1. Introduction of Panel Members
   Chairman – Jim Swisher
   Vice Chair/Secretary – Jason Davis

   Jim Swisher gave introduction on sign sheeting for newcomers. Users can find details of the test sample panel preparation in the Work Plan posted on the NTPEP website.


3. Data Mine Taskforce Report
   - Update on Data Mine, 2.0 modifications
     - Navigation to locate a sample is now a “scrollable” list rather than a series of pages
     - Lead State can now compare site data side-by-side
       - Any level of access can see data side-by-side for data the user is privileged to see
     - Lead State has “bulk release” feature
     - Weather data is now available at the bottom of the “My Datamine” page – (it was noted this should be more visible)
   - Release of data - concerns


   - AASHTO M 268, to be reballedot in 2012
   - AASHTO M 268 was developed from a “user” standpoint, where ASTM D4956 evolved into more of a “product” based specification.

   AASHTO M 268 highlights:
   - Based on previous proposals and research through ASTM
   - AASHTO M 268 is based on a retroreflective progression (mathematical progression for Types A, B, C, and D)
   - Some have asked how this new specification relates to the ASTM Types
   - Industry comments and concerns were discussed and developed into a new AASHTO TS4d ballot that will close in the next few weeks. The results will be discussed at the August SOM meeting.
     - “Delta E” after weathering - proposed to be dropped (remains for side-by-side comparison for uniformity) – colorbox is considered more important for color recognition
     - Adhesive bond pre-conditioning - proposed to be dropped
   - AASHTO M 268 vs. ASTM D4956:
     - M 268 defines (but does not specify limits on) rotational sensitivity
     - M 268 covers only permanent signs (no temporary / construction materials)
     - Luminance (Y%) for fluorescent materials slightly higher than ASTM
     - M 268 includes a minimum luminance (Y%) for “high conspicuity” white, orange, and yellow
     - M268 has no supplemental requirements (i.e. fungus resistance and reboundable specifications)
     - In M268, retroreflectivity values are “capped” in certain cases, as additional increases may provide diminishing returns.
- Impact for SSM – Should M268 be added to the SSM Work Plan?
  - Industry Concerns - Industry may not be confident of some of the values in the higher Types (i.e. Type C). However, to lower a single value would break the logic of the mathematical progression and move toward a “catalog” of products.
- Feds released a 2011 Traffic Sign Retroreflective Sheeting Identification Guide that includes the AASHTO, M268 Types.

5. ASTM Liaison Report (Jason Davis)
- Working on additional colors for sign sheeting (purple, fluorescent pink, and nighttime color box for white).
- Paul Carlson developing specs which utilize luminance needs of drivers (human factors).

6. Old Business-SSM
- Industry Concerns from 2011 – Update
  - Contingency plans - If a state can’t test, what can be done?
    - States can help each other
    - Outside labs may be available
  - Updated Workplan
    - Updated plan is now on website
    - Instrument list is included
  - Data integrity
    - P&B work through E12 (Review E810. E810 limits are currently being used to analyze round robin samples. However, these limits are for non-prismatic sheeting only. New work on P&B will help labs revise their QC plans for SSM – details should be available at the ASTM meeting in June, 2012.
    - Description of a visual Color change
      - Industry objected to wording such as “faded” because some users may think fading is an indication of a color failure. When, in fact, the color may fade but the sheeting color is still acceptable (within the color box).
      - The work plan now directs the use of the statement- “color change observed - refer to the color data.” This will require the user to evaluate the color data (x,y plot on color chart).
  - Disposition of old samples
    - Current policy stands at 10 years retention, after which a state may dispose of field panels.
    - Laboratory retained samples are not addressed
      - Is it necessary to keep the rolls indefinitely?
      - Does the material have a shelf-life?
    - Industry wanted to dispose of 4 x 12 sample panels after 3 years
  - Task Group established to investigate the identification of sheeting with old retains.
    - Task Group Members - Derrick Castle, Dave Kuniega, Jim Swisher, Jason Davis, Matt Hills, Chris Gaudette
  - Roll-up Signs – Update from Jason Davis
    - 2011 RUP – 9-month evaluations complete
    - Working on 6-month report
    - RUP module in progress for Datamine

