

# CE 474 – Class 27

October 26, 2015

# This week...

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## **Class 27 (10.26)**

Mini-lecture: A58

Do: A59

Do: A62

Homework (due 10.29):

- Complete: A62

## **Class 28 (10.28)**

Exam #1

## **Class 29 (10.29)**

Do: Report, presentation, oral examination

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**Word, Excel and PowerPoint files due to ME:  
Thursday 730 am; NO EXCEPTIONS: LATE FILES  
NOT ACCEPTED**

# Exam #1 - Preview

Chapter/Activity	Skills/Abilities
2/A8	<ul style="list-style-type: none"> <li>Represent traffic flow on one approach using flow profile diagram, cumulative vehicle diagram, and queue accumulation. Construct and interpret diagrams based on theory and field data.</li> <li>Define terms: arrival flow, departure flow, saturation flow</li> </ul>
3/A13	<ul style="list-style-type: none"> <li>Define terms: phase and movement, concurrency group, conflict matrix, ring</li> <li>Construct and interpret ring barrier diagrams for various conditions</li> </ul>
4/A17	<ul style="list-style-type: none"> <li>Define process: gap out, max out</li> <li>Describe timing process: minimum green timer, maximum green timer, passage timer</li> <li>Construct and interpret traffic control process diagram</li> </ul>
6/A30 6/A36	<ul style="list-style-type: none"> <li>Define terms: maximum allowable headway, occupancy time, unoccupancy time</li> <li>Interpret relationships:               <math display="block">h = t_o + t_u</math> <math display="block">t_u = h - \frac{L_d + L_v}{v}</math> </li> <li>Concept: choosing passage time from given data</li> <li>Concept: relationship between passage time and detection zone length</li> <li>Describe phase termination analysis</li> <li>Set passage time based on phase termination analysis</li> </ul>
7/A39	<ul style="list-style-type: none"> <li>Interpret and apply relationship between maximum green time, cycle length, and delay (figures 139-143)</li> </ul>
8/A45	<ul style="list-style-type: none"> <li>Describe various left turn phasing options</li> <li>Construct and interpret flow profile diagram and queue accumulation polygon for left turn options</li> <li>Construct and interpret ring barrier diagrams for various left turn options</li> </ul>
9/A52 9/A54 9/A55	<ul style="list-style-type: none"> <li>Define terms: change interval, clearance interval</li> <li>Interpret choice point diagrams</li> <li>Interpret field data – stopping and not stopping on yellow display</li> </ul>

Group	Name	Presentation Time (29 October)
A	Morris Cornwell Keller	830 am
B	Hartzell LeCates Landa	1030 am
C	Larrea Cupps Saras Skinner	930 am
D	Scheel Kury Geibel	830 am
E	Bode Hale Dashti Maffey	930 am
F	Almakrab Crow Elmore	830 am
G	Ryu Alrashdi Bernauer Taylor-Stiffarm	1030 am

- **10 minutes to make key points**
- **5 minutes for follow up and questions**
- **All team members must participate in presentation**

Prepare your written report. Your final report should include the following information:

- Phasing plan shown in ring barrier diagram format
- Timing parameters (minimum green time, maximum green time, passage time, yellow time, and red clearance time), detector location and type, and other relevant controller settings. Justifications for each of your selected parameters including all relevant data should be given in the report.
- Evaluation of your plan using VISSIM with suitable measures of effectiveness and your visual observations of the simulation. Comparisons of the performance of existing or base conditions with each option considered.
- All options that you considered for various parts of your design, including those options that are a part of the final design and those that are not
- Comparison of your results with recommended practice from the *Traffic Signal Timing Manual*

- Prepare a set of tables that include the data that you generated as part of Activity #59 and that describe the final signal timing plan
- Prepare a summary of the points that justify the selection of each element of your timing plan. Identify and construct the graphs or charts needed to support your key points
- Prepare a set of slides using PowerPoint that addresses the problem that you were assigned, the analysis that you have done supporting your design choices, a description of both the data analyzed and the observations that you have made, and the elements of your final design
- The presentation should include visualizations from VISSIM (both static and dynamic) that demonstrate the operation and performance of your intersection and how your results compared with recommendations from the *Traffic Signal Timing Manual*



## **Word document**

- 10 pages maximum (not including title page and table of contents)
- No appendices

