

## TSD Best Practice:

# Upgrading Vietnam's Road Sign Standards to Type XI Reflective Sheeting

## Background

Road signs convey important information to drivers in a wide range of conditions. To be effective, they need to be highly visible and conspicuous so drivers can see and understand them with enough time to react. The sign sheeting material is one of the main factors impacting visibility.

Providing sufficient visibility is fairly easy in bright daytime conditions. But some conditions — particularly at night or in the rain — are more challenging. This challenge becomes even more pronounced on high-speed roads where the signs are placed in less-than-ideal locations, like on the shoulders or overhead. In these situations, the signs need to deliver even greater visibility at wider angles.

This is the primary reason that the Vietnamese Ministry of Transportation decided in 2015 that they needed to upgrade their sign sheeting regulations and looked to 3M for expertise and guidance.

## The Solution

The technology and materials used for road sign sheeting has changed over the years. This evolution started with lower performing ASTM D4956 Type I sheeting, composed of enclosed-lens glass-bead material. Following that, high-intensity Type III and IV prismatic sheeting came along. These sheeting types typically provide higher reflectivity and greater durability than Type I sheeting, but struggle to deliver adequate reflectivity when the signs are in disadvantageous locations or when the headlights on modern vehicles are taken into consideration.

ASTM Type XI sheeting with 100% efficient full-cube prismatic technology reflects almost 60% of available light back to drivers — almost double what the next highest class of sheeting reflects. It also provides a wider angle of reflection and is more visible at greater distances — perfect for Vietnam's high-speed roads.

## Demonstrating the Benefits of Type XI Sheeting

3M was consulted by the officials in Vietnam's Ministry of Transportation and Department of Infrastructure to upgrade the country's sign sheeting specification. Typically, with these types of projects, one of the primary hurdles is demonstrating the cost-benefit ratio of upgrading to a more effective, but higher cost sheeting. However, Vietnam already specified Type IX sheeting for their road sign guidelines.

Since Type IX sheeting is a higher cost material than the sheeting that was specified in the previous version of the sign sheeting standard (Type IV), the 3M team was able to show that upgrading to Type XI from Type IX would not significantly increase the country's costs while providing increased safety benefits. Additionally, Vietnam's regulations previously (Type IV) only required a 3-year warranty for their sign sheeting. 3M's Type XI sheeting has a 12-year warranty, making it an easy choice. So using data, specifications, studies, and one demonstration, the 3M team helped the government agencies upgrade their sign sheeting regulations.

## The Results

As a result of collaboration and hard work, Vietnam upgraded Regulation TCVN 7887-2018 to include Type XI reflective sheeting. The upgrade included signs on the shoulder, overhead signs, and signs on high-speed roads. They also developed sales tools — including a flyer, sample swatch book with local information to promote the new standard, and a recommendation to install signs using 3M™ Diamond Grade™ DG<sup>3</sup> Reflective Sheeting.

### Who do I contact?

**Gina Parker**

*Global Marketer - Signing*

[gmparker@mmm.com](mailto:gmparker@mmm.com)

+1 651 736 0511

**Huy Nguyen**

*Engineer Technical Service*

[htnguyen3@mmm.com](mailto:htnguyen3@mmm.com)

+84 94 954 160 429

**Diem Huynh**

*Activation Marketing Analyst*

[dthuynh@mmm.com](mailto:dthuynh@mmm.com)

+84 989715211



**Transportation Safety Division**

3M Center, Building 0225-04-N-14  
St. Paul, MN 55144-1000 USA

Phone 1-800-553-1380  
Web [3M.com/roadsafety](http://3M.com/roadsafety)

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