APPENDIX F

Field-Expedient Printing Techniques

PSYOP units and the foreign Indigenous groups with which they work often require printed material to support training, information dissemination, and psychological warfare requirements within the AO. In certain situations, the production of printed material is of primary importance to the success of the mission. Because the occupying power usually imposes strict controls on printing material and equipment the production of printed material often requires that field-expedient printing techniques be used. The field-expedient printing techniques described in this chapter can be used to meet operational requirements.

Making and Using a Silk Screen

A field printer must either carry or make the tools needed for printing matter anytime, anywhere. Luckily, even in the most underdeveloped part of the world, materials are readily available.

Tools for the Job

A silk screen, a stencil, ink, a stylus, paper, and a squeegee are necessary for printing in the field. The printer can carry them along whenever he expects to do printing in the field; but he can find a good workable substitute for ail of these tools in any forest, swamp, or desert.

Silk Screen. A silk screen (see Figure F-1, page F-2) consists of a frame over which a piece of fabric is stretched. This frame is attached to a base to provide a flat working space. The cover is not necessary for printing but simply makes the silk screen easy to carry from one place to another.

Stencil. A stencil is a device that allows the ink to pass through the screen and onto the paper where it is needed and blocks out the ink where it is not needed.

Ink. The ink used in silk screen printing should be thick and have an oil base. Many kinds of ink can be used for printing in the field.

Stylus. A stylus is a device used to etch the stencil. A pointed piece of wood or metal can be used for this purpose.

Paper. Paper or a good substitute is an essential item for printing in the field. Many good substitutes for paper have been found, but it is best to have a good supply of

paper whenever possible. Often, paper that has been used can be reused by the printer for anew mission.

Squeegee, or Ink Roller. A squeegee, or ink roller, is stool used to spread ink evenly and to force the ink through the stencil and onto the paper.

Silk Screen Printing Base and Cover Construction

The printer constructs a silk screen printing base by following the instructions in Figures F-2 through F-5, pages F-3 through F-5. The silk screen and all of the other items mentioned can be made by using materials found in the field. A good serviceable silk screen can be made by using wooden pegs instead of nails, a rock instead of a hammer, a knife instead of a saw, and bamboo instead of pieces of wood for the frame. Nails must be very thin so they will not split the wood. It is best to use soft wood for the frame.

Many kinds of fabric can be used to make the screen. However, silk fabric gives the best results. It is strong and can be cleaned and used many times. Parachute nylon or a cotton handkerchief can serve in an emergency. Even an undershirt can be used; however, only finely woven fabrics will allow fine lines to be printed.

The Ink To Be Used

Many different kinds of ink can be used for printing with the silk screen. Ink with an oil base, such as mimeograph ink, is best. Paint with an oil base is the best substitute, or printer's ink can also be used. Ink that is used for silk screen printing should be thick; oil base paints are almost the right thickness. By experimenting with many kinds of ink, the printer will learn what to look for in a good printing ink. In an emergency, he can crush berries or any stain-producing material and make an ink substitute.

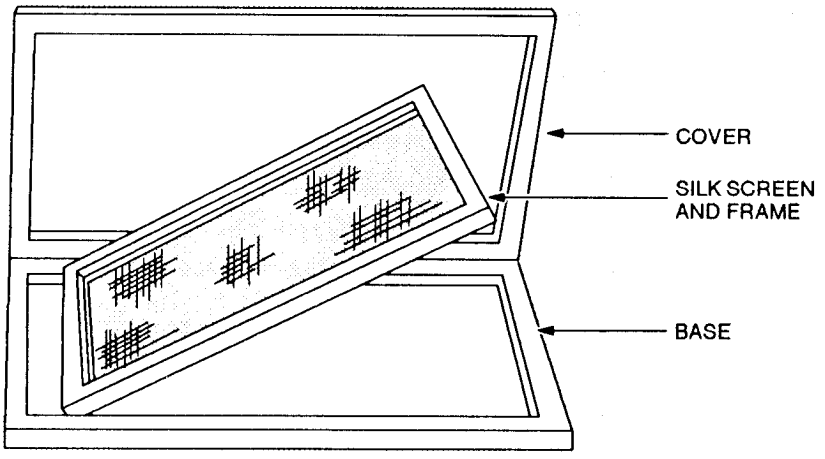


Figure F-1. Silk screen with carrying case.

