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MASTER'S THESIS

This is to certify that the Master's Thesis of

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Science degree at the convocation of

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ECONOMICS OF LIBRARY BINDING

By

Maria I. Canibe

**A thesis submitted in partial fulfillment of the
requirement for the degree of Master of Science in the
School of Printing Management & Sciences
College of Graphic Arts and Photography of the
Rochester Institute of Technology**

November, 1988

Thesis adviser: Professor Werner Rebsamen

ECONOMICS OF LIBRARY BINDING

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November, 1988

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In memory of Horacio.

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ABSTRACT

Since book acquisition funds have become more scarce, libraries are unable to pay higher prices for hard cover books that often circulate the same number of times as less expensive paper back books. Therefore, to increase the number of circulations libraries must send books to be either prebound or rebound. A national survey by the American Library Association (ALA) shows that the average trade book might last only 20 to 25 circulations, but books prebound or rebound according to the LBI standard will last at least 100 circulations. The librarian will have to choose whether to replace deteriorated trade books with new ones in order to achieve the same number of circulations as prebound or rebound books.

This study concentrates on investigating and determining a cost effective model for rebinding or prebinding books according to specifications of the Library Binding Institute. First, the number of circulations of a rebound and prebound book of a certain price was obtained. The purpose was to set a data base and establish a relation between a cost-effective number of circulations and price of the books plus the cost of rebinding or prebinding. Second, the breakeven number of circulations was determined. In addition, other variables were included such as: thickness; dimension (trim size); type of binding, perfect bound or sewn; the type of cover, hard or paper back editions. The purpose was to provide the librarian with a graph that will aid them in their decision as to whether or not to rebind. This research may also aid in the decision to purchase prebound books. Third, the savings from choosing to rebind or prebind as compared to replacing deteriorated books, were also determined. Finally, a pareto analysis was conducted to identify the most common causes of deterioration of a book.

The results showed that the number of circulations was affected strongly by such factors as: ways in which books are handled by users; usage of the books inside the library; photocopying of books; various standards used by libraries to determine when a book should be sent to

rebinding; and inadequate storage of books on shelves. Furthermore, two graphs were made to aid the librarian in deciding whether to rebind, to prebind or to keep the book with its original binding. Both graphs, one for hard cover books and one for paper back books, indicate there will be an increase in the cost effective number of circulations as the original purchasing price increases.

The results also indicated that the original method of binding, i.e. paperback vs. hard cover was significant. However, dimension (the size of the book)

proved to be only significant in the case of paper back books. In addition, the decisions to prebind or rebind was found to be more cost-effective when compared to replacing deteriorated bindings with new ones.

Finally, it was concluded that the major problems that caused circulating library books to deteriorate were broken or damaged spines and damaged covers.

CHAPTER 1

INTRODUCTION

PURPOSE OF THE STUDY

This study has four major purposes:

1. To develop a procedure for determining the cost effectiveness of using prebound or rebound books in accordance to the LBI specifications for library binding in comparison to regular, edition-bound bindings.
2. To develop a procedure for determining the breakeven number of circulations for rebound and prebound books of a specific price.
3. To reveal the savings incurred when books are prebound or rebound instead of replacing the deteriorated ones with new books.
4. To identify the most frequent problems that cause book deterioration.

LIBRARY BINDING INDUSTRY

The binding industry has gone through drastic changes over the last few years. New technologies, materials, techniques and specifications have made library binders even more concerned about quality. In conjunction with the Library Binding Institute, librarians and book publishers, the library binders have tried to prolong the useful life of books.

In his book, Technology and Testing of Library Bound Books, Jack Bendror describes the library binding industry as follows:

" The library binding industry is often characterized as being unique for several reasons among which the following two are most important:

1. The library binder must work on a product someone else has made. Consequently, he has no control over variables, such as wear, weight, quality of paper, grain-print relationship, margin size, diversity of volume, and size, all of which are important in the rebinding process.
2. Hence, from a technological point of view and because of lack of homogeneity in the product, it is a separate and distinct branch of the graphic arts."¹

Over the years the problem of poor binding and poor paper has resulted in the production of books that easily deteriorate. In 1958 the Library Binding Institute (LBI) published some specifications for Library Binding and Prebinding in order to guide publishers and binders in constructing bindings that will withstand the rigors of normal library circulations and provide maximum reader usability. These specifications provided both librarians and library binders with a clear understanding of the binding necessary for library books. A copy of the 8th edition published in 1986 of the LBI specifications for library binding will be found in Appendix C.

PREBINDING, REBINDING AND BREAK-EVEN POINT

Library books are generally subjected to heavy usage and a large number of circulations. Consequently, the mishandled library book bindings are strained. Books which are either prebound or rebound have prolonged useful lives. Prebinding is a strong method of binding using the original edition of publisher's books. These books are prebound before they are put

into circulation by the library. Prebound books are made to last for a higher number of circulations without any deterioration, especially if compared with regular bindings. On the other hand, rebound books are original publishers bindings that have been circulating in the library and have deteriorated for a number of reasons; they require repair in order to enable the book to continue to circulate. Rebinding is a process of removing books from their covers, preparing them and casing-in the rebound and reinforced book blocks into new covers, so that these books can be used again in the library². Rebinding renovates mishandled books and enables them to go back into circulation.

Because librarians want to maintain their printed materials in an economic way, library binding is a budget-saving device for libraries³. By reducing the cost per circulation, libraries can use the money for other activities including buying new books or improving decisions on acquisitions. In order to accomplish the above savings, the National Science Foundation proposes that libraries should focus on the importance of developing and applying cost-effective analytic techniques to their operations ⁴.

Finally, there is an important term that has to be defined to make this study clearer to the reader. This study uses the term "breakeven number of circulations" to refer to that number of circulations where the cost of rebinding or prebinding a book is recovered completely.

FOOTNOTES FOR CHAPTER 1

¹ Bendror, Jack. Technology and Testing of Library Bound Books. Rochester, New York: Graphic Arts Research Center, 1976, p. 1.

² Rebsamen, Werner. Planning and Finishing. Course Notes, Rochester, New York: Rochester Institute of Technology.

³ Weiss, Dudley A. "Strengthening Your Budget with Proper Binding," Text of a talk delivered by the author, March 1964. Typescript in the files of the Library Binding Institute, p. 1.

⁴ Kent, Allen. A Cost Benefit Model of Some Critical Library Operations in Terms of Use of Materials. Pittsburgh, Pennsylvania: University of Pittsburg, 1975.

CHAPTER 2

STATEMENT OF THE PROBLEM

This study deals with the following problems.

Funds allocated to libraries have become too scarce to respond to the demand of the services required by the growing educated community outside the campus and to the shifting academic interests within the campus. In addition, William Mac Dougall states that "libraries often rank near the bottom of priorities for federal, state and local government".¹

According to RIT Professor Werner Rebsamen, the problem is aggravated because "the buyer of books, paying a high price for hard cover bindings, is no longer guaranteed that hardcover bindings will last much longer than regular paper backs." Unfortunately libraries are paying higher prices for hard cover books and often are getting the same number of circulations as less expensive paper back bindings.

In short, libraries are forced to reduce their spending. Therefore, it is essential for the librarian to have a procedure for determining if rebinding or prebinding a book is more cost effective than buying regular, edition-bound books.

The librarian doesn't have an indicator that will tell if it is more cost-effective to rebind/prebind a deteriorated book or to replace it with a new one. However, this problem can be solved by going through two steps. First, the breakeven number of circulations for that book should be determined. Second, use the breakeven number to decide whether to rebind,

prebind or to replace the book when deteriorated.

When the books that are continuously circulating are not prebound, they usually last for only a small number of circulations. A nation wide survey made by the American Library Association (ALA) indicated that books bound in a trade or edition binding might last between 20 to 25 circulations. However, one must keep in mind that this survey was made with Smyth-sewn books. As the majority of books are now adhesive bound, these figures may be even lower today.² However, books bound under LBI specifications for library binding will last at least 100 circulations³. Therefore, librarians will have to buy new books to replace trade bound books more often. This means additional expenses in terms of locating and buying replacement books.

Consequently, it is important for the librarian to be informed about the amount of savings that he obtains by rebinding or prebinding books. Those savings can be used for future plans or in other areas where more funds are necessary.

Different libraries have different methods for book storage and shelving. These conditions are important factors in determining the life length and preservation of library books. Moreover, book handling and usage also determine the length of time that a book will last. Therefore, it is important for the librarian to identify the most frequent problems that cause book deterioration and try to prevent them.

HYPOTHESIS, SUBHYPOTHESES AND RESEARCH QUESTIONS

To address the above problems, this study states the following hypothesis and subhypotheses:

Hypothesis:

Rebinding or prebinding in accordance to the LBI specifications for library binding is more cost effective than regular, edition bound bindings.

Subhypotheses:

This will be true for books with both paper and hard covers.

This will be true for books with both sewn binding and adhesive binding

This will be true regardless of the book's thickness

This will be true regardless of the dimension of the book.

This will be true regardless of the price of the book.

In addition, this study attempts to answer the following questions:

- (1) Is there a breakeven number of circulations that will determine if a book should be rebound or prebound?
- (2) Are there any savings incurred when books are prebound or rebound instead of replacing them with new ones?
- (3) Are there specific frequent problems that cause book deterioration?

FOOTNOTES FOR CHAPTER 2

¹ Mac Douglas, William and Sharon Golden. "Batling Father Time to Serve a Vast Treasure," US News and World Report (April 1985), p. 20.

² Weiss, Dudley A. "Strengthening Your Budget with Proper Binding," Text of a talk delivered by the author, March 1964. Typescript in the files of the Library Binding Institute, p. 1.

³ Bendror, Jack. Technology and Testing of Library Bound Books. Rochester, New York: Graphic Arts Research Center, 1976, p. 2.

CHAPTER 3

REVIEW OF LITERATURE

Book bindings can determine the life length of circulating library books. Therefore, permanent maintenance is critical to keep the books in good condition for multiple circulations. Consequently, it is essential for the librarian to have a procedure to use in deciding if it is more cost effective to rebind, prebind or buy new library books. Actually, according to an LBI pamphlet "How to Analyze Your Collection", it was found that it is more cost effective to rebind mishandled books than to buy new ones. In addition, the pamphlet focussed on the cost per volume circulation of rebound and regular trade books.¹ Thus, this investigator also used the cost per volume circulation to develop a procedure to use in calculating the cost effectiveness of rebinding, prebinding or buying new books.

The librarian is always concerned with knowing which books should be rebound instead of replacing them with new ones. In fact, an article written by Joe Beaton gives an excellent example (shown in Appendix B) that demonstrates the importance of taking into account book rebinding in the library budget. The example also provides a helpful chart of cost per circulation of new books with a specific type of binding in comparison to rebound books. The chart shows that rebinding deteriorated books results in a lower cost per circulation than buying new books. Moreover, the chart also shows that a different types of binding could affect the breakeven number of circulations of rebound books of a specific price². Based on the

former article, this study took into account two different types of book binding, sewn and perfect bound, and studied the effect of each type of binding on the relationship between rebound price and breakeven number of circulations.

On the same topic of type of binding, Matt T. Roberts defines the LBI library method as the minimum binding requirement to withstand the rigors of normal library circulations³. Moreover, Jack Bendror clearly states how oversewing is still the optimum binding method. "Taking into consideration all the parameters which constitute strength and durability of binding, none of the existing methods provide a strong binding as that which is obtained from the oversewing techniques⁴.

Therefore, as this author suspects, the above articles support the hypothesis of this research. That is, books rebound or prebound according to the LBI specifications for library binding should offer a lower cost per circulation. Thus, rebinding or prebinding a library book should be more cost effective.

According to Dudley A Weiss, deciding to rebind a book can save money for the library. These savings can be used to obtain new books or other priority needs⁵. However, in his book "Introduction to University Library Administration", James Thompson points out that the selection of appropriate binding for library books will affect how the library funds are distributed⁶.

Therefore, it can be concluded that selecting the most cost effective book binding method might result in long term savings. Moreover, rebinding

or prebinding library books incurs substantial savings to the library.

A library usually has certain methods to protect and prolong the life of its books. P. Dobrovitz emphasizes that binding remains one of the most effective protection methods against book deterioration.⁷ Finding out the most frequent problems that cause book deterioration should increase book conservation. Moreover, the librarian will be able to decide not only to prevent book deterioration but also to choose the most appropriate binding that will prolong the book's life.

In summary, the importance of the decision to rebind or prebind library books is discussed extensively in many articles. Most of these articles highly recommend the prebinding or rebinding of library books. In addition, other articles discuss the substantial savings obtained from rebinding or prebinding library books. However, none discussed or provided a procedure that will help the librarian determine the cost effectiveness of prebinding, rebinding or replacing library books with new ones. Moreover, no article was found which point out the frequent problems that cause book deterioration.

Based on the above literature, this researcher believes that there should be a procedure for the librarian to determine the cost effectiveness of using prebound or rebound books in accordance to the LBI specification for library binding. In addition, it is also important to reveal the savings incurred when a book is prebound or rebound. Last but not least, identifying the most frequent problems that cause book deterioration will help in conserving library books.

FOOTNOTES FOR CHAPTER 3

¹ Library Binding Institute. How to Analyzed Your Collection. Boston Massachusettes: 1972.

² Beaton,Joe. "Binding and Budgets," The Library Scene. (March 1979), p. 7.

³ Roberts,Matt. "The Library Binder," Library Trends. (April 1976), p. 749-762.

⁴ Bendror,Jack. Technology and Testing of Library Books. Rochester, New York: Graphic Arts Research Center, 1976, p. 2.

⁵ Weiss, Dudley A. "Strengthening Your Budget with Proper Binding," Text of a talk delivered by the author, March 1964. Typescript in the files of the Library Binding Institute, p. 1.

⁶ Thompson, James. Introduction to University Library Administration. Hamden, Connecticut: Linnet Books & Clive, 1974, p.19.

⁷ Dobrovits,P. "Is Library a Luxury?" Australian Academic Research Library (June 1979), p.81-86.

CHAPTER 4

METHODOLOGY

To understand the procedures outlined in this chapter, the following abbreviations were used:

| <u>Abbreviation</u> | <u>Term</u> |
|---------------------|--|
| P | Price of a regular trade book. |
| ON | Number of circulations of a regular trade book. |
| CR | Cost of rebinding. |
| OCC | Cost per circulation of a regular trade book. |
| PR | Price of a book already rebound or prebound (rebound price). |
| Y ₁ | Breakeven number of circulations of a rebound or prebound book. |
| RN | Number of circulations of a rebound or prebound book. |
| OCCR | Cost per circulation of a rebound or prebound book. |
| NBR | Number of books that have to be bought to obtain the same number of circulations of rebound or prebound books. |
| SV | Amount of savings obtained from deciding to rebind or prebind. |

In order to test the hypothesis, subhypotheses and to answer the proposed research questions, 106 regular library books were examined. The sample of books was selected from the Wallace Library of the Rochester Institute of Technology and from the Library of the University of Rochester.

Furthermore, the sample was structured in a manner to include only those books that were going to be rebound. The purpose of selecting that structured sample was to be able to establish a record of the number of circulations of each book before it deteriorated.

PROCEDURE FOR DETERMINING THE BREAK-EVEN NUMBER OF CIRCULATIONS

Before addressing the hypothesis, we must first determine the break-even number of circulations for prebound and rebound library books. The procedure for determining the break-even number of circulations is as follows:

Rebound Books

1. The number of circulations of rebound books were obtained from the library records before they were sent to be rebound. That number of circulations was denoted as "ON".
2. Since books that are bound in accordance to LBI specifications last approximately 100 circulations before they start to deteriorate, the number of circulations that each book lasted after it was rebound, RN, was determined to be:

$$RN = ON + 100$$

3. Since the rebinding decision mainly depends on the price and the ability to recover the deteriorated books, the books' prices (P) were captured from the library records and from the in print books. However, the books prices that were obtained were not up to date. Therefore, all prices were multiplied by the corresponding inflation rate, using the year 1987 as the base year. Thus, the adjusted prices of all the books were obtained¹.
4. The cost of rebinding each book (CR) was obtained from

different price averages that are currently charged by authorized library binders. The rebinding cost was found to vary in proportion to the height of each book. Therefore, rebound books were classified into 6 categories, each of which had its own rebinding price:

- a. Books up to and including 8 inches in height (\$4.40).
- b. Over 8 inches and up to and including 10 inches in height (\$5.10).
- c. Over 10 inches and up to and including 12 inches in height (\$6.00).
- d. Over 12 inches and up to and including 14 inches in height (\$7.00).
- e. Over 14 inches and up to and including 16 inches in height (\$9.00).
- f. over 16 inches (\$11.00).

