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"INTERMODAL '93" attracts Experts to Hamburg

ISO-STEEL CONTAINER's NATIVE TOWN

The present situation and the future of Containerisation will be focused during the special Fair "Intermodal '93" - going to be held in Hamburg from 6th to 8th December, 1993 - and which will be attended by about 600 experts from 60 countries. During this 6th event of its kind about 5,000 visitors will flock in. More than 70 experts shall give information who is going to play the master-role in tomorrow's intermodal world. Will it be the Carriers or the Forwarders respectively how and when the CIS-shores and the inland navigation will be ready for use, and whether projects such as "Combitrans" might be successful.

One of the mental fathers of the ISO Container made from Steel is the Hamburg based entrepreneur Hans GROSSE who ordered from Willy Schliecker's yard the first 3,000 Steel Containers, simple boxes of 9 cbm content, in 1960 already.

Those Containers were mainly used to transport the personal belongings of US-soldiers staitioned in Europe, and on the way back to USA Volkswagen Spare parts filled the boxes. In the following years the demand for these durable boxes increased dramatically. In 1964 an international comittee fixed the worldwide Standardarization of Containers known today as ISO-Containers. In the same year some US-producers flooded the market with Aluminium/Fibreglass Containers.

To counterattack the US competition Grosse let a 20'-Container built, completely made from Steel which was exhibited at Hanover Fair in 1965 - the very first Steel Container ever. A total desaster seems to reveal. Press media and experts alike considered this 2.4-MT-Steel Container as by far too heavy compared with the 1.5-MT-Alu-Container.

Inspite of all bad rumours only one year elapsed and Hans GROSSE was able to book his first substantial order with SeaContainer, London covering some thousand Units of Steel Containers. These Containers produced from an extremely durable material started to conquer the world markets. Graaff, Elze - near Hanover - still one of the worldwide leading producers for Reefer and Special Containers - Mannesmann (later on Thyssen) and I.W.K. (belonging to Quandt-Group at that time), Luebeck started their mass-production feeded by orders submitted by Hans GROSSE.

The production of Containers was increased continuously. Today's world Container fleet stands at 7 Mio TEU's, valued DEM 30 billion out of which 350,000 TEU's

belong to German owners, and the largest - HAPAG-LLOYD - moves 125,000 TEU's.

In 1967 Kurt Eckelmann erected - in close cooperation with Hans GROSSE - the first official Repairshop for Containers. In 1969 HOLZMÜLLER estranged part of their facilities and stored some thousand Containers for Hans GROSSE which he had sold to I.C.S., New York.

During the 70th and 80th the Container production moved to Asia. In the early 70th Japan was the main supplier worldwide but already by mid 70th Japan was superceded by South Korea. South Korea managed to keep its number one position for quite a long time but since two years the situation changed and China, Thailand, Malaysia and Indonesia as well as India are going to drive out South Korea. The last South Korean Containers were ordered by the Steel and Container merchant GROSSE in Spring 1992. 80% of his customers' demand Grosse is covering in China since the recent one and a half year; the remaining 20% come from other Southeast Asian sources.

In China GROSSE delivers to the depots of his European customers in the ports of Dalian, Tianjin and Qingdao in the North, Shanghai being the largest seaport, and in the South to Guangzhou and Shekou. Containers delivered to Hong Kong will be positioned by barges. In Southeast Asia following additional ports are served: Jakarta, Surabaya, Port Klang and Bangkok.

According to GROSSE the demand of Containers has to be seen as a barometer of the economic development: "Judging the last year I have to confess that 1991 was a good year whilst 1992 showed a sharp falling tendency and in 1993 we reached the bottom. However, today I can forecast brisk possibilities for 1994 and the coming years."

How much GROSSE's prognosis is matching with reality demonstrates his vision he had in 1978: at that time - the Container revolution at sea was almost completed - he forecasted by saying: " One day post-offices, petrol-stations, police-stations, flower shops and complete repairshops will be housed in Containers and to be moved on a flexible basis. Possibly even people are going to live in Containers."

For the Container production German know-how is required. Besides of Messrs. Graaff, Elze there are special activities to be observed in connection with the erection of Container yards, activities originating from Hamburg. The Tectrans-Sellhorn-Group already built a Container yard in Shanghai about ten years ago, and during this year will hand over on a turn-key basis each one yard in Tianjin and Qingdao in the North of China. Another yard is under study in India.

