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Economic Commission for Latin America

PRESENTATIONS CONCERNING THE EVALUATION OF THE CIRCUMSTANCES UNDER WHICH IT WOULD BE FEASIBLE TO ESTABLISH CONTAINER REPAIR AND MAINTENANCE ENTERPRISES

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CONTENTS

/Presentation 1

Presentation 1

REFURBISHMENT 1/

As refurbishment involves the execution of five related processes on each container -blasting, masking, painting, drying and marking- it is a ready candidate for automation. However, the investments required for an automated refurbishment cycle can only be justified economically when assured of a high container throughput. Since the onset of this mode of transport technology, container, paint and appropriate handling equipment manufacturers have improved their respective products, so that the amount of time between refurbishing units has greatly increased. This has in turn reduced the demand for such facilities and, hence, reduced the possibility of a high throughput to justify the needed capital expenditure.

Leasing companies usually do not relocate containers for the repair of damage, but such relocation can be easily justified for refurbishment, since a container in need for refurbishment is structurally sound and during relocation may be used to carry cargo. Therefore, although it is not essential that the refurbishment cycle should be automated, persons who seek to offer container refurbishment must understand that they are in direct competition on a world-wide basis with the most efficient and least costly enterprises.

The distinction between repair and refurbishment lies in the production flow nature of the latter. The normal arrangement of a repair and refurbishment facility is a large area for repair work, with the refurbishment sequence on one side of the building. This sequence is composed of separate enclosed or semi-enclosed spaces for grit or sand blasting, masking, spray painting, drying and replacement of container markings. The materials required for refurbishment are mainly blasting grit, paint, masking tape and container markings, with relatively long runs of similar units being a desirable feature. On the other hand, as the repair function requires the matching of a varied work-load to equipment, worker skills and materials constant planning is needed.

The physical differences between repair and refurbishment are apparent. The refurbishment process, with its grit recovery system, air conditioning and extensive use of equipment, together with its minimum team of specialists dependent on each other, is an indivisible cost structure. It relies on a regular uninterrupted volume as the key to economic pricing. An equipment breakdown anywhere in the refurbishment sequence would stop the entire process. Thus, the system is either functional or not. A container taken out of this process for further repair would create an additional cost far beyond the direct costs of handling. On the other hand, container repair requires a covered, uncluttered space for maximum flexibility of positioning within the organization.

These two processes normally come together, as all owners with refurbishment needs have repair requirements. Common siting is therefore a direct economy. Moreover, the integration of site handling, repair work and refurbishment affords economies of scale.

It is interesting to note that REMAIN of Hamburg, Germany, opened a fully automated refurbishment facility in which the services of three operators are utilized in a process requiring only six hours from start to finish. REMAIN opened this facility in order to provide a complete line of rapid and efficient

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1/ Prepared by CEPAL.

container services, thereby seeking the repair work that must be effected prior to refurbishment. Nonetheless, Dr. H. Rust of REMAIN indicated that since the containers constructed today are better designed and protected with long-lasting durable paints, the refurbishment facility has, as yet, generated only sufficient income to pay for its operating expenses.

Presentation 2

SPECIAL NEEDS OF THE CONTAINER LEASING INDUSTRY

A presentation by the Institute of International Container Lessors (IICL)

Introduction

Container depots may be the least glamorous part of marine containerization, but without them international trade would still be wedded to cargo handling procedures that were old a century ago.

The container depot is one of the key elements of the entire containerization industry, one that enables the rest of the parts of that industry to function smoothly and precisely. In a sense, the depot is akin to the ground-support system of the aviation industry, where aircraft specialists, skilled mechanics and the like keep aircraft flying. At the container depot, expert mechanics, metal workers and fabricators, guided by astute administrators, make sure their clients' container fleet is kept floating.

At this time, hundreds of container depots are scattered throughout much of the world. Many of them are owned and operated by entrepreneurs determined to be a part of the containerization explosion that has rocked international transport for the past two or three decades. In many cases, the depots function as staging areas for containers awaiting transfer to the steamship line, as well as sites providing the necessary repair and maintenance services common in the industry. In the course of a year, they may handle hundreds of thousands of "boxes".

Despite the number of such depots, however, there is still a serious shortage of them. The expansion of containerization has caused, and will continue to cause, a shortage of depots.

It has been estimated that, largely because of a shortage of adequate repair facilities, the proportion of containers out of service in the world fleet has risen from 10% in 1978 to 12% in 1979. Based on an estimated fleet size of three million containers worldwide, that means that some 360 000 containers may have been out of service simply because adequate maintenance and repair (M & R) services were unavailable in sufficient places and at the right time. The cost to the owners of the containers has been enormous.

Of particular interest to you should be the fact that the shortage of depots is particularly severe in Latin America. Containerization here has been proceeding at a particularly rapid rate. Indeed, the growth could be described accurately as nothing short of "spectacular".

According to a recent study, the Latin American ports with the greatest increase in containerized cargo handling were Buenos Aires, Rio de Janeiro, and Valparaiso. From 1970 to 1979, their combined container handlings rose from 25 000 tons to more than one million tons. In addition, the imminent opening of new container ports in Mexico and Brazil is indicative of the awakening of all Latin America to the new transportation era.

Obviously, the container depot plays an exceptionally important role in international containerization. In order to understand how this all came about, a brief historical review may be in order.

Containerization: historical highlights

Containerization has become such an integral part of the world's transportation network that it is difficult to realize that it is little more than a quarter-century old. Although the precursor of modern containerization goes back in time at least to the days of the Phoenician traders, it was not until the 1950s that the modern concept of containerization finally took hold. A successful American trucking executive, Malcolm McLean, took the wheels off some of his highway trailers to create "containers". These units were placed on highway chassis and railroad flatcars for ultimate loading into especially constructed ships. McLean was able to demonstrate immediate and substantial reductions in labour costs, in-port time of ships, and loss and damages to cargo.

The maritime industry was impressed by these developments, but it was not until the mid-1960s that containerization began to become accepted in earnest. Experts representing all facets of the fledgling industry, working in concert with governments, set international standards for container sizes, design specifications and strength characteristics. It was not until these prerequisites were completed that the "containerization revolution" was born.

A whole new industry was built up around the intermodal cargo container, and the entire structure of foreign trade was permanently changed. As a result, the traditional ocean-going freighters have largely been replaced by sleek new containerships, which carry cargoes of raw materials and finished products in modular containers. Some container vessels can handle 2 000 or more containers at a time. In addition, the evolution of the industry has resulted in the predominance of the 20- and 40-foot-long steel container over other types.

Dramatic changes also took place in the ports themselves. Massive automated container-handling cranes now move containers on and off ships in minutes. In the larger ports, hundreds of acres of paved area are filled with containers stacked in columns of three or four units high. To keep pace with the new high-speed technology, antiquated governmental and documentary procedures have been streamlined to a remarkable degree.

The basic reason marine containerization grew, of course, was the economic benefits generated. A cellular containership can load and unload cargo in hours, compared with the several days previously required for conventional, break-bulk vessels carrying the same cargo volume. Containers can be loaded on chassis or railroad flatcars and moved off the pier in minutes, compared with the hours or even days required to reload break-bulk cargo into trucks. The fast turnaround time of containerships not only meant speedier transit time for cargoes but immensely improved the earning capability of high cost merchantile fleets by increasing the number of sailings per year.

The role of the leasing industry

The conversion from break-bulk to containerization was not always a smooth one. One of the principal problems was that no-one had expected containerization to grow so rapidly. Part of the difficulty lay in the fact that the steamship lines, proceeding cautiously, had underinvested in container equipment, preferring to pass on the capital investment cost to a third party.

This is where the container leasing industry came into the picture, with its financial capacity and its ability to respond quickly to the needs of its clients. The first container leasing company was formed in 1956, but it was rapidly joined by others as containerization expanded. While most of the major container leasing companies were formed in the first dozen years of the container era, they have since been joined by a number of smaller companies throughout the world. In fact, over 50 such companies were listed in the 1980 issue of "Containerization International".

The leasing industry's contributions to the development of containerization have been impressive. Individually, and collectively through their trade organization (the Institute of International Container Lessors or IICL), container leasing companies have not only encouraged the growth of containerization, but also have been instrumental in the development and publication of container inspection and repair guidelines, as well as developing improvements in container design and maintenance.

Founded in London in 1971, the IICL now has its headquarters in New York, and it comprises the companies owning most of the world's leased containers. Despite the fact that these leasing companies, individually and collectively, have stringent, well-supervised safetystandards, they have co-operated and worked closely with the International Organization for Standardization (ISO) and the Inter-governmental Maritime Consultative Organization (IMCO) as well as the American National Standards Institute in order to produce further standardization of equipment and adequate safety requirements for the benefit of those handling containers. One of the IICL's principal functions, in fact, is to collate and co-ordinate technical advice from members and publish concise inspection guides and repair manuals, aimed at ensuring safe container operation.

It is principally due to the presence of the leasing industry that two of the most serious problems inherent in the container business -trade imbalance and repositioning of empty containers- have been alleviated by a variety of sophisticate leasing arrangements which give the steamship lines the advantage of handling container movements economically. Whilst shipping lines generally operate on regular routes, leased containers will, through interchange arrangements, travel from route to route worldwide and virtually without restriction.

The container leasing industry today owns over 50% of the three-million-plus TEU in the world. (One TEU is the cargo-carrying equivalent of a 20-foot container; thus, a 40-foot container equals two TEU.) This is just one indication of the importance of the leasing industry in international trade. As containerization has grown, so have the leasing companies, which today are sophisticated, computerized high service business organizations.

It has been estimated that leasing companies will own about 61% of the world container fleet by the mid-1980s, and about 75% by the end of the decade. If the forecast of six million TEU in service by 1990 comes true, the leasing industry will own 4.5 million TEU. Obviously, the container leasing industry is growing at an enormous rate, and it is clear that the allied container depot and M & R services industry must share in this growth.

The leasing companies' interest in expediting and controlling the quality and cost of repairs has had an important effect on their customers, for in addition to preserving their own leasable container fleets they have improved the quality of containers available for leasing.

