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16. ABSTRACT

This summary report describes a study that defines the overweight container problem within Washington State and the national level. The study reviews various approaches to the problem as well as potential solutions. Intermodal containers can meet internationally agreed-upon weight limitations (International Standards Organization (ISO)) and industry specifications for ships, cranes, railcars, or barges; however, when they are placed on a truck, they may violate the federal weight limits. Export containers pose a more serious problem than do import containers. About 24 percent of export containers moving through Washington's seaports, and 12 percent of import containers exceed maximum weight limits. The study concludes that resolution of this problem would require a uniform federal policy at the national level. The availability of accurate container weight information throughout any given journey is critical. Such information can be used by ports or the Electronic Interchange System to identify violators. Most overweight containers can meet legal requirements with the use of special chassis. Encouragement of the use of such equipment should be a policy priority. Special corridors that are not subject to weighing requirements in the vicinity of ports should eliminate some of the problem, particularly for rail containers. Any enforcement measures should, however, consider the impact on the efficiency of the transport system, the competitiveness of the state's seaports, and the impact on the trade.

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Research Project T9233, Task 11
Overweight Containers

OVERWEIGHT CONTAINER STUDY

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INTRODUCTION AND RESEARCH APPROACH

Containerization has become the dominant method of transporting general cargo commodities in international trade. In 1990 over 84 million 20-foot equivalent unit (TEU) containers were handled world wide, and 15.3 million were transferred through U.S. ports alone. Last year the two largest ports in Washington State — Seattle and Tacoma — combined to handle about 2 million TEUs. The deregulation of the trucking industry and the railways in 1980 and the U.S. Shipping Act of 1984 advanced the development of intermodal movement of containerized cargo in domestic and international trade.

Despite the rapid progress of containerization and intermodality, the U.S. freight transport system is still struggling with the basic issue of overweight containers. A study conducted by the Federal Highway Administration revealed that between October 1987 and September 1988 more than 1 million containers, or 33.5 percent of the containers in the sample, carried weights that could violate federal vehicle weight laws.

Overweight containers are said to interfere with road safety and generate excessive wear on roads and bridges. Yet the issue is more complicated. It involves a wide range of players in international and domestic trade, transport, and logistics, from shippers to trucking companies, seaports, and shipping lines. In the last several years the issue has attracted considerable attention and remedial efforts from organizations such as the Federal Highway Administration, the American Trucking Association, the American Association of Port Authorities, and the Federal Maritime Commission.

Washington State serves as a gateway to the Far East and Alaska on one side and to the Midwest and the East Coast on the other. Although many containers are transported by rail, a large number of containers move within the state and across its boundaries by truck.

Although the overall overweight truck problem is not solely an overweight container problem, this study addresses only the issue of intermodal containers. The

objectives of the study were to define the problem of overweight containers and its significance on the national and the state levels, to review potential solutions to the problem, and to evaluate the impact of these solutions, particularly on Washington State, and its container ports.

FEDERAL AND STATE VEHICLE WEIGHT LIMITS

OVERWEIGHT CONTAINER — PROBLEM DEFINITION

The current Federal mandatory weight limits for highway vehicles were established by the Surface Transportation Assistance Act (STA) of 1982. The Act required all states to increase their single-axle limits to 20,000 pounds, their tandem-axle limits to 34,000 pounds, and their gross weight limits to 80,000 pounds. Safety and excessive damage to highway pavement and bridges are among the main reasons behind these limits. The Act also required all states to conform to the Bridge Formula, whereas Before the Act, states were only encouraged to do so. (The bridge formula calculates the gross vehicle weight as a function of the number of axles and the distance between them. Commonly, the bridge formula weight limits are reached before the allowable maximum gross weight limits have been reached.) Nevertheless, the STA Act of 1982 has not been rigidly applied in all states.

Any vehicle that carries more weight than these limits violates federal weight limits and is considered overweight. The overweight problem is not solely related to containers. Weight limits apply to the entire trucking industry. However, the problem of overweight containers has unique characteristics. A demonstration of container weighing conducted in 1988 showed that the average cargo load limitations necessary to comply with the federal bridge formula were 37,000 pounds for a 20-foot container (on a 23-foot chassis) and 44,000 pounds for a 40-foot container (on a 40-foot chassis). Heavier payloads could cause the vehicle transporting it to exceed the federal weight limits, and the container could be considered "potentially" overweight unless it was transported on a special chassis.

One of the critical issues of overweight containers in the intermodal transportation stems from the fact that many of the potentially overweight containers can legally travel on board a ship, a barge, or a railcar and meet the International Standards Organization

(ISO) maximum payload restrictions. Only when these containers are loaded on trucks do they exceed the federal limits. The ISO limits include a maximum payload of 47,740 pounds for a 20-foot container and 58,470 pounds for a standard 40-foot container. The ISO allowable limits exceed the maximum payload weight allowed by federal limits by 29 percent for a 20-foot container and by near 33 percent for a 40-foot container.

The overweight container is not only a truck operator problem, and it is not isolated to any single state. The issue is much wider in scope. Container weight is a national issue involving domestic, as well as international, intermodal container trade. The origins or destinations of many of the intermodal containers are beyond the boundaries of this country. Large numbers of parties, domestic and foreign, are involved in a single container journey throughout the intermodal transport chain.

EXEMPTIONS AND PERMITS

Despite the uniform weight limit requirements in the Surface Transportation Assistance Act of 1982, many trucks legally exceed the federal axle weight limits or the gross weight limit because of the grandfather exemption. The different states' limits are summarized in **Table 1** (1). This table does not represent all of the complex and relevant laws and regulations in individual states. Currently, seven states allow single-axle weights to be over 20,000 pounds without special permits. None of these are west coast states. Eight states allow tandem-axle weights over the 34,000-pound limit, and Michigan and New Mexico allow trucks over the 80,000-pound federal limit.

All the states have permit systems that allow trucks to exceed the federal and state limits in special circumstances. In many cases the permit is granted for a large, nondivisible shipment, such as a power generator, but in about half the states permits are granted for divisible commodities. Over 1 million permits a year are granted in the U.S. for divisible loads.

Table 1. Summary of State Weight Limits as of January 1988 (ATA 1988)

State	Axle Limits (lb)			Tire Width (lb/in.)	Gross Weight Law or Type of Restriction	Maximum Allowable Gross Weight (lb)	
	Single	Tandem	Triple			Interstate	Other Roa
Alabama	20,000	34,000	42,000	NS	Formula B	80,000	88,000
Alaska	20,000	34,000	42,000	550	Formula B	—	109,000
Arizona	20,000	34,000	42,000	NS	Formula B, Table A[a]	80,000	80,000
Arkansas	20,000	34,000	54,000	NS	Formula B[b], specific limits	80,000	80,000
California	20,000[c]	34,000	34,000	NS	Table B	80,000	80,000
Colorado	20,000	36,000	54,000	NS	Formula B, Table A[a]	80,000	85,000
Connecticut	22,400[d]	36,000[d]	53,800	600	Formula B, specific limits	80,000	80,000
Delaware	20,000	34,000	42,000	NS	Formula B, specific limits[e]	80,000	80,000
District of Columbia	20,000[f]	34,000[f]	42,000	NS	Table A	80,000	80,000
Florida	22,000	44,000	66,000	600	Table A and Formula B[g]	80,000	80,000
Georgia	20,340	34,000[h]	42,500	NS	Formula B	80,000	80,000
Hawaii	20,000	34,000	42,000	NS	Formula B, specific limits[e]	80,000	88,000
Idaho	20,000	34,000	42,000	600[i]	Table B	80,000	105,500
Illinois	20,000	34,000	42,000	NS	Table B, Table A[a]	80,000	73,280
Indiana	20,000	34,000	34,000	800	Formula B	80,000	80,000
Iowa	20,000	34,000	42,000	NS	Formula B	80,000	80,000
Kansas	20,000	34,000	42,000	NS	Formula B	80,000	85,500
Kentucky	20,000[d]	34,000[d]	50,000[d]	600	Specific limits	80,000	80,000
Louisiana	20,000[d]	34,000[d]	42,000	650	Specific limits	80,000	80,000
Maine	20,000	34,000	42,000	600	Formula B[c]	80,000	80,000
Maryland	20,000	34,000	42,000	—	Formula B	80,000	80,000
Massachusetts	22,400	36,000	54,000	800	Formula B	80,000	80,000
Michigan	20,000	34,000	39,000	700	Formula B	149,000[j]	154,000[j]
Minnesota	20,000	34,000	42,000[k]	600	Formula B, Table A[a]	80,000	73,280
Mississippi	20,000	34,000	42,000	550	Formula B	80,000	80,000
Missouri	20,000	34,000	34,000	NS	Formula B, Table A[a]	80,000	73,280
Montana	20,000	34,000	42,000	600[l]	Formula B	80,000	80,000
Nebraska	20,000	34,000	42,000[m]	NS	Table B	80,000	95,000
Nevada	20,000	34,000	42,000	NS	Formula B	80,000	109,000
New Hampshire	20,000[d]	34,000[h]	34,000	600	Formula B	80,000	80,000
New Jersey	22,400	34,000[d]	56,400[f]	800	Formula B	80,000	80,000
New Mexico	21,600[c]	34,320	34,320	600	Table A	86,400	86,400
New York	20,000	34,000[d]	42,500[n]	800	Formula B[o], Table A	80,000	80,000
North Carolina	20,000	34,000	57,000	NS	Formula B	80,000	80,000
North Dakota	20,000	34,000	42,000	550	Formula B	80,000	105,500
Ohio	20,000	34,000	48,000	650	Table A	80,000	80,000
Oklahoma	20,000	34,000	42,000	NS	Table B	80,000	90,000
Oregon	20,000	34,000	42,000	600	Table B	80,000	80,000
Pennsylvania	20,000	34,000	42,500	800	Formula B[b]	80,000	80,000
Rhode Island	22,400	44,800	NS	NS	Specific limits	80,000	80,000
South Carolina	20,000[d]	35,200[d]	39,600[i]	600[i]	Table B[p], specific limits	80,000	80,600
South Dakota	20,000	34,000	42,000	600	Formula B	80,000	129,000
Tennessee	20,000	34,000	42,000	NS	Formula B	80,000	80,000
Texas	20,000	34,000	42,000	650	Table B	80,000	80,000
Utah	20,000	34,000	42,000	NS	Table B	80,000	80,000
Vermont	20,000	34,000	55,000	600	Table B	80,000	80,000
Virginia	20,000	34,000	42,000	650	Table B	80,000	80,000
Washington	20,000	34,000	42,000	600	Table B	80,000	80,000
West Virginia	20,000	34,000	42,500[n]	NS	Table B	80,000	80,000
Wisconsin	20,000	34,000	42,000	NS	Table B	80,000	80,000
Wyoming	20,000[c]	36,000	42,500	600[l]	Formula B, specific limits[e]	80,000	117,000

NOTE: NS = not specified.

