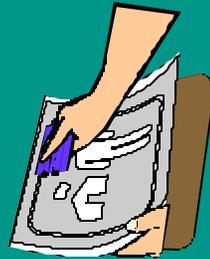
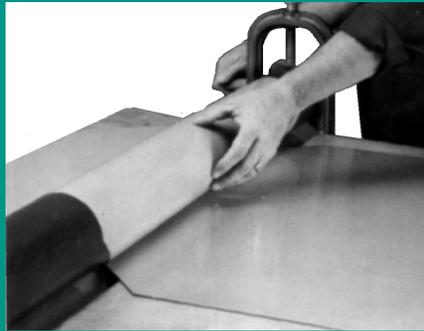
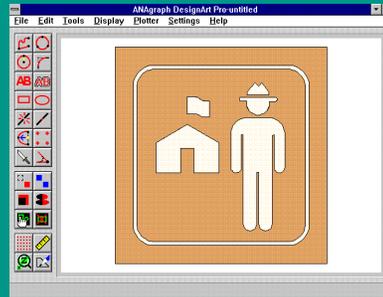
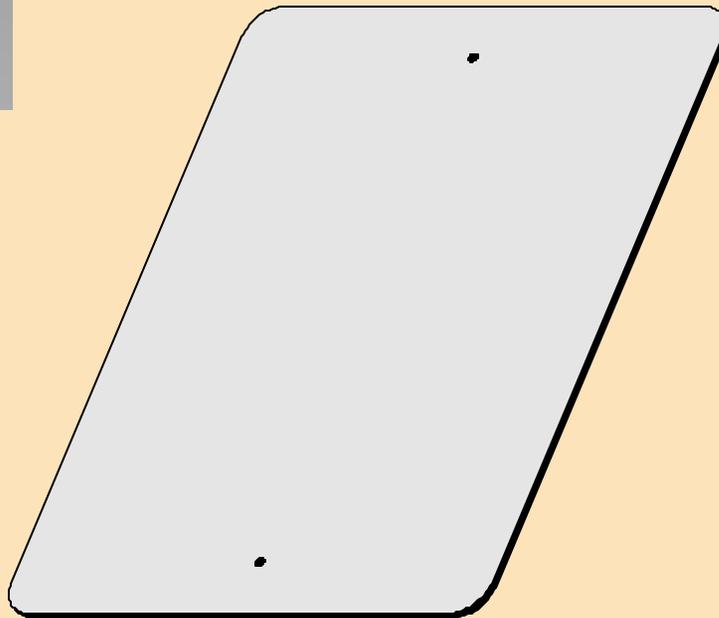


# Sign Making

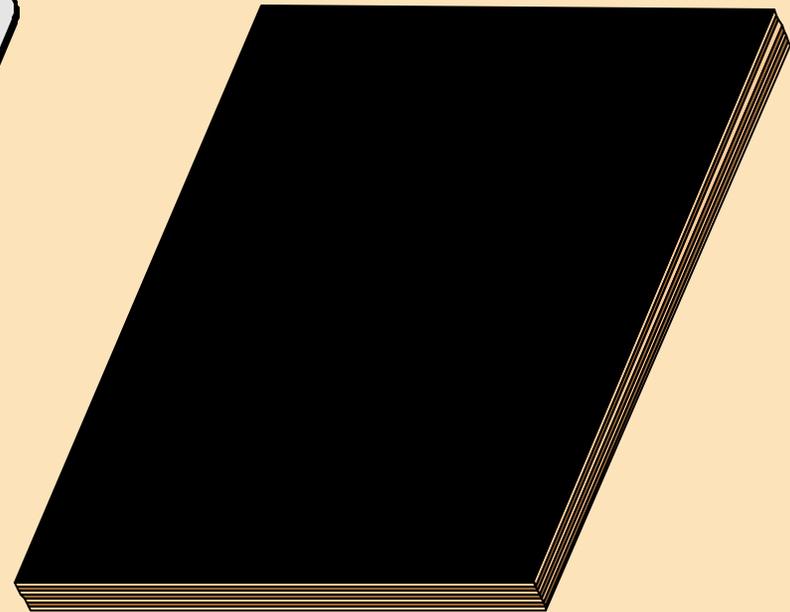


# *Substrate Choices*

*Aluminum*



*HDO*



# *No More Redwood Signs*



**Alternative Materials  
To Be Announced.**

# *Substrate Preparation*

## **Aluminum Blanks.**

**Cut blank to size, Cut corner radius, punch holes, debur and clean.**

## **HDO Plywood Blanks.**

**Cut blank to size, clean with toluene, drill for T-nuts, insert T-nuts, fill holes and sand level with surface. Laminate strips on backs of STANID, SECNID, CREDIT. Round over edges with router. Paint backs and edges.**