The depots are another important partner in these efforts, which result in the availability of containers in good condition in most areas of the world where shippers and steamship companies need them. The importance of this relationship cannot be overstated, since the economic and technical feasibility of containerized cargo handling is dependent upon the availability of safe containers.

Thus, you can easily see the importance of container depots within the structure of the international containerized cargo system. Now, let's take a look at how these depots function.

The role of the container depot

Judging by the rapid increase in container movements in Latin America in recent years, it is apparent that the maintenance and repair (M & R) of the containers will be a major growth industry in this region in the 1980s and beyond. Such a development will be in the interests of shippers, water carriers, leasing companies and other supporting enterprises.

The overriding goal of M & R depots, of course, is to ensure the maintenance of the container as a safe structure which will protect the cargo from damage. The first priority is the physical safety of the general public and personnel handling cargo, and the second priority is the protection of the contents of the container. Besides the leasing industry's own strong safety rules, the administration of the International Convention for Safe Containers (CSC), in which the leasing industry co-operates, helps to fulfil these goals. CSC requires stringent inspection procedures before containers can go into, or remain in, service. This convention, which has been ratified by over 30 nations (including three in Latin America), will go into full force on September 6 of this year. For the leasing industry, the principal effect of CSC will be to affix a safety approval plate upon each container, and to ensure that each undergoes a thorough physical safety check every two years. This in itself is no problem for leasing companies, because at interchange time strong codes, safety checks and maintenance standards which exceed CSC requirements are applied as normal practice by the industry.

Another goal of the depot operator is to ensure that repairs are made so as to preserve the economic life of the container. Every hour, every day, every week that the container is out of service means money lost to the depot operator's client -the container owner. Additionally, the depot operator has the responsibility to use only handling equipment that will allow the container to be moved with complete safety, without impairing its ability to remain an integral intermodal unit.

Recent studies show that most damage is due to mishandling at the terminals. Rail, highway, and sea transportation accounts for the second largest amount of damage, and improper stowage aboard ship accounts for the remainder.

Terminals must handle high volumes of container movement in order to justify their existence economically. In order to do this, highly qualified equipment operators are required for the safe transfer of the containers in these very active, often congested, facilities.

Estimates of expected damage range from 10% of a ship's consignment of containers being damaged in long-established, properly configured ships and terminals, to as high as 75% in situations associated with break-bulk shipping and substandard pier-side facilities.

Container repair costs have risen 9.2% annually on average for the past five years, according to one industry executive. This is fine news for depot operators, but something less than exciting for the container owners and their lessees. IICL's inspection and repair publications recommend appropriate procedures for identifying and repairing damage. These alone are not enough to satisfy the service requirements of the leasing companies and ultimately their customers, the shippers and shipping lines. Depot operators must share in the final responsibility of ensuring that quality repairs are performed at fair prices by employing conscientious workers.

In summary, leasing companies are very interested in the establishment of high-quality depots, particularly in locations like Latin America where the shortage is especially great. Leasing company goals are rapid turnover of equipment between customers, aided by quick and satisfactory container repair and reduced need to move containers due to lack of qualified repair, reconditioning or storage facilities.

How to organize a container depot

The leasing companies are a stable group that seek long-term arrangements with qualified depot operators. Once aligned with an M & R facility, they will not switch to another competitor without good cause. Maintaining the goodwill of the leasing industry will help ensure the business success of the would-be depot.

The steamship lines, in contrast, are of secondary importance to the potential depot operator as container owners rather than lessees. Only a small portion of their work is contracted out to independent repair depots, since many lines own their own depots. Moreover, shipping company-owned containers are not necessarily repaired with each interchange.

In setting up a container depot, there are a number of basic areas that the would-be entrepreneur should investigate and resolve, before making his final decision. This presumes that the entrepreneur is satisfied that the import/export activity and the market potential of the depot are sufficient to justify the investment.

It must also be remembered that the principal potential group customer is the leasing industry. This business group prefers depots which offer a full range of services, including repair, inspection, handling, storage and preferably refurbishment facilities. The last is vital, as almost two-thirds of the world's container fleet is built of steel and such containers are likely to require two refurbishments during their lifetime.

Refurbishment, which in effect is the restoration of a container to pre-specified "acceptable" conditions, normally by means of abrasive blasting the external areas and then re-coating and re-marking in an exact prescribed manner, requires substantially more investment than does the less complicated M & R service, as well as more highly qualified personnel. Items to consider are the size and structure of the blast room, quality of lighting, compressor and blast hose capacity, abrasive recovery system, painting equipment used, and pre-refurbishment repair quality. The control of quality is essential, but greatly rewarding to the careful refurbisher.

Other basic areas of investigation

1. Site selection

The location of any M & R depot should be "where the action is", namely, the busiest meeting point between steamship lines, leasing company offices, and the import/export trades. The worst mistake is to locate off the beaten track, like the ill-fated restaurant built on the nearby, but inaccessible, side road off the main highway.

The first objective is to find a site with a reasonably active import/export trade. However, beware of the port terminal proper, for that is often merely a transshipment point for cargo en route to other destinations, where storage costs are high for idle containers. At such points, damaged containers may only get temporary repairs, serving to get the container through to its final destination, where complete repairs will be made.

Since containers are being stored more frequently near the major leasing ports, start searching close by, but not at, the port proper. Here are some helpful suggestions:

First, look for a site preferably within a radius of approximately eight kilometers (five miles) off the port. This is close enough to reduce transfer costs but will avoid the congestion and high cost of the port itself.

Second, look for a site adjacent to a major highway, preferably not more than five kilometers (three miles) off the highway. Access to a railroad siding is another advantage.

Third, and most important, look for a site big enough to encompass adequate storage space, in addition to shop space. Do not forget that enough space is needed to manoeuvre container handling equipment so as to be able to store the containers safely and efficiently. Ideally, approximately 30% of the site area should be uncluttered by buildings and containers.

Locations near where cargo is "stuffed" (loaded) into and/or "stripped" (unloaded) from containers are desirable. These consolidation areas, which accommodate the cargoes of many different shippers, are prime demand areas for empty containers.

2. Depot design, equipment, and spare parts

The decision on design or layout of the depot depends largely on expected traffic volume, construction costs, prevailing weather conditions, and anticipated equipment to be provided in order to repair the various types of containers serviced. Statistics show that 58% of the world container fleet is steel, 35% aluminium and 7% glass reinforced plywood (GRP). Generally speaking both aluminium and GRP units require somewhat higher artisan skills than do steel containers. Refrigerated container repair requires very specialized equipment and personnel, and usually some kind of authorization agreement with and training from the manufacturer of the refrigeration equipment.

Therefore, the equipment needed to repair steel containers (welding apparatus, painting equipment, bending rigs, lifting equipment, and hand tools, among others) is probably what the fledgling repair shop should first consider providing.

The drainage, climate, and terrain of the site are important determinants in selecting a proper location. Remember that the site must be able to accommodate the weight of heavy lifting equipment supporting an unloaded container and resist the concentrated load of three empty containers at four concentrated load centres (the corner fittings). Areas in rainy territory must be adequately drained to prevent destruction of the containers and handling equipment. Essentially, most leasing companies require that adequate covered areas, protected from the elements, be available to perform repairs, especially when using modern welding equipment and for paint and decal application. Cold areas, of course, require interior heating of the shop. The site must be reasonably flat and large, in order to be able to accomodate a reasonable number of containers and the pathways needs by handling equipment.

It is also desirable to be able to have adequate room to segregate containers by size (20- or 40-foot) and by ownership.

The depot operator must decide whether to fabricate or purchase from a third party the necessary replacement spare parts for containers. If the spare parts have to be imported, the operator must be familiar with customs requirements and duty charges. Remember, too, that some leasing companies may require the use of certain materials (such as a specific paint or decals) that must be imported. First find out if the importation and shipment of such parts poses a problem that has to be resolved.

Subcontracting the fabrication of steel parts to outside metal working shops should be reviewed carefully, because this tends to increase repair times and parts costs, and the quality of the material supplied may have to be constantly controlled to ensure that no substandard parts are used.

It is not the purpose here to debate the merits of own parts fabrication versus purchase. Nevertheless, it should be borne in mind that not only is it important to have handling and repair equipment on hand, but also to have spare parts on hand, or at least easily and quickly available.

For anyone sincerely interested in depot operations, the leasing industry itself can supply more specific aids. The IICL in New York publishes technical manuals rich in valuable tips, and the technical departments of the leasing companies themselves will usually co-operate too.

The leasing industry employs technical surveyors who inspect and approve repairs around the world. The would-be depot operator would do well to tap the skills and experience of these persons.

3. Personnel and pricing

Naturally, the depot facility must have a trained work force with a wide range of skills. These skills include, for example, operating container-moving equipment (such as fork-lifts or cranes), welding, miscellaneous repair skills, cost estimating, and so forth. At the same time, the depot must provide a continuity of service which creates a stable work force, and an administration and management that can adapt quickly to changing workloads.

The inspector/estimator is a key figure, and careful attention must be paid to his selection. On his shoulders falls the responsibility of determining repair costs. If he estimates too low, the facility loses money, if he estimates too high, the depot loses out on the opportunity to form a lasting business relationship with the client.

It should be noted here, however, that most leasing companies and established repair contractors have fixed repair cost schedules or guidelines for the most common repairs, based upon experience. Since the majority of repairs come under this category, much of the guesswork is taken out of the estimating, and the depot operator knowns in advance what the client is willing to pay. It should also be noted that these schedules are not arbitrary documents, but rather are the result of a history of negotiations between individual leasing companies and individual depot operators. It is certainly to the benefit of the leasing industry to have depots which are profitable and operated efficiently. In this way, not only do the lessor and depot operator profit, but so does their ultimate customer, the shipping line.

