

# National Network for Trucks: Development, Performance, and Outlook

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## ABSTRACT

The Surface Transportation Assistance Act (STAA) of 1982, as amended, contains provisions that concern the length, weight, and width of commercial motor vehicles. By enacting STAA Congress preempted state authority completely with respect to width and partly with respect to length. Congress also extended length and width controls to those portions of the Federal-Aid Primary system designated by the Secretary of Transportation. The STAA also requires the states to provide access for commercial vehicles from the Interstate and other designated highways to terminals and facilities for food, fuel, repair, and rest, and for household goods carriers to points of loading and unloading. In this paper the development of the networks is explained, some observations on how well the system is working are presented, forthcoming changes are described, and some speculation about the near future is offered.

If Paul Revere had been alive in 1983 and had felt compelled to warn the people of the New England countryside of a threat to their way of life, he might well have borrowed a 1965 Plymouth with loud speakers on the roof from a fundamentalist preacher and with shrieks of hysteria sounded the alarm that "the doubles are coming, the doubles are coming."

There have been few issues in recent time that have tested federal-state relations, strained old friendships, and evoked such public outcry as the federal law that allows larger trucks to operate on certain highways. And, although the dust is beginning to settle after two years, it has been costly. The FHWA has been in a federal district court more than 10 times (twice as plaintiff), and one case is still pending. Thousands of pieces of correspondence, which have required untold thousands of person-hours to answer, have been received at FHWA headquarters and field offices. Federal Register issuances pertaining to the large truck network totaled more than 20 as of July 1985, an unprecedented average of almost one every 1 1/2 months; and hundreds of unanswered questions, which will require the dedication of resources for the next decade to fully answer, have been raised. Perhaps a little history is in order.

On January 6, 1983, the Surface Transportation Assistance Act (STAA) of 1982 became law. Several provisions of the law concern the length and weight of commercial motor vehicles. On April 6, 1983, the STAA was amended to include truck width provisions.

Before the enactment of these laws, federal involvement in these areas was limited to matters involving permissible maximum vehicle weights and widths and was limited in applicability to the National System of Interstate and Defense Highways.

The changes created by the STAA have been dramatic because, as far as the Interstate system is concerned, Congress has preempted state authority completely with respect to width and partly with respect to length. Congress also extended length and width controls to those portions of the Federal-Aid Primary (FAP) system designated by the Secretary of

Transportation. The secretary has been authorized to seek injunctive relief as the method of enforcing these provisions.

The dimensional limits established by the STAA include

1. Weight--All states must now allow on the Interstate system 20,000 lb on a single axle, 34,000 lb on a tandem axle, and a gross weight limit determined by the bridge formula with a cap of 80,000 lb. The bridge formula develops a maximum gross weight by taking the number of axles and their spacing into account.

2. Width--All states must establish a 102-in. width limit, excluding safety devices, applicable to what is now called the National Network, which will be fully explained later in this paper. All but three states (Connecticut, Hawaii, and Rhode Island) had to enact legislation on this issue to come into conformance.

3. Length--All states must allow on their portion of the National Network:

- A 48-ft semitrailer in a tractor-semitrailer combination; however, semitrailer lengths in normal, nonpermitted use on December 1, 1982, must continue to be allowed.

- A tractor-semitrailer-trailer or "doubles" combination vehicle. This has now been interpreted by the U.S. Department of Transportation (DOT) as including tractor-semitrailer-semitrailer vehicles in order to allow the use of new coupling methods for the units.

- Twenty-eight-foot trailer and semitrailer units as a part of "doubles." Twenty-eight-and-one-half-foot-units in legal operation within a 65-ft overall length limit on December 1, 1982, must also be allowed. However, more than 97 percent of these particular units belong to one company, and they are phasing them out in favor of the 28-ft units.

- Tractor-semitrailer and tractor-semitrailer-trailer (or second semitrailer) to operate without being subject to an overall length limit.

this list of conditions in effect just before passage of the STAA.

- Eleven states had semitrailer limits of less than 48 ft; 38 states had no semitrailer length limit but governed the combination by an overall length limit.
- Fifty states and the District of Columbia had overall length limits on tractor-semitrailer combinations applicable to what are now National Network highways.
- Twelve states and the District of Columbia did not allow doubles to operate at all; 11 states that allowed doubles restricted their movement to certain highways or required permits.
- Thirty-eight states had overall length limits on doubles applicable to what are now National Network highways.

Obviously, the length provisions of the STAA required at least some regulatory changes in almost every state.

