IDEAS THAT WORK

In each issue, the Journal will carry one or more fresh ideas that have been successfully applied to the human resource development environment, and, in most cases, have saved organizations money and valuable time through increased productivity.

If you would like to share a working "idea" with other members of the profession, please submit it to: Training and Development Journal, P.O. Box 5307, Madison, WI 53705.

Each person submitting an "idea" that is published will receive an attractive ASTD key chain, lapel pin or tie tack!

COLOR MICROFICHE USED AS VISUALS IN SELF-PACED LEARNING PROGRAMS

Studies conducted throughout Kodak reinforce our belief that self-teaching programs are often the most efficient way to train employees.

At Tennessee Eastman Co., where self-teaching centers have been an integral part of apprentice training since 1969, a 120-hour classroom program was converted to self-paced instruction. Average completion time with self-paced instruction was only 85 hours. Just as important, though, was the time required for successful completion of the program. This ranged from 65 hours to 165 hours.

The student capable of comprehending the material in 65 hours would have been forced to waste 55 hours under the old classroom system. On the other hand, slow learners, many with less than high-school educations, may have found it almost impossible to grasp the material in the normal classroom environment.

In another study, a 19-day classroom program was converted to individualized learning. With 183 students tested, a 98 per cent successful completion rate was achieved. Average completion time was 14.8 days — a 22 per cent time saving, with the number of days ranging from eight to 24.

Self-paced learning is now widely accepted, both in industry and education. Many trainers and educators also see the increased efficiency of tying in learning techniques with "hands-on" laboratory experience and teacher involvement.

Technological advances over the past decade have provided business and industry with several new types of training equipment and software. But since most of these new products are more complex and sophisticated, there is increased risk of mechanical failure and downtime — which can undermine even the most efficient of self-paced instruction programs.

A recent innovation — use of color microfiche as a visual medium — eliminates most of these potential problems. The only malfunction that can occur in most microfiche readers is a light bulb burning out.

What's more, many companies now using microfiche for training already have readers in use for other applications, such as retrieval of information from microfiche catalogs. It is relatively easy for trainees to adapt the equipment for training, since they already know how to use it.

In any case, microfiche can be a compact, inexpensive medium for individualized learning. Subject matter can be geared to the individual student, who can learn at his own pace. Microfiche also can be used as a stand-alone medium, with typeset frames interspersed between the illustrative frames. Or, it can be used in conjunction with cassette audio-tape players. In many instances, microfiche and audio tape are used in combination with printed materials as complete modular training programs with self-administered tests and reading assignments.

Suggested Formats for Slide Input

SLIDE ORIENTATION	PACKING DENSITY NUMBER OF IMAGES	NUMBER OF ROWS	NUMBER OF COLUMNS	SLIDE IMAGE SIZE (mm)	REDUCTION RATIO	REDUCED SLIDE DIMENSIONS (mm)	AVAILABLE IMAGE AREA (mm)
135 Vertical	60	5	12	23 x 34	2.2:1	10.4 x 15.4	11.75 x 16.5
	98	7	14		3.0:1	7.7 x 11.3	10.0 x 12.5
135 Horizontal	30	5	6	34 x 23	1.5:1	22.6 x 15.3	23.5 x 16.5
	49	7	7		2.0:1	17 x 11.5	20 x 12.5
	84	7	12		3.0:1	11.3 x 7.7	11.75 x 12.5
	98	7	14		3.6:1	9.4 x 6.4	10.0 x 12.5
135 Mixed*	45	5	9	23 x 34 34 x 23	2.2:1	15.4 x 15.4	15.73 x 16.5
	84	7	12		3.0:1	11.3 x 11.3	11.75 x 12.5
	98	7	14		3.6:1	9.4 x 9.4	10.0 x 12.5
126 Square	45	5	9	26 x 26	2.0:1	13 x 13	15.73 x 16.5
	84	7	12		3.0:1	8.7 x 8.7	11.75 x 12.5
127 Square	45	5	9	38 x 38	3.0:1	12.6 x 12.6	15.73 x 16.5
1/2 Frame 135 Horizontal	49	5	9	23 x 16	1.5:1	15.3 x 10.7	20 x 12.5
	84	7	12		2.0:1	11.5 x 8	11.75 x 12.5
1/2 Frame 135 Vertical	60	5	12	16 x 23	1.5:1	10.7 x 15.3	11.75 x 16.5
	98	7	14		2.0:1	8 x 11.5	10.0 x 12.5
1/2 Frame 135 Mixed*	84	7	12	23 x 16 16 x 23	2.0:1	11.5 x 11.5	11.75 x 12.5
	98	7	14		3.0:1	7.7 x 7.7	16.0 x 12.5

*Reduced slide dimension is determined by the larger of the two dimensions of the original slide.