7. New Business - SSM
- 2012 SSM & RUP submittal and testing schedule
  - 68 Submittals for 2012 from 5 manufacturers
  - No RUP submittals for 2012
• Round robin results
  o Absolute values, anomalies, and trends over time should be investigated.
  o Need to establish “trigger points” and a process for investigations.
  o Also need to set up tolerance levels (the new ASTM P&B should help)

• Industry concerns
  o Contingency plans (unresolved) – need to establish deadlines and guidelines
  o Industry representation (resolved)
    ▪ Chris Gaudette replacing Ellen Harelstad
    ▪ Adding Mike Zachar (3M) and Claudia Andreani (Oracal)
  o Number of allowable panels
    ▪ Currently at 90
    ▪ What happens if that number is exceeded
    ▪ Suggestions include multiple or staggered submittals
  o Data integrity
    ▪ Industry is okay with using 4" x 12" (field) panels rather than 8" x 8" (lab) panels for laboratory retroreflectivity
      • Avoids repeating tests
    ▪ Publish round robin results on website
    ▪ AASHTO (or AASHTO-type) accreditation for labs
    ▪ Possibly use 3rd party verification
      • i.e. contract Atlas South Florida for outdoor exposure and have panels tested in an existing lab such as Virginia
      • Tea Table Key is still a concern – harsher than Miami
        o May be able to compare the two sites on the same product at the same time
  o Resubmittal frequency
    ▪ Manufacturers would like to create a proposal for submittal frequency to present in 2013
      • This relates to the discussion on product retention
      • Raw materials, etc. contribute to changes that might affect comparisons
  o Datamine 2.0 (top 3 concerns listed first)
    ▪ Bulk data release (this may already be available for manufacturers)
    ▪ Data export feature
      • Either to an Excel spreadsheet or a report to aid in reviewing data
    ▪ Communication updates
      • Industry would like to be notified of updates to functionality
    ▪ Lost data from the Datamine 1.0 to 2.0 conversion
    ▪ Measurement angle display (resolved)
    ▪ Distinguishing color methods (i.e. ink, overlay)
    ▪ “Refresh” and “back” functions

• Extended weathering discussion- Jim McGraw (MNDOT)
  o Is 3-year data enough to demonstrate compliance with FHWA requirements?
  o Weathering data compared to in-service data
    ▪ In-service data is available for several different colors
    ▪ Matt Hills may present a correlation of exposure to real-world performance (extended vs. in-service)
    ▪ Factors exist which suggest going beyond 3 years of weathering
    ▪ Accelerated weather vs. in-service data is available
    ▪ TTI is presenting an Extended Sign Life paper at TRB in 2013 to summarize this issue

• Improve Efficiency with fewer resources
  o Raw sheeting testing by LA DOTD
    ▪ Proposal to eliminate light tunnel and color testing on 8” x 8” samples at LA DOTD
      • Industry agreed to allow the use of VDOT light tunnel data on field panels. Will consider color analysis by VDOT at a later time.
• LADOTD to continue with color and physical testing.

• Data Mine 2.0 Training and Use
  o Workshop sessions for both industry and state users at this conference.
  o Riaz will be available in 20-minute scheduled sessions as well.