# *Sign Blank*

## **Sheeting Blanks.**

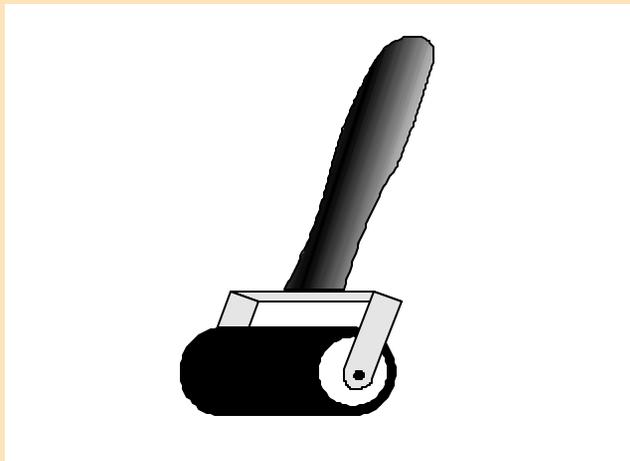
**Sign blanks are covered with vinyl or reflective film. This is done in most cases with a mechanical roller.**

**HDO plywood STANID, SECNID and CREDIT signs as well as signs too large for mechanical rollers are sheeted by hand using a 2 inch hand roller.**

# *Sheeting Methods*



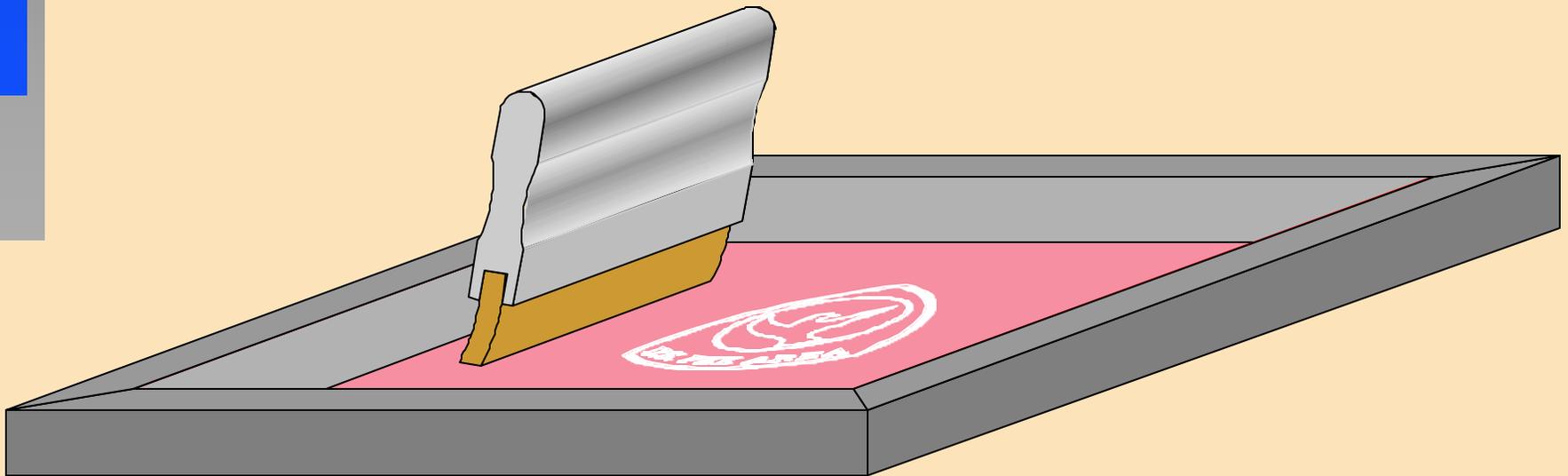
**Mechanical Roller**



**2" Hand Roller**

# *Traditional Method*

## *Screen Printed Signs*



# *Screen Printing*

Silk screens consist of an open mesh fabric stretched and fastened to a frame.

The fabric is coated with a light sensitive emulsion and allowed to dry.

A film positive is positioned between the coated fabric and a light source.

The emulsion, not covered by the film, hardens when exposed to light.

The unexposed portions are washed away with a water spray leaving that part of the fabric open.

# *Screen Printing*

Once dry, the silk screen is placed in a hinged clamp, aligned to the blank sign and registration stops are positioned for consistent alignment.

Ink or paint is placed on the screen and forced through the open mesh by pulling a squeegee across the entire image area.

This action transfers the ink to the face of the sign.

Screen printing is a low cost sign making method when large quantities of the same sign type are needed.

