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SUMMARY

The purpose of this report is to assess the recommendations made in the October, 1976 "Study of Printing and Reproduction System Needs."

Two recommendations made in this study were reviewed in particular detail: the proposal to expand the District's printing capabilities by purchasing additional equipment and the proposal to establish a Printing Committee.

Following a review of these proposals, the conclusions which emerged include:

- 1) The justification for acquiring additional equipment should be clarified,
- 2) Several factors, such as possible fluctuations in future printing needs and potential labor relations impacts, should be more carefully considered, and,
- 3) The District can benefit from increased interdepartmental coordination and improved cost-estimating and budget procedures with regard to printing decisions.

This report does not attempt to identify any particular equipment configurations or alternatives, but is limited to assessing the specific proposals under consideration. However, it is clear that this is a complex decision requiring detailed, expert attention and top-management review.

INTRODUCTION

The October, 1976 "Draft Study of Printing and Reproduction System Needs" was done by the Operations General staff in response to the Board directive of July, 1975. The purpose of this study was to consider the establishment of a new Print Shop and reproduction system.

The findings of the Operations General staff fall into four general recommendations: 1) convert the Print Shop in the basement to a high-speed reproduction center, 2) reduce the cost of "convenience copies" located throughout the building by changing the rental term from a monthly to an annual basis, and by installing automatic copy control counters with a charge-back capability, 3) expand the Print Shop and move it to the vacant warehouse in El Monte, and 4) establish a Printing Committee to oversee all decisions on printing.

One additional recommendation, to replace the Xerox 9200 in the basement with an AM4875, is already in the implementation stage and should be completed in March, 1977. This should result in reduced equipment and paper costs while improving the capabilities of the Print Shop in meeting the District's need for fast reproduction of reports, specifications, and other documents.

The recommendations regarding the Print Shop involve a move to El Monte in order to obtain a larger physical plant, and also, the acquisition of additional printing equipment. The total cost of this move and expansion is estimated to be \$279,000.

The principal objective of the proposed expansion of the District's in-house printing capacity is to reduce the cost of the printing which is presently being done by private outside printers. This outside printing costs about \$895,000 a year at present.

This \$895,000 in outside printing cost includes \$475,000 for the production of transfers, tickets, and passes. Although the District intends to install transfer machines in buses, the report suggests that transfers might be economically produced in-house. Because the in-house production of transfers is not proposed except as a possible short-term move, savings projections based on in-house transfer production are not included in the report's cost/savings justifications for Print Shop expansion.

Of the remaining \$420,000 printing which will be sent outside this year, the report estimates that an annual savings of \$150,000 can be realized by doing the work in-house. This estimate is based on a 50% "mark-up" being applied against the \$420,000 total for an estimated in-house cost of \$270,000. In addition to this savings estimate, the report presents several job comparisons of in-house to outside costs which suggest that in-house cost is generally about 52% of outside costs.

SAVINGS PROJECTIONS

The savings projections used in comparing in-house with outside costs appear overly optimistic for several reasons.

The projections compare the cost of actual jobs which the District has sent outside to the cost estimates made by the Print Shop, based on the cost of materials used, the time required to do the job, and the employees' hourly wage, excluding the costs of supervision and general administration.

The report compares the cost of several types of printing jobs, such as timetables and leaflets, on an in-house and an outside basis. This comparison suggests that it is almost 50% less expensive to have this work performed in-house.

In addition to the fact that this compares "real" outside costs with "ideal" inside costs, it appears that the estimates of Print Shop costs are significantly understated. Also, the production cost estimate of timetables is based on "5-up" or five timetables per impression production, whereas the Print Shop is printing timetables "3-up" or at a 40% less productive rate.

That the in-house cost estimates are understated can be demonstrated by relating estimated per-job cost to total productivity. By multiplying the total Print Shop production by the average cost estimate for each major type of job, a figure should be derived which will roughly equal the Print Shop budget, if cost estimates actually reflect production expenditures.

It should be noted that the Print Shop budget for Department 3150 essentially includes the cost of labor and materials but does not include an estimate of the cost of the equipment, fringe benefits, general administration, or the cost of the floor space. Therefore, the Print Shop budget represents most, but not all, of the actual Print Shop costs.

Despite this, as Table I shows, the cost estimated in the report of producing printed material in the Print Shop is equal to only about one-half of the budget expenditures, even though the costs of fringe benefits, capital expenses, and so on are not included in the budget expenditure total.

