This study assesses the potential for domestic double-stack container transportation and the implications of expanded double-stack systems for railroads, ports, and ocean carriers. The study suggests that double-stack service can be fully competitive with trucks in dense traffic corridors of 725 miles or more. There are opportunities to substantially increase double-stack service in existing corridors and to introduce double-stack service in secondary corridors, in outlying areas near major hubs, and for refrigerated commodities. To meet the challenge of providing and marketing a reliable, high quality, door-to-door service, railroads may have to take unaccustomed steps into marketing and customer service, or become strictly line-haul carriers. Ports must accommodate international double-stack growth, but they will be only indirectly affected by domestic containerization. Intermodal affiliates of ocean carriers will retain their leadership role in domestic containerization, while the ocean carriers themselves concentrate on international movements and markets.

The products available from this contract include the Executive Summary, the Final Report, and the Bibliography.
Introduction

This bibliography was compiled under contract to the Federal Railroad Administration and the Maritime Administration as part of a major study entitled "Double-Stack Container Systems: Implications For U.S. Railroads And Ports."

The dynamic nature of the subject matter prevents any attempt to compile a complete listing of every article or publication on double-stack trains, intermodalism, or domestic containerization. This bibliography concentrates instead on locating and annotating major studies, research reports, and useful overviews.

The citations are organized by general topic areas. Because of the nature of intermodal transportation itself, many publications tend to cross any arbitrary boundaries. It is therefore advisable to consult citations under related categories as well as under the main topic of interest.
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INDUSTRY OVERVIEWS


   Explains Canadian railroads' hesitation in the intermodal industry, and how deregulation has affected the Canadian railroads. Table included summarizes rail and intermodal revenues and facilities.


   Despite grim projections for the U.S. economy in late 1988, the intermodal industry pursues new developments.

   Documents the history and present technology of containers for agricultural commodities. Sea-Land appears to be the leader in experimentation in this area, and a number of its findings are reported.

   This study analyzes the economic and institutional attraction of boxcars, intermodal motor carriers, and new maritime container technology. Interviews reveal that maritime container technology would have the greatest potential impact upon the future of intermodal surface transport.

   The ways in which the U.S. railroad industry is reacting to the challenges of intermodalism are discussed. Various factors have improved service efficiency and led to cost savings, but they have also changed the industry. Double stack trains and domestic containerization issues have also added to the complexity of the situation. [From U.S. MARAD's MARIBASE]
INDUSTRY OVERVIEWS


A summary of speeches given at the 1986 Intermodal Transportation Association's conference in Seattle. Cooperation among operators was the main theme. Equipment options and operators' adaptations were also discussed.


Summary of paper presentations and speeches by Daniel Smith, Manalytics, Inc.; David J. DeBoer, Greenbrier Intermodal; and Peter Metria, American President Intermodal. Topics covered include the potential for domestic containerization and the history and expansion of double-stack service.


Analyzes the potential for domestic containerization by defining the market in terms of demand, supply, and competition. Concludes that the current supply of containers could adequately serve the demand in the near future, but that the potential demand is large. The market will be highly competitive, and leads railroads to compete in the price-sensitive, rather than service-sensitive markets.


An overview of the issues involved in domestic containerization: technical, economic, and institutional. Draws the conclusion that domestic containerization offers potential cost savings over other intermodal systems, and that domestic containers can be successfully integrated into existing systems. The report delineates obstacles which may stand in the way, and also includes a large section on suggestions for a detailed study. Tables and charts depict cost summaries and market trends, and pictures illustrate the equipment.


Anticipates the growth of domestic containerization beyond the shipping line network. Views specific service contracts as integral for expanding the infrastructure. Explains some of the barriers to growth in 1985.
INDUSTRY OVERVIEWS


One of the key challenges in pursuing domestic containerization is the ability of the current system of trailer-based intermodal terminals to adapt to container-based systems. This paper provides an overview of terminal design and operating issues that trailer-on-flatcar (TOFC) terminal managers and designers will face with a transition to domestic containerization. The issues covered include management and control of chassis, terminal mechanization requirements, alternative highway and rail transfer methods, labor requirements, and requirements for container and chassis staging and parking. [From the introduction.]


A Transportation Research Board Conference report describes terminal container equipment. Analysts suggest solutions for various equipment problems: chassis storage, mechanization investment, vehicle identification, etc.


Suggests that international shipping may sometimes be at odds with domestic containerization due to cargo configurations and space requirements. One official stresses that education and incentives are lacking in packing requirements on the different sized containers.


Summarizes speeches made at a 1988 Worldwide Shipping Conference with the main thrust being that port authorities need to cooperate within the "transportation chain." Stress was placed on long-term management approaches which would include soliciting government support for port facility expansion.

This study examines current intermodal developments in the United States, with particular emphasis on ocean carrier double-stack container train services. It evaluates the effects of new container freight services on existing conventional rail/truck intermodal services. An overview of traffic patterns, the competitive relationships between marine and inland carriers and the impacts of the emerging competition on shippers are provided. Recently published studies by others are used to provide a preliminary assessment of the economics of various intermodal train technologies and services. Cost estimates developed by the Association of American Railroads are used to develop cost indices for these economic comparisons. [From the executive summary.]


Examines the impediments to the use of TOFC (facilities, equipment, capital cost, motivational factors); identifies federal agency programs having an effect or possible effect; recommends actions for public or private agencies to encourage intermodal movement.


In-depth assessment of the current logistics which support ship and train container transfers. Specific facilities and managers' philosophies are described.