• Automatic data release
  o In some cases, data in the Data Mine sits for months (or longer) at the “Industry Review” level without any comments or response from the company.
  o To avoid data sitting in for too long:
    ▪ After 30 days, data will be released public.
    ▪ Reminder will be sent out after 20 days
    ▪ Comments or reported discrepancies will stop 30 day clock
  o This is not to pressure industry for a quick review, only to ensure that if data is not being reviewed, we have a procedure to make it available in a reasonable timeframe

• Action Items
  o Task Group (Castle, Kuniega, Swisher, Davis, Hills, Gaudette) to investigate the identification of sheeting with old retains.
  o To investigate if/how Round Robin results should be added to website.
## AASHTO/NTPEP 2012 ANNUAL MEETING

Sign Sheeting Materials (SSM)

Technical Committee

Tuesday, May 1, 2012 (1:00pm-3:00pm)

Working Session #2

### Attendance Sheet

<table>
<thead>
<tr>
<th>Name</th>
<th>Employer</th>
<th>Email Address</th>
<th>Phone Number</th>
<th>Committee Member</th>
</tr>
</thead>
<tbody>
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National Transportation Product Evaluation Program 2012

Sheraton Indianapolis City Center

Indianapolis, Indiana
# AASHTO/NTPEP 2012 Annual Meeting
## Sign Sheeting Materials (SSM)
### Technical Committee
Tuesday, May 1, 2012 (1:00pm-3:00pm)
Working Session #2

