MIDWEST SMART WORK ZONE DEPLOYMENT INITIATIVE

MwSWZDI

FHWA POOLED FUND STUDY

Report Title

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Solar Powered Illuminated RPMs

Principle Investigator

Name Meyer, Eric

Affiliation Meyer ITS

Address 2617 W 27th Terrace
Lawrence, KS 66047

Phone 785 843 2718

Fax 785 843 2647

Email emeyer@insighthawks.com

Vendor Name and Address

Interplex Solar

Author(s) and Affiliation(s)

Eric Meyer (Univ of Kansas)

Supplemental Funding Agency Name and Address (if applicable)

Supplemental Notes

Abstract

The RPMs were easily installed and relatively low maintenance. The data showed no observable change in lane distributions that could be attributed to the greater visibility of the taper after installation of the RPMs. Subjective evaluation and review of driver's view video footage suggested that the light emitted from the units was not sufficient to effectively improve taper delineation.

SOLAR POWERED ILLUMINATED RAISED PAVEMENT MARKERS

Interplex Solar, Inc.

Evaluation Team

John Leopardi
Interplex Solar, Inc.

Lee Roadifer
Kansas Department of Transportation

Eric Meyer, Ph.D.
The University of Kansas

Description

The Interplex Solar solar powered-raised pavement markers (RPMs) were installed with the southbound left-lane drop taper at the north end of the project to provide additional guidance through the lane drop.

Study site

I-135, from the Harvey/Sedgwick County line north to 0.3 miles south of the South K-15 interchange, Harvey County. South end of project at the northbound left lane drop.

I-135, Harvey County
From milepost 22
To milepost 30

ADT = 21000 vpd

Is this ADT directional? NO

T = 18.0%
D = 60%
$V_{current}$ = 70 mph
$V_{construction}$ = NA
$V_{advisory}$ = NA

