

HOW MUCH IS TOO MUCH?
A CASE STUDY TO DETERMINE WHETHER THE COST OF BOOK
LOSS AT THE GEOLOGY LIBRARY AT THE UNIVERSITY OF
NORTH CAROLINA AT CHAPEL HILL IS GREATER THAN THE
COST OF AN ELECTRONIC SECURITY SYSTEM.

by
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Book loss is a major concern among many academic libraries. This case study describes the cost of book loss at the Geology Library at the University of North Carolina at Chapel Hill. It compares those costs, both tangible and intangible, to the costs and benefits of an electronic security system. Alternatives to an electronic security system are also discussed.

Headings:

College and University Libraries

Thefts and Losses of Books

Library Security Systems

INTRODUCTION

Ever since the first library was instituted so came the opportunity for book loss from that library. The first incident of theft from a library can be traced back to Persian conquerors removing papyrus rolls from an Egyptian library in 539 BC. Chaining books to tables was a common practice in Medieval times and during the Renaissance, Pope Nicholas V excommunicated all citizens who had not returned books that belonged to the church (Almagro, 49). While chains are no longer common practice, these days many libraries have installed electronic security systems, (ESS), to try and reduce the amount of book loss a library experiences. Today, many library budgets are decreasing and those that are not are finding their budgets are, at the very least, stagnant and unable to meet the rising costs of maintaining a library. Given these situations, libraries cannot afford to spend money replacing numerous amounts of books that have been lost when the money could be going towards new materials, better technology, increased staff, or any number of programs which "...contribute most to the library's effectiveness." (Bommer 270). It is the goal of this study to determine if installing an electronic security system in the Geology Library is a cost effective measure to reduce the annual amount of book loss that the library experiences.

The library to be studied is the Geology Library at the University of North Carolina, Chapel Hill. The library is located in 121 Mitchell Hall, which is the same building as the Geological Sciences Department, and is approximately 2,959 square feet and holds over 48,000 volumes, 42,000 maps and 850 periodical titles. The collection

provides extensive coverage of the geosciences including geophysics, geochemistry, petrology, structural geology, stratigraphy, sedimentology, economic geology, invertebrate paleontology, micropaleontology, and physical oceanography. Collection emphasis is on the Southeastern United States and Appalachian Basin region. Eligible borrowers include University of North Carolina, Chapel Hill faculty, students, and staff, as well as North Carolina residents who obtain a Library Borrower's Card and holders of a TRLN Cooperative Borrower's Card. Loan periods for borrowers are shown below.

Loan Periods:

Numbers refer to days unless otherwise specified.

Material Type	Faculty	Graduate Students	Staff	Undergraduates and Others
<i>Books</i>	180	90	30	30
<i>Journals</i>	30*	30*	2 hours*	2 hours*
<i>Theses</i>	30*	30*	2 hours*	2 hours*

* Material for Building Use Only.

Source: Geology Library Web Page

The physical layout of the library is such that there are two exits that patrons have access to. One exit is located next to the circulation desk and the other is located at the opposite end of the library. Typically there is no staff sitting at the circulation desk unless they are assisting patrons. The staff office is designed in such a way that staff are unable to easily watch patrons enter and leave the library. Since there is no electronic security system in place, it is possible for patrons to simply pick up material and walk out of the library without the staff noticing. In addition, Geology faculty and graduate students have keys that they can use to access the library after operating hours. Patrons using this service are supposed to remove the circulation card from the item they are checking out and write their names and personal identification numbers on the card and leave it in a designated box that is left out on the circulation desk every evening. If patrons do not follow this policy, the staff has no record of material that is taken after

hours. Given all of these factors, it is easy to estimate the magnitude of book loss at the library and the impact that it has on the collection as well as the budget.

For this study, book loss is defined as monographs that have been checked out but not returned after one year of the due date and monographs that have not been checked out but that cannot be located using trace procedures specified by the library. The second definition encompasses books that are lost due to theft as well as mismanagement of the collection (i.e. misshelving or misplacing of material by patrons or staff).