Finally, the STAA also requires that the states provide access for commercial motor vehicles from the Interstate and other designated roads to terminals and facilities for food, fuel, repair, and rest, and for household goods carriers to points of loading and unloading.

In this paper the development of the networks is explained, some observations on how well the system is working are presented, forthcoming changes are described, and speculation about the near future is offered.

#### NATIONAL NETWORK

The STAA mandates that the full Interstate system be available for the operation of commercial vehicles of the dimensions authorized. In addition, the Secretary of Transportation was required to designate qualifying Federal-Aid Primary (FAP) system highways on which the larger vehicles must be allowed to operate. The term "National Network" was coined to designate the combination of the Interstate system and those portions of other FAP highways on which commercial vehicles of the dimensions authorized by the STAA would be permitted to operate.

The FHWA could have undertaken the designation process solely as a federal initiative without input from the states. This option was quickly dismissed. In the highway program that has existed since 1916, policy and practice have always been matters of state initiation and federal review and, if appropriate, approval. Thus the FHWA decided to designate a network in cooperation with the states. Cooperation with the states in this exercise was essential because the FHWA (headquarters, regions, or divisions) does not maintain files on the detailed geometrics of the highway system. Further, the FHWA is not staffed to undertake such a detailed task covering the 256,000 mi of the non-Interstate FAP system.

Two distinct approaches were available for drafting the message to be communicated to the states through the initial policy statement. One approach was to designate the entire FAP system in each state and let the states request removal of all mileage that they believed was unsafe for operation of the larger vehicles. The second approach was to designate only those FAP routes that met the highest standards, namely multilane, divided, full-control-of-access facilities, and let the states propose additions to this system that they believed were safe for the operation of the larger vehicles. The final decision was to adopt the second approach because it fit the traditional pattern of the federal-state relationship

and it was anticipated that all states would cooperate in the development of a consistent interim network. The goal of the FHWA was to designate a consistent system that could safely accommodate these vehicles. Under either approach, FHWA viewed the FAP system as a generic class that could safely accommodate the larger vehicles.

The responses from the states varied greatly. For example, 13 states recommended 100 percent of their FAP systems, 6 states recommended more than 50 percent of their FAP systems, and 11 other states recommended from 10 to 50 percent of their FAP systems. The remaining 22 states recommended from 0 to 10 percent of their FAP systems. Furthermore, several of the lean submissions consisted of short and unconnected segments. In total, the states initially recommended about 38 percent of the non-Interstate FAP system, or approximately 96,000 mi.

Many states appeared unresponsive to FHWA policy statements of February 3 and March 10, 1983, and because of the extremely limited networks proposed by those states, it appeared that Interstate commerce would be impeded. The FHWA decided to supplement the recommendations of the states.

On April 5, 1983, the FHWA published the interim National Network for the larger vehicles. The 96,000 mi recommended by the states and accepted by FHWA were supplemented by an additional 40,000 mi selected by the FHWA. To emphasize the interim nature of the network and the continuous refining process that the FHWA had earlier announced, the April 5 publication also offered an opportunity to request exceptions to the interim network.

Thus was set in motion a process that was designed to refine the interim network, relying heavily on the judgment of and input from the state highway agencies.

Also immediately following the April 5 publication, the states of Alabama, Florida, Georgia, Pennsylvania, and Vermont requested U.S. District Courts to enjoin the designation of all highways on the interim network that had not been recommended by the individual states. In response the FHWA removed from the interim network all routes not recommended by the five states. These cancellations resulted in a reduction of 8,800 mi.

Between April 5 and July 8, 1983, the FHWA actively sought recommendations for revisions to and did revise the interim National Network. The result was an interim network in 32 states and the elimination of more than 7,200 FAP system miles. Furthermore, the total cancellation of FHWA-designated mileage in Alabama, Florida, Georgia, Pennsylvania, Vermont, and later Connecticut (due to litigation brought by FHWA against Connecticut) resulted in a reduction of more than 9,000 mi.

This refined and reduced network of approximately 162,000 mi was subsequently offered for public comment in the September 14, 1983, Notice of Proposed Rulemaking (NPRM). As a result of public comments and recommendations by state highway agencies, further additions and deletions were made that resulted in a net addition of about 19,000 mi for a total of approximately 181,000 mi.

As of June 5, 1984, 181,000 mi of FAP routes were open to vehicles authorized by the STAA.

#### 12-FT LANES

The final National Network is undergoing an additional formal examination that has the potential for causing some adjustment involving the inclusion of segments with less than 12-ft lanes.