The overall justification of the expansion is based on a 50% industry "mark-up," a figure which seems excessive. The differences in the

cost of an in-house versus an outside print shop would be due to the profit margin of the private outside printer and the expense of merchandising and shipping the product. Although financing methods are, of course, different, the District will incur the cost of equipment and rent, as would an outside private printer.

Therefore, a more accurate reflection of the cost differences of an in-house compared with an outside shop would be overhead, which includes only those costs which the District would not share with private concern. The Printers Industry Association, the major trade association, estimates that the average "overhead" is 12.88% of total sales, a figure which was viewed as "fairly accurate" by the Los Angeles Trade Technical College's Print Shop.

The value of applying an overhead factor in comparing in-house to outside cost is limited because its accuracy depends upon the relative efficiency of an in-house shop to a private outside shop. If the outside shop makes better use of its equipment or has higher-speed or more versatile presses, for example, the cost of overhead will be partially or completely negated by superior productivity. For these reasons, the overhead factor suggests a maximum savings rather than a probable savings.

The expansion proposal uses "mark-up" in order to estimate savings, without considering that the District Print Shop might not be fully competitive with the most efficient private shops in the Los Angeles area. However, there are several reasons why this may not be a valid approach.

Table I

Print Shop Productivity

Comparison of Estimated Costs to Actual Expenditures

	<u>Mats</u> (\$.05/ea.)	<u>Plates</u> (\$5.00)	<u>Timetables</u> (\$.00869/ea.)	<u>Other Copies</u> (\$.01/ea.)	<u>Projected Costs</u>	<u>Actual Expenses</u>	<u>Projections as % of Actual</u>
October 76	1,800 (\$90.00)	148 (\$740.00)	1,709,000 (\$14,851.21)	885,585 (\$8,855.85)	\$24,537.06	\$47,000	52%
November 76	2,771 (\$138.55)	102 (\$510.00)	1,645,000 (\$14,295.05)	1,135,276 (\$11,352.76)	\$26,296.36	\$46,985	56%
Total 76	4,571 (\$228.55)	250 (\$1,250.00)	3,354,000 (\$29,146.26)	2,020,861 (\$20,208.61)	\$50,833.42	\$93,985	54%

PRODUCTIVITY COMPARISONS

While the District's Print Shop has expanded to 20 employees, private outside printers can be significantly larger. For example, three of the print shops which supply the District printing needs employ the following numbers of employees:

Continental	850 employees
Parker & Son	150 employees
Anderson	120 employees

Although larger size does not automatically result in increased efficiency, it does suggest a greater capacity to adjust to business fluctuations due to a more varied sales market.

Further, Continental operates 24 hours a day, usually six days a week, for the entire year. Anderson operates on a 24-hour basis during their two-month peak season and maintains a full 16-hour a day schedule for the remainder of the year; but can shift to a full 24-hour schedule at any time. Parker and Sons schedules a 16-hour production day; although it also can go to a 20-hour-a-day, or seven days-a-week schedule.

The District currently has a full daytime work shift with approximately a half of a "swing" shift. The District, of course, can also use overtime, but would not, at present, seem to be as fully scheduled as are the three outside examples given.

This suggests that private outside shops may make better use of capital equipment with an accordingly lower capital cost per job factor.

In addition, outside shops tend to be somewhat specialized, allowing them to have specialized equipment. For the District to bring all of its printing work in-house, while maintaining the quality levels and varied job specifications currently being supplied, would require that the District obtain a variety of equipment; thereby resulting in an increasing capital outlay.

The major factors which affect productivity per man-hour or productivity per machine-hour are the rate at which copies are made, the size of the print impression area, and the number of colors which can be printed in one run through the press.

At the present time the District's largest press, a Harris 36", is comparable in speed to the presses operated by outside suppliers. However, both Parker and Son and Continental, for example, operate presses with larger printing areas and which are capable of printing up to five colors at a time.