LITERATURE REVIEW

Studies done in 1991 by Robinson, Marshall, and Cravey indicate that libraries can lose up to 6% of their collections annually to theft and mutilation (Nicewarner and Heaton 10). A whopping 25% of material lost to theft can be contributed to staff and faculty (Ulmer 3). Certainly, some libraries lose more than others do and there has been a general outcry from the library community about how to prevent such losses.

Deterrents to protecting collections such as limited budgets, limited staff and collections housed in buildings that lack adequate security measures exist in many libraries and make it difficult to prevent loss (Wurzbarger 43). There are several questions that one must ask when confronting book loss in a library. Two of the most widely asked are why is material being lost and how can the library reduce or prevent such loss?

Some book loss in a library is due to mismanagement of the collection. This usually means that books are not shelved correctly by staff, or by patrons trying to "help out" by re-shelving their own material after use. Improper additions or deletions to the shelf list can also cause material to mysteriously "disappear". Niland and Kurth call this "paper loss", books that are present in the library but not locatable except by chance (135). Other material is lost by theft, either intentionally or by patrons removing material they intend to return but never do. One situation that promotes book loss in the Geology library is that Geology faculty and graduate students are issued keys to the library so they have access after hours. In her article, Susan Stewart, examined how keys issued to non-library personnel reduced the effectiveness of anti-theft measures during the hours that the libraries were closed (90). In her study, thirty-three percent of librarians that responded stated that losses to their collection was "minimal", fifty percent stated that

losses were "average" and fifteen percent stated that losses were "excessive" (93). When asked if the librarians agreed with the key holder policy, twenty-four agreed with it and twenty-three disagreed with it (94). The study did not, however, show what percentage of loss to the collection was a direct result of the key holder policy.

Related to this is the question of why books are taken from the library. In 1990, Terri Pedersen published a report of a study done at Emporia State University that attempted to determine who was stealing or mutilating library material and why. The results showed that situational circumstances led students to steal or mutilate material and that students as a whole could not be identified as "potential violators" (128). The study tentatively concluded that because material loss was due to circumstance, if libraries eliminated situations that were most likely to lead to theft, book loss could be reduced (128). An article by G.H. Souter discusses the problem of delinquent readers in academic libraries. Souter defines the delinquent reader as, "a user of the library who overborrows to a high degree; or retains books after they have been recalled; or illegally borrows, steals or mutilates books." (98). The author feels that there are five factors in the library's role on delinquency; they are security, availability, photocopying facilities, sanctions and attitude towards readers. With the issue of security there is a "catch-22" in that patrons are likely to steal if the security is poor, no matter how well the other factors are satisfied and if libraries do install a security system, they can expect mutilation to rise (101). Lack of adequate photocopying facilities can also increase the likelihood of mutilation. Two of the factors, availability and reader relations can help prevent delinquency. The more materials are available the less likely patrons are to take them or not return them. In addition, positive relationships with readers are likely to keep delinquency levels low

(102-104). Finally, the author believes that sanctions, such as book fines, be more widely enforced than they currently are (104). The article also discusses the "psychology" of the delinquent reader. Reasons for being "delinquent" include the belief that the delinquent reader's need for the book is greater than others' needs. Another reason is that the reader is "basically selfish" and feels as if they are the "only person in the university" and are therefore free to take what they want. Others don't feel that what they are doing is wrong and think they are taking a book from a thing (the library) not others who may need the book. With this is the mistaken idea that the library can afford to replace anything the delinquent reader takes (106-108). Patrons may also wish to take out material that is normally not circulated and they may want to avoid issues they see as inconvenient, such as checking out material or short loan periods. This may help to explain why books and reference materials are most commonly stolen (Ulmer 4). Niland and Kurth suggest that two of the most important factors to book loss are the nature of the collection and the nature of the exit control (135). A study undertaken by James H. Richards, Jr. indicates a number of physical, personal and management factors that can make stealing books easier. He states that physical factors include, "unobserved exits; windows in library areas; open stacks; ineffective security or alarm systems; [and] small, easily concealed books." Personal factors are "classroom pressure, economic need, convenience, competition, peer pressure such as dares or showing off, getting even; [and] lack of scruples." Finally, library management factors are "too few copies; inconvenient loan periods, insufficient or negligent staff; ineffective recall system; [and] lack of orientation or publicity concerning the implications of books stealing." (268).