To reach this point, however, an effective cost control system is a priority project for any depot operator, new or old. Here are just a few ideas on how a depot operator can control his costs:

1. Hire dependable skilled conscientious staff.
2. Make regular re-examinations of depot operations to discover new ways to reduce repair times.
3. Locate suppliers who will provide repair materials at the lowest cost.
4. Minimize the number of containers which must be returned to the repair shop for "touch-up" work.
5. Maintain a dialogue with the workers to determine repair "bottlenecks" and methods by which the work involved in repairs can be minimized.
6. Minimize the number of times a container must be moved within a repair facility.

These ideas represent only a small sample of the collective experience built up by the container leasing industry. The depot operator is urged to keep in close touch with the technical experts of the leasing companies and with other depot operators in order to share valuable experience.

The time for decision

Obviously, entry into the container repair business is not a decision to be taken lightly, and neither IICL or the leasing companies can guarantee your success. There is a challenge here that must be weighed carefully, bearing in mind the following facts:

1. The growth of containerization in Latin America has been spectacular in the past decade. Every sign points to an accelerated rate of expansion for the foreseeable future.
2. The growth, however, has not been accompanied by a corresponding development of a properly equipped M & R network in the region. As a result, this particular facet of the industry cannot help but grow substantially in the coming year. Demand for depot services is becoming stronger all the time.
3. Since the leasing industry is the major owner of containers, it is most concerned with the shortage not only of repair, but also of refurbishment facilities. At the present time, quality refurbishing is mostly available in high-cost areas of the world, where the container trade is already well established. Certain leasing companies might be willing to support the development of quality refurbishment facilities in Latin America, in order to save on costly repositioning of containers requiring immediate refurbishment. Advice can be obtained from IICL member companies.

4. The initial capital investment will depend on the extent of services the new depot intends to provide. A new depot need not try to offer a complete range of services all at once in order to be a successful enterprise.

Do not forget about the expert advice available through the leasing industry itself. It wants -and needs- the services the depot provides, so it is in the interest of the leasing industry as well as your own that your enterprise does not start off with unrealistic capitalization. They want you to be a success as much as you do!

One final reminder. Some years ago, it was popular to refer to the "container revolution" as a phenomenon peculiar to the 1950s and 1960s. In reality, that "revolution" is still in full swing, especially in such developing regions as Latin America. The container leasing industry is very much aware of the "explosion" of growth here, and fully intends to be a part of it. Without a firm co-operative partnership between the leasing industry and the depot operators, based on a mutuality of interest, respect, and professionalism, this bright future may well be dulled. We are betting that this will not happen.

Presentation 3

Conditions of Lease

INSTITUTE OF INTERNATIONAL CONTAINER LESSORS

The ICL Conditions of Lease have been prepared for use as a form, in whole or in part, on a strictly voluntary basis by parties to leases of containers and related equipment. The Institute makes no recommendations or representations as to the content of leases, or with respect to these provisions; and these provisions are for use in conjunction with the advice of counsel only. The Conditions of Lease are not complete in themselves and reference should be made to the accompanying memorandum for instructions with respect to their use.

HCL CONDITIONS OF LEASE

THE FOLLOWING CONDITIONS are incorporated into the foregoing Lease, or any Lease which may adopt these Conditions, in consideration of LESSOR's promise to lease the Equipment referred to in such Lease or Leases, LESSEE's promise to pay Rental Charges therefor and the following terms and conditions:

1. **Definitions.** The terms herein shall have the following meanings in these Conditions of Lease:
   (a) "LESSOR" shall mean [ ].*
   (b) "LESSEE" shall mean the other party or parties to the Lease or Leases which precede or adopt these Conditions.
   (c) "Conditions" shall mean the provisions of this document.
   (d) "Lease" shall mean any document which incorporates these Conditions by attachment, adoption, reference or otherwise, and, subject to paragraph 17(j), reference hereafter to "this Lease" shall mean such document as supplemented and modified by these Conditions.
   (e) "Equipment" shall mean all containers, chassis trailers and other equipment subject to the Lease together with any improvements, repairs, accessories and replacements thereto or thereof prior to return of the Equipment to LESSOR.
   (f) "Item of Equipment" shall mean any single piece of Equipment.
   (g) "Rental Charge" shall mean the amount computed as set forth in the Lease and payable by LESSEE for use of each item of Equipment during the term of the Lease.

2. **Rental Charge.** Except as otherwise herein provided, LESSEE shall pay the Rental Charge set forth in the Lease for each item of Equipment from the date on which the item of Equipment is delivered by LESSOR until the date on which such item of Equipment is returned, inclusive of both date of delivery and date of return. If the item of Equipment is not returned as required in this Lease or if it fails to meet the requirements of this Lease upon its return, LESSOR shall have such rights and remedies as are hereinafter provided, and LESSEE shall continue to pay rent at the rate payable during the term of the Lease or at such other rate as the Lease may provide.

The time for payment of each Rental Charge installment hereunder shall be of the essence and a condition of the Lease; without prejudice to the foregoing or to any other remedy LESSOR may have, payments not received on or before the date payable shall be subject to a service charge at the rate of % per month on the unpaid balance.

3. **Term.** Subject to the provisions of the Lease and of paragraphs 8 and 13 below, this Lease shall be binding upon the parties upon execution of the Lease by LESSOR and LESSEE and shall continue for a term expiring on the last date set forth in the Lease for return of any item of Equipment; provided that LESSOR's remedies and other rights and LESSEE's liabilities or obligations under other provisions of this Lease shall continue until such liabilities or obligations are discharged and until the last item of Equipment is returned.

4. **Delivery of Equipment.** LESSOR will use its best efforts to deliver the Equipment on the dates specified in the Lease to the locations designated, but LESSOR shall not be liable for any delays in delivery. LESSEE's return to LESSOR of LESSOR's Receipt and Equipment Report shall constitute conclusive evidence that all items of equipment to which the same relates have been delivered to LESSEE and that LESSEE has examined them and found them (except as described otherwise in said Receipt and Equipment Report) to be complete, in good condition and fully satisfactory. Nothing entered in such Receipt and Equipment Report by LESSEE shall affect LESSEE's obligation to pay the full Rental Charge or any of LESSEE's other obligations under this Lease.

5. **EXCLUSION OF WARRANTIES.** ALL ITEMS OF EQUIPMENT ARE LEASED AS IS, AND THE LESSOR WARRANTS ONLY THAT THEY CORRESPOND WITH THE DESCRIPTION SET OUT IN THE LEASE (OR IN ANY FURTHER SUCH LEASES ATTACHED OR WHICH MAY HEREAFTER ADOPT THESE CONDITIONS), AND THAT THE LESSEE SHALL HAVE QUIET POSSESSION AS AGAINST ANY PERSON CLAIMING UNDER OR THROUGH THE LESSOR. SAVE AS AFORESAID, NO CONDITION OR WARRANTY WHATSOEVER OF ANY KIND HAS BEEN OR IS GIVEN BY THE LESSOR IN RELATION TO THE EQUIPMENT OR ANY ITEM

**Name of leasing company*

THEREOF, AND ALL CONDITIONS AND WARRANTIES IN RELATION THERETO WHETHER EXPRESSED OR IMPLIED, WHETHER STATUTORY COLLATERAL HERETO OR OTHERWISE, WHETHER IN RELATION TO THE FITNESS OF THE EQUIPMENT OR ANY ITEM THEREOF FOR ANY PARTICULAR PURPOSE, OR TO COMPLIANCE WITH ANY CONVENTION, STATUTE, REGULATION, ORDER OR OTHER PROVISION OF LAW OR STANDARD, OR WHETHER IN RELATION TO MERCHANTABILITY OR AS TO DESCRIPTION, STATE, QUALITY, OR CONDITION OF THE EQUIPMENT OR ANY ITEM THEREOF AT DELIVERY OR AT ANY OTHER TIME ARE HEREBY EXCLUDED AND EXTINGUISHED.

6. **Operation, Maintenance and Repairs.**

(a) LESSEE shall use each item of Equipment properly and shall, at its expense, maintain and return each item of Equipment in good and safe condition and make repairs, replace parts, touch up paint, etc. LESSEE shall be liable for any repairs wrongly made. LESSEE shall wash and clean each item of Equipment regularly inside and outside to prevent corrosion and other damage. LESSEE shall be liable for all expenses, costs and losses to LESSOR arising out of LESSEE's failure to maintain and return the Equipment in good and safe condition or to spot paint or make such repairs or replace such parts as may be necessary for such maintenance and return.

(b) LESSEE shall use each item of Equipment so as to comply with all loading limitations, handling procedures and operating instructions, and to prevent excessive impact, unbalanced loading, etc. LESSEE shall not use any item of Equipment for storage or transportation of unsuitable contents which may damage the Equipment, including without limitation unprotected corrosive substances, poorly secured materials or bulk commodities which may corrode, oxidize, puncture, contaminate, stain, severely dent or otherwise damage the Equipment.

(c) Except as otherwise provided herein, LESSEE shall be liable for all changes in the condition of each item of Equipment prior to its return to LESSOR, and such changes shall be deemed damage pursuant to paragraph 9 hereof. LESSEE shall not be responsible for (i) such normal wear and tear defined below as may reasonably be expected between delivery of the item of Equipment and the date of its return specified in the Lease, or the date of its actual return, if earlier, or for (ii) such changes as are shown to have been caused by LESSOR. Normal wear and tear may include light oxidation or light rust, random small dents and scratches, on any side of the item of Equipment, caused by normal handling, ground storage, ship storage and securing, transport, and loading and discharge, consistent with good practice and in accordance with any specifications, handling procedures and operating instructions as may have been given by LESSOR to LESSEE. Notwithstanding the two preceding sentences, changes which could have been prevented by routine washing, routine lubrication, spot painting, or other normal repair or maintenance, changes affecting security, water tightness, weather proof qualities, mechanical and/or electrical function of integral components, the integrity of design or structure, or regulatory, classification or certification requirements, or affecting the inside or outside dimensions or cubic content of an item of Equipment, whether or not such changes add thereto or subtract therefrom, or changes which may threaten the safety of person or property, shall not constitute normal wear and tear, and LESSEE shall be liable therefor.

