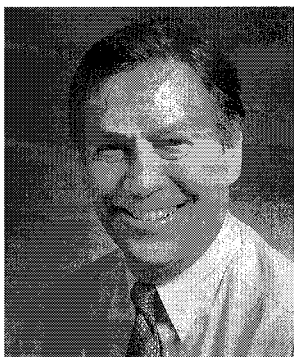


III. PANEL PRESENTATIONS

Equipment Panel

George C. Woodward, Moderator



*ITI Board of Directors
Senior Vice President and CCO
ALK Associates, Inc.*

The story of equipment is a fascinating one, and it is a story that we may have lost sight of, given the world that we live in today. These industry leaders had the opportunity to create something, to do something before standardization. They were the people who actually signed on the line and took on mortgages and lease payments when there was still a significant amount of risk to these actions.

The ability to transfer and move freight efficiently has been a key factor in the development of intermodal. The early history of intermodal is linked with equipment innovations and new technologies. This continues today.

PANELISTS

**Charles F. Kaye, Henry V. (Hank) Logan,
Aaron J. Gellman, David J. DeBoer**



(Left to right) Hank Logan, Charles Kaye, Aaron Gellman, Dave DeBoer, and George Woodward.

Charles F. Kaye

Chairman

Transportation Investments, Inc.

Equipment is tangible; you can touch it and see it, and I have always enjoyed the unique fragrance of new equipment and looking at shiny new trailers or domestic containers and seeing them move. XTRA Corporation, which I was associated with for over 20 years, is the oldest, existing, major equipment leasing company in the United States. The leasing industry did not really exist in terms of large equipment leasing prior to the mid-1950s, and then it started on a very, very modest basis. Large equipment is specifically trailers, domestic and foreign containers, chassis, and some terminal equipment. How was this large equipment acquired in the world that existed in the mid-1950s to early-1960s? There were many players in the game at that time, some of whom had conflicting interests.

The Equipment Players

The railroads were important and clearly a major player because they were the ones who ultimately carried the equipment that carried the freight. The motor carriers were extremely important because they were major competitors. The marine carriers, at that time, were not as important. Freight forwarders, consolidators, played a large role. And, the federal government was a big, big player, for, as you recall, we were living in a wholly regulated industry in those days. The Interstate Commerce Commission (ICC) was the "bauble of marble" in Washington DC to which we all paid homage, if we were in these businesses. It is no accident that in those days the presidents of the major railroads in the United States usually emanated from the legal department, as it was a highly regulated industry. In addition, the federal government was terribly important because of its ability to control interest rates, which to people who had to finance equipment, was terribly important.

The interstate highway system was beginning to be built at this time. It carried some of the seeds that bring us to this intermodal conference because it allowed the motor carriers a means of travel that they did not have before, and they did it on our tax dollars. At the same time, you have a group of people who were trying to invent a new system, called piggyback, a way of moving trailers on flatcars. And last, but not least with respect to financing, is the fact that the investment tax credit was invoked actually three times over this period of time. For a company such as XTRA, the tax credit provided a major advantage.

In 1956 and 1957, intermodal was really struggling, and all of these people were competing with each other for part of what seemed like a good idea but was very fragmented. The banks were involved, to be sure,

and insurance companies were also involved. But there was nothing on the scene, such as large mutual funds, that moved equity around. Commercial paper was not available at all. Preferred stock from leasing companies was not even thought of at this time. We were dealing with pretty cosmopolitan but very traditional ways of financing.

I grew up during the Depression, and I always thought that banks in the Midwest were the most conservative institutions I had ever seen. I expected banks in the East to be even more so. Nevertheless, banks in the East really were, and are, risk-takers, and their experience is different historically. They did not lose farms; they did not go through a lot of bankruptcies with family businesses the way banks did in the Midwest. It was a new environment for me in the East. It was an environment that gave rise to the financing of piggyback equipment because the Eastern bankers were willing to take the risk.

