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Every Day Is Freight Day

Finding the Balance with Continuous Transportation Planning

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Freight mobility requires continuous planning and balance between modes, objectives, and livability.

The development of a transportation plan can lead to two outcomes: either the plan is the first step toward action and implementation, or the plan is considered a completed project and disconnected from implementation. Good plans include objectives and strategies for transitioning the plan into action and for igniting continuous planning as an ongoing process. The challenge is to develop transportation plans that are thorough and that accurately address needs but that still are multimodal and balanced.

Many jurisdictions—states, metropolitan planning organizations (MPOs), and municipalities—have moved to continuous planning to stay current with continuous change, needs, and trends. Good modal plans support an agency's long-range transportation plan, which should be comprehensive and provide strategy for how transportation supports all needs, including freight, rail, transit, aviation, bike and pedestrian, and maritime. Many jurisdictions realize that all modes of transportation must provide options and redundancy to users. Mobility offered by multiple means of transportation improves quality of life for all; in this way, multimodal transportation planning and a continuous planning process set the conditions for maximizing mobility most effectively.

Finding the Balance

Virtually all state departments of transportation (DOTs), MPOs, regional planning organizations, cities, and counties develop comprehensive transportation plans to improve mobility and quality of life and to provide future direction. Many plans can be categorized as long-range transportation plans, corridor or regional transportation plans, various modal-specific plans, or economic development plans.

PHOTO: VIRGINIA DOT

Although they sometimes compete for freight service, each transportation mode has unique strengths and weaknesses.

Transportation plans differ among jurisdictions. Many agencies have needs and issues that are similar but that vary in magnitude and complexity. As such, the prioritization of needs and actions should have different balance points. Balance means optimizing the transportation strategy to solve issues and needs and at the same time employing and harmonizing various transportation modes.

Freight Modes in Balance

To some degree, transportation modes compete and each mode has inherent, comparative strengths and weaknesses. In freight transportation, each mode is unique in its characteristics, operating models, and cost structure. Some competitive service overlap occurs among the modes, depending on shipment distance, geography, operating speed and velocity, and customer requirements. To a much larger degree, however, the freight modes complement each other, providing shippers various modal options to match customer service needs and transportation costs (see Figure 1, at right).

Good planning supports objectives and actions to address the unique, specific needs of each jurisdiction. Conversely, some plans minimize certain aspects of transportation planning and modes depending on expertise, knowledge, and senior leadership guidance. Some emphasize bike and pedestrian, greenway, environmental, or safety issues and others focus on general-purpose transportation mobility, complete streets, transit, and bus rapid transit.

Specialized modal planning may focus on aviation systems, freight rail, passenger rail, pipelines, or maritime ports and waterways. Still relatively new are comprehensive multimodal freight mobility plans. Both the Moving Ahead for Progress in the 21st Century Act and the Fixing America's Surface Transportation Act articulated the needs and requirements for states to develop multimodal freight mobility plans. Likewise, MPOs must address and incorporate freight movement into their transportation planning process.

A challenging aspect of transportation planning includes the questions of where to fit freight mobility into the overall, comprehensive plan; how to prioritize freight issues and needs; and how to harmonize

