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The 'Design Library'—Introducing Students to the Use of Manufacturer's Literature*

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Engineers frequently use the information supplied in manufacturer's literature to help in their design work. To introduce students to this resource, a 'Design Library' was estabished which contains, primarily, a collection of manufacturers' literature. This paper describes the library, which goes a step further than the usual collection of catalogs on a shelf. Database software was written to give students ready access to the information and to greatly simplify maintenance of the library. Students have responded favorably, citing improved 'realism' in their course work and their awakening to how wide a range of products and services are offered to engineers. The faculty have used the library in more than five of the department courses.

INTRODUCTION

THE LITERATURE produced by manufacturers is often used by engineers to help them in their detailed design work. It seems fitting, therefore, to introduce engineering students to this source of information, and to ask them to practice using such information in their engineering design courses. At Clarkson's Mechanical and Aeronautical Engineering Department we have established the 'Design Library' for this purpose. A key feature of the library is the use of database software, running on a personal computer, to organize and maintain the library collection. This paper describes what the library contains, how it is organized and maintained, and how it is used by students.

Many schools probably have informal collections of catalogs. However, these are often outdated, haphazardly organized, or not conveniently accessed by all students. That was the case in our department. However, our recent experience shows that a more formal collection of manufacturer's literature is not difficult to set up. Perhaps this library could serve as a model for other engineering departments.

The Design Library was started about 3 years ago. The author's earlier experience with engineering design, and his current teaching of courses in design, suggested that students should be encouraged to use the wealth of information found in manufacturers' literature. It interjects additional realism into the course work, to which students respond favorably. And, students learn something about the wide range of products and services which are offered to engineers.

CONTENTS OF THE DESIGN LIBRARY

Presently the library contains the literature and catalogs of 265 manufacturers, or vendors, of standard mechanical engineering components and services. The topics range from accelerometers, bearings, pumps, and springs to zinc plating. A partial listing of keywords describing the contents of the library is given in Fig. 1.

The library also contains a complete set of Thomas Register [1] (a 25-volume listing of industrial vendors organized by subject matter) so that students can conduct their own search for product literature. Also included is a subscription to a machine design magazine, as well as other assorted trade magazines. A professional drafting table is also fitted into the room for student use. Finally, the library contains a collection of old machine parts—things like a crank shaft, an outboard motor gearbox, various roller bearings, a carburetor, and so on. The library also includes a PC computer, discussed below.

The library is located in a small room (120 square feet) in the department building. Catalogs are housed in three filing cabinets and a few shelves on the wall. There is a desk and two chairs, in addition to the drafting table. The library is open during regular business hours.

ORGANIZATION

A computerized database program helps organize the library holdings [2]. The database contains the names and addresses of manufacturers, the status of literature requests, and a list of keywords describing each manufacturer's product. Students use this database to locate catalogs of interest.

Using a simple menu-driven interface, students can search for information by keywords. Students do not need training, beyond a brief set of posted

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blower	damper	gasket
booster	dampers	gauge
brake	dash pot	gear
breadboard	data	gear accessory
bulk	diaphragm	gear boxes
bumper	die	gear drives
bushing	digital	gear pump
cad system	displacement	gear systems
calendered	door	gearmotor
cam	drive	general
caster	duct	generator
casting	electric	grating
centrifugal	electrical	grommet
ceramic	electronics	guide
chain	electroplating	handle
chain drive	elevator	handling
channel	encoder	hard wood
check	epoxy	hardware
chemical	equipment	harmonic drive
chuck	exchanger	heat

Fig. 1. A partial listing of keywords cataloged in the Design Library database. The database contains 368 keywords. Each item in the library can have up to six keyword references.

instructions, to use the database. Each library holding is described by up to six words. For example, a manufacturer of plastic journal bearings might have the keywords *bearing*, *plastic*, *journal*, *nylon*, ptfe, *dry* associated with it. Once the student enters a keyword, the database responds with a list of vendors' names and a file number which identifies where the literature can be found in the library file drawers. The search can be narrowed by entering additional keywords.

An early decision was made to file the holdings by numerical order assigned in the order by which they are received. This simple plan works well. It makes expansion of the library easy—the file draws fill up sequentially.

Students are asked not to remove literature from the library. They are also asked to refile the literature carefully. By and large, student response is excellent. The absence of a photocopy machine in the room produces a strong temptation to borrow a catalog briefly to go next door to the student union, but most are returned promptly.

STUDENT AND FACULTY RESPONSE

Student use of the library has been good, and increasing. In the Spring 1991 semester, 98 students from five different courses signed the log book that is in the library. During the same semester, a counter written into the database program recorded 332 accesses into the library database.

Perhaps a stronger endorsement of the library comes in the form of student donations. At the end of the semester a box in the author's office is filled with donated catalogs that students have independently requested from vendors (often located using the Thomas Register in the Design Library). Students also contribute old machine parts for the library. One student took the trouble to make a cutaway in the housing of an old outboard motor gearbox to show the internal workings. The collection of old parts seems to be of great interest to the students. It is not unusual to enter the room to find a group of students handling one of the items and arguing about what failure caused the part to find its way into the design library.