How to Use the Stencil and Silk Screen

The printer places the words, picture, or symbols on the stencil. If using the standard printing stencil, he scratches the words onto the stencil with the pointed stylus. If using the cutout stencil, he removes the parts with a knife or sharp object.

He lifts the silk screen frame up from the base (as in Figure F-1, page F-2) and places the stencil on the bottom of the screen. Tacks, tape, or glue can be used to hold the stencil in place.

He places a piece of paper on the base under the stencil. This piece of paper serves to protect the base from ink while preparing to print.

The printer lowers the silk screen onto the base and places enough ink on the silk to cover the screen. He uses the squeegee to spread the ink evenly and to force the ink through the openings in the stencil. The squeegee must have a straight edge. Another tool that will do the same job is a roller. A roller made of hard rubber is best for spreading the ink on the silk screen. A stiff brush is another tool that can be used.

To print, the first step is to ensure that all tools are clean and in good working order and that there is enough paper to finish the job. The printer places the piece of paper to be printed on the base and lowers the silk screen on top of the paper. He slides the squeegee firmly over the silk, forcing the ink through the stencil. He lifts the screen, removes the paper, and allows the paper to dry. If the printing is not dark enough, he adds more ink to the screen. When the printing job is finished, he removes the stencil and cleans the screen and all other tools.

Tools for making a silk screen:

- A hammer or heavy object for driving tacks and small nails
- A knife for cutting the fabric and canvas hinge
- A saw or hatchet for cutting the wood

Tools for constructing a 22 1/4″ X 16 1/2″ frame:

- Four pieces of wood, 1 1/4 X 3/4 x 15 1/4 inches
- Four pieces of wood, 1 1/4 X 3/4 x 21 inches
- Sixteen 1-inch nails
- Two 1 1/4-inch nails

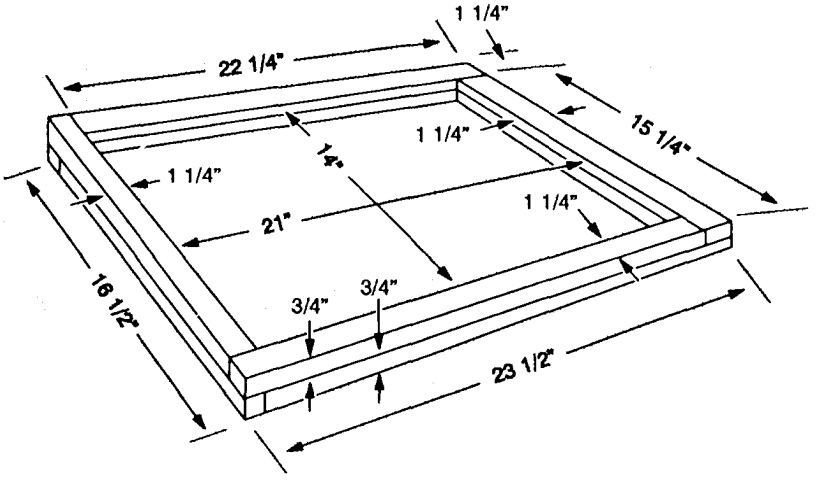
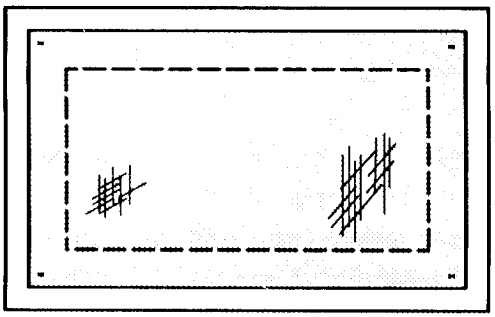


Figure F-2. Materials and measurements for constructing a silk screen.