Note: This table is presented as a guide. We feel that the given data will give you the best packing density with the least waste space. There may be some cases where lower reduction ratios are necessary. This can be accomplished by lowering the packing density (by selecting a different format) or by using the same format and losing some of the original slide.

Low Cost

Low cost also is an important reason for the use of microfiche. A West Coast importer of motorcycles was using three traveling vans to instruct dealer mechanics in the repair and maintenance of its equipment. Dealers would send mechanics to the nearest city on the van schedule, where they would take a week-long course consisting of lectures, hands-on practical work and slide-tape presentations. It was costly both for the importer and the dealers.

Converting to self-paced training eliminated the need for traveling vans and instructors. Instead, the audio tapes used in the classroom presentations were re-recorded and the slide packages were copied onto color microfiche — 98 slides to one 4x6-inch film card. With the success of the initial programs, others were developed. Now, 35 modules are available for mechanics to use at their convenience, with selling prices ranging from $10 each for individual programs to $7.50 on a subscription basis.

The programs could have been produced on filmstrips, or made available in quantity as 35mm slides, but the comparatively low cost of microfiche production was a deciding factor. Compare the cost of duplicating one program, using 80 visuals, needed in a 500-copy quantity:

Microfiche:
$465, or 93 cents per package
35mm slides:
$3,000, or $6 per package
Filmstrips:
$1,080, or $2.16 per package.

Those are production costs only.

Distribution cost-savings are even more impressive: Six microfiche, containing several hundred images, can be mailed first class for a 13-cent stamp.

A microfiche teaching program can be as simple or as elaborate as the situation warrants. A midwestern manufacturer of motor vehicles combines audio tape, microfiche and a workbook in a multimodule course for dealer parts-department personnel. Students study a frame of microfiche and answer a related question in the workbook. At the end of each exercise is a self-administered examination, which the student completes and forwards to the manufacturer's training department for evaluation.

Input media is one factor that determines formatting of the final microfiche. Almost any medium can be used as originals — from catalog pages to artwork, 35mm to 11x14-inch transparencies. Probably the simplest way to create a microfiche program is to transfer an existing slide or filmstrip program. Other than numbering the slides in sequence, no further preparation is necessary. Transparencies that look good when projected will generally look equally good on color microfiche.

Information on microfiche can be formatted in a number of ways. Up to 140 images can be put on a single microfiche. A primary consideration is the type of equipment used for reading the microfiche. For example, the Recordak Easamatic reader, model PFCD, has a screen size of 11x16¼ inches. This is an excellent size for reading two catalog-page images simultaneously. Using a 25.5X lens, this reader fills the screen wtih a 35mm slide image reduced to a 49-image microfiche format.

Another consideration for determining format is the reduction ratio. We recommend that 35mm slides not be reduced more than four times. At that reduction, 98 images can be accommodated on one microfiche.

Image sizes can be made slightly larger or smaller than the size called for in the standard formatting. For example, one series of
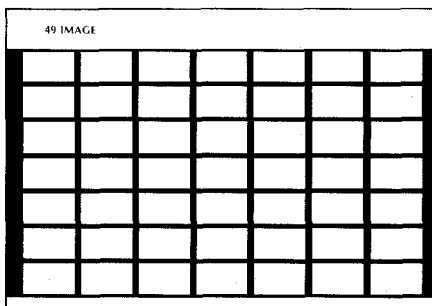
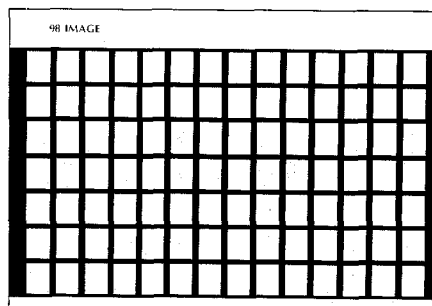# Suggested Formats for Color Fiche production
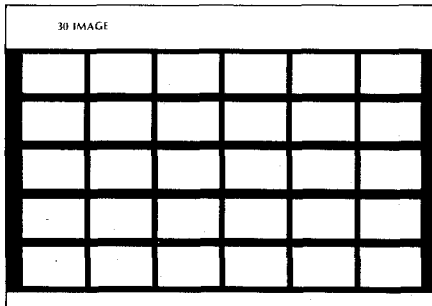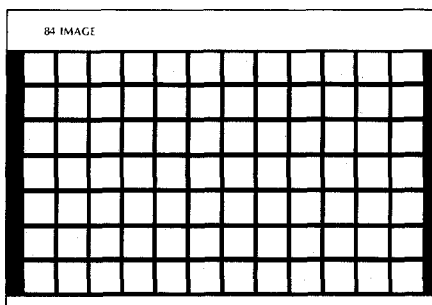

