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## Maintenance Bureau Specification 2001-04

for

### Changeable Message Sign, Trailer-Mount

(April 2011)

This document describes the features and specifications for a trailer-mounted, “Changeable Message Sign”. The message sign shall meet or exceed the following: 1) currently adopted edition of the MUTCD, chapter 6, section entitled “Portable Changeable Message Signs” 2) Section 742 of the current edition of the ALDOT Standard Specifications for Highway Construction current edition, and 3) the specifications contained herein. All products must be inspected by the State Signal shop for acceptance on to the Approved Products List (APL) for the State. Proper paper work and fees shall be on file prior to any inspection taking place. All products submitted for bid shall be pre-qualified and included in the Alabama Department of Transportation’s “Materials, Sources, & Devices with Special Acceptance Requirements” (APL), List IV-3, “Work Zone Traffic Control Devices”, sub-heading “*Message Boards*”.

#### 1.0 General

The following items will be addressed in the following sections: cabinet, display, control system, power plant, and trailer assembly.

- 1.01 Bonded delivery and warranty of the product shall be made available.
- 1.02 All wire, cable, and other electrical components shall be properly sized/rated for the unit and its operation and shall be suitable for exposed, outdoor installations subject to adverse weather conditions. The wiring harness shall be securely fastened inside the message sign to reduce fatigue and chaffing.
- 1.03 The changeable message sign shall not be affected by the use of mobile radios or phones.
- 1.04 The message sign shall be visible from a minimum of 0.5 miles under both day and night conditions and legible from a minimum distance of 650 feet.
- 1.05 The system shall be protected against short circuit, overload, and reverse polarity by appropriate fuses and protective devices.
- 1.06 The message sign shall be supplied with all software and hardware required for the operation and maintenance of the message sign, this is to include all manuals and guides.
- 1.07 Manufacturers exact model # including current configuration shall be readily visible.

#### 2.0 Cabinet

- 2.01 The message panel/cabinet shall be constructed of extruded aluminum, approximately 1/8 inch thick minimum.
- 2.02 The cabinet shall have convection and/or fan cooling adequate to protect components under high heat conditions.
- 2.03 The message cabinet shall be sealed to withstand all types of weather conditions.

**Maintenance Bureau Specification 2001-04**  
**for**  
**A Changeable Message Sign, Trailer-Mounted**

- 2.04 The front face of the message cabinet shall be covered with an impact-resistant material and shall be non-glaring.
- 2.05 The cabinet and panel face shall be painted/coated non-reflective/flat black.
- 2.06 A weep hole shall be provided in the bottom of the message cabinet to provide for drainage of condensation as needed.
- 2.07 The mounting hardware for the sign shall be capable of obtaining a minimum height, of 7 feet, from the roadway to the bottom of the sign cabinet/panel.
- 2.08 The face of the display shall be accessible to allow safe and easy maintenance and repair of display.

**3.0 Display**

- 3.01 The element color shall be yellow, green-yellow, orange, or orange-yellow on a flat/non-reflective black background.
- 3.02 The display shall automatically adjust its brightness under varying light conditions, to maintain legibility and shall not be affected by headlights or street lights.
- 3.03 The display shall, at a minimum, be able to display 8 characters/line for a minimum of 2 lines and legible as per paragraph 1.04.
- 3.04 On a full-matrix message sign, the display shall also be capable of displaying standard traffic and custom symbols.
- 3.05 The grid matrix for the display shall be easily accessed and modular for ease of repairs.
- 3.06 On a full-matrix message sign, the system shall be capable of performing the following arrow board modes as follows, if needed as per the flashing and sequential rates outlined in the MUTCD:
  - 1. Flashing Arrow, Left & Right
  - 2. Sequential Arrow, Left & Right
  - 3. Sequential Chevron, Left & Right
  - 4. Flashing Double Arrow
  - 5. Flashing Caution

**4.0 Control System**

- 4.01 The control system shall include a display screen upon which messages can be reviewed before being displayed on the message sign.
- 4.02 The control system shall be housed in a weather resistant, lockable box.
- 4.03 The control panel shall be password protected to prevent unauthorized tampering of the message.
- 4.04 The control system circuitry shall be capable of providing, at a minimum, character/symbol intensity regulation over the range of 10.0 to 15 volts DC.