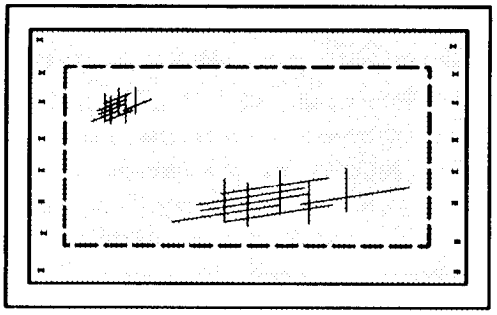
Cut a piece of fabric so that it is several inches larger than the dimensions of the frame. Soak it in water so that it will shrink tightly over the frame when it dries.

A



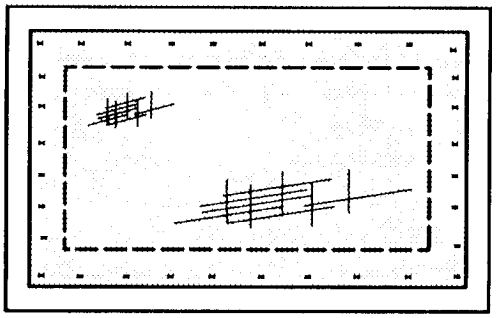
Place the fabic over the wooden frame and place one tack in each corner to hold the cloth in place. Use either small 1/4-inch tacks or staples. Approximately 90 tacks or staples are needed to attach the fabic securely.

B



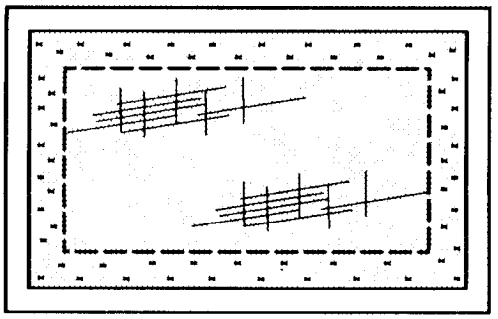
Place a row of tacks along one side of the frame, keeping tacks about 3/4 inch apart. Eight to ten evenly spaced tacks or staples will be enough.

C



Place a row of tacks along the remaining edges of the frame. The fabric must be pulled tight before driving each of these tacks.

D



Continue to drive the tacks around the inside edge of the frame to give added strength to the screen.

Figure F-3. Tacking cloth to underside of silk screen frame.

Materials needed to construct base and cover:

- Four pieces of wood, 1 X 1 X 17 inches
- Four pieces of wood, 1 X 1 X 28 inches
- Two pieces of cardboard or plywood, 19 X 28 inches
- One piece of canvas or heavy cloth, 2 X 28 inches
- Eight 1 1/4-inch nails
- One hundred forty 1 1/4-inch tacks