The production of a multi-color job on a one-color press requires a separate run for each job. This means that a two-color press can produce a two-color job twice as fast as a one-color press, and is therefore twice as efficient. The same logic applies to three, four and five color jobs. (See Table II)

Table II

Comparison of Largest Printing Presses
RTD and Outside Suppliers

	<u>Maximum Impression Size</u>	<u>Number of Colors</u>
<u>RTD</u>		
(1) Harris	24" x 36"	One
(1) Didde-Glaser (proposed)	17" x 26"	One
<u>Parker & Sons</u>		
(1) Harris	19" x 25"	Two
(2) Harris	24" x 36"	One
(1) Harris	26" x 39"	Two
(1) Harris	26" x 39"	Four
<u>Continental</u>		
(1) Miehle	23" x 31"	One
(1) Harris	43" x 60"	Five
(1) Miller	25 3/4" x 38 1/2"	Two
(1) Miller	25" x 38"	Four
(1) Miller	25" x 38"	Five
(1) Harris - rotary	17 3/4" x 26"	Four

THE DIDDE-GLASER

The proposed expansion of the Print Shop includes the acquisition of a printing press called a Didde-Glaser DG 175 rotary press. Although this machine has a smaller maximum impression-image area than the Harris 36" the District already owns, it is capable of more impressions per hour.

It is important to note that the expansion of the Print Shop to include a Didde-Glaser is justified in the report on the savings to be derived from producing in-house the \$420,000 worth of materials which are currently sent outside. The production of transfers is not part of the calculation.

While the acquisition of the Didde-Glaser would result in a major increase in per-hour productivity, the District would still not be able to equal the production levels, except perhaps in special cases, of the major, private outside printers, based on a comparison of the Didde-Glaser to equipment currently in use by the District's present suppliers. (See Table II)

The comparisons in Table II suggest that while the Didde-Glaser would provide a competitive one-color capacity, the RTD would still be unable to achieve similar productivity levels on multi-color work. For this reason, the District might economically produce specialized one-color jobs, such as transfers and timetables, while perhaps leaving large three, four and five color jobs for outside firms.

In addition to these factors, several other considerations impact the benefit to be obtained from the Didde-Glaser.

- 1) Because the Didde-Glaser cannot be used for multiple color printing, it therefore cannot be used for many District printing jobs such as brochures, the annual report, regional system maps, and so on.

- 2) The Didde-Glaser makes 20,000 two-sided impressions per hour, which may somewhat exceed the District's needs.

The District, for example, distributes about 9,000 copies (four pages) of the Headway. Because the Harris 36" can print the Headway "2 up" or two at a time, it would produce about 16,000 impressions per hour and could complete the entire job in about one hour and 8 minutes. With its smaller impression size but higher speed, the Didde-Glaser could produce the Headway in about 27 minutes.

While this example compares "ideal" press times and does not include time consumed in preparation, it illustrates that the proposed larger press would save little press time per each issue of the Headway due to the relatively small size of the job.

This is important because the larger printing jobs which the District uses, besides schedules and transfers, are multi-color jobs which cannot be done on the Didde-Glaser.

The expansion of the Print Shop and the acquisition of the new press are both based on the assumption that the entire \$420,000 of printing work which is currently sent outside will be done in-house. This does not appear to be a safe assumption.

The \$30,000 work for engineering specifications and documents will be done on the new AM 4875 replacement for the Xerox copier; none of the \$75,000 for plates and supplies can be brought in-house by the Didde-Glaser, and that amount of the \$225,000 for brochures or maps which were done in color cannot be brought inside by the new press. It seems safe to say that, assuming that 40% of the cost of printed brochures and maps is for one-color work, the Headway will be brought in-house and that all folding and stapling costs are brought in-house; no more than \$180,000 of the work which is currently sent outside can be produced by the equipment identified in the proposed Print Shop expansion.

Because the amount of work which can be done by the Didde-Glaser is less than estimated in the report, the time required to recover the initial investment will be longer than the estimated 1.9 years. Based on the optimum 13% overhead factor and the \$180,000 maximum new in-house workload, an annual cost reduction of \$20,708 can be projected. This savings would result in the recovery of the initial capital expense in 13.47 years. (See Table III)

An additional consideration which should be a part of the decision to expand the Print Shop concerns the risk involved in making a substantial investment for a printing demand which may not be stable or which might somewhat decline.

In 1976 the District produced nearly 22 million timetables, for example, while answering over 10,000 telephone information calls each weekday. Now that the sector improvements are implemented and the District's service has stabilized, telephone information calls have dropped by nearly 10%, and continue to decrease. This may be the first sign of a stabilizing demand for scheduling information which will eventually reduce the need for printing.