## **Excel document**

- Appendices and data
- Clearly organized by tabs

## **PowerPoint file**

- Emphasize visualizations and minimum text

- Was the design goal or objective clearly stated?
- Were the methods for selecting each parameter value described?
- Were the recommended values clearly described?
- Was evidence presented to support each selected value?
- Did you show understanding of each signal timing parameter?
- Did you combine numeric and visual data in informed way?
- **What did you learn?**
- **Did you make use of the Signal Timing Manual?**
- **Do you use high quality PowerPoint slides that emphasized visuals and not text?**



Component (attributes)	Degree of influence or control of component by designer	Your degree of influence or control of component in your design project
User (automobiles, trucks, pedestrians, transit, trains)	None or little	None (user volume assumed)
Detectors (technology, detection area, location)	High (technology type, detection area, location)	None (assumed inductance loops, presence detection, located at stop bar, 22 feet in length)
Controller	High (phase sequence, timing processes, timing durations)	High (selected/determined phase sequence, basic actuated timers, timer durations, yellow interval, red clearance interval)
Display (indications)	High (type, location)	None (display configuration assumed)

**Table 26.** Your design role in the traffic signal control system





a. Queue at end of green



b. Short queue that will clear before end of green

Figure 177. Queue in through lane

Case	Average delay (sec/veh)	Average queue length (vehicles)
Queue doesn't clear	35	14
Queue clears	12	2

Table 28. Comparison of numeric performance data for different flow conditions (Example #2)

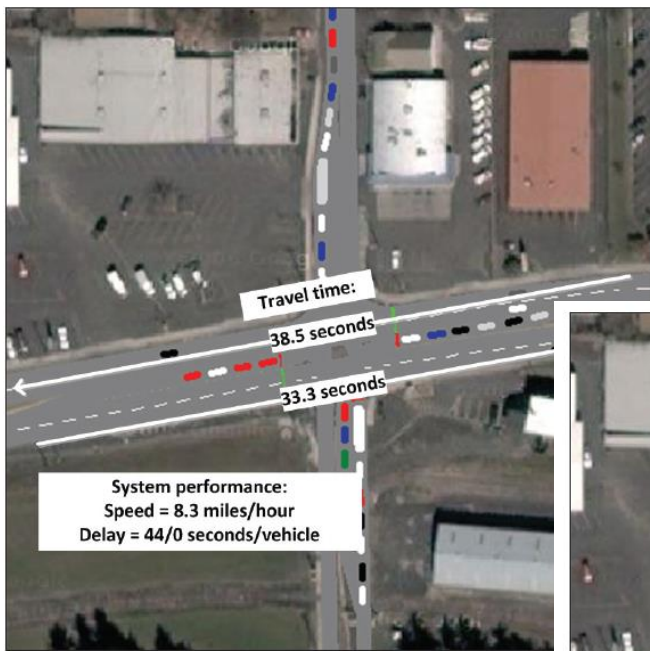


Figure 178. System performance data

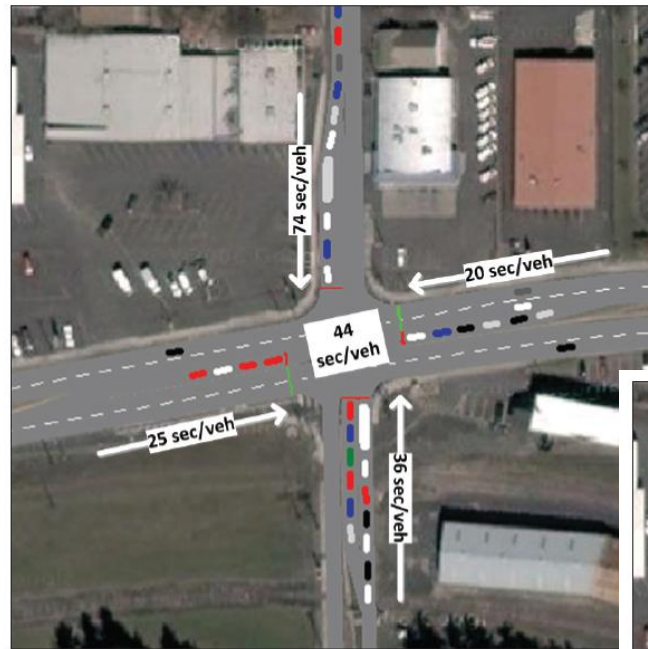


Figure 179. Intersection and approach performance data (average delay)

