

in the system, he can push a button and state his need to a clerk in the SBS office. Not only will SBS order a copy of the catalog for the requester, it will also order a copy for filming.

Another difference in the AIM file is the method used to locate a specific frame on the film. As mentioned, VSMF uses optical coding that matches a line on the film to a scale on the reader. AIM uses an odometer reading to find a desired frame.

Another system that should be mentioned is the Showcase Corp.'s Architectural File. The Showcase file contains catalog information from over 3800 manufacturers of building products and has been on the market since October 1967. It also provides descriptive information from 100 national associations that are allied with the building trades. An interesting feature of this company-oriented file is its tradename index. Showcase supplies updated material in 16-mm cartridges every 90 days.

A few words should be said about two other systems that were recently discontinued. From 1967 to 1970 the Sweets Vendor Catalog File provided direct competition

to the VSMF Documentation File. Sweets is part of the F. W. Dodge Co., which is in turn a division of McGraw-Hill. The Sweets file was an excellent file, but McGraw-Hill discontinued it in January 1970. The Thomas Micro-Catalog was in its 7th year and differed from those previously mentioned in that it used microfiche instead of roll film in cartridges. It had over 1200 manufacturers' catalogs in its Basic File and more than 4000 in its Library File. A subscriber could order the Basic File and get a broad-brush, nonselective coverage of product information, or he could order the Library File and structure it to his needs by selecting only those catalogs that were pertinent. VSMF offers supplementary services such as filmed files of Military Specifications, Military Standards, and transistor and semiconductor information. Some of these additional options could be quite valuable to the user. Most are priced separately.

It is difficult, if not impossible, to say that any one system is superior. They each have advantages and disadvantages that have to be understood before an intelligent selection can be made.

Preparation of a Microfilm File of Company Technical Reports*

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At Esso Research and Engineering Co., worldwide sets of technical reports from company divisions and affiliates are periodically microfilmed on 16-mm rolls, in the proper order to permit use in cassettes in company report centers having cassette-type microfilm reader-printers. This format is the latest in a 50-year progression through 35-mm roll microfilm, micro-opaques, and microfiche; reasons for each change are discussed. In-house microfilming is described, with emphasis on procedures that yield a film capable of producing good photoprints. A cost comparison shows that report-file duplication on microfilm is more economical than hard-copy office storage, or even report storage in an off-site archive.

All technical reports that are written on petroleum refining, chemicals, and related subjects by members of the Standard Oil Co. (New Jersey) family are regularly received by Esso Research and Engineering Co.'s Central Reports Room, at Linden, N. J. These reports have been coded at source under Jersey's long-established international system for reports numbering, and they are logged accordingly on arrival. Technical Reports Indexes are then

computer-prepared; these consist of a key-word-in-context (KWIC) subject index (*to multiple sentences/report*), a number-title list of reports, and an author index. The index is published monthly as a current-awareness tool, and semiannual compilations are issued as permanent tools for manual searching. The number-title list in these cumulations then sets the order in which a microfilm file is produced. The cumulated indexes and the corresponding microfilm form the basis for our present information-retrieval system for company technical

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reports. Computer searching of the index input for the past ten years will be possible by 1970.

All existing technical reports from the company's beginning (in 1919) were microfilmed in 1942 in order to preserve them. The first subject index to company reports had been published in 1928, and the earliest report recorded on microfilm was dated 1927. The backlog was filmed under contract by a local microfilm company. There was then no choice of microform, so for those years everything appears on 35-mm roll microfilm. The images were photographed in duplex format at about a 20-to-1 reduction ratio, about the same reduction presently used for 16-mm microfilm. Consequently, to read a report on this microfilm, one must alternate between advancing the film and moving it sideways to follow the document's pagination. Later, sets of reports were collected on a yearly basis, indexed, and microfilmed.

In 1952, the company shifted to 4- × 6-inch micro-opaques, the cheapest unitized microform available at that time. These were produced under contract until 1960, and for a few affiliates until 1963. If a good micro-opaque reader-printer had been developed, this form may not have been doomed to obsolescence so quickly. From 1960 through 1963, we offered our network of affiliated reports centers a choice of 16-mm roll microfilm, microfiche, or micro-opaques. Microfiche was preferred mainly by our European affiliates because of its early acceptance on that continent.