The Equipment Leasing Company

Enter people looking for equipment and enter the leasing company. Two or three people with an idea formed XTRA. Carl Tomm, long since dead and who was with the Boston & Maine Railroad (B&M), and Selwyn Kudick and Frank Ventre put the money together. They hired the vice president of a trucking company and they got some trailers. The major trailer manufacturers were not willing to give equipment, under any guise, to the leasing companies, because leasing companies were competition to the manufacturers and because some manufacturers were also in the leasing business. The fledgling leasing companies had to look at minor players in the trailer business. Interestingly, almost all of these trailer manufacturers evolved from wagon makers.

People started with no assets, just with a dream. They mortgaged their homes to get the startup money. I came over from the Massachusetts Institute of Technology (MIT). I thought I was an operating person when I went there, but it turned out I was thrust immediately into the financing side. It became clear that XTRA needed at least two things. First, they needed some economic credibility, so we took the company public and put it on the American Stock Exchange and raised some money. Prior to that time, all of the cash flow that came in from our modest earnings was put right back into equipment. A very modest salary was paid to the founders and even more modest salaries were paid to the employees.

Second, we had to make sure that we could offer a product that could track the equipment, a product that could also be a sales tool. I brought in some of my friends from MIT, and we established a software program and set up a tracking program for our equipment. We later gave

the program to the railroads, first to the Santa Fe, and they were excited about the product. It was good business and helped our system. These two things got XTRA going.

The Equipment Financing Practices

To finance a piece of equipment at this time, we would use conditional sales contracts. Sounds pretty simple, except that no bank would underwrite conditional sales contracts unless the manufacturer went on the paper. So we had a very complicated piece of paper. At the end of the line was a leasing company that promised to pay, but if they could not, the manufacturer was on the paper. For a long period of time, this was the only way to finance equipment. It was painful; it was tortuous. Eventually some of the banks in the East and the Boston banks were willing to lend money on equipment. The Bank of Boston gained a franchise in lending money to transportation companies and wrote the first evergreen loans for Ryder Transportation. This was not a big leap for Ryder, but it was for XTRA because this gave us a modicum of legitimacy. We also went to the insurance companies, and some of them would underwrite the financing. XTRA progressed and used this kind of financing to get additional equipment.

It then became apparent that we needed even more credibility in an economic sense. So we took the company from the American Stock Exchange and moved it to the New York Stock Exchange. To do that, we had to meet certain criteria for listing, including having a certain number of assets and a certain amount of revenue. Forget whether we made any money or not, which we were making, we had to have the revenue. Thus, we acquired capital, because in those days, the company's stock price was pretty high.

Once on the New York Stock Exchange, we gained financing with other banks and in other places. Things worked pretty well and the company prospered. During those years, however, a 3 or 4 percent inflation rate was a given and it began to accelerate. For the equipment business, it meant that the trailers had an economic second and third life, which allowed us to take a little more risk and to borrow under the equation $R = G$, or risk equals gain. We were willing to take the risk because we knew that we could sell the equipment at greater than our accounting book value. Equipment had an innate value, which was a great advantage.

We were betting on inflation, but in 1970 inflation began to get out of hand. President Nixon put a wage and price freeze on, and we were in big trouble, except for the conditional sales contracts. We did not pay them. We did not pay them with the acquiescence of the manufacturers

and the banks. They declared a moratorium. Not much was ever published about this, but for about nine months no money changed hands among XTRA Corporation and the conditional sales contract manufacturers and the banks. When the price freeze was lifted, we went back into business and all was forgotten. However, this helped XTRA during a very rough time. It also got XTRA out of financing with insurance companies and into the world where we could write commercial paper, we could float preferred stock, and we were able to bring in the money necessary to go to a capital budget in the hundreds of millions dollars a year. One year, XTRA actually had \$125 million in capital expenditures. This was big for a leasing company; this was a lot of trailers and domestic containers.

Now, if you look back at the beginning of intermodalism, you can see this marvelous exponential evolution in technology, not unlike the experience in the business of computer technology today. I have enjoyed my role in the development of this industry, an industry where people were willing to take risks.

Henry V. (Hank) Logan

Senior Vice President of Fleet Management
TTX Company

TTX is honored to participate in this conference. This is an industry that is obviously near and dear to our hearts, and we believe that TTX has made a substantial contribution to the success of the intermodal freight transportation industry. I will cover, in broad terms, some of the early history of TTX, then called Trailer Train Company. Some of the facets of the company operation form a major part of the foundation for the company as it exists today.