# *Screen Printing*

Multi-color signs can be produced by screen printing. This requires a separate screen for each color.

While screen printing is a low cost means of producing signs, environmental concerns and modern methods have resulted in a decline of the number of screen printed signs being made today.

# *Modern Methods*

In the 80's, computers entered the signmaking scene. Several companies came out with CAD (computer aided drafting) and CAS (computer aided sign) software. Since that time, dozens of companies have introduced sign making software and hardware.

Vinyl cutters and router tables have taken the place of X-acto knives and hand tools.

# *Fabricating Corps Signs*

To ensure consistency, the Corps developed a sign standards system. This system incorporates several formats that are used as guides to fabricate the various sign types.

*Sign Manager* software is used to determine the size of a particular sign. Once the legend text has been determined, it is typed into *Sign Manager*. *Sign Manager* will then calculate both the panel size and the line lengths.

This information is typed into the CAS software for output to the cutting device.

# Determining Line Lengths and Panel Sizes

The screenshot shows the SIGN MANAGER application window. The title bar reads "SIGN MANAGER". The menu bar includes "File", "Edit", "System", and "F1=Help". The system path is "C:\ASM\SPECS\GSI-02.SPC".

The main window contains a "Message:" dialog box with the following content:

Legend Item	Cost
Primary Legend:	
Courtesy	9.847
Dock	5.400
Secondary Legend:	
Loading and Unloading Only	8.895
	11.120

Buttons: NEXT, OK, CANCEL

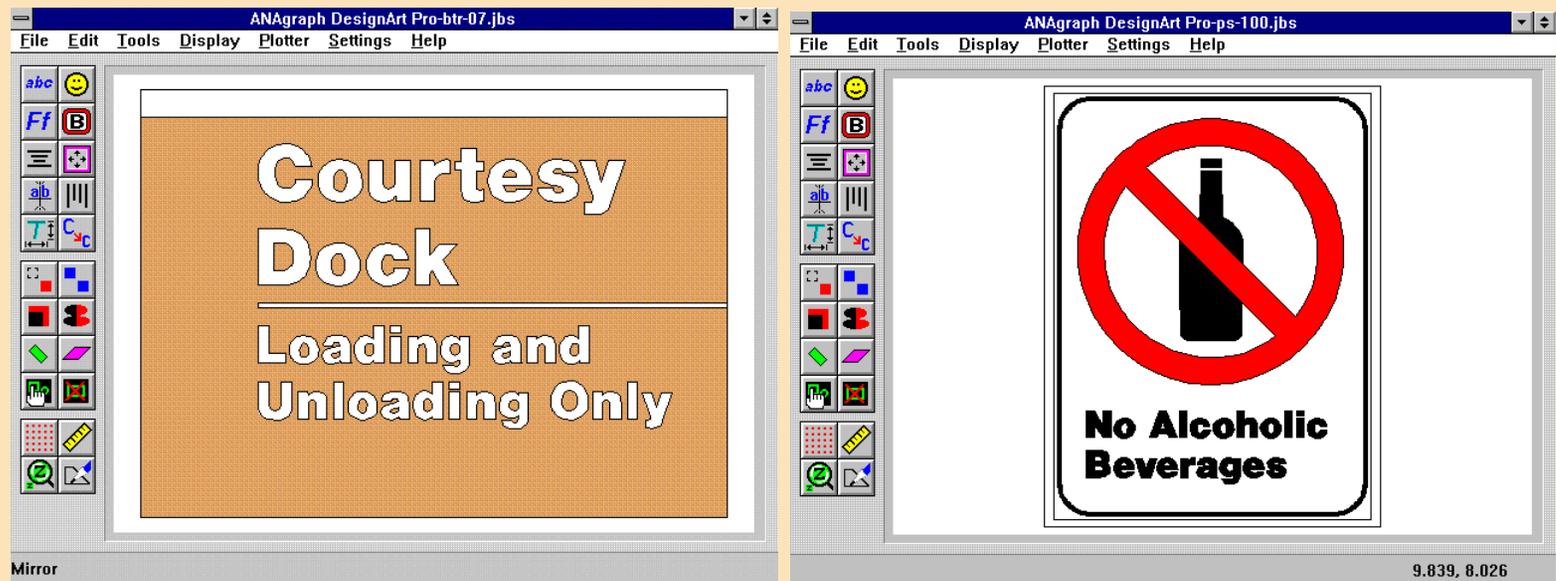
Cost Summary:

