TASK 3:
CLOSED COURSE TESTING

INTRODUCTION

The objective of the field evaluation is to determine the legibility distances of overhead guide signs for three fonts: Series E(Mod), Clearview 5W, and Enhanced E(Mod). In addition, legibility distance of numbers is also of concern; thus, numbers were presented on a shoulder-mounted sign, also in each of the three fonts. All signs were fabricated using Type XI white letters on Type IV green background sheeting. The study was conducted on a closed course track and included both daytime and nighttime settings, with participants in two distinct age groups. This report describes the study design and variables, test signs and equipment, and study procedure.

Study Design

For the field study, three full-size overhead guide signs and one full-size shoulder-mounted sign were placed along the closed course roadway. Letter legends were tested using overhead guide signs, and number legends were tested using shoulder-mounted signs. A total of 15 target words and 5 numbers were presented to participants, and each participant saw each word and number only once. Words and numbers were randomized for each participant among each of the three fonts being tested, and font types for the guide signs were randomly assigned to different positions along the driving course throughout the study. Words were selected that were common but had no relation to roadway terminology. The words also had similar footprints. In addition, the occurrence of ascending and descending letters was controlled, as descending letters on an upper line may interfere with ascending letters on a lower line. The test signs were purposely designed to address this potential interference. Number legends were selected such that they contained similarly shaped characters as well. Target words and numbers are shown in Table 1.

Table 1. Target words and numbers.

Neutral	Ascenders	Descenders	Numbers
Honors	Buffer	Grapes	31
Houses	Rubber	Hungry	38
Season	Dishes	Orange	52
Sensor	Finish	Jogger	73
Series	Punish	Supper	85

Drivers in two age groups were tested: younger (21-35 years) and older (65+ years), with the focus of the study being on older drivers. Also, data was collected for daytime and nighttime driving conditions, with the focus of the study being on nighttime driving and the resulting halation effects of the vehicle headlights on the high intensity sheeting. Independent variables and the number of participants tested are presented in Tables 2 and 3 below.

Table 2. Independent variables.

Sign Color / Sheeting Type	Age Group	Time of Day	Font
White letters / Type XI Green background / Type IV	21-35 years 65+ years	Daytime (baseline) Nighttime	Clearview 5W Series E(Mod) Enhanced E(Mod)

Table 3. Number of participants.

Age Group	Both Daytime & Nighttime		Nighttime Only	Totals		TOTAL
	Daytime	Nighttime		Daytime	Nighttime	
21-35	6	6	12	6	18	24
65+	10	10	20	10	30	40
Totals	**16**	**16**	**32**	**16**	**48**	**64**

Test Signs and Equipment

Letter Legend Signs

A total of three full-size overhead guide signs (with interchangeable legend overlays) were used in this study. Each guide sign consisted of an 8' x 10' extruded back panel with Type IV green background sheeting and Type XI white sheeting for the border and lettering. These sheeting types were used because they are the materials currently in use that produce the greatest contrast and the greatest halation effect.

Each guide sign contained three lines of text with one word per line. The words on the upper and lower lines remained the same throughout the study, with the upper word containing descenders and the lower word containing ascenders. The two words were *Paying*, which contains descenders, on the upper line and *Likely*, which contains ascenders, on the lower line. The word on the middle line, which was the target word, was changed using interchangeable legend overlays. The aluminum letter legend overlays measured 2.5' x 8' each and were constructed using the same sheeting materials as the extruded back panels. A total of 45 letter legend overlays were used (15 words x 3 fonts per word). To allow for easier handling during panel changes, each individual word was formed using two 2.5' x 4' overlays, forming the 2.5' x 8' full overlay. (See Figure 1)

Figure 1. Full-size overhead guide sign.