The 1955-56 timeframe is really when this thing called piggyback was beginning to make sense to many people within the industry. A number of railroads and others had been experimenting with the movement of trailers on flatcars prior to 1956, but there were problems associated with this. Some of the problems were related to the availability of flatcars and to the varied means of hauling trailers on those flatcars and securing them to the flatcars. There were, frankly, too many different forms of hardware that were in existence to enable the industry to really begin to grow the way a number of people thought it could and should. A number of real founding fathers thought through these problems and decided that it would be in the best interest of the entire industry to create an entity charged with the responsibility of operating and maintaining a pool of equipment that could be used to foster the growth of piggyback.

TTX Charter

The original founding fathers of intermodal freight were, in fact, the Pennsylvania Railroad (PRR) and the Norfolk & Western Railway (N&W). It is not coincidental that these two railroads got together, since the PRR, more or less, controlled the N&W. But, interestingly enough, when the Trailer Train charter was first written, the basic objective of Trailer Train was to foster the growth of piggyback by providing a fleet of high-quality equipment that could be made available to a number of different railroads at the lowest possible cost. The railroads would, presumably, own a piece of the company.

Even in November 1955, there was concern that this business was not likely to be terribly profitable. To help offset the prospect of low profitability, low-cost rolling stock became an important part of the TTX concept. Last, but not least, TTX would provide a fleet with a standardized design, and this would attack the problems of the multitude of different car types and tie-down systems that were in use. There were as many different car types and as many different tie-down systems as there were railroads involved in piggybacking. The most common set of hardware was a series of chocks, chains, and jacks that were used to secure a trailer to a flatcar. As I understand it, there were some 42 separate pieces of hardware that had to be engaged to get a trailer attached to a flatcar.

The fundamental company objectives, which I outlined, really have not changed very much at all, and here we are 43 years later with the same language written into the formal contract that lays out the terms and the conditions of the arrangement between TTX and participating railroads. So the company got up and running. Stock was issued. The PRR, the N&W, and a company called Rail Trailer were the initial purchasers of the stock. There were some six thousand shares outstanding. The company was off and running, but it was not a cakewalk.

Early Days of TTX

There were a number of problems encountered in those early days. First, the desire to create this nationwide pool presumed that there would be widespread consensus for the desirability of standardized equipment and of piggyback itself. Jim Newell, more than anyone else, had the primary responsibility of selling the concept of Trailer Train and allowing it to grow and be successful. There were quarters within the industry that were suspicious of piggybacking. There were those who really believed that if we did not get involved in the hauling of trailers on rail that the truckers would begin to have serious problems, which could cause their demise. The third problem was that this was a new concept, untried, an experiment. Certainly, the hardware and the system itself were new, but

so was the concept of creating a company to own and operate these flatcars.

The TTX Club

We did not have a financing problem. We were backed by the mighty Pennsylvania Railroad, which provided financing guarantees for all of the initial flatcars purchased by TTX. This arrangement continued as additional stockholders joined the Trailer Train club. Every railroad that joined the company was obligated to buy 500 shares of stock and to sign a guarantee on the financing for any new fleet additions. The initial group of stock, the first 6,000 shares and the stock purchased by the first 10 railroads that ultimately joined Trailer Train, was purchased at a \$100 a share. Each railroad paid \$50,000 to join TTX. The July 1999 book value of the TTX stock is \$68,000 a share. While TTX is not exactly a “dot-com,” its record is not bad. Between 1955 and 1958, 10 railroads were added. But, by 1964, we had 41 major railroads, each owning 500 shares of TTX stock, providing a firm foundation for success.

Flatcar Hardware

There were a number of really dramatic breakthroughs in hardware that made the flatcar perform more effectively. Without argument, the most significant breakthrough was the development of the trailer hitch, the device that replaced the 42 pieces of hardware discussed earlier. The trailer hitch provided the means to secure the trailer to the deck of the flatcar in the most efficient possible manner. According to legend, Lester Robinson sketched the design for a trailer hitch on a napkin in a restaurant in Chicago. This single innovation added a tremendous degree of efficiency to the entire system. It took a number of years before the next significant breakthrough occurred, the development of the all-purpose intermodal flatcar. The 89-foot, 4-inch flatcar turned out to be the workhorse of the TTX intermodal fleet. It appeared on the scene as the transition between trailer and container. This car was a cost-effective way of handling the trailers as well as the containers, which in the early 1960s were in their infancy. The TTX fleet was expanded rather aggressively to develop this fleet of all-purpose equipment.

