

# UNIT 8 – SIGN FABRICATION

## *INTRODUCTION*

Based on a survey conducted during the early part of 1998 and responded to by 12 out of 14 highway divisions, most of the signs fabricated within the various sign shops are done by the ***baked on*** sheeting method and/or the ***pressure sensitive*** sheeting method. Only two divisions use silk screening and three divisions use the computer aided ***pressure sensitive*** sheeting method. Although this unit will attempt to emphasize general techniques in sign fabrication, much of the material will be geared to the two most commonly used methods.

The scope of sign fabrication varies from full-process automated factories (Bunn sign plant) that begin by processing aluminum sheeting to smaller shops (Division sign shops) with limited capabilities to compose sign legends by hand. Although Divisions throughout the state are beginning to purchase computer aided equipment to layout and fabricate signs, unit # 8, which is required for skill block # 1T7, will concentrate on hand fabrication techniques involving hand cut letters and standard die cut letters. It is very important for a sign fabricator to master the ***basics*** before using the more technically advanced equipment. In addition to the assigned reference guides for unit # 8, a sign fabricator should be familiar with manufacturer's specifications and guides regarding the various products that are currently under state contract.

## *ASSIGNMENT*

Although several reference guides exist that a sign fabricator should become familiar with, including the ***Manual on Uniform Traffic Control Devices*** and the ***North Carolina Supplement to the MUTCD***, the most important reference guide is ***Standard Highway Signs*** published by the Federal Highway Administration. Therefore, self-study unit # 8 will give a sign fabricator the opportunity to become very familiar with this reference guide. Every sign shop throughout the state should have a copy of ***Standard Highway Signs*** and the sign fabricator should use it on a regular basis.

As an introduction to sign fabrication, read and study part II (Signs) of the ***Traffic Control Devices Handbook***. Also, read and study ***Standard Highway Signs***. Answer review questions. Take and pass the written test. Using the design provided on page 2-11 of ***Standard Highway Signs***, fabricate a 30 inch by 30 inch side road warning sign. Using the design provided on page 3-30 or page 3-32 of ***Standard Highway Signs***, fabricate a two line destination guide sign (D1-2) or a two line distance guide sign (D2-2). To avoid wasting materials, each division should use messages that are applicable to their divisions. The purpose of this exercise is to gauge a sign fabricator's ability in actually fabricating signs; therefore, all of the design information should be furnished to him/her. Both signs should be fabricated to the supervisor's satisfaction using hand cut letters or standard die cut letters.

In order to give a sign fabricator more exposure to the various techniques of sign fabrication, a supervisor may want to send a sign fabricator to the Correction Enterprises sign plant in Bunn, North Carolina. Personnel at this plant have indicated a willingness to spend two or three days with the sign fabricators throughout the state. This additional training is not a skill block requirement because of the travel costs involved.

### ***KEY POINTS***

Sign substrates (defined as an underlying layer) fall into two general categories; flat and reinforced. Aluminum is the most common material for both categories, given its long life and economy. Although aluminum is readily available, its preparation as a sign substrate requires significant capital investment in specialized metal working machinery and treatment equipment. Therefore, most Division sign shops will continue to purchase precut and treated sign blanks from Correction Enterprises.

Flat substrates include aluminum in thicknesses of 0.063 inches, 0.080 inches, 0.100 inches, and 0.125 inches.

High-density overlay (HDO) and medium-density overlay (MDO) plywood is a good choice for temporary and shorter life work zone signs because it can be cut and shaped with ease without a significant investment in equipment.

Sign blanks should be clean and free of contact greases, oils, and other contaminants before sheeting is applied. The ***tape snap*** test and the ***water break*** test can be helpful in detecting surface contaminants.

***Tape snap*** test – If dirt or improper conversion coating is suspected, firmly apply a strip of transparent tape to the dry surface. Then, snap it up at a right angle to the surface. Any material on the tape or visual change in color or sheen where the tape was applied to the surface indicates a heavy, loosely coated or otherwise contaminated surface that may be unsatisfactory for sheeting or film application.

***Water break*** test – Test for oil or wax contamination by pouring water onto the surface. The water should not bead but should flow out to form a uniform layer on the surface.

Generally, the overall dimensions of signs should be in multiples of six inches.