5. The rebinding price (PR) was calculated as follows:

$$PR = P + CR$$

6. Consequently, the cost per circulation of each trade book (OCC) was obtained by using the formula:

$$OCC = P / ON$$

7. Finally, the breakeven number of circulations of a rebound book could be calculated according to the following formula:

$$Y_1 = PR / OCC \text{ or } Y_1 = ON(1 + CR/P)$$

The data used for determining the breakeven number of circulations of each rebound book is shown in tables A and B (Appendix A). The tables below show the breakeven number of circulations obtained after applying the procedure to these data.

TABLE 1: BREAKEVEN NUMBER OF CIRCULATIONS

Hard Cover Rebound Books

| <u>Book Number</u> | <u>Breakeven No. of Circulations (Y₁)</u> | <u>Book Number</u> | <u>Breakeven No. of Circulations (Y₁)</u> |
|--------------------|--|--------------------|--|
| 1 | 28 | 29 | 24 |
| 2 | 16 | 30 | 36 |
| 3 | 18 | 31 | 23 |
| 4 | 20 | 32 | 42 |
| 5 | 19 | 33 | 53 |
| 6 | 35 | 34 | 32 |
| 7 | 75 | 35 | 20 |
| 8 | 11 | 36 | 27 |
| 9 | 39 | 37 | 41 |
| 10 | 51 | 38 | 22 |
| 11 | 42 | 39 | 30 |
| 12 | 55 | 40 | 45 |
| 13 | 21 | 41 | 22 |
| 14 | 43 | 42 | 48 |
| 15 | 34 | 43 | 24 |
| 16 | 49 | 44 | 93 |
| 17 | 42 | 45 | 90 |
| 18 | 17 | 46 | 102 |
| 19 | 16 | 47 | 34 |
| 20 | 48 | 48 | 38 |
| 21 | 39 | 49 | 21 |
| 22 | 28 | 50 | 80 |
| 23 | 49 | 51 | 38 |
| 24 | 42 | 52 | 47 |
| 25 | 15 | 53 | 26 |
| 26 | 46 | 54 | 42 |
| 27 | 23 | 55 | 42 |
| 28 | 14 | 56 | 76 |

TABLE 2: BREAKEVEN NUMBER OF CIRCULATIONS

Paper Back Rebound Books

| <u>Book Number</u> | <u>Breakeven No. of Circulations (Y1)</u> | <u>Book Number</u> | <u>Breakeven No. of Circulations (Y1)</u> |
|--------------------|---|--------------------|---|
| 1 | 20 | 26 | 38 |
| 2 | 40 | 27 | 26 |
| 3 | 26 | 28 | 34 |
| 4 | 36 | 29 | 57 |
| 5 | 34 | 30 | 59 |
| 6 | 40 | 31 | 45 |
| 7 | 21 | 32 | 104 |
| 8 | 102 | 33 | 45 |
| 9 | 47 | 34 | 40 |
| 10 | 57 | 35 | 59 |
| 11 | 46 | 36 | 31 |
| 12 | 54 | 37 | 25 |
| 13 | 78 | 38 | 36 |
| 14 | 34 | 39 | 29 |
| 15 | 33 | 40 | 15 |
| 16 | 39 | 41 | 100 |
| 17 | 21 | 42 | 27 |
| 18 | 50 | 43 | 96 |
| 19 | 45 | 44 | 62 |
| 20 | 29 | 45 | 21 |
| 21 | 25 | 46 | 46 |
| 22 | 30 | 47 | 56 |
| 23 | 53 | 48 | 58 |
| 24 | 39 | 49 | 71 |
| 25 | 68 | 50 | 41 |

Prebound Books

To determine the breakeven number of circulations for prebound books, the previous procedure was also followed. The only difference was that equation $RN=ON+100$ was replaced by:

$$RN=100$$

This is because according to LBI specifications prebound books will last at least 100 circulations.

The data used for determining the breakeven number of circulations of each prebound book is shown in tables C and D (Appendix A). The tables below show the breakeven number of circulations obtained after applying the procedure to these data.

TABLE 3: BREAKEVEN NUMBER OF CIRCULATIONS

| <u>Hard Cover Prebound Books</u> | | | |
|----------------------------------|--|--------------------|--|
| <u>Book Number</u> | <u>Breakeven No. of Circulations (Y₁)</u> | <u>Book Number</u> | <u>Breakeven No. of Circulations (Y₁)</u> |
| 1 | 28 | 29 | 24 |
| 2 | 16 | 30 | 36 |
| 3 | 18 | 31 | 23 |
| 4 | 20 | 32 | 42 |
| 5 | 19 | 33 | 53 |
| 6 | 35 | 34 | 32 |
| 7 | 75 | 35 | 20 |
| 8 | 11 | 36 | 27 |
| 9 | 39 | 37 | 41 |
| 10 | 51 | 38 | 22 |
| 11 | 42 | 39 | 30 |
| 12 | 55 | 40 | 45 |
| 13 | 21 | 41 | 22 |
| 14 | 43 | 42 | 48 |
| 15 | 34 | 43 | 24 |
| 16 | 49 | 44 | 93 |
| 17 | 42 | 45 | 90 |
| 18 | 17 | 46 | 102 |
| 19 | 16 | 47 | 34 |
| 20 | 48 | 48 | 38 |
| 21 | 39 | 49 | 21 |
| 22 | 28 | 50 | 80 |
| 23 | 49 | 51 | 38 |
| 24 | 42 | 52 | 47 |
| 25 | 15 | 53 | 26 |
| 26 | 46 | 54 | 42 |
| 27 | 23 | 55 | 42 |
| 28 | 14 | 56 | 76 |

TABLE 4: BREAKEVEN NUMBER OF CIRCULATIONS

Paper Back Prebound Books

| <u>Book Number</u> | <u>Breakeven No. of Circulations (Y1)</u> | <u>Book Number</u> | <u>Breakeven No. of Circulations (Y1)</u> |
|--------------------|---|--------------------|---|
| 1 | 20 | 26 | 38 |
| 2 | 40 | 27 | 26 |
| 3 | 26 | 28 | 34 |
| 4 | 36 | 29 | 57 |
| 5 | 34 | 30 | 59 |
| 6 | 40 | 31 | 45 |
| 7 | 21 | 32 | 104 |
| 8 | 102 | 33 | 45 |
| 9 | 47 | 34 | 40 |
| 10 | 57 | 35 | 59 |
| 11 | 46 | 36 | 31 |
| 12 | 54 | 37 | 25 |
| 13 | 78 | 38 | 36 |
| 14 | 34 | 39 | 29 |
| 15 | 33 | 40 | 15 |
| 16 | 39 | 41 | 100 |
| 17 | 21 | 42 | 27 |
| 18 | 50 | 43 | 96 |
| 19 | 45 | 44 | 62 |
| 20 | 29 | 45 | 21 |
| 21 | 25 | 46 | 46 |
| 22 | 30 | 47 | 56 |
| 23 | 53 | 48 | 58 |
| 24 | 39 | 49 | 71 |
| 25 | 68 | 50 | 41 |

COST EFFECTIVENESS PROCEDURE

To determine the cost effectiveness of rebinding, prebinding or replacing deteriorated library books with new ones, the two variables calculated above: rebound price and breakeven number of circulations were used. However, in order to test the subhypotheses other variables were included: dimension (trim size), type of cover, type of binding and thickness.

The steps followed to determine the cost effectiveness were as follows:

1. The values for: dimension (trim size) and thickness were obtained. Dimension was obtained by multiplying the height and width of each book. This measurement was made in the metric system. Then, the thickness of the book was obtained by measuring (in the metric system) the thickness of the paper without the cover. (see table E in Appendix A)
2. Next, the values of: type of cover and type of binding were determined. The type of cover was indicated as either hard or paper back. Finally, the type of binding was determined to be either sewn or perfect bound. (see table E in Appendix A)
3. The values of breakeven number of circulations and rebound price calculated above were used in this procedure.
4. To test the hypothesis and subhypotheses a multiple regression analysis was calculated. This regression analysis model describes how the breakeven number of circulations varies with the variables: rebound price, type of cover, type of binding, thickness and dimension.

$$Y_1 = \alpha + \beta_1 PR + \beta_2 CV + \beta_3 B + \beta_4 T + \beta_5 S + \beta_6 PRB + \beta_7 PRC + U \quad 2$$

where: Y_1 was the breakeven number of circulations; PR was the rebound price of library books; CV represented a dummy variable with a value equal to zero if the type of cover was hard and one if the type of cover was paper back; B represented a dummy variable with possible values of zero and one depending on the type of binding, perfect bound or sewn, respectively; T denoted the thickness of the book; and S denoted the dimension (trim size) of the book. Both variables were measured using the metric system. The variables PRB and PRC were constructed as the product of B by PR and CV by PR. The last term, U, represented the stochastic error term of the regression.

The results of the multiple regression analysis were:

$$Y_1 = 23.408 + 0.667PR + 9.974CV + 3.916B - 2.300T - 0.016S \\ (2.42) \quad (2.52) \quad (1.08) \quad (.046) \quad (1.01) \quad (1.30) \\ + 0.036PRB + 0.393PRC \\ (0.138) \quad (1.272)$$

$$R = 0.58$$

Number of observations = 106

The quantities in parenthesis represent a t-ratio statistics, calculated as the ratio of the estimated coefficients and their corresponding standard error. R represents the usual measure of correlation. This number corresponds to the percentage variation of the dependent variable, breakeven number of circulations (Y_1), that can be explained by the variation of the independent variables: rebound price (PR), type of cover (CV), type of binding (B), thickness (T) and dimension (trim size) (S).

Using a 95% level of confidence the t-critical value from the statistical table is approximately 2.0. Therefore, any estimated t-ratio statistics that has a value greater than 2.0 would be significant. The following table summarizes the findings.

Table 5
Results from Multiple Regression Analysis

| <u>Symbol</u> | <u>Variable</u> | <u>Value</u> | <u>t-value</u> | <u>Coefficient</u> | <u>Significant</u> |
|---------------|-----------------|--------------|----------------|--------------------|--------------------|
| PR | rebound price | 0.667 | 2.42 | 2.0 | Yes |
| CV+PRC | type of cover | 9.974 | 2.352 | 2.0 | Yes |
| B+PRB | type of binding | 3.916 | 0.598 | 2.0 | No |
| T | thickness | -2.30 | 1.01 | 2.0 | No |
| S | dimension | -0.016 | 1.30 | 2.0 | Yes |

From the table it can be seen that the variables: type of cover and price rebound are significant and the variable dimension (trim size) is relatively significant.

4. The type of cover was found to be significant. Since this variable is a dummy variable and only has values of zero for hard cover and of one for paper back books, the cost effectiveness of each type of book cover was calculated separately. Therefore, the study was divided into two categories:

- a. Books with hard cover. (n=56)
- b. Books with paper back. (n=50)

5. A regression analysis was calculated for each type of cover using the data obtained from the rebound price, breakeven number of circulations and dimension (trim size). Note that the variable, type of cover, was not included since it was already used to determine the above division. The results of each regression were:

a. Books with hard cover.

$$Y_1 = 14.774 + 0.513PR + 0.013S$$

(2.27) (3.72) (0.94)

$$R = 0.53$$

Number of observations = 56

b. Books with paper back

$$Y_1 = 38.200 + 1.400PR - 0.058S$$

(6.60) (5.91) (3.08)

$$R = 0.652$$

Number of observations = 50

the quantities in parenthesis represent a t-ratio statistics.

6. The relation between the breakeven number of circulations and the rebinding price of hard cover books was plotted with its estimated regression (figure 2). The same procedure was also followed to obtain the chart for paper back books (figure 3).

Note: the function is a two dimensional equation, depending on the two variables price and dimension (trim size). However the plots correspond to the projection of the relationship given by Y_1 and PR .

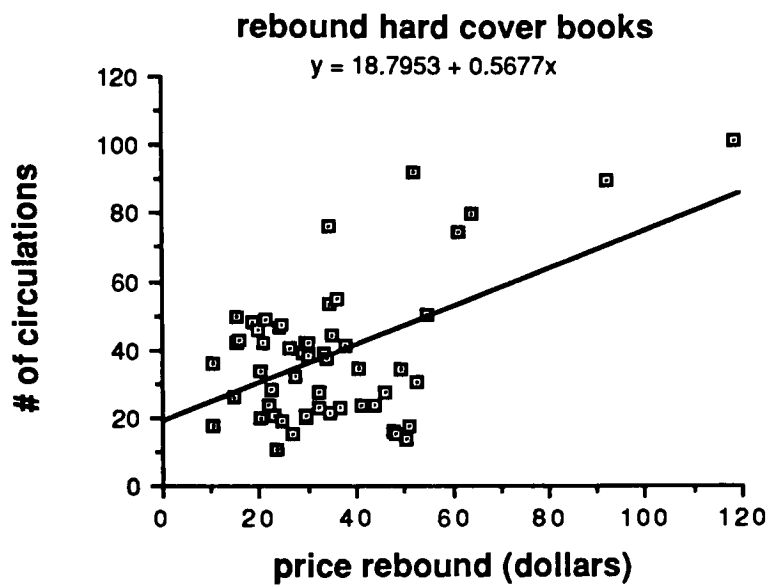


FIGURE 1: Simple regression analysis for hard cover books. The relation is between the rebinding price (PR) and the breakeven number of circulations (Y_1).

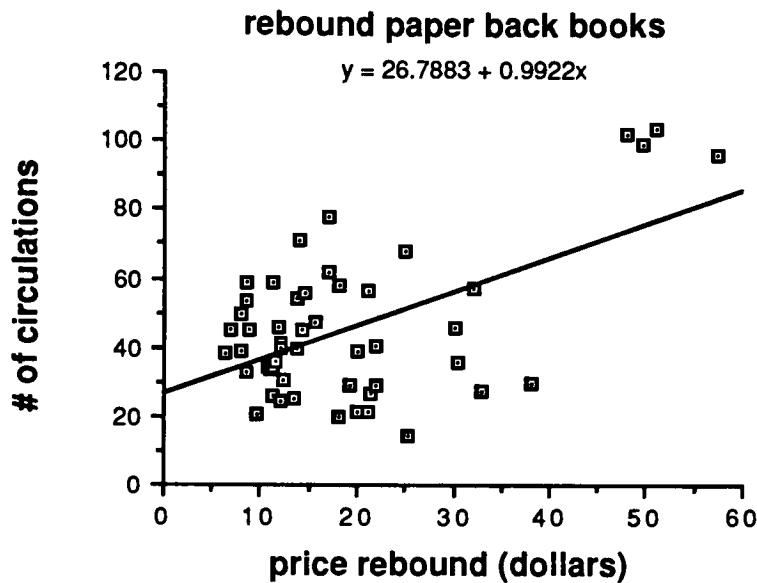


FIGURE 2: Simple regression analysis for paper back books.

The relation is between price rebound (PR) and
breakeven number of circulations (Y_1).

The data and the regression analysis obtained from prebound books behaved in the same manner as the data obtained from rebound books. Therefore, the charts that represent the relationship between the breakeven number of circulations and rebinding price of prebound books (hard cover and paper back) were omitted to avoid repetition.

LIBRARY SAVINGS

In order to answer the second research question, if there are any savings incurred when books are prebound or rebound instead of replacing them with new ones, these steps were followed:

1. The cost per circulation of a book already rebound or prebound was calculated according to the following formula:

$$OCCR=PR/RN$$

2. The number of books that had to be bought to obtain the same number of circulations that a rebound or prebound book offers, was calculated as follows:

$$NBR=1+100/ON$$

3. The amount of savings were calculated as follows:

$$SV=[NBR(p)]-PR$$

The data obtained from steps 1, 2 and 3 of the procedure for determining the savings of rebound hard cover books, rebound paper back books, prebound hard cover books and prebound paper back books is shown in tables A, B, C and D respectively. (Appendix A)

4. The relationship between the savings and the price of hard cover rebound books was plotted (figure 3). Other plots were: paper back rebound books (figure 4), hard cover prebound books (figure 5) and paper back prebound books (figure 6).