Ramifications of Canada's National Transportation Act, which include the potential for U.S. railroads to "invade." The Canadian lines recognize that improvements in their intermodal facilities are needed, as well as a cooperative effort with the U.S.


The rapid growth of container transportation has brought attendant problems, not the least of which is the handling, processing, and exchange of data that efficient control requires. The proposal outlined in this paper attempts to solve this problem by providing a standard communications code for use between operators, leaving each individual operator free to use the internal operating code of its choice.
INDUSTRY OVERVIEWS


Different types of cargo suitable for domestic containers are described, as well as statistics for platforms in use and intermodal fleet platform-miles. Indicates K-Line's intention to double its stack car fleet, and includes a few representative opinions on domestic containerization trends.


Summarizes the findings of the 1986 Temple, Parker & Sloane study on domestic containerization. The study concluded that domestic containerization is bound to replace the current trailer-based system, and that double-stacks are the most cost-effective of the new technologies.


First in a four-part series, this article attempts to define "microbridge" and its future. Predicts that the railroads will handle the bulk of the business and delves into some of the economic problems in organizing services. Educating the shipping public about microbridge issues is stressed.


Stresses the importance and objectives of research to assess company needs, and to find the correct intermodal carrier. Contains a list of pertinent questions for prospective carriers, as well as listing two sources for obtaining intermodal information.


An analysis of government policy on water and truck-rail competition. Using a time series regression model, concludes that the Motor Carrier Act of 1980 and the Surface Transportation Assistance Act of 1982 will continue to have a depressing effect on the rail market, but the highway policy is beneficial to motor carriers, and water carrier competition has improved as well.


Two Temple, Barker & Sloane associates describe growth projections based on past statistics. Continuing profitability problems are defined and the contribution of new technology is discussed.
INDUSTRY OVERVIEWS


This paper presents a survey on the current status of some selected R&D projects in the field of intermodal transport, under way in the Federal Republic of Germany or which have recently been finalized.


Quickly describes Santa Fe's, Chessie System's and BN's involvement in intermodalism at the time of this article (1985).


The author, president of Atlantic Container Line USA, discusses the positive aspects of utilizing Ro/Ro ships for the North American Trade and comments on the status of intermodal transportation in the context of deregulation of the U.S. railroad system. [From U.S. MARAD's MARIBASE]


An overview of intermodalism which credits deregulation for its upsurge. Briefly describes different movements, third parties, terminals and equipment, as well as reasons for its appeal.


In an age of intermodalism, the conventional planning methods and criteria previously used to design container terminals and intermodal facilities in the United States will no longer be adequate. There will be a requirement for continual technological and operational advances. These will include increased vessel and crane capabilities, coupled with demands for the just-in-time arrival of containers at rail transfer facilities and for the distribution of containers by high-speed double-stack rail service. [From U.S. MARAD's MARIBASE]


Vincent Grey, equipment consultant, gives his reasons for the standardization of domestic boxes. ANSI is leaning toward a 48-foot standard, and their specifications and justifications are included.
INDUSTRY OVERVIEWS


Excerpts from speeches made at the 1988 International Intermodal Expo which emphasized a "single system" of intermodalism. Shipping containers are viewed as the key to intermodalism due to their flexibility and international appeal, but their use has been stunted due to railroads' unfamiliarity with them and the size restriction question.


Gives a brief history of maritime-rail interface and brings up logistics questions for current and future developments. Double-stack technology is described as an integral part of this interface, and needs to be addressed as such.


Documents a few companies who were not pleased with the intermodal service they were getting in 1982, as well as a few for whom the service works well.


Documents the intermodal development of the larger service shippers, some of the smaller lines, and the NVOS which negotiate service packages for clients, utilizing all modes. Domestic coordination is emphasized as the key for the future.


Explains Europe's system of shipper responsibility and control of intermodal transport. Success is attributed to the European geographical layout, and is not easily comparable to U.S. mini-bridge.


Briefly documents multimodal growth in Canada, discussing regulatory and logistics issues. Charts illustrate costs, revenues and capacities of various modes.

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INDUSTRY OVERVIEWS


Short overview of the newest intermodal developments in North America. Mention of information transmission as an area needing significant improvement.


Defines on-dock transfer and the issues surrounding it. Describes specific terminals and equipment used. Emphasis is organizational/institutional innovation as opposed to technological.


The key to the future, for the third generation of the shipping industry, lies in effective planning. The traditional view of planning as synonymous with engineering design and with a window of up to 5 years into the future must be abandoned. Instead, planning must be seen as a process, a series of activities that occur in a logical order or sequence. The complex interactive nature of all of the elements that are involved in a marine or intermodal terminal operation must be considered in developing plans. [From the introduction].


After using a rail cost model to evaluate intermodal technology, the study suggests that the double-stack and "truck equivalent" container trains are "substantial improvements in operational efficiency."

44. "Pro and Con: Domestic Containerization." Richard Knee. AMERICAN SHIPPER, v. 26, no. 12, December 1984, pp. 18-22

A report on the 1984 Intermodal Transportation Association conference. Summarizes speeches by leaders in the industry.
INDUSTRY OVERVIEWS

45. "Rail Versus Truck: Are Rail Intermodal Services a Serious Threat to the High Service Truckers?" Alex, Brown & Sons, Inc. RESEARCH TRANSPORTATION GROUP, INDUSTRY COMMENT. July 1987, 14 p.

