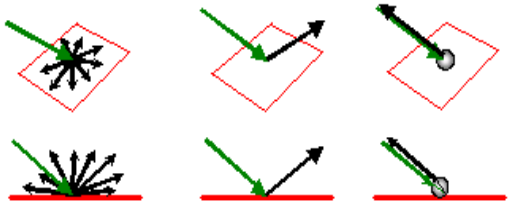
Pavement Marking Selection

Introductions

General Issues to All Markings

- Color
- Retroreflectivity

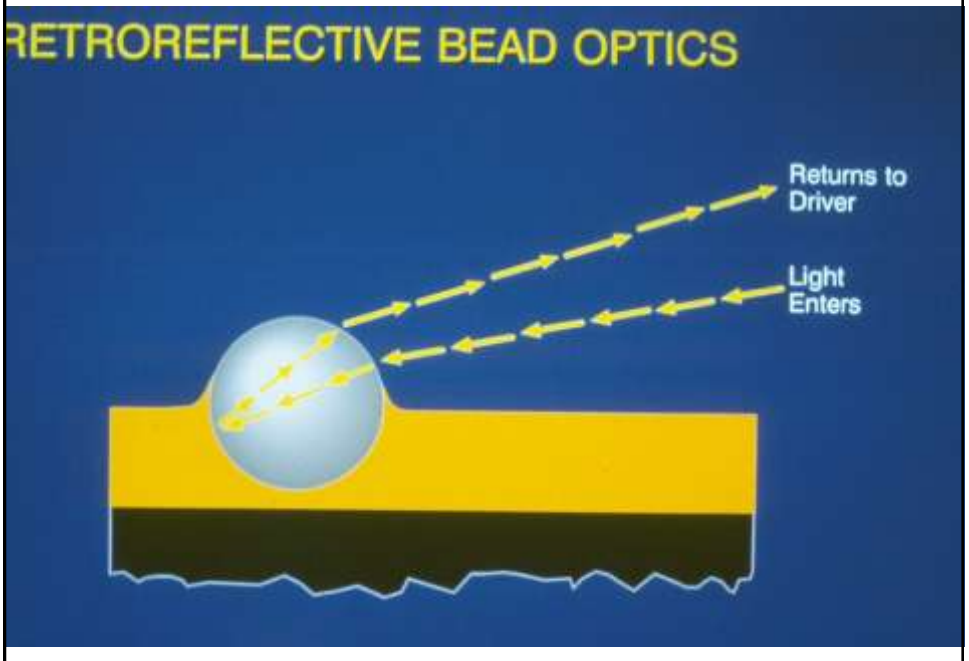
Types of Reflectors



Diffuse reflector | Specular reflector | Retro-reflector

What Is Retroreflectivity?

Retroreflectivity is where the reflected rays are preferentially returned in a direction close to the opposite of the direction of the incident rays.



How is Retroreflectivity Measured

600 300 200 150 100 50

Coefficient of Retroreflected Luminance:
R_L in ($mcd/m^2 * lx$)

Types of Marking Materials

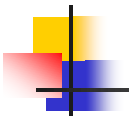
- Paint
- Thermoplastic
- Preformed Thermoplastic
- High Performance Tapes
- Two Component Reactive
- Audible & Vibratory Markings

Types of Marking Materials

- Paint

Paint Policy

- "Paint is normally used in MOT operations and is appropriate for short term operations."
- Two coats of paint are required as the final pavement markings for construction contracts.



