

CE474: Traffic Systems Design-Fall 2004

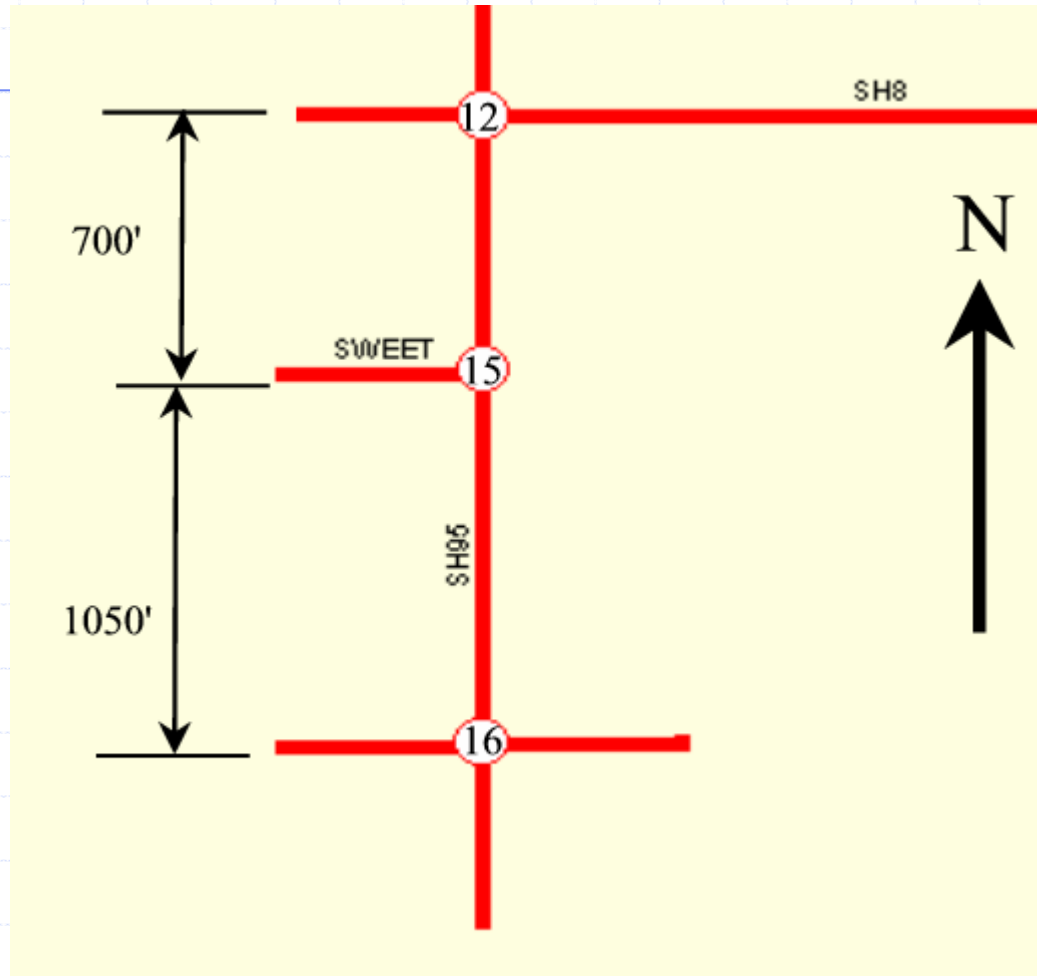
Class 15 – System Coordination Concepts –
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Design Project 3: Tasks?

- ◆ Project Objectives (why ?)
- ◆ Project Analysis (how?)
- ◆ Project Deliverables (what?)

Distance Between Intersection



What is TRANSYT

- ◆ TRANSYT (TRAffic Network StudY Tool) is one of the most widely used design models, developed by the Transport and Road Research Laboratory in England.
- ◆ In 1980 the FHWA awarded a contract to the University of Florida Transportation Research Center to develop the Americanized version of the program TRANSYT-7 and the result was TRANSYT-7F in late 1992
- ◆ Now TRANSYT 7F Release 10

Potential Application

◆ Traffic Signal Timing Optimization

- TRANSYT-7F is designed to optimize traffic signal systems for arterial or networks on the basis of cycle length, offsets, and green split adjustments to improve progression opportunities, or to reduce delay, stops and fuel consumption, or a combination of both. Optimization is performed through the simulation of vehicle responses to various signal settings.

◆ Simulation of Traffic Flow

- TRANSYT-7F simulates the flow of traffic in a signalized network. Traffic simulation model in TRANSYT-7F is among the most realistic of those available in the family of computerized macroscopic traffic models. The traffic model further utilizes a platoon dispersion algorithm that simulates the normal dispersion of platoon as they travel downstream. It also considers traffic delays, stops, fuel consumption, travel time and other traffic system measures.

Performance Measures

- ◆ Delay,
- ◆ Stops and queuing,
- ◆ Fuel consumption,
- ◆ Total travel and total travel time,
- ◆ Operation cost, and
- ◆ Other derivatives of these measures.
- ◆ Other special applications of TRANSYT-7f are, bus operation, carpool, mid-block sources, bottlenecks, actuated control, and pedestrians and Bicycles operations.

Performance Index

- ◆ When optimizing TRANSYT-7F minimizes (or maximizes, depending on the selection) an objective function called the performance index (PI).
- ◆ The PI is either a linear combination of delay and stops, fuel consumption and excessive maximum back of queue; or excess operating cost. This PI is to be minimized, which is often referred to as “Performance Optimization”.
- ◆ Another performance index alternative is the forward progression opportunities “PROS”. It can be used either alone or in combination with the delay and stops (or fuel consumption) disutility function. This PI is maximized to increase the quality of perceived progression.

Disutility Index

- ◆ Standard TRANSYT-7F disutility index (DI), the “standard” delay and stops is a linear combination of these measures:
 - ***DI = [delay on a link * link-delay weighting factor] + [stop penalty * stop * link-specific stops weighting factors]***
- ◆ Excess operating cost,
- ◆ Progression Opportunities (PROS), and
- ◆ Optimization objective function, may defined by the user in a number of ways:
 - ◆ ***Standard delay and stops***
 - ***DI = Excess fuel consumption + [double count progressive links] + [Queue Penalty]***
 - ◆ ***Excess operation cost***
- ◆ One of the three in the first bracket is required, the other two brackets are optional

- ◆ The PI may, thus be optionally defined as follow:
 - Disutility index alone (DI)
 - PROS - only
 - PROS & DI