. In the present system all of the work is performed after the end of the month. In contrast in the proposed system, the major part of the processing time, keypunching and verifying, amounting to 24 hours is allocated during the month as gas-oil and repair tickets are received from the garage. Therefore, an actual time savings of 56 hours per month or 76% will contribute to more timely reporting.

The procedural change referred to earlier involves the sending of the transfer sheets to the individual departments for verification. This verification process should continue but at a different point in time. Rather than sending the notification of a money transfer before the actual money shift from the department's account to the garage's account is made, the actual transfer should be made first and then notification sent. This would eliminate an existing 2 to 5 day delay involved in obtaining the department's sanction. This verification is superfluous in many cases, since many departments do not maintain their own records of vehicle expenses (from copies of charge tickets). Consideration should be given to the total elimination of this verification. However, if notification of the garage transfer is sent after it is recorded, a discrepancy that may exist can still be detected by the department and adjusted the following month. This system change would contribute greatly to more timely reporting of monthly budgetary reports.

### Report Efficiency

An important aspect of the proposed system is the efficiency gained in the documents needed to perform the garage disbursements function. In the present system three documents are created in the disbursement process: The Garage Work Sheet, Transfer Sheets (inter and intra fund), and the Individual Equipment Record. The proposed system combines two of the documents into one data processed print-out, the Garage Disbursements Record.

The Garage Disbursement Record resembles the Present Garage Work Sheet in that it shows vehicle and departmental totals for the month by expense classification (e.g. labor, parts, etc.).

However, it also shows functional classification totals given on intra-fund transfers (e.g. Police, Administrative total vehicle expense, Fire, Firefighting total vehicle expense.) This cost breakdown will be used to prepare transfer slips for notifying the departments of their garage expenses incurred during each month, (clerical time required approximately 1 hour).

In addition to the above information this record shows the cost incurred (month and year to date) for each vehicle along with rentals earned and depreciation for revolving equipment vehicles. Therefore, this record can substitute for the Individual Equipment Record.

Monthly and year to date vehicle totals will be filed in punch card form. Therefore, if a cumulative listing by month of cost incurred is desired, the file can be printed-out showing the cost incurred by each vehicle over a period of months. There should be a nominal additional charge incurred by the department for this detailed print-out.

Presently, many of the Individual Equipment Records are not kept up to date and much of the information is left out even where entries are made (e.g. miles, hours of operation). The proposed system automatically keeps a running account of vehicle expenses. Mileage usage data is not currently kept on many of the vehicles. This is due either to poor cooperation on the part of the departments in response to request for usage, or inconsistent follow-up on sending requests. It is felt that better cooperation and performance would be achieved if mileage data were requested once or twice yearly. This would be adequate for periodic analysis of vehicle efficiency.

## COST ANALYSIS

Data Processing Cost

<u>Machine</u>	<u>Hrs/mo.</u>	<u>Rental Cost/Hr.</u>	<u>Cost/mo.</u>	
024	12:00	\$ .24	\$ 2.88	
056	12:00	.26	3.12	
083	1:45	.58	1.02	
085	:20	.86	.28	
519	6:30	1.10	7.15	
407	6:30	4.48	29.12	
557	:55	1.07	.98	
602	1:45	1.17	<u>2.04</u>	
				\$46.59
Direct Labor			58.86	
Fringe Benefits @ 30%			<u>17.65</u>	
				<u>76.51</u>
TOTAL				\$123.10

The above equipment times are based upon commonly accepted data processing work standards. Time requirements were obtained using existing peak workload volumes of 2500 gas-oil charges and 1600 repair charges.

A flow chart of the proposed data processing system has been prepared and is located in the appendix pages 10 and 11.

The existing labor cost associated with preparing garage transfers is:

Direct Labor	\$234.00/mo.
Fringe Benefits (@30%)	<u>70.20</u>
	\$304.20

Thus the proposed system will require the equivalent of \$2,744 per year less labor than the present system, with the total cost being \$2,172 per year less. (Total cost equals labor plus equipment)

## ADDITIONAL CONTROL

Although the proposed system deals exclusively with an accounting application, the system can be expanded to incorporate inventory control. Enough space is available on the punch cards to input information appropriate for inventory control (i.e. part number and quantity). With this information data processing can maintain an inventory file and notify purchasing when certain parts must be replenished. This control would help eliminate the possibility of pilferage and enable a pricing control to be established on inventory items. Pricing control can be implemented by attaching a unit price to each part number in the inventory file. Consequently, the burdens of maintaining the inventory file and pricing could be eliminated from the garage while at the same time help to eliminate the possibility of lost revenue through price collusion or pilferage.

Moreover, if the labor rate associated with each garage employee were kept on file, the part and labor cost extensions currently done at the garage could be accomplished by data processing. This change would increase control by eliminating the errors associated with manual processing.

Additional systems analysis would be required to develop these additional systems modifications, plus the availability of less cumbersome equipment than Unit Record.

APPENDIX

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