In between the development of the all-purpose car and the double-stack, which I would characterize as the next significant technical breakthrough, there were a number of fine-tuning exercises. Better end-of-car cushioning devices and the single-axle car were technology improvements. They were important improvements but not as pivotal as the hitch or the all-purpose car and, certainly, not as important as the doublestack car. The doublestack revolution, more than anything else, prompted the

significant expansion of the TTX operation over the past seven or eight years.

TTX Equipment Pool Management

TTX was innovative in the management of its equipment pool. The founding fathers developed the concept of a truly free-running pool, a fleet of intermodal flatcars that would be available for every member of the pool, as needed. Flatcars would be allowed to go from railroad A to railroad B, and railroad B could hold them as long as was needed to await a load without returning them to anyone. This contrasted with the policy of a railroad-owned car, which required that an empty car be returned to the railroad whose marks were on the car, contributing to a tremendous amount of inefficiency and the accumulation of empty miles. The free-running pool concept, on a scale the size of the TTX fleet, represented a tremendous improvement in efficiency that has found its way into the intermodal system overall.

The second significant point was the absence of any long-term rental obligation on the part of any railroad that uses TTX cars. The TTX lease, if you can call it that, is five days. If any railroad does not need a TTX car at the end of five days, it merely calls TTX, declares the car surplus, and it is our job to find someone else who does need it. So the five-day-turn-back policy, as we call it, goes back to the early days of the company. In large measure, it is a pricing mechanism that allows us to know where cars are needed and where cars are surplus. We can use that information to direct cars from areas of surplus to areas of need.

TTX Pricing Policy

The low-cost policy, which was outlined in November 1965 by Jim Newell and his colleagues, has turned out to be a major part of the overall TTX strategy. Some people think of TTX as a nonprofit company. If this is true, then we are the most profitable nonprofit company on the Planet Earth. Nevertheless, we do have a policy of not maximizing profits. The TTX pricing system is designed to produce a target level of profit that allows us to go to Moodys and Standard & Poors and our lenders to demonstrate that we have managed the company consistently with promises we have made for ratios, like fixed-charge coverage and debt equity. All of our pricing is designed to meet those target levels.

In 1998, for example, we had very good utilization, exceeded our estimates, and, in fact, lowered our prices \$37 million so that we came in right at the targets we had set. The low-price concept helps make the railroads more competitive and more efficient, as does the so-called pool pricing convention, in which we charge the same for a car of similar eco-

conomic utility, regardless of when the car was purchased or what we actually paid for it. If I had different prices for different vintage cars, similar to the old ICC car-hire rate system, I would be faced with constant queries about which railroad got the expensive cars versus which one got the cheap ones. The formal contract has been supplemented on many occasions and, frankly, tweaked to recognize changes in the business.

Very active advisory committees, from each of the railroads that are part of the TTX pool, played an important role in that tweaking exercise. The most active is the Intermodal Advisory Committee. This committee, more than any other, writes the rules, tweaks the contract, and provides the consensus on the changes in the contract to meet the changing requirements.

TTX Maintenance Philosophy

The maintenance philosophy at TTX has been a very important part of the company from the beginning. The founding fathers seized the opportunity to create this new fleet of equipment and decided that the fleet was going to be managed by a preventative maintenance philosophy. TTX keeps individual records on its cars, including the mileage; cars are sent in for maintenance when they have accumulated a predetermined level of miles, rather than waiting for the cars to fail and then sending them for maintenance. The real point is that we knew that service levels in the intermodal marketplace would be rather stringent, if the railroads were going to compete effectively with the highway carriers. Cars would have to be available on an as needed basis with a high degree of reliability. So this preventative maintenance philosophy has been critical to the success of TTX. Moreover, until this time, no one had owned such a large fleet of cars with this tremendous amount of information on performance of components and maintenance standards in a high-mileage environment. The TTX fleet has, many times, been referred to as a laboratory-on-wheels.