Concludes that rail intermodal service does not threaten the high-service truckload sector because it taps only a small market; service requires high density, long-haul freight corridors; its costs are higher; its services are not as timely, reliable or flexible; and its equipment availability and quality are lower. Contains cost/service graphs and charts.


An overview of recent trends in domestic containers and projections for the future of the service. The possibility that domestics could cut into international backhauls is discussed.


A report from the United Nation's Economic Commission for Latin America and the Caribbean is reviewed. The document, entitled "Structural Changes in Ocean-Liner Transport," deals with factors bearing on liner trades and on the development of integrated intermodal systems. It also challenges prevailing opinion on the most cost efficient way to handle containerships and predicts that U.S. double-stack traffic could double by 1989. [From U.S. MARAD's MARIBASE]


Identifies the long-range impact that double-stack service will have on ports and intermodal service. Concludes that those ports that adapt the quickest to double-stacks will gain the most advantages. Also, double-stacks will lower general transportation costs and stimulate the movement of price-elastic goods and commodities. Included is a chart on "current" (1985) one-way double-stack train service.


Despite prevalent assurances about the general health of intermodalism, the economic performance and profits of the U.S. railroad industry are being seriously undermined by legislation, labor relations and competition from truckers. The difficulties in which the industry finds itself are reviewed. [From U.S. MARAD's MARIBASE]

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Article quotes a major shipper's agent to the effect that although railroads now control stack-train operations, shippers and ocean carriers are becoming more active in managing and marketing double-stack services.


Double-stack traffic from the West Coast to Chicago has been booming since 1985, but a study by Chicago's Trailer Train suggests that this trend should slow and that traffic might perhaps even decrease in the face of pending protectionist measures in Congress. Auto parts traffic from the Far East is expected to double by 1991. [From U.S. MARAD's MARIBASE]


Referring to the increased ties between steamship lines and railroads, port officials give projections for future facility needs.


Discusses the technical challenges being posed to the container industry, including container weight, height, and capacity design considerations. Also cites the firms engaged in producing domestic containers.


The new double-stack railcar intermodal services are being touted as a long-term solution to the cost and service time problems often faced by international shippers moving products into and out of U.S. markets. The objective of this paper is to examine current intermodal developments in the United States, with particular emphasis on the impact of new container freight technologies on international logistics systems over the next few years. [From U.S. MARAD's MARIBASE]
INDUSTRY OVERVIEWS


This paper traces the evolution of intermodal transportation in the United States and points up a number of issues facing the railroads in relation to this concept. Topics covered include: development of American President Lines double-stack car system; confusion among railroads on whether to adopt domestic containerization; limitations in the potential of the double-stack concept; criteria for the "ideal" domestic container; experimentation with carless technology; uncertainty over the type of equipment for intermodal operations; and the future of intermodal traffic. [From U.S. MARAD's MARIBASE]


A major double-stack survey concludes that U.S. railroads will soon have to containerize domestic flows, a massive new market for the box. Included are tables giving statistical data on scheduled transcontinental stack trains, development of the double-stack railcar fleet, and stack-car owners/operators. [From U.S. MARAD's MARIBASE]


Defines intermodality, its participants, and new technology in the Western U.S. and Canada. An overview for a reader unfamiliar with terms and issues.


Describes intermodal facilities implemented at six West Coast ports. Mentions L.A.'s large scale '2020 plan', which will accommodate the huge increase in cargo expected by that time.
CORPORATE & PORT DESCRIPTIONS


   Explains the terminal planning philosophy behind Alabama's Huntsville - Madison intermodal terminal project which is fully automated and accommodates air, rail, and motor carrier modes.


   American President Companies has placed its intermodal operations under a new subsidiary, American President Intermodal Company. AP Intermodal will be the owner of American President Lines' new lightweight double-tiered container railcars, and will manage the railroad and trucking contracts for the line. [From U.S. MARAD's MARIBASE]


   "Consolidation and modernization" are the key words for improving the container handling activity at the Port of New York and New Jersey. Investment is needed in an unstable period of Atlantic Coast trade and a few of these improvements in the face of risk are described.


   Describes the new "joint marketing program" between the Port of Baltimore (Maryland Port Administration) and Chessie System which includes double-stack service between the Midwest and Baltimore.


   Describes BN's "international service packages" formed from international third parties. Representatives from the industry attempt to label this new level of service, which is basically NVOCC. The EDI system is mentioned as centralizing customer needs and carrier availability.


   This article reports on the emergence of the Burlington Northern Railroad as the provider of an ambitious, double-stack container train service between the Port of Seattle and Chicago. [From MARAD's MARIBASE]
CORPORATE & PORT DESCRIPTIONS


Detailed documentation of Canada's two transcontinental railways and approach to intermodalism. Explains the different tactics of each railroad and the "Freedom to Move" philosophy.


Explains the evolution, logistics, and economics of CN's planned $200 million investment in intermodalism by 1990. Competition from truckers is the main incentive to investment.


The precedent of CSX/Sea-Land Intermodal (CSLI) reveals the accomplishments and goals of this 6-month old company. Stresses intermodalism as integral to the transportation industry.


Portrayal of CSX/Sea-Land Intermodal includes its subsidiaries, route, fleet, and management.


Details the Ports of Oakland and San Francisco's plans for improving box traffic. The reasons for LA/Long Beach's success are delineated. Describes the West Coast port industry in general.


A report on the major container manufacturers: Stoughton, Freuhauf & Monon. An increase in production is caused by the railroads' adoption of the part piggyback/part-container policy. Sizing and design are discussed. Asian influences on the market are mentioned.


