Workshop on Quick-Response and Sketch-Planning Methods

Workshop Summary

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This workshop covered planning methods that can be applied in a quick response to decisionmaking. Such procedures are also called sketch-planning techniques. Background papers by Arthur Sosslau and George Schoener summarized the state of the art and the state of the practice, respectively.

Quick-response techniques were defined as those techniques that support the required decisionmaking time frame within the given cost and staff resource constraints. These techniques may be manual, stand-alone, microcomputer based, or subsets of larger computer systems (e.g., UTPS). As such, these techniques represent more than just those documented in NCHRP Report 187, Quick Response Urban Travel Estimation Procedure and Transferable Parameters. Table 1 provides an overview.

Table 1. Techniques and applications areas.

Technique	Application Area		
	Regional	Corridor or Subarea	Project
Computerized			
Conventional models			
UTPS	X	X	X
PLANPAC/BACKPAC	X	X	X
NAG (network aggregation)	X	X	
CAPM (sketch planning)	X		
SCAGM (small city gravity model)	X		
DRAM/EMPAL (land use)	X		
Windowing or focusing	X	X	
Air-quality analysis	X		
FREQ (freeway operations)	X	X	
Carpool-matching programs	X		
Noncomputerized			
NCHRP Rept. 187			
Four-step (quick response)	X	X	X
Site impact		X	X
Corridor diversion		X	
Energy-conservation estimation	X	X	X
Air-quality analysis	X	X	X
Manual of planning for your community	X	X	X
AASHTO Red Book (user-benefit analysis)			X
Pivot point (corridor mode choice and route diversion)		X	
Land use and arterial spacing		X	
Planner-aids case studies	X	X	
Macrolevel manual		X	
Parking-management handbook	X	X	
Sampling			
Ground-count factoring	X	X	X
Design of small-sample home-interview travel surveys	X		
Statewide manual (sampling techniques)	X		
Automobile on-board surveys	X	X	
Transit on-board surveys	X	X	
External cordon (O-D manual)	X	X	
1980 Census	X	X	
VMT or PMT sampling	X	X	
Reasonableness checking			
Characteristics of Urban Transportation Systems (CUTS)	X	X	X
Characteristics of Urban Travel Demand (CUTD)	X	X	X
Traveler response to transportation system changes	X	X	X
NCHRP Report 187 (defaults)	X	X	X
ITE trip generation	X	X	X
FHWA trip-generation analysis manual, 1975 (Appendix E)	X	X	
Friction factors	X		

Quick response does not necessarily imply less detail. That is, the techniques may be applied across all the various planning contexts (i.e., strategic, project, urban, microscale, and system operations); the level of detail increases when a change is made from strategic to system operations. Also, quick-response procedures may be applied as part of an on-line planning effort or may be used to evaluate the reasonableness of previously conducted studies. These procedures may be viewed as giving planners relative control of the planning environment. In the ultimate, for computerized approaches, the planner interacts directly with the computer and receives a response to an inquiry almost immediately. The output is generally provided in a format that may be easily interpreted by decisionmakers. The quick-response concept generally applies in sketch-planning situations but may apply as well in situations normally viewed as requiring many variables and detailed data.

Sketch-planning techniques are defined as those techniques useful in screening a large number of alternatives. They may involve but are not limited to quick-response procedures. In these techniques, the number of variables and the precision involved are adequate to eliminate most alternatives that are not cost-effective. The remaining alternatives require more refined analysis.

Methods are structured to permit parametric sensitivity analyses and thus test the importance of modeling assumptions and data quality and aid in establishing bounding values for major decision variables. In addition, such methods often exploit common data bases.

Besides the objective of screening out impractical alternatives, the techniques should provide insights into the following areas:

1. The interaction among variables in single-objective scenarios,
2. The interaction among objectives in multiple-objective scenarios,
3. The definition of alternatives for more detailed study,
4. The identification of other data needs, and
5. The assumptions where uncertainty must be reduced.

Sketch-planning techniques may also be manual, stand-alone, microcomputer, or subsets of larger computer systems, e.g., UTPS.

The workshop reviewed the use and applications of quick-response techniques to each of the five levels of planning. Their findings are as follows.

