Evaluation of BlinkerSign® Flashing LED-Enhanced Signs and SmartStud™ In-Pavement Crosswalk Lighting Systems*

In an effort to increase pedestrian safety and driver awareness, the Vermont Agency of Transportation (VTRANS) installed a series of in-pavement flashing warning Light-Emitting Diode (LED) lights, known as Smartstuds, in September of 2006 to further delineate the limits of a preexisting crosswalk in Quechee, in the town of Hartford, Vermont. Unfortunately, the SmartStuds began malfunctioning and replacements were installed in July 2007. The system was monitored and in January 2008 the SmartStuds were once again found to be not working properly.

At this time, key VTRANS personnel chose to decommission the system and install a different safety measure at the location. BlinkerSign® Flashing LED signs from Traffic & Parking Control Company (TAPCO) were chosen as the replacement. They incorporate Daylight-Visible (Day-Viz™) LEDs and 3M™ VIP Diamond Grade™ sheeting, giving drivers notice much further in advance than conventional signs. The BlinkerSigns were installed in November 2008. The system to date has had no malfunctions.

A high tourist population and large traffic volume characterize the installation location. The average annual daily traffic (AADT), on this two-lane roadway, is 12,500, a moderately high AADT for the State of Vermont. Although the posted speed limit is 35mph, visual observations indicate that many motorists travel above this speed. While the results from a before and after study found that the in-pavement lighting system was effective in increasing driver awareness and pedestrian safety, several of the SmartStuds malfunctioned during the two year monitoring period, so they were removed and replaced with two flashing LED traffic signs, known as BlinkerSigns. The new system can be activated either by pushing the SmartButton, or by a minimum weight of 30 pounds applied to the SmartPed. Both signs blink in unison at a rate of 60 times per minute for a period of 20 seconds.

Evaluation

To evaluate the condition of the BlinkerSign system and to visually assess the brightness of the LEDs, two site visits were conducted on Tuesday January 6th, 2009 and Monday, August 2nd, 2010. During the first site visit, the BlinkerSigns were examined during daylight, dusk and nighttime hours, whereas the second visit was conducted solely during daylight hours. The signs appeared to be extremely visible under all light conditions, especially during evening hours, and were in excellent condition during both visits with no visible wear to the sign face or LEDs.

Unlike the Smartstud System, minimal wear was anticipated due to the upright nature of the signs. According to the District 4 maintenance crew and Traffic Shop personnel, no maintenance has been performed in the 21-month period after installation. No complaints have been recorded from the traveling public. On a side note, this area is inundated with pedestrians during daylight hours, and system users and drivers might not use the full capability of the system as occurs in nighttime hours.

BlinkerSigns, manufactured by TAPCO of Brown Deer, Wisconsin, are traffic signs enhanced with Light Emitting Diodes (LEDs) around portions of the sign border, and they meet the requirements of the MUTCD Section 2A.07, "Retroreflectivity and Illumination". The array of incredibly bright, Daylight-Visible (Day-Viz™) LEDs flashes in unison, once per second. BlinkerSigns may be programmed to operate continuously or on solar time clocks, pushbuttons, motion detectors or other Intelligent Transportation System (ITS) devices. In addition, Advance and At-crosswalk signs can be programmed to flash simultaneously. BlinkerSigns operate on solar power, or can be hard wired into an electrical system. TAPCO utilizes highly reflective 3M™ Diamond Grade™ sheeting, and the LEDs can be seen up to two miles away.

Results

Overall the percentage of traffic that yielded to pedestrians increased after both the SmartStud and BlinkerSign Systems were installed. When no system was in place, 56% of traffic yielded. The percent of traffic increased to 76% compliance after the SmartStud System was in place. The largest percentage of compliance was witnessed after the BlinkerSign System was in place with an overall 80% of traffic yielding to the staged pedestrian. The overall percentages are comprised of both directions and crossing scenarios.

After analyzing the results from the speed study, the *BlinkerSign system is clearly more effective* than having no system in place and slightly more effective than the SmartStud system in terms of yielding compliance. Following the installation of the BlinkerSign system, yielding compliance increased by 23% on average. Comparatively, yielding compliance only increased by 13% after installation of the SmartStud system.

SUMMARY

At the time of this report the BlinkerSign System has been successfully in use and maintenance free for a little over two years. The pedestrian study results are promising, showing increased yielding compliance and lower approach speeds. There have been no documented complaints from vehicular or pedestrian traffic.

[For more information on BlinkerSign Flashing LED Signs and other LED traffic control devices, contact Traffic & Parking Control Company (TAPCO) at 800-236-0112, or log on to www.tapconet.com]

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*Synopsis of report, edited for space and clarity. For full report, go to http://www.aot.state.vt.us/search.htm and search for "BlinkerSign"