In 1965, a tighter company-security policy was established, and it was decided that the microfilms of company reports had to be produced in-house by our own employees. We therefore purchased a planetary camera, and a combination film developer and duplicator.

It then became important to standardize on one microform for all report centers, because it would be too costly for us to produce all types in-house. Our experience with the microforms already mentioned had proved to us that 16-mm roll microfilm on reels would be the most economical to produce. It also was the most appropriate microform for maintaining a permanent, unbroken secondary collection. Unitized microforms seemed to offer no real advantage to the system. Additional cutting, mounting, the addition of bibliographic data, and filing each fiche would add to the cost. Maintenance of such a file and loss of cards by misfiling or for other reasons made it as difficult as hard-copy collection to maintain file integrity.

Moreover, we had found that document-searching time approaches the speed of a unitized system when the 16-mm roll microfilm is used in self-feed cassettes in a motor-driven reader-printer. We had comparatively little difficulty in convincing our reports centers of the value of 16-mm microfilm, since they knew by then that the incentive for having such a reader-printer had been greatly enhanced, since journal subscriptions and technical-abstract services were also becoming available for this microform.

From then on, the production of cumulated indexes and the microfilming of reports was done on a semiannual basis. In this way, we can get the microfilm sets to the satellite reports centers much sooner. The elapsed time from report origin until it was delivered on microfilm has been reduced to less than a year. During this period,

of course, hard copies of the reports are available from our Central Reports Center, as well as at several satellite centers.

As regards our in-house microfilming procedures, once the semiannual index and its list of reports have been published, we are ready to prepare the collection for microfilming. We conduct this work in the following order:

1. The code number is marked on each report cover with 1½ inch characters with a black felt pen, to make microfilm scanning easier.
2. Reports are checked for completeness, and are arranged in the proper filming order.
3. Binders and staples are removed, so that each page will lie flat while being photographed.

The reports are photographed with a Recordak Model MRD-2 planetary camera at a 21-to-1 reduction ratio on silver-emulsion films. We have found it possible to have the filming done by an inexperienced clerk; within a few hours, she is taught the proper film loading, operation, and unloading of the camera. We have her run a test film to insure that the light meter is calibrated to achieve the correct film density. On the remainder of the test film, the operator is allowed to practice the microfilming format, which is set up in the following target sequence:

1. The roll number.
2. The general job title; e.g., 1969 Company Reports.
3. The reports in the indexed sequence, with three blank spaces between reports for easier scanning and retrieval.
4. The Certificate of Authority, showing the first and last report number contained on the film, date, where it was filmed, and the operator's signature. This must be the last target on each roll.

In order that our report microfilms will be more acceptable as legal evidence, we refile all corrected reports on the last roll instead of splicing them in sequence order. On this last roll, also, we film the Technical Reports Index, with its List of Reports, showing corrections and the exact sequence of reports for each roll.²

We found that the camera had to be installed in a quiet, dust-free area which has no change in room electric lighting, and with window blinds closed. Indeed, we later found it desirable to cover the window completely, because at certain times of some days it seems that a beam of sunlight found its way between the blind and window frame onto the photographing table, exactly where the meter measures light intensity. This extraneous light could not be detected with the camera lights on. It took considerable trouble shooting and a few rolls of wasted microfilm before we finally found the source of our problem.

We also found that unannounced intrusions into the working area by over-anxious supervisors and other visitors sometimes caused the operator to miss or duplicate a report page. When pages are missing, the entire report has to be refilmed. We found it better to wait until the operator comes to a stopping point of her own accord before discussing any phase of the operations. The filming operation progresses very smoothly since these problems were corrected.