(d) All improvements, repairs, accessories, replacements, etc., made or attached to any item of Equipment by LESSEE become fixtures, part of the item of Equipment and the property of LESSOR without LESSOR incurring any liability therefor. LESSEE shall make no modifications, improvements, repairs or replacements, nor attach accessories or additions to any item of Equipment, without the prior written consent of LESSOR, except as may be necessary for emergency purposes or to comply with other provisions of this Lease. Such written consent may include such conditions, including later restoration of the Equipment to its prior condition, as the LESSOR in its sole discretion may require.

(e) LESSEE shall not change or supplement any identification marks on the Equipment, including without limitation, letters and numbers, except as may be otherwise required under these Conditions or agreed upon in writing between LESSOR and LESSEE. Such agreement may include such conditions, including later restoration of the Equipment to its prior condition as LESSOR and LESSEE may provide. Subject to any such agreement, the LESSEE at its expense shall keep such marks and the color of each item of Equipment in good condition as long as such item of Equipment is under lease to it.

(f) LESSEE shall at its expense comply with all conventions, laws, regulations or orders of federal, state, foreign and local governments and agencies which in any way affect any item of Equipment or its use, operation or storage or which in any way affect this Lease and shall be liable for all fines, penalties, fees and interest thereon for failure to comply. LESSOR shall have no responsibility for compliance with any such conventions, laws, regulations or orders, including, without limitation, all such conventions, laws, regulations or orders as may relate to customs, transportation, handling, safety, labor regulation, repair, standards, etc.

(g) LESSEE shall comply in all respects with the International Convention for Safe Containers (CSC) and shall have and exercise such responsibility as would otherwise be LESSOR's for maintenance and examination of each item of Equipment as shall be necessary to comply with such Convention. LESSEE shall also comply in all respects with the Customs Conventions on Containers, 1956 and 1972, including, without limitation, all obligations of the operator of an item of Equipment and all requirements relating to temporary admission, transport of goods under Customs seal and maintenance of records.

(h) LESSEE shall at its expense comply with all rules and practices of ports, depots, storage areas and transportation companies consistent with the other requirements of this paragraph 6.

(i) If the equipment passes into the possession of any party other than LESSEE or LESSOR prior to return by LESSEE, LESSEE shall take all additional actions necessary to assure that such other party accepts, handles and relinquishes the Equipment in a manner consistent with all of LESSEE's obligations and LESSOR's rights hereunder.

7. **Taxes, Government Levies and Other Charges.**

(a) LESSEE shall pay all taxes (other than taxes on LESSOR's income), fees, penalties, and charges levied on or in connection with the Equipment subsequent to delivery, including without limitation property, sales, use and excise taxes, duties, customs charges, and all further government levies, fees or charges, including without limitation fines, penalties and interest thereon. Without limiting the foregoing, LESSEE shall pay all customs charges arising out of failure to comply with any instructions that LESSOR may furnish to LESSEE.

(b) LESSEE shall pay all charges incurred in ports, depots, storage areas or otherwise arising out of the use of the Equipment, including without limitation, lifting and loading, in and out, customs charges and wharf fees. LESSEE shall also pay all costs or other charges incurred in picking up and returning the Equipment.

8. **Return of Equipment.**

(a) LESSEE shall, at its own expense, return each item of Equipment on the date and to the location specified for its return in the Lease. Time is of the essence.

(b) Should the term of the Lease be extended more than six months, LESSEE shall give LESSOR not less than 90 days' prior written notice of the date and place of return of each such item; should the term of the Lease be extended six months or less, LESSEE shall give 30 days' prior written notice.

(c) Upon return the LESSOR and LESSEE shall execute a Joint Condition Inspection Report identifying the Equipment as specified in the schedule of equipment and identifying and acknowledging any changes in the condition of the Equipment subsequent to delivery.

(d) With regard to chassis and trailer equipment, LESSEE shall return such Equipment with the identical brand of tires equal in value and condition to those delivered with the Equipment. The "normal wear and tear" provisions of these Conditions shall not apply to tires.

(e) In the event that without obtaining prior written consent of LESSOR, LESSEE shall return any item of Equipment on a date or to a location or agent different from that specified for its return in the Lease, such return shall be improper. Within a reasonable time of the discovery of such improper return, LESSOR may elect such of the following remedies (i)–(iii), separately or in combination or sequence, and without prejudice to any other remedies or rights under this Lease, or otherwise available to LESSOR, as in LESSOR's sole discretion it may deem necessary or desirable to meet its obligations to LESSEE or to others or to maintain adequate allocation and condition of its Equipment:

(i) to tender the same item of Equipment to LESSEE at the place of its improper return, or at such other place upon which LESSOR and LESSEE may agree,

(ii) in the event that such item of Equipment is not within the possession and control of LESSOR, to tender another item of Equipment of equivalent type at the place of improper return, or at such other place upon which LESSOR and LESSEE may agree,

(iii) should LESSEE refuse, within five days of notice of LESSOR's election, to accept tender in accordance with (i) or (ii) above, LESSOR may elect to terminate the Lease forthwith with respect to such item of Equipment (but without prejudice to any other rights or remedies hereunder).

In the event that LESSOR shall elect (i), (ii), or (iii) above, all of LESSEE's obligations under the Lease shall continue, including without limitation the obligation to pay the Rental Charge without allowance for interruption as a result of the improper return, and in addition LESSEE shall pay any extra costs or charges for handling or services as a

result of improper return including without limitation charges for shipping the item of Equipment or item of Equipment of equivalent type to the place of tender. In the event that LESSOR shall elect (iii) above, LESSOR shall use its best efforts to lease such Equipment to others and, upon receipt of rent from such a lease to another, shall credit LESSEE with the amount thereof, after deducting the extra costs and charges above and such other reasonable costs as may be incurred in connection with such efforts to lease to others. Improper return by LESSEE shall constitute full and sufficient notice to LESSEE of LESSOR's intention to exercise one or more of its rights hereunder, notwithstanding any other provision of these Conditions, providing that LESSOR shall notify LESSEE of its election under (i), (ii) or (iii) above within a reasonable time after such election. No such election of (i) or (ii) shall affect the term of the Lease except as otherwise permitted pursuant to these Conditions.

(f) In the event that without obtaining prior written consent of LESSOR, LESSEE shall fail to return any item of Equipment for more than 30 days after the return date specified in the Lease, LESSOR, without prejudice to any other rights hereunder, including, without limitation, claims relating to Rental Charges or breach of this Lease or later exercise of any right to repossession, may in its sole discretion elect to treat such item of Equipment as lost, and in that event LESSEE shall pay to LESSOR the replacement value of such item in accordance with the provisions of the Lease. LESSEE shall continue to pay rent at the rate set forth in the Lease for each such item of Equipment, or in the event that LESSOR so elects, LESSOR's standard rental charge for such item at the rate prevailing on each day after expiration of the aforesaid 30 days, until the date that payment of such replacement value is made. In the event that after payment of such replacement value, LESSOR shall elect and obtain repossession, LESSOR shall, after deducting LESSOR's expenses, return to LESSEE such portion of such replacement value as LESSOR shall reasonably deem to be the value of such item of Equipment on the date of repossession.

9. Risk of Loss and Damage. LESSEE is liable for all loss and damage to the Equipment subsequent to delivery and prior to return to LESSOR, regardless of when such damage may be discovered.

(a) *Damage.* If an item of Equipment is returned to LESSOR in damaged condition, LESSOR will so advise LESSEE upon discovery thereof. LESSOR shall in its sole discretion have the right to repair the Equipment or to require LESSEE to repair it. In the event that LESSOR elects to repair it, LESSEE hereby authorizes LESSOR to proceed with the repairs, or arrange for the repairs to be made, at any repair facility of LESSOR's choice. LESSEE will execute any further documents required to authorize the repair facility to proceed. All repairs shall be made at the cost and expense of LESSEE, and LESSEE shall have the right to inspect any repairs so made. LESSEE shall continue to pay rent at the rate set forth in the Lease until the date upon which LESSOR and LESSEE shall agree in writing upon the amount of the cost and expense of such repairs and thereafter until the date specified in such writing for completion of such repairs. Upon satisfactory completion of the repairs and restoration of the Equipment to good and safe condition, the LESSOR shall at the request of LESSEE, issue a second Condition Inspection Report so stating.

(b) *Loss and Total Damage.* LESSOR shall in its sole discretion determine whether it is feasible to repair an item of Equipment. If LESSOR determines that it is not feasible to repair an item of Equipment or if an item of Equipment is lost or stolen, the LESSEE shall pay to LESSOR the replacement value for such item in accordance with the provisions of the Lease. LESSEE shall pay Rental Charges pursuant hereto until the date that full settlement is made therefor. In the event that full settlement is not made within 30 days after the return date specified in the Lease, LESSEE shall, if LESSOR so elects, pay LESSOR's standard rental charge for such item at the rate prevailing on each day after expiration of the aforesaid 30 days. Full settlement shall consist of proof of such loss satisfactory to LESSOR and full payment of the replacement value of the Equipment.

(c) *Replacement.* In the event of damage, loss or theft of Equipment, LESSOR may elect, but shall not be obliged, to deliver another item of Equipment, which it deems of similar type, and at LESSOR's option, this Lease shall apply to such replacement item of Equipment.

10. Interests in Lease, Subleasing and Other Encumbrances. Notwithstanding any other provisions of these Conditions, including without limitation the definitions and nomenclature used herein, this Lease shall not be deemed a sale or anything other than a lease for any purpose. LESSEE shall not sell, assign, sublease, hypothecate, mortgage or otherwise encumber any of the items of Equipment or any of its rights or interests under this Lease without the express written consent of LESSOR, which consent LESSOR may in its sole discretion withhold.

