INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Engineering Drawings Control
Type of Industry	Aircraft Parts Manufacturer
Name of User	Aircraft Division Aeroquip Corp. Jackson, Mich.
Equipment Used	Remington Office Systems Micro-Retrieval Systems System

Synopsis

Microfilming, used in conjunction with electro-mechanical filing, is the method adopted by the aircraft division of Aeroquip Corp., Jackson, Mich., to control rising costs of reproducing, storing and distributing engineering drawings. Each month, the division's 29 draftsmen turn out an average of 1,000 new and revised drawings in four different sizes. These must be copied and stored at the reproduction center and at many of the company's 10 distribution points. To do so, Aeroquip has installed an Remington Office Systems Micro-Records Retrieval System. This system includes a planetary camera, a microfilm processor, a Kard-Veyer electro-mechanical file, and an aperture card mounter.

An average of 11 photos of each tracing is taken by the planetary camera. After the film is processed, its individual frames are mounted in aperture cards. These cards, prepared by the tabulating department, bear preprinted identifying information. Green "slave cards" used as distribution guides are also prepared. They bear various codes such as company distribution points and the amount and type of reproduced media needed at each point. One aperture card is retained by the reproduction center and stored in the Kard-Veyer unit. This file holds microfilm copies of all of the 70,000 tracings produced during the company's history. Any one of them may be promptly retrieved when the operator presses a button which brings the proper tray to the operator's level.

Through this system, the company reports that it has substantially reduced reproduction and postage costs. It has also realized significant economies in terms of labor expenditures and storage space.

"Copies of our tracings are now easier to store, find and distribute. The company's costs have been reduced, and we have greater convenience, " says Gary Woodman, chief draftsman for the aircraft division of Aeroquip Corp. in Jackson, Mich. These achievements came about when the company turned to microfilming, used in conjunction with electro-mechanical filing, to alleviate the growing problem of storing several thousand engineering drawings. In this way, Aeroquip, which uses Remington Office System equipment, has been enabled to control the continuously rising costs of reproducing, storing and distributing engineering drawings.

Since it was founded in 1940, Aeroquip Corp.'s record has been one of continuous growth. Its sales of an extensive line of aircraft hose, quick disconnects, couplings, clamps and other components exceed $77 million a year. The company now has 3459 employes, 850 of them in Jackson, Mich., which serves both as the corporate home and the headquarters of its aircraft division; and industrial division with six branches from California to New Jersey; and two other divisions and foreign affiliates in both Canada and Germany.

Engineering Drawing Control Methods and Equipment

With Aeroquip's rapid growth and the expansion of its product lines, the problem of storing engineering drawings grew gradually more severe, reaching its most acute stage in the aircraft division. There, 29 draftsmen turn out each month an average of 1,000 new and revised drawings in four different sizes. Each month, these had to be copied and stored at the reproduction center and in many of the company's 10 distribution points. To store them, most of the distribution points and the reproduction center used as many as nine letter-size four drawer filling cabinets.

The inconvenience and cost of these methods led division management to reexamine the engineering drawing record-keeping and distribution procedures. The system which Aeroquip found would best alleviate the condition was microfilming, used in conjunction with electro-mechanical filing. This led to the installation of the entire micro-records retrieval system manufactured by the Remington Office Systems Div. of Sperry Rand Corp.