The TSH-Group, Hamburg built a new Container yard at Zhanjiagang - located at the Yangtze river, which went on stream last year. Another yard was handed over on turn-key basis in St.Peterburg this year. This yard is going to satisfy the CIS demand. An additional Container yard is planned for India by TSH.

About 90% of the world's Container fleet is produced with special Steel featuring high weather resistance but the total range of Container types is rather wide. Besides of ISO-Standard-Containers a large variety is used such as High Cube, Open Top, Ventilated-, Hardtop-, Bulk-, Tank-, Flatrack-Containers.

A novelty is the so-called "Six-inOne-Container". Six empty TEU's will be collapsed forming one 20'-ISO-Container representing a cost saving solution once no return cargo available.

The total Container spectrum will be completed by an ever increasing fleet of Reefer Containers. With 24 Container yards China has more producers than the rest of the world. China is followed by Indonesia, South Korea, Malaysia, Thailand and Taiwan. India is at its starting position. South Africa tries to cope part of the European market with two yards. Brasil, Uruguay, Mexico and Cuba cover to a marginal extend the demands from Central- and South-America.

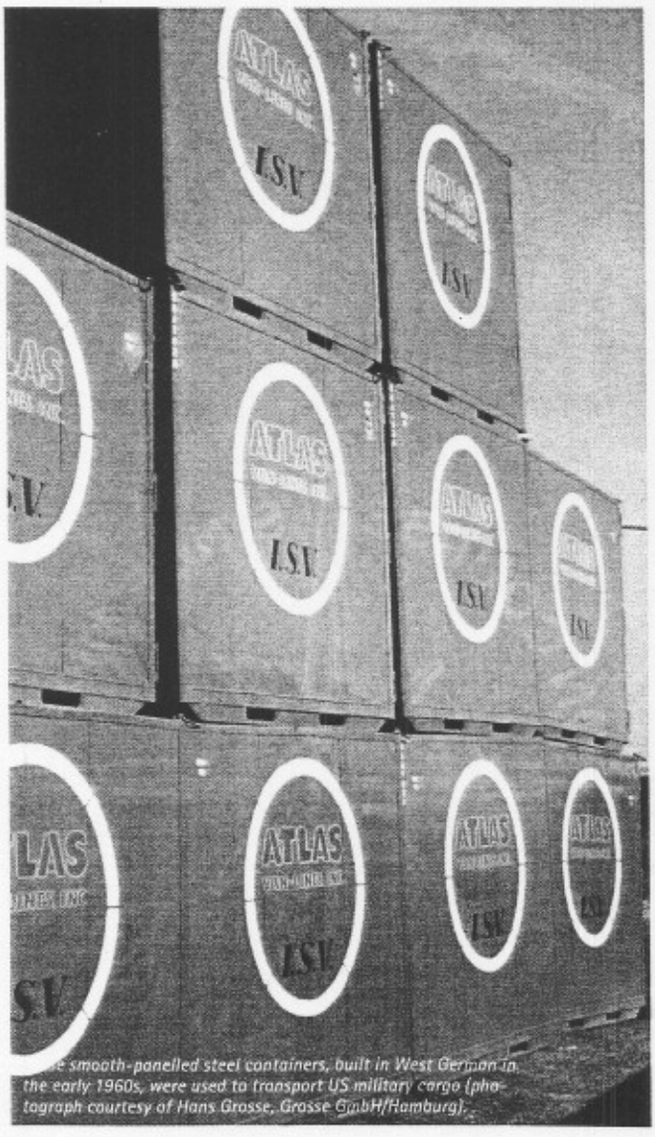
From Europe producers - located in Italy, Turkey, Poland, Slovakia and CIS - participate in covering the demands of owners and leasing companies. There is one yard for Special Containers in UK whilst Reefer Containers are produced in Norway.

The world's most modern yard was built at Tinglev/Denmark - just 20 minutes north of Flensburg . Since two years Maersk is producing at this yard for own use 25,000 TEU's per year with a workforce of 180.