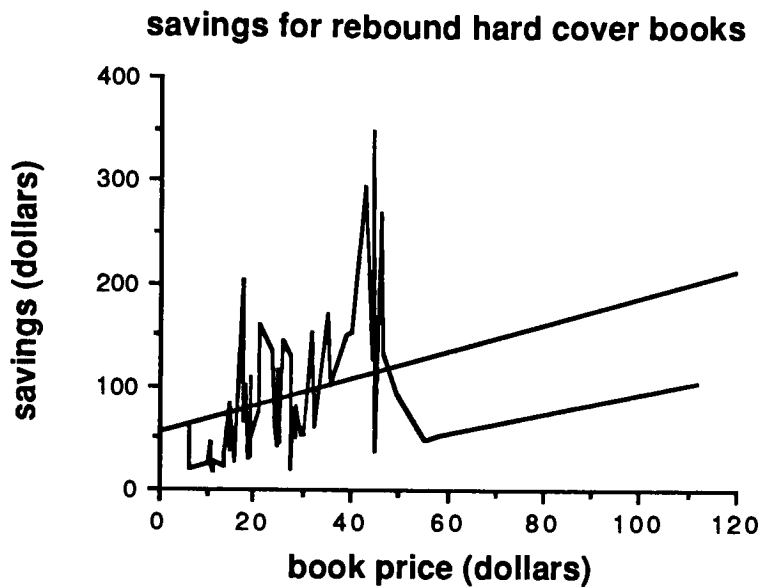


FIGURE 3: Savings for rebound hard cover books.

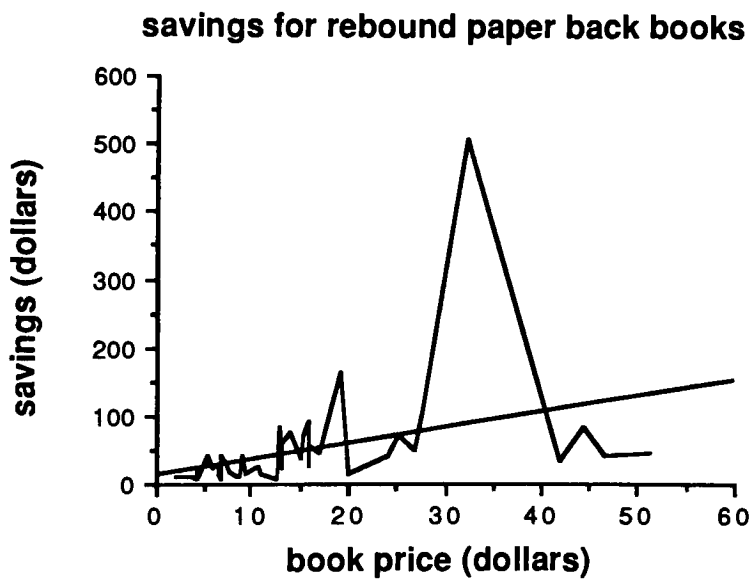


FIGURE 4: Savings for rebound paper back books.

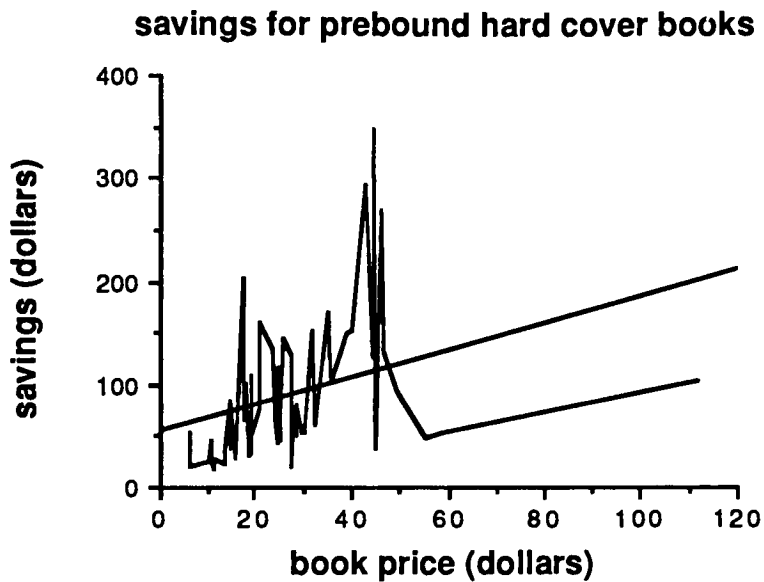


FIGURE 5: Savings of prebound hard cover books

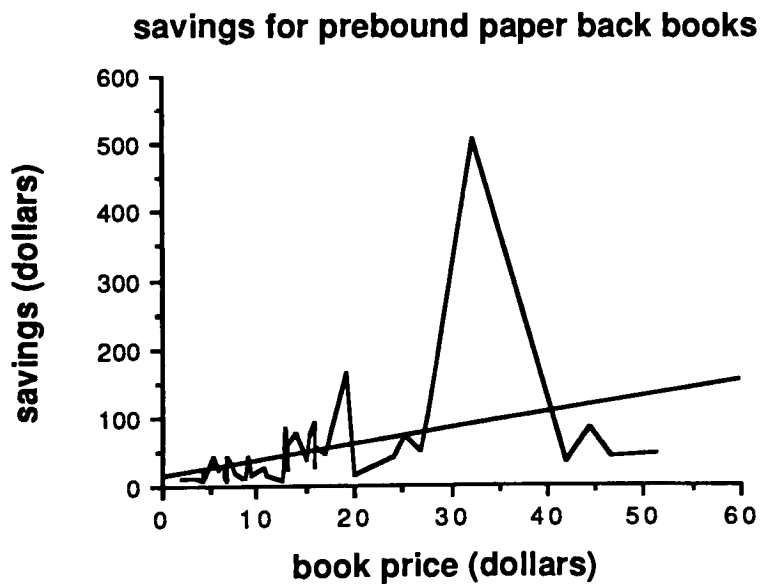


FIGURE 6: Savings of prebound paper back books.

5. It was found that figure 4 was distorted by one value (32.2, 509.2). Upon deletion of this value, figure 7 was obtained. From figure 7 more accurate and feasible information could be concluded.

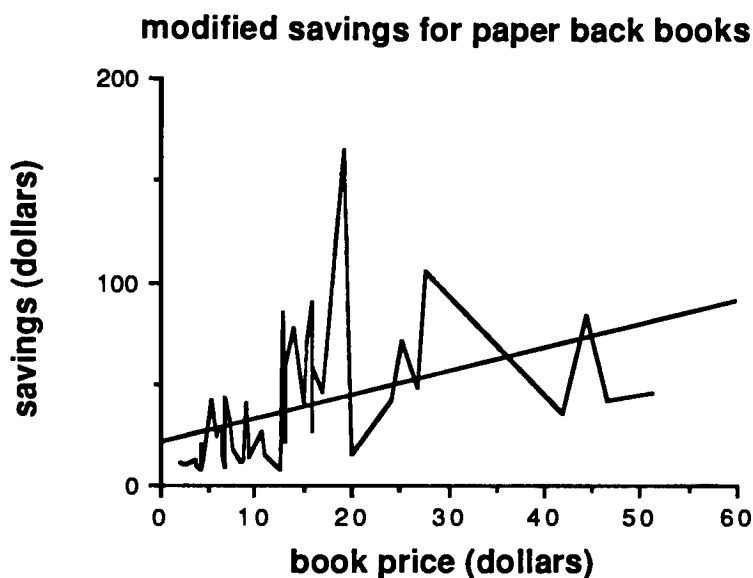


FIGURE 7: In this graph the value (32.2,509.2) is deleted to show a more feasible chart.

Figures 3, 4, 5, 6 and 7 can be helpful to identify the book prices where savings are higher when the decision is to rebind or prebind. For example, in figure 3 the area inbetween 40 to 50 in book price has higher savings than any other area when hard cover books are rebound. The curve fit only indicates that the higher the book price the higher savings are obtain from deciding to rebind hard cover books.

PROBLEMS CAUSING BOOK DETERIORATION

To determine the problems that cause book deterioration, a selection of mishandled books were investigated by an expert in the field, professor Werner Rebsamen. The expert determined the causes that deteriorated the books. Furthermore, the expert also counted the number of times each defect appeared to be the reason of the deterioration of the library book. Finally, a pareto analysis was performed to determine the most common problems that cause book deterioration.

FOOTNOTES FOR CHAPTER 4

¹ Council of Economic Advisers. Economics Report of the President. Washington D.C.: United States Government Printing Office, 1987.

² Chase W & Brown F. General Statistics. New York: John Wiley & Sons, 1986, p.418.

CHAPTER 5

ANALYSIS OF DATA AND RESULTS

COST EFFECTIVENESS

The data generated by the regression analysis of hard cover and paper back rebound books reinforced the decision to calculate the cost-effectiveness of each type of book cover separately. When the two regressions:

a. $Y_1 = 14.774 + 0.513PR + 0.013S$ (books with hard cover)

b. $Y_1 = 38.200 + 1.400PR - 0.058S$ (books with paper back)

were analyzed, it was found that the slope of the rebinding price of the hard cover books was equal to 0.513 and the slope of the rebinding price of the paper back books was equal to 1.400. Therefore, it was obvious that the latter slope is almost three times the value of the previous one and the cost effectiveness of each type of book had to be calculated separately.

In addition, the two slopes, paper back (+1.400) and hard cover (+0.513) have a positive coefficient. This indicates that a more expensive book will have a higher breakeven number of circulations. The price of a book is determined by the type of binding, type of cover and size among others. A book, for example, with a better type of binding, generally correlated to a higher cost, will have a lower probability of an earlier deterioration.

Moreover, from the regression analysis of the paper back books we could observe that the variable dimension (trim size) is highly significant. However, this significant variable has a negative coefficient (-0.058) which indicates the existence of a negative relationship between the breakeven number of circulations and the dimension (trim size). Therefore, a large book deteriorates more easily. This results from the fact that an oversize book is much harder to handle than a small book.

Furthermore, it is important for determining the cost effectiveness of prebound, rebound or replacing deteriorated books with new ones, to analyze the correlation (R) of both regressions. The paperback (R= 0.652) and hard cover (R= 0.53) correlations are fairly good. Trying to explain what factors are responsible for only a fairly good correlation led to an examination of the "ON" column in tables A, B, C and D (Appendix A). It was determined that the number of circulations of the rebound books were affected by unmeasurable variables that include the following:

- a. Different ways of book handling from one individual to another.
- b. Different ways of pulling out the book from the stack.
- c. Lack of space on shelves causes the books to be squeezed.
- d. Different binding qualities.
- e. Different libraries have different standards in deciding when a book should be sent to be rebound.
- f. Books are used inside the library without being checked out.

- g. Some books are used inside the library for photocopying.
- h. Some books are repaired in the library with low cost binding.
- i. The librarian decides to rebind out of print books before they deteriorate.
- j. Library book return boxes are inadequate.

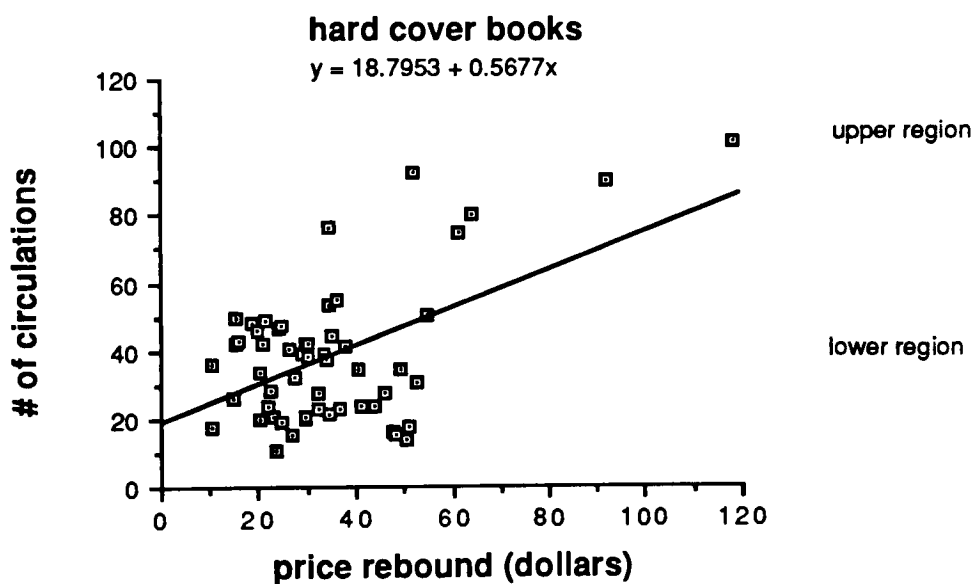
Looking over the information shown in table 1, the results of the multiple regression analysis show that the variables of price rebound, type of cover and dimension are significant. The variables of type of binding and thickness were found not to be significant. Therefore, the subhypotheses: "this will be true regardless of the dimension of the book", "this will be true regardless of the price of the book" and "this will be true for books with both paper back and hard cover" are accepted. But the subhypotheses: "this will be true regardless of the thickness of the book" and "this will be true for books with both sewn binding and adhesive binding" are not accepted.

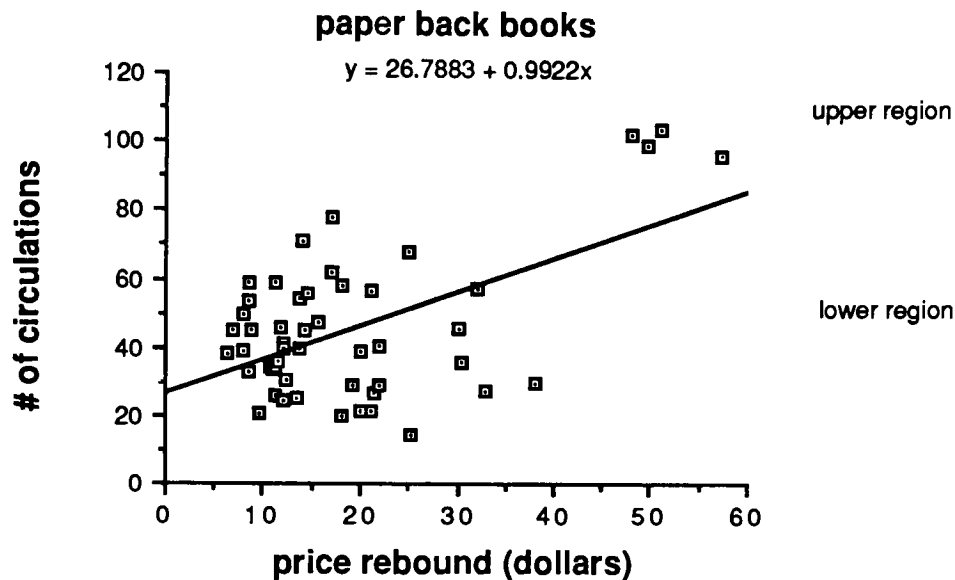
The following figures are the estimated regression charts for hard cover and paper back books, respectively. These charts will determine the cost effectiveness of rebinding or replacing deteriorated books with new ones. The simple regression line divides the feasible area into two regions:

- a. The upper region indicates all the possibilities in which a rebinding decision will provide savings to the library. If the price of rebinding a

book falls in this region, it will be cost effective to rebind that book.

b. The lower region indicates all the possibilities where rebinding is not profitable. If the price of rebinding a book falls in this region, it will be more cost effective to replace the deteriorated book with a new book. Note: the function is a two dimensional equation, depending on the two variables price and dimension (trim size). However, the plots correspond to the projection of the relationship given by Y_1 and PR.





SAVINGS

Figures 3, 4, 5, 6 and 7 showed that the savings increased as the price of the books increased. Moreover, it can be seen that as the books' prices increase, the savings were not affected by the method of rebinding, prebinding or by the type of cover. It is important to note that in order to calculate the savings obtained for each rebound book, the number of times that a book circulated before it deteriorated was added to the minimum number of circulations for books rebound under the LBI specifications (100). this means that the savings incurred will vary with the number of times that a book circulates. The more it circulates, the more the savings.

PROBLEMS CAUSING BOOK DETERIORATION

Finally, a pareto diagram was used to determine the most common results of mishandling library books. Most of the books included more than one of these results.

