



RESEARCH PROJECT CAPSULE [16-1C]

July 2016

TECHNOLOGY TRANSFER PROGRAM

Radio Frequency Identification (RFID) Tagging for Material Tracking and Future Asset Management

JUST THE FACTS:

Start Date:
July 1, 2016

Duration:
24 months

End Date:
June 30, 2018

Funding:
SPR: TT-Fed/TT-Reg

Principal Investigator:
Amar Raghavendra, P.E.
Concrete Research Engineer
Louisiana Transportation Research Center

Administrative Contact:
Tyson Rupnow, Ph.D., P.E.
Associate Director, Research
225-767-9124

Technical Contact:
Samuel B. Cooper, III, Ph.D., P.E.
Materials Research Administrator
225-767-9164

Louisiana Transportation
Research Center
4101 Gourrier Ave
Baton Rouge, LA 70808

Sponsored jointly by the Louisiana
Department of Transportation and
Development and Louisiana State
University

POINTS OF INTEREST:

*Problem Addressed / Objective of
Research / Methodology Used
Implementation Potential*

WWW.LTRC.LSU.EDU

PROBLEM

Current Louisiana Department of Transportation and Development (DOTD) practice allows multiple mixtures or materials to be submitted and subsequently used during a highway construction project. Such materials include mechanically stabilized earth (MSE) wall units, concrete, asphalt, and aggregate. Other items include precast elements such as girders, barrier wall, pipe, box culverts, and traffic signs. It can get difficult to track these elements after a few years of use. The ability to identify constituent materials of transportation assets for future forensics is desired. Radio Frequency Identification (RFID) is a promising new technology that can assist in the tracking of materials by using embedded or attached tags for database-recording of material properties.

OBJECTIVE

The primary objective of this research is to study the feasibility of using RFID technology to track DOTD's transportation assets. This research will identify RFID technologies suitable for tracking aboveground and underground assets within DOTD right-of-way. The research will also study the possibility of inventorying these assets from a moving vehicle.

METHODOLOGY

A comprehensive literature review and a survey of transportation agencies from other states will be performed to identify RFID technologies and to document system specifications and user experiences.

A set of system requirements for this research will be developed. Vendors offering systems that meet these requirements will be contacted to obtain cost information. It is anticipated that two RFID systems will be needed: one for underground assets and one for aboveground assets. After consultation with DOTD personnel, a suitable site will be selected for field testing of the purchased RFID systems.

RFID tags will be installed on varied transportation assets, e.g., panels, culverts, girders, guardrails, light poles, MSE walls, and traffic signs. The tags will be read from predetermined stationary distances (10, 20, 30, 40, and 50 feet) as well as from a vehicle travelling at predetermined speeds (10, 20, 30, 40, 50, and 60 mph). Optimum vertical height of the RFID reader will be determined. Environmental conditions (temperature and humidity) will be documented for all tests.

Collected data will be analyzed to determine optimal ranges of height, distance, or speed for RFID readings and to assess the effects of environmental conditions.

IMPLEMENTATION POTENTIAL

Materials used for highway projects will be identified with a unique RFID tag that can be linked to a database of design and construction details, including the current condition of the transportation asset. This information is important for forensic studies and efficient scheduling of maintenance activities.



RFID tag on sign asset



RFID tag in concrete pipe