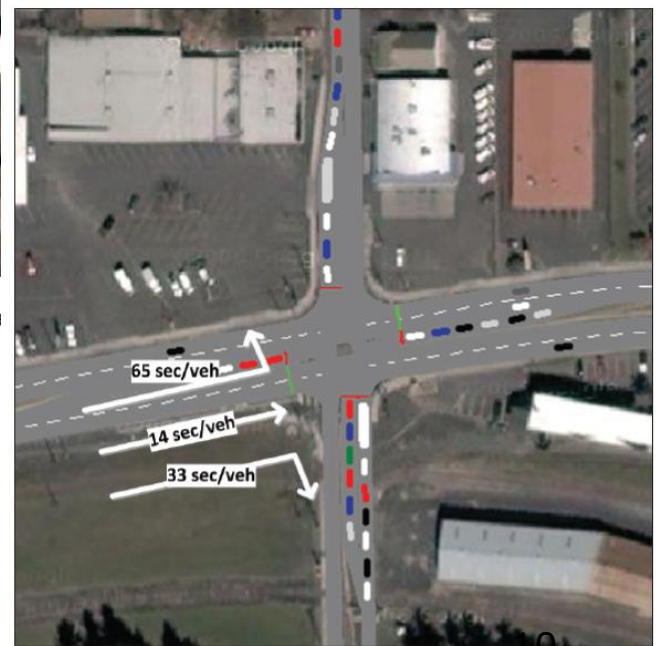


Figure 180. Movement performance data (average delay)