Table 6
Pareto Analysis ¹
RAW DATA

| <u>DEFECT</u> | <u>TALLY</u> | <u>TOTAL</u> |
|------------------|--|--------------|
| Damaged Spine | //////////////////// //////////////// | 59 |
| Loose Signatures | //////// | 19 |
| Torn Pages | //// | 4 |
| Bent Pages | // | 2 |
| Damaged cover | //////////////////// /// | 43 |
| Torn End Paper | //////// | 15 |
| Highly Damaged | | |
| Book Edges | //////// | 9 |

| RANK ORDER OF DEFECTS | | |
|-----------------------|---------------------------|--------------|
| <u>ORDER</u> | <u>DEFECT</u> | <u>COUNT</u> |
| 1 | Damaged Spine | 59 |
| 2 | Damaged Cover | 43 |
| 3 | Loose Signatures | 19 |
| 4 | Torn End Paper | 15 |
| 5 | Highly Damaged Book Edges | 9 |
| 6 | Torn Pages | 4 |
| 7 | Bent Pages | 2 |

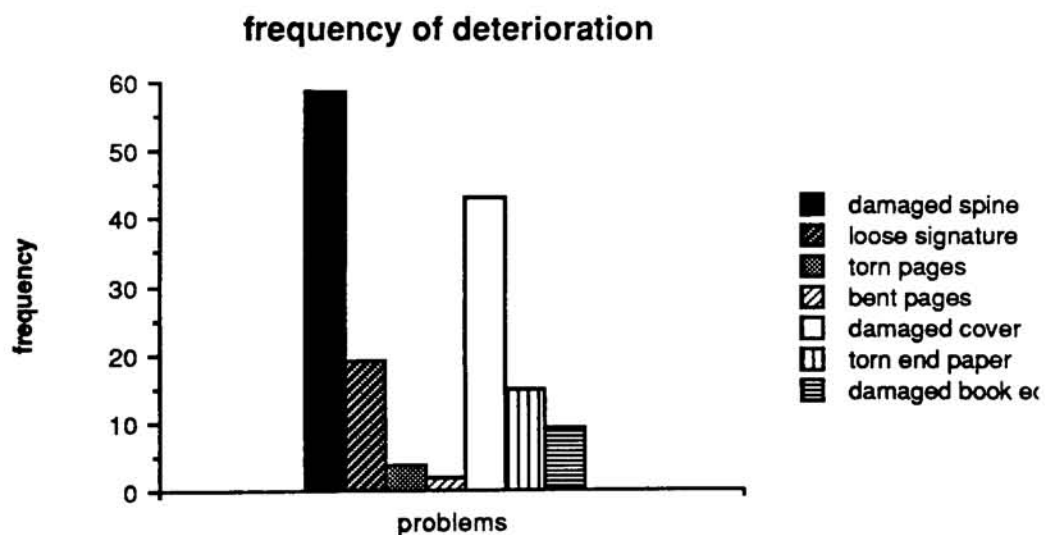


FIGURE 8: Pareto Diagram of the most common problems that cause book deterioration.

The pareto analysis (table 6) and the diagram (figure 8) show that the most common problems are damaged spines and damaged covers. Librarians and experts in the field considered that these problems can be attributed mainly to: the lack of space on the library shelves, the handling of books and the use of books for photocopying.

FOOTNOTES FOR CHAPTER 5

¹Graphic Arts Quality Control. Seminar Notes, Rochester, New York: Technical and Educational Center, Rochester Institute of Technology, 1987.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The hypothesis examined in this study states that it is more cost effective for libraries to rebind or prebind books in accordance to the LBI specifications than to leave them with regular trade book bindings. From the study it can be concluded that it is more cost effective for libraries to prebind or rebind their books. This is the result of accepting three of the five subhypotheses.

In answer to the first research question, it was found that there is a breakeven number of circulations that will determine if a book should be rebound or prebound. This breakeven number of circulations was used to find the cost-effectiveness of rebinding or prebinding books. However, the breakeven number of circulations obtained was also affected by external variables that were ignored in order to simplify this study.

The second research question inquired if there are any savings incurred when books are prebound or rebound instead of replacing them with new ones. Figures 3, 4, 5, 6 and 7 of this study proved that rebinding and prebinding books are more profitable than replacing them with new ones. In addition, the savings were noticed to increase in proportion to the price of the books. Therefore, it is concluded that it is essential to prebind

or rebind expensive books to generate more savings.

To answer the last research question, it was found that there are common problems that cause book deterioration. The pareto analysis (in figure 8 and table 6) showed that these most common problems of book deterioration were spine and cover damages. In fact, from the analysis it can be concluded that the weakest points of a book binding are its spine and cover.

Furthermore, librarians and experts in the field were consulted to know the causes of having so many books with damaged spines and with damaged covers. Their opinion was that the causes of damaged spine were attributed mainly to: lack of space on shelves causing the books to be squeezed; different ways of pulling out the book from the shelves; insertion of magnetic strips in the spine; and usage of some books for photocopying. Similarly, the causes of damaged covers were mainly due to the different ways books are handled from one individual to another and the inadequate library book return boxes. Once these causes are known to the librarian, preventive measures can be taken to avoid or minimize these problems.

RECOMMENDATIONS

The suggested procedure for determining the cost effectiveness of prebinding or rebinding books proved to be helpful in deciding if a book

should be prebound, rebound or replaced with a new one. The procedure can be used in a library as follows:

Step 1. Calculate the breakeven number of circulations (Y_1) and the rebound price (PR) of a sample of deteriorated books in the library.

Step 2. Separate the data into two categories: hard cover and paper back.

Step 3. Calculate a regression analysis for each category having Y_1 as a dependent variable and PR as an independent variable.

Step 4. Plot the regression analyses on graphs of breakeven number of circulations vs. rebound price. (example figures 1 and 2)

Step 5. Determine the price of the book in question

Step 6. Go to the regression analysis graph corresponding to the type of cover of the book in question (figures 1 or 2) and determine the breakeven number of circulation for that specific price.

Step 7. Estimate the number of circulations expected for the book in question.

Step 8. If the expected number of circulations is larger than the breakeven number of circulations, then it is more profitable to rebound the book. If not, then it is more profitable to replace the deteriorated book with a new one.

The above procedure can also be applied to decide whether to prebind or replace deteriorated books with new ones. However, a decision

to prebind a book is also affected by the number of color plates, the price, the dimension of the book and the risk that a book will go out of print.

The model can be useful for the libraries in other ways as well. It will provide the librarian with a reference number of circulations that a book should last. With the help of a computer the librarian will locate those books that reached the breakeven number of circulations. Consequently, those books can be examined and the degree of deterioration determined. In this way, irremediable book damage can be prevented. In addition, the model can be a guide to help individuals working in the library to determine which books should be rebound without having any knowledge about library book binding.

In this study it was not possible to obtain a sample of books that represented all of the uncontrollable variables, mentioned in the analysis of data and results (page 33). It is recommended that such a sample be examined in order to obtain a better count of the number of circulations. This sample will provide the library with a more accurate breakeven number of circulations.

Furthermore, it will be interesting to perform a study that focuses on the relationship that exists among the different problems that cause book deterioration.

BIBLIOGRAPHY

Beaton, Joe. "Binding and Budgets." The Library Scene. (March 1979).

Bendror, Jack. Technology and Testing of Library Bound Books. Rochester New York: Graphic Arts Research Center, Rochester Institute of Technology, 1976.

Chase W & Brown F. General Statistics. New York: John Wiley & Sons, 1986.

Dobrovits, P. "Is Binding a Luxury?" Australian Academic Research Library. (June 1979).

Council of Economic Advisers. Economics Report of the President. Washington D.C.: United States Government Printing Office, 1987.

Graphic Arts Quality Control. Seminar Notes, Rochester New York: Technical and Educational Center, Rochester Institute of Technology, 1987.

Kent, Allen. A Cost Benefit Model of Some Critical Library Operations in Terms of Use of Materials. Pittsburg, Pennsylvania: University of Pittsburg, 1975.

Library Binding Institute. How to Analyze Your Collection. Boston, Massachusetts: 1972.

Lyle, R. Guy. The Administration of the College Library. New York: The HW Wilson Co., 1961.

Mac Douglas, William and Sharon Golden. "Battling Father Time to Serve a Vast Treasure." US News and World Report. (April 1985).

Rebsamen, Werner. Planning and Finishing. Course Notes, Rochester, New York: Rochester Institute of Technology.

Roberts, Matt. "The Library Binder." The Library Trends. (April 1976).

Thompson, James. Introduction to University Library Administration. Hamden, Connecticut: Linnet Books & Clive, 1974

Weiss, Dudley A. "Strengthening Your Budget with Proper Binding." Text of a talk delivered by the author, March 1964. Typescript in the files of the Files of the Library Binding Institute

Weiss, Dudley A. "The LBI specifications: The Only Industry Standard for Library Bound Books." The Library Scene. (September 1975).

Appendix A

TABLE A: DATA OF HARD COVER BOOKS

| book No. | price | No. of circ. | rebind cost | cost per circ. | price rebound |
|----------|-------|--------------|-------------|----------------|---------------|
| (P) | (ON) | (CR) | (OCC) | (PR) | |
| 1 | 40.00 | 24 | 6.0 | 1.667 | 46.00 |
| 2 | 42.95 | 14 | 5.1 | 3.068 | 48.05 |
| 3 | 45.90 | 16 | 5.1 | 2.869 | 51.00 |
| 4 | 15.00 | 15 | 5.1 | 1.000 | 20.10 |
| 5 | 19.30 | 15 | 5.1 | 1.287 | 24.40 |
| 6 | 44.20 | 31 | 5.1 | 1.426 | 49.30 |
| 7 | 55.25 | 68 | 6.0 | 0.812 | 61.25 |
| 8 | 17.50 | 08 | 6.0 | 2.188 | 23.50 |
| 9 | 28.15 | 33 | 5.1 | 0.853 | 3325 |
| 10 | 49.50 | 46 | 5.1 | 1.076 | 54.60 |
| 11 | 10.35 | 28 | 5.1 | 0.370 | 15.45 |
| 12 | 29.50 | 46 | 6.0 | 0.651 | 35.95 |
| 13 | 24.70 | 17 | 5.1 | 1.453 | 29.80 |
| 14 | 24.50 | 35 | 5.1 | 0.700 | 29.60 |
| 15 | 14.95 | 25 | 5.1 | 0.598 | 20.05 |
| 16 | 10.70 | 35 | 4.4 | 0.306 | 15.10 |
| 17 | 10.95 | 29 | 5.1 | 0.378 | 16.05 |
| 18 | 5.90 | 10 | 4.4 | 0.590 | 10.30 |
| 19 | 42.60 | 14 | 5.1 | 3.043 | 47.70 |
| 20 | 13.50 | 35 | 5.1 | 0.386 | 18.60 |
| 21 | 23.90 | 32 | 5.1 | 0.747 | 29.00 |
| 22 | 17.55 | 22 | 5.1 | 0.798 | 22.65 |
| 23 | 16.00 | 37 | 5.1 | 0.432 | 21.10 |
| 24 | 32.50 | 36 | 5.1 | 0.903 | 37.60 |
| 25 | 20.95 | 12 | 6.0 | 1.746 | 26.95 |
| 26 | 13.74 | 32 | 6.0 | 0.430 | 19.75 |
| 27 | 27.15 | 19 | 5.1 | 1.429 | 32.25 |
| 28 | 44.50 | 12 | 6.0 | 3.708 | 50.50 |
| 29 | 35.10 | 20 | 6.0 | 1.755 | 41.10 |
| 30 | 6.10 | 21 | 4.4 | 0.290 | 10.50 |
| 31 | 31.60 | 20 | 5.1 | 1.580 | 36.70 |
| 32 | 25.00 | 35 | 5.1 | 0.714 | 30.10 |

TABLE A: DATA OF HARD COVER BOOKS

| book No. | price (P) | No. of circ. (ON) | rebind cost (CR) | cost per circ. (OCC) | price rebound (PR) |
|----------|--------------|----------------------|---------------------|-------------------------|-----------------------|
| 33 | 28.75 | 44 | 6.0 | 0.653 | 34.75 |
| 34 | 20.55 | 24 | 7.0 | 0.856 | 27.55 |
| 35 | 23.45 | 16 | 6.0 | 1.466 | 29.45 |
| 36 | 27.20 | 23 | 5.1 | 1.183 | 32.30 |
| 37 | 19.45 | 30 | 7.0 | 0.648 | 26.45 |
| 38 | 38.80 | 21 | 5.1 | 1.848 | 43.90 |
| 39 | 46.35 | 27 | 6.0 | 1.717 | 52.35 |
| 40 | 29.70 | 38 | 5.1 | 0.782 | 34.80 |
| 41 | 25.75 | 16 | 9.0 | 1.609 | 34.75 |
| 42 | 18.40 | 36 | 6.0 | 0.511 | 24.40 |
| 43 | 14.65 | 16 | 7.0 | 0.916 | 21.65 |
| 44 | 45.00 | 80 | 7.0 | 0.562 | 52.00 |
| 45 | 85.00 | 83 | 7.0 | 1.024 | 92.00 |
| 46 | 111.55 | 96 | 7.0 | 1.162 | 118.55 |
| 47 | 35.50 | 30 | 5.1 | 1.183 | 40.60 |
| 48 | 28.76 | 32 | 5.1 | 0.899 | 33.86 |
| 49 | 18.00 | 16 | 5.1 | 1.125 | 23.10 |
| 50 | 58.85 | 73 | 5.1 | 0.799 | 63.95 |
| 51 | 25.15 | 32 | 5.1 | 0.786 | 30.25 |
| 52 | 19.25 | 37 | 5.1 | 0.520 | 24.35 |
| 53 | 10.30 | 18 | 4.4 | 0.572 | 14.70 |
| 54 | 14.90 | 30 | 6.0 | 0.497 | 20.90 |
| 55 | 10.50 | 28 | 5.1 | 0.359 | 15.15 |
| 56 | 27.50 | 61 | 7.0 | 0.451 | 34.50 |

TABLE A: DATA OF HARD COVER BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. rebound book (RN) | cost per circ. rebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|--------------------------------------|--|-----------------------|-----------------|
| 1 | 28 | 124 | 0.371 | 5 | 154.00 |
| 2 | 16 | 114 | 0.421 | 8 | 295.55 |
| 3 | 18 | 116 | 0.440 | 7 | 270.30 |
| 4 | 20 | 115 | 0.175 | 7 | 84.90 |
| 5 | 19 | 115 | 0.212 | 7 | 110.70 |
| 6 | 35 | 131 | 0.376 | 4 | 127.50 |
| 7 | 75 | 168 | 0.365 | 2 | 49.25 |
| 8 | 11 | 108 | 0.218 | 13 | 204.00 |
| 9 | 39 | 133 | 0.250 | 4 | 79.350 |
| 10 | 51 | 146 | 0.374 | 3 | 93.90 |
| 11 | 42 | 128 | 0.121 | 4 | 25.95 |
| 12 | 55 | 146 | 0.246 | 3 | 53.90 |
| 13 | 21 | 117 | 0.255 | 6 | 118.40 |
| 14 | 43 | 135 | 0.219 | 3 | 43.90 |
| 15 | 34 | 125 | 0.160 | 5 | 54.70 |
| 16 | 49 | 135 | 0.112 | 3 | 17.00 |
| 17 | 42 | 129 | 0.124 | 4 | 27.75 |
| 18 | 17 | 110 | 0.094 | 12 | 60.50 |
| 19 | 16 | 114 | 0.418 | 8 | 293.10 |
| 20 | 48 | 135 | 0.138 | 3 | 21.90 |
| 21 | 39 | 132 | 0.220 | 4 | 66.60 |
| 22 | 28 | 122 | 0.186 | 5 | 65.10 |
| 23 | 49 | 137 | 0.154 | 3 | 26.90 |
| 24 | 42 | 136 | 0.276 | 3 | 59.90 |
| 25 | 15 | 112 | 0.241 | 9 | 161.60 |
| 26 | 46 | 132 | 0.150 | 4 | 35.25 |
| 27 | 23 | 119 | 0.271 | 6 | 130.65 |
| 28 | 14 | 112 | 0.451 | 9 | 350.00 |
| 29 | 24 | 120 | 0.343 | 6 | 169.50 |
| 30 | 36 | 121 | 0.087 | 5 | 20.00 |
| 31 | 23 | 120 | 0.306 | 6 | 152.90 |
| 32 | 42 | 135 | 0.223 | 3 | 44.90 |

TABLE A: DATA OF HARD COVER BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. rebound book (RN) | cost per circ. rebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|--------------------------------------|--|-----------------------|-----------------|
| 33 | 53 | 144 | 0.241 | 3 | 51.5 |
| 34 | 32 | 124 | 0.220 | 5 | 75.20 |
| 35 | 20 | 116 | 0.254 | 7 | 134.70 |
| 36 | 27 | 123 | 0.263 | 5 | 103.70 |
| 37 | 41 | 130 | 0.203 | 4 | 51.35 |
| 38 | 22 | 121 | 0.363 | 5 | 150.10 |
| 39 | 30 | 127 | 0.412 | 4 | 133.05 |
| 40 | 45 | 138 | 0.252 | 3 | 54.30 |
| 41 | 22 | 116 | 0.300 | 7 | 145.50 |
| 42 | 48 | 136 | 0.179 | 3 | 30.80 |
| 43 | 24 | 116 | 0.187 | 7 | 80.90 |
| 44 | 93 | 180 | 0.289 | 2 | 38.00 |
| 45 | 90 | 183 | 0.503 | 2 | 78.00 |
| 46 | 102 | 196 | 0.605 | 2 | 104.55 |
| 47 | 34 | 130 | 0.312 | 4 | 101.40 |
| 48 | 38 | 132 | 0.257 | 4 | 81.18 |
| 49 | 21 | 116 | 0.199 | 7 | 102.90 |
| 50 | 80 | 173 | 0.370 | 2 | 53.75 |
| 51 | 38 | 132 | 0.229 | 4 | 70.35 |
| 52 | 47 | 137 | 0.178 | 3 | 33.40 |
| 53 | 26 | 118 | 0.125 | 6 | 47.10 |
| 54 | 45 | 130 | 0.161 | 4 | 38.70 |
| 55 | 42 | 128 | 0.118 | 4 | 25.05 |
| 56 | 76 | 161 | 0.214 | 2 | 20.50 |