Many have contributed to the success at TTX. Jim Newell played a key role developing the TTX philosophy as did Gene Ryan, who is regarded by many as the father of modern intermodalism. Over the years, the TTX Board has had a number of stellar individuals from the industry. Bill Johnson, the retired chairman of the Illinois Central, was a lawyer at the Pennsylvania Railroad when the formal contract was being developed. He played a major role in developing the rules and regulations that we continue to follow. I am frequently asked how anything got done when we had 41 railroads on the board. I can tell you that it got done very effectively. The presence of 41 railroads was no more of a problem than the 9 railroads in 1999.

TTX Current Status

TTX will have 10.2 million loads in 1999. The Pacific Rim trade phenomenon has been a major contributor to the demand for containers coming in through the West Coast of the US and has hastened the growth of the TTX fleet. Right now, we have 86,000 doublestack cars, well over one-half of the 154,000 intermodal fleet overall.

The market determines what it wants, and our job at TTX is to make sure that the railroads in our pool have sufficient equipment to meet their needs. We have not been shy about spending money. Some \$4 billion has been spent on equipment over the past 10 years. Well over one-half of this was for the intermodal fleet. This spending program is designed to support the efforts of the railroad industry to expand the intermodal market. Much of the freight volume handled by the nation's railroads tends to follow the rise and fall in the gross domestic product (GDP) of the US and the world. The best opportunity for growth through increased market share rests in the potential to tap the demand for intermodal service.

Aaron J. Gellman

Director of the Transportation Center
Northwestern University

When considering the equipment history of intermodal, it is important to acknowledge that much of the development of intermodal equipment comes from the military during World War II. It is not that the contribution of the military was so lasting from a dimensional standpoint, but that the principles established by the military served us well, for the most part, and have been well integrated into everything since then. For example, the military recognized that what we were really talking about was not so much intermodal as multimodal, at least three modes and not just two. Second, the military claimed to recognize the importance of standardization of dimensions and standardization of lifting points. Indeed, the military pushed every standardization effort, including the committee that set the standards we live by today. After the war, the military demonstrated the unit load principle and became very interested in containers.

In addition, an experience during the Korean War had an influence on equipment decisions and the course that equipment technology has taken. I was in the US Army at the Transportation Research and Engineering Command at Fort Eustis, Virginia, and it happened that the Army had decided to move CONEX containers, a very nonstandard container today, directly from the Columbus General Depot in Ohio to Korea, literally through the battlefield in many cases. The Army asked

the railroads to participate in this move from Columbus, Ohio, to shipside on the West Coast. The railroad industry refused to consider it because the government insisted upon a Freight-All-Kinds (FAK) rate. General E.C.R. Lasher, a pro-railroad officer, concluded that the railroads were not going to respond, and we went to the truckers. I was asked to be involved in this process. We talked to the trucking industry association. The truckers got very excited about the project and they took all the traffic for a time.

At this point the railroads complained to Congress. I was a Second Lieutenant, but I had a graduate degree in transportation management, which was not usual for those working for the US Army Transportation Corp in uniform. As a result, I was asked to go up to Capitol Hill and talk to people there. The senator who was most in favor of giving this traffic to the railroads was Paul Douglas, who had a PhD in economics from Chicago. The point was that the railroads were not enthusiastic at all about the unit load principle. The railroads in Canada were enthusiastic about it but not those in the United States. History records that the traffic shifted away from the truckers to the railroads at the end of the Korean War.

Double-length Flatcars

The double-length flatcar became the standard for rail intermodal from the late 1950s until the mid-1980s. There is plenty of documentation to suggest that the double-length flatcar was favored, rather than the 40- to 50-foot flatcar, because of economic regulation by the Interstate Commerce Commission (ICC). Rail Form A had a major component called cost-per-car mile. The ICC was trying to decide whether rates were compensatory. John Ingram, who was then president of the Eastern Railroads President's Conference, determined that the rates that the conference had to charge would never pass muster with the ICC if a short car was used because of the cost-per-car mile component of Rail Form A. This is how the double-length car was born. This is a very good example of how economic regulation hindered technological change in the railroad industry, not only in this context, but also for decades until railroad regulation was abolished in 1980. But, of course, this is not the whole story of equipment prior to deregulation in 1980.