Report analyzes the impact of intermodal services, ocean carriers' increasing concern with land transportation, and other maritime industry developments over a ten-year period. Charts show containerizable TEU shares and trade activity for West Coast ports. Concludes that "long-term cargo flows are mainly influenced by factors outside the control of the ports."

The container-handling expansion of the Ports of Miami and the Everglades are discussed in the context of a national trend and the increase in Florida trade and population.


A short report on intermodal traffic in the South Atlantic area.


As the leading supplier of intermodal equipment, Trailer Train was asked about its intermodal projections, taken in consideration with economic and trade trends. Tables are included with equipment projection data.


This article discusses the plans of CSX Corp. to acquire the Sea-Land Corp., pending ICC approval. In this context, the author discusses the crucial role that Sea-Land could play in the efforts of the marketing and distribution division of CSX to develop a network of transcontinental double-stack services. [From U.S. MARAD's MARIBASE]


Surveys ICTF development in the three primary west coast port centers: Puget Sound, S.F. Bay Area, and L.A. Basin. Equipment and service capacities are outlined.


Briefly describes various ports and terminals around the country, and their plans for existing and future intermodal facilities.


The president of CSX/Sea-Land Intermodal (CSLI) reveals the accomplishments and goals of his 6-month old company. Stresses intermodalism as integral to the transportation industry.
CORPORATE & PORT DESCRIPTIONS


A short history of Itel and its subsidiaries is given. The presidents of Itel Transportation Services and Itel Container Corporation are interviewed, and future business strategies are discussed.


Details the development of Ford Motor Company's Just-In-Time operations which utilizes "tightly controlled" hub centers for its shipments.

23. "L.A. Box Transfer Facility Records Solid Progress." Bel Mongelluzzo. JOURNAL OF COMMERCE, October 20, 1988, p. 2B.

Reports on the development of the ICTF in L.A., as well as the politics involved in new development.


The new terminal operating company, Termont, is described, with intermodal projections for the future. A chart of cargo traffic for 1986 and 1987 is included.


Analyzes Conrail's decision to modernize its New England Intermodal facilities and the results achieved. Attempts to apply Conrail's experience to different areas.


The reorganization of NYK encompasses three regional headquarters dedicated to domestic intermodal operations.


Describes the philosophies of various ports concerning intermodal container transfer facilities and discretionary cargo. Industry analysts offer their opinions on advantages and disadvantages of such facilities.

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Describes intermodal facilities at Pacific ports and specifically the Los Angeles/Long Beach ICTF. Port administrators discuss their problems and plans as well.


Description of the Port of Tacoma's ICTF, which has two on-dock intermodal rail facilities within a 25-acre site.


Overview of the changes occurring in the West Coast ports as a result of increased intermodalism. Problems and developments within specific ports are discussed.


A manager of Norfolk Southern Corp. discusses her views of intermodalism and plans which include offering faster, flexible, damage-free freight service. Mentions Road Railer as a helpful extension of NS rail service.


As part of its strategy for expanding its intermodal operations (scheduled for implementation through 1985-1986 and beyond), Sea-Land Service will provide its own double-stack cars, control its own rail container terminals, and eventually invest in a fleet of 45 ft. boxes. [From U.S. MARAD's MARIBASE]


Description of Palmer, Massachusetts' inland seaport, which is part of a wider economic development plan for the area.

34. "South Atlantic Ports Key on Intermodal Services." CONTAINER NEWS, v. 23, no. 8, August 1988, pp. 32-37.

Reviews the impending improvements for the South Atlantic container ports, which are experiencing an increase in business: Wilmington, Charleston, Savannah, Jacksonville, Palm Beach, Port Everglades, and Miami.
CORPORATE & PORT DESCRIPTIONS


Southern Pacific's view of an emerging network including both international and domestic container movements. Topics include the importance of California in balancing traffic and the growing commonality of equipment among modes.


Multimodal structural changes in Newfoundland over the past 10 years are described and applied to the situation in the U.S. Domestic containerization is mentioned as a major factor in the transformation.


Documents the emerging intermodal industry in 1984. Includes charts of intermodal movements by various railroad lines. Emphasis is on the "new" hub centers.


Describes the proposed improvements in Vancouver's Port Corporation which will double its container capacity by the year 2000.


Describes the West Coast ICTFs and the justification for building facilities. Also enumerates facility capabilities.


The impending opening and possibilities of the Virginia Inland Port are described. It will be a rail-truck intermodal terminal linked to Virginia Port Authority's Hampton Roads terminal by dedicated rail. It will cater to containerships unwilling or unable to move up the Port of Baltimore, and provide competition for that port.
RAIL INTERMODAL TERMINALS


Following visits to several Chicago rail yards that are handling stack cars, the author takes a look at the differing systems that are emerging. [From U.S. MARAD's MARIBASE]


The Ports of Los Angeles and Long Beach were faced with the common problem of overcoming the distance and travel time between the marine container terminals and the existing intermodal rail terminals. The solution was for the ports to develop a major intermodal container transfer facility or several smaller facilities within or in close proximity to the harbor complex. Various studies including an engineering feasibility study were conducted to determine the most efficient rail terminal layout and operational characteristics. [From the introduction.]


A major modernization program currently taking place at the Port of San Francisco illustrates the considerations and constraints involved in planning a state-of-the-art intermodal marine facility. Impediments to designing modern intermodal marine-rail facilities include problems such as lack of land for expansion of existing facilities and modification of existing facility requirements to accommodate variations in equipment and operations.


