Target Setting – How Much Congestion is OK?

Analyses of system adequacy, the need for improvements, or congestion trends in corridors or regions can benefit from comparisons using "target" conditions. There are several approaches to creating a comparison standard that can be used to identify the locations of the worst congestion problems. It also seems useful to separate the consideration of "where are the corridors or system elements that require the most attention?" from the question of "how much travel delay is caused by the land use and transportation system infrastructure and operating strategies?" The first question is part of prioritizing improvements and might acknowledge that "acceptable congestion levels" are different in downtowns, suburbs and rural areas as well as in large and small urban areas. Some possible target setting considerations are listed below.

- Effect on economy -- Free-flow conditions will not be the goal of most large urban transportation improvement programs, but using them provides one consistent benchmark relevant for year-to-year and city-to-city comparisons. Free-flow speed is the average speed that can be accommodated under relatively low traffic volumes on a uniform roadway segment under prevailing roadway and traffic conditions.
- System efficiency -- Maximum throughput or maximum productivity is a concept that connects the system efficiency goal with the standards used to judge the quality of travel conditions. The basis of the concept is the identification of the speed at which the greatest number of customers can be served (i.e., highest traffic volume) and assigning that speed as the baseline for evaluating congestion levels.
- Local conditions -- A "target" travel speed or travel time index value that varies according to density and development type can improve the guidance provided to system designers, operators and planners. The target travel time index identifies when citizens believe improvements should be made. The conditions that citizens find unacceptable will be a mix of economic development, transportation, and quality of life considerations. For example, a travel speed of 20 mph (TTI = 1.75) may be acceptable on major downtown streets where transit, walk or bike modes are viable options for the short trips between dense developments (see Exhibit T-1). The community may decide that speed is not appropriate for the same type of street in the suburbs where trips are longer and multimodal options fewer.

Exhibit T-1. Example Target Travel Time Index Values

Development Area Type	Peak	Off-Peak
Central Business District	1.75	1.20
Central City/Major Activity Center	1.50	1.10
Suburban	1.30	1.00
Fringe	1.00	1.00

Using the Targets – Calculation Basics

Goal conditions can be used in a number of ways and there are reasons for more than one value to be used to gauge the amount of congestion. It is useful to initially focus on the type of analysis being conducted.

- If the total amount of delay on the system is being estimated, a standard that identified the negative effects of congestion on society and the economy might be the most useful. A free-flow speed or speed limit-based definition for the beginning of congestion works best in this case.
- For operations projects or programs, the focus on improving system efficiency is best graded using a measure like the maximum throughput travel time index or calculating delay based on the best system efficiency speed (either 45 mph or 50 mph). Focusing on system considerations, rather than concerns about individual travelers, is appropriate in this case as the goal of the measure is to use system constraints as the factors determining the eventual successful implementation.
- A set of target speeds or travel time index values, developed with input from citizens, businesses, decision makers, and transportation professionals, can provide a method to match the different expectations that travelers have for the transportation system. A set of conditions can be used for corridors and multimodal systems. A project prioritization system based on this condition will compare the resulting improvements in various parts of a region to the standards for the nearby developments.
- All of the target concepts can be connected to and used in the same analyses. A corridor analysis using any of the standards, for instance, might indicate a problem with one mode, but the solution may be to improve another mode or program that is a more cost-effective approach to moving the overall corridor value closer to the target. The amount of corridor or areawide person-travel that occurs in conditions worse than the target can be used to monitor progress toward transportation goals and identify problem areas.
- In some cases, a particular goal value will work better. A regional target for delay per traveler or TTI can focus discussion in a way that is not possible with the complex underlying analysis. The “attainment of locally determined goals” will be used during a discussion of planning and project prioritization at the corridor or region level. It might be used at the national or state level, but less frequently.
- Free flow speed can be calculated or estimated in a number of ways. A common approach is to use the 85th percentile speed during the off-peak periods. The off-peak periods can be defined by time period (e.g., overnight—10 p.m. to 6 a.m.) or by low vehicle volume or long headways (e.g., freeway traffic volumes of approximately 700 vehicles per hour per lane or 5 second headways). Ideally, a continuous data source with at least one year of data (e.g., traffic management center, weigh in motion, automatic traffic recorder, etc.) could be used to identify the free-flow speed.
- The discussion about what constitutes unacceptable conditions could be conducted in conjunction with the long-range planning process and the future visions of the area. If the target travel speeds are a product of public discussion, they will illustrate the balance that the public wishes to have between road space, social effects, environmental impacts, economic issues, and quality of life concerns. Areas or system elements where the performance is worse than the target can be the focus of more detailed study.