Painted Pavement Markings

Primary Uses:

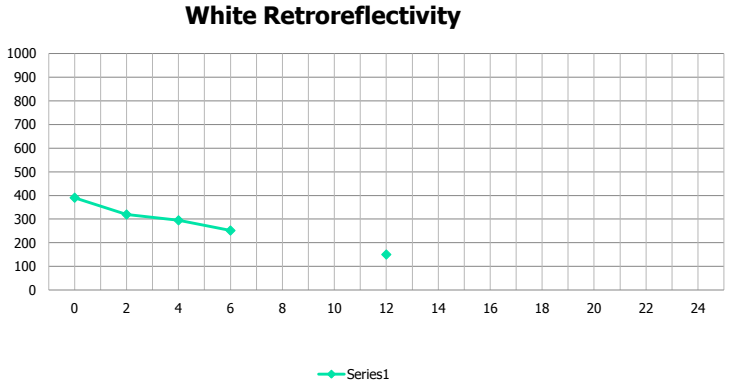
- Maintenance of Traffic Markings
- Short Term Refurbishment Marking
- Contrast Marking

Painted Pavement Markings

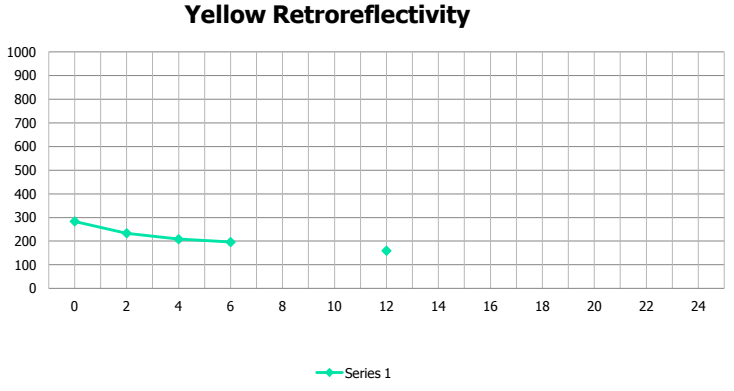
Limitations:

- Expected Service Life - 6 to 12 Months
- No Wet Retroreflectivity Characteristics

White Paint Performance



Yellow Paint Performance



Painted Pavement Markings

Life Cycle Cost:

- Initial Cost - $ 900/Mile
- Expected Life – 1 Year
- Annualized Cost - $ 900/Year
- Average Retroreflectivity -
  - White – 261 mcd
  - Yellow – 206 mcd

Section 710: Painted Pavement Markings

Field Installation

Section 710:
Painted Pavement Markings
Field Installation

Section 710:
Painted Pavement Markings
Field Installation

Types of Marking Materials

- Paint
- Thermoplastic

Thermoplastic Policy

- "Thermoplastic is the Department's primary material to be used for permanent markings on asphalt surfaces."

Thermoplastic Pavement Markings

Primary Uses:

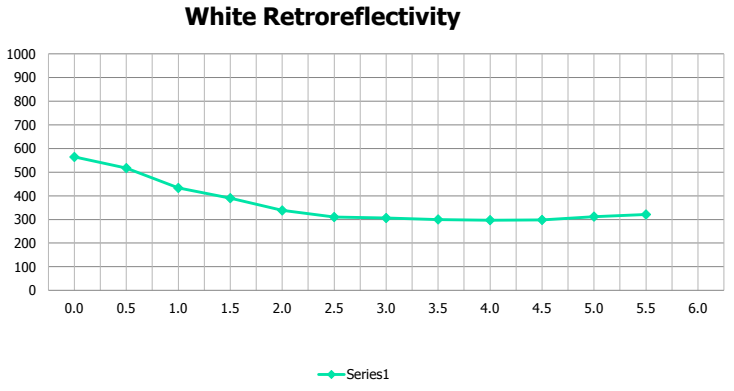
- Longitudinal and Transverse Lines
- Messages and Symbols
- Arrows

