

EXPERIMENTAL PROJECTS WORK PLAN

3M WET REFLECTIVE CERAMIC ELEMENTS AND VISIMAX PLUS ELEMENTS: NEW BEAD TECHNOLOGY FOR ADDED RETROREFLECTIVITY IN PAVEMENT MARKINGS

Location:	US 310/US 212 (N4) Approximate Mile Point 43-53, Counties Carbon and Yellowstone Counties
Project Name:	Rockvale - Laurel
Project Number:	HSIP 4-1(63)43
Experimental Project No.	MT-12-12
Type of Project:	Pavement Markings Retroreflectivity
Principal Investigator:	Craig Abernathy: Experimental Project Manager (ExPM)
Technical Contact:	Joe Nye: Inspection Operations Supervisor

Description

Evaluate the effectiveness of 3M Ceramic Elements and Visimax Plus Elements when blended with conventional MDT Type 2 glass beads.

These elements are claimed to provide increased retro-reflectivity during wet conditions allowing states to recess the 20 mil thick striping in a 60 mil deep grind resulting in an increased durability during plowing seasons. The increased retro-reflectivity during wet conditions is also being evaluated to determine their effectiveness as safety treatments.

1. 3M Elements wet-reflective microcrystalline dualoptic beads (2.4 reflective-index) with high efficiency pigments are reported to provide potential reflectivity for pavement markings under wet and rainy conditions. The 3M system combines standard glass beads with ceramic elements to maintain optimal visibility in wet conditions as described by the manufacturer.
2. The Visimax elements are composed of a Visibead Core coated with a proprietary coating and bonded to thousands of high index beads to form an outer shell. Visimax Plus is a blend of Visimax and Type 4 (large) beads which is used to supplement standard glass beads to maintain optimal visibility in wet conditions as described by the manufacturer.

Experimental Design

Beads used on the project will be a blend consisting of 3M wet reflective elements and MDT Type 2 glass beads, a blend consisting of Visimax Plus and MDT Type 2 glass beads, and a control segment of 2 miles using MDT's standard application rate of Type 2 glass beads. The beads will be applied to 20 mil thick epoxy striping placed in a 60 mil +/- 5 mill groove.

The blend ratio of retro-reflective elements to MDT Type 2 glass beads will be established based on supplier recommendations. The project chosen will entail line striping of the centerline, fog line and passing line.

The blend incorporating the 3M reflective elements will be placed from RP 42.9 to RP 46.9, MDT Type 2 glass beads will be placed from RP 46.9 to 48.9 and serve as a control section, and the blend incorporating the Visimax reflective elements will be placed from RP 48.9 to RP 52.9 on N-4 (US 310/US 212).

The following is a detailed breakout of the test and control sections:

RP 42.9 to RP 46.9 (4 miles/6.4km)	6 lbs. per gallon 3M Wet Reflective Ceramic Elements
	20 lbs. per gallon Type 2 Glass Beads in accordance with Section 620
RP 46.9 to RP 48.9 (2 miles/3.2km)	25 lbs. per gallon Type 2 Glass Beads in accordance with Section 620 (Control Section)
RP 48.9 to RP 52.9 (4 miles/6.4km)	10 lbs. per gallon Visimax Plus Elements
	10 lbs. per gallon Type 2 Glass Beads in accordance with Section 620

Evaluation Procedures

Research will document the installation for best practice and any constructions concerns germane to the performance of the striping placement. Initial retroreflectivity readings will establish a baseline for ongoing comparisons. Semi-annual inspections will report on markings integrity and any other measurable outcomes.

Additional site inspections may supplement the semi-annual visits based on need. Monitor and report on long-term performance. Documentation of actual nighttime wet-rainy/dry conditions will supplement the reporting. Before and after safety data will be added to the report as that becomes available.

Construction Documentation: Will include information specific to the installation events of the pavement markings.

Post Documentation: Will entail semi-annual inspections of the marking durability as well as documented nighttime retroreflectivity of the 3M product.

Evaluation Schedule

Research will monitor performance for a minimum period of five years annually, with every year up to *ten years (informally). This is in accordance with the Department's "Experimental Project Procedures". Delivery of a construction/installation report, interim, annual or semi-annual reports is required as well as a final project report (responsibility of Research). A web page will be dedicated to display all reporting from the project.

2013:	Installation/Construction Report
2014-2017:	Semi-Annual Inspections/ Annual Evaluation Reports
2018:	Final Evaluation/Final Report