Traffic Counting, Equipment, Setup and Best Practices

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Field Operations Supervisor

&

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Non-Trunkline & Local Road Program Coordinator
Travel Information Unit

Operates under the Data Collection & Reporting Section

Core responsibilities include:

1. Monitoring and reporting of trunkline (motorized and non-motorized), ramps and federal aid roadway traffic data that is used by MDOT and others for planning and project decisions

2. Maintenance, data quality, and the reporting of traffic from the Continuous Count Station (CCS) program

3. Management of traffic data
Field Operations

Main Responsibilities

• Collect statewide traffic count program
  • Approximately 3500 counts a year
  • Classification, Volume, and Ramps
• Monitor Park and Rides
  • 242 lots collected 4x a year
• Rest Area’s
  • Varies year to year (22 classification counts in 2018)
• Airports
  • Varies year to year. Collected 3x a year.
• Turning Movements
  • 250 are requested yearly
Traffic Counting Equipment

JAMAR BOARD
(Manual Count)

OMEGA X3
(Traffic Counter)

MIOVISION
(Video recording unit)
Types of counts and duration

**Turning Movement (TM)**

- These studies are special request
- Directional Volume counts on all four legs
- 24 or 48 hour counts
- Gaps
- Delays
- Pedestrians
Statewide Counts
Class vs Volume (short)

- 48 hour
- 7 day
- 3x a year
Manual Counts

- Turning Movements
  7am-9am
  11am-1pm
  2pm-6pm
- 14 hours counts
  6am-8pm
Software

Centurion

- Omega files are downloaded
- Raw data
- Cut in to 24/48 hour blocks
- Downloaded using the FHWA format

Miovision

- Uploaded to Traffic Data (TDO) online website
- Downloaded to CSV format

*Both uploaded to Transportation Data Management System (TDMS)*
Count Station Data

- ~40,000 MDOT stations
- Over 120 CCS

- Spatial component creates a more efficient means request, set, and validate count data
- Linked to ESRI Roads & Highways
QA/QC Data

- Avg amount of data submitted daily?
  - Over 32 QC rules implemented
  - Automated rules
    - AADT Tolerance
    - Consecutive 0’s
  - Manual checks
    - Visual comparison
Factors

• 4 Distinct factors
  1. Seasonal
  2. Axle
  3. Growth Rate
  4. Class Distribution

• Factors need to be applied to all ‘Primary’ stations in TCDS
# Seasonal Factors

## 9 Seasonal Factor Groupings

- Annually generated from CCS data using cluster analysis
- Groups 1-6 classified as Trunkline
- Groups 7-9 classified as Non-Trunkline

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Urban</td>
</tr>
<tr>
<td>2.</td>
<td>Urban Rural</td>
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<tr>
<td>3.</td>
<td>Rural</td>
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<tr>
<td>4.</td>
<td>Rural North</td>
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<tr>
<td>5.</td>
<td>Recreational</td>
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<tr>
<td>6.</td>
<td>Recreational Corridor</td>
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<tr>
<td>7 – 9.</td>
<td>Non-Trunkline</td>
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# Seasonal Factors

<table>
<thead>
<tr>
<th>Group 1 2017 Seasonal Factors</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
<tr>
<td>Sunday</td>
<td>1.656</td>
<td>1.541</td>
<td>1.448</td>
<td>1.424</td>
<td>1.421</td>
<td>1.331</td>
<td>1.365</td>
<td>1.335</td>
<td>1.374</td>
<td>1.373</td>
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<td>Monday</td>
<td>1.103</td>
<td>0.983</td>
<td>0.996</td>
<td>0.964</td>
<td>1.016</td>
<td>0.929</td>
<td>0.97</td>
<td>0.945</td>
<td>1.026</td>
<td>0.946</td>
<td>0.945</td>
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<tr>
<td>Tuesday</td>
<td>1.028</td>
<td>0.956</td>
<td>0.942</td>
<td>0.936</td>
<td>0.923</td>
<td>0.904</td>
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<td>0.927</td>
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<td>Wednesday</td>
<td>0.968</td>
<td>0.952</td>
<td>0.93</td>
<td>0.922</td>
<td>0.901</td>
<td>0.887</td>
<td>0.912</td>
<td>0.896</td>
<td>0.903</td>
<td>0.919</td>
<td>0.907</td>
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<td>Thursday</td>
<td>0.968</td>
<td>0.933</td>
<td>0.92</td>
<td>0.924</td>
<td>0.903</td>
<td>0.88</td>
<td>0.892</td>
<td>0.886</td>
<td>0.89</td>
<td>0.886</td>
<td>0.972</td>
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<td>Friday</td>
<td>0.919</td>
<td>0.899</td>
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<td>0.89</td>
<td>0.865</td>
<td>0.858</td>
<td>0.871</td>
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<td>0.854</td>
<td>0.857</td>
<td>0.932</td>
<td>0.937</td>
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<td>Saturday</td>
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<table>
<thead>
<tr>
<th>Group 2 2017 Seasonal Factors</th>
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<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
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<tbody>
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<td>1.549</td>
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<td>1.288</td>
<td>1.19</td>
<td>1.1</td>
<td>1.061</td>
<td>1.019</td>
<td>1.136</td>
<td>1.161</td>
<td>1.295</td>
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<td>1.218</td>
<td>1.092</td>
<td>1.106</td>
<td>1.02</td>
<td>1.01</td>
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<td>1.088</td>
<td>1.07</td>
<td>1.009</td>
<td>0.967</td>
<td>0.933</td>
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<td>0.941</td>
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<td>0.889</td>
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<td>0.951</td>
<td>0.959</td>
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<tr>
<td>Thursday</td>
<td>1.106</td>
<td>1.038</td>
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<td>0.963</td>
<td>0.908</td>
<td>0.875</td>
<td>0.864</td>
<td>0.85</td>
<td>0.891</td>
<td>0.897</td>
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<tr>
<td>Friday</td>
<td>1.006</td>
<td>0.952</td>
<td>0.922</td>
<td>0.882</td>
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<td>0.792</td>
<td>0.781</td>
<td>0.789</td>
<td>0.809</td>
<td>0.914</td>
<td>0.956</td>
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<tr>
<td>Saturday</td>
<td>1.353</td>
<td>1.271</td>
<td>1.213</td>
<td>1.129</td>
<td>1.057</td>
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<td>0.988</td>
<td>0.967</td>
<td>1.003</td>
<td>1.068</td>
<td>1.143</td>
<td>1.241</td>
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</table>
Axle Factors