Thermoplastic Pavement Markings

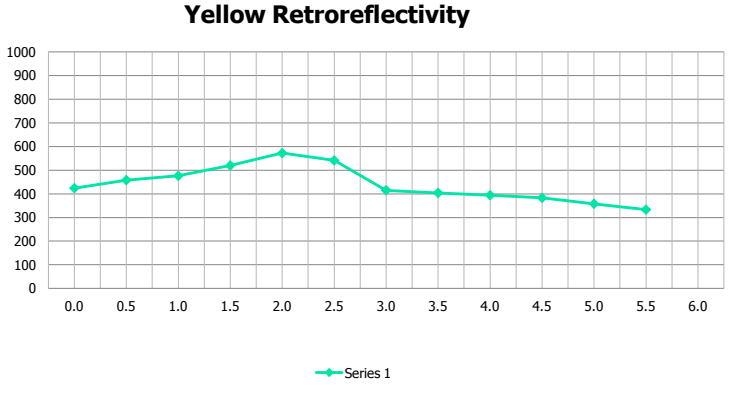
Advantages:

- Expected Service Life - 7 to 8 Years
- Retroreflectivity Levels
  - White Average - 374 mcd (6 Years)
  - Yellow Average - 434 mcd (6 Years)
- Wet Retroreflectivity Characteristics

White Thermoplastic Performance



Yellow Thermoplastic Performance



Thermoplastic Pavement Markings

Limitations:

- Sealer for Use on Concrete
- Will Not Bond to Concrete If Moisture is Present

Thermoplastic Pavement Markings

Life Cycle Cost:

- Initial Cost - $ 4000/Mile
- Expected Life – 8 Years
- Annualized Cost - $ 500/Year
- Average Retroreflectivity -
  - White – 374 mcd
  - Yellow – 434 mcd

Thermoplastic Pavement Markings
Field Installation – Ribbon Gun

Thermoplastic Pavement Markings
Field Installation – Handliner

Types of Marking Materials

- Paint
- Thermoplastic
- Preformed Thermoplastic

Preformed Thermoplastic Policy

- Preformed thermoplastic is required for all bicycle markings.
- Preformed thermoplastic is required for interstate exit numbers.
- Special emphasis crosswalk markings should utilize preformed thermoplastic.

Preformed Thermoplastic Pavement Markings

Primary Uses:

- Exit Ramp Numbers
- Bicycle Symbols
- Crosswalk Pavement Markings
- Horizontal Pavement Signing
- Pavement Messages

Preformed Thermoplastic Markings

Preformed Thermoplastic Markings

Preformed Thermoplastic Markings

Preformed Thermoplastic Markings

Preformed Thermoplastic Markings

Preformed Thermoplastic Markings

Types of Marking Materials

- Paint
- Thermoplastic
- Preformed Thermoplastic
- Permanent Tapes

High Performance Tape Policy

- "High performance contrast tape is required for centerline markings on concrete pavements and concrete bridge decks with (lengths of 300' or greater)."

Tape Pavement Markings

Primary Uses of High Performance:

