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Discussion of Resource Paper

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Drake has thoroughly and capably presented the existing state of the art of statewide freight systems planning methodology. He indicates that the state does have a role in freight movement, particularly with respect to investment in freight-serving facilities, tax and subsidy programs, regulation, and research and development. Thus, there is a need for adequate freight system planning capabilities at the state level.

Our capability to address these questions, however, is undeveloped in almost every respect. We have few data on freight flows at the state level, almost no information on the spatial distribution of freight-producing activities, no inventory of the supply of state freight systems, no developed capacity to simulate state freight movement, and little understanding of the costs and benefits to freight movement of alternative state transportation plans, programs, and policies. In short, we have grossly inadequate knowledge of the freight phenomenon at the state level and, consequently, a similarly inadequate capability to address the critical state freight planning questions that confront us.

Drake identifies the critical elements of statewide freight planning that must be developed. Most particularly, he identifies the following needs:

1. Compilation of basic data on goods movements, freight transportation facilities, and spatial arrangement of freight producers and consumers;
2. Development of capability to simulate freight movements, particularly intermodal trade-offs and activity allocation;
3. Development, application, and evaluation of different analytical techniques; and
4. Empirical investigation of critical freight questions such as investments in alternative freight-serving modes, potential rail branch-line abandonments, subsidies, taxation and regulations of competing modes, investments in freight distribution systems, and rationalization of freight-producing activity locations.

None of these unmet needs is simply an adjunct to an already well-developed analytical and planning capability; all of them are fundamental necessities for the responsible investigation of statewide freight questions.

Although Drake's paper is admirable and comprehensive in all the above respects, there is one area of concern and that is freight movement simulation. Although the paper does not make any positive statement on the subject, it leaves the reader with the impression that the necessity for addressing state freight planning questions can be met adequately if a sufficiently comprehensive simultaneous multimodal, multicommodity freight simulation capability can be developed covering the entire state. In essence, this would be to extend the simulation method originally developed for urban freeway planning to the state freight question.

The reason that this is perceived as a problem is not that Drake has made such proposals but that he does not explicitly reject them. This, in turn, is a problem because a pervasive tendency in the urban transportation planning field has been exactly to try to use and extend regional travel simulation technology to all transportation planning applications regardless of geographical scope or analytical applicability. The transportation planning tool that was developed to plan urban freeway systems—a job for which it was admirably suited—is being extended, detailed, and misused in all sorts of applications for which it is entirely inappropriate. The unfortunate assumption has been, at least implicitly, that one grand simultaneous computer simulation model can solve all transportation planning questions if it is sufficiently comprehensive and has enough variables in it. The result has been the continued development of a more and more complicated, time-consuming, and expensive process that is completely unresponsive to our needs and often gives misleading and incorrect answers. We know more and more about our transportation planning technology but less about the travel phenomenon; meanwhile, critical transportation planning questions remain unaddressed and unresolved.

The reason for the above disastrous turn of events in urban transportation planning appears to have been at least in part the federal requirements for developing comprehensive intermodal urban transportation plans. It would seem logical to assume that the ideal comprehensive intermodal plan would be the result of a conceptually and methodologically consistent process and that a natural way of doing this would be to use one tool throughout. The only problem is that it does not work. The transportation phenomenon is too complex for us to try to simulate simultaneously all of its many aspects, and the attempt simply breaks down.

Because of the nature of the phenomenon, a far more cost-effective approach is to address transportation planning problems as problems and then synthesize the results rather than try to synthesize the system and then address the problems. Generally, when the problem-solving approach is used, parallelism in methods and results is usually found, and the resultant plans developed are not only consistent, intermodal, and comprehensive but also realistic and practical.

A difficulty similar to that in urban transportation planning is now developing in the statewide transportation planning field—both passenger and freight—where the state of the art is roughly analogous to that of urban transportation planning in the late 1950s and early 1960s. Some rudimentary work has by now been done in developing statewide travel simulation models, and federal and state governments are becoming insistent in their desire for comprehensive intermodal statewide transportation plans. The state appears to be set for a rerun of the urban transportation planning history with all of its attendant mistakes and follies.

A more hopeful prospect, however, is that statewide transportation planning may learn from the errors of urban transportation planning and not be doomed to repeat them. If this is to be the case, we must adopt an explicit problem-solving approach that can lead to a reasonable and worthwhile state-level transportation planning process. The crucial elements of such a process should probably be as follows:

1. Establish goals for statewide transportation,
2. Identify basic problems in statewide transportation that are within the realm of the state's responsibility,

3. Design analysis procedures and identify data requirements for determining appropriate problem solutions that are consistent with goals,
4. Collect data,
5. Analyze problems in terms of alternative solutions, and
6. Synthesize solutions and develop plans.

If this approach is used, we may well find that certain problems overlap considerably in method of analysis, data, and solution. We may also find that there are overlapping needs for travel simulations in many applications. These possibilities, however, should develop as results of analysis rather than as starting points.

Throughout, if we use such an approach, we should be able to plan statewide transportation systems through increasing our knowledge of and ability to deal with the phenomenon of statewide transportation rather than through knowing about a complex transportation planning technology. If we work on the basic needs identified in Drake's paper in directly addressing problems rather than in developing a monolithic procedure, we will be well on our way not only to developing good statewide transportation plans but also to solving our statewide transportation problems.

Discussion of Resource Paper

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The methodology for planning statewide multimodal goods movement systems should begin with a definition of goals and objectives and follow with a systems approach through evaluation of alternatives and final selection of a statewide goods movement system. However, there are several ways to develop such a framework for this planning methodology; the level of detail of each step can vary from state to state; the responsibility for conducting each step may be assigned to either statewide, regional, or local governmental units; and, in general, a framework to satisfy all transportation planners is difficult to envision.

The goods movement system can be viewed in terms of inputs and outputs, with constraints and impacts as shown in Figure 4. Figure 4 also shows the same input-output representation with some elaboration of the constraints, controls, and outputs. The goods movement system is composed of physical, human, activity, and concomitant subsystems, as shown in Figure 5. These subsystems are described as follows:

1. The physical subsystem includes all goods-movement vehicles and facilities and the goods that are expected to be moved in the region;
2. The human subsystem includes the operators of those vehicles and facilities, the shippers and consumers or final receivers, and the community that is affected by the goods movement system;
3. The activity subsystem involves the entire spectrum of activities that occur with the movement of goods and includes total goods flows, flow patterns, costs, operating schedules, terminal location and operation, and land use development; and
4. The concomitant subsystem encompasses the results of the accomplishment of the movements of goods and may be further divided into environmental, social, and economic consequences of goods movements.

Regardless of how one chooses to represent the statewide goods movement system, it remains a very complex system with many viewpoints, involves several modes of transport, and has far-reaching social, economic, and environmental consequences. The consequences of goods movements on the transportation network, land use, land use patterns, and environment must be addressed in any truly comprehensive trans-