The overhead guide signs were tested at a height of 18½ ft. The signs were raised and lowered using three forklifts, one for each sign structure. Each extruded back panel was secured to a metal structural support which was designed such that it could be readily accessed, raised, and lowered using the forklift. (See Figure 2)

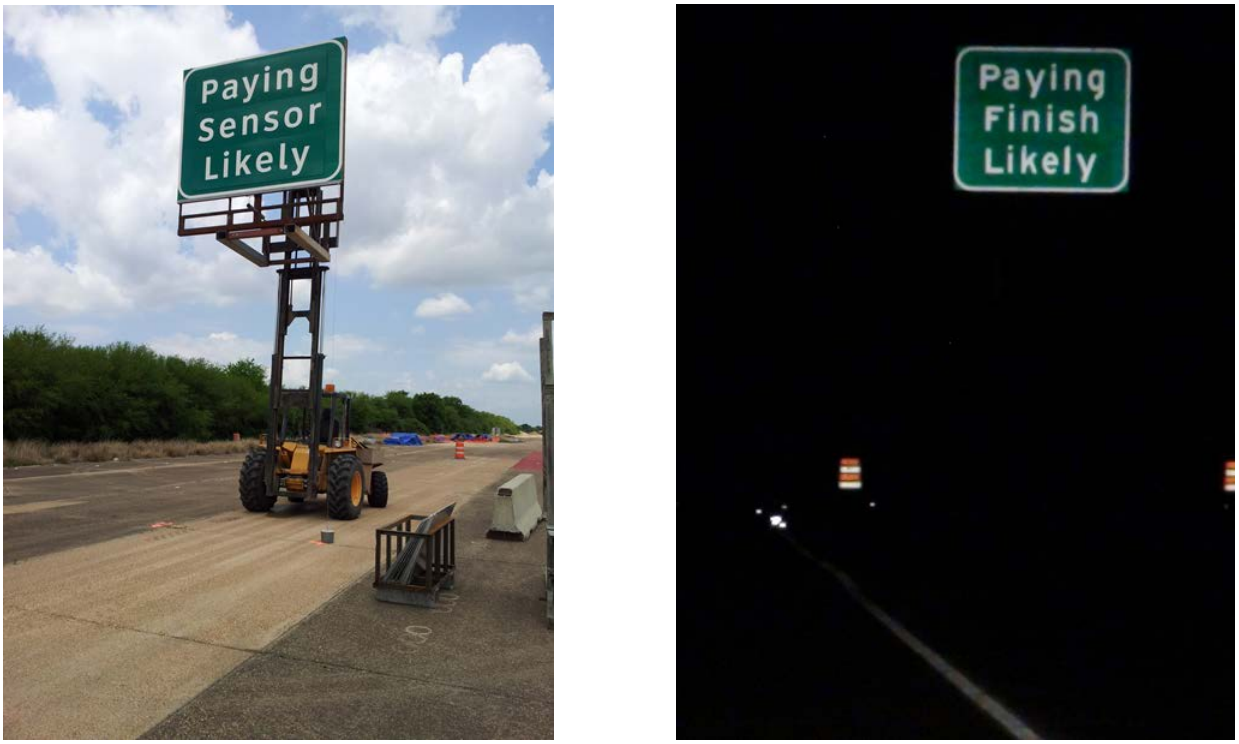

Figure 2. Overhead guide signs in the daytime and nighttime raised position.

Number Legend Signs

Each number legend sign was constructed using a 2.5' x 4' extruded panel. Similar to the letter legend signs, Type IV green sheeting was used for the background and Type XI white sheeting was used for the border and numbers. The signs were supported on a metal post at a height of 7 ft.

Figure 3. Shoulder-mounted number sign.

Study Procedure

A test course was laid out on the closed course facility at the Texas A&M Riverside campus. (See Figure 4) All signs were offset 12 ft from the right edge line of the driving lane. The overhead guide signs were placed at a height of 18½ ft to the bottom of the sign, and the shoulder-mounted number signs were placed at a height of 7 ft to the bottom of the sign. An oval course was set up which contained three

overhead guide sign positions and one shoulder-mounted sign position. The sign positions were 1250 ft apart at a minimum. The driving path was clearly delineated using paint, raised pavement markers, and traffic barrels.