Describes the role electronic data interchange will play in the impending Rail-Bridge terminal, a new inland double-stack terminal in Elizabeth, New Jersey.


The Corwith railroad terminal was established in 1888 as the eastern terminus for Santa Fe trains, was sufficient for the trains of 100 years ago but hardly adequate for mid-twentieth century trains. With the advent of piggybacking, it was necessary to purchase additional land for intermodal facilities. [From the Introduction]
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RAIL INTERMODAL TERMINALS


The author reports on her visit to Chicago and North Western's $36 million double-stack Chicago facility, scheduled to open in December 1986 as the first railroad terminal dedicated solely to dealing with double-stack trains. According to the author, the yard could be handling up to 700,000 TEU's by the end of 1987. [From U.S. MARAD's MARIBASE]


Trends in design and operating systems for intermodal rail terminals are examined. Discussion is focused on three main topics: terminal equipment and construction; computer application in terminal design; and rail movement options. [From U.S. MARAD's MARIBASE]


In 1985 the Port of Tacoma completed two new railroad intermodal facilities that embody a whole series of features that are unique in the port industry. About 80 percent of all imported container traffic coming into Tacoma is destined for U.S. markets in the Midwest and on the East Coast. This makes the port's intermodal rail connections a vital link in assuring that container cargo coming in through the port is moved rapidly to its final destination. [From the introduction]


The purpose of this paper is to show how Santa Fe Railway used an integrated computer system to manage the physical operation of major intermodal ramps. The main benefit of this system is the ability to take information used predominantly to support one particular area of the operation and blend it with information gathered for other areas to support the entire intermodal facility.


The intermodal container transfer facility (ICTF), jointly developed by Southern Pacific Transportation Company (SP) and the Ports of Long Beach and Los Angeles, was officially opened on January 15, 1987. It is expected that it will handle up to 280,000 containers during its first full year of operations. [From U.S. MARAD's MARIBASE]
INTERMODAL MARKETING

   
   Describes BN's less-than-container-load service for international shipments moving through Pacific Northwest ports, using third parties for the service rather than in-house expansion. The program is open to customs house brokers, freight forwarders, cargo consolidators, and NVOCC companies.

   
   Describes Burlington Northern's Expeditor trains which are short, fast, frequent intermodal trains competing with trucks in the short-to-medium distance range. Discusses segmentation of the railroad's services to accommodate different markets.

   
   A summary of the 27th annual Transportation Research Forum where experts discuss several aspects of domestic containerization, including the marketing of railroad services to meet the needs of the trade. Weight/size alternatives, cost simulations, and requirements for efficient containerization are discussed.

   
   Projections for third party involvement in the intermodal industry are given by intermodal marketers. Consolidation of third parties seems to be the emerging trend.

   
   A plea for third parties and railroads to act as a "unified network" by being more responsive during the drayage process. He gives tips on "completing the service cycle" effectively so the customer can receive the product on time.

   
   Identifies three profitability variables: labor cost, terminal cost, and equipment cost. Also pinpoints market opportunities, equipment management, conversion of motor carriers to intermodal, and diversion of all-water international business to land bridges.
INTERMODAL MARKETING


   Gives examples of new services marketed by different rail lines. Encourages "product improvement," which is a new concept to railroads.


   Summary of the International Intermodal Expo. Among topics discussed: profitability margin, better labor contracts, higher service standards, increased containerization of bulk commodities.


   Trailer Train conducted an intermodal market survey and concluded that it has "natural boundaries of segmentation," based on size of container. Discusses issues regarding the Teamsters, third parties, and major intermodal customers.


    A Norfolk Southern representative maintains that traffic imbalance is the greatest obstacle to continued container growth and consistent competitive price levels and believes in third parties and customized services.


    A report on the development of Sea-Land's master plan, which includes an increase in intermodal activity, more efficient container handling, and new vessels.


    A summary of papers presented at the Intermodal Transportation Association Conference. Analysts felt that intermodal operators were losing business because of a lack of marketing techniques, or because they are not making their advantage known to the correct audience. Suggestions include marketing to banks and financiers, and to small shippers and clients with fragile merchandise. It was suggested that problems in image would be overcome by a positive marketing plan.

Describes how truck supercarriers are challenging the stack train market, which presently has the lowest cost structure.


Describes the newest developments undertaken by several railroads, and attempts to explain the innovative marketing strategies discussed by industry analysts and company representatives.


A criticism of the railroad industry for not participating in common marketing techniques in order to utilize present resources more effectively. Maintains that the "phantom five feet" (5 feet added on to the 40 foot trailer) are causing profit loss due to underutilization by shippers. Offers some concrete suggestions for areas of study.


Author predicts large-scale changes in the intermodal field in the near future, and cites the role of personnel and information systems development in achieving equipment and terminal productivity increases. Such increases are required to overcome the marginal profitability of intermodal traffic.
DOUBLE-STACK TRAINS


   Announces the experimental stack trains (1983) of APL and Transway, in attempts to improve their economics, but not necessarily market share.


   Documents the development of double-stack trains at this time, and specifically USL and NYK. Chart includes services operating for 1985.


   Burlington Northern Railroad decides to introduce domestic containers and double-stack cars, largely displacing the conventional trailer on flatcar piggyback technology used in its domestic Expediter intermodal network. Ingram, the new vice president, discusses his plans for BN and the direction of domestic containerization.