Our very competent photographic department develops the master microfilm, using the Recordak Prostar film processor. Examination of the developed film is then made for proper density, format, pagination, and image readabil-

ity. We learned that better enlarged paper prints can be made by establishing quality standards for the hard copy of the original reports. We recommend that reports writers should avoid using:

1. Foldouts over 11 × 17 inches.
2. Photoreductions greater than 50% for the original report duplication.
3. Pen or pencil markings on pages, flow-charts, or graphs.
4. Pictures and printing on the same page.
5. Colored background paper (especially for covers).
6. Copies that have been poorly mimeographed or photocopied.

Each year's collection of about 1800 reports requires about forty 100-ft rolls of microfilm. Duplicate sets are made for our nine satellite report centers. Our costs are summarized in Table I.

Of course, the main factor in making this project economically feasible is having enough satellite reports centers which want a microfilmed set of company reports. The filming cost is shared equally by each center, which at present has to pay only one ninth of the total cost.

To determine relative costs,¹ the actual charge for a single set of report microfilms was compared to space costs for storage of a hard-copy file in office file cabinets, seven-tier open shelves, and in an off-site records center. There are differences in storage or space charge for various

Table I. Unit Costs for Microfilm File of Company Reports

Microfilm	Cost/Set	Cost/Image
On reels	\$472.00	0.6 Cent
In cartridges	\$580.00	0.7 Cent

Table II. Annual Storage Costs for 260 Inches of Reports

Office File Cabinets

260"/26"/drawer = 10 file drawers

Two 5-drawer file cabinets @ 5.8 sq ft floor space/
cabinet = 11.6 sq ft

11.6 sq ft × \$8.25/sq ft/yr = \$95.70

Seven-Tier Open-Shelf Files

260"/36"/shelf = 7 shelves

1 shelf occupies 7.5 sq ft of floor space

7.5 sq ft × \$8.25/sq ft/yr = \$61.88

Records Center Storage

260"/15"/box = 17 boxes

17 boxes × \$3.00/box/yr storage charge = \$51.00

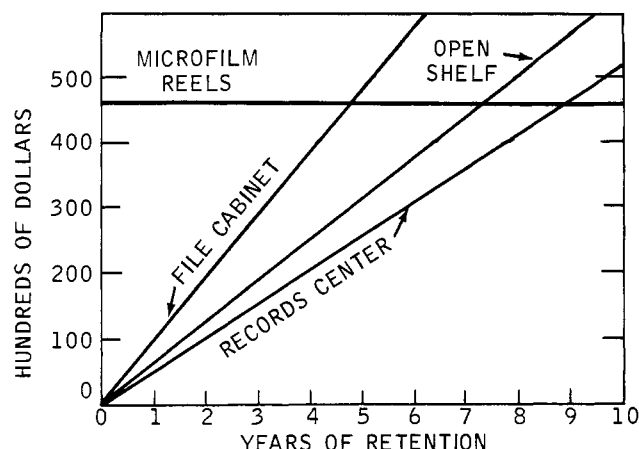


Figure 1. Storage cost for one year's company reports

locations, but the general relationship is probably the same. The storage figures used in Table II apply only to Esso Research and Engineering Co. in the Linden area, of course.

Company technical information must be kept for an indefinite period. Hard-copy storage costs continue year after year, but microfilm production costs are paid only once, since storage costs are negligible. Therefore, when annual costs are plotted against file retention time, Figure 1 shows that even if a hard-copy file were to be stored in our off-site records center, the savings in storage alone would pay for the microfilm within nine years. Similar savings are also realized by each of our world-wide reports centers that would otherwise retain hard copies of reports.

In-house microfilming of company reports is therefore an effective, economical method of storage when satellite report centers need duplicate sets. Internal controls help to insure microfilm quality, and operations are not difficult to manage. We intend to continue producing 16-mm roll microfilm copies for the indefinite future.

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Use of Microfilm in Internal-Mail Control*

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Mail control systems are designed to help insure the proper distribution, timely handling, and prompt filing of important correspondence. Most of these systems operate around a record control card that is prepared for each piece of correspondence when it is received.²

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The distribution information contained in the record card is used to institute follow-up procedures if there is a break in the circulation, or if the material does not return to files in the proper time.

In spite of this control, a significant amount of material is still "lost" during circulation. While these mail control systems can establish this fact, they can do little about producing the document or the information it contained.