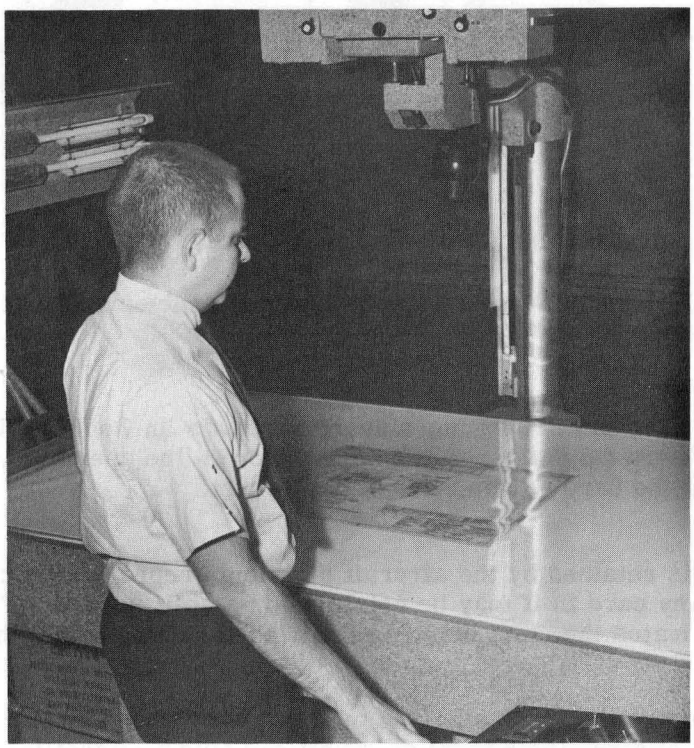
This system includes a Remington planetary camera; the Unipro processor which develops a 100-foot roll of film in less than 30 minutes, a card-to-card diazo printer; an aperture card mounter with a capacity of 200 cards an hour; and a Kard-Veyer unit, an electro-mechanical file with a capacity of up to 80,000 aperture cards. The Kard-Veyer is equipped with a Remington F440 aperture card reader to eliminate misfiling.

Using this system, the reproduction center, headed by Dale Hendershot, records and reproduction lead man, handles all its volume with five full-time employes. Normally, one of them operates both the planetary camera and the processor. After the equipment installation, Hendershot and his staff began microfilming and filing all the tracings going back to the company's founding in 1940. Then, the following year, the system became operative on a day-to-day basis.

Procedures

The Reproduction Center's workday begins in the morning when a sample tracing is shot. A "target test" is then run on a transmission densitometer to measure background intensity, along with a microscope check to determine resolution.

The engineering tracings are then photographed in 35mm with the planetary camera, which offers automatic exposure control, straight-line loading and green fluorescent lighting. An average of 11 pictures is taken of each tracing. One is retained by the aircraft division. The others are sent to the company's distribution points, many of which have their own viewing and reproducing equipment. About 500 original and duplicate microfilm shots are made each day. Since 600 photos can be taken on a roll of microfilm, one roll usually suffices for an average day's shooting.



REMINGTON PLANETARY CAMERA is used to take an average of 11 photos of each of approximately 1,000 new and revised tracings a month.

All film is developed in the Unipro processor. Since one trained operator can handle both the processor and the planetary camera at the same time, the entire Aeroquip photo and processing operation takes about 10 days' working time a month for one person.

After the film is processed, it is mounted in an aperture card, which has been prepared by the company's tabulating department. Across the top of each card is printed information which includes the number, division, description, and distribution date of the drawing whose photo will be placed in it.

Also prepared by the tabulating department are green "slave" cards used as distribution guides. On these are printed various codes such as the company's distribution points, and the number of aperture cards, vellum copies and "hard copies" needed at each point.

APERTURE CARD MOUNTER permits microfilm pictures of engineering tracings to be mounted in preprinted aperture cards.

Aeroquip's operators mount 200 or more aperture cards an hour. When film is mounted, it is first checked on the verifier-viewer against the number on the aperture card. Then, it is quickly cut and slipped into the card's protective Mylar pocket.

One aperture card is retained by the aircraft division's reproduction center and is placed in the Kard-Veyer unit. Any card in it may be retrieved in a split second. The operator merely presses a button which activates the unit, bringing the needed record within the operator's reach.