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<td>Property</td>
<td>AASHTO M268-10</td>
<td>ASTM D4956-11a</td>
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<tr>
<td>1 – Scope</td>
<td>Traffic Control Applications (Flat and Vertical)</td>
<td>Traffic Control Signs, Delineators, Barricades and other devices</td>
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<tr>
<td>3.3 – Rotationally Sensitive Sheeting</td>
<td>Rotationally insensitive sheeting is defined as sheeting with retroreflective values which vary not more than 20% when the optimum orientation is compared with an orientation with the sheeting rotated to 45°, 90° and 120°.</td>
<td>(Not defined)</td>
<td></td>
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<tr>
<td>4.2 – Classification of Retroreflectivity</td>
<td>Type A,B,C,D Description of Types: AASHTO classification of Types B, C and D describe the relative performance in the 0.5° and the 1.0° observation angle geometry. (ASTM does not discuss this relative performance.)</td>
<td>Type I,II,III,IV,V,VI,VII,IX,XI Retro values representative of Type I (very low retro values), Type V (delineation) and Type VI (flexible sheeting for roll-up warning signs, cone collars, and post bands) are not included in the AASHTO standard.</td>
<td></td>
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<tr>
<td>4.3 – Classification of Backing Classes</td>
<td>Class 1,2,3,4</td>
<td>Class 1,2,3,4,5 Class 5 describes a non-adhesive backing typically used in roll-up warning signs, cone collars, and post bands is not included in the AASHTO standard.</td>
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<tr>
<td>5.3 – Adhesive</td>
<td>Requires preconditioning under heat and pressure prior to preparation of bond sample. Proposed Revision: Remove preconditioning of pressure and heat.</td>
<td>(No preheating and pressure requirement)</td>
<td></td>
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<tr>
<td>5.5 – Daytime Color</td>
<td>Requires slightly higher %Y values for: Orange 12 Fluorescent Yellow 45 Fluorescent Orange 25</td>
<td>Orange 10 Fluorescent Yellow 40 Fluorescent Orange 20</td>
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<td></td>
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<tr>
<td>5.5 – Daytime Color</td>
<td>Also includes minimum %Y values for Higher Daytime Conspicuity for White, Yellow and Orange.</td>
<td>(No requirement)</td>
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<td>5.7 – Color</td>
<td>Requires ΔΕ of less than 3 units when sheeting is to be used side by side. Proposed Revision: Clarify and insert as a note regarding construction: If sheetings (typically green, blue and brown) from multiple lots are used on a single sign, those lots when compared to each other shall have a Hunter Lab ΔΕ of less than 3</td>
<td>(Comparison of material to determine color differences is not required.)</td>
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<td>Specification Details</td>
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| 5.8 – Coefficient of Retroreflection (Refer to attached graphs to visualize differences) | **4 Types of sheeting.** Generally, each Type is a Geometric Multiple of other types as detailed in Table X1.2 of the Appendix. (Permanent sheeting only)  
**9 Types of sheeting.** Generally, each Type is Specified around a Specific Manufactured Product. (Also includes temporary sheeting) |
| 5.10 – Accelerated Laboratory Weathering                               | Requires $\Delta E$ of less than 5 units after weathering.  
**Proposed Revision:**  
Omit $\Delta E$ color requirement.  
(Does not allow for reduced weathering or specified requirements for work zone sheeting or sheeting with lower retroreflectivity properties.) |
|                                                                       | (Allows for reduced weathering or specified requirements for work zone sheeting or sheeting with lower retroreflectivity properties.)  
(Types I and II).  
Comparison of material to determine color differences is not required. |
| 5.12 – Accelerated Outdoor Weathering                                  | Requires $\Delta E$ of less than 5 units after weathering.  
**Proposed Revision:**  
Omit $\Delta E$ color requirement.  
..................................................................................................................  
(Does not allow for reduced weathering or specified requirements for work zone sheeting or sheeting with lower retroreflectivity properties.)  
..................................................................................................................  
(Allows for reduced weathering or specified requirements for work zone sheeting or sheeting with lower retroreflectivity properties.)  
(Types I and II).  
Comparison of material to determine color differences is not required. |
|                                                                       | (Comparison of material to determine color differences is not required.)  
..............................................................................................................................................  
..............................................................................................................................................  
..............................................................................................................................................  
(Types I and II).  
Comparison of material to determine color differences is not required. |
| 5.14 – Workability                                                    | Sheet is required to have no adverse effects under normal application process.  
Flexibility requirement by bending sheeting over 1/8 inch mandrel. |
| 5.15 – Positionability                                                | Test method included to verify Positionability of sheeting.  
(No test method is included.) |
| 5.16 – Thickness                                                      | Maximum thickness requirement for sheeting.  
**Proposed Revision:**  
Omit maximum thickness requirement.  
Address this issue in the section on Workability.  
(No requirement) |
| 5.17 – Processing                                                     | Requirements specified for inks and electronic cutting films.  
(No requirement) |
| 5.18 – Transparent colors                                             | Transparent colors placed over white sheeting are required to meet the same specifications as solid color sheeting.  
(No requirement) |
| 5.19 – Identification                                                 | Orientation marks are required if retro values of sheeting vary more than 20% when oriented to designated degrees of rotation.  
(No requirement) |
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Requirement Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>Impact Resistance</td>
<td><em>(No requirement)</em></td>
<td>Sheetings subjected to an impact of 10 in-lb</td>
</tr>
<tr>
<td>SUPPLEMENTARY REQUIREMENTS</td>
<td><em>(When specified by purchaser)</em></td>
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</tr>
<tr>
<td>Fungus Resistance</td>
<td><em>(No requirement)</em></td>
<td>Fungus resistance is specified</td>
</tr>
<tr>
<td>Reboundable Sheeting</td>
<td><em>(No requirement)</em></td>
<td>Impact, flexibility, adhesion and weathering properties are specified for reboundable sheeting.</td>
</tr>
</tbody>
</table>
AASHTO M268-10 TYPES - White Sign Sheeting

Coefficient of Retroreflection ($R_A$)

Observation Angle Increases
Wide Entrance Angle (30º)

Observation Angle Increases
Narrow Entrance Angle (-4º)

Entrance Angle / Observation Angle

0 100 200 300 400 500 600 700

0 10 20 30

30 0.2 30 0.5 30 1.0 -4 0.2 -4 0.5 -4 1.0

Types:
AASHTO M268-10 TYPES - White Sign Sheeting
ASTM D4956-11a TYPES - White Sign Sheeting

Coefficient of Retroreflection ($R_A$) vs. Entrance Angle / Observation Angle

- Observation Angle Increases
  - Wide Entrance Angle (30º)
  - Narrow Entrance Angle (-4º)