   Discusses problems in double-stack operations, and suggests solutions. Mentions ship-railroad coordination, terminal operations, car-loading, and container "blow offs."


   Describes some of the initial successes and problems of APL's Linertrain, which had been running for 1-1/2 months at the time of this article.


   Discusses the advantages of "block space" utilized on stack trains, as opposed to dedicated trains. Hanjin's use of BN's "cooperative" service is given as an example.


   Predicts growth of domestic double-stack, decline of piggyback. Conrail is moving toward a double-stack service for larger containers competitive with trailers by the 1990s. Includes checklist for improving intermodal profitability.
DOUBLE-STACK TRAINS


Examines the cost savings of double-stacks as compared to conventional TOFC/COFC cars. The estimated 40% savings must be combined with efficient backhaul operations and smaller crews in order to decrease labor costs.

8. "Dallas/Denver All-Box Service." Bruce Johnson. AMERICAN SHIPPER, v. 30, no. 6, June 1988, p. 44.

Describes BN's new domestic stack service which will phase out its piggybacks on this 800-mile run. Centralization of pricing, marketing, and operations is the key factor. New asst. vice president views a mixture of intermodal equipment as favorable.


This study documents the cost of handling freight via a double-stack network and its potential impact in New York State. It established: 1) traffic database; 2) cost-service profiles of transportation options; 3) comparison of competing modes on cost and delivery-time basis and an estimate of the potentially divertible traffic.


Double-stack container trains are studied from the perspective of an ocean carrier. Use of double-stack container trains for ocean carriers involves such considerations as the origin and destination of the trains, the choice of the party to manage the rail movement, and the size of the containers. In the final analysis, the ocean carrier must determine how these issues can be integrated into its overall corporate strategy.


The efficiencies of double-stack cars and low westbound backhaul rates may be of particular value to agricultural exporters.


Overview of history of double-stack container services as of July 1987, with emphasis on the needs of agricultural exporters. Includes a list of double-stack trains and carrier contacts.
DOUBLE-STACK TRAINS


A brief overview is given of the development, economic benefits, operation, and terminal facility requirements of American President Lines' double-stack container rail car system.


A report on this U.S.D.A.-sponsored double-stack session, which included representatives from APL and CNW, who spoke of economics and new developments in double stack service.


Double-stack trains are a North American innovation made possible by high-volume, long-distance container movements that are not subject to any height restrictions of the sort that apply in Europe. The design changes made by the two principal manufacturers of stack trains as a result of several years of experience are discussed. [From U.S. MARAD's MARIBASE]


Interviews with several industry leaders and consultants reveal agreement on the potential for further double-stack expansion and domestic containerization.


Attempts to compare all-water and landbridge costs and markets (includes chart). Concludes that the only survivors of all-water service may be the large worldwide shippers or those with very efficient truck transfer capabilities.


The future of double-stacks is discussed according to various company representatives. Infrastructure and terminal capabilities are mentioned as major obstacles.
DOUBLE-STACK TRAINS


Examines economic factors and institutional viewpoints of the double-stack industry. Includes hypothetical cost factors and policy descriptions and suggestions.


The purpose of this thesis is to educate the military transporter on double-stack train developments. A very comprehensive overview which includes pictures and extensive description of equipment and a list of sources. It also examines such issues as efficiency, future cooperation between modes, and impact on military shippers.


The economic appeal of the double-stack is explained, as well as its relatively "late" development.


The Alaska Hydro-Train (AHT) which operates from Seattle and contains consumer goods construction materials, and oil-related commodities is capturing a high percentage of the Alaskan transportation market. Describes AHT's double-stack.


In-depth analysis of the double-stack business from its beginning to present state. Describes the individual shipping and rail companies involved, with specific information on routes and schedules.


Southwest gateway intermodal business developments are described. Los Angeles' large population/industrial base fills westbound containers consistently and that city has the maximum clearance of any port area on the West Coast. Terminal developments and logistics are also discussed.


Details the evolution of APL's and Sea-Land's stack car configurations. The stack services are compared to piggyback.
DOUBLE-STACK TRAINS


Describes the burgeoning of double-stacks in 1985 and the profitability factor and pricing structures.


An overview of the double-stack trends at this time (April 1987) and locations that the different rail lines serve. Analysts and rail and shipping representatives discuss their philosophies and projections for the industry.


Announcement of SF's new domestic container service between Modesto, California and Chicago-Kansas City, which features double stacks both eastbound and westbound, designed to cater to wine and canned goods shippers of the San Joaquin Valley.


Topics discussed include the following: the economic advantages of moving commodities in double-stacked containers; the design of double-stack rail cars; and the operations of APL, Sea-Land and Burlington Northern Railroads double-stack trains. [From U.S. MARAD's MARIBASE]


Describes APL's experiments in double-stack reefers to the midwest and the particular problems attributed to them: special loading patterns; a daily flexible schedule; refueling problems; reluctance on the part of shippers to switch to this mode. Suggests that in order to make it feasible, it must be a "combination of technology, marketing and logistic control."


A detailed description of a stack train operation, which includes route and line information and new equipment improvements.


Discusses Santa Fe's transcontinental stack-train service aimed at domestic shippers and the wide variety of equipment being made available. Emphasis is placed on its goal for an increase in its intermodal business.
DOUBLE-STACK TRAINS


Double-stack safety features, terminal handling efficiency, and ride quality are evaluated and compared to conventional flatcars. Bulkheads, interbox connectors, and flippers are discussed. Concludes that relative operating and terminal handling costs will determine which design will be most effective.