40 years

A steady evolution

The introduction of the first intermodal freight containers in the late 1950s were viewed to be little short of revolutionary. They have since undergone a gradual evolution, as the economics of the global market have shaped and refined dimensions and subtly altered construction techniques. Andrew Foxcroft investigates.



...e smooth-panelled steel containers, built in West Germany in the early 1960s, were used to transport US military cargo (photograph courtesy of Hans Grosse, Grosse GmbH/Hamburg).

The international freight container is today so ubiquitous a piece of transport hardware that it is easy to forget what a stir it caused when originally introduced in the late 1950s. Indeed, so radical was the idea that it took several years to gain hold in the collective mind of the global transport industry. The very first containers were constructed solely for use within US domestic trades. One of the earliest designs was 24ft in length, constructed by Matson Navigation Co for use on its trade between the US West Coast and Honolulu. The selection of this particular size had more to do with achieving an optimum weight/loading ratio for the carriage of Hawaii's main export to the US, canned pineapple, than any attempt to set a universal standard for the future.

The Matson 24-footer was soon to be followed by the 35ft container, which was introduced by Malcom McLean. This length was also dictated by regional rather than global criteria. The maximum US road trailer length, legally permitted circa 1960, was 35ft. It actually replaced an earlier 33ft container length originally selected by McLean in the 1950s, when legal road trailer lengths were shorter. Interestingly, the 24ft Matson unit has proved the more durable of the two earliest container sizes, as many are still operated today. The McLean 35ft dimension, as adopted for the fleets of Sea-Land Service and later Navieras de Puerto Rico, was already disfavoured by the 1970s and completely phased out by the late 1980s.

The launch of Sea-Land by McLean, as a trucker-turned-shipping operation, did much to set the pace in container design for the 1960s. Another influential participant was the US military, which was already exporting the idea of intermodalism to Europe in the early 1960s. The military potential for container use was vast and much experimentation took place deploying various small-sized modules on the North Atlantic. The first were built in late 1960, when North American Van Lines took 1,000 units of nine cubic metre capacity from Germany. This batch of containers made further history as they were the first to be constructed from steel.

It was significant that these containers, even though they were setting the style for construction in years to come, were built to give the appearance of a ribbed panel. They copied the rivetted aluminium construction used by manufacturers in North America and favoured by purchasers (which were exclusively American). It was not until the mid-1960s, with the introduction

of the 20ft unit and the initial glimmerings of European interest, that the long-familiar steel corrugation made its first appearance. By that time, other common fixtures, such as the corner fitting, had also become more standardised.

Such characteristics soon became the norm. The corrugated steel 20ft container offered by the emerging manufacturing industry of western Europe in the late 1960s was not vastly different in broad design to the many millions which have since been built at factories in Japan, South Korea, Taiwan, South Africa, Eastern Europe, and most recently in China and South East Asia.

TABLE 1

World container fleet size 1960-95

Year-end	Fleet (TEU)
1960*	18 000
1965*	54 000
1970	500 000
1975	1 300 000
1980	3 150 000
1985	4 850 000
1990	6 400 000
1995	9 600 000

Notes: * Fleet sizes are in units (not TEU)

Sources: IIS Steel Commercial Research Division and CI Market Analysis

Instrumental in supplying the earliest steel containers was Hamburg-based container broker and design specialist, Hans Grosse, who then went on to develop the world's first 20ft steel container prototype in 1964. This was constructed by German manufacturer, Metallwerke Saar, and unveiled at the Hannover Trade Fair in April 1965. Grosse reports that the first series production of steel 20ft containers took place during 1966, for an ex-works cost of DM5,000 per unit (US$1,250 based on then existing exchange rates). A major customer was the newly-founded lessor, Sea Containers.

Even before the 20-footer made its debut, the world fleet of operational containers had already grown rapidly. During the preceding five years, the number increased threefold, from just 18,000 units (1960) to more than 53,000 (1965). Just about all were owned by companies in the US.

The fleet virtually trebled again during the next two years, rising to almost 145,000 units by end-1967. If measured in TEU (a term which had yet to be invented), the figure was even greater. Many units in operation in the late 1960s were of the 35ft Sea-Land size. Virtually all were aluminium panelled. The US steel industry was, however, already predicting a rapid rise in the production of steel-clad boxes, on the back of an expected fast growth in the size of the leased container fleet.