Item	Cost
Sign Price	\$0.00
Installation	\$0.00
Total Cost	\$0.00

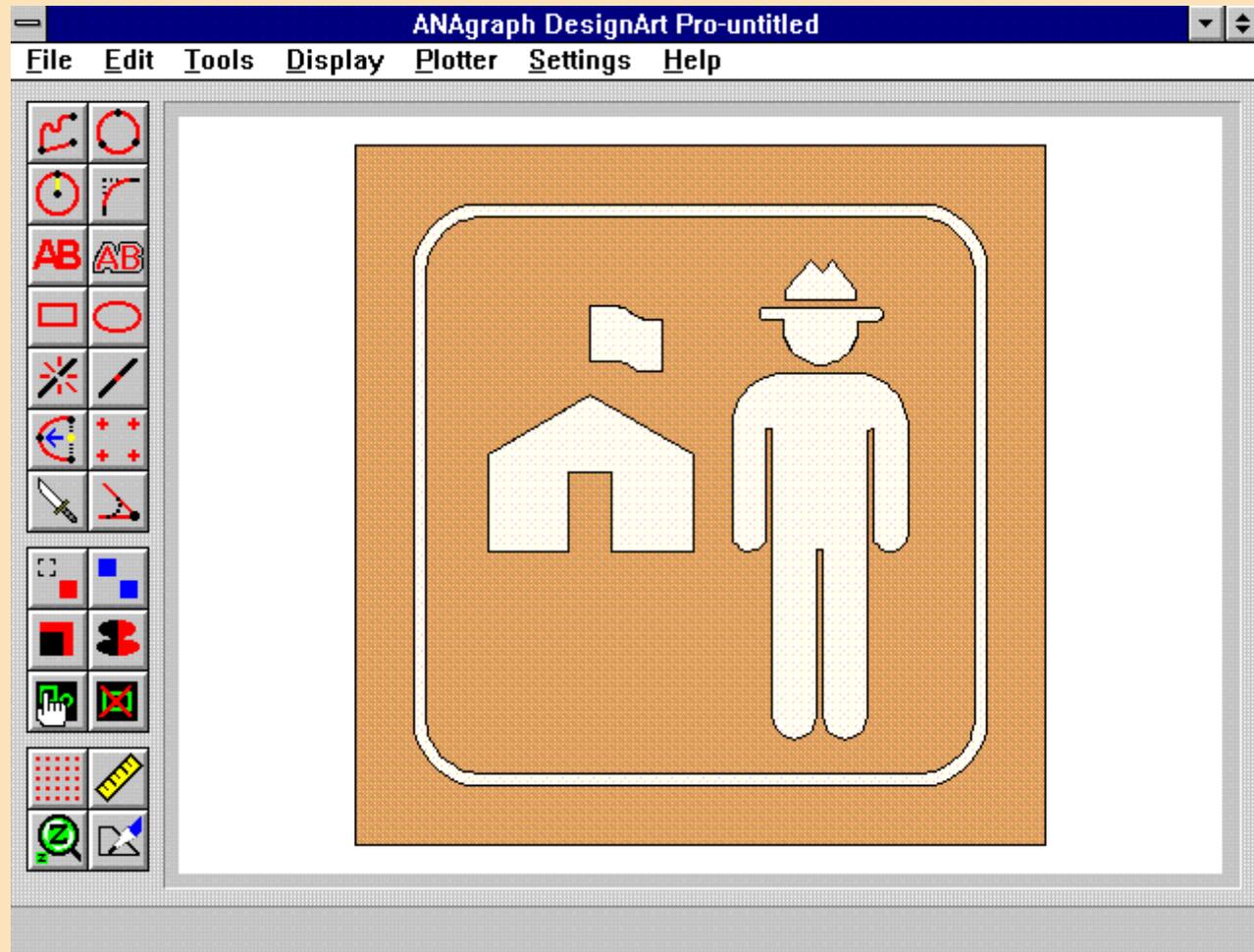
Control Panel:

Key	Action
←→	Move
↑↓	Move
Home	Begin
End	End
Tab	Next button
Ins	Cursor toggle
Esc	Cancel
↵	Select