First the double-length car had tremendous operating problems that were not foreseen. Double-length cars were unstable and were dumped regularly into ditches under certain situations, such as drop bar, curvature, and grade conditions. In addition, the government re-entered the scene in a big way and, this time, in a pernicious way. The US Department of Transportation (USDOT) decided that the US railroad industry

should feature trailer-on-flatcar (TOFC) and not container-on-flatcar (COFC). The USDOT would not allow the ICC to consider proposals for lower rates for hauling containers rather than trailers. The rationale was that the truckers of America had lots of trailers but no containers and no one could be expected to invest in containers.

Trailers and Containers

During this period, a very important event took place. Ivan Ethington, the chief operating officer on the Burlington Northern, was interested in the cost differences between hauling trailers and hauling containers and consulted Alan Cripe and me. He assembled two trains with identical gross weight to find out if there was any difference in tonnage for locomotives hauling containers on flatcar or trailers on flatcar. The trains ran 61 miles-per-hour between yards, touching 70 miles-per-hour briefly. Ivan found that the tonnage for the locomotives was not quite three times as high for hauling containers as it was for hauling trailers. They presented their data to the USDOT, and they were laughed out of court. The Denver & Rio Grande Western (D&RGW) and the Southern Pacific said they wanted to charge less for hauling containers than trailers. The ICC would not hear of it.

It is also important to note that from 1960 to 1980 a number of innovative cars were proposed and some prototypes were even supplied, but the US rail carriers, by and large, rejected them. Doublestack cars were presented to the US railroads for consideration; they would have none of it. Articulated cars with the "autoporter" were presented, but the railroads would not accept them. And, there were RoadRailer-like cars. Today we have many examples of doublestack, articulated, RoadRailer units.

Deregulation of 1980

The fact is deregulation happened in 1980. The railroads were deregulated; the truckers were deregulated for interstate commerce; but the shippers were also deregulated in the sense that they could now demand containers. Deregulation also contributed to the tremendous technological change that occurred for a decade and that affected intermodal and other forms of transportation. Shippers caused the big shift in equipment technology, and no shipper was more prominent in this than APL Rail.

Deregulation also influenced equipment development in trailers, containers, and terminals. For example, the plate-wall trailer is an important technological change that never would have taken place without deregulation, because everyone wanted lower costs. Recently, technological change related to intermodal transport has slowed. I would hypothesize

that it is largely because of a dramatic shift away from transport to logistics or supply-chain management. We need to go back and consider what a transport system can produce for the country. The further development and growth of intermodal transportation, beyond the present time, is again going to require entrepreneurship.

David J. DeBoer

President

Greenbrier Intermodal

I want to make three points. First, you will hear a lot of truth telling from the panelists at this conference. Because we have known each other for so long, it will be impossible to lie to each other. Second, intermodal history has been made standing on the shoulders of the people who went before. This industry would not have developed had it not been for the XTRAs and the Realcos to provide the boxes and the TTXs to provide the capital for the cars. Third, I think that I spent more money on terminals than all of my Southern Pacific (SP) predecessors combined, just because I had a very understanding CEO. There were not very many of those around. And, this is one of the important things we need to focus on.

Hank Logan talked a little bit about the isolation and the feelings of other people toward intermodal people on the railroad side. I was at Southern Pacific (SP) two weeks when the chief commercial officer pulled me aside and told me that the SP was a boxcar railroad. Many of us have had that kind of experience, and it came not only from the commercial side but also from the operating side. It is an important part of why we have gotten where we are. We did not have a lot of friends in the rest of the railroad. Generally, we tended to mix with each other a lot more than our counterparts in other parts of the railroad.

I started to reflect on why we were not squashed along the way. A lot of people did not like us. Looking at the economic history of the United States from the middle of the 1840s until after World War II, the railroads were the largest segment of the business economy of the United States except for two years just before the Depression. This means that the railroad industry was like Microsoft or AOL. After World War II and with the building of the interstate highway system, the largest segment of the business economy went into a precipitous slide. Everything was going downhill for the railroads except for one little piece of the business and that was intermodal. From the 1950s on, it was this one part of the railroad business that a CEO could go in and brag about to his stockholders and to Wall Street.