[a] Table A applies off Interstates, primary highways, and certain other defined routes: check with state.

[b] Formula B applies over 73,280 lb gross weight.

[c] Steer axle limits: California, 12,500 lb; New Mexico, 10,000 to 12,000 lb; Wyoming, 12,000 to 14,000 lb.

[d] Higher limits allowed off Interstates (including tolerance where applicable).

[e] Specific limits apply off Interstates.

[f] Higher limits allowed on all highways except Interstates.

[g] Formula B applies over 73,271 lb gross weight.

[h] Higher weight limits apply for vehicles over 73,280 lb gross vehicle weight off Interstates.

[i] Vehicles manufactured before July 1, 1987, may carry 800 lb.

[j] Maximum allowable axle weight limited to 13,000 lb with one 32,000-lb tandem axle and an 18,000-lb steering axle.

[k] Requires 9 ft or more of spacing.

[l] Excludes steering axle from limit; Wyoming, 750-lb steering axle limit.

[m] Requires 8 ft or more of spacing.

[n] Requires 8 ft 6 in. or more of spacing.

[o] Formula B applies over 71,000 lb gross weight; under 71,000 lb, Table A.

[p] Table B applies over 75,195 lb gross weight on Interstates.

QUANTIFICATION OF THE OVERWEIGHT CONTAINER ISSUE

In 1989 the FHWA published a study that attempted to analyze the magnitude of the overweight container problem at the national level.(2) To determine the number of international maritime container shipments that could cause vehicles to violate weight limits under the federal bridge formula, the study analyzed data compiled by the Journal of Commerce in the PIERS (Port Import/Export Reporting Services) master files. The PIERS files consist of data recorded from import manifests and export bills of lading for international containerized freight moving through U.S. ports. The definition of potentially overweight containers was determined by a threshold of maximum cargo weight per container, which was based on a test of typical container loading practices conducted at the Port of New York/New Jersey in 1988.

The detailed findings of the PIERS analysis are presented in **Tables 2** and **3.** The major findings were as follows:

- 20-foot import and export containers appeared to be particularly problematic: 40 percent were potentially overweight. Only 17 percent of the 40-foot import containers were potentially overweight.
- Import containers had been assumed to be the major container weight problem, but this was not the case. With 38.3 percent of all 40-foot export containers potentially overweight, the exported containers appeared to present the potential for more violations than the imported ones.
- Nearly half of all potentially overweight 20-foot containers and over half of all 40-foot import containers exceeded their respective weight thresholds by less than 2,000 pounds.
- The top ten commodities most likely to cause violation of the federal weight limits were exports of paper, plastic resins, chemicals, logs and

Table 2. Potentially Overweight Containers in the U.S. (PIERS Data Files)

	Container Size		
	20 ft.	40 ft.	Total
Export			
Potentially overweight	7,709	15, 506	23,215
Number in sample	19,259	40,408	59,667
Potential violation rate	40%	38%	39%
Under 2,000 lbs overweight	45%	32%	
Under 10,000 lbs overweight	97%	83%	
Import			
Potentially overweight	7,448	4,527	11,975
Number in sample	18,588	26,608	45,196
Potential violation rate	40%	17%	26%
Under 2,000 lbs overweight	46%	56%	
Under 10,000 lbs overweight	98%	97%	
Total			
Potentially overweight	15,157	20,033	35,190
Total in sample	37,847	67,016	104,863
Potential violation rate	40%	30%	34%

Table 3. Potentially Overweight Containers on the Pacific Coast*

	Container Size		
	20 ft.	40 ft.	Total
Export	2,994 (23%)	7,398 (56%)	10,392 (79%)
Import	1,946 (15%)	811 (6%)	2,757 (21%)
Total	4,940 (38%)	8,209 62%)	13,149 (100%)

* Distribution of potentially overweight containers by U.S Coast: Atlantic — 51%, Pacific — 38%, and Gulf — 11%. Total = 34,866.

lumbers, animal feed, drilling mud, leather hides, imports of beer, paper, and ceramic tiles.

- Only three of the foreign ports ranked in the top ten for exporting potentially overweight containers were in the Pacific Rim (two in Taiwan and Hong Kong).

The FHWA analysis of the PIERS data was the first attempt to estimate the magnitude of the overweight problem on a national level. However, the findings were limited in several ways. The study considered only international containerized shipments. Domestic traffic was excluded. For Washington State, which has strong trade ties with Alaska and Hawaii, that represents a real omission (at the Port of Tacoma, for example, 38 percent of the containers are domestic). Second, the findings were expressed in terms of potentially overweight containers. Because of the variety of the states' weight limits, permit policies, and grandfather rules, these containers might have violated the laws in some states but not in others. Third, critics questioned the validity of the one day a month and one year sample.

ECONOMIC AND SAFETY IMPLICATIONS OF OVERWEIGHT CONTAINERS

An overweight container threatens roadway safety and damages the transportation infrastructure. Beyond these issues, the problem is more complex. Related complications include factors such as shippers' transport costs, the competitiveness of U.S. goods in a global market, logistical considerations, and even the fines and penalties issued to truck drivers, which draw attention to the issue. Some of these factors are addressed in the discussion on the intermodal transport concept, and others are illustrated through the presentation of various viewpoints toward overweight containers. Three factors will be briefly introduced in this section: economic incentives for overloading, damage to the infrastructure, and safety.

ECONOMIC INCENTIVES FOR OVERLOADING CONTAINERS

There are several economic incentives for illegally overloading shipments:

- In international trade, importers and exporters use marine containers that allow them to load up to the ISO standards for the maritime voyage. These load weights are higher than those allowed for U.S. land transportation, unless special equipment is used. To comply with the federal highway weight limitations for a trip of several miles or several hundred miles, the shipper may have to pay more for a maritime or rail voyage that may stretch over several thousand miles.
- In intermodal transportation, freight rates are often based on the shipping unit, i.e., a per container rate as opposed to a rate based on the weight or volume of the shipment. This practice poses an incentive to load a container to its maximum capacity to save transportation costs. For some low-value commodities, these savings may determine the feasibility of participating in the trade.

- For logistical reasons, sometimes the entire shipment must be included in a single container unit. If the shipment is divided to ensure legal loads, the risk of loss or damage to a consignment may increase. Additionally, if a shipment is divided, part of it may be subject to higher LCL (less than a container load) rates.
- According to a recent study, the economic temptation for a truck driver to illegally load a truck can be considerable in states where the fines for overloading are low and for trips when the probability of apprehension is low (on non-interstate highways). For example, a truck with a 20,000-pound overload can save an average of $3,700 on a 12,500-mile trip. (1)

INFRASTRUCTURE

Overweight containers, it is generally claimed, cause excessive wear on roads and stress and fatigue-related damage to bridges. Researchers have estimated that if the number of ESALs (equivalent single-axle loads) on the nation's highways were increased 10 percent, highway agencies would have to spend about $375 million more per year to maintain the pavements in the same condition that they would have been in had the ESALs not increased. (1)

Container weight is only one of many elements responsible for excessive wear of pavements. The type of trailer, number of axles, tire configuration, tire pressure, axle spacing, and more are also important factors in this issue. Other things being equal, a nine-axle combination vehicle carrying 110,000 pounds, has much less effect on a pavement than a five-axle combination vehicle carrying 80,000 pounds. A current proposal, known as the Turner proposal (after Francis Turner, former Federal Highway Administrator), would allow higher gross weights while lowering the allowable weight on each axle.

The effect of overweight containers on bridges is related, among other things, to overstress, which can result in severe damage. Stress can be caused by a single incident of extreme overloading, or by fatigue, which can shorten the safe life of a bridge and occurs after many trucks have passed over the bridge. The federal bridge formula was derived from assumptions about the extent to which legal weight vehicles should be allowed to exceed the stress assumed in bridge design. Under certain conditions, the formula may be overly cautious, but on the other hand, a general increase in weight limit may require that a large number of bridges be upgraded or replaced.

SAFETY

Overweight containers carried on unfit chassis and trucks are a risk to road safety. Key vehicle handling and stability properties of heavy trucks are affected by the weight they carry. Substantial weight increases (more than 10 percent to 20 percent) may lead to poorer stopping-distance capabilities. The rearward amplification, which can culminate in the overturning of a rear trailer during a sudden lane change, increases with increased gross vehicle weight. Excess weight may cause greater difficulties for trucks merging in traffic. Double trailers may also create safety hazards and affect the handling and stability of trucks. (For detailed analysis of safety in relation to weight and truck configuration, see Transportation Research Board, *Truck Weight Limits, Issues and Options*, Special Report 225, National Research Council, Washington D.C, 1990.)

THE INTERMODAL TRANSPORT SYSTEM

EVOLUTION AND RATIONALIZATION

Since the late 1970s, and particularly in the latter part of the 1980s, international freight transport has embarked on a new cycle of innovations. The new phase of transport development has been characterized not so much by technological innovations in ships, cranes, or terminals as by alterations in the organization and synchronization of the transport industry. This new trend, which focuses on greater integration, cooperation, and coordination of the various components of the transport system, is known as intermodal transportation.