Informal surveying of students—stopping by the library occasionally and speaking with the students that are there—suggests that the students find the library useful. They like using 'real' information in their design work. Sometimes, though, the level of detail appears to overwhelm them a bit. A frequently heard comment is surprise about how many engineering products and services are provided to engineers. As one student said, 'It seems if you can imagine some kind of part, someone probably makes it.' This wide range of products also leads to some frustration with the library; students cannot always find the information they need in the existing holdings, but a look through the Thomas Register shows that information is available to students who have sufficiently planned ahead.

The faculty response to the library has also been good. They have recommended use of the library to their students in appropriate courses. On occasion a faculty member will request that we obtain literature on a particular topic, such as solar panels or machine chucks, to supplement normal course materials. We have also received requests to set aside a collection of literature for a particular course.

MAINTENANCE

The library is maintained by a student working 2–3 hours per week. The database program—also initially written by a student—was designed to help

maintain the library. The program accomplishes the following maintenance tasks:

(1) Produces a form letter and mailing label to request literture from a newly entered manufacturer's name and address; checks for duplicate requests first.
(2) Records the date that the literature arrives and assigns an unused file number to the item, then queries for a list of keywords.
(3) Automatically generates new requests for literature from manufacturers whose current literature is older than a specified date; this allows easy updating of the literature.
(4) Records the number of accesses to the database.
(5) Provides easy editing of the database entries.
(6) Automatically backs up the database and the database program to a floppy disk.

The software is write-protected with a password, so there is rarely a problem with student tampering. The software is fully backed up, using the programmed utility, after all updates. The software runs on a 286, 8 MHz PC with a 20 MB hard disk and 1 MB of RAM; performance speed is adequate.

The initial effort needed to write a good maintenance program into the database proved worthwhile. It is now easy to request new literature, to record it in the database, and update the library as needed. As part of the initial programming, the operation of the software and suggestions on how to maintain the library were fully documented. This document becomes an essential guide to students hired to tend the library each semester.

Response of the manufacturers and vendors to requests for literature has been excellent. The letter we send out is on university letterhead, and explains briefly the purpose of our request. The letter mentions the opportunity for manufacturers to introduce their products to many students. We ask for two copies of literature so that we have a spare copy. It is not clear that the request is always read carefully—in about half of the responses we receive only one copy of the literature. On the other hand, many of the vendors respond with supportive letters offering additional copies if necessary. In some cases samples of the product are sent. One note of caution: the addressee to whom the return mail is sent will receive large volumes of mail, even after the initial requests are fulfilled.

The original collection of literature was built by simply listing subjects and asking the student worker to survey the Thomas Register for likely sources of product literature. Expansion of the collection occurs as new topics are added, by various sources, to the list. Surveying advertisements in trade journals often points to manufacturers' willing to supply interesting catalogs or design guides. In addition, students donate materials.

An initial concern was that literature of particular relevance to a current course would soon disappear from the library. This has proven not to be a major problem. To help slow down the inevitable dissolution of library holdings, a simple rubber stamp is used to label all materials with *Clarkson University, Design Library*. Losses are moderate; a rough estimate is that about 10% of the materials are lost each year. Each semester the student librarian starts by inventorying the holdings and providing replacements. (Some of the catalogs eventually return by themselves—being slipped under an office door at night.) The ease of not having to have the library supervised offsets the small annoyance of reordering materials.

POSSIBLE EXPANSION

The number of catalogs held by the library is increasing, but as the database gets bigger there is a growing need for a more powerful computer. At the present time design articles from trade magazines and other sources are not cataloged; photocopies of articles, such as 'Designing with Plastic Fasteners' could be included in the library database. There is a growing amount of design software being provided, often for nominal cost, by manufacturers. Adding a collection of design software might be a nice addition to the library. Although expensive, placing a photocopy machine in the library would be welcomed by students.

At present the library focuses on vendors to the mechanical and aeronautical engineering field. Expanding the library to include other areas of engineering would be a big step, but may be more efficient than several small departmental libraries.

CLOSING REMARKS

The design library conveniently introduces students to the valuable information contained in manufacturers' literature. Students are impressed to learn of the wide range of products and services offered to engineers. Using the literature as part of their design course work provides appreciated realism. The collection of old machine parts also receives a lot of attention by students.

Setting up the library requires little expense, and maintaining it is not difficult if 2–3 hours/week of student help is available. A key feature of the library is the database software written to make the holdings readily accessibe to students and to ease maintenance tasks.

No objective measure of how the Design Library benefits students has been attempted, but the use that students make of the materials and their positive response to the library suggest that the modest effort needed to establish the library is worthwhile.

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REFERENCES

1. Thomas Register, Thomas Publishing Co., One Penn Plaza, New York.
2. Paradox, Release 2.0, Ansa Software—A Borland Comany, 4585 Scotts Valley Dr., Scotts Valley, CA 95066.