In part because of language in a Memorandum Opinion issued March 27, 1984, by the U.S. District Court

for the District of Columbia in a suit challenging interim designations of highways open to STAA vehicles, the preamble to the June 5, 1984, Final Rule proposed to establish a definition for the statutory term "highway with traffic lanes designed to be a width of twelve feet or more," and requested comments. In October 1984, Congress passed the Tandem Truck Safety Act (TTSA) of 1984. Section 105 of the TTSA amended the STAA to provide the FHWA the authority to designate FAP system highways for use by 102-in-wide vehicles, if such designation is consistent with highway safety.

This amendment clarified the authority of the FHWA to designate highways with less than 12-ft-wide lanes and disposed of the need to define further the phrase "highways with traffic lanes designed to be a width of twelve feet or more."

In accordance with the TTSA the FHWA is again reviewing those highways that have sections with less than 12-ft lanes that were designated in the June 5, 1984, rule to determine their suitability for STAA vehicles. Only 2,200 mi of the 181,000-mi network are involved in this review. Those that are inadequate will be removed or improved.

#### REASONABLE ACCESS

"Reasonable access" is another term from the STAA that has caused major consternation in some states. The STAA provides that states may not deny reasonable access to vehicles of the weights and linear dimensions authorized by the STAA between the National Network and terminals or service facilities. The September 14, 1983, NPRM stated the intent of the FHWA to allow the states to establish individual reasonable access provisions. The subsequent comments did not reveal evidence that the states would not provide reasonable access; thus the intent of the NPRM was retained in the Final Rule.

The FHWA continues, however, to monitor the access policies of the states. Should the FHWA determine a state's position to be unreasonable, it has the authority to seek injunctive relief.

The following list indicates the variety of policies that have been established to define reasonable access:

- Twenty-one states allow essentially unlimited access;
- Ten states allow from 2 to 20 mi;
- Four states allow 1 mi or less with no provisions to go farther;
- Two states have not yet established an access policy;
- One state allows access to all terminals via the shortest practical route;
- Nine states have a limited free access of from 1/2 to 2 mi for food, fuel, and lodging, but require permits for all terminal access; and
- Five states have a terminal access system that requires terminals to apply for access rights; the state evaluates the service road and either grants or rejects access; if access is granted, this route is publicized.

The FHWA is especially concerned with the provisions requiring permits for all access or that allow non-permitted access for only very restrictive distances such as 1/4 mi or less.

#### TANDEM TRUCK SAFETY ACT

In addition to the 12-ft lane clarification, the TTSA contains two other significant provisions.

First, the act allows 28 1/2-ft "pup" trailers the same access as household goods carriers (i.e., to any point of loading or unloading). Second, a mechanism was established whereby certain Interstate segments may be withdrawn from the National Network.

Historically local motor carrier pickup and delivery operations have been conducted using substantially the same equipment used for over-the-road operations. In the past this meant an 18 wheeler that included a semitrailer that was nominally 45 ft long by 96 in. wide. Most companies now plan to use the individual 28- or 28 1/2-ft trailers allowed in a doubles combination for pickup and delivery after splitting the STAA-authorized combination at the terminal. This should improve local traffic flow because even though these vehicles will be an imperceptible 6 in. wider, they will be a quite perceptible 17 ft shorter.

The TTSA also gives the Secretary of Transportation the authority to exempt sections of the Interstate system from the National Network. Originally the STAA had mandated that the entire Interstate system be opened to STAA vehicles. This meant that several segments, primarily older, urban sections, built to less than current Interstate design standards, were to be made available to these vehicles at the same time as newly built wide-open rural segments. Many of the urban segments antedated the Interstate system and were subsequently included as logical connecting links but have not been updated to current Interstate design standards.

The decision to excluded a section of the Interstate can be based on the request of a governor or on the secretary's own initiative.

In requesting an exemption a governor must consult with the local government or governments involved and, if appropriate, the governor of any neighboring state concerned. Any request must show consideration of alternate routes and include specific evidence of safety problems. In acting on an exemption, the secretary must follow a notice and comment procedure through the Federal Register.

The FHWA is now in the process of developing specific regulatory instructions for both Interstate exemptions and pup-trailer access.

#### NETWORK PERFORMANCE

As a cook would say, the real test is in the tasting. In the case of the National Network, what's happening? Let us look at it from three perspectives: combination truck traffic, industry conversion, and safety experience.

