HSM Applications to Multilane Rural Highways and Urban Suburban Streets

Exercise I – Prediction of Safety Performance for Rural Multilane Highway and Comparison to Substantive Safety Performance

- Session #4

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

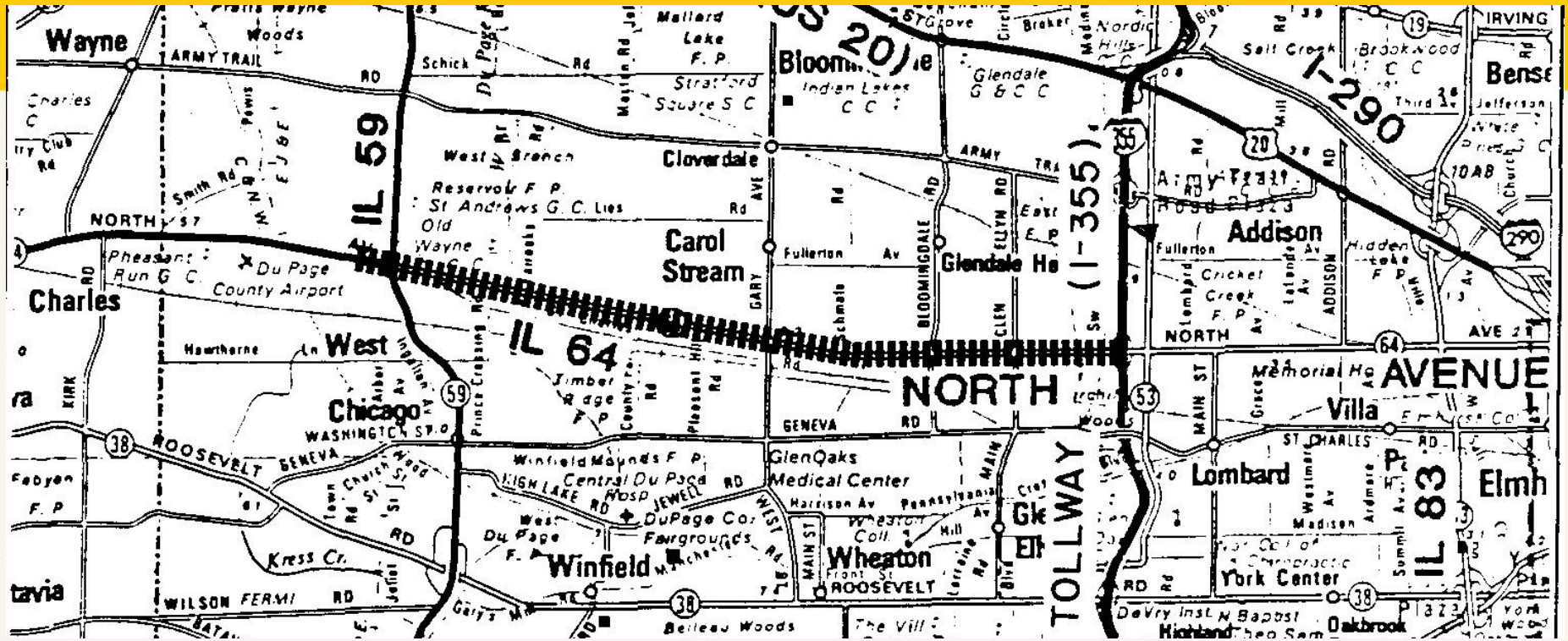
Learning Outcomes:

- **Apply Rural Multilane Crash Prediction model**
- **Calculate Severity Rate**
- **Compare predicted safety performance to actual safety performance**

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

IL 64, DuPage County, Illinois:

IL Route 64, an east-west state highway initiates at Lake Michigan in the City of Chicago and terminates at the Mississippi River at the west border of Illinois. In DuPage County, 1987 population of 780,000, IL Route 64 is known as North Avenue traversing the cities of Elmhurst and Villa Park and through rural unincorporated areas west to St.Charles Illinois in Kane County. IL Route 64 was improved to 4 lanes in the 1960's throughout this length with intersection improvements at major crossroads such as other state routes and county routes consisting of left turn lanes and traffic signal control during the 1960's and 1970's.