34. "Should Ports Run Their Own Stack Trains?" Richard Knee. AMERICAN SHIPPER, v. 30, no. 8, August 1988, pp. 54-56.

Describes the proposed SCORE operation: Southern California Overland Rail Express service operating out of Long Beach and Los Angeles, which could serve "second- and third-tier" ocean liners. Legal implications and carrier reactions are discussed.


Representative of Gunderson describes new rail car developments, including the coupling of Road Railers with stack cars. Also describes the Maxi-Stack cars, which are geared toward both domestic and international markets. Plans for new auto containers are also discussed.


Experimentation with the design of domestic containers is discussed. Cost, weight, dimensions, interfacing capability, and load conditions are considered.


Rates Gunderson, Thrall, and ACF in terms of cars in service and cars on order.


The first double-stack service in Iowa is due to the dedicated cargo of Maytag Co., which has significantly reduced its transportation costs.
DOUBLE-STOCK TRAINS


Concludes that double-stacks are still at a disadvantage because of capacity constraints at high-density terminals, problems with drayage operations, and shipment tracing problems. However, growth of piggyback traffic and replacement with double-stacks and Road Railers will penetrate the medium-to-high density, long-haul truck lanes (non-service oriented).


Reference article on the development of double-stack trains and the leaders in the industry, namely American President. Contains charts on stack train growth and corridors. Politics and trends in the industry are discussed.


Developments in the double-stack business are discussed, including size considerations and price disputes. A chart of principal operators and their routes and capacities is appended.
ROAD RAILER, TRAILER TRAIN, AND PIGGYBACK


BN's attempt to market its boxcar backhaul from the Midwest to the Northwest, utilizing third parties, will not jeopardize its own domestic container and piggyback car programs.


Explains the decision of the ICC to exempt TOFC/COFC from federal regulation in order to "stimulate improvements in service." It did not, however, grant the setting of piggyback rates antitrust immunity.


Railroad executives discuss the future of piggyback at the 1986 MODERN RAILROADS' Intermodal Conference, agreeing that intermodalism is "the most hopeful development for the old business in over two decades," but disagreeing on other issues, including labor, equipment and service requirements.


Detailed description of Road Railer and its accompanying equipment, as well as the marketing strategy used by this company.


Maintains that double-stacks will complement piggybacks, if piggyback services provide improved management and facility control. Evaluates the market at this time, projecting a surge in the industry.


Describes the hub center concept and terminal and equipment innovations in 1983.


Previews the issues and equipment to be discussed at the 1984 National Intermodal Forum and Piggyback Exposition. Various railroad company executives give their opinions on the future of piggyback.
ROAD RAILER, TRAILER TRAIN, AND PIGGYBACK


Production has increased for piggybacks but profitability has lagged, and this article suggests a few reasons why. Quotes mainly from an unofficial ICC study. Road Railer and double-stacks are seen as integral parts of the intermodal system.


Describes plans to run high capacity, or "superwedge," trains through a hub and spoke system centered in Kansas City. Definitions of the system and market, and industry requirements are included.


Pictures and simplified description of Road Railer service. Company representatives emphasize cheaper cost, faster service, and smoother ride than conventional modes.


Attempts to project estimated costs, revenues, service, and freight traffic of TOFC trains between a midwestern consolidating point and a southwestern distribution point. Compares estimates to freight trucks and concludes that it would be very profitable and a shot in the arm for the railroad industry.


Discusses the issues involved in adopting Road Railer technology. Mentions labor disputes as a major impediment.
TRUCK COMPETITION


   Paper examines intercity truckload competitive factors: changes in equipment, mileages, wages, commodities, etc. Attempts to define trends in the industry which have improved its competitiveness. Concludes that mixed commodities, non-union drivers, larger trailers, and increased productivity have contributed positively.


   Report on the impact of the 1987 Surface Transportation Assistance Act and an impending longer combination vehicle network on the railroad industry.


   A summary of the issues raised at the 1988 ATA Management Conference and Exhibition, entitled "Conceptions and Misconceptions of Intermodal Trucking." Participants were urged to expand their concepts of drayage and flexibility was encouraged.


   A representative of Strick Corp. told the National Association of Shippers' Agents that railroads must offer a complete package of equipment, price, and service to compete with trucks: Representatives of Trailer Train, Greenbrier Intermodal, XTRA Corp., and Transamerica Distribution Services were in substantial agreement.


   Industry representatives and analysts offer their opinions on the truck vs. rail issue. Shippers perceptions of rail service are still fairly negative. Rail's impediments to lower costs and better service are outlined.


   This report claims that a large opportunity still exists in lanes under 500 miles in length for truckload carriers, despite the private to common carriage conversion due to deregulation. Author recommends those carriers with tight control systems.
OTHER COMPETITORS


   An engineered cost model used to project fuel consumption for existing double-stack container trains and hypothetical integral intermodal trains between Los Angeles and Chicago. The author found the HPIT could reduce fuel consumption by 12% compared to conventional double-stacks. Examines many design factors in detail and discusses the implications of the study for the industry.


   Describes Robert Ranck's Trailer Xpress Company. A firm disbeliever in double-stack services, he intends to operate his trains with much more flexibility and more cost effectively than double-stacks.


   Meticulous description of the HPITs augmented by a picture-chart which outlines the attributes of various trains. Equipment and terminal logistics are discussed, as well as implications for the future.
MULTIMODALISM AND INTERNATIONAL INTERMODALISM

   Discusses the implications for next year's U.S.-Canadian free trade agreement as it relates to the double stack industry. Author feels Canadians are too cautious in implementing double stack service, and may "lose out" because of it.