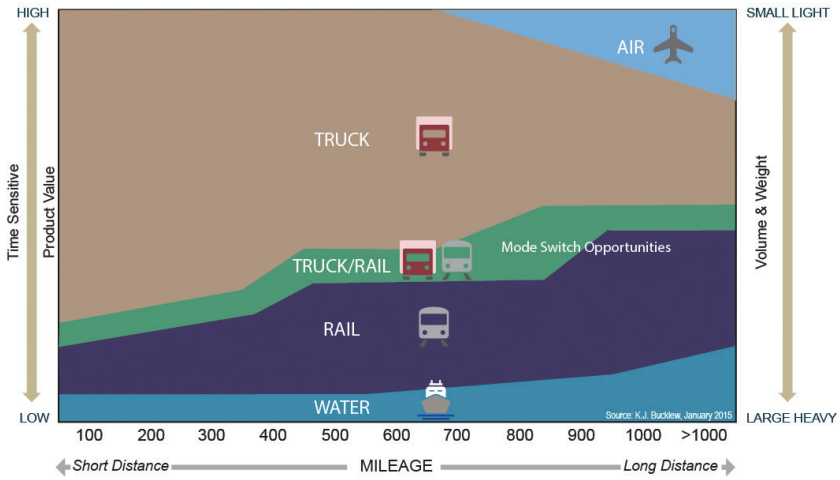

FIGURE 1 Domestic freight modal selection. (Source: Bucklew, 2015.)

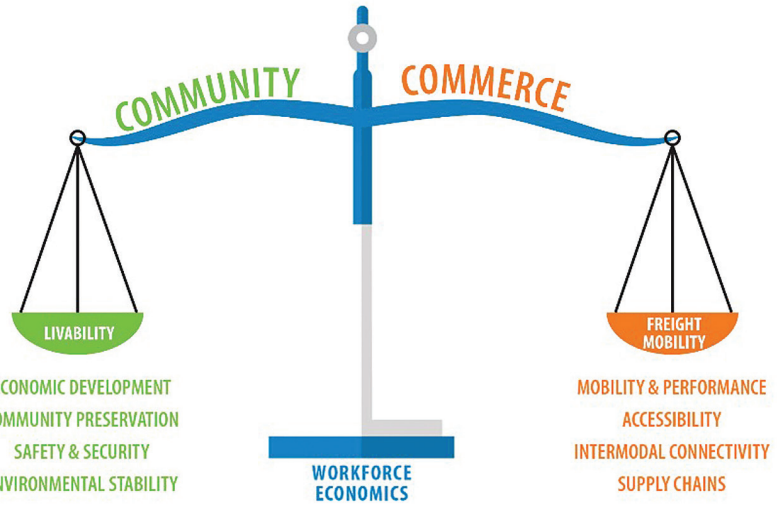

FIGURE 2 Multimodal freight transportation plan: an integrated and balanced approach.

all the modal needs into an integrated, synchronized plan. Such a plan should strive for balance among all the competing needs and issues. All these needs and issues are important but should be prioritized.

Community and Commerce in Balance

Communities require an environment that is conducive to a good quality of life. The subjective term "livability" encompasses factors that provide access to markets, such as goods and services and life support; environmental friendliness, such as walkways, bicycle, transit, clean air, and noise mitigation; utilities, such as electricity, sewers, waste removal systems, Internet access, and water; family needs, such as schools, churches, shopping, and entertainment venues; and other needs and conveniences. Freight mobility needs are similar to those of livability, but community and commerce need some separation between them to be effective. Underscoring both is land use; the availability, mobility, and technical skills of the workforce; and economics (see Figure 2, at left).

Since World War II, the national and global population has trended toward urbanization. Goods and services are produced and consumed primarily in urban areas.[1] As such, the urban population demands that community and commerce coexist but do not conflict. A key link in this continuum is freight mobility—the trucks, railroads, barges, ships, aircraft, and pipelines that move goods and commodities to meet consumer demands. The challenge for the transportation planner is to find a balance between community needs and commercial needs that satisfies all. Because no two jurisdictions are alike, this balance will vary among states and MPOs.

Communication between private-sector freight stakeholders and public-sector residents is key. No solution is one-size-fits-all—every state or community is different and has different needs. As society becomes more urban, people have less private space

[1] Agriculture remains the rural industry of choice because of specific land, water, and environmental requirements.

PHOTO: JAXPORT, FLICKR

Cargo moves between ships and rail at the Talleyrand Marine Terminal, operated by the Jacksonville Port Authority. Multimodal plans often take into account a region's specialized needs and requirements.

for personal enjoyment and rely more on shared public space to fill their recreational and social needs. Similarly, residential space in the urban environment is dense; often, freight needs and livability needs compete for the same geography and transportation infrastructure.