11. Indemnity. LESSEE shall indemnify and hold LESSOR harmless from all liability, damage or loss (including without limitation expenses in connection with any claim or suit, such as attorneys' fees, court costs and other expenses) arising out of (a) any failure to comply with LESSEE's obligations under this Lease; or attempt by any third party, whether private or governmental, to impose upon LESSOR liability for LESSEE's obligations; (b) any claim,

whether private or governmental, for personal injury or death, and for loss or damage to person, property, cargo or vessels arising out of or incident to the ownership, selection, possession, leasing, operation, control, use, storage, loading, unloading, moving, maintenance, delivery, or return of any item of Equipment; and (c) any forfeiture, seizure, or impounding of, or charge or lien on, any item of Equipment. In the event of the occurrence of (b) or (c), each party undertakes promptly to give notice to the other of claims against it or action against it, with respect thereto. In the event of the occurrence of (c), LESSEE agrees not to settle any action relating to the Equipment without the consent of LESSOR.

12. Insurance. Without prejudice to any other liability under this Lease, LESSEE shall at its own expense maintain insurance policies satisfactory to the LESSOR with insurers satisfactory to LESSOR as follows:

(a) public liability, including property damage, with limitations of not less than $ for each person, $ for each occurrence, and $ property damage for each accident.

(b) contractor's and cargo liability covering LESSEE's indemnity obligations hereunder.

(c) all risks physical damage insurance in an amount equal to the replacement value of the Equipment covering such Equipment while on land, afloat, in transit or at rest anywhere in the world, including Particular Average and General Average, and with a deductible from such value not exceeding $

(d) automobile liability and property damage with limitations not less than as provided in (a) of this paragraph above.

The Certificates, Policies and premium receipts shall be furnished to LESSOR when requested. The Policies shall contain loss payable clauses in favor of LESSOR and clauses prohibiting cancellation without 45 days' written notice to LESSOR. LESSEE hereby irrevocably appoints LESSOR as LESSEE's attorney in fact to make claims, receive payment and execute and endorse all documents, checks or drafts for payment of loss or damage under any insurance policy. Recovery under any such insurance shall be applied first to LESSEE's liability under paragraph 11 hereof and second to LESSEE's liability under paragraph 9 hereof. The LESSEE shall not use or allow the Equipment or any items thereof to be used for any purpose not permitted or covered by the terms and conditions of the said insurance policies or do or allow to be done any act or thing whereby the insurance thereunder may be invalidated. If the LESSEE shall default in the payment of any premium in respect of any such insurance policies, the LESSOR may, but shall not be obliged to, pay such premium, and if the LESSOR does so, the LESSEE shall repay the amount thereof to the LESSOR on demand.

13. Further Remedies. The remedies and other rights set forth in this paragraph, elsewhere in this Lease, or otherwise available to LESSOR, are cumulative and not alternative. Such remedies and rights may be exercised separately or in any combination or sequence, and the use of any remedy or right individually or in any combination or sequence shall be without prejudice to and shall not waive any others. The exercise of any such remedy or right, including without limitation, termination, shall not relieve LESSEE of any liability or obligation under this Lease incurred prior to the exercise thereof.

Termination. The LESSOR may (but without prejudice to any other rights under this Lease) forthwith by notice in writing to the LESSEE terminate this Lease with respect to all, or any, of the items of Equipment if:

(a) the LESSEE shall fail punctually to pay any Rental Charge installment on the date payable as set forth in the Lease, or

(b) within 10 days of prior notice from LESSOR thereof, (i) the LESSEE shall fail to pay any other sum becoming due under this Lease, or (ii) the LESSEE shall fail to cure any other breach of the provisions of this Lease, or (iii) the LESSEE shall fail to cure any condition or situation which may jeopardize the LESSOR's rights in the Equipment or any items thereof, or

(c) any distress, execution or other legal process shall be levied on the Equipment or any items thereof, or

(d) the LESSEE shall permit any judgment against it in excess of $1,000 to remain unsatisfied for 7 days or fail to comply with the order of any court for 7 days, or

(e) upon the filing of any petition in bankruptcy, assignment for benefit of creditors, appointment of a receiver of all or any of its assets, entry into any type of liquidation, whether compulsory or voluntary, or the initiation of any other bankruptcy or insolvency proceeding by or against LESSEE including, without limitation, any action by LESSEE to call a meeting of its creditors or to compound with or negotiate for any composition with its creditors, or

(f) upon the seizure or nationalization of LESSEE or any of LESSEE's assets by a government or governmental instrumentality.

Upon receipt of notice of termination, LESSEE promptly shall give LESSOR notice in writing of the location of each item of Equipment and, at its own expense, shall return each such item of Equipment as LESSOR shall direct.

Provisional Remedies and Summary Proceedings. In the event of the occurrence of any of (a), (b) (i)-(iii), (c), (d), (e) or (f), if LESSOR shall so elect by notice in writing to LESSEE, LESSOR may utilize such legal remedies as may be available to it, including, without limitation, replevin, injunction, summary judgment, or any other provisional remedy or summary proceeding designed to obtain possession of or protect the Equipment or any items thereof. LESSEE hereby specifically waives any hearing with respect to any such provisional remedy.

Repossession Without Judicial Process. In the event of the occurrence of any of (a), (b) (i)-(iii), (c), (d), (e) or (f), LESSOR, upon notice in writing to LESSEE, may retake possession of the Equipment or any items thereof without resort to judicial process and for such purpose may enter upon any premises belonging to or in the occupation or control of the LESSEE.

Acceleration. In the event that LESSEE shall fail punctually to pay any Rental Charge installment on the date payable, as set forth in the Lease, and if LESSOR shall so elect by notice in writing to the LESSEE, all Rental Charges for the full term of this Lease to and including the return dates set forth in the Lease shall become due and payable immediately for all Equipment or, if, in LESSOR's sole discretion, it shall specify that acceleration shall apply only to certain items of Equipment, then only for such items thereof as may be specified in such notice. In the event LESSOR so elects, LESSOR may, without further notice to LESSEE, retake possession of the Equipment or any items thereof. In that event the unpaid balance of the Rental Charge shall become due and payable immediately but LESSOR shall use its best efforts to lease such Equipment forthwith to others and shall credit LESSEE with the amount of the rent received by LESSOR from the leasing of such Equipment during the remaining portion of the term of the lease after deducting the reasonable costs incurred in connection with such efforts to repossess and lease to others.

14. Governing Law. This Lease shall be governed by and construed according to the law of * [ ].

15. Arbitration and Litigation. Institution of arbitration or litigation by any party shall not prejudice or waive LESSOR's right to any of the remedies referred to in paragraphs 8, 13 or elsewhere in this Lease or otherwise available, including, without limitation, termination, provisional remedies, repossession without judicial process or acceleration.

(a) Any controversy, dispute or claim arising out of or relating to this Lease, or to the breach thereof, in which the claim is for less than $, shall be settled by arbitration before a single arbitrator in accordance with the rules, then obtaining of ** [ ], and such arbitration shall be held in* [ ]. Judgment upon any award may be entered in any court having jurisdiction thereof. Such arbitration and all documents and proceedings in connection therewith shall be in the English language.

(b) Any such controversy, dispute or claim in which the claim is for $ or more, or seeking enforcement of an arbitral award, or seeking a form of relief other than money shall be litigated in the courts of * [ ], and the parties hereby expressly confer jurisdiction upon such courts for such purpose, and consent to service of process for such litigation by registered mail (with return receipt requested) to the address referred to in paragraph 17(f) hereof.

16. Extent of Liabilities and Obligations. LESSEE shall not be excused from its liabilities or obligations hereunder by events beyond its control, including but not limited to fire, storm, flood, earthquake, explosion, accidents, acts of the public enemy, sabotage, riots, civil disorder, insurrection, war, strikes, lockouts, labor disputes, labor shortage, work stoppages, transportation embargoes or delays, failure or shortage of materials, equipment, fuel, electricity or other supplies, failure of suppliers to deliver as requested, failure of repair facilities to finish repairs, acts of God, and acts, orders, directions, or regulations or priorities of any government or its branches or agencies.

17. General.

(a) This Lease is binding upon the parties and their respective heirs, legal representatives, successors and assigns.

**Country and/or state*

***National or international arbitration body*

(b) This Lease contains the entire agreement between the parties and may not be amended, altered, modified or added to except by a writing signed by the party to be bound thereby.

(c) LESSOR may grant a security interest in this Lease and/or assign all or any part of its obligations, rights, title or interest in this Lease, including all or any portion of the Rental Charge due or to become due. To the extent, if any, that this Lease constitutes chattel paper (as such term is defined in the Uniform Commercial Code as in effect in any applicable jurisdiction), no security interest in this Lease may be created through the transfer or possession of any counterpart other than the original counterpart which shall be so identified on the signature page of the Lease.

(d) LESSEE hereby waives any and all existing and future set-offs and counterclaims against the Rental Charge or any payments due under this Lease.

(e) The paragraph headings in these Conditions are for convenience only and shall not be deemed to alter or affect any provision hereof.

(f) Any notice required to be given under this Lease shall be effective upon dispatch to the party to whom such notice is directed at the address first above written, or at such other address as may have been communicated in writing to the other party or parties to this Lease in accordance with the provisions of this paragraph. All notices required to be given in writing shall be given either by hand delivery, by mail or by telex confirmed by mail. Such mail shall in all cases be registered air mail unless the address for delivery is in the same country as that from which the notice emanates and the distance involved is less than 200 miles (in which case registered first-class surface mail shall suffice).

(g) In the event that any of the terms and conditions of this Lease are not completed by insertion of the necessary words and/or figures, the parties agree to adopt LESSOR's standard terms and conditions for comparable equipment, prevailing on the date on which LESSEE executes the Lease, including without limitation rental charges, penalties for improper return and replacement values.

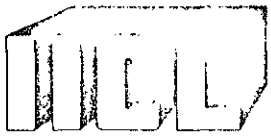
(h) Where there are two or more persons parties to the Lease as LESSEE their liabilities under this Lease shall be joint and several.

(i) The provisions of this Lease are separable and any provisions found upon judicial interpretation or construction to be prohibited by law shall be ineffective to the extent of such prohibition without invalidating the remaining provisions hereof.

(j) These Conditions incorporate all the provisions of the Lease; the provisions of the Lease and these Conditions are to be construed in all cases so as to result in an effective and consistent agreement, but in the event of any conflict between the provisions of the Lease and of these Conditions, the provisions of the Lease shall control.