TABLE B: DATA OF PAPER BACK BOOKS

| book No. | price | No. of circ. | rebind cost | cost per circ. | price rebound |
|----------|-------|--------------|-------------|----------------|---------------|
| | (P) | (ON) | (CR) | (OCC) | (PR) |
| 1 | 12.95 | 14 | 5.1 | 0.925 | 18.05 |
| 2 | 6.00 | 20 | 6.0 | 0.300 | 12.00 |
| 3 | 15.30 | 19 | 6.0 | 0.808 | 21.35 |
| 4 | 6.50 | 20 | 5.1 | 0.325 | 11.60 |
| 5 | 6.45 | 20 | 4.4 | 0.323 | 10.85 |
| 6 | 16.95 | 31 | 5.1 | 0.547 | 22.05 |
| 7 | 16.00 | 16 | 5.1 | 1.000 | 21.10 |
| 8 | 42.00 | 51 | 3.0 | 0.824 | 48.00 |
| 9 | 10.55 | 32 | 5.1 | 0.330 | 15.65 |
| 10 | 26.95 | 48 | 5.1 | 0.561 | 32.05 |
| 11 | 24.15 | 37 | 6.0 | 0.653 | 30.15 |
| 12 | 8.60 | 34 | 5.1 | 0.250 | 13.70 |
| 13 | 12.60 | 58 | 4.4 | 0.217 | 17.00 |
| 14 | 6.15 | 20 | 4.4 | 0.308 | 10.55 |
| 15 | 4.15 | 16 | 4.4 | 0.259 | 8.55 |
| 16 | 3.45 | 17 | 4.4 | 0.203 | 7.85 |
| 17 | 5.10 | 11 | 4.4 | 0.464 | 9.50 |
| 18 | 3.53 | 22 | 4.4 | 0.160 | 7.93 |
| 19 | 2.45 | 16 | 4.4 | 0.153 | 6.85 |
| 20 | 13.15 | 20 | 6.0 | 0.658 | 19.15 |
| 21 | 8.95 | 17 | 4.4 | 0.526 | 13.35 |
| 22 | 32.20 | 6 | 6.0 | 5.367 | 38.20 |
| 23 | 4.15 | 26 | 4.4 | 0.160 | 8.55 |
| 24 | 14.95 | 29 | 5.1 | 0.516 | 20.05 |
| 25 | 19.95 | 54 | 5.1 | 0.369 | 25.05 |
| 26 | 2.00 | 12 | 4.4 | 0.167 | 6.40 |
| 27 | 6.95 | 16 | 4.4 | 0.434 | 11.35 |
| 28 | 6.95 | 21 | 4.4 | 0.331 | 11.35 |
| 29 | 16.00 | 43 | 5.1 | 0.372 | 21.10 |
| 30 | 6.85 | 36 | 4.4 | 0.190 | 11.25 |
| 31 | 9.35 | 29 | 5.1 | 0.319 | 14.35 |
| 32 | 46.60 | 51 | 4.4 | 0.914 | 51.00 |

TABLE B: DATA OF PAPER BACK BOOKS

| book No. | price | No. of circ. | rebind cost | cost per circ. | price rebound |
|----------|-------|--------------|-------------|----------------|---------------|
| | (P) | (ON) | (CR) | (OCC) | (PR) |
| 33 | 4.50 | 23 | 4.4 | 0.196 | 8.90 |
| 34 | 9.20 | 27 | 4.4 | 0.341 | 13.60 |
| 35 | 4.00 | 28 | 4.4 | 0.143 | 8.40 |
| 36 | 7.30 | 18 | 5.1 | 0.406 | 12.40 |
| 37 | 6.95 | 14 | 5.1 | 0.496 | 12.05 |
| 38 | 25.30 | 30 | 5.1 | 0.843 | 30.40 |
| 39 | 16.00 | 21 | 3.0 | 0.762 | 22.00 |
| 40 | 19.05 | 11 | 6.0 | 1.732 | 25.15 |
| 41 | 44.40 | 49 | 5.1 | 0.906 | 49.50 |
| 42 | 27.75 | 23 | 5.1 | 1.207 | 32.85 |
| 43 | 51.35 | 86 | 6.0 | 0.597 | 57.35 |
| 44 | 1.095 | 40 | 6.0 | 0.274 | 16.95 |
| 45 | 14.00 | 15 | 6.0 | 0.933 | 20.00 |
| 46 | 6.62 | 26 | 5.1 | 0.255 | 11.72 |
| 47 | 9.35 | 36 | 5.1 | 0.260 | 14.45 |
| 48 | 13.10 | 42 | 5.1 | 0.312 | 18.20 |
| 49 | 8.75 | 45 | 5.1 | 0.194 | 13.85 |
| 50 | 7.55 | 26 | 4.4 | 0.290 | 11.95 |

TABLE B: DATA OF PAPER BACK BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. rebound book (RN) | cost per circ. rebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|--------------------------------------|--|-----------------------|-----------------|
| 1 | 20 | 114 | 0.158 | 8 | 85.55 |
| 2 | 40 | 120 | 0.100 | 6 | 24.00 |
| 3 | 26 | 119 | 0.179 | 6 | 70.75 |
| 4 | 36 | 120 | 0.097 | 6 | 27.40 |
| 5 | 34 | 120 | 0.090 | 6 | 27.85 |
| 6 | 40 | 131 | 0.168 | 4 | 45.75 |
| 7 | 21 | 116 | 0.182 | 7 | 90.90 |
| 8 | 102 | 151 | 0.318 | 2 | 36.00 |
| 9 | 47 | 132 | 0.119 | 4 | 26.55 |
| 10 | 57 | 148 | 0.217 | 3 | 48.80 |
| 11 | 46 | 137 | 0.220 | 3 | 42.30 |
| 12 | 54 | 134 | 0.102 | 3 | 12.10 |
| 13 | 78 | 158 | 1.108 | 2 | 8.20 |
| 14 | 34 | 120 | 0.088 | 6 | 26.35 |
| 15 | 33 | 116 | 0.074 | 7 | 20.50 |
| 16 | 39 | 117 | 0.067 | 6 | 12.85 |
| 17 | 21 | 111 | 0.086 | 10 | 41.50 |
| 18 | 50 | 122 | 0.065 | 5 | 9.72 |
| 19 | 45 | 116 | 0.059 | 7 | 10.30 |
| 20 | 29 | 120 | 0.160 | 6 | 59.75 |
| 21 | 25 | 117 | 0.114 | 6 | 40.35 |
| 22 | 30 | 106 | 0.360 | 17 | 509.20 |
| 23 | 53 | 126 | 0.068 | 4 | 8.05 |
| 24 | 39 | 129 | 0.155 | 4 | 39.75 |
| 25 | 68 | 154 | 0.163 | 2 | 14.85 |
| 26 | 38 | 112 | 0.057 | 9 | 11.60 |
| 27 | 26 | 116 | 0.098 | 7 | 37.30 |
| 28 | 34 | 121 | 0.094 | 5 | 23.40 |
| 29 | 57 | 143 | 0.148 | 3 | 26.90 |
| 30 | 59 | 136 | 0.083 | 3 | 9.30 |
| 31 | 104 | 151 | 0.338 | 2 | 42.20 |

TABLE B: DATA OF PAPER BACK BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. rebound book (RN) | cost per circ. rebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|--------------------------------------|--|-----------------------|-----------------|
| 33 | 45 | 123 | 0.072 | 5 | 13.60 |
| 34 | 40 | 127 | 0.107 | 4 | 23.20 |
| 35 | 59 | 128 | 0.066 | 4 | 7.60 |
| 36 | 31 | 118 | 0.105 | 6 | 31.40 |
| 37 | 25 | 114 | 0.106 | 8 | 43.55 |
| 38 | 36 | 130 | 0.234 | 4 | 70.80 |
| 39 | 29 | 121 | 0.182 | 5 | 58.00 |
| 40 | 15 | 111 | 0.227 | 10 | 165.35 |
| 41 | 100 | 149 | 0.332 | 3 | 83.70 |
| 42 | 27 | 123 | 0.267 | 5 | 105.90 |
| 43 | 96 | 186 | 0.308 | 2 | 45.35 |
| 44 | 62 | 140 | 0.121 | 3 | 45.35 |
| 45 | 21 | 115 | 0.174 | 7 | 78.00 |
| 46 | 46 | 126 | 0.093 | 4 | 14.76 |
| 47 | 56 | 136 | 0.106 | 3 | 13.60 |
| 48 | 58 | 142 | 0.128 | 3 | 21.10 |
| 49 | 71 | 145 | 0.096 | 3 | 12.40 |
| 50 | 41 | 126 | 0.095 | 4 | 18.25 |

TABLE C: DATA OF PREBIND HARD COVER BOOKS

| book No. | price (P) | No. of circ. (ON) | prebind cost (CR) | cost per circ. (OCC) | price prebound (PR) |
|----------|--------------|----------------------|----------------------|-------------------------|------------------------|
| 1 | 40.00 | 24 | 6.0 | 1.667 | 46.00 |
| 2 | 42.95 | 14 | 5.1 | 3.068 | 48.05 |
| 3 | 45.90 | 16 | 5.1 | 2.869 | 51.00 |
| 4 | 15.00 | 15 | 5.1 | 1.000 | 20.10 |
| 5 | 19.30 | 15 | 5.1 | 1.287 | 24.40 |
| 6 | 44.20 | 31 | 5.1 | 1.426 | 49.30 |
| 7 | 55.25 | 68 | 6.0 | 0.812 | 61.25 |
| 8 | 17.50 | 08 | 6.0 | 2.188 | 23.50 |
| 9 | 28.15 | 33 | 5.1 | 0.853 | 33.25 |
| 10 | 49.50 | 46 | 5.1 | 1.076 | 54.60 |
| 11 | 10.35 | 28 | 5.1 | 0.370 | 15.45 |
| 12 | 29.50 | 46 | 6.0 | 0.651 | 35.95 |
| 13 | 24.70 | 17 | 5.1 | 1.453 | 29.80 |
| 14 | 24.50 | 35 | 5.1 | 0.700 | 29.60 |
| 15 | 14.95 | 25 | 5.1 | 0.598 | 20.05 |
| 16 | 10.70 | 35 | 4.4 | 0.306 | 15.10 |
| 17 | 10.95 | 29 | 5.1 | 0.378 | 16.05 |
| 18 | 5.90 | 10 | 4.4 | 0.590 | 10.30 |
| 19 | 42.60 | 14 | 5.1 | 3.043 | 47.70 |
| 20 | 13.50 | 35 | 5.1 | 0.386 | 18.60 |
| 21 | 23.90 | 32 | 5.1 | 0.747 | 29.00 |
| 22 | 17.55 | 22 | 5.1 | 0.798 | 22.65 |
| 23 | 16.00 | 37 | 5.1 | 0.432 | 21.10 |
| 24 | 32.50 | 36 | 5.1 | 0.903 | 37.60 |
| 25 | 20.95 | 12 | 6.0 | 1.746 | 26.95 |
| 26 | 13.74 | 32 | 6.0 | 0.430 | 19.75 |
| 27 | 27.15 | 19 | 5.1 | 1.429 | 32.25 |
| 28 | 44.50 | 12 | 6.0 | 3.708 | 50.50 |
| 29 | 35.10 | 20 | 6.0 | 1.755 | 41.10 |
| 30 | 6.10 | 21 | 4.4 | 0.290 | 10.50 |
| 31 | 31.60 | 20 | 5.1 | 1.580 | 36.70 |
| 32 | 25.00 | 35 | 5.1 | 0.714 | 30.10 |

TABLE C: DATA OF PREBIND HARD COVER BOOKS

| book No. | price (P) | No. of circ. (ON) | prebind cost (CR) | cost per circ. (OCC) | price prebound (PR) |
|----------|--------------|----------------------|----------------------|-------------------------|------------------------|
| 33 | 28.75 | 44 | 6.0 | 0.653 | 34.75 |
| 34 | 20.55 | 24 | 7.0 | 0.856 | 27.55 |
| 35 | 23.45 | 16 | 6.0 | 1.466 | 29.45 |
| 36 | 27.20 | 23 | 5.1 | 1.183 | 32.30 |
| 37 | 19.45 | 30 | 7.0 | 0.648 | 26.45 |
| 38 | 38.80 | 21 | 5.1 | 1.848 | 43.90 |
| 39 | 46.35 | 27 | 6.0 | 1.717 | 52.35 |
| 40 | 29.70 | 38 | 5.1 | 0.782 | 34.80 |
| 41 | 25.75 | 16 | 9.0 | 1.609 | 34.75 |
| 42 | 18.40 | 36 | 6.0 | 0.511 | 24.40 |
| 43 | 14.65 | 16 | 7.0 | 0.916 | 21.65 |
| 44 | 45.00 | 80 | 7.0 | 0.562 | 52.00 |
| 45 | 85.00 | 83 | 7.0 | 1.024 | 92.00 |
| 46 | 111.55 | 96 | 7.0 | 1.162 | 118.55 |
| 47 | 35.50 | 30 | 5.1 | 1.183 | 40.60 |
| 48 | 28.76 | 32 | 5.1 | 0.899 | 33.86 |
| 49 | 18.00 | 16 | 5.1 | 1.125 | 23.10 |
| 50 | 58.85 | 73 | 5.1 | 0.799 | 63.95 |
| 51 | 25.15 | 32 | 5.1 | 0.786 | 30.25 |
| 52 | 19.25 | 37 | 5.1 | 0.520 | 24.35 |
| 53 | 10.30 | 18 | 4.4 | 0.572 | 14.70 |
| 54 | 14.90 | 30 | 6.0 | 0.497 | 20.90 |
| 55 | 10.50 | 28 | 5.1 | 0.359 | 15.15 |
| 56 | 27.50 | 61 | 7.0 | 0.451 | 34.50 |

TABLE C: DATA OF PREBIND HARD COVER BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. prebound book (RN) | cost per circ. prebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|---------------------------------------|---|-----------------------|-----------------|
| 1 | 28 | 100 | 0.460 | 5 | 154.00 |
| 2 | 16 | 100 | 0.481 | 8 | 295.55 |
| 3 | 18 | 100 | 0.510 | 7 | 270.30 |
| 4 | 20 | 100 | 0.201 | 7 | 84.90 |
| 5 | 19 | 100 | 0.244 | 7 | 110.70 |
| 6 | 35 | 100 | 0.493 | 4 | 127.50 |
| 7 | 75 | 100 | 0.613 | 2 | 49.50 |
| 8 | 11 | 100 | 0.235 | 13 | 204.00 |
| 9 | 39 | 100 | 0.333 | 4 | 79.35 |
| 10 | 51 | 100 | 0.546 | 3 | 93.90 |
| 11 | 42 | 100 | 0.155 | 4 | 25.95 |
| 12 | 55 | 100 | 0.360 | 3 | 53.90 |
| 13 | 21 | 100 | 0.298 | 6 | 118.40 |
| 14 | 43 | 100 | 0.296 | 3 | 43.90 |
| 15 | 34 | 100 | 0.201 | 5 | 54.70 |
| 16 | 49 | 100 | 0.151 | 3 | 17.00 |
| 17 | 42 | 100 | 0.161 | 4 | 27.75 |
| 18 | 17 | 100 | 0.103 | 11 | 54.60 |
| 19 | 16 | 100 | 0.477 | 8 | 293.10 |
| 20 | 48 | 100 | 0.186 | 3 | 21.90 |
| 21 | 39 | 100 | 0.290 | 4 | 66.60 |
| 22 | 28 | 100 | 0.226 | 5 | 65.10 |
| 23 | 49 | 100 | 0.211 | 3 | 26.90 |
| 24 | 42 | 100 | 0.376 | 3 | 59.90 |
| 25 | 15 | 100 | 0.269 | 9 | 161.60 |
| 26 | 46 | 100 | 0.198 | 4 | 35.25 |
| 27 | 23 | 100 | 0.322 | 6 | 130.65 |
| 28 | 14 | 100 | 0.505 | 9 | 350.00 |
| 29 | 24 | 100 | 0.411 | 6 | 169.50 |
| 30 | 36 | 100 | 0.105 | 5 | 20.00 |
| 31 | 23 | 100 | 0.367 | 6 | 152.90 |
| 32 | 42 | 100 | 0.301 | 3 | 44.90 |