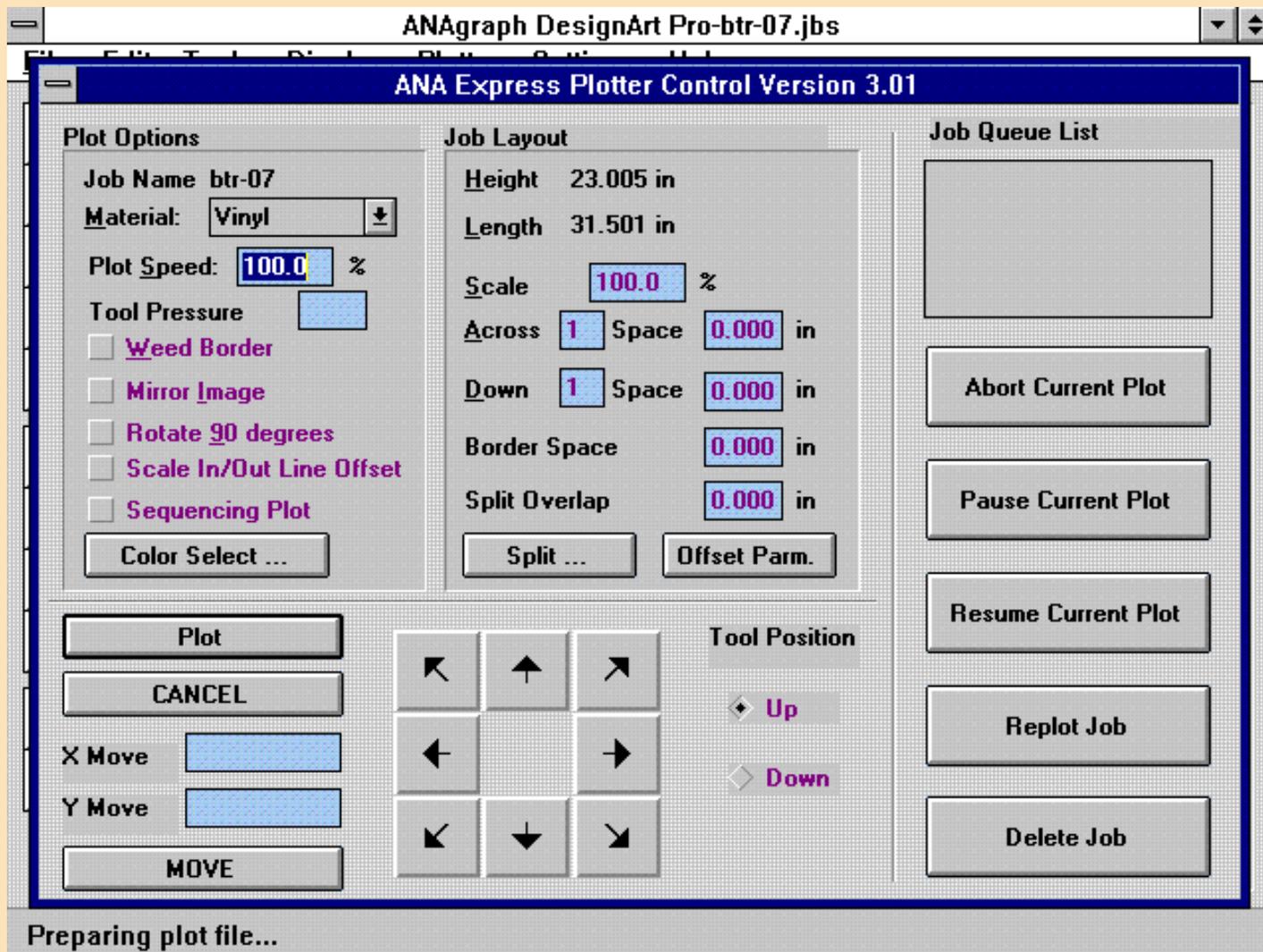
# *Sign Layouts in Graphics Software*



# *Layout of RS-015 in Graphics Software*



# Computer Cut Legend



# *RS-015 Computer Cut Graphics*



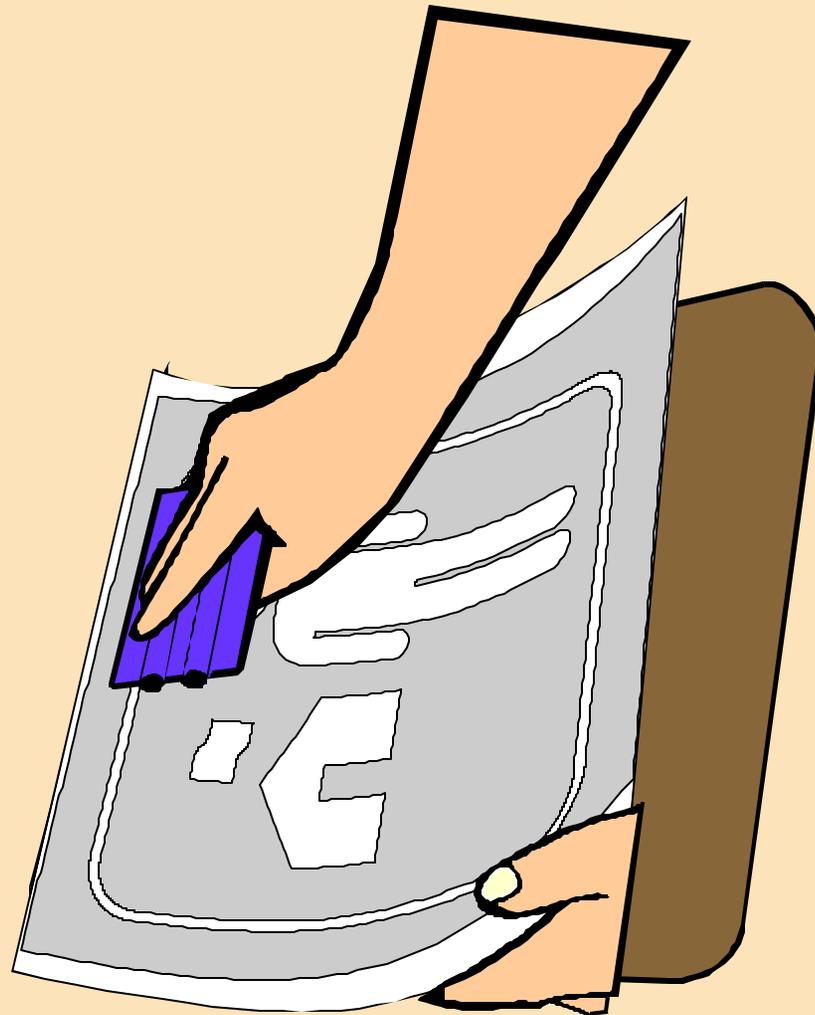
# *Weeding and Transferring Image to Substrate*

Once cut, the material is weeded. Weeding is the term used to describe removing the unwanted vinyl or reflective material.

Transfer-tape is then applied to the entire weeded image. This tape holds the text or graphics in alignment.

The image is then aligned to the substrate and tape hinged. The back or liner is removed, the image is squeegeed onto the sign face and the transfer-tape is removed leaving the image on the sign.

# *Applying Graphics*



# *Next Generation Sign Making*

The most recent development in sign making has been the advent of Digital Printing.

Digital printing is rapidly becoming the method of choice. This method transfers the desired image or text directly to vinyl. Developers have refined materials and inks to obtain up to 5 years outdoor durability.

Soon the process will include printing on long life reflective materials.

# *Next Generation Sign Making*

Digital printing allows for the transfer of photographic quality images. Essentially, anything that can be scanned or designed on a computer can be printed.

The environmental concerns involved with screen printing are eliminated.

Present Corps sign applications for utilizing this method include INTPRT, Industrial Safety signs or any non-reflective format.

# *Sign Maintenance*

## **When does it start?**

**Maintenance should start before the ordered signs arrive. An area should be set aside for the storage of stock and replacement signs.**

**Area should include racks where signs can be stacked on edge vertically with slip sheets between them until they are installed.**

**Project Sign Program Managers should review Section C. of the Sign Standards Manual.**

# *Sign Maintenance*

*My signs just arrived. What should I do?*

Unpack your signs ASAP. Inspect them! Are they what was ordered?

What condition did they arrive in? Are they wet? If moisture is present, unpack and separate signs until dry. If signs are cold when they arrive, moving them into a heated environment may cause condensation between them.