THE PRINTING COMMITTEE

The primary impetus for the proposed committee is the desire to broaden the considerations brought to bear on specific decisions on when and how to have materials printed. The committee would provide a convenient multi-disciplinary forum for reviewing technical and cost-related aspects of all printing jobs.

Marketing is the major producer of printed materials and is the source of the material which requires the highest quality, technically most complex and most expensive printing methods. Marketing has the professional capability and responsibility for making marketing decisions on such elements as literature design and layout, copy, color, photography, quantity as well as on less tangible considerations such as marketing goals and information campaign targets.

While marketing considerations must be the major factor in literature design and so on, the goal of the proposed Printing Committee to seek cost reductions by introducing automatic institutional procedures to insure that technical and production costs are considered is a worthwhile objective.

The proposed committee, however, has several drawbacks. It could largely preempt the exercise of skilled expertise by professionals in the print shop and the marketing departments. Further, this committee could result in a time-consuming process without necessarily improving the quality of printed material or in reducing costs.

There are several problems the Printing Committee would face in making determinations on using outside printers or in reducing costs, several of which are rooted in the budgeting system currently in use with regard to the print shop. At the present time, the cost of reproduction work done in the Print Shop is not estimated when a job is presented for printing. Rather, the Print Shop assesses the complexity of the job and estimates a completion time.

Because of this, the user department gets each job done on what appears to be a "free" basis: no costs, regardless of the expense or complexity of the printing request, are applied to the user department's budget. The user department cannot compare alternative reproduction methods cost and has little incentive to use less expensive materials or processes.

This difficulty would also impair the Printing Committee in its decision. The Printing Committee would be unable to make by-the-job, inside

versus outside comparisons or make cost-comparison determinations because of the same lack of cost information which affects department level decisions.

Equally important, however, is the fact that the Printing Committee would separate organizational responsibility for managing a particular program which involved printing from the organizational responsibility for maintaining the program budget.

Because the Printing Committee would make budget decisions following the preparation of material for printing by a user department, the user department would have little incentive for seeking cost reductions. This could affect the scope of proposals which are submitted to committee and would place budget-management responsibilities in what is essentially a disinterested part-time body.

Another means of achieving the cost-reduction objectives of the Printing Committee proposal would be for the Print Shop and the Accounting Department to develop a comprehensive price-list of jobs which would be used in estimating the costs of particular printing jobs. This price-list should consider the various technical factors which result in higher job costs, such as multiple colors, paper stock used, the number of folds, and the impact on run time of the size of the brochure or timetable.

Because the use of such a list would include a "built-in" consideration of cost-factors which would be reflected in the user department's budget, the user department would have a distinct incentive to utilize less costly production methods.

It is recommended that the cost of all printing jobs be applied to the budget of the user department, based on the actual cost as determined by the Print Shop's price-list information.

It is recommended that the Print Shop and the Accounting Department develop a price-list for the various types of jobs which the Print Shop is capable of performing.

This price-list should consider all the costs which are associated with the operation of the Print Shop, such as equipment, labor, supervision, general administration, floor space, and so on.

It is further recommended that the Print Shop make this list available to all departments which utilize Print Shop services and be prepared

to make job cost estimates and comparisons when major jobs are accepted.

Finally, it is recommended, following a decision to produce certain types of jobs in-house, that all District work of that type be offered to the Print Shop, which should then determine whether it can meet the written time and quality requirements of the job. Only in the event that the Print Shop refuses the job, should the originating department send the work outside.

Table III

Estimated Cost Impact of Didde-Glaser

Current Outside Printing Expenses		\$420,000
Work to be Performed on AM 4875	\$ 50,000	
Plates, Supplies to be Sent Outside after Acquisition of Didde-Glaser	\$ 55,000	
Multicolor Brochure Cost (estimated at 60% of total)	<u>\$135,000</u>	
	\$240,000	
Work to be Performed on Didde-Glaser		\$180,000
In-house Cost (based on 13% outside overhead)		<u>\$159,292</u>
Estimated Maximum Savings		\$ 20,708
Cost of Expansion		\$279,000
Years to Recover Investment		13.47

LABOR RELATIONS IMPACTS

A decision to expand or move the Print Shop has possible labor relations implications.

District Print Shop employees are represented by the Brotherhood of Railway and Airline Clerks (BRAC). The terms and conditions of their employment are defined in the BRAC-RTD contract.

Several general considerations define the obligations of the District regarding the production of printed materials. Probably the most important of these considerations as they relate to the Print Shop expansion proposal is the fact that a union can, in effect, claim broad categories of work.