• Truck traffic--Indications are that the trucking industry is switching to vehicles with the larger dimensions to take advantage of the increased payload, and this is resulting in a reduction in the overall vehicle miles of travel (VMT) by combination vehicles. VMT of combination trucks has increased by more than 32 percent since 1975, but because all other vehicle VMT has likewise increased, the combination truck share of total VMT has remained at a steady 3.5 to 3.8 percent since 1975. Although exact data are not available for STAA-dimensioned vehicles, it is estimated that by 1990 the total VMT for all trucks will be 1.2 percent less than it would be if the STAA had not been passed. Included in this estimate is the prediction that VMT of tractor-semi-trailer combinations will decrease by 20 percent, but that VMT of 28-ft double combinations will increase by 25 percent. From the safety perspective this means less exposure of automobiles to large trucks and, it is hoped, fewer truck-involved accidents.

• Industry conversion--The Truck Trailer Manufacturing Association indicates that more than 75 percent of current van production is of 48-ft semi-trailers, 102 in. wide. The remainder is of different lengths, but almost all are 102 in. wide. Equipment orders for STAA dimensions exist at an estimated value of more than \$1 billion. Many carriers are aggressively changing fleet dimensions. Roadway, for example, has committed \$200 million to upgrade its fleet to 15,000 twin trailers, 102 in. wide, by 1986. In 1983 United Parcel Service had approximately 1,000 trailers 102 in. wide. By the end of 1984 that number had increased to 3,000. Obviously, the industry has confidence in the network and intends to use it and take advantage of the productivity gains it offers.

• Safety experience--Much of the concern heard by the FHWA pertains to a perception that the larger dimensioned trucks, and especially the doubles, are less safe than are conventional sized trucks. Experience to date, though limited, shows the opposite. On the basis of 1984 data from six states that agreed to watch closely the twin trailer experience and to report accident data to the FHWA, both the fatality rate and the nonfatal injury rate per 100 million VMT for multitrailer trucks was about one-half that of single-trailer trucks. The FHWA has asked all state highway departments to revise their accident recording systems to include separate classifications of the STAA-authorized vehicles in order that accurate surveillance and experience can be analyzed and evaluated.

#### THE FUTURE

National uniformity in all aspects of trucking operations has long been a goal of the trucking industry. On the other side of the coin, the individual states have been necessarily provincial in their outlook, seeking to protect local industry and shippers. If at any time these two philosophies coincided, it was strictly coincidental.

By enacting the STAA, Congress has come down on the side of the trucking industry in the first battle over uniformity.

In the years to come, industry is likely to continue pressing for more uniformity, but that uniformity, no matter what the issue, is always to be at increasing levels, limits, or amounts. In commenting on these proposals, the traffic engineering community must be able to respond with factual information about the operation and effect of existing vehicles and sound estimates of what longer and larger vehicles are likely to do.

The FHWA has under way several research studies that are designed to provide some information about many unanswered questions, including

• "Impact of Specific Geometric Features on Truck Operations and Safety at Interchanges," which

will help improve interchange designs through updated offtracking models and turning templates;

• "Operation of Larger Trucks on Roads and Streets with Restrictive Geometry," which will provide criteria for the safe operation of large trucks on local roads and streets and suggest under what conditions the larger trucks should be allowed or prohibited; and

• "Techniques for Improving the Dynamic Ability of Multi-Trailer Combination Vehicles," which involves the development of improved dollies or coupling devices.

These three studies are scheduled for completion within the next 12 months. Additional studies scheduled for later completion include

• "Effectiveness of Truck Roadway or Lane Restrictions," which examines current truck lane roadway restrictions, such as prohibiting trucks from using certain lanes of a multilane highway, to determine their impact on operations and safety;

• "Safety Implications of Various Truck Configurations," which will examine several possible near-term changes in size and weight limits that may influence future truck design; and

• "Safety Criteria for Multi-Trailer Highway Network," which will determine what controls are necessary to ensure the safe operation of even longer combination trucks on the Interstate system nationwide.

These projects should be completed in the next 2 years.

Currently only 60 percent of the eligible Federal-Aid mileage is available to STAA-authorized vehicles. As economic pressures mount from the trucking industry, and as research and experience expand the body of knowledge on operational and safety requirements, an expansion of the National Network can be expected.

The transportation engineer is being pulled in two directions. The large truck interests want access to their terminals and other points of loading and unloading now. The public wants to be protected. How are access and productivity gains to be balanced against safety? Perhaps research and experience will provide some tools for use in making these determinations. In the meantime, the FHWA would welcome any assistance or advice in any area pertaining to large truck operations.

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