It was, however, some way out in its overall projection. Pundits within the US steel industry suggested in 1969 that there would be maximum US requirement for 640,000TEU by 1977, met by an annual production of 88,000TEU. In reality, the world fleet had almost reached two million TEU by the end of that year. Annual output had already surpassed 300,000TEU.

The rate at which the world box fleet has grown has taken most observers by surprise. It took over 15 years, to end-1973, to achieve a size of one million TEU. Ten years later, at end-1983 (according to *CI World Container Census* data), the count exceeded four million TEU. It was to double again, during the next 10 years, to reach eight million TEU. On present *CI* forecasts, the fleet is set to surpass 10 million TEU during 1996.

Current annual purchases amount to more than one million TEU, of which at least 40% covers replacement. Compare this with a maximum of 400,000-500,000TEU bought annually in the early 1980s, and an annual purchase of just 150,000TEU in the early 1970s. The current fleet would cost a staggering US$30 billion to replace, at today's prices, as compared to under US$15 billion in 1985, and just US$3 billion in 1975. A massive growth in the number of operational reefer and tank containers has contributed to the rapid rise in the value of the global box fleet. These now account for a growing 40% of all inventories in asset terms.

The rapid growth in the number of containers in service, and their inexorable spread worldwide, attracted calls for standardisation from a relatively early date. A leading player was Vincent Grey, who was instrumental in establishing ISO TC104 (the Technical Committee charged with determining container standards). In a 1983 interview with *Containerisation International*, he explained how he had written to the ISO (International Standards Organisation) as early as 1959, to suggest the formation of a committee to cover container standardisation.

The first meeting of ISO TC104 was held in 1961. It took several years to create the Series One (Dry Freight) container standard. By the mid-1960s, permissible over-the-road trailer lengths were relaxed from 35ft to 40ft by the majority of US states, thus opening the way for the 40ft container size. This fitted nicely with the requirement of European operators for a 'half' size of 20ft, even though it effectively locked out the 35ft length. Also marginalised were oddities such as the 27ft container adopted by Seatrain Lines. Certain lengths, such as the 24ft favoured by Matson, were less affected as they were tied into closed trades. The Series One standard, summarised in Table 2, was universally adopted by the late 1960s.

The standards set down in Series One have been much debated during the past 30 years, but has remained intact. Relatively few amendments have been made. It took around 15-20 years to purge fully all 35ft units from the global fleet. As the last of these units were being cleared, a new threat to standardisation emerged in the form of the 45ft length. This was first adopted by American President Lines (APL), and then by Sea-Land and Maersk Line, for the carriage of low-weight cargo within the US and on certain transpacific trades. The 45-footer was soon followed by the 48ft container, again largely pioneered by APL, which was tailored specifically for the US domestic market.

TABLE 2

The original Series One (Dry Freight) Container standard as approved by ISO TC104 in the 1960s

Code	Nominal length	Nominal height	Nominal width	Gross weight
1A	40ft	8ft	8ft	30 480kg
1AA	40ft	8ft 6in	8ft	30 480kg
1B	30ft	8ft	8ft	25 400kg
1BB	30ft	8ft 6in	8ft	25 400kg
1C	20ft	8ft	8ft	20 320kg
1CC	20ft	8ft 6in	8ft	20 320kg
1D	10ft	8ft	8ft	10 160kg

In the same way as Malcom McLean had originally used the 33ft and 35ft US road-trailers to define the length of his first containers, the US domestic length was derived from the standard 48ft road trailer almost 30 years later. By the late 1980s, most US states permitted the operation of road/intermodal trailers up to 48ft length, with a few already accepting 53ft.

A STEADY EVOLUTION

40 years

A rapid increase in the number of US domestic containers, together with the appearance of new regional 'pallet-friendly' and swapbody container sizes in Europe, encouraged TC104 to reopen the subject of container standardisation in the early 1990s. It actually went as far as to debate a 'Series Two' container standard, based on new container lengths of 49ft/24.5ft. Even more controversial was the Series Two width, which was set at 8ft 6in (in place of 8ft). The aim was to include both maritime and regional containers within a newly formulated standard.