Given that book loss is a large problem for many libraries there has been a great deal of literature written about how to prevent it. If the number of articles published about the benefits of electronic security systems (ESS) is any indication, there are many that feel that an ESS is the best way to prevent book loss. Supporters of ESS, like David Luurtsema believe that an ESS "...can be extremely advantageous in preventing theft in academic libraries. When properly used, these systems are able not only to prevent theft from occurring, but also work to deter thieves from even attempting to steal materials" (22). Ulmer states that an article written by C.Z. Hanson in 1990 estimates that "installation of security equipment alone will reduce theft by more than 50%" and that the average for libraries that have installed an ESS is as high as 85% to 90% (3). In her article, Alice M. Chavez describes how an electronic security system operates. First, a sensor (or tag) is placed inside the material. Second, system hardware such as gates, screens, posts, or columns detect the presence of the tagged item as it passes through unless the item has been desensitized or passed around the hardware (61). Not only does an ESS prevent tagged material from leaving the library, it may also create a "halo effect" where patrons may believe that all material in the library is tagged, even if this isn't the case, and prevent theft (Scherdin 232-35).

If electronic security systems are as effective as some believe then why doesn't every library have one? There are several factors that must be considered before making the decision to install an ESS. They include physical layout, circulation policies, type of library, and cost. For small, departmental libraries in an academic setting, cost seems to be the biggest factor. Justifying the expense of an ESS to supervisors requires taking statistics and performing a cost-benefit analysis to determine how valuable an ESS would

be to the library. In their 1974 article, Bommer and Ford discussed two methods that they developed to determine the cost-benefit analysis of an ESS for the Van Pelt Library at the University of Pennsylvania. This article turned out to be the basis for a majority of later articles and studies written about the cost-benefit value of electronic security systems.

In addition to these factors, there are several weaknesses that need to be discussed when considering an electronic security system. Most librarians will tell you that having an ESS does not guarantee "total security control" (Almagro 51). Some problems associated with an ESS are high costs, potential increase of mutilation and patrons that (often creatively) circumvent the system. For example, books can be passed through unsecured windows and dropped to a waiting accomplice or into the bushes to be picked up later. Fire exits that are not secured are another way books can bypass the system (Smith 50-51). Another problem is that detection systems can often produce false alarms, which can lure staff members into complacency when the alarm goes off with regularity (Olsen and Ostler 69). Material can be concealed in clothing and the magnetic tags can be removed by determined patrons. Patrons can pass books over, under, and around security gates. In addition, these systems will not ensure that overdue fines are paid or that properly checked out material is returned and they usually cannot control mutilation of material (Ulmer 4). It is these weaknesses which have lead several libraries to institute security measures in addition to an ESS.

One such measure is door checkers, whose job it is to monitor patrons leaving the building and make sure all library material has been properly checked out. According to Frederick E. Smith, door checkers serve the same purpose as an electronic security

system. That is, they make sure that patrons have checked out library materials they are leaving with (Smith, Door Checkers 7). Smith, however, does not feel that door checkers are a viable means for preventing theft. Door checkers should not be assigned any additional duties and this often leads to long periods of time with nothing to do. He argues that student checkers usually have no sense of commitment to the job and that motivation quickly drops for most checkers (8). Another problem is the inability to search patrons' belongings or clothing for legal and personal reasons. Relationships also create problems for student door checkers. Checking fellow students and friends may create an awkward atmosphere for the checker. Students are also in a subordinate position to faculty and may feel uncomfortable requesting to examine material (10). Student door checkers can also be unreliable by being tardy, having scheduling conflicts or by not showing up to work. While replacing student door checkers with adults can solve relationship and reliability problems, the job is still boring and adults cannot search patrons clothing any more than students can (11). Another alternative means of security is patron education. Informing patrons of the disservice of theft is one way to augment an electronic security system. One study found that educating the student body about the cost of material replacement could reduce the amount of mutilation that a library suffers (Smith, Supplementary Deterrents, 54). Other deterrents include non-removable screens on windows, limited exits for patrons and alarms on fire exits (50-51). Another way to help prevent book loss is to create or use an existing checklist that helps evaluate a library's security measures. One example is the Cornell University Libraries' Security Checklist by Susan Currie, et al. The authors suggest that an outside observer might be more objective and see problems that staff members overlook on a daily basis. The

purpose of the checklist is to prompt "...staff to systematically think about, describe in detail and analyze current security practices." (4). Questions range in topic from opening procedures, to patron screening, to bibliographic control, to equipment and supplies.