(k) No waiver of any remedy or other right under this Lease shall operate as a waiver of any other remedy or right, nor shall any single or partial exercise of any remedy or right preclude any other or further exercise thereof or of any other remedy or right.

(l) References in these Conditions to LESSEE shall be deemed to refer also to LESSEE's employees and to LESSEE's agents including without limitation shipping companies, depots and truckers under hire to it. Any action or agreement required by these Conditions of LESSEE may be performed by LESSEE's employees or such shipping companies, depots, truckers or other agents, and their actions or omissions to act shall be binding upon LESSEE.



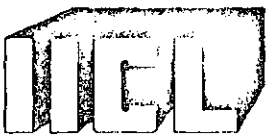
INSTITUTE OF INTERNATIONAL CONTAINER LESSORS

USE OF IICL CONDITIONS OF LEASE

The following should be observed in the use of the IICL Conditions of Lease (LT 2-73). The IICL Conditions are intended to serve as a set of examples of provisions which may be adopted, in whole or in part, on a strictly voluntary basis by parties to long term leases of containers or related equipment (See paragraph 1 of Conditions (Definitions)). The IICL Conditions are not complete in themselves. The most essential provisions of the lease (i.e., those relating to the names of the lessor and lessee, number and identification of containers or equipment, rental charge, replacement value, dates of delivery and return, terms of invoicing and payment, and currency in which payment is to be made) do not appear in these conditions and must be set forth in the lease.

If the lease is to be a physically separate document, the IICL Conditions are examples of provisions which may be attached to the lease. If only one document is desired, such provisions as are deemed useful may be incorporated in such document. In addition, if paragraphs 1, 2, 12, 14 or 15 are used, the further provisions required in those paragraphs must be inserted.

It should be remembered at all times that the IICL Conditions of Lease are not standard provisions. It is important to draw this distinction from the point of view of the United States antitrust laws, the U.K. Restrictive Trade Practices Acts and other laws. The Institute does not expressly or impliedly recommend the use of these conditions in any way. Each leasing company is free to ignore them or use such parts as in its own individual discretion it may see fit. If use is made, there can be no compulsion in connection with such use. Nor can there be any agreement or understanding among members of the Institute that some or all of them will use them or any parts of them. Members are strongly advised not to communicate concerning the extent to which they are used. No information even remotely related to prices should be exchanged by members.



INSTITUTE OF INTERNATIONAL CONTAINER LESSORS

IICL CONDITIONS OF LEASE

Revision of Paragraph 6(g) Pursuant to Article II(10) of the International Convention for Safe Containers (CSC)

Paragraph 6(g) of the IICL Conditions of Lease issued in 1973 provided for compliance with the International Convention for Safe Containers (CSC) and the Customs Conventions on Containers, 1956 and 1972. Specifically it provided illustration of exercise of the opportunity under Article II(10) of the CSC for lessee to be deemed owner of the containers for purposes of the Convention.

With the entry into force of the CSC in September 1977, greater flexibility and specificity were required in connection with the several obligations imposed by the Convention. Accordingly, IICL has revised Paragraph 6(g) describing requirements relating to maintenance, examination and initial approval under the CSC with greater specificity. In view of the five year transition period for existing containers and the five year period prior to the first examination of new containers (CSC Safety Approval Plates will be applied to new containers at manufacture), the only requirement effective immediately is the obligation to maintain the containers in safe condition.

The revised Paragraph 6(g) is set forth below and is distributed, in accordance with the purposes of the original IICL Conditions of Lease, as an example of a provision which may be adopted, in whole or in part, on a strictly voluntary basis by parties to leases of containers or related equipment. It is not issued as a standard provision, and the Institute does not expressly or impliedly recommend its use. Its purpose is to indicate how obligations can be allocated, should the parties desire to take advantage of the opportunity to do so under Article II(10) of the Convention.

(g) It shall be the obligation of LESSEE to comply in all respects with the International Convention for Safe Containers (CSC), and LESSEE shall have and exercise owner's responsibilities for the purposes of the CSC, including, without limitation, such responsibilities as would otherwise be LESSOR's for maintenance, examination and repair of each container. Performance of such examinations shall include ascertaining that the container has no defects which could place any person in danger, marking each container with the date before which it is next to be examined and complying with all other requirements imposed by LESSEE's country of domicile or head office. In the event that neither LESSEE's country of domicile nor of head office is a signatory to the CSC when an examination is due, LESSEE shall take such action as may be necessary to perform such examination in compliance with the regulations of a signatory permitting it to do so. Should approval and plating of any container become due prior to its return to LESSOR, application for approval, if not already made, shall be the obligation of LESSOR, but affixing the CSC Safety Approval Plate in accordance with the CSC and with applicable government or approval authority requirements (and performing the CSC examination required in connection therewith) shall be the obligation of LESSEE. In such event, LESSEE shall use LESSOR's CSC Safety Approval Plates, and LESSOR shall supply LESSEE with such quantities thereof and instructions as may be necessary. It shall also be the obligation of LESSEE to comply in all respects with the Customs Conventions on Containers, 1956 and 1972, including, without limitation, all obligations of the operator of an item of Equipment and all requirements relating to temporary admission, transport of goods under Customs seal and maintenance of records.

Depot Agency Agreement

This Agreement dated _____, 19___ ("Effective Date") between TRANSAMERICA ICS INC., 522 Fifth Avenue, New York, N.Y. 10036 ("ICS") and

_____

_____ ("Agent").

WHEREAS, ICS is engaged in the business of leasing its freight containers and related equipment to third parties ("Lessees"), and

WHEREAS, ICS has leasing plans whereby Lessees may obtain specific equipment from specified, authorized ICS depots and return said equipment to said depots or to other authorized ICS depots, and

WHEREAS, ICS desires to contract with Agent to perform certain services and afford certain facilities to ICS in furtherance of its leasing plans, and

WHEREAS, Agent has represented to ICS that it is duly authorized and qualified to perform the services and afford the facilities.

NOW, THEREFORE, it is mutually agreed as follows:

1. Agent agrees to receive, inspect, store and release equipment and provide maintenance and repair service to ICS and its Lessees, all as more fully provided for below, at its place or places of business located at _____

_____

_____

_____ (list addresses of depots where services will be performed).

*Included

[ ] Storage - Agent shall provide facilities for the storage of _____ 20' containers or equivalent and _____ 20' chassis or equivalent. It is understood and agreed that Agent's ability to store said quantity is of the essence of this Agreement.

Agent shall use all reasonable care to protect the equipment of ICS in its possession from loss or damage and shall be liable for any such loss or damage resulting from Agent's lack of care or that of its employees, agents or servants.

[ ] Receipt, Release and Inspection of Equipment - Agent shall, upon instruction from ICS (i) receive equipment from ICS' Lessees and perform an inspection thereof on behalf of ICS, and (ii) release equipment to ICS'

*Mark boxes with "Yes" or "No"

Lessees. At the time of receipt and release of equipment, Agent shall execute on behalf of ICS such interchange forms as are from time to time provided by ICS. All of the foregoing services shall be performed in strict accordance with instructions for the operation of ICS depots, as are from time to time issued and delivered to the Agent by ICS. ICS shall have the right to amend such instructions at any time.

[ ] Maintenance - Agent shall, at the specific request of ICS, perform routine maintenance work. At the time of inspection of equipment, Agent shall advise ICS of the necessity for such routine maintenance. The cost for routine maintenance shall be agreed upon between Agent and ICS at the time ICS gives instructions for the performance of such work, unless specified to the contrary in Schedule A hereof.

[ ] Repair - Agent shall provide adequate facilities and maintain a stock of spare parts and materials necessary for the repair of ICS equipment. Agent agrees that it shall accept all orders for repairs made by ICS or its Lessees and shall perform such work without delay and in accordance with normal industry repair standards, including specific repair guidelines of ICS, as are from time to time issued and delivered to the Agent by ICS. ICS shall have the right to amend such guidelines at any time.

Agent agrees to perform repairs at prices competitive in the locale of Agent's place of business. Repair charges shall include all charges incidental thereto, such as necessary transportation charges. All damaged equipment shall not be subject to a storage charge until such equipment is repaired.

Agent acknowledges that, generally, the responsibility for repairs is, under the terms of ICS' agreements with Lessees, the obligation of such Lessees. Accordingly, unless specified to the contrary in Schedule A hereof, agreements for repairs shall be made and billed to the Lessees.

ICS shall have the right to contract directly with Agent for the repair of its equipment and in those cases, the cost of such repairs shall be the responsibility of ICS. All repair estimates shall have ICS' approval before the work commences.

Agent shall indemnify ICS and hold it harmless from any and all claims arising out of the negligence of Agent in the performance of repairs.

ICS reserves the right to obtain repair cost estimates from third parties for all damaged equipment at any time and to contract out maintenance and repair work to such third parties. Agent agrees to permit such maintenance and repair work at the depot locations listed herein. Agent further agrees to permit said third parties to remove equipment from and to return it to said depot locations.

ICS shall have the right to advertise Agent as an ICS repair facility as well as an ICS depot. Agent consents to the use by ICS of its name in connection with any such advertisements and publications.

2. For its services in receiving, inspecting, storing and releasing ICS equipment, ICS shall pay to Agent the charges set forth in Schedule A hereof. Said charges shall be effective for the term of this Agreement, unless specified to the contrary in Schedule A or changed as hereinafter provided. In the event Agent desires to change the charges set forth in Schedule A during the term of this Agreement, Agent shall give ICS 90 days' prior written notice, and any changes to such charges may be made by mutual agreement between the Parties hereto.

3. Agent shall, at its own cost and expense, maintain public liability insurance, including "care, custody, and control" insurance, against claims for bodily injury or death or damage to property in an amount not less than $1,000,000 per accident or occurrence. Upon the request of ICS, Agent shall furnish ICS with copies of the policies or other proof that such insurance is in force. At the written request of ICS, Agent agrees to have ICS named as an additional insured on all such policies.