Studies have shown that, for any given legend, better legibility can be obtained by using a relatively wide spacing between letters than by using wider and taller letters with a cramped space.

Generally, sign lettering shall be in upper-case. The MUTCD states that highway signs shall be in upper-case letters of a type approved by the Federal Highway Administration,

except destination names on freeway and expressway guide signs, which may have initial upper-case lettering followed by lower-case lettering (MUTCD, Section # 2A-15, Section # 2E-10, and Section # 2F-11).

The *only* lower-case font is Emod or E Modified (E(M)), which is based on series E upper-case letters but with stroke width increased to 20 percent of letter height.

The Federal Highway Administration has prepared standard upper-case and lower-case alphabets which are arranged in different sets, including Series B, C, D, E, E(M), and F. Each series has wider letters, which get wider as series letter advances, with greater stroke widths and uses larger proportional spacing between letters and words.

The Series A alphabet was discontinued in the early 1970s.

The Series B alphabet is restricted to street name signs, parking signs, and other similar signs where limited breadth and stroke widths are required for design purposes.

The principal legend on guide signs for rural conventional roads along major routes shall have a minimum letter height of six inches.

The principal legend on guide signs for rural conventional roads along minor routes and along urban streets shall have a minimum letter height of four inches.

An accepted *rule-of-thumb* to follow for legibility for signs other than Interstate is to have one inch of letter height for every 50 feet of desired legibility.

The legend on guide signs must be kept to a minimum to be instantly legible. Conventional road guide signs should be limited to three lines of principal legend which includes place names, route numbers, and street names.

With few exceptions, all signs shall have a border of the same color as the legend.

Interline spacing should be about  $\frac{3}{4}$  the average of uppercase letter heights in adjacent lines of letters.

The spacing to the top and bottom borders should be about equal to the average of the letter height of the adjacent line of letters.

When cutting letters, numbers, and other special symbols, all tools used should be kept sharp and clean to minimize the possibility of damage to the sheeting or film and adhesive transfer.

## ***REVIEW QUESTIONS***

1) Define sign substrate.

2) What are the two general categories of sign substrates?  
\_\_\_\_\_ and \_\_\_\_\_

3) Can plywood be used as a sign substrate?

YES                  NO

4) When cutting letters, numbers, and other special symbols, all tools used should be kept sharp and clean to minimize the possibility of damage to the sheeting or film and adhesive transfer.

TRUE                  FALSE

5) What is the purpose of the *tape snap* test and the *water break* test?

6) Describe the *tape snap* test.

7) Describe the *water break* test.

8) Generally, sign lettering shall be in lower-case.

TRUE                  FALSE

9) What type of signs is the Series B alphabet restricted to?

10) Should the border of a sign be the same color as the legend?

YES                  NO

11) The spacing to the top and bottom borders should be about equal to the average of the letter height of the adjacent line of letters.

TRUE

FALSE

12) What is the letter height and style for a standard size Stop sign?

\_\_\_\_\_ ; \_\_\_\_\_

13) What is the distance from the bottom of a standard Stop sign to the bottom of the line of letters?

14) What is the letter height and style of the speed numbers for a standard size Speed Limit sign?

15) What is the size of a Speed Limit sign along a freeway?

## ***ANSWERS TO REVIEW QUESTIONS***

- 1) The underlying layer
- 2) Flat and reinforced
- 3) Yes
- 4) True
- 5) To help detect surface contaminants
- 6) Firmly apply a strip of transparent tape to the dry surface. Then, snap it up at a right angle to the surface. Any material on the tape or visual change in color or sheen where the tape was applied to the surface indicates a heavy, loosely coated or otherwise contaminated surface that may be unsatisfactory for sheeting or film application.
- 7) To test for oil or wax contamination, pour water onto the surface. The water should not bead but should flow out to form a uniform layer on the surface.
- 8) False
- 9) Street name signs, parking signs, and other similar signs
- 10) Yes
- 11) True
- 12) 10 inches, "C" (*Page 1-2 of the Standard Highway Signs manual*)
- 13) 10 inches (*Page 1-2 of the Standard Highway Signs manual*)
- 14) 10 inches, "E" (*Page 1-5 of the Standard Highway Signs manual*)
- 15) 48 inches by 60 inches (*Page 1-5 of the Standard Highway Signs manual*)