4 Axle Factor Groupings

- Automated process in TCDS using a cluster analysis
- Groups 1-3 are reserved for trunkline stations
- 4 group is labeled – NoFactor with a value = 1

➤ Place holder in TCDS

<table>
<thead>
<tr>
<th>Month</th>
<th>Day of Week</th>
<th>Value</th>
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<tbody>
<tr>
<td>January</td>
<td>Sunday</td>
<td>0.936</td>
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<tr>
<td>January</td>
<td>Monday</td>
<td>0.848</td>
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<td>January</td>
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<tr>
<td>January</td>
<td>Friday</td>
<td>0.855</td>
</tr>
<tr>
<td>January</td>
<td>Saturday</td>
<td>0.92</td>
</tr>
</tbody>
</table>
Growth Factors

- Align with the seasonal factor groupings (1-9)
  - Groups 7-9 differ:
    7. Urban Non-State
    8. Rural Non-State
    9. Recreational Non-State
- Growth rate is annually calculated from CCS’s for State trunkline routes only
- Non-trunkline factors are produced using MDOT’s Statewide and urban models
Class Distribution Factors

• MDOT utilizes >1200 class distribution factor (CDF) groups
  ➢ Inherently more accurate extrapolations
  ➢ Partially derived from legacy process
• CDF extrapolations provide commercial values for locations not calculated during current count year
• Groups use cluster analysis of current year classification data to create % distribution for a 13-bin schema (per ¹FHWA regulations)

# Class Distribution Factors

<table>
<thead>
<tr>
<th>Class</th>
<th>Value</th>
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<tbody>
<tr>
<td>1</td>
<td>0.009</td>
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<tr>
<td>2</td>
<td>0.629</td>
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<td>3</td>
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<td>7</td>
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<tr>
<td>12</td>
<td>0.001</td>
</tr>
<tr>
<td>13</td>
<td>0.009</td>
</tr>
</tbody>
</table>
Traffic Monitoring Data

Year-End Processing in TCDS
- Begin processing in Feb.
- Multi-week process
- Collaborative within TIU
- More efficient

Outputs
- Factors
  - *AADT
  - *CAADT
- *K-Factor
- *D-Factor
- *Summary Tables

*Output used for HPMS reporting
HPMS Reporting

Reporting requirements:
“Each State is to include, as part of the annual submittal, their Linear Reference System (LRS), which enables the attribute data to be represented in a geospatial format.” (HPMS Field Manual, Updated March 12, 2018)

• HPMS requires a segment-based file
• TCDS is a point-based system

How do we go from points to segments?!
Critical attribution on primary stations are mapped to traffic segmentation.
Future Enhancements

- Full integration with ESRI Roads & Highways (LRS solution)
  - Powerful user experience in TCDS
  - Increased efficiency in reporting
  - Dynamic LRS and asset management
  - Integrated validation checks
  - Multi-user editing environments (versioning)
Future Enhancements

- MS2-to-MS2 data exchange
  - Seamless data exchange with other MS2 users
  - Data processing for HPMS will be streamlined

- Local Agency Data Uploader
  - Local agencies (non-MS2 users) can upload their traffic data directly into corresponding MDOT traffic stations
Shameless Plug(s)

Non-Trunkline Federal Aid Program NEEDS you!
A vibrant multimodal transportation system is vital to Michigan’s future economic viability and competitiveness. Michigan’s geographic, manufacturing prowess, and outstanding higher education institutions position our state to lead the nation and the world into the next generation of transportation innovation. To meet this challenge, Michigan needs a vision for a 21st century transportation system that will support user needs for improved safety, infrastructure conditions and system reliability to drive statewide economic investments. The Michigan Department of Transportation is developing an integrated, performance-based 2045 State Long-Range Transportation Plan (2045 SURFP) to guide implementation of this vision.

What are your priorities for transportation in Michigan? MDOT has created an online, interactive survey through MetroQuest to gather public opinion about the future of transportation in the state.

Accommodations can be made for persons with disabilities and limited English speaking ability. Large print materials, auxiliary aids or the services of interpreters, signers, or readers are available upon request. Please call 517-335-4381 to request assistance with completing the online survey or for help with other public input tools.

Public & Stakeholder Participation Plan
for Michigan’s State Long-Range Transportation Plan

Development of the comprehensive, draft Public and Stakeholder Participation Plan (PSPP) was informed by a review of past and current MDOT practices, peer state reviews, and workshops with MDOT and regulatory staff.

Contact Brad Sharlow for questions (517)335-4593

Available until March 31, 2019
Sources of Travel Information

www.Michigan.gov/trafficdata
AADT Maps

www.Michigan.gov/trafficdata
Questions?

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