Intermodality may be defined simply as the movement of cargo from shipper to consignee by at least two different modes of transport, under a single rate, with one bill of lading and single liability for the entire trip. The objective of intermodality is to transfer goods in a continuous flow through the entire transport chain, from origin to final destination, in the most cost- and time-effective way. The concept of intermodality contrasts with the conventional segmented transport system, in which each transport mode operates independently. The movement of goods in a single container by several modes of transportation has had a far reaching impact on international and domestic trade, as well as on the transport industry. Greater efficiency and savings has been achieved by capitalizing on the relative advantages of various transport modes on every segment of the journey, and through improved coordination of the various transport segments.

In the conceptual metamorphosis of the transportation system, cargo movements are viewed in light of the total distribution system. Included in such a total system are producers; commodity shippers; ocean, air, and land carriers; ports; logistical managers; and freight forwarders. The physical distribution of cargo, then, involves an integrated

logistical system, in which the justification for independent operation of a single mode of transportation has been weakening. A transport carrier may not, as it once did, consider itself a seller of a single and separate route service within a marketing arena. New multi-modal transport companies are assuming a greater control over the entire route, from origin to destination. (3)

The efficiency and reliability of the entire transport system are determined by the weakest link of the transport chain. The relevance and effectiveness of seagoing vessels, trucks, railroads, or ports are evaluated in relation to their roles as elements within a total system. The container weight limits must be viewed in this perspective. Containerization, and the container units in particular, serve as a common denominator of a growing intermodal transport system. If an intermodal container meets the weight limitations for ships, railcars, barges and container cranes, but becomes "overweight" when placed on a truck, it constrains the entire transport chain.

Intermodal transportation was greatly enhanced in the United States by the deregulation of the transport system in the first part of the 1980s. Since then, intermodality has become a visible and dominant part of the North American international transport system. New, large container vessels with about 4,000 TEU are serving the U.S. import and export system; in 1990 about 15.3 million TEU were handled by U.S. ports, which are ranked first in worldwide container port traffic. Container traffic is particularly strong on the West Coast; five of the six largest U.S. ports are on the West Coast. In 1988 intermodal rail loading in the U.S. totaled 5.7 million containers and trailers. New intermodal container transfer facilities were constructed around many ports to serve a growing number of double-stack container trains. Trucks transport containers primarily over relatively short distances and between marine and rail terminals.

Containerization was introduced by the maritime transportation industry and has served primarily this industry. The inland transportation of international trade and

domestic transportation of commodities developed along two different avenues. With the advance of the intermodal concept during the 1980s, the focus of the transportation system gradually shifted from the sea-side to the inland segments of the transport system. The relative importance of inland transportation in the total transport chain has been increasing as a direct result of the fact that the lion's share of the costs involved in door-to-door service on many international trade routes is related to the inland transport mode, not to the ocean voyage. Consequently, the inland transport modes have started to challenge the dominance of the ocean carrier in the intermodal chain. The competitive position of the standard-size marine container is decreasing in light of the higher volumes of common domestic containers, and the introduction of larger containers in the intermodal system is a clear indication of that trend. Recent developments related to the dimensions of some of the containers are evidence of the growing strains in the transport system.

Intermodality is an international issue. In the developed world more than 70 percent of international, oceanborne liner trade is containerized, and in the developing world it is above 50 percent. In 1980, the final act of the United Nations Conference on International Multimodal Transport of Goods was signed in Geneva under the auspices of the United Nations Conference on Trade and Development, providing the international framework for this transport concept.

Intermodal transportation may be interpreted differently and have different characteristics in different parts of the world. These differences are greatly dependent on the geographical setting, the nature of the infrastructure, and travel distances. However, the basic components and, certainly, the common denominator — the container — exist globally. This has become true particularly in the last decade, with the growing importance of the world economy and the regional specialization of labor. The container

weight problem must be viewed as an international issue and should be treated as an integral part of the total distribution of commodities from origin to destination.

STANDARDIZATION OF FREIGHT CONTAINERS

From the early stages of its development, containerization was faced with problems of interchangeability and compatibility, although mostly in relation to ocean transport and seaports. The ISO Technical Committee 104 assumed a leading role to ensure greater standardization of container classification, dimensions, and specifications. Gradually the world's container fleet became more standardized, and the basic container dimensions of 20-foot and 40-foot length, 8-foot width and 8-foot and 6-inch height were recognized by the ISO as the industry standards. In 1986, 88.2 percent of all containers met these standards in comparison to 67.3 percent in 1978. (4) Large numbers of non-ISO containers have always existed; however, their numbers are declining. In 1980, 63,277 of Sea-Land's 35-foot boxes were still in service, but less than half of that number are in use today.

Constant pressure was exerted on the ISO to adopt larger containers to meet the needs of land transport operators. With the deregulation of road transport in the United States, 9.6-foot high "high cube" containers were introduced, and in 1989 this dimension was adopted by the ISO as one of the standard heights for a 40-foot container. As early as 1982, containers of 45-foot length were introduced and promoted, particularly by American President Lines; again, the extra length was favored by overland carriers.

As a result of the domestic market demand, and partly because of the adoption of the Surface Transportation Assistance Act in 1982, which permitted larger containers, United States transport companies involved in both domestic and international intermodal trade introduced a new breed of containers — the "super high cube." These containers are 45-feet, 48-feet, and 53-feet long by 8 feet 6 inches (2.6 meters) wide, and can carry 67,000 pounds gross weight. Currently, these high cubes account for about 1.5 percent of

all containers in the United States. These containers have corner fittings similar to those of the 40-foot ISO containers (the typical specifications for dry freight containers are illustrated in **Table 4**).(5)

The introduction of the high cube containers was met with considerable reservation and concern in Europe. In a resolution adopted in April 1989, the Economic Commission for Europe (ECE) stated that this evolution has an adverse impact on road and rail infrastructure (ECE/(44)L.13, Decision K(44)). The European domestic container, known as the "swap-body," is designed especially for combined road and rail transport. This container cannot be stacked, and it is lighter than the standard marine container. Although the ISO maximum gross weight of the European wide-body 40-foot container is almost identical to the ISO 40-foot container — 67,195 pounds — its maximum payload is 59,810 pounds, 1,760 pounds more than the high cube marine 40-foot container.

In the Far East, particularly in southeast Asia, many problems arose with the handling of oversize containers. Many of the countries are still coming to terms with the requirements of the standard ISO containers, and oversize containers are met with opposition. Particular problems have been encountered in the Philippines and Indonesia, which have refused to accept 45-foot containers. In 1988 in Singapore, on the other hand, almost 100,000 oversized and high cube containers were handled at the port.

It seems ironic that the hoped-for trend toward greater standardization that followed the emergence of containerization with considerable success is now being reversed with intermodal transportation. The explanation might be found in the evolution of containerization. Containers were developed by the shipping lines to improve the efficiency of cargo handling in ports and to speed up the turnaround time of ships in

Table 4. Typical Specification of Dry Freight Containers

CATEGORY		EXTERIOR DIMENSIONS		INTERIOR DIMENSIONS		DOOR OPENING		CUBE CAPACITY	WEIGHTS		
* 20'	Length	= (19' 10½")	= 6.06m	(19' 3⅞")	= 5.90m				TARE	2,340kg	(5,160 lbs.)
Dry Freight	Width	= (8' 0")	= 2.44m	(7' 8¼")	= 2.35m	(7' 8¼")	= 2.34m	(1,173 ft.³)	Max. PayLoad	21,660kg	(47,740 lbs.)
Container	Height	= (8' 6")	= 2.59m	(7' 9⅞")	= 2.39m	(7' 5¼")	= 2.28m	33.2m³	ISO Max. Gross	24,000kg	(52,900 lbs.)
* 40'	Length	= (40')	= 12.19m	(39' 5¼")	= 12.02m				TARE	3,960kg	(8,730 lbs.)
Dry Freight	Width	= (8' 0")	= 2.43m	(7' 8¼")	= 2.35m	(7' 8¼")	= 2.34m	(2,391 ft.³)	Max. PayLoad	26,520kg	(58,470 lbs.)
Container	Height	= (8' 6")	= 2.89m	(7' 9⅞")	= 2.39m	(7' 5¼")	= 2.28m	67.7m³	ISO Max. Gross	30,480kg	(67,200 lbs.)
* 40' High Cube	Length	= (40')	= 12.19m	(39' 5¼")	= 12.02m				TARE	4,150kg	(9,150 lbs.)
	Width	= (8' 0")	= 2.43m	(7' 8¼")	= 2.35m	(7' 8¼")	= 2.34m	(2,692 ft.³)	Max. PayLoad	26,330kg	(58,050 lbs.)
	Height	= (9' 6")	= 2.89m	(8' 10⅜")	= 2.69m	(8' 5⅝")	= 2.58m	76.2m³	ISO Max. Gross	30,480kg	(67,200 lbs.)
45' High Cube	Length	= (45')	= 13.72m	(44' 1½")	= 13.58m	(7' 8")	= 2.34m		TARE	4,110kg	(9,061 lbs.)
	Width	= (8' 0")	= 2.43m	(7' 8¼")	= 2.35m	(8' 5¾")	= 2.58m	(3,026 ft.³)	Max. PayLoad	28,390kg	(62,588 lbs.)
	Height	= (9' 6")	= 2.89m	(8' 10")	= 2.69m			85.7m³	ISO Max. Gross	32,500kg	(71,650 lbs.)
** 48' Domestic	Length	= (48' 0")	= 14.63m	(47' 3⅞")	= 14.42m				TARE	4,399kg	(9,700 lbs.)
Dry Freight	Width	= (8' 6")	= 2.59m	(7' 2½")	= 2.50m	(8' 2¼")	= 2.49m	(3,463.1 ft.³)	Max. PayLoad	26,077kg	(57,200 lbs.)
Container	Height	= (9' 6")	= 2.89m	(8' 11")	= 2.71m	(8' 11")	= 2.71m	98.01m³	ISO Max. Gross	30,480kg	(67,200 lbs.)
** 53' Domestic	Length	= (53' 0")	= 16.15m	(52' 6")	= 16.03m				TARE	4,665kg	(10,280 lbs.)
Dry Freight	Width	= (8' 6")	= 2.59m	(8' 2½")	= 2.50m	(8' 4")	= 2.34m	(3,830 ft.³)	Max. PayLoad	25,815kg	(56,920 lbs.)
Container	Height	= (9' 6")	= 2.90m	(8' 10½")	= 2.70m	(8' 10½")	= 2.70m	108.5m³	ISO Max. Gross	30,480kg	(67,200 lbs.)
European	Length	= (40')	= 12.19m	(39' 8½")	= 12.10m				TARE	3,350kg	(7,385 lbs.)
Wide Body	Width	= (8' 2½")	= 2.50m	(8' 0½")	= 2.45m		2.42m	(2,641 ft.³)	Max. PayLoad	27,130kg	(59,810 lbs.)
	Height	= (8' 11")	= 2.74m	(8' 3")	= 2.51m		2.42m	74.8m³	ISO Max. Gross	30,480kg	(67,195 lbs.)