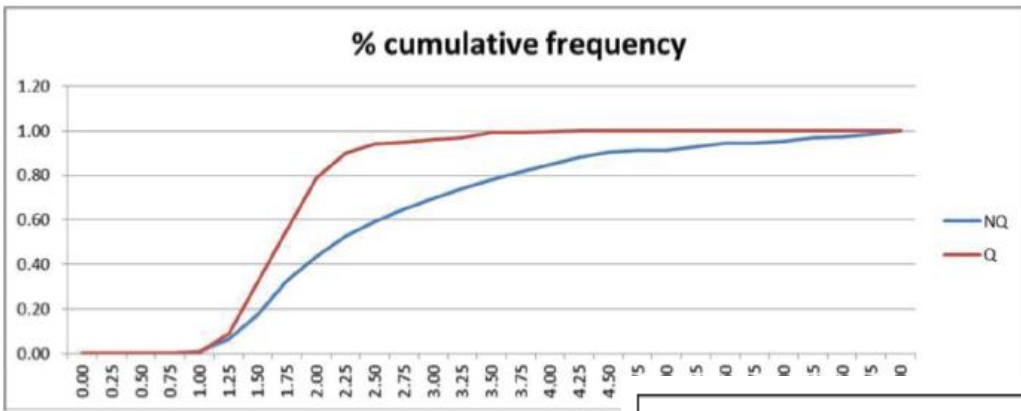


Figure 182. Poor example of grap

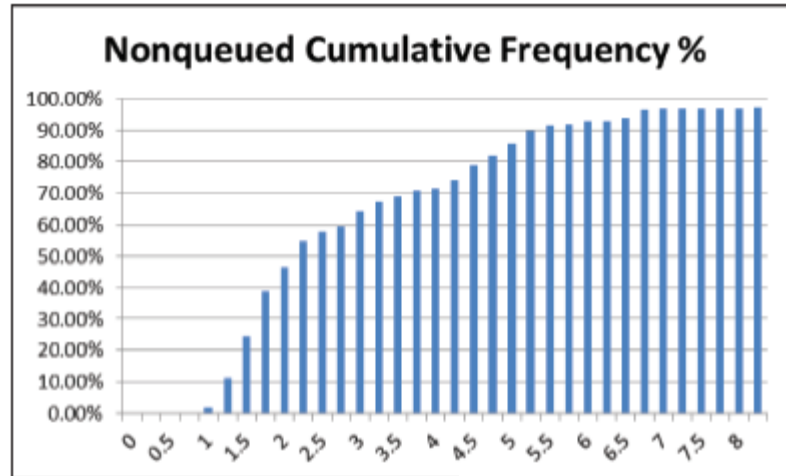


Figure 184. Poor example of cur

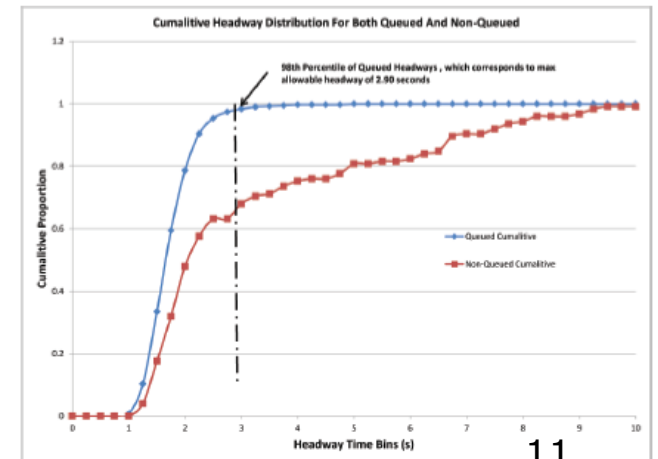


Figure 185. Example headway distribution for queued and non-queued vehicles (original)

Movement	Before		After	
	Queue length (ft)	Delay (sec/veh)	Queue length (ft)	Delay (sec/veh)
EBTH	72.7	33.6	30.1	15.1
EBRT	72.7	38.8	30.1	18.6
EBLT	52.2	69.0	12.1	24.5
NBRT	51.3	43.0	22.2	15.4
NBTH	51.3	33.2	22.2	19.6
NBLT	25.1	59.6	7.1	21.7
WBTH	74.1	35.9	27.4	14.9
WBRT	75.8	28.9	28.6	10.8
WBLT	29.5	64.4	6.1	23.8
SBLT	76.7	46.8	28.1	19.0
SBTH	76.7	43.8	28.1	19.0
SBRT	45.7	74.0	9.3	---
Average	58.7	47.6	21.0	---

Table 31. Performance measures (before and

Movement	Queue Length (ft)		Delay (sec/veh)	
	Before	After	Before	After
EBTH	73	30	34	15
EBRT	73	30	39	19
EBLT	52	12	69	25
NBRT	51	22	43	15
NBTH	51	22	33	20
NBLT	25	7	60	22
WBTH	74	27	36	15
WBRT	76	29	29	11
WBLT	30	6	64	24
SBLT	77	28	47	---
SBTH	77	28	44	---
SBRT	48	9	74	---
Average	59	21	48	---

Table 32. Performance measures (before

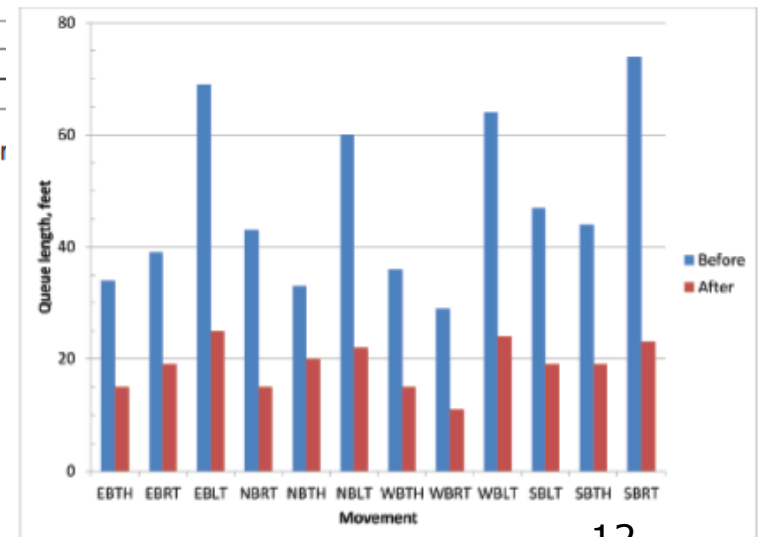


Figure 187. Queue length data (before and after)

- What is your story, how does it justify your findings and results, and how does it integrate the numeric and the visual?
- Excel spreadsheet should be well organized summary of your data and analysis
- PowerPoint slides should be clear, readable, and focus primarily on visual elements:
  - Talk to the audience!
  - Tell your story!
  - Use slides for communicating visual elements



...assemble your data.