



Pavement Marking Services



Overview

Pavement markings communicate information to drivers like no other traffic control device, providing continuous information related to the roadway alignment, vehicle positioning, and other important driving-related tasks. The importance of pavement markings is even more paramount at night when they are often the only cue for pavement edge or lane location. In addition to meeting driver needs, today good quality markings are also required for Automated Driver Assistance Systems (ADAS), such as lane departure warning, to function correctly. To ensure sufficient discernibility for both human drivers and machine vision technology, the level of visibility provided by pavement markings needs to be monitored accurately and maintained appropriately.

ARA has a comprehensive suite of testing capabilities designed to assess the performance of pavement markings. Our professionals are nationally recognized experts in lane demarcation and have over 15 years of experience in providing pavement marking services. Customers we have served include the Illinois, Florida, Missouri, Michigan, Arizona, and West Virginia state DOTs; the Illinois State Toll Highway Authority; and the cities of Chicago and Washington D.C.



For more information on ARA's Pavement Marking Services, please visit www.ara.com



Mobile Data Collection Services

ARA has over 10 years of experience developing or maintaining pavement marking management systems with the use of a mobile retroreflectometer unit (MRU). Retroreflectivity is a measurement of the amount of light from a vehicle's headlights that reflects off of a pavement marking and back to the driver's eyes (i.e. how visible the marking is). Having an accurate and accessible pavement marking inventory can improve understanding of existing markings and promote a proactive maintenance plan. This foresight not only increases roadway safety but also allows for better fiscal preparedness. Besides monitoring existing markings for maintenance management plans, ARA has performed MRU data collection and analysis for assisting transportation agencies with enforcing minimum initial retroreflectivity specifications.

ARA currently owns and operates four Laserlux G7 (LLG7) MRUs. The LLG7 complies with the 30m geometry requirements of ASTM E 1710. The unit records up to 400 measurements per second, allowing the survey vehicle to travel at posted speed limits. In addition, the unit self-aligns and calibrates using automatic motorized height adjustment and leveling, maintaining the required geometry at all times. The unit has an observation width of 1.0 m (39.4 inches), allowing the driver to

safely maintain a center-of-lane position and still collect data at an offset. It can measure the retroreflectivity of yellow and white pavement markings between 40 and 5000 mcd/m²/lux. Also, the user can define the data collection segmentation/interval as well as ten event codes for "flagging" features, such as construction zones or debris on the markings. A built-in humidity sensor identifies potential data degradation due to excess ambient humidity, and digital video recordings are synced with the data stream. Data output from the LLG7 include:

- Retroreflectivity (mcd/m²/lux)
- Contrast (between the marking and the pavement surface)
- GPS coordinates at the end of each user defined interval
- Raised Retroreflective Pavement Marker (RRPM) counts
- Google Earth KML file—map with average retroreflectivity presented in user defined color-coded ranges
- Color (in Yxy Color Space)—available on two of ARA's four units

ARA also has the capability to produce presence values from the raw data files. Presence is a measurement of percentage of the marking still bonded to the pavement surface and is an indication of the marking system's durability.

Research and Consulting Services

ARA has conducted performance evaluations on every pavement marking material type (paint, thermoplastic, epoxy, urethane, polyurea, modified polymers, methylmethacrylate, and tape) and has provided valuable guidance to transportation agencies on the optimum pavement marking system(s) for their environment. During installation of pavement marking research test decks, ARA has provided quality assurance monitoring of the following:

- Wet film thickness
- Optic application rate
- Tape placement procedures
- Groove depth for recessed striping
- Ambient temperature and relative humidity
- Retroreflectivity
- Spectrophotometry

Post-installation testing has been performed to assess each marking's rate of deterioration and service life. For these condition assessments, ARA uses handheld devices to collect and analyze dry and wet retroreflectivity, spectrophotometry, and presence data. ARA also developed a Pavement Marking Index (PMI) to have one repeatable and objective metric that combines both dry retroreflectivity and presence. Final products of ARA's research and consulting have included an award winning pavement marking selection and installation inspection guide, pavement marking and pavement marker use and maintenance policies, late season pavement marking policies, specification review and modifications, local and nation-wide surveys, and queries and analysis of the National Transportation Product Evaluation Program's pavement marking datamine.