* 20'-40' and 40' high cube can vary in dimensions and capacities according to manufacturers specifications or customers special needs. Above are only examples of typical dimensions. Dimensions should always be checked with the supplier and Mariport accepts no responsibility for inapprpriate use of the data in this table.

** Many 48' and 53' domestic containers have been constructed to international strengths and load bearing standards but are presently exclusively in the U.S. services or in U.S. road rail operations.

ports. They were not originally developed for long inland hauls, nor were land transport needs incorporated in the design of the containers. The dimensions of the containers were dictated by the ship operators.

With the development of intermodal transportation, land transport has become a much more significant cost in the total transport chain from origin to destination. Consequently, pressure has increased to improve the efficiency of land transportation to cut costs. The standard ISO marine container is certainly not the optimum solution for land transportation, and the many "high cube" containers that have entered the market can be seen as steps to adjust the container design to meet the demand of land transportation. With the total distribution perception of modern logistics, the length, width, and height of the containers probably will continue to be challenged. It is vitally important that the weight, or overweight, issue be considered in any such development and in any policy related to a truly multimodal freight movement.

PERSPECTIVES ON THE OVERWEIGHT CONTAINER ISSUE

The overweight container issue affects a diverse list of individuals, private organizations, and government agencies involved directly and indirectly with goods transport: intermodal operators, trucking companies, seaports, exporters and importers, regulatory agencies, and the public. Each group has its own point of view on the issue. Some groups may have common interests related to overweight containers, but consensus is far from being reached.

However, all of the elements involved share a common acceptance that the overweight container problem is a national, and not a regional or local, issue. Consequently, any solution should be worked out on the national level, and a comprehensive government and industry cooperative effort is needed to resolve the problem. The following is a summary of the main perspectives on the issue:

The overweight container issue is related to many players. The following is a brief summary of some of the major points of view:

1. The **Federal Highway Administration** (FHWA) requires each state to develop an effective enforcement plan (23CFR part 657). Such a plan should include details of the facilities, resources, practices, and procedures that the state has incorporated in the enforcement process. Failure to submit or to meet the requirements defined by the FHWA may result in reduction in federal aid highway funds. The FHWA has recognized the problem of overweight containers and is behind attempts to resolve it, but it has not taken any independent action because of its lack of complete jurisdiction over the issue.
2. The **Federal Maritime Commission** (FMC) claims that the weight of a container is only one of the factors affecting a truck's violation of vehicle weight limits. In any event, the violation is not caused by the container while it is under FMC jurisdiction. The FMC has denied petitions to change the freight rate structure

submitted by the American Trucking Association and shipping conferences, and has maintained that the issue should be addressed by Congress or the trucking industry.

3. For the safety of employees operating cranes, the **Occupational Safety and Health Administration** (OSHA) has issued regulations that apply to employment within marine terminals (29 CFR part 1917-Marine terminals). The regulations require that every intermodal container be permanently marked with its tare weight, maximum cargo weight, and maximum gross weight. Every container bound for export must be weighed, and its gross weight must be provided to the operator of the crane or other hoisting equipment. If there is no scale in the terminal, the gross weight should be calculated on the basis of the contents of the container and its weight. For import containers, the weight should be determined from the shipping documents or by the contents if the container was not weighed.

4. The **trucking industry** bears the immediate pressure stemming from the problem. The ATA's position is that truckers should not be held responsible for the issue because they have no control over the loading and weight of the containers. They would like to eliminate the per box freight rate to reduce the economic incentive for overloading containers and require that drivers be given weight information before they start their trips. They would like to protect carriers who refuse to take overweight loads from retaliation.

5. The **American Association of Port Authorities** (AAPA) supports the ATA's request to provide weight information to drivers, but places the ultimate responsibility on truck drivers, who are best qualified to determine whether their equipment is capable of legally transporting the container. The AAPA does not favor weighing containers in seaports, nor any practice that would interfere with the efficient flow of transportation and distribution.

6. **The individual states'** perspectives reflect the fact that they are responsible for maintaining the infrastructure and the safety of the highways. While recognizing that the issue is national, if not international in nature, and an issue that should be addressed on a national level, states are concerned that imposing restrictions at the state level may adversely affect the competitiveness of the ports, transport operators, and economic developments within their jurisdictions. (California's task force on overweight containers, for example, recommended that the state should carefully evaluate the alternative solutions to minimize any possible diversion of trade to other Pacific Coast ports.)

7. The **state of California** recognizes that the overweight container problem should be addressed on the national level. The state generally does not issue permits to exceed weight limits if the load is reducible. A report on the issue from 1989 recommended that strategies for solving the overweight container problem should not be limited only to enforcement. (6) Independent actions should also be taken by the intermodal industry, such as development of proper chassis for particular loads. A plan to construct scales at exit points of each port was opposed by the California State Patrol and the ports. A recent California DOT report (June 1991) recommended that legal authority be given to the California State Patrol to access and use private weight records. (7) In 1980, the State of Minnesota enacted its "relative evidence" legislation, which gave Minnesota law enforcement officers the legal right to review various types of private weighing records and to introduce those records in court without apprehending and weighing the vehicle on the road.

8. **The shippers' perspective.** Exporters and importers are competing in domestic and international markets. With the globalization of the world economy, the competition is more intense than ever before. Shippers seek efficiency and

reduced transport costs in every segment of the transport chain between the producer and the ultimate consumer. For many shippers, the box rate is an attempt to better utilize the transport unit available to them. The call for the elimination of box rates has been viewed by shipping groups as a covert attempt to raise rates.

9. **Shipping lines** generally claim that the container weight is not a maritime issue because they transport containers that meet the ISO standards. Intermodal carriers however, are confronted with the applicability of maritime containers to inland transportation. They view the overweight container problem as an issue that interferes with the continuous flow of containers throughout the intermodal journey.

CONTAINER TRAFFIC IN WASHINGTON STATE

CONTAINER PORT TRAFFIC

Washington State is among the top ten states in the United States in both export and import of containers (see Table 5). Washington State ports serve as a major intermodal gateway for U.S. international and domestic trade. Most containerized cargo is handled by two primary ports - the Port of Seattle and the Port of Tacoma. Container traffic consists of international trade, primarily with the Far East and Asia, and domestic trade, primarily with Alaska and Hawaii. In 1990 about 24 percent of Washington State Port's container throughput was domestic and 76 percent was related to international trade.

Table. 5. Container Imports and Exports - Top 10 States in the U.S. in 1990 (in 000 TEUs)

Exports				Imports			
	U.S. States	000 TEU	Share		U.S. States	000 TEU	Share
1	California	957	21.9%	1	California	1,096	21.1%
2	New York	377	8.6%	2	New York	734	14.2%
3	Florida	270	6.2%	3	New Jersey	466	9.0%
4	Washington	258	5.9%	4	Illinois	258	5.0%
5	New Jersey	222	5.1%	5	Florida	202	3.9%
6	Texas	210	4.8%	6	Texas	187	3.6%
7	Illinois	185	4.2%	7	Ohio	141	2.7%
8	Tennessee	144	3.3%	8	Massachusetts	135	2.6%
9	Georgia	120	2.8%	9	Washington	103	2.0%
10	Pennsylvania	113	2.6%	10	Michigan	102	2.0%
-- Others --			34.6%	-- Others --			33.9%

Source: Journal of Commerce, PIERS

In 1991 Washington State ports handled a total of 2.18 million TEUs, which represents 14.2 percent of the total U.S. container trade. (8) The combined volume of the two Washington container ports was greater than that handled by the Port of New York/New Jersey. The Port of Seattle, with 1,155,000 TEUs in 1991 and the Port of Tacoma with 1,020,708 TEUs, are ranked the fourth and the sixth largest container ports in North America, respectfully. According to a recently revised container forecast, container traffic in the Puget Sound is expected to grow to 3.0 - 3.2 million TEUs in the year 2000 and to 4.0 - 4.7 million TEUs in 2010. This represents a yearly growth rate of about 4.1 percent to the end of the decade and a smaller growth rate of 3.3 percent during the first decade of the twenty-first century. (9)

In 1990, the ports of Seattle and Tacoma maintained a substantial 27.8 percent share in the highly competitive West Coast market (Table 6). Unlike its major competitor ports in Southern California, which greatly benefit from a large local market, Washington State's ports rely heavily on intermodal container traffic to the Midwest and East Coast. In the Pacific Northwest market (Oregon to British Columbia), the Puget

Table 6. North America West Coast Container Ports 1990 (Twenty-Foot Equivalent Units -- TEUs).

Rank	Port	TEUs
(1)	Los Angeles	2,116,404
(2)	Long Beach	1,598,078
(3)	Seattle	1,171,091
(4)	Oakland	1,124,123
(5)	Tacoma	937,691
(6)	Vancouver (BC)	322,569
(7)	Portland	162,987
(8)	San Francisco	140,364

Source: Containerisation International Yearbook

Sound container ports are in a dominant position with 81.2 percent of the market share. It is estimated that approximately 150,000 TEUs of Canadian containers are handled by the ports of Seattle and Tacoma. The ports of Portland (in the south) and Vancouver B.C. (in the north) are competing with the Puget Sound, but so far on a limited scale.