ILLINOIS ROUTE 64 NORTH AVENUE
ILLINOIS ROUTE 59 TO
INTERSTATE ROUTE 355

LOCATION MAP

EXHIBIT A-1

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Geometric Information:

Cross-Section:

- Four 12-foot wide lanes with double yellow centerline dividing the opposing directions of travel (Undivided)
- 8 foot wide Gravel shoulders
- 12 foot wide left turn lanes at all major intersections

No left turn lanes at minor street intersections nor at commercial driveways

No highway illumination other than some minor intersection lighting by local municipalities and the County Highway Department; no automated speed enforcement

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Study Section:

Length of Section = 0.97 miles
ADT = 37,000 AADT
No Horizontal Curves
side slope = 1:6
Trees and Power poles 18.0 feet from edge of pavement

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Study Section:

Number of Unsignalized Intersections with left turn lanes	0
Number of Unsignalized Intersections without turn lanes	9

Driveways:

Residential driveways	7
Minor commercial driveways (< 50 parking spaces)	7
Major commercial driveways (> 50 parking spaces)	11
Total # of Driveways	25

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Unsignalized T- Intersections:

Mildred	700 AADT
Virginia	700 AADT
Bernice	700 AADT
Western	700 AADT
Pearl	1,500 AADT
Diane	700 AADT
Evergreen	700 AADT
Amy	700 AADT
Newton	700 AADT

Signalized 4-Approach Intersections:

Bloomingdale Road	16,100 AADT
Shopping Center (north and south)	2,400 AADT
Main Street-Glen Ellyn	16,700 AADT

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Study Section:

Crash data for 1986, 1987, 1988 – 3 years

	Total Crashes	Injury Crashes	Day	Night
Rdwy Segment	84	26	57	27
SubTotal:	**84**	**26**	**57**	**27**

Crash data for 1986, 1987, 1988 – 3 years

Intersections:	Total	Injury	Day	Night
Mildred	9	2	6	3
Virginia	12	3	9	3
Bernice	16	3	11	5
Western	11	4	7	4
Pearl	22	6	16	6
Diane	16	5	11	5
Evergreen	11	4	7	4
Amy	7	4	4	3
Newton	12	5	8	4
Bloomingdale Rd	170	68	122	48
Shopping Center	18	5	13	5
Main St-Glen Ellyn	146	45	100	46
Totals:	**450**	**154**	**314**	**136**

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

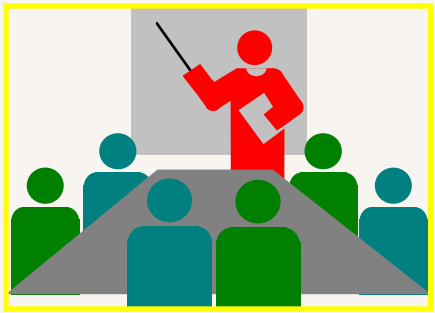
Study Section:

Crash data for 1986, 1987, 1988 – 3 years

	Total Crashes	Injury Crashes	Day	Night
Rdwy Segment	84	26	57	27
12 Intersections	450	154	314	136
Totals:	**534**	**180**	**371**	**163**

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

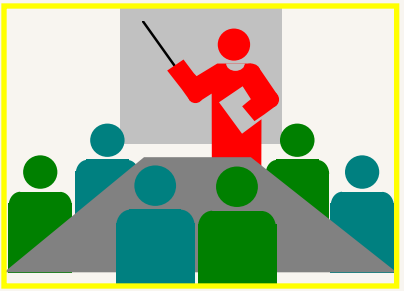
1. Predict the Crash Performance for the segment using the Rural Undivided Multilane model for the following:



   a. **Base Model for the Roadway Segment**
   b. **CMFs for; Lane Width, Shoulder Width and type, Side Slope, Lighting, and Automated Speed Enforcement**
   c. **Total Predicted Crashes for Segment (with CMF's applied)**

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

From the crash information, perform the following:



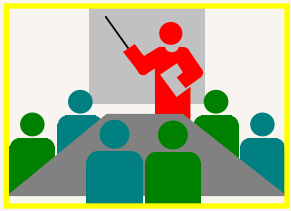
2. Compute the Severity Index (SI) for the segment and for the 3 signalized intersections

$$SI_{segment} = \frac{\text{Fatal + Injury Crashes}}{\text{Total Crashes}}$$

$$SI_{intersections} = \frac{\text{Fatal + Injury Crashes}}{\text{Total Crashes}}$$

Is the Severity Index higher or lower than normal?

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn



From the Crash Prediction analysis, answer the following question:

3. Is the actual Crash Frequency of the geometrics for IL 64 (Lane Width, Shoulder Width and Type, Horizontal Curves, Horizontal Clearance and Driveway Density) less than the predicted Crash Frequency?

Yes or No?

Actual Safety Performance = **? crashes per year**

Predicted Segment Crashes = **? crashes per year**

Use Worksheet 1

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Learning Outcomes:

- **Calculated Severity Rate**
- **Applied Rural Multilane Crash Prediction model**
- **Compared predicted safety performance to actual safety performance**

Exercise I – IL 64 North Avenue from Bloomingdale Road to Main Street-Glen Ellyn

Questions and Discussion