Do not throw slip sheets away. Signs must be stored and transported with the slip sheets between them.

# *Sign Maintenance*

## **Installing Your Signs.**

**Maintenance is a concern when transporting signs to the installation site. Avoid stacking tools and posts on signs when transporting.**

**Transport with slip sheets in place. Damage to the face or back during transportation can significantly reduce the useful life of a sign.**

**The reflectivity of diamond grade signs is dependent on surface condition. Treat it like a camera lens.**

**Use an anti-seize lubricant on the threaded inserts and bolts when mounting HDO signs.**

# *Sign Maintenance*

## **Cleaning.**

**At least twice a year and immediately after installation, clean signs with a mild soapy water solution. This can be scheduled during semi-annual inspections.**

**Coating the surface of your vinyl and reflective sheeted signs with Armor-All or a similar product can help keep signs clean in dusty areas and help reduce UV damage.**

**Redwood signs can be cleaned with tub and tile mildew removers or redwood deck wash.**

# *Sign Maintenance*

## **Cleaning Redwood.**

**Clean signs on an as needed basis. Signs become dark due to mildew and dirt accumulation.**

**Ready-mixed solutions for cleaning redwood are available at your local home center or hardware. These cleaners will remove dirt and kill mildew.**

**Redwood can also be cleaned with tub & tile mildew removers.**

**See manual page C.5 for detailed information on cleaning redwood.**

# *Sign Maintenance*

## **Inspecting.**

**Inspections should be done at least twice a year, both before the recreation season begins and after it is over.**

**During inspections, check for rusty bolts, rusty or rotting post, loose footing and sign surface deterioration. Plan appropriate action and document. Repair or replace as soon as possible.**

**It is a good idea to put together a kit containing mounting hardware, tools, patch material and cleaning supplies to take along with you while performing inspections.**

# *Sign Maintenance*

## **Edge Protection.**

Wooden signs require some sort of edge protection. When it becomes necessary to recondition, determine what type of paint was used originally. In most cases HDO signs would have been painted with Poly-Silicone Enamel.