Developing a holistic transportation plan—one that addresses community and commerce needs—requires information, stakeholder involvement, and the understanding that trade-offs must be made.

Continuous Planning

Every day is freight day—freight planning must be continuous to stay ahead of the dynamic, ever-changing freight mobility environment.

As Dwight D. Eisenhower often stated, "Plans are worthless, but planning is everything."[2] Simply, the risk is that plans may not result in what was expected. A good transportation plan should incorporate plausible future scenarios that facilitate options. At best, transportation plans are an 80-percent to 90-percent solution at the time of adoption. As time passes, these plans become dated and must be revised periodically to stay relevant. Because of this, states and MPOs have implemented planning processes that allow for continuous planning.

The transportation plan is only the first step in establishing an ongoing transportation planning process, which must be flexible and adaptive to be effective. Plans have an inherent level of risk and uncertainty, and that risk should be managed via a planning process—one linked to implementation—that continually assesses the array of possible future scenarios. Implementation of the plan can be daunting and challenging, but it is an ongoing activity—as is maintaining a continuous planning process (Figure 3, at right).

Battle Rhythm

The U.S. Army coined the phrase "battle rhythm" and has used this process for many years to articulate the continuous flow of planning and operations necessary to maintain combat momentum: a deliberate sequence of events—planning, administration, intelligence, operations, logistics, communications, and more—to synchronize current and future activities. In essence, battle rhythm is a continuous planning process, albeit flexible and adaptive. A key ingredient to the success of the battle rhythm process is that planners and operators communicate and collaborate on planning efforts so that the Army does not lose momentum on the battlefield, which is critical for operational success.

[2] From Remarks at the National Defense Executive Reserve Conference, November 14, 1957.

FIGURE 3 Freight plan implementation.

Transportation plans come and go, often conceived after the enactment of a federal reauthorization bill. Federal funding is a major source of state and local resources, so these agencies are somewhat encumbered to develop plans that meet federal requirements. Because of this, the plan has a finite life. A continuous planning process, however, is flexible; can incorporate changing needs, issues, and requirements; and facilitates trends, allowing agencies to maintain momentum. A synchronized transportation rhythm that ties planning directly to investment and development could create a nearly seamless process that provides momentum for implementation.

The comprehensive transportation plan should focus on an agency's strategy, goals, objectives, and performance measures, and should establish the investment methodology and process. Continuous planning then focuses on monitoring needs and issues, measuring the transportation system per-

Photo: Roy Luck, Flickr

A train carries ethanol across Texas. State transportation planning requires the assessment of state needs and the prioritization of programs and projects.

formance, evaluating policies and programs, identifying solutions (that is, projects) to needs, selecting and prioritizing projects, and matching funding and financial options. The comprehensive plan also guides development of specific modal plans and corridor studies.

Real-World Examples

Several states have an ongoing transportation planning process. Florida and Texas regularly review projects, programs, and policies to ensure that higher-priority needs are being addressed. Although these DOTs have different planning rhythms, these rhythms are tailored to their specific requirements and to the needs of freight system users. The characteristics of successful ongoing planning include private-sector stakeholders and a process that is openly understood, or transparent.

Some MPOs, such as the Delaware Valley Regional Planning Commission, keep a continuous focus on how the region can set the conditions for freight mobility efficiency and reliability. Other states and MPOs are moving beyond periodic planning to a process that involves integration with regular performance management—that is, monitoring and measuring—and, in turn, continuous or more-frequent planning.

Most, if not all, state freight plans seek to solve various local needs in a collective sense. The Kansas Freight Plan describes the state's transloading facility program. Each locally identified need—approximately 60—are scattered throughout Kansas. Thus far, the state has initiated two transloading facilities designed to transfer bulk grain from trucks to rail cars. The focus of this public–private partnership program is economic development, because it supports agribusinesses' need to choose between truck and rail to meet customer demands and to reduce freight transportation costs.