TRUCK TRAFFIC GENERATED BY WASHINGTON'S CONTAINER PORTS.

In the modal distribution of land transportation of containers, a distinction must be made between international seaborne trade and domestic seaborne traffic. The domestic trade, particularly with Alaska and Hawaii, includes moving containers almost exclusively by truck to and from the Puget Sound ports. Only 5 percent of the inland traffic use rail services. In international seaborne trade, about 39 percent of container traffic was moved by trucks in 1990.

In 1990 about 1.1 million TEUs were moved by trucks to and from Washington Public Ports. The vast majority of the containers went through the ports of Seattle and Tacoma. A small volume of containers, mostly with agricultural export commodities, were loaded at the Mid-Columbia and Snake ports.

There was considerable differences in the modal distribution of import and export container traffic. Only 23.3 percent of imported containers are moved by truck and the remaining 76.7 percent are moved by rail, mostly to the Midwest and the East Coast. The export of containers, however, is more regionally oriented -- about 57.1 percent of the containers moved to the Puget Sound in 1990 were moved by trucks.

It is predicted that more international intermodal containers will utilize rail in the future. It is estimated that in the year 2010, trucks will account for only 28 percent of this traffic, by tonnage, compared with 39 percent of the share in 1990. Nevertheless, considering the base-line growth scenario of the latest traffic forecasts, truck traffic will nearly double from 1.1 million TEUs in 1990 to about 2.1 million TEUs in 2010 (see Table 7).

Table 7. Modal Distribution - Washington Public Ports Base-line Forecast (1,000 TEUs).

Containers	1990	1995	2000	2005	2010
Puget Sound Base-line Forecast					
Truck - Puget Sound	1,108	1,297	1,513	1,765	2,071
Percent	52.6%	52.6%	51.1%	51.1%	51.1%
Rail - Puget Sound	998	1,171	1,445	1,691	1,985
Percent	47.4%	47.4%	48.9%	48.9%	48.9%
Puget Sound High Growth Forecasts					
Truck - Puget Sound	1,108	1,297	1,513	1,765	2,071
Percent	52.6%	50.7%	47.5%	45.6%	43.9%
Rail - Puget Sound	998	1,261	1,675	2,105	2,649
Percent	47.4%	49.3%	52.5%	54.4%	56.1%

Source: BST Associates (10)

Containers that are distributed by rail, in many cases, must be transported by truck between the marine terminal and the rail terminal on public roads, which are under the jurisdiction of the local municipality. The situation is different between Seattle and Tacoma. At the Port of Seattle, with the exception of the on-dock rail facility at Terminal 18, all containers that move by rail must travel on roads under the jurisdiction of the City of Seattle. In the Port of Tacoma intermodal container transport between ship and rail are performed between the on-dock terminals (there is no the need to use city roads).

TRUCK WEIGHT LIMITS AND ENFORCEMENT

The legal gross weight of a truck transporting containers depends on the truck configuration, number of axles and the axles' spacing (a detailed table of allowable loads

in every state was published by the American Trucking Association, July 1991). In Washington State the maximum gross legal weight for a truck transporting loaded containers is 105,000 pounds. To qualify for the maximum allowed weight, a special large chassis is used. (see Fig. 1).

The most common truck combination used to transport containers is a three-axle tractor pulling a two-axle semi-trailer (upper combination in Fig. 1). The maximum legal gross weight is 80,000 pounds. The truck must have an overall axle spacing of 51 feet to have a gross weight of 80,000 pounds. The internal axle spacing must be 36 feet to legally carry the maximum allowed 34,000 pounds on the two sets of tandem axles. There are various truck configurations that allow a total gross weight between 80,000 - 105,000 pounds. The weight limits are imposed on all state highways, as well as on public access roads to the ports (unless more restrictive weight limits are posted).

WASHINGTON STATE PATROL STUDY

The Commercial Vehicle Enforcement Section (CVES) of the Washington State Patrol (WSP) is responsible for enforcement of laws and regulations pertaining to trucks. The purpose of CVES is to ensure the safety of citizens and protect Washington's highway infrastructure from damage caused by overweight vehicles. (11)

Following a request by the Legislative Transportation Committee, the WSP conducted a study of containerized vehicle loads at the ports of Seattle and Tacoma, between May 1 and October 31, 1991. (12) The WSP and the two ports have weighed a total of 14,416 trucks. The main findings of the study are as follows (See Table 8):

- 21.5 percent of the trucks weighed in this study exceed the legal load limitations for Washington State. This figure is lower than the equivalent national findings of the FHWA study in 1989.
- Export loads pose more of an overweight problem than import loads. Weighing by the WSP revealed that 28 percent of the export loads violated the weight limits,

Figure 1. Maximum legal weight for truck combinations in Washington State (Source: Washington State Patrol, *Containerized Cargo Study*, December 1991)

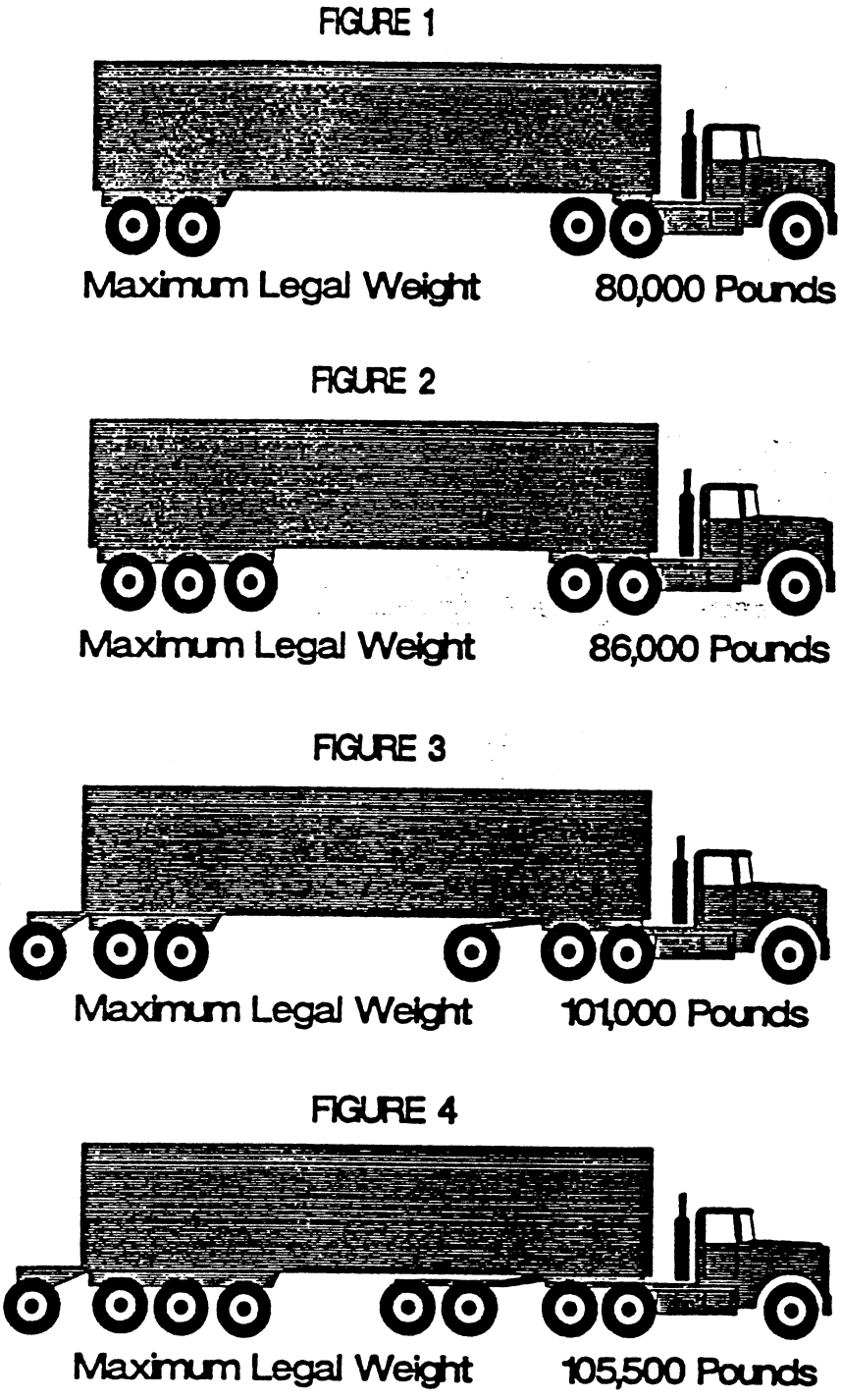

Table 8. W S P sample of trucks weighed at the Ports of Seattle and Tacoma , 1991

WSP	**Import**	**Export**	**Total**
Trucks Weighed by WSP	3,328	1,293	4,921
Overweight Trucks	407	442	849
Percent Overweight	12.2%	27.7%	17.3%
Load that could be legalized:			
@ 81,200 GVW (Permit)	0	12	12
@ 86,000 GVW (Add Axles)	300	258	558
@ 101,000 GVW (Add Axles)	82	159	241
@ 105,500 GVW (Add Axles)	25	13	38
Total	**407**	**442**	**849**
PORTS	**Import**	**Export**	**Total**
Trucks Weighed by Ports		9,495	9,495
Overweight Trucks		2,251	2,251
Percent Overweight		23.7%	23.7%
Load that could be legalized:			
@ 81,200 GVW (Permit)		164	164
@ 86,000 GVW (Add Axles)		703	703
@ 101,000 GVW (Add Axles)		1,348	1,348
@ 105,500 GVW (Add Axles)		35	35
Total	**0**	**2,250**	**2,250**
TOTALS	**Import**	**Export**	**Total**
Trucks Weighed by WSP	3,328	11,088	14,416
Overweight Trucks	407	2,693	3,100
Percent Overweight	12.2%	24.3%	21.5%
Load that could be legalized:			
@ 81,200 GVW (Permit)	0	176	176
@ 86,000 GVW (Add Axles)	300	961	1,261
@ 101,000 GVW (Add Axles)	82	1,507	1,589
@ 105,500 GVW (Add Axles)	25	48	73
Total	**407**	**2,692**	**3,099**

and the ports show that 24 percent of the export loads exceed the state legal load limits. Only 12 percent of the import loads were found to be overweight. These findings contradict the commonly accepted assumption that the problem of overweight containers lies primarily with imported containers.

