At the January 2009 meeting, the NCUTCD approved language for a new section on minimum marking retroreflectivity and directed the MTC to develop additional language that would recommend specific retroreflectivity values to include in the section. The text below has been developed by the task force and is presented to the MTC for consideration. The proposed new language is shown as underlined text. Text that is not underlined has already been approved by the NCUTCD.

Chair note to the MTC: The language highlighted in yellow is the material that we will be discussing and voting on at the June 2009 meeting. Language that is not highlighted is not up for debate unless the proposed (highlighted) text directly conflicts with or otherwise requires modification due to the proposed text. The non-highlighted text has already been approved by the NCUTCD and sent to the FHWA.

The task force offers the following comments regarding the proposed text:

a) The Deballion, et. al research report recommended minimum values for roadways without edgelines of 250 and 575 for 55-65 mph and >70 mph respectively. The MTC believes these numbers are commonly unattainable, much less maintainable except for particular durable markings. These products are not in widespread use. A minimum R_L of 90 is considered practical and attainable. Additional research is needed before significantly higher values such as 250-575 are placed into the Manual given the fact that the majority of in-service retroreflective ratios for yellow/white marking are near 0.7/1.

b) The research also indicated that recommended minimum R_L values could be reduced if RRPMs or edge lines were present. Rather than increasing the recommended minimum R_L values for higher speed highways to levels that will be difficult and impractical to maintain, edgelines or RRPMs could be employed by an agency thus reducing the minimum R_L to 60. The minimum R_L of 60 was deemed to be the lowest level permissible for high speeds roadways using either edgelines or RRPMs.

c) 55 mph was selected as the top of the mid-range speed limit category as a means of providing a practical implementation approach for counties and some State DOTs, rather than including those 55 mph highways in the high speed (≥60 mph) category and triggering an unfunded recommendation to add edgelines or RRPMs for these affected agencies. The Deballion, et. al research report refers to studies that show that nearly 68% of the rural two-lane highways in the U.S. have a speed limit of 55 mph, and that in Texas, for example, about 40% of the rural, two-lane, state-maintained highway miles have no edgelines. Requiring these agencies to add and maintain edgelines with no additional funding being made available would result in a significant financial impact. Northern states could not effectively take advantage of the RRPM option. The recommended minimum R_L value is 90 for 35 to 55 mph highways; the minimum can be reduced to an R_L of 40 if edgelines or RRPMs are provided. This provides agencies with choices as to how best to allocate their
resources, and may have the effect of encouraging the use of edge lines or RRPMs without mandating them.
d) At the January meeting, the MTC gave support to the idea that lower speeds for local roads warrants a “presence” only designation due to decreased operating speeds, stopping sight distance, PIEV times, etc. Within cities and most urban counties, local access roads which have 25 to 30 mph speed limits have no markings whatsoever and operate safely, indicating that the R_L of markings that are used at these lower speeds does not have a significant influence on driver guidance as compared to conditions at higher speeds. The “presence” designation would also lessen the burden placed upon local agencies for monitoring such roadways while at the same time not discouraging use of markings at lower speeds.
e) The language approved by the NCUTCD at the January 2009 meeting, together with the Proposed language are a measured step forward to improved nighttime visibility of pavement markings based upon current research and practice. It also provides a reasonable threshold for compliance on the part of transportation agencies. As future research becomes available the language can and should be amended to enhance the overall safety objectives of maintaining minimum retroreflectivity of pavement markings.

3A.06 Longitudinal Pavement Marking Retroreflectivity

Support:
Retroreflectivity is a factor associated with pavement marking visibility.

Standard:
Public agencies or officials having jurisdiction shall establish an assessment or management method for maintaining longitudinal pavement marking visibility for center lines, edge lines, and lane lines.

Guidance:
The assessment or management methods should be consistent with the recommended minimum, R_L (mcd/m²/lux) values for both yellow and white markings as shown in Table 3A-1.

<table>
<thead>
<tr>
<th>Roadway Marking- Configuration</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 30</td>
</tr>
<tr>
<td>Centerline only</td>
<td>Present and retroreflective^B</td>
</tr>
<tr>
<td>Centerlines, edgelines, and lane lines (as applicable)</td>
<td>Present and retroreflective^B</td>
</tr>
<tr>
<td>Either Configuration above and supplemented by retroreflective raised pavement markers^A</td>
<td>Present and retroreflective^B</td>
</tr>
</tbody>
</table>

Notes:
^A Retroreflective raised pavement markers are present consistent with Section 3B.12 or 3B.13.
^B Minimum R_L values do not apply.
Guidance:
The jurisdiction's method should apply to, at a minimum, center line, edge line, or lane line markings required by a standard or recommended by a guidance statement in this Manual. One or more of the following assessment or management methods should be used to evaluate pavement marking retroreflectivity with respect to the minimum levels:

a. Measured Marking Retroreflectivity - Pavement marking retroreflectivity is measured using a 30-meter retroreflectometer.
b. Visual Nighttime Inspection - The retroreflectivity of existing markings is assessed by a visual inspection from a moving vehicle during nighttime conditions.
c. Expected Marking Life - The replacement of markings is based on the experience of pavement marking retroreflectivity degradation. Degradation experience is based on such items as materials test results, traffic volumes, geographic area, weather, snowplowing, pavement type and roadway type.
d. Control Markings – The replacement of markings is based on the performance of a sample of control markings. The control markings are a small sample located in typical roadway environments that are representative of the larger population of markings in the jurisdiction.

Support:
Compliance with the above Standard is achieved by having a method in place and using the method to maintain nighttime visibility of markings. Agencies and jurisdictions are deemed to be in compliance provided an assessment or management method is in use even though some sections of markings are below minimum levels or methods cannot be employed. These occurrences include but are not limited to:

- weather (such as snow, ice, temperature, and rainy seasons);
- reconstruction, resurfacing, and replacement schedules;
- localized or abnormal wear (such as vehicular abrasion by heavy trucks or severe erosion); and
- other constraints.

Based upon the Support and Guidance statements above, successful implementation of the assessment or management methods identifies markings in need of replacement. Markings are replaced as conditions permit.

Option:
Jurisdictions may use other methods where established and documented.

The minimum retroreflectivity levels may be reduced if a longitudinal marking line is supplemented by retroreflective raised pavement markers in accordance with Section 3B.13 or if continuous roadway lighting is present.
Support:
Additional information on minimum retroreflectivity levels, measurement and assessment methods, and specifications for measurement taking, can be found in the FHWA publication, “Maintaining Pavement Marking Retroreflectivity.”

The following factors can also be used to help establish methods, process evaluations, and schedules for replacement or retracing:

1. Representative sample size for a roadway segment
2. Presence of dirt, water, snow, etc. on the sections of markings
3. Time or season of year for evaluation and replacement/retracing
4. Width of line; type of material and retroreflective elements
5. AADT including percentage of nighttime travel
6. Typical roadway section and functional classification (including presence or absence of all-weather shoulder, rumble stripe, rumble strips, etc.)

Additional comments on the proposed language from the National Committee on Uniform Traffic Control Devices:

- The NCUTCD recommends the following compliance periods:
  - 4 years from the effective date of the Final Rule to have a method in place
  - 7 years from the effective date of the Final Rule to be in compliance and/or when the road is being resurfaced, but in no case greater than 10 years from the effective date of the Final Rule.