MIDCAP
Maryland Intersection and Interchange Design & Capacity Analysis Program
INTRODUCTION

- **Maryland Intersection and Interchange Design & Capacity Analysis Program (MIDCAP)**
- Developed by University of Maryland, College Park and MDSHA
- A tool to conduct a capacity/queuing analysis for signalized intersections and interchanges, signal warrant and shoulder bypass analysis at the preliminary, planning, or design stage

Copyright ©2004-2014 ATTAP. All rights reserved.
Ability and queue analysis

- for signalized Intersections
- for signalized interchanges

Signal Warrant

Shoulder Bypass Lanes (SBLs) Warrant
MODULE 1: CAPACITY AND QUEUE ANALYSIS

- Uses the CLV method and MDSHA’s Queuing analysis procedure
- Provides the volume-to-capacity ratio and corresponding level of service associated with a particular intersection/interchange design, given hourly turning movement volumes, lane configurations, right turn restrictions, and phase control (split or non-split)
- Considers different types of intersection/interchange from conventional design (4 leg, 3 leg, diamond intersection) to unconventional design (Continuous Flow Intersection, Single Point Urban Interchange, and Diverging Diamond Interchange)
MODULE 1: CAPACITY AND QUEUE ANALYSIS

Framework

**INPUT**

- Movement volumes
- Lane configuration
- Intersection type
- Right-turn restriction

**OUTPUT**

- Intersection Critical Lane Volume
- Intersection v/c and LOS
- Maximum Queue Length

Calculate Max. queue length

INPUT:

- Calculate CLV for each approach

Determine critical movement and calculate intersection CLV

Calculate v/c and determine LOS

Calculate Max. queue length
MODULE 1: CAPACITY AND QUEUE ANALYSIS

User-friendly interface

1. Choose Intersection Type
2. Set Lane Configurations
3. Input Movement Volumes
4. Choose Right Turn Control Type
5. Calculate Critical Lane Volume
6. Obtain Intersection LOS & V/C
MODULE 1: CAPACITY AND QUEUE ANALYSIS

- Multiple intersections analysis
  - Corridor analysis
  - Up to 10 intersections
Integration of intersection and interchange designs

- On the multiple intersection analysis
Analysis for both AM and PM peak hours at a time
Multi-hour analysis

![Graph showing multi-hour capacity and queue analysis results.](image-url)
Import a report from Internet Traffic Monitoring System (I-TMS) as traffic volume input
Factors and Criteria

- Editable Lane Use Factors, LOS criteria, and PCE values
- Can be applied in different intersections and different approaches
- Default values (see tables)
Right turn restriction

- Percentage of no-turn-on-red traffic
- Free right turn
- Right turn overlap
Comparison summary

<table>
<thead>
<tr>
<th></th>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brock Bridge Road</td>
<td>LOS: D V/C: 0.89</td>
<td>LOS: F V/C: 1.10</td>
</tr>
<tr>
<td>Sellner Road/Race Road</td>
<td>LOS: F V/C: 1.06</td>
<td>LOS: E V/C: 0.93</td>
</tr>
<tr>
<td>MD 295</td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td></td>
<td>LOS: E V/C: 0.94</td>
<td>LOS: D V/C: 0.86</td>
</tr>
<tr>
<td>Clark Road/Max Blobs Park Road</td>
<td>AM</td>
<td>PM</td>
</tr>
<tr>
<td></td>
<td>LOS: E V/C: 0.97</td>
<td>LOS: E V/C: 0.96</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AM</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOS: D V/C: 0.88</td>
</tr>
</tbody>
</table>

Print   Save
Recommended bridge length for DDI design
Different intersection and interchange designs

- Full CFI
- Symmetric CFI
Different intersection and interchange designs

- Asymmetric CFI
- CFI-T
Different intersection and interchange designs

- SPUUI
- DDI
MODULE 2: SIGNAL WARRANT

- Uses the Maryland Manual on Uniform Traffic Control Devices (MUTCD) 2011 edition
- Investigates the need for a traffic control signal by analyzing related factors such as traffic conditions and physical characteristics of the location
- Provides whether the following traffic signal warrant is satisfied at a particular location or not
  - Warrant 1. Eight-Hour Vehicular Volume
  - Warrant 2. Four-Hour Vehicular Volume
  - Warrant 3. Peak Hour
  - Warrant 9. Intersection Near a Grade Crossing
Module 2: Signal Warrant

🌟 User-friendly Interface

- Import a turning movement report from Internet Traffic Monitoring System (I-TMS) as input

1. Load Traffic volume data
2. Set Location-specific Characteristics
3. Click Calculate button
User-friendly Interface

- Evaluation results for Warrant 1
User-friendly Interface

- Evaluation results for Warrant 2
Module 2: Signal Warrant

- User-friendly Interface
  - Evaluation results for Warrant 3
MODULE 2: SIGNAL WARRANT

User-friendly Interface

- Evaluation results for Warrant 9
Using the MDSHA’s application and design guidelines for shoulder bypass lanes (SBLs)

Investigates the need for shoulder bypass lanes and left-turn lanes by analyzing related factors such as traffic conditions and physical characteristics of the location

Provides whether the following shoulder bypass lane warrant is satisfied at a particular location or not

- Warrant 1. Vehicular Volumes
- Warrant 2. Stopping Sight Distance
- Warrant 3. Accident History
MODULE 3: SHOULDER BYPASS LANES (SBLs)

User-friendly Interface

1. Input Traffic volume data
2. Set Location-specific Characteristics
3. Click Calculate button
MODULE 3: SHOULDER BYPASS LANES (SBLs)

🌟 User-friendly Interface

- Evaluation results for Warrant 1
User-friendly Interface

- Evaluation results for Warrant 2 and Warrant 3