- The 20-foot containers appear to be particularly problematic in terms of potential violation of the state's legal load limits. 86 percent of the 20-foot containers that were weighed in the study exceeded the axle spacing weight limits.
- Of the total 3,100 trucks that were found to be overweight, all but one could be reconfigured by adding axles to be legally transported.

PIERS DATABASE

The master file of the Journal of Commerce Port Import / Export Reporting Service (PIERS) consists of data recorded from import manifests and export bills of lading for international freight moving through U.S. ports. The data are constantly being compiled and there is only a time lag of a few weeks between the actual date that a container has moved through a port and the time it enters the database.

The PIERS files contain the following information: the names of the U.S. importer and exporter, origin and destination of the cargo, name of overseas shipper, U.S. and foreign ports, steamship line, commodity description, container size, and the weight of the cargo in pounds. The PIERS database is available to subscribers.

PIERS data files were used in this study to identify potentially overweight containers moving through Washington State ports, based on the declaration on the import manifests and the export bills of lading. Particular attention was given to the types of commodities that are most frequently associated with weight limit violations. The definitions of potentially overweight containers were based on the findings of a loading and weighing test performed at the Port of New York/New Jersey in 1989. These definitions were also adopted on the national level by the FHWA in a study of overweight

containers. It was concluded that the average cargo load limitations necessary to comply with the federal bridge formula were 37,000 pounds of cargo in a 20-ft container on a 23-ft chassis and 44,000 pounds of cargo in a 40-ft container on a 40-ft chassis.

A special computer run was conducted (courtesy of the Port of Seattle), of all international containers (about 1.5 million TEUs) that were handled by Washington State ports (almost all in the Port of Seattle and Port of Tacoma) in 1991. All the containers that hold more than 37,000 pounds for 20-ft, and 44,000 pounds for 40-ft , were classified by type of commodity (PIERS 4-digit commodity number).

About 20 percent of all containers were found to be potentially overweight by the definition used (unclassified containers and some missing data did not allow the researchers to calculate the exact figure). The findings show that export containers are more often overweight than import containers. This was also confirmed in the WSP study. Most of the overweight 20-ft containers were in the range of 38,000-42,000 pounds for import containers and 38,000-45,000 pounds for export containers. The overweight 40-ft containers were 45,000-48,000 pounds for import containers and 45,000-52,000 pounds for export containers.

The list of the top ten most frequently noted overweight containerized commodities is presented in **Tables 9 - 12.** Canned foodstuffs, rubber, nuts and bolts, steel and iron wire, ceramic tiles, and agricultural products are most commonly found in overweight import containers. The list of the most commonly found commodities in export containers includes waste paper, aluminum rods and blocks, lumber, animal feed (hay), vegetables, and chemicals. Most of the overweight containers contain low-value commodities.

It should be noted that the PIERS data applies only to international trade and does not include domestic container trade (Alaska and Hawaii). Additionally, it is impossible at this stage to distinguish between containers that were moved by truck and those that

were transported by rail, although it is expected that such a distinction will be possible in the future. PIERS database information can be accessed for constant updates of the overweight container problem or to identify shippers with heavy container loads. It does not provide all of the information that can be obtained by a scale; however, it is less expensive and less complicated than conducting occasional weighting samples outside the ports. The PIERS database is an accessible and up-to-date source that can be used to gain information and aid in container weight enforcement.

Table 9. Washington State Ports Export - Contents of the Top 10 Most Frequently Overweight 20-ft Containers (by commodity, over 37,000 pounds per container)

Rank	Commodity	Number of containers	Average container weight	% of overweight containers
1.	hides, skins, furs	11857	17.6	21.9
2.	alumin rods, forgings, scrap	6032	19.0	11.1
3.	grains & flour products	5008	18.1	9.2
4.	aluminum blocks	3493	19.5	6.4
5.	leadwire, bars	2888	19.4	5.3
6.	bentonite	2801	18.7	5.2
7.	copper anodes, ingots	2152	18.8	4.0
8.	benzenoid chemicals	2079	19.6	3.8
9.	canned foodstuffs	1725	17.0	3.2
10.	beer & ale	1569	17.4	2.9

Source: Journal of Commerce, PIERS Database.

Table 10. Washington State Ports Exports - Contents of the Top 10 Most Frequently Overweight 40-ft Containers (by commodity, over 44,000 pounds per container)

Rank	Commodity	Number of containers	Average container weight	% of overweight containers
1.	paper & paperboard, incl. waste	31909	21.1	23.4
2.	pet & animal feeds	25958	20.2	19.0
3.	logs and lumber	24650	21.4	18.1
4.	vegetables	9769	20.5	7.2
5.	boards	9496	23.4	7.0
6.	newsprint	8227	20.0	6.0
7.	synth. resins & plastics	3291	21.4	2.4
8.	aluminum rods, forgings, scrap	2865	20.1	2.1
9.	melamine, urea resins	2707	23.7	2.0
10.	field seeds & bulbs	2050	20.0	1.5

Source: Journal of Commerce, PIERS Database

Table 11. Washington State Ports Imports - Contents of the Top 10 Most Frequently Overweight 20-ft Containers (by commodity, over 37,000 pounds per container)

Rank	Commodity	Number. of containers	Average container weight	% of overweight containers
1.	canned foodstuffs	871	17.3	21.0
2.	nuts & bolts, studs	548	16.8	13.2
3.	rubber, synthetic	542	17.2	13.0
4.	steel, iron wire	351	17.4	8.5
5.	ceramic & mosaic tiles	260	17.5	6.3
6.	carbon & gragh cathode & electr	160	17.3	3.9
7.	tacks & nails	146	18.0	3.5
8.	rice	145	18.1	3.5
9.	steel, iron pipes & tubes	126	17.2	3.0
10.	iron CMP	75	17.8	1.8

Source: Journal of Commerce, PIERS Database

Table 12. Washington State Ports Imports - Contents of the Top 10 Most Frequently Overweight 40-ft Containers (by commodity, over 44,000 pounds per container)

Rank	Commodity	Number of containers	Average container weight	% of overweight containers
1.	rubber, synthetic	343	20.4	31.9
2.	rubber, natural	277	21.0	25.8
3.	canned foodstuffs	232	20.4	21.6
4.	coconut products	58	22.1	5.4
5.	org potassium, sodium salts	26	20.1	2.4
6.	acrylic, methacrylic resin	22	20.6	2.0
7.	pet & animal feed	21	20.5	2.0
8.	saccharides/ polysaccharides	16	20.5	1.5
9.	bananas	14	22.4	1.3
10.	tapioca & cassava	7	21.5	0.7

Source: Journal of Commerce, PIERS Database

INTERPRETATION AND APPLICATION

OVERVIEW

Research and data findings of container movements clearly indicates that the problem of overweight trucks exist in both domestic and international trade. All of the parties involved in hauling and handling containers in the United States recognize that a considerable number of the marine containers that are legally and safely loaded on container vessels, become illegal or unsafe when loaded on to trucks. (13)

The motivation to resolve this problem is based on the widespread recognition that trucks transporting containers in excess of gross weight, axle weight, and the federal bridge formula significantly accelerate the physical deterioration of public roads and highways. Overweight trucks also interfere with road safety and the safety of workers who load and unload containers in ports or other terminals. In addition the heavy fines imposed on truck operators is a problem that keeps this issue on the agenda.

The overweight container problem is a complex issue involving many parties along the intermodal route. Hauling overweight containers is not only a technical issue but, to a great extent, also an organizational issue that is closely related to the economic competitiveness between ports, regions, and states. As a result, there are several underlining principles that should be considered in any proposed solution:

- First and foremost, a comprehensive solution should be addressed at the national level. Federal guidelines governing the weight limitations of containerized cargo must be introduced. Such guidelines should be uniformly imposed on all U.S. highways and all local roads leading to and from the ports that are under local jurisdiction.
- Since the over-land movements of marine containers on U.S. highways is part of an international intermodal transport system, any proposed solution should not

have an adverse effect on the efficiency of that system. Such an effect could have serious consequences on the competitiveness of the U.S. market in international trade. This issue is particularly significant for Washington State, which is an origination point for large quantities of export commodities and a major gateway for import goods.

- A solution to the problem should include coordination between international weight limitations on containers (ISO standards) and domestic highway regulation. The fact that a container moving in an intermodal journey is perfectly legal in maritime transportation and illegal when it is loaded on a chassis for over-land distribution impairs the efficiency of the total integrated transport system.

SOLUTIONS

1. Weight Documentation.

It is commonly agreed that there is a problem with the accuracy and reliability of weight information of import and export containers. Often truck drivers complain that tickets for overweight containers are issued even though the driver has no control over the weight of the containers and may not know the actual weight until he enters the weighing station.

It is essential, therefore, that a first step in resolving the overweight truck issue is to require that every container en route have accurate information on its weight (contents and tare weight). It is also essential that the motor carrier have accurate chassis and truck weight information so it will be possible to calculate the gross weight of the loaded truck. Reliable information on the weight of the containers can also ensure the safety of terminal operators. Once a carrier or terminal operator has information on the container weight, he can obey the laws and regulations governing their specific activities.

The container weight information can be included in existing documentation, such as the bill of lading or the standard Interstate Commerce Commission forms. However, since accurate information on the axle weight is related to the specific equipment (chassis), such information can only be added after the truck is weighed on a public scale.