TABLE C: DATA OF PREBIND HARD COVER BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. prebound book (RN) | cost per circ. prebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|---------------------------------------|---|-----------------------|-----------------|
| 33 | 53 | 100 | 0.347 | 3 | 51.50 |
| 34 | 32 | 100 | 0.276 | 5 | 75.20 |
| 35 | 20 | 100 | 0.294 | 7 | 134.70 |
| 36 | 27 | 100 | 0.323 | 5 | 103.70 |
| 37 | 41 | 100 | 0.264 | 4 | 51.35 |
| 38 | 22 | 100 | 0.439 | 5 | 150.10 |
| 39 | 30 | 100 | 0.524 | 4 | 133.05 |
| 40 | 45 | 100 | 0.348 | 3 | 54.30 |
| 41 | 22 | 100 | 0.347 | 7 | 145.50 |
| 42 | 48 | 100 | 0.244 | 3 | 30.80 |
| 43 | 24 | 100 | 0.216 | 7 | 80.90 |
| 44 | 93 | 100 | 0.520 | 2 | 38.00 |
| 45 | 90 | 100 | 0.920 | 2 | 78.00 |
| 46 | 102 | 100 | 1.185 | 2 | 104.55 |
| 47 | 34 | 100 | 0.406 | 4 | 101.40 |
| 48 | 38 | 100 | 0.339 | 4 | 81.18 |
| 49 | 21 | 100 | 0.231 | 7 | 102.90 |
| 50 | 80 | 100 | 0.640 | 2 | 53.75 |
| 51 | 38 | 100 | 0.303 | 4 | 70.35 |
| 52 | 47 | 100 | 0.244 | 3 | 33.40 |
| 53 | 26 | 100 | 0.147 | 6 | 47.10 |
| 54 | 42 | 100 | 0.209 | 4 | 38.70 |
| 55 | 42 | 100 | 0.152 | 4 | 25.05 |
| 56 | 76 | 100 | 0.345 | 2 | 20.50 |

TABLE D: DATA OF PREBIND PAPER BACK BOOKS

| book No. | price (P) | No. of circ. (ON) | prebind cost (CR) | cost per circ. (OCC) | price prebound (PR) |
|----------|--------------|----------------------|----------------------|-------------------------|------------------------|
| 1 | 12.95 | 14 | 5.1 | 0.925 | 18.05 |
| 2 | 6.00 | 20 | 6.0 | 0.300 | 12.00 |
| 3 | 15.30 | 19 | 6.0 | 0.808 | 21.35 |
| 4 | 6.50 | 20 | 5.1 | 0.325 | 11.60 |
| 5 | 6.45 | 20 | 4.4 | 0.323 | 10.85 |
| 6 | 16.95 | 31 | 5.1 | 0.547 | 22.05 |
| 7 | 16.00 | 16 | 5.1 | 1.000 | 21.10 |
| 8 | 42.00 | 51 | 3.0 | 0.824 | 48.00 |
| 9 | 10.55 | 32 | 5.1 | 0.330 | 15.65 |
| 10 | 26.95 | 48 | 5.1 | 0.561 | 32.05 |
| 11 | 24.15 | 37 | 6.0 | 0.653 | 30.15 |
| 12 | 8.60 | 34 | 5.1 | 0.250 | 13.70 |
| 13 | 12.60 | 58 | 4.4 | 0.217 | 17.00 |
| 14 | 6.15 | 20 | 4.4 | 0.308 | 10.55 |
| 15 | 4.15 | 16 | 4.4 | 0.259 | 8.55 |
| 16 | 3.45 | 17 | 4.4 | 0.203 | 7.85 |
| 17 | 5.10 | 11 | 4.4 | 0.464 | 9.50 |
| 18 | 3.53 | 22 | 4.4 | 0.160 | 7.93 |
| 19 | 2.45 | 16 | 4.4 | 0.153 | 6.85 |
| 20 | 13.15 | 20 | 6.0 | 0.658 | 19.15 |
| 21 | 8.95 | 17 | 4.4 | 0.526 | 13.35 |
| 22 | 32.20 | 6 | 6.0 | 5.367 | 38.20 |
| 23 | 4.15 | 26 | 4.4 | 0.160 | 8.55 |
| 24 | 14.95 | 29 | 5.1 | 0.516 | 20.05 |
| 25 | 19.95 | 54 | 5.1 | 0.369 | 25.05 |
| 26 | 2.00 | 12 | 4.4 | 0.167 | 6.40 |
| 27 | 6.95 | 16 | 4.4 | 0.434 | 11.35 |
| 28 | 6.95 | 21 | 4.4 | 0.331 | 11.35 |
| 29 | 16.00 | 43 | 5.1 | 0.372 | 21.10 |
| 30 | 6.85 | 36 | 4.4 | 0.190 | 11.25 |
| 31 | 9.35 | 29 | 5.1 | 0.319 | 14.35 |
| 32 | 46.60 | 51 | 4.4 | 0.914 | 51.00 |

TABLE D: DATA OF PREBIND PAPER BACK BOOKS

| book No. | price (P) | No. of circ. (ON) | prebind cost (CR) | cost per circ. (OCC) | price prebound (PR) |
|----------|--------------|----------------------|----------------------|-------------------------|------------------------|
| 33 | 4.50 | 23 | 4.4 | 0.196 | 8.90 |
| 34 | 9.20 | 27 | 4.4 | 0.341 | 13.60 |
| 35 | 4.00 | 28 | 4.4 | 0.143 | 8.40 |
| 36 | 7.30 | 18 | 5.1 | 0.406 | 12.40 |
| 37 | 6.95 | 14 | 5.1 | 0.496 | 12.05 |
| 38 | 25.30 | 30 | 5.1 | 0.843 | 30.40 |
| 39 | 16.00 | 21 | 3.0 | 0.762 | 22.00 |
| 40 | 19.05 | 11 | 6.0 | 1.732 | 25.15 |
| 41 | 44.40 | 49 | 5.1 | 0.906 | 49.50 |
| 42 | 27.75 | 23 | 5.1 | 1.207 | 32.85 |
| 43 | 51.35 | 86 | 6.0 | 0.597 | 57.35 |
| 44 | 1.095 | 40 | 6.0 | 0.274 | 16.95 |
| 45 | 14.00 | 15 | 6.0 | 0.933 | 20.00 |
| 46 | 6.62 | 26 | 5.1 | 0.255 | 11.72 |
| 47 | 9.35 | 36 | 5.1 | 0.260 | 14.45 |
| 48 | 13.10 | 42 | 5.1 | 0.312 | 18.20 |
| 49 | 8.75 | 45 | 5.1 | 0.194 | 13.85 |
| 50 | 7.55 | 26 | 4.4 | 0.290 | 11.95 |

TABLE D: DATA OF PREBIND PAPER BACK BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. prebound book (RN) | cost per circ. prebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|---------------------------------------|---|-----------------------|-----------------|
| 1 | 20 | 100 | 0.181 | 8 | 85.55 |
| 2 | 40 | 100 | 0.120 | 6 | 24.00 |
| 3 | 26 | 100 | 0.213 | 6 | 70.75 |
| 4 | 36 | 100 | 0.116 | 6 | 27.40 |
| 5 | 34 | 100 | 0.108 | 6 | 27.85 |
| 6 | 40 | 100 | 0.221 | 4 | 45.75 |
| 7 | 21 | 100 | 0.211 | 7 | 90.90 |
| 8 | 102 | 100 | 0.480 | 2 | 36.00 |
| 9 | 47 | 100 | 0.157 | 4 | 26.55 |
| 10 | 57 | 100 | 0.321 | 3 | 48.80 |
| 11 | 46 | 100 | 0.301 | 3 | 42.30 |
| 12 | 54 | 100 | 0.137 | 3 | 12.10 |
| 13 | 78 | 100 | 0.170 | 2 | 8.20 |
| 14 | 34 | 100 | 0.106 | 6 | 26.35 |
| 15 | 33 | 100 | 0.086 | 7 | 20.50 |
| 16 | 39 | 100 | 0.079 | 6 | 12.85 |
| 17 | 21 | 100 | 0.095 | 10 | 41.50 |
| 18 | 50 | 100 | 0.079 | 5 | 9.72 |
| 19 | 45 | 100 | 0.068 | 7 | 10.30 |
| 20 | 29 | 100 | 0.192 | 6 | 59.75 |
| 21 | 25 | 100 | 0.134 | 6 | 40.35 |
| 22 | 30 | 100 | 0.382 | 17 | 509.20 |
| 23 | 53 | 100 | 0.086 | 4 | 8.05 |
| 24 | 39 | 100 | 0.201 | 4 | 39.75 |
| 25 | 68 | 100 | 0.251 | 2 | 14.85 |
| 26 | 38 | 100 | 0.064 | 9 | 11.60 |
| 27 | 26 | 100 | 0.113 | 7 | 37.30 |
| 28 | 34 | 100 | 0.113 | 5 | 23.40 |
| 29 | 57 | 100 | 0.211 | 3 | 26.90 |
| 30 | 59 | 100 | 0.112 | 3 | 9.30 |
| 31 | 45 | 100 | 0.143 | 4 | 22.65 |
| 32 | 104 | 100 | 0.510 | 2 | 42.20 |

TABLE D: DATA OF PREBIND PAPER BACK BOOKS

| book No. | breakeven No. of circ. (Y1) | No. of circ. prebound book (RN) | cost per circ. prebound book (OCCR) | No. of books (NBR) | savings (SV) |
|-------------|-----------------------------------|---------------------------------------|---|-----------------------|-----------------|
| 33 | 45 | 100 | 0.089 | 5 | 13.60 |
| 34 | 40 | 100 | 0.136 | 4 | 23.20 |
| 35 | 59 | 100 | 0.084 | 4 | 7.60 |
| 36 | 31 | 100 | 0.124 | 6 | 31.40 |
| 37 | 25 | 100 | 0.121 | 8 | 43.55 |
| 38 | 36 | 100 | 0.304 | 4 | 70.80 |
| 39 | 29 | 100 | 0.220 | 5 | 58.00 |
| 40 | 15 | 100 | 0.252 | 10 | 165.35 |
| 41 | 100 | 100 | 0.495 | 3 | 83.70 |
| 42 | 27 | 100 | 0.329 | 5 | 105.90 |
| 43 | 96 | 100 | 0.574 | 1 | 45.35 |
| 44 | 62 | 100 | 0.169 | 3 | 15.90 |
| 45 | 21 | 100 | 0.200 | 7 | 78.00 |
| 46 | 46 | 100 | 0.117 | 4 | 14.76 |
| 47 | 46 | 100 | 0.144 | 3 | 13.60 |
| 48 | 58 | 100 | 0.182 | 3 | 21.10 |
| 49 | 71 | 100 | 0.138 | 3 | 12.40 |
| 50 | 41 | 100 | 0.120 | 4 | 18.25 |

TABLE E: DATA OF THICKNESS, DIMENSION (TRIMSIZE)
TYPE OF COVER AND TYPE OF BINDING

| book No. | thickness | type of binding sewn=1 perfect bound=0 | dimension (trimsize) | type of cover paper back=1 hard cover=0 |
|----------|-----------|--|-------------------------|---|
| 1 | 2.3 | 0 | 301 | 1 |
| 2 | 0.1 | 0 | 650 | 1 |
| 3 | 1.8 | 0 | 582 | 1 |
| 4 | 2.2 | 0 | 280 | 1 |
| 5 | 1.2 | 0 | 203 | 1 |
| 6 | 1.5 | 0 | 270 | 1 |
| 7 | 0.08 | 0 | 345 | 1 |
| 8 | 0.7 | 0 | 558 | 1 |
| 9 | 1.6 | 0 | 443 | 1 |
| 10 | 2.2 | 0 | 462 | 1 |
| 11 | 0.8 | 0 | 598 | 1 |
| 12 | 0.8 | 0 | 271 | 1 |
| 13 | 2.7 | 0 | 180 | 1 |
| 14 | 2.0 | 0 | 189 | 1 |
| 15 | 2.0 | 0 | 200 | 1 |
| 16 | 1.6 | 0 | 186 | 1 |
| 17 | 1.8 | 0 | 187 | 1 |
| 18 | 1.6 | 0 | 190 | 1 |
| 19 | 1.1 | 0 | 186 | 1 |
| 20 | 1.8 | 0 | 619 | 1 |
| 21 | 3.0 | 0 | 220 | 1 |
| 22 | 2.2 | 0 | 605 | 1 |
| 23 | 0.8 | 0 | 264 | 1 |
| 24 | 2.8 | 0 | 345 | 1 |
| 25 | 2.0 | 0 | 351 | 1 |
| 26 | 0.5 | 0 | 182 | 1 |
| 27 | 1.1 | 0 | 276 | 1 |
| 28 | 1.2 | 0 | 198 | 1 |
| 29 | 1.7 | 0 | 271 | 1 |
| 30 | 1.8 | 0 | 136 | 1 |
| 31 | 2.4 | 0 | 293 | 1 |
| 32 | 0.6 | 0 | 212 | 1 |

TABLE E: DATA OF THICKNESS, DIMENSION (TRIMSIZE)
TYPE OF COVER AND TYPE OF BINDING

| book No. | thickness | type of binding sewn=1 perfect bound=0 | dimension (trimsize) | type of cover paper back=1 hard cover=0 |
|-------------|-----------|--|-------------------------|---|
| 33 | 1.2 | 0 | 201 | 1 |
| 34 | 2.5 | 0 | 201 | 1 |
| 35 | 1.0 | 0 | 187 | 1 |
| 36 | 1.0 | 0 | 304 | 1 |
| 37 | 1.3 | 0 | 273 | 1 |
| 38 | 1.1 | 0 | 293 | 1 |
| 39 | 1.1 | 0 | 492 | 1 |
| 40 | 1.7 | 0 | 470 | 1 |
| 41 | 0.8 | 0 | 298 | 1 |
| 42 | 2.6 | 1 | 420 | 1 |
| 43 | 1.0 | 1 | 742 | 1 |
| 44 | 0.9 | 1 | 441 | 1 |
| 45 | 1.0 | 1 | 577 | 1 |
| 46 | 2.1 | 1 | 290 | 1 |
| 47 | 2.5 | 1 | 300 | 1 |
| 48 | 2.5 | 1 | 300 | 1 |
| 49 | 1.8 | 1 | 274 | 1 |
| 50 | 1.0 | 1 | 202 | 1 |
| 51 | 1.3 | 0 | 450 | 0 |
| 52 | 2.1 | 0 | 369 | 0 |
| 43 | 1.3 | 0 | 294 | 0 |
| 54 | 3.0 | 0 | 282 | 0 |
| 55 | 1.5 | 0 | 263 | 0 |
| 56 | 2.4 | 0 | 423 | 0 |
| 57 | 3.7 | 0 | 638 | 0 |
| 58 | 1.0 | 0 | 664 | 0 |
| 59 | 2.0 | 0 | 483 | 0 |
| 60 | 4.0 | 0 | 352 | 0 |
| 61 | 0.5 | 0 | 522 | 0 |
| 62 | 0.8 | 0 | 459 | 0 |
| 63 | 0.5 | 0 | 500 | 0 |

TABLE E: DATA OF THICKNESS, DIMENSION (TRIMSIZE)
TYPE OF COVER AND TYPE OF BINDING

| book No. | thickness | type of binding sewn=1 perfect bound=0 | dimension (trimsize) | type of cover paper back=1 hard cover=0 |
|-------------|-----------|--|-------------------------|---|
| 64 | 1.5 | 0 | 287 | 0 |
| 65 | 1.4 | 1 | 423 | 0 |
| 66 | 0.6 | 1 | 226 | 0 |
| 67 | 2.0 | 1 | 300 | 1 |
| 68 | 0.6 | 1 | 253 | 0 |
| 69 | 2.2 | 1 | 312 | 0 |
| 70 | 1.3 | 1 | 294 | 0 |
| 71 | 1.2 | 1 | 382 | 0 |
| 72 | 2.2 | 1 | 279 | 0 |
| 73 | 2.1 | 1 | 319 | 0 |
| 74 | 1.5 | 1 | 363 | 0 |
| 75 | 1.1 | 1 | 624 | 0 |
| 76 | 1.6 | 1 | 580 | 0 |
| 77 | 2.2 | 1 | 421 | 0 |
| 78 | 3.3 | 1 | 452 | 0 |
| 79 | 1.7 | 1 | 583 | 0 |
| 80 | 0.2 | 1 | 223 | 0 |
| 81 | 1.3 | 1 | 424 | 0 |
| 82 | 1.4 | 1 | 414 | 0 |
| 83 | 2.0 | 1 | 622 | 0 |
| 84 | 1.0 | 1 | 753 | 0 |
| 85 | 0.8 | 1 | 593 | 0 |
| 86 | 1.6 | 1 | 365 | 0 |
| 87 | 2.0 | 1 | 805 | 0 |
| 88 | 4.1 | 1 | 364 | 0 |
| 89 | 1.0 | 1 | 720 | 0 |
| 90 | 0.9 | 1 | 346 | 0 |
| 91 | 0.7 | 1 | 908 | 0 |
| 92 | 0.8 | 1 | 490 | 0 |
| 93 | 0.3 | 1 | 884 | 0 |
| 94 | 1.8 | 1 | 791 | 0 |
| 95 | 2.3 | 1 | 918 | 0 |

TABLE E: DATA OF THICKNESS, DIMENSION (TRIMSIZE)
TYPE OF COVER AND TYPE OF BINDING

| book No. | thickness | type of binding | dimension (trimsize) | type of cover | |
|-------------|-----------|---------------------------|-------------------------|---------------|--------------|
| | | sewn=1 perfect bound=0 | | paper back=1 | hard cover=0 |
| 96 | 3.1 | 1 | 870 | | 0 |
| 97 | 4.5 | 0 | 449 | | 0 |
| 98 | 2.0 | 0 | 268 | | 0 |
| 99 | 1.8 | 0 | 292 | | 0 |
| 100 | 2.8 | 1 | 287 | | 0 |
| 101 | 2.7 | 1 | 376 | | 0 |
| 102 | 3.6 | 1 | 377 | | 0 |
| 103 | 1.4 | 1 | 138 | | 0 |
| 104 | 1.0 | 0 | 516 | | 0 |
| 105 | 0.5 | 0 | 288 | | 0 |
| 106 | 1.5 | 0 | 694 | | 0 |

APPENDIX B¹

The economic justification for binding is demonstrated by this illustration. Librarians may insert their own costs to get a more accurate estimate. However, no matter what particular costs are used for a book and the binding process, this illustration exemplifies the financial advantages for rebinding and prebinding.