Strategic and long-range systems planning are intended to monitor surveillance and trend analysis, anticipating problems. Planning at this level reviews objectives and broad priorities, develops measures and indicators of success, responds to unexpected changes in the environment, retains close-out future options, and reviews major policy alternatives. It is generally large in geographic area and comprehensive in scope; it extracts essential factors from relevant areas. These include demographics, economics, urban development, transportation

and land use, travel demand, technology, and institutional or intergovernmental structure. Long-range planning also provides information to support project planning, such as interaction effects between projects.

Quick-response methods applicable to long-range and strategic planning include what-if scenario testing and pivot-point methods. NCHRP Report 187 on land use and arterial spacing and transit corridor analysis are other examples. These are commonly used by planning agencies, MPOs, operating agencies, and transportation and/or land use planners.

The status of quick-response methods is quite advanced. Sound conceptual basis exists for the methods, and demonstrated examples are available. However, packages are not available for general use, although some demand-oriented information has been disseminated.

Project planning focuses on major capital-intensive transportation proposals analyzed in comparison with alternatives involving less capital investment or no action at all. The scale is generally travel corridors or subareas; the planning process is oriented to making a final decision on a transportation action rather than studying long-range strategies and/or plan development.

The time horizon depends on useful life of the major capital investment alternatives and is usually quite short. Land use and demographics are generally prespecified rather than a consideration of options, and cost and evaluation methods are needed as well as demand-estimation techniques.

Quick-response methods (see paper by Sosslau in this Report) are more applicable to project planning than to the other context areas. Strong conceptual basis exists and demonstrated examples are readily available, although more are needed. Some packages are available for general use, and information has been partly disseminated.

Urban-microscale planning focuses on subareas. The planning process may appear as project planning, which has capital investment components, or may focus on system operations. Though land use decisions may be involved, the change in land use in the subarea is presumed to have little impact on the overall region. Institutional and jurisdictional interactions may require resolution. Some microscale planning is done by state departments of transportation or regional agencies, although more likely by a local agency most directly affected by the outcome.

The status of quick-reponse techniques is quite limited. Although conceptually such methods are possible, very few have been demonstrated and fewer still have been packaged for general use. Research needs identify concerns for development.

In system operations, studies usually have a non-capital-intensive outcome, although many affect a variety of local rules, regulations, and procedures. These studies may involve a number of jurisdictional units and institutions, and results often appear in the implementing agency's operating budget for the year. Procedures normally involve considerable detail.

The status of quick-response methods is similar to that of microscale planning.

Quick-Response and Sketch-Planning Techniques: State of the Art

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Urban travel analysis procedures historically have been designed to evaluate regional transportation systems and to provide design volumes. These activities, being broad in scope and involving many steps, usually did not require what might be referred to today as quick-response analysis time frames. As a matter of fact, the use of the computer along with the tools developed resulted in what might be considered quick response for activities such as regional systems analysis for freeway systems.

Times change, however, and emphasis in transportation planning has been changing. Use of regional methods, modifications to these, or adaptation of computer approaches to a myriad of applications usually does not result in quick response or the most appropriate approach. Today more than ever there is a need for methods designed to aid in making quick-decision trade-offs on projects. There is also a need to screen alternatives quickly and efficiently so that more detailed analysis can be more effectively concentrated on the most feasible transportation improvement proposals. Local planners need to analyze the transportation impacts of new developments (site-impact analysis). Interest is being centered more often on corridors and subareas rather than on a regional level. The effects of development and growth on the arterial system must now be evaluated by transportation planners.

I will try to address the state of the art as it pertains to quick-response planning techniques. This will cover planning methods that can be applied in a quick-response manner to the decisionmaking process. The remainder of the paper will address

1. What quick response is,
2. What some examples of currently available methods are,
3. Taking advantage of current technology, and
4. Conclusions and recommendations.

WHAT IS QUICK RESPONSE?

From my perspective, quick response is a frame of mind. One needs to take one's head out of the sand, the sand being represented by the large mainframe computer and travel-forecasting models that have been applied in regional analysis. UTPS and PLANPAC have their place and for some work offer quick response. However, the quickest response to a project is not always a model and a computer. The range of quick response includes, on the one hand, the planner, who, based on years of experience and know-how, can judge pretty reasonably the consequences of a proposal. The World Bank, as an example, has developed and will continue to develop decisions on a multi-million-dollar public work project based on experienced judgment. At the other end of the scale, a two-year, computer-based modeling process may be the quick response to a project such as the