   Describes Honda's commitment to quality multimodal services and community responsibility via Honda International Trading Co. which fills inbound containers for return movement back to Japan.

   An overview of European domestic containerization which developed out of the formation of European box dimensions. A comparison between the U.S. and Europe reveals similarities in intermodal theory, but many technical differences, largely due to population density and individual government subsidies.

   Theoretical costs (British) are applied to seven different configurations. Concludes the most cost effective method is lifting directly from stack to rail. If this is not possible, the study recommends that the rail should be close to the container stack and the berth should manage the rail terminal.
INTERMODAL HISTORY

   Announcement by APL to use 53-foot containers for domestic use, which can ride on the upper tier of APL stack trains. Documents fleet increase in containers and chassis as well.

   Precise description of containers currently used in industry. Identifier codes are also charted.

   Documents the use of the first stack car unit train used for front and backhaul by APL.

   A concise, illuminating article on the development of containers from the Roman Ages to the present. A chronological chart included with a few illustrative examples.

   An article describing the evolution of containers (beginning in 1917) in Cincinnati area, which proved to be economically feasible.

   A detailed overview on the development and current designs of container intermodal cars. Contains clear pictures and helpful charts: capacity comparison table; chronology of intermodal cars; guide to Trailer Train initials.

   Includes all aspects of intermodalism: history, containerization, equipment, etc. Contains useful pictures, charts, glossaries of sources.

   Briefly documents the development of intermodalism from 1847 to the present.
INTERMODAL HISTORY


A detailed analysis of the evolution of the container, written by an historian. The author also speculates on the role of the ICC.


Describes the different-sized containers owned by APL (40, 45, 48 ft.) and APL's plans for investment in domestic containers.


This article identifies design characteristics of various piggyback models. Equipment terms and identifier codes are explained: trailer operators/builders and fleet facts are outlined.


Describes BN's plans for its hub centers to accommodate intermodal activities, which is stressed as being more advantageous economically. Attempts to define "hub" and project the future position of truckers.


Analyzes the reasons for restraint on the part of the railroads when considering double-stack rail car investment. Points to the confusion regarding the ideal domestic container and equipment/facility limitations.


Announcement by BN and Conrail to use neutral chassis pools for double-stack shipments to the Midwest.


The article has an historical slant to intermodalism, explaining how some of the infrastructure developed. Problems with the structure are couched in terms of "shifting lines of responsibility": untrained/unmotivated railroad union employees; cargo liability; shipper vs. third party, etc.

An early article on the development of domestic containerization. Hub centers, equipment problems, and design specifications are discussed.

Technical advisor to the Technical Advisory Group of the ISO explains CEDEX - Container Equipment Data Exchange - and its role in container logistics. The standard nomenclature is also described.


Traces the development of container standardization and reviews agreements currently up for discussion by the ISO in Europe and U.S./Canada. Makes a case for container bifurcation: unrestricted vs. "captive" (or trade-route-limited).


Describes the current state of the domestic tank container industry, which is developing slowly. Emphasis is placed on improvement of support services.


Crane, trailer, car, and intermodal industry developments for 1983 are described in detail. Safety considerations are also mentioned.


Describes the evolution of the domestic container due to the efforts of the ISO and operators demanding larger capacity and increased strength. Stresses common interface standardization in the face of a diversified market.


New (1983) cars and handling equipment developments are detailed. Intermodal traffic volumes are also documented.


The latest in intermodal handling equipment is described.
INTERMODAL EQUIPMENT


Describes new (1982) car developments, arranged by companies emphasizing weight considerations and new sizing. Costs, ride, lift, and load capability, etc., are some of the elements described for each type. A chart is included.


Presents all of the emerging (1983) car design considerations and names their manufacturers. Economics and future intermodal trends are considered.


New (1982) car designs are described and their drawbacks and advantages are delineated. Analysts predict a trend toward the specific-use car, as opposed to the all-purpose car, which tends to be too heavy. Major manufacturer representatives discuss cost, weight, and logistics involved in new designs.


Aluminum is credited as being responsible for much of the new car developments. Mentions High Productivity Integral Trains (HPIT) as the newest innovation.


The report presents summary results of a research program sponsored by the D.O.T. F.R.A. The program was concerned with safety issues of flatcars and the transport of liquid hazardous materials (hazmat) in intermodal configurations. [Abstracted by NTIS]


Description of Monon Corporation's approach to the burgeoning domestic container and chassis industry. Emphasis is on quality craftsmanship and adaptation to the market.
INTERMODAL EQUIPMENT


Existing double-stack designs are described in terms of their advantages and shortcomings. The next generation of stack cars is portrayed and suggestions for improvements are given. Emphasis is placed on increased capacity.


Projections for intermodal equipment configurations are given by manufacturer representatives. Domestic container growth is used as a premise for impending specialization and improvements.


Several U.S.-based manufacturers of container handling equipment, and also some outside the U.S. are devoting a good deal of their time and resources to developing equipment especially designed for use at railroad terminals for handling trailer on flatcar (TOFC) and container on flatcar (COFC) services, including double-stack operations. [From U.S. MARAD's MARIBASE]


Enumerates the production of Gunderson and Thrall stack cars from 1985-1987. The bulkhead design is explained, along with it's advantages and disadvantages. Road Railer and similar technologies are discussed by the two company representatives.