**Maintenance Bureau Specification 2001-04**  
**for**  
**A Changeable Message Sign, Trailer-Mounted**

- 4.05 The controller shall be capable of adjusting the display rates, so that the entire message can be read at least twice at the posted speed, the off-peak 85<sup>th</sup> percentile speed prior to work starting, or the anticipated operating speed.
- 4.06 The controller shall be capable of connecting to a laptop PC or modem for message configuration and control.

**5.0 Power Plant**

- 5.01 The power for the message sign shall consist of a solar-assisted, battery bank.
- 5.02 An onboard battery charger to be supplied with 110 VAC connection routed to the outside of the enclosure.
- 5.03 The battery bank shall be housed in a lockable container with expanded steel sides or some other equally effective ventilation design or material to permit continuous operation in ambient temperatures up to 120° F.
- 5.04 The system shall be capable of operating and running autonomous test with message set as follows: (LEFT LANE CLOSED; PLEASE SLOW DOWN; WORK ZONE AHEAD) for a minimum of 25 days with the solar cell(s) disconnected from the battery bank (i.e. run off of the battery bank for a minimum of 25 days).
- 5.05 Unit shall have high visible RED 2” circular LED, located on rear of display in upper left corner, illuminating indicating when batteries reach 50% of maximum power.

**6.0 Trailer Assembly**

- 6.01 The trailer shall be all steel constructed with 1/8 inch thick deck plates, arc welded to a steel tube frame.
- 6.02 The trailer shall be engineered to provide adequate strength and support for the message sign.
- 6.03 The message panel shall be installed on a swivel bracket attached to the trailer to allow 180° rotation, 90° left and right from the perpendicular traffic flow with a variable angle locking mechanism.
- 6.04 The trailer fenders shall be heavy gauge formed steel, full width, with interior splash shield. (Nonmetallic fenders may be considered, based on design and a minimum required load rate of 250 lbs. with minimum deformation. Also, must endure 10 year lifespan without deterioration, and supply independent lab results confirming).
- 6.05 The trailer shall be equipped with a conventional swivel jack with folding handle mounted to the draw-bar assembly immediately behind the towing hitch.
- 6.06 The trailer hitch shall be capable of connecting to either a Class II 2” ball or pintel-hook tow bar, along with two 5/16 inch minimum safety chains welded or otherwise securely fastened to the tongue of the trailer.
- 6.07 The trailer shall also be equipped with four (4) adjustable stands, one at each corner for support, constructed of 1-3/4 inches X 1-3/4 inches Unistrut (or similar post-type jack stand design of equal strength) complete with foot-pads, mounting pads, locking pins, and clips.
- 6.08 The axle rating shall not be less than 2500 pounds.

**Maintenance Bureau Specification 2001-04**  
**for**  
**A Changeable Message Sign, Trailer-Mounted**

- 6.09 The overall length of the trailer, including the hitch and panel, shall not exceed 20 feet. The overall width of the trailer, without the sign panel, shall not exceed 8 feet. The overall height shall not exceed 10 feet with the sign panel in the “DOWN” position.
- 6.10 All trailer parts, excluding the wheels, shall be finished with a minimum of (5 mil) combined primer and Federal Orange paint.
- 6.11 All nuts and bolts shall be steel, minimum grade 5, stainless steel.
- 6.12 A gun/peep sight shall be installed on the framework, of the message board, to assist in the aligning of the message board, to the targeted traffic flow or incorporate some other valid means of aligning the message board.
- 6.13 A standard four wire, quick disconnect coupling shall be supplied with each unit for connection to the towing vehicle’s lighting system.