4. Agent shall indemnify and hold ICS harmless against all loss, damage, claim or liability by injury to persons or damage to property arising out of, on account of, or in connection with the services performed by Agent hereunder.

5. Agent acknowledges that all ICS equipment which comes into its possession pursuant to this Agreement is the property of ICS and shall, notwithstanding any other provision in this Agreement, be delivered over to ICS upon demand. Agent agrees that it shall not exert or make any claim or lien, and no lien shall attach against ICS or its property, for failure of any Lessee to pay Agent for charges due Agent from such Lessee.

6. This Agreement shall continue in effect for one year from the Effective Date and shall continue thereafter for successive one-year terms. However, either Party may terminate this Agreement on the last day of any one-year term provided 90 days' prior written notice is given to the other Party. In the event of any termination of this Agreement, ICS shall have three months to remove its equipment from Agent's premises. During such three-month period, the terms and conditions of this Agreement shall remain in effect.

7. Agent shall permit access by ICS and its authorized agents to ICS equipment in its possession and the books and records relating thereto at all reasonable times.

8. This Agreement constitutes the entire agreement between ICS and Agent and no statement, representation or understanding not specifically contained herein shall be binding upon the Parties hereto, unless agreed to in writing and signed by the Party to be bound thereby.

9. This Agreement may not be assigned by Agent without the consent of ICS.

10. This Agreement shall be interpreted in accordance with the internal law of the State of New York, United States of America.

SCHEDULE A

Effective _____ for a minimum period of _____ Currency _____

			CONTAINERS 20'	CONTAINERS 40'	TEU	CHASSIS 20'	CHASSIS 40'
1	Handling Rate*	In					
		Out					
2	Storage Rate (fill in a or b)						
	a. Fixed						
	b. Volume Discount						
	Free Storage						
3	Inclusive Rate (fill in if handling-in, handling-out and storage are quoted as one rate)						
4	Labor Rate Per Hour (for repairs)						
5	Supplemental Provisions						

*Handling rate includes inspection, forklift or crane charges, preparation of interchange forms, oiling of hinges, sweep-out and removal of port and line stickers. If other services are to be included in handling rate, such services should be listed in Item 5.

Agent hereby agrees that the prices charged to ICS shall be the lowest prices charged by Agent to any customer for a similar service.

IN WITNESS WHEREOF, the Parties hereto have caused this Agreement, including Schedule A, to be signed by their duly authorized officers as of the day and year first above written.

_____
Depot Agent (Type Name)

By: _____

Title: _____

TRANSAMERICA ICS INC.

By: _____

Title: _____

Transamerica ICS

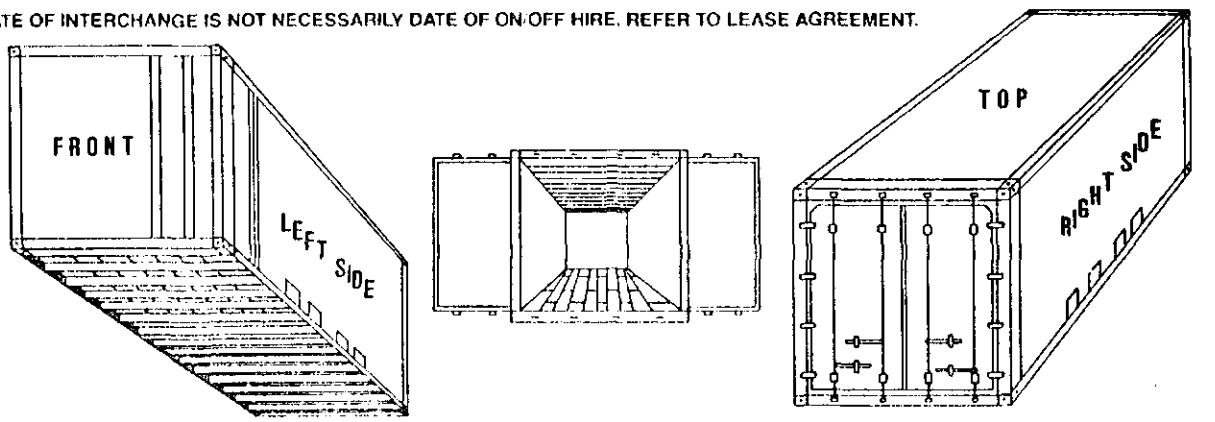
Equipment Interchange Receipt

EASTERN REGION

CONTAINER NUMBER	DATE OF INTERCHANGE	LOCATION	MOVEMENT	STATUS
I C S U			☐ IN OUT ☐	☐ DAMAGE GOOD ☐

CSC PLATE FITTED	RELEASE NO	RECEIPT NO	LESSEE NAME CODE	CARRIER NAME	VEHICLE NO
☐ YES NO ☐					

DATE OF INTERCHANGE IS NOT NECESSARILY DATE OF ON/OFF HIRE. REFER TO LEASE AGREEMENT.



INSPECTION REPORT: PLEASE INSPECT THE EQUIPMENT AND NOTE THE FOLLOWING AS APPROPRIATE.

CROSS MEMBERS

FORKLIFT POCKETS

SIDES

FRONT TUNNEL

DOORS HARDWARE

RAILS

END FRAMES CASTINGS

INSIDE WALLS LINING

FLOOR

ROOF/BOWS

MARKINGS

PAINT

OTHER

RECON NEEDED ☐ YES NO ☐

FOR DELIVERING CARRIER: THIS EQUIPMENT WAS DELIVERED IN GOOD CONDITION, EXCEPT AS NOTED ABOVE	FOR RECEIVING CARRIER: THIS EQUIPMENT WAS RECEIVED IN GOOD CONDITION, EXCEPT AS NOTED ABOVE
SIGNED	SIGNED
PRINT NAME	PRINT NAME

CONTAINER QUOTATION No. _____

Ltd.

HEAD OFFICE
CANAL STREET
BOOTLE L20 8NP
Telephone: 051-922 8761/9
Telex: REPCON [UK] Lpool 627808

PLEASE REPLY TO

1 PRINCIPAL _____

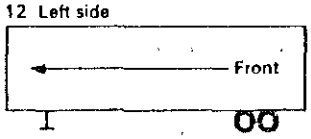
2 YOUR REF. _____ 3 OUR REF. _____ 4 DATE _____

5 ADDRESS _____

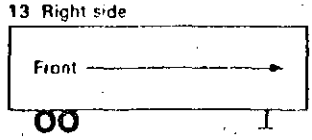
6 Container No.	7 Location	8 Type
9 Manufacturer	10 Date of Inspection	11 Inspected by

INSPECTION REPORT:– b/B – Bent or Bruised, br/BR – Broken, c/C – Cut or Cracked, d/D – Dented, h/H – Hole, M – Missing.

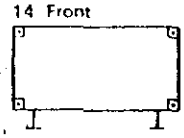
12 Left side



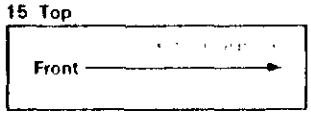
13 Right side



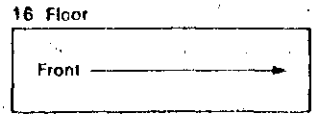
14 Front



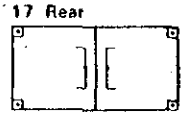
15 Top



16 Floor



17 Rear



TS&S 7192

DIA. No.	SUMMARY OF DAMAGE AND REQUIRED REPAIR	ESTIMATED COST OF REPAIR					
		Material		Labour		Total	
		£	p	£	p	£	p
	TOTAL						

COMMENTS _____

PLEASE NOTE: Trading terms and Conditions detailed overleaf.

Signed
For and on behalf of REPCON [UK] Inc

REPCON (U.K.) LIMITED
STANDARD TRADING CONDITIONS

1. All contracts are subject to Repcon (U.K.) Limited's Standard Trading Conditions. In these Conditions the "Client" means the party with whom the contract is made. All terms, whether conditions or warranties which would otherwise be implied are hereby excluded. These Conditions may only be omitted, varied or waived by the written authority of the Company.

2. By contracting with the Company the Client undertakes:-
   (a) that he or it is and will at all material times remain either the owner or the authorised agent of the owner of, and all other (if any) persons interested in the goods or any part of them.
   (b) that he or it is authorised to and does accept these Conditions including (but not limited to) the settlement of accounts for and as binding upon itself and all other interested parties.
   (c) in any event to indemnify the Company and keep it indemnified against all claims or demands whatsoever by third parties in respect of any loss, detention, delay, misdelivery or damage however caused whether or not by the negligence of the Company or its servants, agents, subcontractors or others for whom it may be responsible.

3. Quotations, which may be withdrawn at any time before acceptance, and in any event become invalidated in the absence of acceptance 30 day after they are dated, are subject to variation in accordance with any changes in the price of materials and parts or in wage rates.

4. Unless instructions to the contrary are received in writing prior to the commencement of the work, every endeavour will be made to use manufacturers recommended spare parts.

5. Transport costs to and from our repair bases are additional to the quoted repair or maintenance charges unless otherwise stated.

6. The Client undertakes to notify the Company of any contaminating substances where containers and/or boxes are presented for cleaning and shall indemnify the Company against all claims of whatsoever nature arising out of or in way connected with any breach of this Condition.

7. The Company will not be responsible for any loss or damage due to or arising from:
   (a) Act of God, invasion or other action of foreign enemy, hostilities (whether war be declared or not), civil war, civil commotion, riot, rebellion, looting, insurrection, politically inspired disturbance, military or usurped power, confiscation, requisition, destruction of or theft or damage to property by or under the order of any government or public or local authority.
   (b) Combinations, industrial action, lockouts, general partial stoppage or restraint of labour from whatever cause or official or unofficial strikes of any persons in the Company's employment or in the employment of others.