Niland and Kurth discovered that periodical searches in addition to an initial search that identifies missing volumes could substantially reduce the original number of losses (135).

If libraries are aware of the problem and have taken measures to prevent book loss then why is it still such a large problem? Author Susan Allen believes it is because the public accepts library theft as "ok." She states that because "...stealing books is rather like a cousin to borrowing-and borrowing is acceptable behavior at libraries-book theft from libraries has often been taken lightly by the media and accepted as "ok" by society in general" (37). In light of this, libraries must get the message out to the public that library theft is a problem that must be taken seriously and that everyone in the library community is negatively impacted by theft.

METHODOLOGY

This case study is designed to study what the current cost of book loss is at the Geology Library and to determine if the cost of book loss is greater than the cost of installing a security system. In the Encyclopedia of Library and Information Science, a case study in librarianship is "...a descriptive record of circumstances and events relating to the emergence of a particular issue or problem in a specific library or information center" (214). This case study will examine book loss at the Library over the past ten years, from 1988 to 1998. The author, as a graduate assistant at the Library, has been working in collection development and has been working with library staff to develop new procedures and streamline existing ones for handling book loss.

The data that was used to determine the amount of book loss annually were the Annual Reports made by the librarian from 1988 to 1998, the current "missing material" files, and the current "lost materials" files. To determine the cost of replacing missing books, the author used the current statistics kept by the library that detail the amount of time it takes to search for missing books, perform pre-order searching using the computer and the order files, type up order cards, process and check in new books. Once the statistics were collected for the amount of time it takes to perform these duties, the author then compared the times collected to the hourly wages for the student assistants, graduate assistants, and the library technical assistant. Since it is possible that different staff can perform the various functions in the book replacement process, it was determined which duties they typically perform in an average week. The author then determined staff costs by multiplying the hourly wage of the staff performing the duty by the amount of time it takes to perform that duty. The total amount of staff time and cost was then determined

by adding the total personnel cost together. One problem is that the above procedures are not the only procedures conducted to replace books in the Library. For example, the librarian must decide what books are to be replaced after pre-order searching and before order cards can be typed up. However, there are no current statistics which detail what percentage of the librarian's time is taken up with this duty. Secondly, the procedures detailed above are ones performed only by the Geology Library. Additional procedures are performed by other departments to replace books for the Geology Library, such as cataloging, binding, and marking and pasting. These are not included because they do not come out of the Geology Library's budget and therefore do not cost the Library directly.

When the Library replaces a lost book the actual cost for that book can vary greatly. Because of this, the author used the 1998 edition of The Bowker Annual of Library & Book Trade Information to determine the average cost of a college level geology monograph published in the United States. This figure was used as the "average" cost for determining the cost of book loss.

When determining the costs of an electronic security system, two types of costs must be addressed. The first is the initial outlay cost of purchasing the system and the equipment needed for it to work effectively. The second is maintenance cost, which includes yearly maintenance by the ESS company, as well as the cost of purchasing additional tags to put in newly purchased material. The author has determined that if an electronic security system were to be installed at the Library, the following equipment would be needed. First, two detection gates would be needed for each of the library's two exits. Second, a magnetic sensitizer is needed to desensitize material being checked out and to sensitize material being checked in. Finally, according to Bommer's article, it is

believed that approximately twenty percent of a library's collection receives eighty percent of the collection's use (275). Given this information, the library would need tags for 20% of its collection, or 9600 volumes, outright, and additional tags for ongoing tagging, as mentioned above. Actual costs for the equipment as well as the maintenance fees would be dependent on the make and model of ESS that the library chooses.