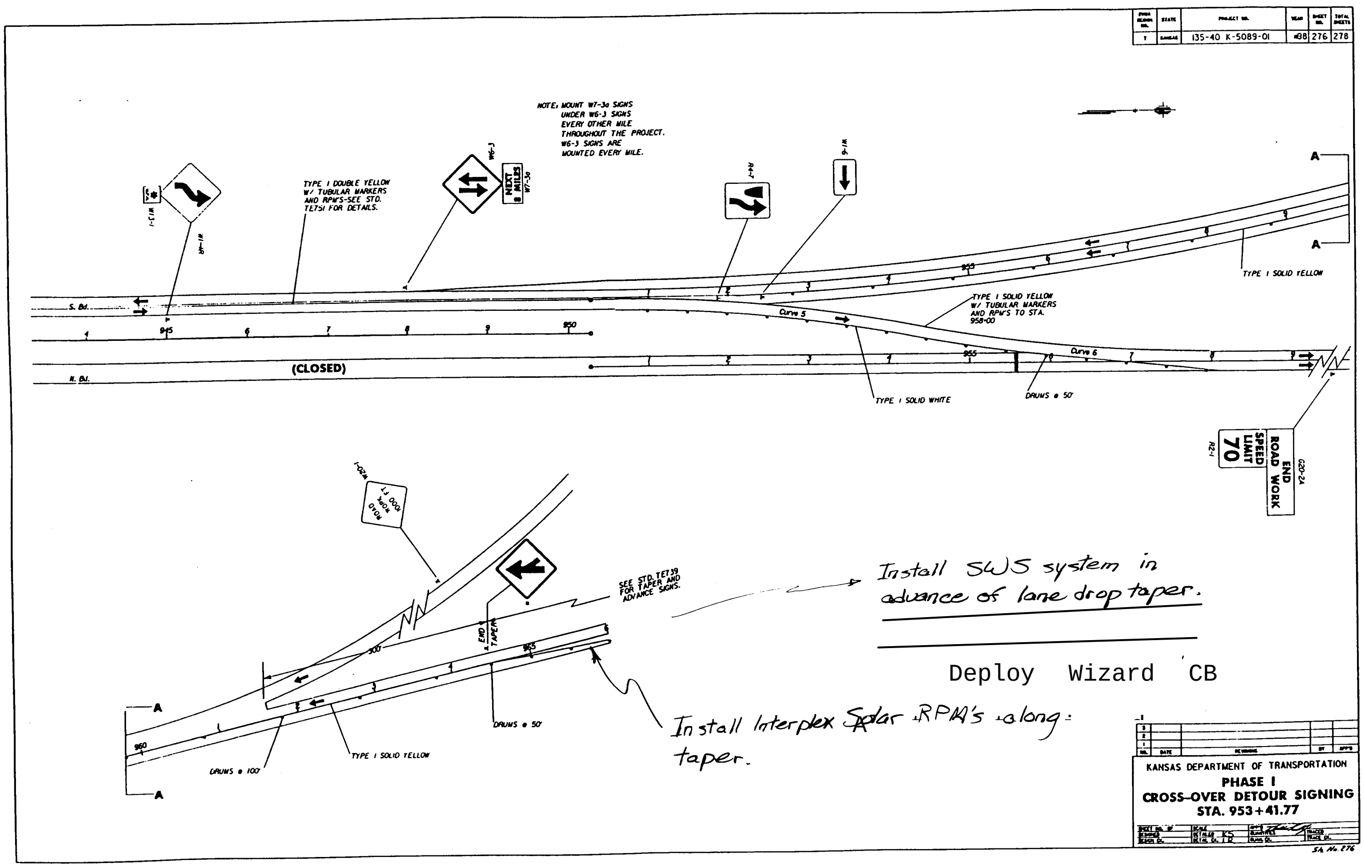

FIGURE 3-1 Solar powered illuminated RPMs study site.

Performance Measures

The objectives of this application and the associated performance measures are listed in Table 3-1.

TABLE 3-1. Interplex Solar RPMs: objectives and performance measures.

Objectives	Performance Measures
Provide additional guidance	1. Lane distribution upstream of the taper 2. Speed upstream of the taper

Experimental Design

Study type: Before and after.

Data Collected

Lane distribution at locations 500 ft, 1000 ft, and 1500 ft upstream of taper

Collection method: pneumatic tubes and automatic traffic recorders.
Sample size: one 24 hr day before and one 24 hr day after installation.
Analysis technique: comparison of lane distributions before and after installation.

Speed of vehicles 500 ft, 1000 ft, and 1500 f upstream of taper

Collection method: pneumatic tubes and automatic traffic recorders.
Sample size: one 24 hr day before and one 24 hr day after installation.
Analysis technique: comparison of 85^{th} percentile and mean speeds, and percent of vehicles speeding before and after installation.

Special Notes

Equipment difficulties resulted in only one hose on each counter being utilized. Consequently, speed data could not be derived from the raw data. Further difficulties resulted in corrupted data for the 1500 ft collection point.

A software utility was developed to derive vehicles from the data, thus lane distributions were available for the 500 ft and 1000 ft collection points.

Lane distributions were calculated for one-hour periods by vehicle classification (*passenger car* and *other*). Data were analyzed using the percentage of vehicles in lane 2 (closing lane).

Evaluation Results

The RPMs were quickly and easily installed. Devices operated properly throughout the duration of the evaluation.

No change occurred in the percentage of vehicles in lane 2 in any of the analyses, including passenger cars, trucks, daytime and darkness. Summaries of the data collected 500 ft upstream of the taper are shown in 3-2. Because there were no statistically discernable changes, 3-2 shows a comparison of the baseline data with data collected while both the Interplex Solar RPMs and the Wizard CB Alert System were in operation.

Table 3-2 Interplex Solar RPMs: percent of vehicles in lane 2.

	Lane 1	Lane 2	Total Vehs	% Lane 2	Avg %	sigma	z	level of significance 0.05	0.01
DAYLIGHT,PASSENGER CARS									
Before	3466	205	3671	0.0558	0.0605	0.0049	-1.4668	1.96	2.576
After	6365	428	6793	0.0630				**no change**	**no change**
NIGHTTIME,PASSENGER CARS									
Before	760	44	804	0.0547	0.0520	0.0101	0.4413	1.96	2.576
After	1171	62	1233	0.0503				**no change**	**no change**
DAYLIGHT,TRUCKS									
Before	552	8	560	0.0143	0.0237	0.0076	-1.7330	1.96	2.576
After	1382	39	1421	0.0274				**no change**	**no change**
NIGHTTIME, TRUCKS									
Before	327	7	334	0.0210	0.0176	0.0097	0.6368	1.96	2.576
After	400	6	406	0.0148				**no change**	**no change**

Visual observation revealed the configuration and intensity of the lights was insufficient to achieve significant conspicuity.

Conclusions

The traffic volumes experienced at the test site at night were low. The terrain was level and the visibility was excellent. Under such conditions, the demands on the driver are few and lane change maneuvers are simple. Consequently, there was little need for improvements to the traffic control measures commonly used at such a site.

The collection of data at distances upstream of the taper of 500 ft or more may have been too far removed to capture lane change patterns.

Recommendations

Operating the RPMs in a flashing mode rather than steady burn might improve their effectiveness. Additionally, deploying more units with smaller spacings might provide better delineation. The ease of installation and low maintenance are noteworthy benefits, but a more effective configuration must be developed before these can be recommended for delineation of lane drops.