A new hardcover book costs \$12.00. It gets 50 circulations.

$$\$12.00 \div 50 = 24\text{¢ per circulation}$$

A used 8-inch hardcover book rebound according to "Class A" standards costs \$3.00 for the rebinding. It gets 100 circulations.

$$\$3.00 \div 100 = 3\text{¢ per circulation}$$

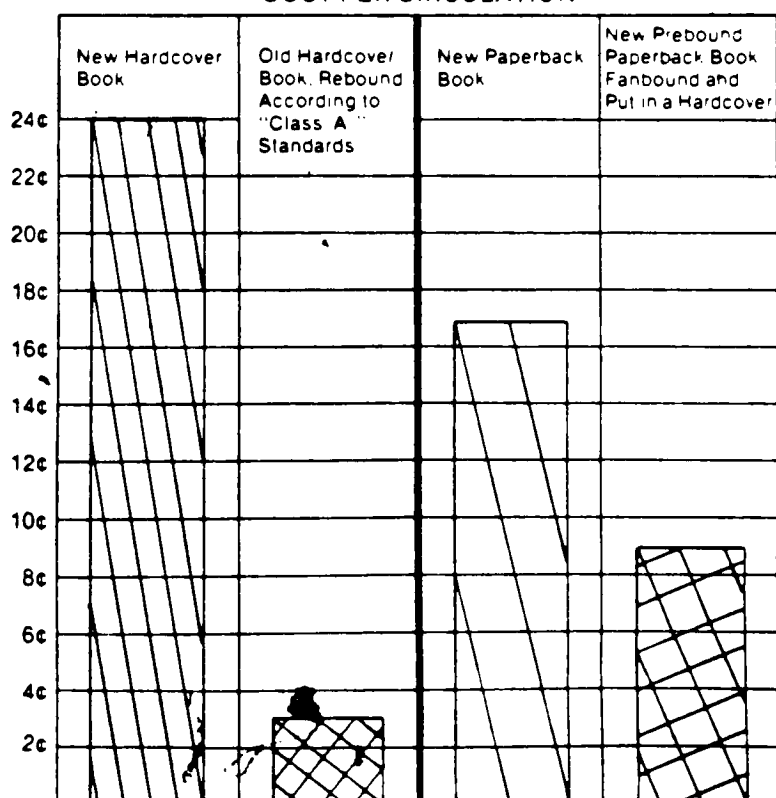
A new paperback book costs \$2.00. It gets 12 circulations.

$$\$2.00 \div 12 = 17\text{¢ per circulation}$$

A new paperback book costs \$2.00 and the prebinding cost to have the book fanbound and put in a hardcover is \$2.25. It gets 50 circulations.

$$\$4.25 \div 50 = 9\text{¢ per circulation}$$

COST PER CIRCULATION



APPENDIX C

**LIBRARY BINDING INSTITUTE
STANDARD FOR LIBRARY BINDING****Introduction****1.0 Purpose and Scope**

This Standard specifies methods and materials appropriate for the binding of books and periodicals that must withstand the rigors of library use; that is, for the manufacture of bookbindings that are sturdy, durable, and flexible. This Standard is applicable for the following general procedures:

1.1 Books

- ☐ First-time hard cover binding of monographs for library use.
- ☐ Rebinding of hard cover monographs for library use.

1.2 Periodicals

- ☐ First-time hard cover binding of serials.
- ☐ Rebinding of hard cover serials.

1.3 Exceptions

No specifications are set forth for binding volumes identified by a customer as having high artifactual value; or for any volumes that, because of their physical characteristics, cannot or should not be library bound. Arrangements for special treatments shall be made on an item-by-item basis by the customer in consultation with the binder.

2.0 Title & Citation

This Standard shall be cited as the *Library Binding Institute Standard For Library Binding*

3.0 Representation & Warranty

Only binding that adheres to this Standard may be represented as conforming to the *Library Binding Institute Standard For Library Binding*. With respect to such binding, the binder shall warrant to the customer as follows:

“Warranty: We warrant that the binding represented by us as conforming to the *Library Binding Institute Standard For Library Binding* complies with all requirements of the *Library Binding Institute Standard For Library Binding* as amended. This statement is made pursuant to Sections 2.0 and 3.0 of the *Library Binding Institute Standard For Library Binding* issued by the Library Binding Institute, and applicable federal and state laws relative to representations by a seller to a purchaser regarding the quality of a product and its adherence to a standard.”

4.0 Classification of Volumes

For the purpose of this Standard, volumes shall be classified as follows.

4.1 Books

A book is a single text block that can be bound without requiring the binder to refer to, or make, a record of the spine stamping pattern and color of cover for the purpose of matching the volume to others having the same title.

4.2 Reference Books

A reference book is a single text block for which the color of cover and color of stamping foil must be selected to match others in a set or series. The binder may or may not be required to refer to, or make, a record of the spine stamping pattern.

4.3 Periodicals

A periodical consists of one or more serial issues that must be bound together as a single unit; and requires the binder to refer to, or make, a record of the spine stamping pattern, color of cover, and color of stamping foil, for the purpose of matching the volume to others having the same title.

Technical Specifications

5.0 Examination and Collation

All volumes shall be carefully inspected to determine an appropriate method for binding or rebinding. Inspection shall include an examination of the condition of the paper, the nature and condition of the original leaf attachment, and the width of the binding margin. Based on this inspection a suitable method of leaf attachment shall be selected. An examination of the head, fore edge, and tail margins shall be made to identify those volumes that cannot be trimmed without cutting into text or illustrations.

5.1 Books

Books shall be inspected for completeness and for correct order of leaves.

5.2 Periodicals

5.2.1 Custom Periodical Collation

Custom periodical collation shall include one or all of the following services per instructions from the customer: custom placement of title page, table of contents, index, supplements, and other inserts; removal of covers and unpaginated advertising at the front and back of each issue; inspection to ensure correct order of issues; and examination for completeness and defects. Incomplete or defective volumes shall be returned to the customer or bound as is, per instructions from the customer.

5.2.2 Standard Periodical Collation

Standard periodical collation shall include inspection for completeness and correct order of issues. Title page, table of contents, index, supplements, and other inserts shall be bound in the order in which the binder receives them from the customer. Advertisements shall be left in place. Incomplete or defective volumes shall be returned to the customer or bound as is, per instructions from the customer.

5.3

Repair

All paper tears shall be repaired with transparent pressure-sensitive alkaline paper mending tape, unless the customer and the binder make special arrangements for use of alternative mending materials

5.4

Maps, Illustrations, and Folded Sheets

Steps shall be taken to preserve maps, illustrations, and folded sheets that are likely to be damaged when the spine of the text block is milled, the leaves attached, or the text block trimmed. Options include selecting a method of leaf attachment that requires as little of the binding margin as possible, setting the map or illustration out on a strip of reinforcing cloth or alkaline paper that is compatible with the weight and texture of the map or illustration; constructing a cloth or alkaline paper pocket for the map or illustration; and/or leaving the text block untrimmed. Refolding of maps or other inserts to accommodate trimming or oversewing shall be avoided whenever possible. When a pocket is constructed for an insert that is thicker than 3/16 inch, stubbing shall be added to the text block.

6.0

Attaching the Leaves

Specifications are set forth for the following methods of attaching leaves:

- ☐ Oversewing
- ☐ Sewing through the fold
- ☐ Double-fan adhesive binding
- ☐ Recasing
- ☐ Side sewing

The customer may provide the binder with instructions for selecting the method of leaf attachment by writing general guidelines that can be used by the binder to make decisions, or by writing specific instructions for each volume.

In the absence of instructions from the customer, the binder shall use his/her best judgment in selecting an appropriate method of leaf attachment for each volume. The binder shall provide the customer, in writing, with the general guidelines that are used by the bindery to make decisions regarding leaf attachment.

6.1

Oversewing

Oversewing is a method of sewing thin sections (i.e., piles) of leaves, one to another in succession, to create a semi-flexible text block. This process can be done by hand or by machine. When done by machine, multiple needles and threads pass obliquely through the binding margin of each section, forming stitches that link it to adjacent sections. When done by hand, the sections are whip stitched, one to another, using one needle and one thread. Medium and large size text blocks that are oversewn by hand shall be sewn onto tapes. For all oversewn volumes, a minimum binding margin of 5/8 inch (after milling) is desirable. When volumes have narrower margins another method of leaf attachment shall be used if possible. If no other method is appropriate, volumes that have narrow margins may be oversewn on a machine that has been modified by adding a narrow sewing plate. Because this technique is less strong than regular oversewing it shall be used only as a last option.

6.1.1

Preparation

The spine of the volume shall be milled or trimmed if necessary to free the leaves for sewing. No more than 1/8 inch of the binding margin shall be removed.

6.1.2

Process

All volumes shall be divided into uniform sections approximately 1/16 inch thick, the thickness variable depending on the nature and condition of the paper.

Sewing shall be no closer than 1/4 inch, and no farther than 1 inch from the head and tail of the text block after trimming. The shuttle thread shall be coated with methyl cellulose paste during sewing, or a thin line of paste shall be applied along the binding margin of the top sheet of each section prior to sewing.

In no case shall the sewing stitches be closer to the text than 1/8 inch.

6.1.3

Endpaper Construction

Endpapers for oversewing shall consist of:

☐ a single folded sheet tipped 1/4 inch in from the edge of a single leaf to make three leaves. A 1-1/4 inch strip of reinforcing cloth shall be adhered along the binding edge of the folded sheet and the exposed 1/4 inch margin of the single leaf. After sewing, the outermost leaf shall be folded and tipped back flush and parallel to (but not extending beyond) the binding edge of the text block, to cover the sewing thread and to allow the endpaper to hinge from the binding edge.

or

☐ 2 or 3 leaves. One leaf has a 1-1/4 inch wide reinforcing cloth extension. A second leaf is tipped to that extension along the binding edge, and a third leaf may be tipped to the second leaf. When this type of endpaper is used, boards shall be cut approximately 1/4 inch narrower than specified in Section 11.3 of this Standard, and the spaces between the inlay and the boards shall be no less than 3/8 inch, and no more than 1/2 inch wide. (This alternative endpaper may be used with the permission of the customer.)

6.2

Sewing Through the Fold

Sewing through the fold is a method of attaching separate signatures, one to another in succession, to create a text block. Signatures may be sewn through the fold by hand, using one needle and one thread; or by machine, using multiple needles and threads. A volume consisting of a single signature may also be sewn through the fold, to secure the leaves and to attach them to endpapers.

6.2.1

Preparation

All staples shall be removed prior to sewing. All weak and damaged folds shall be reinforced or repaired with pressure-sensitive alkaline paper mending tape, unless the customer and the binder make special arrangements for use of alternative mending materials. Loose leaves or stiff inserts shall be hinged or tipped in. Sewing holes may be pre-punched; or may be cut with a saw, provided that they do not extend more than 1/4 inch in on either side of the fold of any sheet. When a volume is being resewn, and original sewing holes exist, these should be used whenever possible.

6.2.2

Process

6.2.2.1

Sewing Through the Fold by Hand

For optimum combination of openability and serviceability, tapes shall be used on all volumes sewn through the fold by hand. (Sawn-in cords may be substituted, with the permission of the customer.) As a general rule, text blocks less than 8 inches high shall be sewn on two tapes; those between 8 inches and 12 inches on three tapes; and those over 12 inches on four or more tapes. All tapes shall extend at least one inch onto the endpapers. The kettle stitches shall be no closer than 1/4 inch, and no farther than 1 inch from the head and tail of

the text block after trimming. Sewing shall be all along except on volumes with many thin signatures, in which case sewing may be two-on for all but the first six and the last six signatures. When a text block consists of a single signature, it shall be sewn through the fold by hand using a sewing pattern based on the figure eight, with stitches no longer than 2 inches.

6.2.2.2 Sewing Through the Fold by Machine

As many needles as possible shall be used. Stitches shall be no closer than 1/4 inch, and no farther than 1 inch from the head and tail of the text block after trimming. Volumes sewn through the fold by machine may be sewn on tapes, per instructions from the customer. When a text block consists of a single signature, it shall be sewn through the fold by machine using a lock stitch, with stitches approximately 1/2 inch long.

6.2.3 Endpaper Construction

6.2.3.1 Endpapers for Volumes Comprised of Multiple Signatures

Endpapers for volumes comprised of multiple signatures that will be sewn through the fold by hand or by machine shall consist of:

- ☐ a single leaf hinged with reinforcing cloth to a single folded sheet,
- ☐ a single folded sheet with a reinforcing cloth hinge that is adhered along the binding edge of the endpaper and extends beyond the fold,

or

- ☐ two folded sheets, nested. The fold of the inner sheet shall be reinforced with a 3/4 inch wide reinforcing cloth strip.

6.2.3.2 Endpapers for Volumes Comprised of a Single Signature

Endpapers for volumes comprised of a single signature that will be sewn through the fold by hand or by machine shall consist of two folded sheets. The fold of the outer sheet shall be reinforced with a 1-1/4 inch wide reinforcing cloth strip. The signature and the endpapers shall be sewn through the fold as a single unit.

6.3 Double-fan Adhesive Binding

Double-fan adhesive binding is a method of adhering loose leaves together at the binding edge to create a text block. An emulsion copolymer of internally plasticized polyvinyl acetate adhesive shall be used.

No text block more than 2 inches thick or weighing more than 5 pounds shall be double-fan adhesive bound. The grain direction, flexibility, and surface finish of the paper must be taken into account when deciding whether to double-fan adhesive bind a volume.

6.3.1 Preparation

The spine of the text block shall be milled or trimmed if necessary, to free all leaves so that they may be fanned. As many paper fibers as possible shall be exposed for optimum linkage of paper and adhesive. If the spine is notched after milling, notches shall be no deeper than 1/8 inch, and in no case shall they cut into the text. Text blocks that have brittle paper shall not be notched.

6.3.2 Process

The text block shall be securely clamped. The binding edge shall be fanned first in one direction, as adhesive is applied by brush or by roller; and then in the opposite direction, as adhesive is applied. The penetration of adhesive between leaves shall be approximately 1/64 inch, so that each leaf is tipped to the next; but no adhesive shall run between pages farther than 1/8 inch, and in no case

shall it run into the text. If the binding edge is notched, all notches shall be completely filled with adhesive.

A stretchable spine lining shall be squarely and snugly adhered to the spine of the text block. The lining shall cover the entire spine, and extend onto the endpapers. The text block shall be positioned squarely and allowed to dry without the use of a heating or drying device.

6.3.3 Endpaper Construction

Endpapers for double-fan adhesive binding shall consist of a single folded sheet, which is tipped to the text block during the fanning operation.