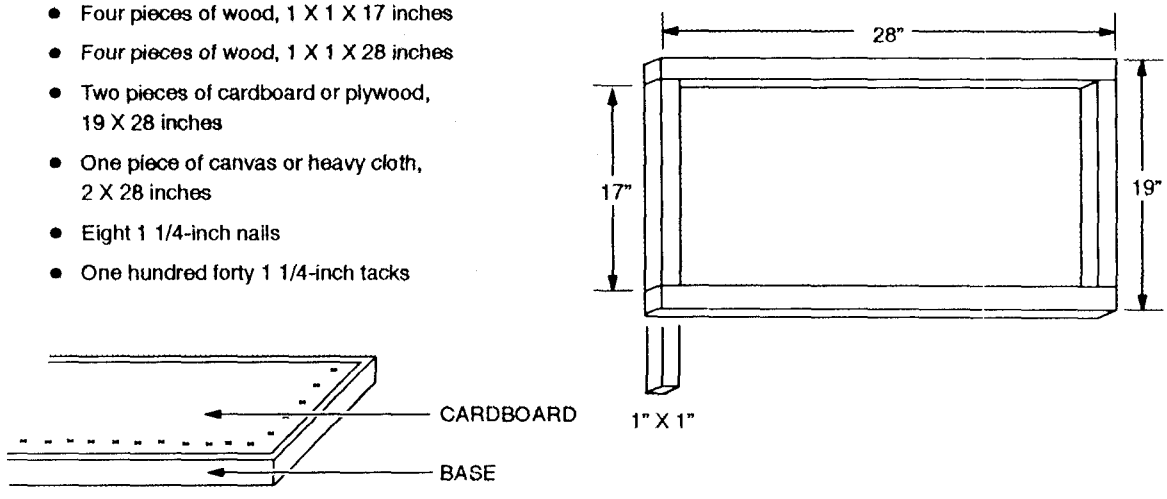
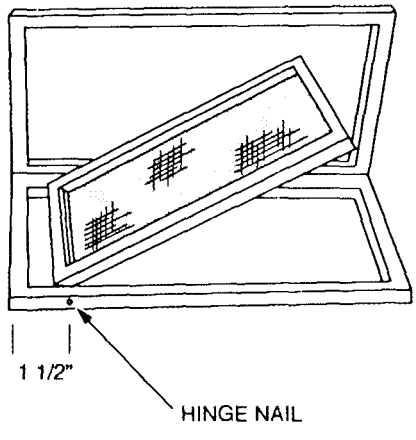
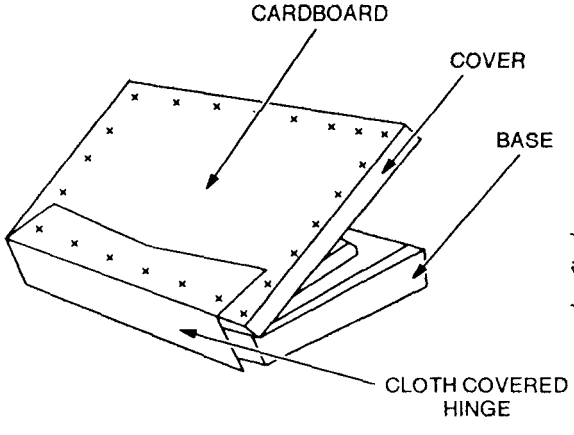


Figure F-4. Materials and measurements for constructing base and cover.

To attach the silk screen to the base, place the frame in the base with the fabric side down. The silk screen is now flat against the cardboard or plywood. The end of the silk screen frame should be 1 1/2 inches from the end of the base. This will permit the frame to be raised.

Drive the two 1 1/4-inch nails through the side of the base from the outside and into the end of the silk screen frame. These two nails form a hinge that allows the screen to be raised and lowered.





Tack the 2- by 28-inch piece of canvas along one side of the base and cover.

The silk screen now has a carrying case and is portable.

Figure F-5. Making hinges for the silk screen kit.

Making and Using a Rocker-type Mimeograph Machine

The printer covers any smooth, curved surface with a heavy (thick), porous fabric. He saturates the fabric with mimeograph ink. He covers the ink pad with the desired stencil and applies it to appropriate paper with a rocker-type movement of the apparatus.

By using many ordinary items, an inking base for rocker-type mimeograph machine can be made with crude tools or, in some cases, the item may be used as it is. Any smooth surface, such as a tin can or glass bottle can used as a base. A larger frame can be hollowed out to carry ink, styli, and an extra supply of stencil paper. Size can be increased by fastening a piece of sheet metal to the block.

An inking pad can be made by using thick, porous materials, such as a coat, a blanket, felt, or burlap. A pad can also be made of many layers of thin fabric. The printer wraps the pad around the smooth, curved surface of the base and holds it in position with tape, string, thumb tacks, or glue. He then saturates the pad with mimeograph ink.

This ink can be a composite of almost any grease and carbon scraped from a fireplace or grating. Color can be achieved by mixing pigments of color to the grease instead of carbon. Commercial grade mimeograph ink is a universal item and is available in many countries. Shoe polish, thinned with kerosene or other solvent, is generally available and usable.

Stencils can be made from thin, tough tissue or thin airmail paper by applying a coat of wax (paraffin) to one side. This wax can be rubbed on, then gently warmed to ensure uniformity of thickness and penetration of the paper. Only partial penetration is desirable, not saturation.