30 IMAGE

30 Image–Double Cosati (Horizontal image)
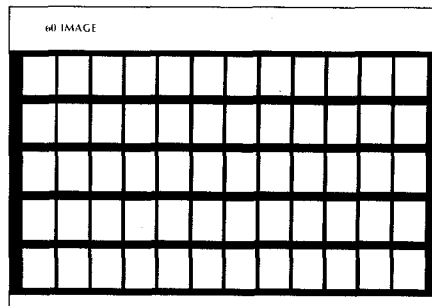
60 IMAGE

60 Image–Single Cosati (Vertical image)

49 IMAGE

49 Image–Double NMA (Horizontal image)

98 IMAGE

98 Image–Single NMA (Vertical image)

84 IMAGE

84 Image–Ektalite (Horizontal image)
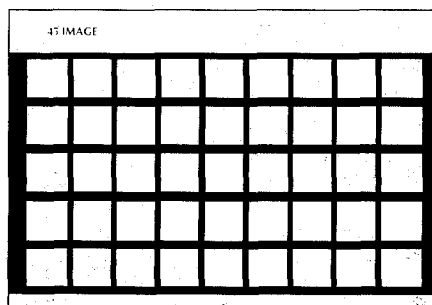
45 IMAGE

45 Image–(Horizontal or Vertical image)

microfiche programs called for a reduction ratio of 2.1:1 instead of a normal 2:1 for 35mm slide images, to allow a narrow margin at the bottom for the frame numbers.

Both the slide and the frame number fit nicely on the screen.

The only restriction to formatting is that the images must fit in either five or seven rows. This is a mechanical restriction which is determined by standard methods of stripping up the microfiche masters.

The flow from image to image also is a consideration. When microfiche is used for reference or as a look-up, the general rule is that every row proceeds from left to right, just as one would read a book. This requires that the operator switch eye movement from right to left when a row of images is finished.

To provide smoother reading flow, a serpentine flow is recommended for training programs. When finished with one row of images, the operator shifts down to the next row and moves backwards. This provides for smooth, uninterrupted reading and easier operation of the reader.

Microfiche can be designed for use with any reader. Smaller readers are most convenient because they can be carried to work areas, plugged in, and used for hands-on situations where the student can see the operation to be performed and then do it.

In response to the comment that microfiche would be as effective if hardware were automated, one training consultant said he believes the very fact that students must be actively involved with the microfiche reader keeps them alert and increases their learning capabilities.

One manager of a self-teaching program, who was looking for teaching tools "as simple and reliable as a piece of chalk," said he believes the microfiche approach will meet his needs at a much lower cost than any other medium, without sacrificing educational effectiveness.

One program, designed by a consultant for a multistore midwestern hardware retailer, trains clerks to sell paints. The program combines audio tape, microfiche and printed lessons in 10 exercises. Each lesson begins with a pretest and ends with a completion test. The audio, visuals and workbook are each used where they will be most effective. — *James A. Eastman, Business Systems Markets Division, Eastman Kodak Company, Rochester, N.Y.*

Suggested Fiche Formats for
Hard Copy and Large Transparency Input

49 IMAGES PER FICHE
7 Rows 7 Columns
Normal Frame Size 20 x 12.5 mm
(.7874 x .4921 in.)

Camera Field Size (inches)		Reduction Ratio
Width	Height	
11	6¾	14
11¾	7¼	15
12½	7¾	16
13¼	8¼	17
14	8¾	18
14¾	9¼	19
15¾	9¾	20
16½	10¼	21
17¼	10¾	22
18	11¼	23
18¼	11¾	24

98 IMAGES PER FICHE
7 Rows 14 Columns
Normal Frame Size 10 x 12.5 mm
(.3937 x .4921 in.)

Camera Field Size (inches)		Reduction Ratio
Width	Height	
5½	6¾	14
5¾	7¼	15
6¼	7¾	16
6½	8¼	17
7	8¾	18
7¼	9¼	19
7¾	9¾	20
8¼	10¼	21
8½	10¾	22
9	11¼	23
9¼	11¾	24

30 IMAGES PER FICHE
5 Rows 6 Columns
Normal Frame Size 23.5 x 16.5 mm
(.9252 x .6496 in.)

Camera Field Size (inches)		Reduction Ratio
Width	Height	
13	9	14
13¾	9¾	15
14¾	10¼	16
15¾	11	17
16½	11½	18
17½	12¼	19
18½	13	20
19¼	13½	21
20¼	14¼	22
21¼	15	23
22¼	15½	24

60 IMAGES PER FICHE
5 Rows 12 Columns
Normal Frame Size 11.75 x 16.5 mm
(.4626 x .6496 in.)

Camera Field Size (inches)		Reduction Ratio
Width	Height	
6½	9	14
7	9¾	15
7¼	10¼	16
7¾	11	17
8¼	11½	18
8¾	12¼	19
9¼	13	20
9¾	13½	21
10	14¼	22
10½	15	23
11	15½	24

HORIZONTAL FRAME SEQUENCE DIAGRAM