There are a few additional costs to the library, which cannot be measured monetarily. One cost is the loss of reputation that a library sustains when material is lost and cannot be located for a patron. There is also a cost to the patron in time spent looking for lost material. If the patron must use Inter Library Lending to request material that the Library deems lost, there is time spent waiting for material to arrive and a possible cost to the patron depending on the lending library's policies. Finally, it can be very frustrating if the material cannot be found or borrowed and as a result the patron cannot complete his or her work. Even though a dollar amount cannot be placed on these intangible costs, they can be just as 'expensive' to the library and should not be ignored.

CASE STUDY

The Geology Library has a few factors that may work to encourage book loss. One factor is the key holder policy that gives faculty and graduate students access to the Library after hours. Library staff depends on these patrons to pull the circulation cards and write the item's barcode number and their user ID number. If patrons do not follow this "after hours checkout procedure", the Library is unable to track the material taken out after hours. Another factor is that the Library's two exits are unattended. The Emergency Exit Door is not supposed to be used by patrons and is locked to patrons from the outside. However, patrons can leave the Library through this door and there are no alarms to alert staff that the door has been opened. Furthermore, staff members are unable to monitor patrons from the office area, as there is no direct line of sight to the door. A final factor is that currently, there is no security system for the Library. Patrons can remove books without Library staff knowing. Books can be placed inside bags or backpacks or concealed in clothing.

The data collected and analyzed consisted of Annual Reports for the fiscal years 1988-1998; hourly wage for the Library Technical Assistant (LTA), Student Assistants and Graduate Assistants; duties related to book loss that are performed by various staff members; and statistics detailing the amount of time it takes to perform these duties. Using these data, the author was able to determine the staff cost associated with several aspects of the book loss process at the Library including searching missing traces, pre-order searching for replacing lost books, typing order cards for replacement books, checking in books once received by the Library, and processing the books. Both students

and the Library Technical Assistant process the books and exact details of what is involved in each procedure are outline below.

The Library is usually alerted to a missing book when a patron or staff member is unable to locate the book on site and the book has not been checked out. If the book is not in its proper place in the stacks, the staff will check the overflow shelving, the book return area, the new book shelf and the staff office. Staff then checks DRA, the University's online catalog, to determine if the book has been checked out and the shelf list to ensure that the Library received the book and that it has not been listed as missing already. If it is decided that the book is missing, the staff member then completes a missing trace form. This form consists of areas to be completed regarding the call number, name and author of the book as well as the date the trace was established. Student assistants then take the trace form and search for the missing book everyday for one week. After the trace has been searched for one week, the Library Technical Assistant annotates the shelf list to show that the book is missing. The LTA also changes the DRA record to reflect that the item is missing from the library. The students search the stacks, the overflow area, the new book shelf and the office for the missing item. If the book is not located within the one week time period, the missing trace is then moved to the monthly trace file. Currently, there are 24 items in the missing trace file. Traces in this file are searched once a month for one year in the same fashion. Those items that are not located during the one-year period are then moved to the lost book file. At this time, there are 97 missing traces filed in the lost book file. A new form must be completed for each item filed in the lost book file. In addition to information contained on the missing trace form, other copies that are held by the University are identified as well as any recent

or former editions of the work. If there are additional copies, the location and condition of those copies must be identified. At this point, the LTA annotates the shelf list and DRA to record that the book has been declared lost. This final form in this process is then given to the librarian who must decide whether or not to reorder the missing item. According to the statistics from the Library, it takes approximately three minutes to search one missing/lost trace at a cost of \$0.28.

Another step in the process is pre-order searching, usually performed by a Graduate Assistant in the Library. This involves searching DRA; Innopac, the University's online acquisitions system; the Kardex, which is the Library's file of current and ceased serial holdings; and the Library's order files to determine if there are any copies or editions of the missing item anywhere on campus. Usually, a final physical check of the Library is performed to ensure that the item is not at the Library. If the price of the item is unknown, the Graduate Assistant may be asked to search Books in Print or Yankee Book Peddler's online pricing and ordering system to determine the price of the item. Approximately two minutes are required to perform this search, excluding price searching, at a cost of \$0.31. Price searching may require additional time searching the above databases using bibliographic information such as author and title, and therefore additional cost. Since prices vary widely, the author used the pricing information listed in the 1998 edition of The Bowker Annual of Library and Book Trade Information. The most recent information listed in this source was the average price for a 1996 North American Academic Geology monograph, which is \$80.95, (500).