What about the old cracking body filler that is coming off of the edges? Different expansion rates cause the putty to crack and release. It is not necessary to replace this filler. Clean out as best as possible and re-paint. Use two coats of paint on edges.

# *Sign Maintenance*

## **Edge Protection con't.**

**Points to remember when determining what type of paint to use.**

**Avoid oil based stains or shake and shingle paints. Oil/alkyd primers and paints are recommended. Latex are not.**

**Simpson Plywood Company recommends HDO plywood edges be protected with 2 coats of EC-3 clear or EC-4 aluminized polyurethane edge coating to provide adequate edge protection.**

# *Sign Maintenance*

## **Top Edge Tape.**

**Covering the top edge of signs with clear tape originated in areas where signs were buried under snow. While there is some merit to this practice, in most cases it is not necessary.**

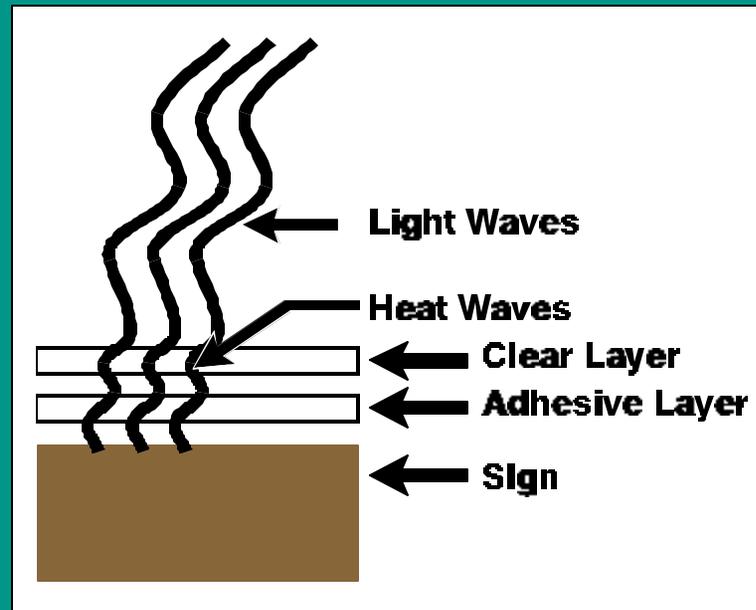
**Almost every project has experienced cracking and peeling of top edge tape.**

**Why does this happen?**

# *Sign Maintenance*

## Top Edge Tape con't.

Sunlight passing through clear top edge tape causes a build up of heat at the surface of the sign. This heat build up destroys the adhesive and makes the clear brittle.



# *Sign Maintenance*

**Top Edge Tape con't.**

*How do I correct this problem?*

**Clean off the tape and paint edges of sign.**

*Should I replace the clear tape?*

**This is not recommended.**

*What about extreme environment conditions?*

**Cover top edges with the same material that the sign is sheeted with.**

# *Sign Maintenance*

**Painting Backs of Aluminum Signs.**

**This is no longer recommended.**

**Painting the backs of aluminum signs just adds another maintenance item.**

**Exception: Some states require a non-glare coating on the backs of aluminum signs that are placed along state routes.**

# *Sign Maintenance*

## **Paint and Stain Colors.**

*Where can I buy paint that matches my signs?*

Most home centers and hardware stores have computerized paint matching systems. Select only quality paints that meet or exceed the specifications set in the Sign Manual.

Take a page out of your Sign Manual that has a good example of COE Brown with you. The computer matching systems can match this color very close. Reflective repair sheeting cannot be used for color matching.

# *Sign Maintenance*

## **Patching and Repairing.**

### **Repairing Bullet Holes.**

**HDO - Remove any splintered wood. Cover face damage with color-matched sheeting. Fill from back with caulking. Touch up with paint.**

**Aluminum - Remove sign from post. Place on hard surface slightly larger than damaged area. Pound flat from high side with a plastic mallet using light blows to minimize stretching of the aluminum.**

**Cover face damage with a matching piece of sheeting. Repair or replace damaged lettering.**

# *Sign Maintenance*

**Patching and Repairing con't.**

**Repairing Bullet Holes.**

**Redwood - Fill hole with color matched caulk if available. If necessary, touch up finish. Make sure caulk is paintable. Engraved areas require special attention. Review Section B.3 Rev 1.**