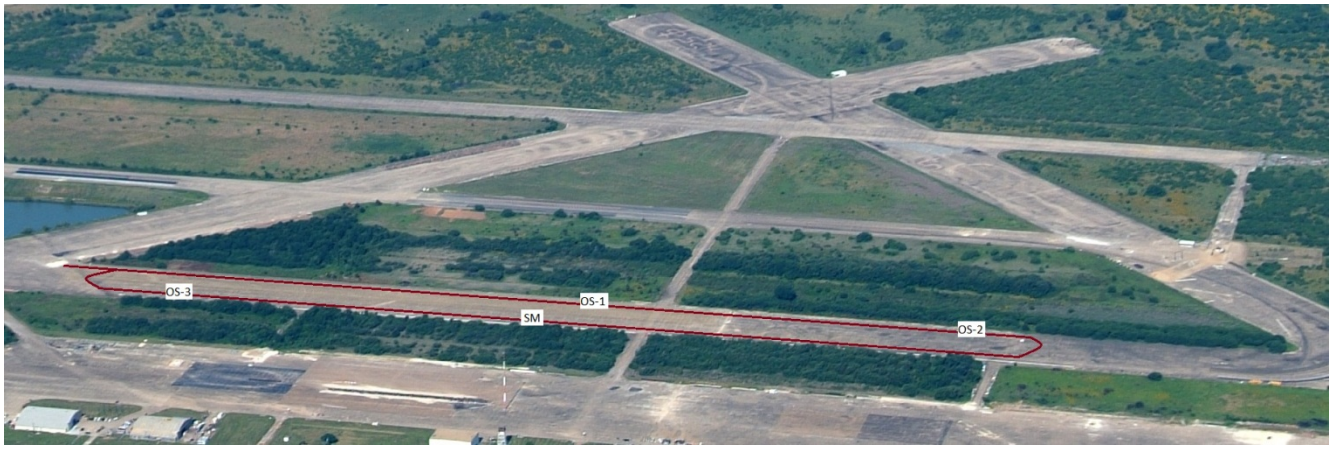

Figure 4. Closed course track with sign positions marked (OS-1 is overhead sign position 1, etc.; SM is shoulder mounted sign).

The participant was seated in the driver seat of the instrumented vehicle, and the experimenter was seated in the middle row passenger seat. The experimenter provided verbal instructions to the participant regarding where the participant was to drive and the preferred speed (35 mph, not to exceed 40 mph). The experimenter instructed the participant to state only the middle word on each overhead guide sign as soon as they could read it. They were asked to wait until they felt they could read the word correctly and were discouraged from guessing. If the participant found that they misread the word, they were asked to say the correct word as soon as they realized the error.

The experimenter recorded all responses by pressing the appropriate numbered computer key. The laptop computer was connected to the Global Positioning System (GPS) hardware and software within the vehicle so that distances could be measured relative to the test sign locations. The experimenter pressed the computer key at the time the participant said the target word aloud. If the participant said the incorrect word initially and later corrected him/herself, the experimenter pressed the same computer key again at the time the correct word was said. The experimenter also noted on the paper data form if there were any words said incorrectly and wrote any incorrectly stated words next to the associated target words on the form.

Each lap of the closed course roadway contained three overhead guide signs and one shoulder-mounted sign and took approximately 2.5 minutes to complete. The participant was asked to drive five laps; thus each participant saw a total of 15 overhead signs (5 randomized different words in each of the 3 fonts) and 5 shoulder-mounted signs (5 numbers randomized among the 3 fonts). At the end of each lap, the overhead signs were lowered using the forklifts, the target words changed, and the signs raised back to the 18½ ft height. The number sign was also changed. This process took approximately 8 minutes, thus the entire driving portion of the study took approximately 45 minutes to complete.