2. Responsibility

Truckers often claim that they are innocent victims of the overweight container problem, and that they unfairly bear the responsibility and fines for overweight violations. The American Trucking Association's (ATA) position is that the shippers who load the container should be held responsible for the weight violation.

Although it is commonly accepted that the responsibility lays with the shipper, complicated jurisdictional and technical problems do exist regarding the issue of responsibility. In many cases the shipper is a foreign exporter, and problems related to jurisdictional issues of U.S. regulatory agencies overseas exist. Additionally, a shipper may load a container abroad according to the restrictions in his own country and meet all the ISO weight limitations for maritime transport. Only when the container is put on a standard chassis in the U.S., even for a very short distance, does it become illegal.

The FMC could advise international shippers that American ports will not accept overweight containers. This would put pressure on the ocean carrier operator who might claim (as they have in the past), that such an act would merely transfer the responsibility from the truckers to the shipping lines, and a comprehensive solution to the problem would not be achieved.

In the case of Washington State, the WSP study and the PIERS data revealed that the overweight container problem primarily lies with export containers, many of which are loaded in Washington State. It is relatively easy to trace the violators, but then another issue related to competitiveness comes to the forefront.

Because of the practical difficulties of placing direct responsibility on the shippers, the National Industrial Transportation League and the American Trucking

Association created a working group that focused on the person tendering the container to verify container weights. Due to opposition on various points, the group was unable to come to a consensus. (Terminal operators, for example, who in some cases might be determined responsible for verifying container weight have raised their concerns about this matter.)

The responsibility issue is strongly tied to the availability of reliable information. The shippers abroad must have accurate information on weight limits throughout the intermodal journey; all international containers must be labeled with maximum gross weight; and shipping lines, terminal operators, and truckers must have accurate information on the container weight. If all the necessary data are available, each party could be held responsible for meeting the governing laws in its area of activity. In practical terms that still allocates considerable responsibility on the motor carrier because it is on the roads and highways that most overweight violations occur.

3. "Intermodal Safe Container Transportation Act of 1991" (H.R. 3598)

The American Trucking Association (ATA) and representatives of the steamship lines have drafted a proposal which they sought Rep. Helen Bentley (R-Maryland) to include as an amendment to the Surface Transportation Bill in Fall 1991. The proposal was withdrawn at the chairman's request, but a commitment was made to consider the issue in 1992.

In October 22, 1991 Rep. Bentley introduced the "Intermodal Safe Container Transportation Act of 1991" (H.R. 3598). The bill addresses many of the issues raised in Sections 1 and 2 of this report. The bill would require any person initially tendering any loaded container or trailer to a carrier in interstate or foreign commerce, with a gross weight of more than 10,000 pounds, to give the carrier prior notification of the total net weight of the container and a description of the cargo. The carrier would, in turn, be required to forward weight and content information to the subsequent carrier.

The bill applies only to containers or trailers that will be transported in intermodal transportation (defined in the bill as "successive carriage from an origin to a destination point by more than one mode of transportation"). The responsibility for providing the carrier with prior notification of weight and content lies on the shoulders of the initial shipper. According to the bill, a carrier or a terminal operator shall in no case be deemed to be a person initially tendering a loaded container or trailer for the purpose of this bill. The Act also stated "it shall be unlawful for any person to request a carrier to transport a container with a weight excess of that permitted, or prior to the tendering of the verification required the bill."

H.R. 3598 was referred jointly to the House Energy and Commerce and Public Works and Transportation Committees. A hearing on the bill was held in April 1992, and a further hearing will be required. The Bill is strongly supported by the ATA. The American Association of Port Authorities have also supported the bill, but they have raised some concerns about it. According to the proposed Act, it would not be required to weigh containers at the dock. However, the AAPA is concerned that if a truck driver refused to haul a container, congestion would result.

The Act includes several points that could help resolve the overweight truck issue, but it would only be a partial solution. For example, the bill does not address domestic truck shipments. The Act proposes a national solution that would be equally applied to all states and ports. In the competitive environment which ports and transport carriers operate, this is an important step forward. The Act would also help to expose the overweight containers by providing the carriers and terminal operators with reliable information, which is essential in any attempt to resolve the problem.

4. Modification in the container rate structure

The ATA, along with representatives of some of the shipping lines (the Transpacific Westbound Rate Agreement), in 1989 filed a petition to the Federal Maritime Commission (FMC) requesting a ban of the practice of "per container" rates.

The rationale behind the request was that the so called "box rates" encourage shippers to overload the containers. Indeed, in most cases the unit rate charge in ocean and intermodal transportation is based on volume; not on weight.

Shippers try to fill the containers as much as possible to maximize container utilization and to minimize land transport cost and ocean freight rates. Packing the containers to their maximum capacity is particularly critical practice in transporting low-value and low-margin commodities. The FMC has denied the petition by the truckers and the ocean carriers. Shippers associations have voiced their opposition to this change in freight rate structure, claiming that it will only increase transportation rates. Most shipping lines are using the container as a base unit for calculating their costs and determining their pricing, and not on weight or volume. Banning the "per box" rate would bring back the traditional more complex rate structure which containerization helped to simplify.

The "per container" rate charges has certainly been an incentive to overload containers. However, eliminating this rate may incur serious consequences beyond the scope of the overweight truck problem. This issue is particularly sensitive in Washington State. First, the elimination of "per container" rates would affect all containers, not just those moved by truck. Many of the imported containers that move through the Ports of Seattle and Tacoma are transported by rail to the Midwest. Secondly, a significant volume of Washington's export commodities are carried in overweight containers, most of which originate in Washington State. Elimination of the "per container" rate could result in a significant increase in the freight cost of many of Washington's low-value export commodities and with an adverse effect on their competitiveness.

Additionally, adopting tariffs based on container weight, rather than per container, may result in an increase in truck traffic with all of the associated impacts, such as increased road congestion. Any plan to alter the tariff structure of intermodal containers should consider the potential impact on the local economy.

5. Technical solutions

In most cases the weight of the container and its contents do not violate the weight limits. Most of the loaded containers meet the limits set by the container manufactures, the international recognized ISO standards, the shipping lines, barge carriers and the railroads. Only when they are loaded on standard chassis do they become potential violators of the U.S. federal highway regulations. With the encouragement of the ATA, manufacturers and suppliers of chassis systems have responded to the predicament of overweight containers.

The technological solution is available, in fact, new lines of "super chassis" are already in service. Chassis manufacturers have designed and engineered a variety of new extendable container chassis with the USDOT bridge formula in mind. The sliding tandems allow optimal weight distribution, solve most internal spacing problems related mostly to 20-ft. containers, and allow maximum gross weight. The need for new equipment comes with the growing trend to use longer containers. These containers primarily accommodate light, high-density commodities, such as clothing, which is very common, particularly in the import containers from the Far East. Extended containers of 45-ft, 48-ft, and even 53-ft are becoming more and more visible on U.S. highways. Many 45-ft containers are frequently seen on board the double stack trains in Washington State. (The 48-ft and 53 ft containers are being used mostly in domestic transportation.)

A recent WSP study concluded that over 99 percent of the overweight containers in their sample could become legal with the right truck configuration and equipment. Special chassis can, therefore, solve a considerable part of the overweight problem. It is not a technological challenge as much as an investment issue. However there is more involved here.

In an interview with Washington Trucking Association members, it was stated that many trucking companies in this state own the new chassis but these truckers are not being called. When a trucker goes to pick up a container at the port, he does not know

the weight of the containers in advance. The limited availability of accurate weight information in advance makes it impossible to adjust the truck configuration for the heavier containers. In the case of overloaded containers, the trucker is faced with one of two choices: one, to return with a special chassis; or two, to refuse to transport the overweight containers until the cargo has been off loaded to make it a legal move. In the very competitive environment in which the trucking industry is operating and the restricted port back-up space, neither option is practical. Moreover, in the case of exporters from Washington State, it became clear in the interview that many of them do not provide the trucking companies advance notice of overweight containers, knowing that the special equipment used to transport the heavier weight will cost them more. In the current competitive market, the truck driver is in a difficult position: refusing to carry an overweight container with a standard chassis will result in a competitor getting the job.

The new special chassis system, combined with the availability of reliable information on container weight, has the potential to solve much of the overweight container problem. It could relieve low-value commodities exporters of the necessity to reduce utilization of the containers because of a relatively short link in the entire intermodal trip, and it will not interfere with safety and road maintenance.

6. Enforcement

A. Federal level. The surface transportation Assistance Act of 1982 established new weight limits for the Federal Aid Interstate System. The FHWA, in its regulation "Certification of Size and Weight Enforcement," requires each state to develop an effective vehicle size and weight enforcement program on all federal-aid highways, including interstate, primary, urban, and secondary road systems. The plan includes detailed information on facilities, resources, practices, and procedures.

Another federal agency involved in the enforcement of container weights is the Safety and Health Administration (OSHA). OSHA requires that every export container must be weighed in the marine terminal or elsewhere and that that information is

provided to the terminal operators (OSHA 29 CFR part 1917 Marine Terminals). The weight of import containers is determined by weighting or by the shipping documentation. All intermodal containers must be permanently marked with its tare weight, maximum cargo weight, and gross weight.

At the Ports of Seattle and Tacoma export containers are weighed and recorded at the gates of the terminals by the stevedoring companies. However, only the gross weight is recorded, and no other information, such as axle weight or internal axle spacing, is taken. The weighing is performed primarily for the safety of the terminal employees. The relevant weight limits are the ISO standards, which are higher than the the federal highway weight limits. (In Terminal 5 at the Port of Seattle an advanced automated weighing scale has been installed. The scale, which scans the chassis or the containers' symbols, is operating on an experimental basis.) The information obtained by ports can aid enforcement of weight limitations by exposing overweight containers. In many ports in Europe, scaling devices are installed on gantry cranes, and overweight imported containers can be detected before they are placed on trucks.