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**Paint and stain suppliers listed on manual page E.1.**

# *Sign Maintenance*

## **Graffiti.**

**Identify materials (both sign sheeting and graffiti).**

**Take action to remove ASAP. The longer paints remain on sheeting, the harder they are to remove.**

**Mild solvents (mineral spirits) will work in most cases. Diluted citrus cleaners will remove uncured paints in most cases without damaging cured inks. Start mild and add citrus cleaner as necessary.**

**Graffiti removers are commercially available. Check with local suppliers.**

# *Sign Maintenance*

## **Graffiti on Redwood.**

**Cleaning with solvents can cause the damage to increase due to the porous nature of the wood.**

**Remove damage caused by paint and other markings by sanding with 150 grit sandpaper.**

**After removing as much of the graffiti as possible, re-stain the entire sign panel.**

**Procedure is described on manual page C.9.**

# *Sign Maintenance*

## **Reconditioning Redwood.**

**Try to obtain Olympic brand semi-transparent stain, number 715. If not available, use the color match formula on manual page E.1.**

**Signs should be re-stained every three years. Signs exposed to harsh environmental conditions may require more frequent staining.**

**Properly maintained redwood signs can last for decades.**

# *Sign Maintenance*

## **Reconditioning Redwood con't.**

**When possible, refinish indoors. Remove the sign from its mounting to expose back and edges.**

**Clean the sign prior to refinishing. The sign must be clean, dry and free from any chemical or cleaning solvents.**

**Lightly sand the surfaces to smooth any raised grain. This will also help to clean the sign.**

**Remove any dust by blowing with low pressure compressed air and wiping with a tack cloth.**

# *Sign Maintenance*

## **Reconditioning Redwood con't.**

**Apply stain with a very short napped roller.**

**Stain should be applied in several light coats, built up over a few hours time. This is necessary to sufficiently enhance the wood grain and protect the wood. A heavy coat of stain applied to the sign will run down into the routed areas .**

**The roller must be rolled out onto a scrap board until almost dry before applying stain.**

**Overlapping strokes will show to some extent. This can be minimized by rolling in the direction of the grain.**

# *Sign Maintenance*

## **Reconditioning Redwood con't.**

**Stir stain frequently in both the can and the roller pan. Stain will settle quickly. This will help ensure color consistency.**

**The first coat should be allowed to penetrate, but not to harden. Then apply the second coat. Drying (hardening) time will vary with temperature and humidity. Usually, this will be between 1 to 4 hours. All staining should be done the same day.**

**Remove any stain that runs down into routed areas with a soft dry cloth.**

# *Sign Maintenance*

## **Reconditioning Redwood con't.**

**If necessary, re-paint the routed letter areas with exterior enamel or reflective liquid as specified in Appendix B and E. Be careful not to get enamel or reflective liquid on the stained sections.**

**Allow the stain to dry thoroughly before the sign is re-assembled.**

**You can greatly prolong the life of your sign's finish by periodically rinsing while wiping with a soft brush.**

# *Sign Maintenance*

## **Safety.**

The safety of personnel should be the number one concern when performing sign maintenance.

Prepare AHA and hold tool box safety meetings.

Wear safety orange vests when working along road.

Maintenance vehicles should be equipped with flashing lights. 4-way flashers may not be enough.

Set up barricades, traffic cones and “Work Area” signs when appropriate.

Wear appropriate safety clothing when cleaning or repairing signs.

# *Sign Maintenance*

## **Replacing Legends.**

**Changing facility fees and hours of operation will require legend changes on signs.**

**The Sign Manual shows several procedures to do this in Appendix C.**

**Legend removal can be a difficult process. If not properly done, it may result in severe damage to the sign face.**

**Review the handout on legend removal and replacement.**

# *Sign Maintenance*

## **Storage.**

**Storage area should be prepared before signs are received. Always unpack signs to store.**

**Extremely high temperatures should be avoided. Signs must be kept dry when in storage. Make certain that moisture is not present on signs or slip sheets.**

**Store signs vertically, on edge. Store with slip sheets between them. The shiny or slippery side of the sheet goes toward the sign face.**

**Save some of your old slip sheets and roll them shiny side in for future use.**

# *Sign Maintenance*

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**Q & A.**

**Questions on what was covered.**

**What problems are you encountering that haven't been covered.**

# *Sign Maintenance*

## **Communication.**

**Share your experiences with the Corps Community.**

**E-mail is a good medium for getting answers and sharing you problem solving methods.**

**Use the NRM Gateway: [corpslakes.usace.army.mil](http://corpslakes.usace.army.mil) to find more information about signs and the Sign Standards Program.**