The proposal was finally rejected by operators and ports alike. Everyone was fearful that a new standard favouring maritime containers of greater length and width would render the existing fleet, then numbering more than seven million TEU, obsolete within a few years. Neither was the problem expected to end with the container itself. Existing cell guides on containerships would have to be modified to accommodate the Series Two dimensions. So would the spreader attachments fitted to port handling cranes.

In the aftermath of the decision to reject Series Two, the threat of a major change to the Series One standard has receded. There is little talk today of a 'super' standard to cover all container types. Regional container pools have, instead, been left to evolve in their own way, separately from the global fleet of maritime ISO containers. Even the 45ft maritime unit, which originally sparked off the Series Two debate, is about to suffer at the hand of the European Commission. The EC is presently introducing legislation to prevent its operation on European roads from 1997.

Other, less dramatic (but more permanent) trends have affected container height and loading capacity. Series One originally identified 8ft as the mainstream height, although it was largely superseded by 8ft 6in during the 1970s. Containers of 8ft 6in height have since lost some ground to the 'high cube' 9ft 6in unit. The latter height was initially favoured by the same shipping lines that introduced the 45ft container, and for much the same reason. However, unlike the 45-footer, the 9ft 6in-high container has since become a mainstream type. There are more than one million TEU of maritime high cube containers in service today, as compared to under 100,000TEU in 1982, and just 30,000TEU in 1977. The growing importance of the high cube container was finally endorsed in the early 1990s, when it was incorporated within ISO Series One. Another change to Series One was implemented in the 1980s, when the 24-tonne rating for 20ft containers was accepted.

The first steel 20ft container on display at the Hannover Trade Fair in April 1965 (photograph courtesy of Hans Grosse, Grosse GmbH/Hamburg)

As suggested, basic container design has undergone relatively little change during the past 30 years. Owners' expectations have changed, however, bringing increased pressure to bear on the manufacturing sector. One of the main differences between a container of the 1960s, and one built today, is its life expectancy. The US Steel Industry, in its 1969 industry review, quoted a average container life of under 10 years. By the mid-1980s, this had been upwardly revised to at least 12-13 years. Most owners currently expect 15 years or greater. This steady improvement is attributable to advances in container construction techniques, the introduction of mass production and use of Corten steels.

In contrast to earlier years, container longevity is now largely taken for granted. It has been increasingly sidelined by more topical issues. Environmental concerns are now high on the agenda, as manufacturers search out alternatives to tropical hardwood floors and solvent-based paints. The reefer container sector has been similarly preoccupied with the search for 'ozone-friendly' refrigerants. In one area, at least, the industry would appear to have gone full circle: enlightened companies are still, in 1996, evaluating prototype containers built from composite/plastic materials, just as they were in the 1970s, 1960s and even the 1950s.

Better standards of box construction have been achieved at the same time as the industry has shifted progressively to lower-cost countries. Raw material costs have also steadily fallen. The box manufacturing sector was initially centred in the US, although it was fast moving into western Europe by the late 1960s. The growth in the demand for steel boxes was largely met by the emerging European industry. The next transfer of manufacturing technology was to Japan, led by franchise agreements set up between established US firms (such as Fruehauf and Trailmobile Corp) and Japanese licensees. The 1970s witnessed a shift from the US and Europe to the Orient. It also saw a rapid decline in the manufacture of containers in aluminium (and GRP/plywood) as owners increasingly opted for cheaper steel.

Japan held sway as the world's leading producer-country for almost a decade, with output peaking there in the late 1970s. By the mid-1980s, Japan had been displaced by South Korea, which also achieved record levels of production before finally losing out to mainland China in 1993. This vast country looks set to remain the world's leading box manufacturing country for some years to come. Chinese production topped 500,000TEU for the first time in 1995, and has already belittled the former Korean record of 375,000TEU (achieved in 1992).

Despite the pace of change, the gripes heard from box builders today are hardly any different to those made in 1970s and 1960s. There are still too many companies chasing too few orders. Manufacturing overcapacity remains rife. Container prices are still too low.

Prices have not risen much in real terms since the earliest days of containerisation. Many accept that the best period to be in the box building business, apart from a brief respite in the late 1980s (when prices rose to record levels), was before 1975. Containers were then at their most expensive, even though they were poorly manufactured by later standards. Even today, as box builders face a new downturn, prices seem set to plunge back to levels more typical of the 1980s and even 1970s, than the 1990s.