For a stylus, the printer can use a ballpoint pen, a slender stick of hardwood, or even a heavy piece of wire with the ends rounded and smoothed enough to etch the wax without tearing the paper. He uses the stylus to inscribe the desired message or to sketch on the wax coating of the stencil. Then he applies the stencil to the ink pad with the wax next to the ink. Some of the ink will penetrate through the lines made by the stylus, thus inking the stencil. The undisturbed wax prevents the ink from penetrating the paper in unwanted places. The printer lays the stencil on the sheet of paper with the inked surface next to the paper. He rubs the back of the stencil to transfer the ink to the blank paper.

If no mimeograph paper is available, substitute paper should be of quality equal to newsprint, but almost any paper will suffice.

Making and Using a Gelatin Printing Device

The reproduction method is more commonly known as the hectograph technique, a commercial technique used worldwide. All necessary materials are commercially known by the name hectograph and are available in several

variations from gelatin plates to prepared plates which are fiberbacked, wraparound models for machine use (ditto). The ditto machines are similar in appearance to mimeograph machines. Emergency or field conditions will probably dictate the use of a simple gelatin plate.

Gelatin, which is the base for this technique, can be purchased as a hectograph product, made from gelatin powder produced by food concerns (Knox gelatin), or made by boiling the bones and skins of animals. (Pulverizing the bones will speed the boiling down process.) The printer can add enough gelatin powder to make a semisolid plate by pouring the warm liquid gelatin into a shallow, wide container or on a tabletop and allowing it to cool and set. When properly prepared, it becomes a glass-smooth plate that feels like sponge rubber to the touch. This plate will be soft enough to absorb the ink but firm enough not to bleed the ink on the master copy. Adding a little animal glue will toughen the plate, and adding a little glycerine will keep it from drying out too quickly. The effects of these additions are in direct proportion to the quantity used; both are desirable but not absolutely necessary. The printer should add them and mix well during the liquid stage of the gelatin.

The printer makes the master copy using a good grade of smooth, tough, hard-finish paper. Using hectograph or ditto carbon paper, ribbon, ink, or pencil (all are commercially available), he types or writes the material to be reproduced. Trial and error testing will unveil numerous ink pencils (indelible), writing inks, and stamp pad inks that will reproduce. He does not blot after applying the ink to the master copy. If using a pencil, he ensures that the copy is strong and uniform.

When the gelatin plate is set and ready for work, the printer sponges the plate thoroughly with cold water and allows it to set for an additional minute or two. Using a sponge, he removes all excess moisture and applies the master copy, face down, on the gelatin plate. He carefully smooths the copy to ensure complete and uniform contact with the prepared plate. He does not remove it for at least 2 minutes. He lifts one comer of the master for a gripping point and smoothly and carefully lifts the master copy from the gelatin plate. The gelatin plate now bears a negative copy of the desired material and is ready to reproduce the copy.

The printer begins reproduction immediately after the master copy has been removed from the gelatin plate. He places a blank sheet of smooth surface paper on the gelatin plate. Using one hand (or a rubber roller, if available), he smooths it into total contact. Then he lifts the sheet from the gelatin surface. This process is done rapidly to obtain as many copies as possible from one inking of the plate. One good inking of the plate may produce from 100 to 200 copies using this method, while a commercial ditto machine may produce as many as 700 copies. To speed this process, the printer leaves one small comer of the sheet of reproduction paper free for gripping by sticking a small piece of paper to the place on the gelatin plate where a comer of the reproduction paper would fall. This piece of paper acts as a guide and a buffer to keep that one comer of the reproduction paper from sticking. When removing the reproduction paper, the printer lifts the sheet by the loose corner; he does not attempt to roll it away. The rolling action will cause the reproduction paper to curl as it dries.

After completing the reproduction job, the printer sponges the gelatin plate thoroughly with cold water and allows it to set for 48 hours or until the ink has been assimilated by the gelatin. The plate is now ready to be used on a new and different job. The only way the printer can shorten the waiting time between jobs is to dissolve the gelatin plate in hot water, boil off the excess water until the liquid is thickened to the desired consistency, and pour a new gelatin plate. Of course, two or more gelatin plates may be prepared to increase production capabilities.