Once the Librarian has decided to order the item, order cards must be typed up and sent to the Collection Development office in Davis Library. Typically the author,

title, and publication information are placed on the card. In addition, the Geology Library is listed as the location of the item as well as the fund from which monies are drawn. This is also usually the responsibility of a Graduate Assistant and costs \$0.47 per item to process.

After the items have been ordered and are sent to the Geology Library, they must be checked in. This is the responsibility of the Library Technical Assistant and involves making sure that the Library ordered the items that were received. It also includes checking to determine that the item is the correct edition, that it was bound correctly and that the call number on the spine or front cover is correct. The LTA then pulls the order slip that is included with each item and checks the order file to decide how the item should be processed. For example, a reference book is processed differently than a book that will circulate. It takes approximately one minute to check in one book at a staff cost of \$0.20.

After a book is checked in, it is placed on a shelf for student assistants to process. It is the students' responsibility to type up a circulation card with the book's author, title and barcode. The students then type a label with the book's call number and place it on the book's circulation card pocket. A date due slip is glued into the book and a new book slip is placed inside the circulation card pocket. However, if the book is a replacement for a lost item, there is no new book slip and the item goes straight to the shelves to circulate. Finally, students stamp the book with the date it was processed and with a property stamp that identifies the Geology Library. Staff cost to process one book is approximately \$0.47 and takes about five minutes.

The final step is for the Library Technical Assistant to continue processing the book after the student assistant has finished. The LTA must check the online record to make sure the information is correct. For example, if the call number is listed incorrectly in DRA, patrons will have a difficult time locating the book inside the library. The LTA must also file the order slip in the "new books list" file and annotate the current shelf list to indicate that a book was ordered to replace the lost item. The students' work is then checked to determine that the circulation card was typed with the correct information, the item was properly stamped, and that the book is ready to be shelved in the stacks. This procedure takes about six minutes per item at a cost of \$1.22.

Total staff cost for the above procedures is \$2.95. Add the estimated cost from the Bowker Annual of Library and Book Trade Information of \$80.95 and the total cost to replace a lost book is \$83.90. If 18 of the 35 missing books were not found for the fiscal year 1997/98 and it was decided to replace all of them, it would cost the library \$1510.20. If total costs from the last ten years were added up, the price to replace 427 lost items would equal \$35,441.80. Is the amount and cost of book loss and book replacement great enough to warrant an electronic security system?

For this study, the researcher decided to examine the 3M line of Library Security products to determine if an electronic security system would be a cost-effective measure to prevent book loss. The Library's policy to distribute keys to faculty and graduate students presented a special problem with regard to an ESS. If the alarm was tripped during operating hours, staff could work with the patron to get the item checked out properly. However, if the alarm went off after hours, what would happen? Most likely, the alarm gates would lock and prevent the patron from leaving the Library with the

material. This problem defeats the purpose of giving faculty and graduate students access to Library materials after hours. It was for this reason that the 3M Shelfcheck System Model 4210 was chosen for this study. This machine would allow patrons to check materials out themselves, thereby eliminating the problem of not being able to take material out of the Library after hours. In addition, the patrons could check out material to themselves during operating hours, thereby freeing up staff time normally spent checking out material. Security features of this model include "Multiple Book Detection", a feature that prevents checkout of more than one item on a single barcode. Another feature is that the machine contains photocells that prevent item substitutions during the checkout process. The machine also contains a help screen, which instructs patrons on how to quickly check out their own material. The one-time cost for the SelfCheck System Model 4210 is \$17,000 and is the most expensive piece of equipment in the system.

Another product that would be needed for an electronic security system would be the 3M Bookcheck Model 955. This machine resensitizes and desensitizes material in the Library. Staff members can desensitize checked out material so that the patron can take the material out of the Library without setting off the alarm. Staff members can also resensitize material when it is returned to the Library before it is placed on the shelf. Material that has not been desensitized cannot leave the Library without alerting staff members. This model runs approximately \$2,100.