Driving Forces behind Intermodal

A handful of people and their corporations were the driving forces behind intermodal. One of them was Jim Newell. Jim was a vice president of operations of the Pennsylvania Railroad, the largest railroad in the country, and the president of TTX at the same time. And, he loved intermodal. He was a rare individual and he stood alone. All of his contemporaries were on the other side of the fence. It was not until the 1970s that three other vice presidents of operations (VPOs) became big supporters of intermodal. Southern Railway's Stan Crane, Santa Fe Railway's Larry Cena, and SP's Dick Spence were very powerful VPOs who were big intermodal supporters.

To make technological progress in this industry, it takes corporations that are innovative and it takes individuals within those corporations to drive the process. For example, doublestack began as an alliance between the shipper, the car-builder, and an innovative railroad. The Southern Pacific, American Car & Foundry (ACF), and SeaLand were the innovators. Paul Garin in the mechanical department at SP, Bill Thomford, a car designer at SP, and Tom Fante, who was one of my predecessors in SP's intermodal department, all got together with George Reed and Eugene Cordani at ACF and Bob Ingram at SeaLand in 1975 or 1976. They came out with a prototype in 1977 of the first doublestack car. In 1979, they went forward again, to determine what an articulated car would do to the economics and to the ride quality. In 1979, they built a three-unit car. Interestingly enough, it had a 125-ton intermediate truck. And, in 1981, we ordered 42 five-unit cars for service. Don Orris, who was working for APL, suspected that the Southern Pacific had given a very favorable rate to SeaLand, recognizing the economics of doublestack cars. The commercial department assured Don that this was not true. But, in fact, it was true. Don with his company then started working with Thrall and with the Union Pacific and set up a container network of his own and was very successful.

Advantages and Economics of Doublestack

The advantages and economics of doublestack are well known. One of the things that is less well known is what doublestack did for the quality of service that intermodal was able to offer. As an operating officer, I was generally embarrassed to take my customers out on the railroad because, in the old days, you had slack in the train—sort of like a great big slinky toy out on the tracks. Part of the train was going uphill and stretching out, part of it was coming downhill and running in. There were huge dynamic forces in the train, and if you were in severe grade and

curve territory, no matter how good the road foreman was, the business car people would wind up with their lunch in their laps.

With doublestack, this all went away. Articulation came in, and instead of 160 feet of slack in a train for 200 boxes, there was 10 feet. We had better ride quality than a passenger train. For the first time, we had a service that was competitive from a ride quality standpoint. Ride quality became as important to intermodal as the economics.

Again, APL recognized this and did the incredible. It took two containers and put them on a car on a train; APL then put a dining room table with china and a chandelier in the top container and ran the train across the country. APL opened the container up at the other end of the country and only one fork had moved. The fuel savings with doublestack were huge, but it took some time to appreciate the ride quality aspects. Again, we instrumented a train in conjunction with APL and ran a load from Oakland to Detroit. As I looked at a tape of the trip, the scale readings were down in the 2s instead of the norm of 10 or 12; then, all of a sudden, the readings went to 7 and 7½. As turned out, the load was taken off the train in Chicago and was run over the highway. The higher numbers were highway vertical loads. The railroad-ride quality had become better than the highway-ride quality. This was an amazing step forward. But without Don Orris and Bob Ingram and their two companies, I do not think the doublestack revolution would have happened.

I was told, as I left the SP to become a car builder, that there were only going to be 2,000 wells ever built and that they would haul all of the container traffic that would ever be hauled in doublestack. My business plan looked a little different than that. There were a total of 61,000 wells of doublestacks built by 1999. We have built about two thirds, or \$3 billion worth, so it has been a little better business than some thought.

There have been a lot of tweaks along the way. We have completed our ninth doublestack design with a 53-foot car that is currently being put into service. Many railroaders thought that we would obsolete the fleet. In the past 15 years, the 89-foot fleet has gone from something like 60,000 cars, except for the three-unit cars, down to about 4,000 or 5,000. In the same period, the wells have gone up to 61,000. One of the reasons that it has been so much fun is that intermodal has always been a changing business, and I think that it will continue to be.