This means, under normal circumstances, that a work category, when it has been regularly performed in-house, may be claimed by the concerned union to be within the scope of the union's work. This could result in a situation in which that type of work could be sent outside only when it exceeds the physical capacity of the Print Shop. Ordinarily, a job exceeds the capacity of the Print Shop only when employees are already working maximum overtime.

The District has the prerogative of demanding that work be produced within a deadline and can use outside print shops when necessary provided that reasonable time has been allowed and all reasonable efforts have been made to have the work performed in-house. Even when these conditions have been met, it is a good labor relations practice to notify union officials before work is sent outside.

Within these general guidelines, work can be assigned to any employee; although the union may claim a work category, a particular employee or job title cannot claim a particular phase or element of the production process. If an employee who operates a particular machine is absent, another employee can be re-assigned to fill that job if the supervisor so decides. Depending on the positions involved, this may require the payment to an employee of a higher rate of pay than normal.

At the present time, BRAC "claims" the production of timetables, operator paddles, and other assorted materials because these items have been produced in-house in the past. Any move to have these materials sent outside on a one-time only, or permanent basis, would probably result in BRAC filing a grievance for time payment to employees who could do this work, which would stop the practice.

The proposal to expand the Print Shop is made with the intent of performing all of the District's printing needs in-house. When this is done, this work may be claimed by the union, which would probably oppose any future attempt to pull back from this total in-house printing operation.

An additional labor relations consideration with regard to the expansion and move to El Monte involves the section 13(c) labor protective obligations of the District. A possible 13(c) obligation owing to the change of location might develop if a claim of unreasonable mileage were made.

One last consideration is potentially significant: the introduction of more complex and productive printing equipment could possibly result in a union demand for a differentiated wage structure, which involves a wage increase for those who operate the new machinery, as is done in the private sector.

CONCLUSION

The Operations General staff report on the needs of the District for printed material is a comprehensive effort to assess and identify beneficial programs of a highly complex nature with significant interdepartmental and cost implications.

Some of the recommendations made in the report are in the implementation stage and should prove to be beneficial. The acquisition of the AM4875 copier, for example, should provide an increased capability for high-speed copying and result in a cost reduction.

The analysis presented in this report of the recommendations to expand the Print Shop and establish a Printing Committee are intended to strengthen the objectives of those recommendations.

Therefore, the following conclusions have been compiled:

1. The expansion of the Print Shop and the acquisition of the Didde-Glazer DG175 should be postponed pending a clarification of the purpose and justification for the comparison.

This clarification should include the following points:

- a) The material to be produced by the expanded facility should be identified and projections on future needs justified. Specifically, if transfers are to be included in this projection, a decision should be made on the installation of transfer machines on buses.
- b) As this expansion would involve a significant capital expense and would commit the District to a major continuing operating cost, a detailed consideration of alternative expansion programs should be outlined. This outline should include other equipment and configurations and an analysis of changing the Print Shop to a 24-hour operation without any further physical expansion.

- c) A determination of the types of work which can be more advantageously produced in-house than outside should be used to select the types of equipment which should be part of the Print Shop, regardless of a decision to expand the Print Shop. This determination may indicate that while the District can more economically produce one-color printed material than it can purchase outside, it cannot competitively produce more complex multi-colored material.

Whatever such an analysis indicates, the District should accordingly plan its Print Shop and accordingly acquire or dispose of equipment in order to most economically operate the Print Shop.

2. Determinations to produce printed material on an in-house basis should be consistent with the following considerations:

- a) What specific types of printed materials can be more economically produced in-house than can be purchased outside? The calculation of in-house cost should include labor and materials costs, along with fringe benefits, supervision, general administration, equipment, and housing; or, in short, all costs associated with the operation of the Print Shop.
- b) What specific types of printed materials require and could more conveniently be produced in-house?
- c) What specific types of printed materials require such security that they should be produced in-house?

3. In order to obtain maximum utilization of the District's investment in reproduction equipment, a policy should be established outlining a job costing system which reflects printing expenses and which assigns reproduction costs to the user department.

4. Labor Relations considerations are of primary importance in a decision to expand the Print Shop.

It is hoped that the questions posed and conclusions reached in the course of this review of the proposal to expand the Print Shop and establish a Printing Committee will be of assistance as this complex issue is resolved.