Sensors, or tags, which trigger an alarm at the gate when an item has not been properly desensitized, need to be inserted inside the items to prevent them from leaving the Library without being properly checked out. 3M offers Tattle-Tape Security Strips

that are designed for hardcover books that can be quickly and easily inserted into the spine of the item. As mentioned earlier in the methodology section of the paper, the Library would need to initially tag 20%, or 9600 volumes, of the collection. 3M offers the Tattle-Tape Security Strips in boxes of 1,000 and cases of 5,000 at a cost of 12 ½ cents per tag or sensor. The total cost for the 9,600 tags required would be \$1,200.

A final piece of equipment that the Library would have to install is some form of electronic security exit. 3M offers the Detection System Model 3800. It is available in a one-corridor model, which is better suited to the layout of the Library than larger models. This is because of the relatively low amount of daily traffic as well as the spatial limitations of the Library's entrance. The gate helps prevent patrons from leaving the Library with material that has not been checked out properly. The price for the gate is \$8,200 for a one-corridor model. Each exit would require that a sensitized gate be installed to ensure the effectiveness of the ESS. However, one option is to lock the Emergency Exit located at the rear of the Library so patrons can exit only through the front door. This poses a potential hazard in the case of an emergency so another option is to install an alarm system at the rear exit to alert staff whenever the door is opened.

The total estimated cost of the equipment for the security system is \$28,500. The approximate cost of book loss in the Library from 1988 to 1998 is \$35,441.80. There are other costs that must be considered, however. First, there is the cost of taking time to train staff to use the new equipment and this will take time away from other duties. Also, there would be cost in terms of time to teach patrons how to use the self-checkout system and some patrons may resist the change, which may cost the Library in terms of patron relations. In addition, patrons may resent the installation of a security system and feel

that the Library does not trust them, which can create a negative impact in patron relations. Library staff will need to take the time to tag, or place sensors in the material, which will take time away from other responsibilities. There is also the issue of continuing costs, such as maintenance costs and the cost of purchasing additional sensors to tag new books. Some of these costs are intangible and others cannot be calculated at this time. However, each is important and must be carefully considered before making the decision to install a security system. Potential benefits of installing a security system include decreased book loss, which means less money spent on replacing books as well as increased access to materials. A situation that may benefit patron relations when patrons are able to get the materials they need in a timely and efficient manner.

CONCLUSION

It appears that book loss is a significant factor of the institution of librarianship. While it is important for libraries to understand this, it does not mean that they must lose large portions of their collection to it. It would be almost impossible for a library not to lose some material over time. However, according to the literature, the invention of electronic security systems has done a great deal to decrease the amount of book loss a library can experience. The issue of whether or not an ESS is cost effective and appropriate must be determined by each individual library. Many libraries are organized in such a manner that they may either deter or encourage book loss. The Geology Library at the University of North Carolina at Chapel Hill, in particular, has several factors that encourage potential book loss, including the key holder policy and lack of a security system. The figures show that over the past ten years the estimated cost of book loss is greater than the approximate cost of installing security equipment by \$6,941.80. What is not shown are the intangibles, be they costs or benefits, that are related to this situation, such as the relationship between the Library and its patrons. The installation of an electronic security system offers both and these must be weighed in addition to monetary cost before making a decision to install a security system. Also to be considered are alternatives that could augment or replace an electronic security system, such as door checkers. Others include modifications to the Library's physical structure like placing screens in windows and locking or alarming emergency exits. Educating patrons about the effects of book loss on themselves and fellow patrons is another deterrent to book loss that could be implemented. Of course, if none of these options are viable, the Library could consider returning to the traditions of old where books were chained to tables and

patrons were cursed if they removed material from the library without permission. This researcher expects that librarianship has moved beyond such practices. Although electronic security systems have proven effective for many libraries, based on the analysis the researcher does not recommend one for the Geology Library at this time. This is not to say that in the future an ESS would not be a cost-effective choice for the Library. As student enrollment, and therefore use of the Library, increases and the cost of books rises, the Library may need to consider security measures that include the use of an ESS.

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