TABLE 1 Changes in Freight Perspective

Legacy	Today
Regulatory	Economic development
Safety	Competitiveness
Capacity needs	Investment prioritization
Moving vehicles	Moving people and freight
Vehicle volumes	System performance
Separate modal networks	Integrated freight system
Separate modal movements	Intermodal connectivity
Individual jurisdictions	Commerce corridors
Independent decisions	Partnership with users
Reactive	Proactive

Key Components

Although multimodal freight plans have been widely accepted thanks to federal reauthorization bill mandates and forward-thinking freight champions, these plans are relatively new to the transportation-planning curriculum. Three key aspects have propelled freight planning to the forefront of transportation innovation, however:

PHOTO: MAUREEN, FLICKR

The Trans-Alaska Pipeline. Multimodal planning must incorporate all freight transportation modes.

◆ **Freight planning is multimodal**. It incorporates all freight transportation modes: trucking, rail, marine, aviation, and pipelines, as well as the intermodal connectivity between modes. Freight planning also includes economic development, workforce mobility, safety, and environmental needs in creating an implementation plan that prioritizes investments and policies.

◆ **Private-sector stakeholders—users of the freight system—are included in the development of the multimodal freight plan**. The private sector comprises the bulk of the membership of state and MPO freight advisory committees (FACs). The FAC advises on freight mobility issues and needs from a user perspective and is a source for recommending projects, policies, and programs to enhance freight mobility. This public–private partnership infuses the freight plan with enhanced knowledge, experience, modal diversity, geographical representation, and, most importantly, better solutions.

◆ **Every day is freight day**. Supply chains are dynamic, economic conditions are fluid, funding is volatile, and freight must move. As such, agencies and freight planners are realizing that freight mobility requires them to think differently and to focus more on functionality and the user's perspective. Legacy factors still must be considered, but in service of developing a more efficient, reliable, and safer transportation system (Table 1, page 36).

Forward-Thinking Planning

Intelligent transportation systems (ITS) and information technology (IT) have developed at a rapid pace. The variety of options can be chaotic and disruptive, but ITS and IT can act as capacity multipliers. Instead of transportation agencies building their way out of congestion, they can use less-costly solutions to operate their way out of these issues. Big-data sources, utilized with new analytical methods and tools to manage and integrate multiple datasets, can provide timely data and more accurate information to support recommendations. All of this requires continuous planning to incorporate and meld ITS and IT solutions and big-data analysis into capacity investments and maintenance–preservation projects (Table 2, at right).

The future requires transportation planners to be holistic, forward thinking, collaborative, and innovative, and to know and understand how transportation system users operate. Gone are the days when a planner handed the plan to engineers and moved on to the next plan—planners are architects that must remain engaged in a continuous process. Planning is the skill of seeing the future now. As the adage goes, "it wasn't raining when Noah built the ark."

TABLE 2 Freight Mobility Technology

Clean Energy	• Alternative fuels: natural gas (CNG and LNG), propane, hydrogen, electric and battery operation • Aerodynamics: improved components
Routing and Wayfinding	• Satellite-based navigation • Online mapping • Route optimization and dispatching models
Safety and Regulatory	• Electronic logging devices • Positive train control • Weigh-in-motion
Security	• Cargo and container detection systems
Operational	• Digital FTL freight brokers (e.g., Transfix) • Robotics and automation • Off-hour delivery
Smart Infrastructure	• Electronic sensors • Autonomous (gantry) loading • Vehicle-to-infrastructure communication
Communications	• Satellite-based (e.g., Qualcomm) • Telematics
Vehicles	• Truck platooning • Autonomous vehicles • Urban delivery trucks • Flex barges • Automomous container ships • Hyperloop • Cargo airships • Self-operating barges • Vehicle-to-vehicle communications • Drones • Freight Shuttle System
Management Systems	• Internet of things • Supply chain dynamics, just-in-time delivery • Cargo radio-frequency identification • Barcoding • Vehicle tracking devices • Fuel optimization models • Artificial intelligence

NOTE: CNG = compressed natural gas; LNG = liquefied natural gas; FTL = full truckload.