B. State level. The Washington State Patrol is legally responsible for vehicle weight enforcement on all freeways and public roads in the unincorporated areas of Washington. All other public roads come under the jurisdiction of local law enforcement agencies. Currently, the enforcement at the state level is conducted by using a stationary scale system and portable scales. Several other approaches should also be considered.

Both the WSP study and the PIERS data analysis found that most of the overweight trucks carrying containers are export commodities originating in Washington state. A selective spot enforcement by the State Patrol and local jurisdictions targeting most common violating commodities could be an effective way to deal with the problem.

Another approach to vehicle weight enforcement is based on information which is currently not accessible to law enforcement agencies. In California it was recently recommended that legal authority be given to the California Highway Patrol to access the

use of private weight records to identify overweight containers. (7) Perhaps a less complicated alternative would be to allow law enforcement agencies to access Electronic Data Interchange (EDI) systems for weight information. Considerable effort is currently being made by shipping lines, ports (including a joint effort by the Ports of Seattle and Tacoma), transport companies, and custom and freight forwarders to develop EDI capabilities. It is expected that EDI systems will increasingly be used in intermodal transport and by federal agencies to exchange and transfer freight and transport information. EDI can be used as a means to expose overweight container shipments.

C. Local level. Weight enforcement on public roads in municipal areas are under the jurisdiction of local enforcement agencies. In the city of Seattle, the transportation division employs two law enforcement officers to conduct all truck operations within the city limits. It is estimated that less than 20 percent of their time is related to port traffic. There is no doubt that this limited workforce cannot adequately handle the yearly volume of about 1.1 million TEUs. In the Port of Seattle, most of the containers that are moving to their final destination by rail need to travel some distance on public roads, between the marine terminal and the intermodal rail yard. These containers are subject to weight limit enforcement. The two exceptions are the on-dock facilities at terminal 18 and the truck crossing between Terminal 37 and the Burlington Northern terminal.

A solution that must be examined is to develop access roads between the port and the rail terminals along the rail right of way. If such an option is feasible, this would allow containers that meet the ISO standards, and, thus, the shipping line and the railroad limits, to move without interruption between the marine and rail terminals.

In the city of Tacoma, the enforcement situation is quite similar: two officers are responsible for conducting truck operations. It is estimated that less than 25 percent of the officers' time is related to weight enforcement of containers moving in and out of the port (yearly traffic is about 1.0 million TEUs). In Tacoma, too, the limited resources result in limited enforcement of this problem.

In the Port of Tacoma all the containers that move by rail through the north on-dock intermodal yards do not travel on public roads and uninterrupted crossing is allowed by the city between the Sea Land terminal and the southern intermodal yard. Recently, a proposal to designate a limited "free zone" of truck movement adjacent to the port was discussed between the city of Tacoma and the Port of Tacoma. The issue was raised following a request to allow the transport of overweight containers of frozen fish from the port to a nearby storage area where those containers could be made legal for highway transport. There are two issues on the agenda: liability and excessive road damage costs in this proposed zone. Such a proposed "free zone," if established, might relieve some of the overweight container problems.

7. A new approach to the bridge formula

A recent study of truck weight limits, which was published by the Transportation Research Board (1), challenged the adequacy of the current federal bridge formula. Bridges on interstate highway systems generally can handle heavier weight than those allowed under the current bridge formula. However, many of the bridges on the non-interstate highways would become deficient if the maximum weight of trucks were increased.

A modified version of the bridge formula, known as the TTI HS-20 bridge formula, was developed for the FHWA. This formula allows much higher weights on shorter trucks than the current formula. Under the federal bridge formula, a conventional four-axle truck with a 22-ft wheelbase and 9-ft triden can carry about 56,000 pounds. The new bridge formula allows the same truck to carry 64,000 pounds (20,000 pounds on the steering axle and 44,000 pounds on the rear triden). New configuration designs that take advantage of the new formula could allow trucks to carry up to to 70,000 pounds on a 22-ft wheelbase. (1)

In Canada, the Council of Ministers of Transportation and Highway Safety agreed on a common set of limits for tractor-semi trailer and double-trailer combinations

operating on designated interprovincial highways. The Canadian limits do not include an explicit bridge formula, but provide minimum axle spacing to spread the load. The Canadian bridge overstress criteria are more permissive than those used in the U.S., and a truck operating under the Canadian interprovincial limits would exceed the weight allowed by the U.S. bridge formula. (An eight-axle double with a wheelbase of 75 ft. could have 131,000 pounds under the Canadian limits, 22,000 pounds more than it would be allowed under the current U.S. bridge formula.)

The lack of continuity in the U.S. federal vehicle weight limits and the ISO standards, or the recent Canadian limits in an era of intermodal transportation calls for considerations of new approaches to vehicle weight limits. Indeed, attempts have already been made in this direction. Any new approach should be proposed on the national level and be adapted by all the states.

CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. Intermodal transport has become an integral part of international and domestic trade. The intermodal chain consists of many links throughout the container's journey from origin to final destination. An intermodal container can meet the weight limitations of a container vessel, crane, rail car or barge, but if placed on a truck for inland transportation in the U.S., it may violate the federal weight limits. Overweight trucks carrying containers have become the weakest link of the transport chain and can adversely effect the efficiency of the combined transport system.
2. Overweight trucks transporting containers is a national problem in the United States in both domestic and international trade. First, because of the international scope of the intermodal transportation system and secondly, because of the size of the problem. An FHWA study based on PIERS data files reveals that 34 percent of the containers moving through U.S. ports are potentially overweight if transported by trucks.
3. In Washington State, Based on a WSP study, 21.5 percent of the trucks that carried containers to and from the Ports of Seattle and Tacoma exceed the legal load limitations. The majority of the overweight containers are export commodities containers, most of which originate in Washington State. About 24 percent of the export containers and 12 percent of the import containers exceed the weight limits. Similar findings were found in a special analysis of PIERS data base of containerized cargo in Washington State.
4. Technically, a truck and container that exceed the maximum weight limits of 20,000 pounds per single-axle, 34,000 pounds per tandem-axle limits, and a

maximum gross weight of 80,000 pounds, subject to the federal bridge formula, violates federal mandatory weight limits that were established in the Surface Transportation Assistance Act of 1982 (STA). However, the issue is far more complex. First, with the grandfather exemptions, and special permits, trucks can legally exceed these weight limits. Second, the overweight issue is related to importers, exporters, ports, and other transport modes, not just to truck operators. Third, the weight problem is not isolated to containers. Many other truck loads also exceed the weight limits.

5. Reducing intermodal container weight to comply with highway weight limits can significantly increase the cost of transporting goods. In Washington State, where many of the export commodities responsible for the majority of overweight containers exist, higher transport costs may adversely effect the competitiveness of exports. Reduction of container weight can also increase the number of trucks moving on the roads, possibly resulting in greater congestion on the highways, in urban areas, and in ports.

6. The enforcement of vehicle weight limits is closely tied to the issue of competitiveness between seaports, states, exporters, and importers. The absence of standard weight limits and enforcement policies along the Pacific Coast compounds this problem. At one end of the coast, California maintains a stricter enforcement policy in regard to overweight permits than Washington and Oregon. At the other end of the coast, weight limitations in British Colombia are more permissive than those in the United States. Coherent national policy is the most likely solution.

7. Technical solutions, such as the new "super chassis" truck modification could alleviate many of the violations of overweight trucks hauling containers. However, efficient utilization of the new equipment greatly depends on the level of cooperation and the exchange of information on the container weights and

content. According to the Washington Trucking Association, the new chassis are available in Washington State but they are not efficiently utilized because of insufficient advance information on the container weights. Also, because of the competitive environment in the deregulated trucking industry, shippers prefer utilizing the standard, less costly chassis.

8. Availability and exchange of reliable information on container weights among shippers, transport carriers, and port operators is one of the critical missing factors in the enforcement of overweight intermodal containers. Because of the large volume of containers that move through Washington State ports (2.1 million TEU in 1991), identifying all of the overweight containers with the current enforcement resources is impossible. There are other informational sources on container weight that are available and could be considered for use as part of the enforcement effort. Among them are: port data records of all export containers (Gross weight only), PIERS data files based on transport documents, and the Electronic Data Interchange system used by government agencies, ports, and transport carriers and the use of private scale records.

B. POLICY RECOMMENDATIONS

- Support a uniform and comprehensive federal policy regarding overweight containers. A national solution, either in new approaches to vehicle weight limits or in enforcement procedures would be more effective than addressing the issue at the state level.
- Any measure on enforcement policy attempting to resolve the overweight container problem should consider the impact on the efficiency of the transportation and distribution systems, the economic impact on the state's international and domestic trade, and the competitiveness of Washington State Ports versus out-of-state ports.

- Support the development of an accurate and reliable container weight information system, which could be made available to all parties involved in intermodal movement.

C. IMPLEMENTATION

1. Encourage the development of national guidelines governing the transportation of domestic and international containerized cargo.
2. Maintain up-to-date information on the overweight container problem within the state, primarily through existing data sources (PIERS for example), to monitor the issue and to identify the main potential commodity violators.
3. Encourage the use of super-chassis and specialized equipment as a viable option to improve container weight compliance and help the coordination between seaports, truckers, and domestic shippers. (This is particularly important in Washington state due to the large portion of low-value and low-margin export commodities, which are sensitive to higher freight rates.)
4. Monitor the policies and enforcement practices of neighboring states regarding overweight containers to maintain the competitiveness of Washington State ports along the Pacific Coast.
5. Any proposed solution should not add to the congestion and demand for space in the ports. The scarcity of back-up areas in the ports already poses a problem
6. Legal authority should be given to WSP to use Electronic Data Interchange systems (EDI) as a means of identifying overweight containers. It is expected that in the future, EDI systems will increasingly be used to transfer transport documentation in domestic and international trade.
7. Encourage selective vehicle weight enforcement practices targeting potential container weight violators (spot enforcement) based on information obtained from existing data sources (for example, PIERS and EDI systems).

8. Propose special corridors and designated routes between seaport terminals and intermodal railyards over which overweight trucks may operate. This practice could be extended to a limited distribution zone around the ports.

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