6.4 Recasing

When text blocks are sewn through the fold, oversewn, or side sewn, and are intact (that is, when the original sewing thread is unbroken and the number of stitches is adequate for the size and weight of the text block) the sewing can be retained and the text block fitted with a new case.

6.4.1 Preparation

Old covers, adhesive, and spine lining shall be carefully and completely removed from the text block without damaging the sewing thread. The text block shall be inspected after the spine is cleaned. If the original sewing is not sound, minor repairs shall be made, a different method of leaf attachment shall be selected, or the volume shall be returned to the customer, per instructions from the customer.

6.4.2 Process

New endpapers shall be sewn to the text block using a method that is compatible with the original sewing structure. For text blocks that are sewn through the fold, endpapers shall be attached by sewing through the folds of one or two outermost signatures of the text block (in order to secure them), and then through the fold of the endpaper. For volumes that are oversewn or side sewn, the endpaper shall be whip stitched on with sewing stitches approximately 1 inch apart.

6.4.3 Endpaper Construction

Endpapers for volumes that will be recased shall consist of:

- ☐ a single leaf hinged with reinforcing cloth to a single folded sheet.
- ☐ a single folded sheet with a reinforcing cloth hinge that is adhered along the binding edge of the endpaper and extends beyond the fold.

or

- ☐ two folded sheets, nested. The fold of the inner sheet shall be reinforced with a 3/4 inch wide reinforcing cloth strip.

6.5 Side Sewing

Side sewing is a method of attaching signatures or loose leaves together by machine sewing the entire text block through the side along the binding margin, in a single pass. No text block more than 1/2 inch thick, or with a binding margin less than 3/4 inch wide, shall be side sewn.

6.5.1 Preparation

All staples shall be removed prior to sewing.

6.5.2

Process

A lock stitch shall be used. Stitches shall be approximately 1/2 inch long. The sewing shall be no farther from the head and tail of the text block than 1/2 inch after trimming, and shall be no farther in from the binding edge than 3/16 inch.

6.5.3

Endpaper Construction

Endpaper construction for side sewing shall meet the specifications in Section 6.1.3. of this Standard.

7.0

Trimming the Text Block

Text blocks shall be trimmed as squarely and slightly as possible. The trimmed edges shall be smooth and without knife marks. Excessive trimming of irregularly sized issues, for the purpose of making them uniform, shall be avoided. The binder shall leave text blocks untrimmed when necessary to preserve text, marginal notes, illustrations, and the folds of maps and other inserts. Volumes that will be recased, and that are already rounded and backed, shall be left untrimmed. The customer may specify that certain other volumes, or all volumes, shall be left untrimmed.

8.0

Gluing the Spine

Adhesive shall be applied to the spines of all sewn text blocks prior to rounding and backing. The adhesive shall thoroughly coat the spines. Text blocks shall be stacked squarely and allowed to dry without the use of a heating or drying device. (For volumes that are sewn through the fold, the adhesive shall be applied prior to trimming.)

9.0

Rounding and Backing

9.1

Process

Text blocks shall be evenly rounded to form a smooth, convex spine and a concave fore edge, and shall be backed to form shoulders that are symmetrical, uniform from head to tail, and nearly equal in size to the anticipated board thickness.

9.2

Exceptions

- ☐ Double-fan adhesive bound text blocks shall be rounded but only slightly backed with a small shoulder, so as not to split the text block or lining material.
- ☐ Text blocks that have been sewn through the fold, and that have signatures thicker than 1/4 inch, may be rounded but shall not be backed.
- ☐ Rounded and backed text blocks that will be recased shall be rerounded and backed only if they are poorly shaped and have strong sewing thread and paper.
- ☐ Flat backed text blocks that will be recased shall be rounded and backed only if they have strong sewing thread and paper.
- ☐ Text blocks less than 1/4 inch thick or that have fragile paper shall not be rounded and backed.

10.0

Lining Up the Spine

The spines of all text blocks shall be lined with spine lining cloth after rounding and backing. (This includes double-fan adhesive bound text blocks, to which a stretchable spine lining has already been applied.) The lining shall extend to

within 1/2 inch of the head and the tail of the text block, and extend squarely onto each endpaper at least 1 inch. The spines of all volumes over 1-1/2 inches thick that have been sewn through the fold or recased, and all other volumes over 2-1/2 inches thick or that weigh more than 5 pounds, shall be reinforced with an additional layer of material. This reinforcement can be alkaline paper (no lighter than 60 pound text weight) cut to the height and width of the spine, or a second layer of spine lining cloth. In the latter case, the first cloth lining shall extend from one shoulder, across the spine, and at least 1 inch onto one endpaper; the second cloth lining shall extend from the opposite shoulder, across the spine, and at least 1 inch onto the other endpaper. The result is a double lining on the spine, and a single lining extending onto each endpaper.

11.0 Making the Case

11.1 Cutting the Covering Material

Covering material shall be cut squarely, 1-1/2 inches taller and wider than the anticipated size of the finished case. This allows for a 3/4 inch overhang on all four sides of the unfinished case and results in a turn-in of 5/8 inch.

11.2 Stamping the Covering Material

Lettering shall be permanent, sharp, clean, legible, and stamped with adequate pressure, temperature, and dwell to ensure adhesion of the foil to the covering material. Binders shall keep records of stamping patterns and color of stamping foil for serial titles so that uniformity of sets may be maintained. (Precise matching of stamping may not always be possible, since different binders use different equipment and different type faces.)

11.3 Selecting and Cutting Boards

Boards shall be cut squarely and smoothly, with the grain running parallel to the binding edge. The height of the boards shall be approximately 1/4 inch taller than the text block, unless the text block is to be bound flush with the bottom of the case. In the latter instance the height of the boards shall be approximately 1/8 inch taller than the text block. The width of the boards for rounded and backed volumes shall be equal to the width of the text block from shoulder to fore edge. The width of the boards for flat backed volumes shall be approximately 3/16 inch narrower than the width of the text block. The thickness of the boards shall be between 0.060 and 0.125 inch, and appropriate for the size and weight of the text block. For heavy or large text blocks the boards shall be no less than 0.095 inch thick. For small or light text blocks the boards shall be no more than 0.080 inch thick. At least two (preferably three) board thicknesses shall be stocked to comply with this requirement.

11.4 Selecting and Cutting the Inlay

An inlay shall be used to reinforce the spine of the case. The inlay shall be cut squarely, and shall be the same width as the spine of the text block from shoulder to shoulder and the same height as the boards.

11.5 Assembling The Case

The boards and the inlay shall be squarely and securely adhered to the covering material. The spaces between the inlay and the boards shall be uniform and approximately 1/4 inch wide. On all volumes 1/2 inch thick or more, a piece of cord approximately 1/8 inch in diameter shall be placed at the head and tail of the inlay. (Cords shall be omitted if headbands have been applied to the head and tail of the text block prior to lining up the spine.) The corners of the cloth shall be left uncut so that library corners can be made; or shall be cut at a 45 degree angle so that traditional corners can be made. The covering material

shall be turned in snugly and uniformly, approximately 5/8 inch on all sides, and shall adhere neatly and tightly to the edges of the boards

12.0 Casing In

Text blocks shall be cased in squarely and tightly. All squares shall be uniform around the perimeter of the text block, and shall be 1/8 inch wide, plus or minus 1/16 inch, depending on the size of the text block. Very heavy or thick text blocks may be bound flush with the bottom of the case (that is, the case will have no square at the tail) per instructions from the customer. When text blocks are bound flush with the bottom of the case, the cord at the tail of the inlay shall be omitted.

Cased-in volumes shall either be pressed between metal-edged boards until thoroughly dry; or pressed in a building-in machine using sufficient pressure, dwell, and heat to ensure good adhesion of the endpapers to the boards and turn-ins, and good adhesion of the covering material to the spine lining and endsheets in the joint area of the text block. The amount of adhesive applied to the joints, and the method used for building in, shall be sufficient to ensure that joints are tight and secure and cannot be separated without damaging the bonded surfaces.

Endpapers shall adhere to all surfaces smoothly, and be free of wrinkles and bubbles.

13.0 Inspection

Each volume shall be inspected to ensure that:

- ☐ the case and the edges of the text block are free from adhesives,
- ☐ workmanship is neat,
- ☐ instructions from the customer have been followed,
- and
- ☐ there has been strict adherence to this Standard.

Materials Specifications

14.0 Paper

14.1 Endpapers

14.1.1 Paper Composition

All endpapers shall be constructed of paper that meets *American National Standard for Information Sciences—Permanence of Paper for Printed Library Materials*, ANSI Z39.48-1984:

- ☐ Minimum pH of 7.5 in accordance with the cold extraction method described in TAPPI T509 om-83.
- ☐ Minimum alkaline reserve equivalent to 2% calcium carbonate based on oven dry weight of the paper (see TAPPI UM531 for qualitative testing; or ASTM D3290-81, Subsection 11.4, for quantitative testing).
- ☐ The paper shall include no groundwood or unbleached pulp (see ANSI/TAPPI T401 os-74).

14.1.2

Basis Weight

Five Hundred (500) 25 inch by 38 inch sheets of the paper used to construct endpapers shall weigh 80 pounds

14.1.3

Mechanical Characteristics

Endpapers shall meet or exceed the following specifications:

| Test | Performance | Tappi Test Number |
|---|---------------------------|-------------------|
| Bursting Strength (Mullen) | 40 pounds per square inch | TAPPI T-403 |
| Folding Endurance (MIT), with grain | 275 double folds | TAPPI T-511 |
| Folding Endurance (MIT), across grain | 200 double folds | TAPPI T-511 |
| Tensile Strength, with grain | 40 pounds per inch | TAPPI T-404 |
| Tensile Strength, across grain | 25 pounds per inch | TAPPI T-404 |
| Tear Resistance (Elmendorf), with grain | 114 grams | TAPPI T-414 |
| Tear Resistance (Elmendorf), across grain | 140 grams | TAPPI T-414 |

14.2

Papers For Stubbing, Pockets, and Setting Out Inserts

Papers used for stubbing, pockets, and setting out inserts shall meet the specifications cited in Section 14.1.1.

14.3

Inlays

Inlays shall be made from flexible paperboard with the grain running parallel to the spine of the case. The paperboard shall be between 0.012 and 0.030 inch thick, and shall have a minimum pH of 7.0. (NOTE: Minimum pH shall be raised to 7.5 at such time as a suitable product becomes available.)

15.0

Binders Board

Board quality shall conform to the requirements of the *Manufacturing Standard and Specifications for Binders Board* issued by the Manufacturers of Binders Board, (January 15, 1975)—which is based on the requirements of U.S. Commercial Standard CS 50-34, *Binders Board for Bookbinding and Other Purposes*, published by the United States Department of Commerce, National Bureau of Standards; and is incorporated in the *Manufacturing Standards and Specifications for Textbooks* of the National Association of State Textbook Administrators (September 1, 1973).

16.0

Cloth

16.1

Reinforcing Cloth for Endpapers

Endpapers shall be reinforced with cotton cloth having no less than 77 warp threads per inch, and no less than 72 filling threads per inch. The tensile strength (strip method) of the warp threads shall be no less than 45 pounds per inch; and of the filling threads, no less than 20 pounds per inch.

- 16.2 Stretchable Fabric for Lining the Spines of Double-Fan Adhesive Bound Text Blocks**
The spines of double-fan adhesive bound text blocks shall be lined immediately after double-fanning with a stretchable fabric that does not split during rounding and backing.
- 16.3 Cloth for Lining All Spines After Rounding and Backing**
The spines of text blocks shall be lined with cotton cloth having no less than 45 warp threads per inch and no less than 38 filling threads per inch. The tensile strength (strip method) of the warp threads shall be no less than 54 pounds per inch, and of the filling threads, no less than 42 pounds per inch. The cloth shall weigh no less than 4 ounces per square yard.
Alternative material for lining spines (including synthetic material) may be substituted for cotton cloth providing that it meets or exceeds the performance of the cotton cloth specified above, as evidenced by an independent testing laboratory.
- 16.4 Covering Materials**
- 16.4.1 Group F Buckram**
Covering materials, including those that are preprinted, shall be impregnated with pyroxylin or an equivalent non-migratory resinous substance, and shall conform to the specifications for Group F Buckram cited in *Fabrics for Book Covers, ANSI L29 1-1977*, except that single-filled enameling duck may be used in place of double-filled enameling duck.
- 16.4.2 Exceptions**
Light-weight volumes (i.e., those weighing less than 2 pounds) may be covered with Group C-1 Book Cloth, with approval from the customer.
Alternative covering materials (including nonwoven materials), used alone or in conjunction with reinforcing materials, may be substituted for Group F Buckram, with approval from the customer, provided that these alternative materials meet or exceed the performance of the covering materials specified above, as evidenced by an independent testing laboratory.
- 17.0 Adhesives**
- 17.1 Adhesives for All Processes**
Adhesives used for all processes shall be capable of forming a permanent bond between the surfaces to be joined. The adhesive force shall be such that the bonded materials cannot be separated without damaging them.
- 17.2 Adhesive for Double-Fan Adhesive Binding, Gluing the Spine, and Lining Up the Spine**
Adhesive used for double-fan adhesive binding, gluing the spine, and lining up the spine shall be an emulsion copolymer of internally plasticized polyvinyl acetate adhesive that is flexible and that will not cross-link on long term aging at normal room temperature (25-30 degrees Centigrade).
- 17.3 Adhesive for Making The Case**
The adhesive used for making the case shall have good long-term aging characteristics. It shall be a high grade animal glue or polyvinyl acetate emulsion adhesive.

17.4**Adhesive for Casing-In**

Text blocks shall be cased in using a polyvinyl acetate emulsion adhesive with good long-term aging characteristics. The adhesive used for casing-in shall be compatible with the adhesive used to make the case, so that the case adheres tightly and securely to the text block. Adhesion of the covering material to the spine lining and endpapers in the joint is critical.

18.0**Thread****18.1****Thread for Oversewing**

Thread for oversewing shall be cotton, nylon, or cotton covered polyester. Cotton thread shall meet or exceed Federal Specifications U-T 276H (October 1976), nylon thread shall meet or exceed Federal Specifications U-7 295D (February 3, 1977).

18.2**Thread for Sewing Through The Fold**

Thread for sewing through the fold by machine shall be cotton, nylon, or cotton covered polyester, and shall be of appropriate caliper to control swell. Breaking strength shall be no less than 3.4 pounds for cotton, 4.0 pounds for nylon, and 4.2 pounds for cotton covered polyester. Threads of the same quality shall be used for sewing through the fold by hand, except that linen thread may also be used.

18.3**Thread for Side Sewing**

Thread for side sewing shall be at least equal to cotton thread No. 14-4 cord.

19.0**Sewing Tapes**

Sewing tapes shall be cotton or linen, shall be no less than 1/2 inch wide, and shall have no less than 104 warp threads per inch and 32 filling threads per inch. The tensile strength (strip method) of the warp threads shall be no less than 65 pounds; and of the filling threads, no less than 24 pounds.

20.0**Stamping Foil**

Stamping foil shall be legible during the life of the binding and shall perform as follows, when tested in environmental conditions as described in Federal Test Method AA T CC 23-72:

| Type Of Exposure | Time | Minimum Requirement |
|-----------------------|----------|---------------------|
| 158°F, Dry Heat | 10 Days | No change |
| 158°F, Moist Heat | 10 Days | Moderate change |
| Oxygen | 4 Days | Very slight change |
| Ozone, 50 PPHM, 100°F | 4 Days | No change |
| Hydrogen Sulfide Gas | 2 Hours | No change |
| Fade-Ometer | 40 Hours | Satisfactory |
| Oxides of Nitrogen | 3 Cycles | 3.0 |

Appendix D

GLOSSARY²**ADHESIVE BINDING**

A style of binding in which all pages are cut and roughed up all the back or binding edge and held together by adhesive. Adhesive binding is used for both paper covered and hard bound books.

EDITION BINDING

A total quantity of books printed and bound at one time.

OVERSEWING

A method of machine sewing much used in library reinforced bindings; instead of sewing through the back fold of the sections, the needles pass obliquely through the section itself, forming a lock stitch with each separate section and independent lock stitches along the back.

SMYTH SEWING

The operation of feeding signatures or sections into an automatic sewing machine by placing the open signatures straddle-wise on the revolving or moving arms of the machine; commonly used machines sew threads through each signature with the threads passing continuously through the entire book.

FOOTNOTES FOR APPENDIXES

¹Beaton, Joe. "Binding and Budget," The Library Scene. (March 1979), P.7.

²Rebsamen, Werner. Planing and Finishing. Course Notes, Rochester, New York: Rochester Institute of Technology.