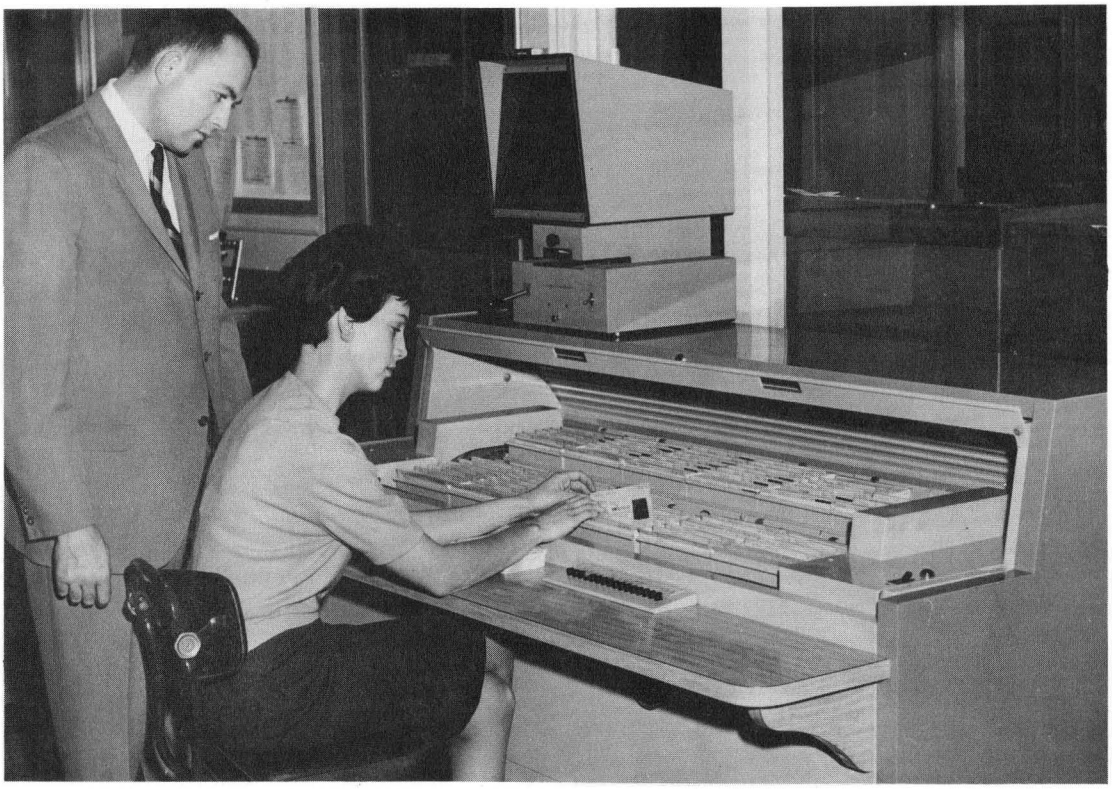
All cards in the file are the same size, no matter what the size of the original drawing. Because of this uniformity of size, the Kard-Veyer unit can hold a microfilm copy of every one of the 70,000 engineering drawings in the company's history.

Of these 70,000 drawings, 30,000 represent inactive tracings. They are stamped as such in red on the front of the card and placed in a special part of the Kard-Veyer unit. When a tracing becomes inactive, the card is pulled from the file and is refilmed with the "inactive" information directly on the film. It is then refiled in the proper section, and a red stripe is painted across the filed "inactives" for quick identification.

The other aperture cards made are sent to the distribution points. Before microfilm, hard copies had to be sent to each location. Now, many distribution points have set up their own viewing and reproduction equipment and often receive only duplicate aperture cards instead of printed copies.

Once aperture cards have been completed, reproduction is simple. Intermediate, or vellum, copies are made on an electrostatic printer. Except in the case of the small "A" tracings, the machine is set to create a vellum copy one-half the size of the original tracing.

Hard copies are run off on a standard blueprint machine from the vellum intermediates. Duplicate aperture cards may also be made on a card-to-card duplicator at a rate of nearly two per minute. When all the copies of various types are made, they are shipped to as many of the 10 distribution points as required.



KARD-VEYER ELECTRO-MECHANICAL FILE has a capacity of 80,000 cards. At Aeroquip, it stores miniaturized copies of all the 70,000 engineering tracings turned out by the company since 1940.

Results

Microfilming, Woodman says, has brought new efficiency to engineering drawing record-keeping and distribution. He adds, "We are not overburdened with large file cabinets, and 20 percent less time is now needed to locate engineering drawings and to get them from the files. Now, every drawing is miniaturized in a tab card and filed in the storage unit. The micro-image is easy to work with in making reproductions. It is much easier and more economical this way than continuing to build large, bulky files of tracings." Similar savings in storage have been achieved at the 10 distribution points to which copies of engineering drawings are sent.

The system has also brought about substantial economies through the lower cost of hard copy or diazo reproduction. These savings have attained major proportions in the costs of postage for and shipping of tracings from the reproduction center. The cost of the equipment is thus scheduled to be fully amortized within five years of its initial installation.

Other advantages include almost foolproof security from any disaster occurring at the aircraft center. The company can now store copies more easily and inexpensively. At the same time, government specifications can now be met on the premises instead of the job having to be farmed out.