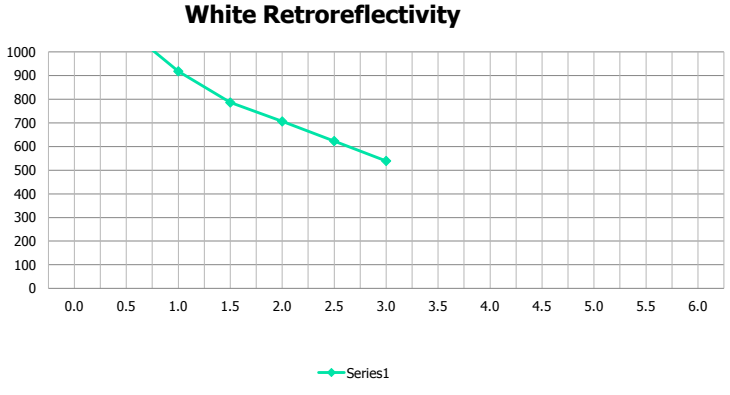
- Longitudinal Centerlines on Concrete

Tape Pavement Markings

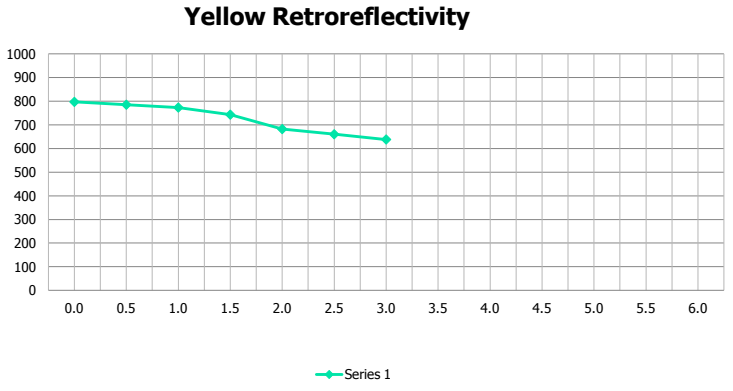
Advantages:

- Expected Service Life - 7 to 8 Years
- Retroreflectivity Levels
  - White – 842 mcd (3 Years)
  - Yellow – 725 mcd (3 Years)
- Wet Retroreflectivity Characteristics

White High Performance Tape



Yellow High Performance Tape



High Performance Tape Skip/Contrast Markings

Life Cycle Cost:

- Initial Cost - $ 8,450/Mile
- Expected Life – 7 Years on Concrete
- Annualized Cost - $ 1207/Year
- Average Retroreflectivity -
  - White – 842 mcd (3 Years)
  - Yellow – 725 mcd (3 Years)

High Performance Tape Edge Line Markings

Life Cycle Cost:

- Initial Cost - $ 18,750/Mile
- Expected Life – Insufficient Data
- Annualized Cost – Insufficient Data

Tape Pavement Markings

Limitations:

- High Cost
- Performs Best on Concrete
- Requires Lane Closures to Install
- Extensive Prep. for Refurbishment

High Performance Tape Markings

Types of Marking Materials

- Paint
- Thermoplastic
- Preformed Thermoplastic
- High Performance Tapes
- Two Component Reactive

Types of Two Component Reactive Pavement Markings

- Epoxies
- Polyureas
- Modified Urethanes
- Methyl Methacrylates

Two Component Markings

Primary Uses:

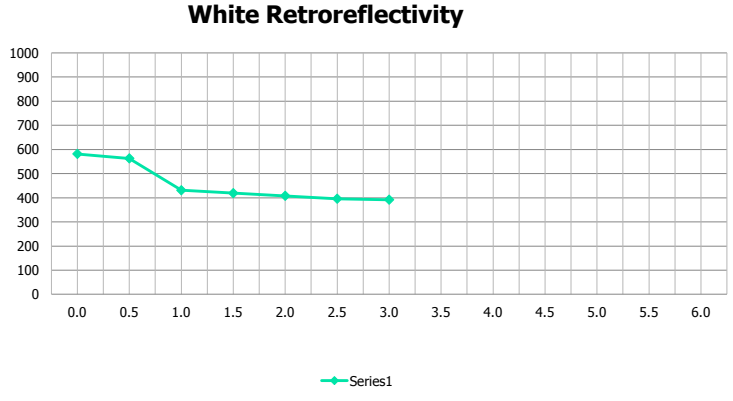
- Longitudinal Edge Lines on Concrete

Two Component Markings

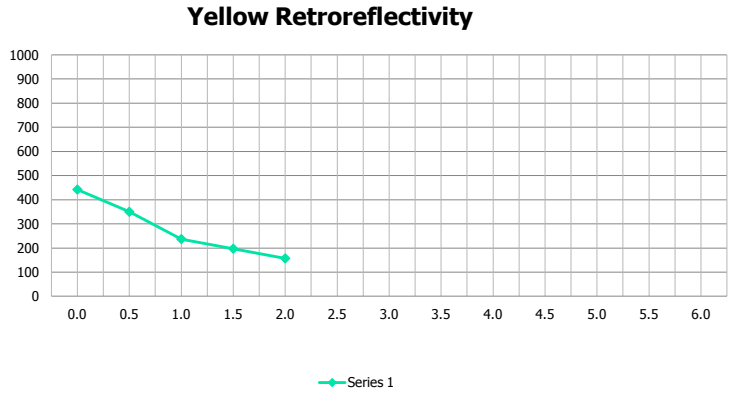
Advantages:

- Excellent Adhesion to Concrete
- Retroreflectivity Levels
  - White – 415 mcd (3 Years)
  - Yellow – 277 mcd (2 Years)
- Wet Retroreflectivity Characteristics

White Two Component Performance



Yellow Two Component Performance



Two Component Markings

Limitations:

- Limited Equipment - Do Not Specify for Projects with Small Quantities
- Extensive Prep. for Installation
- May Require Lane Closures to Install
- Can Only Be Refurbished With Identical Materials

Two Component Markings

Life Cycle Cost:

- Initial Cost – Insufficient Data
- Expected Life – Insufficient Data
- Annualized Cost – Insufficient Data

Types of Marking Materials

- Paint
- Thermoplastic
- Preformed Thermoplastic
- High Performance Tapes
- Audible & Vibratory Markings

Audible & Vibratory Policy

- "Edge lines on all two-lane and multi-lane flush shoulder rural roads with posted speed of 50 mph or greater."
- "Only on centerlines of two-lane rural roads with history of centerline cross over crashes."

Audible & Vibratory Pavement Markings

Primary Use:

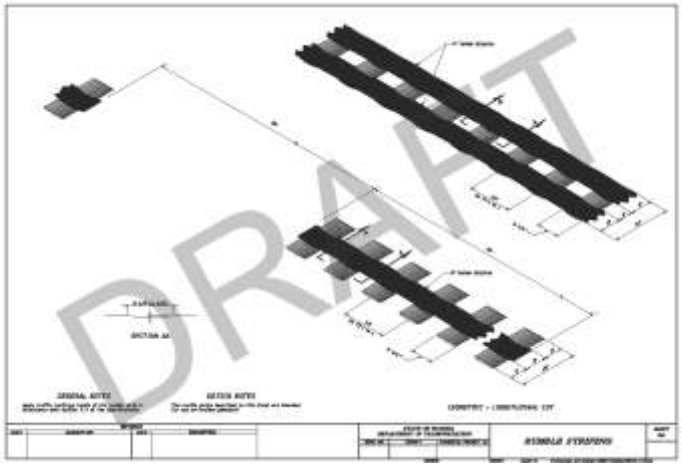
- Longitudinal Edge Lines
- Centerline markings (If Justifiable)

Audible & Vibratory Markings
Ennis Product

Audible & Vibratory Markings
Crown Product

Audible & Vibratory Markings
Ground-in Rumble Stripe

Audible & Vibratory Markings
Field Installation - Ground-in Rumble Stripe



Section 701:
Audible & Vibratory Markings
Field Installation - Ground-in Rumble Stripe

Section 701:
Audible & Vibratory Markings
Field Installation - Ground-in Rumble Stripe

Section 701:
Audible & Vibratory Markings
Field Installation - Ground-in Rumble Stripe

Audible & Vibratory Markings
Field Installation - Ground-in Rumble Stripe

Section 701:
Audible & Vibratory Markings
Field Installation - Ground-in Rumble Stripe

Audible & Vibratory Markings

Life Cycle Cost:

- Initial Cost - $ 5,750/Mile
- Expected Life – Insufficient Data
- Annualized Cost – Insufficient Data

Audible & Vibratory Markings

Limitations:

- Do Not Specify for Tapers, Turn Lanes or Radius Markings

Questions

????

Contact Information

Chester A. Henson, P.E.
State Traffic Standards Engineer
chester.henson@dot.state.fl.us
(850) 414-4117