8. The Company shall not be liable for any consequential loss or loss of profits, directly or indirectly caused by or contributed to or arising from its failure to perform or its defective or delayed performance of any services which it undertakes to perform (including but not in any way limited to delay arising in whole or in part from combinations, industrial action, lockouts or official or unofficial strikes of any persons in the Company's employment or in the employment of others) and whether or not resulting from its act default or negligence or that of its servants, agents or subcontractors or of others for whom it may be responsible.

9. The Company shall be entitled to arrange for the performance of or any part of the contracted services by subcontractors who shall be under no liability whatsoever to the Client in respect of the goods in addition to or separately from that of the Company.

10. The Company shall be discharged from all liability and any claim shall be deemed to be waived and absolutely barred unless the claim shall be made in writing and notified to the Company at the earliest possible time and in any case within 28 days of the facts giving rise to the claim first coming to the notice of the Client its servants or agents. Any claim by the Client shall be limited to the market value of the goods under service or repair.

11. All goods shall be subject to a particular and general lien for monies due either in respect of such goods or for any particular or general balance or other monies due to the Company from the Client and/or any other person interested in the goods. If any monies due to the Company are not paid within 28 days after notice has been given to the Client that such goods are detained, they may be sold by auction or otherwise at the sole discretion of the Company and at the expense of the Client and the proceeds applied in or towards the satisfaction of such particular or general lien.

12. Settlement terms are net cash, payment being due 28 days following the date of invoice. Notwithstanding that the Client may have a claim against the Company the Client shall not be entitled to set off any such claim against any monies due to the Company.

Presentation 4

THE INTERNATIONAL CONVENTION FOR SAFE CONTAINERS (CSC) 1972 AND CONTAINER REPAIR STANDARDS */

IMCO and the International Convention for Safe Containers (CSC) 1972 1/

General

The Inter-Governmental Maritime Consultative Organization (IMCO) is a specialized agency of the United Nations composed of 121 Member Governments and with its Headquarters in London. IMCO's main objective is to facilitate co-operation among Governments on technical matters affecting International Maritime Transport in order to achieve the highest practical standards of safety and efficiency. The Organization has a special responsibility for safety at sea and for the protection of the marine environment through prevention of pollution of the sea caused by ships and other craft. IMCO also deals with legal matters connected with International Shipping, with the facilitation of International Maritime Traffic and is responsible for providing technical assistance in maritime matters to developing countries. This latter activity has increased very substantially in recent years and IMCO now has a team of advisory personnel as part of its technical co-operation programme. This team consists of general regional advisers covering Africa, Latin America, Asia and the Pacific, as well as specialist interregional experts advising on particular subjects at the global level.

Turning to IMCO's responsibilities and activities as they relate to multimodal transport and containerization, it can be said that IMCO is primarily concerned with safety and related technical aspects of multimodal transport where such transport includes a sea leg (e.g., roll-on/roll-off, lash, or container ships). It is well recognized that there is an ever-increasing trend towards through transport characterized by rapid vessel turnaround and increasing dependence by the ship's master and crew on the skills of individuals further and further removed from the vessel. This is especially true in container transport and roll-on/roll-off operations, where pre-packed freight containers and vehicles are often rapidly loaded and secured in the vessel, sometimes away from shoreside supervision, and the condition of the cargo within has to be assumed safe. It is also true that the integration of transport highlights the interdependence of the transport modes and the indivisibility of safety in transport from origin to destination. With respect to containerization, IMCO, as the depositary of the International Convention for Safe Containers (CSC), is responsible for all safety aspects related to the application and amendment of this Convention.

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*/ Prepared by L.M. Goll and S.E. Felding, IMCO.

1/ The interpretation of international instruments is the prerogative of the Contracting Parties or, in the case of recommendations, the Governments implementing them. The views expressed in this paper are not to be construed as being the views of the IMCO Secretariat nor as official interpretations of the instruments cited.

The International Convention for Safe Containers

In view of the rapid increase in the use of freight containers for the consignment of goods by sea and the development of specialized container ships, IMCO undertook in 1967 to identify all the safety aspects of containerization in the marine transport environment, and as the container represented the common denominator in the container transport system, the container itself emerged as the most important aspect to be considered. Consideration of this matter by the IMCO Technical Sub-Committee on Containers and Cargoes resulted in the adoption of the International Convention for Safe Containers in 1972 at a World Conference convened by IMCO and the United Nations. The Convention became effective in September 1977 and there are currently thirty-three Contracting States to the Convention, including the world's major container operators. At the time of writing the only one of the Latin American and Caribbean countries which has ratified the Convention is the Bahamas.2/ A list of Contracting States is attached at Appendix 1.

Although the technical details of the CSC will be dealt with in more detail later it might be useful to make some general observations at this stage.

The International Convention for Safe Containers, more commonly known as the CSC, is a case where the vaccine has been discovered before the epidemic. It is indeed preventive medicine, although its strength depends on the differing points of view. Some consider that it is not stringent enough, since it is possible to obtain CSC approval for containers built to less than the ISO strength standards. Others consider that the CSC possesses the necessary flexibility to enable it to apply to the largest number of containers used in all modes of international surface transport, taking into account different operating conditions. For those who think that an International Convention is not necessary, one can only ask them to imagine trying to comply with widely divergent national regulations and procedures. One of the major reasons why the CSC was developed by interested governments was to avoid the establishment of differing national requirements. The other major motivating factor behind the creation of the CSC was that many governments' experts wanted to ensure that the remarkably safe record of container transport would continue as containerization developed. For this reason it was considered desirable to formalize the then current safe practices to ensure their continuance. For example, it was found to be logical that the owners 3/ of containers should be held responsible for maintaining containers in a safe condition and periodically inspecting them to ensure that they remain so.

The CSC, like any international agreement between countries with different political, legal and economic systems, is a result of compromise. Therefore some people may be of the opinion that it has imperfections and that it is not sufficiently stringent to achieve its purpose. It should, however, not be forgotten that an international agreement is not immutable and is subject to amendment and

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2/ Any further ratifications will be announced during the seminar.

3/ For the purposes of the CSC, the term 'owner' also includes operators who have leased-in containers and have accepted responsibility for obtaining CSC approvals and for the examination and plating of these.

improvement where experience proves it necessary. The CSC, unlike many international agreements, has a fairly simple procedure for the amendment of its technical annexes, and this will facilitate the adoption of future amendments which may be required. Amendments were recently made to the Convention by IMCO's Maritime Safety Committee 4/ with respect to dates for plating and inspection of containers, a point further touched upon later in the presentation.

The Sub-Committee on Containers and Cargoes, being the Sub-Committee solely responsible for preparing proposals for amendment of the Convention, is open to participation by all IMCO members. It is composed of government delegations, which usually include industry advisers as well as governmental representatives. In addition there are numerous international non-governmental organizations which participate actively in the meetings of this Sub-Committee and often put forward industry views on the problems being discussed. The International Cargo Handling Co-ordination Association (ICHCA), International Association of Ports and Harbors (IAPH), International Chamber of Commerce (ICC), Institute of International Container Lessors (IICL), International Union of Marine Insurance (IUMI), International Chamber of Shipping (ICS), and International Organization for Standardization (ISO) are some of the relevant organizations which enjoy consultative status with IMCO.

Container standards

On the one hand reluctance to change container standards should not be allowed to reduce flexibility to such an extent that progress in the efficiency, safety and economy of international trade is impeded.

On the other hand it is believed that changes in the fundamental ISO container standards might have substantial technical and economic repercussions, not least in maritime transport, and that changes which are not strictly or urgently required should be avoided.

Because of the fundamental impact of possible changes in container standards on shore-based as well as maritime industry, the relevant IMCO technical body has considered establishing a formal consultation arrangement within the United Nations system (in which the two organizations most immediately involved would probably be UNCTAD and IMCO) when changes to the basic accepted container standards are being proposed.

The 1981 amendments to CSC

In spring of 1981, the IMCO Maritime Safety Committee unanimously adopted proposals for the amendment of CSC to allow more time for the completion of the work of plating existing containers and new containers not approved and plated at time of manufacture.

The amendments were made because governments were of the opinion that the process of examining and plating existing containers simply could not be completed by September 1982 as originally envisaged.

4/ Contracting Parties not Members of IMCO were also invited to participate in the adoption of these amendments.

The amendments to the Convention have two main objectives:

1. Allowing about 2 1/4 additional years for container owners to complete the process of examining and plating existing containers and those new containers not approved at time of manufacture, by changing the deadline for the completion of this process from 6 September 1982 (i.e., five years after the date of entry into force of the Convention as a whole), to 1 January 1985;
2. Allowing, as a transitional arrangement, a further two years -i.e., until 1 January 1987- during which the requirements for the marking of date of next examination (i.e., the latest date for the first examination of new containers and the latest date for the re-examination of existing containers and new containers not approved at time of manufacture) will be waived. This transitional arrangement is subject to the proviso that an administration may make more stringent requirements to cover those containers which belong to its own national owners.

The waiving of requirements related to the marking of dates of examination is intended to allow owners a reasonable degree of flexibility in their planning for the completion of the work of examination and plating containers and for the modification of such dates of examination as may have already been marked on containers, so as to even out the re-examination work load. By 1 January 1987 all containers will display a future date for next examination.

Having agreed to extend the time limits for examination and plating, and having also allowed further time during which containers need not be required to display a date of next examination, it was emphasized and accepted that no further extension would be considered.

During the course of work on the amendment of the Convention, it was agreed that two other minor amendments should be made to Regulation 2 of Annex 1, in order to draw a clearer distinction between the maintenance of a container, which is the responsibility of its owner, and the examination of a container, which must be arranged by the owner in accordance with a procedure prescribed or approved by the government. These apparently minor amendments are of significance to owners of containers, who have repeatedly insisted that they must be regarded as fully responsible for the maintenance of their own containers and for selecting the method by which this is done.

Recommendations on the Harmonized Interpretation and Implementation of the CSC, as amended and adopted by the Maritime Safety Committee in the spring of 1981, are attached at Annex 2.

Content of the CSC

The requirements of the Convention apply to the great majority of freight containers moving internationally by any mode of transport, excepting air. It was not intended that all types and sizes of containers, vans or re-usable packing boxes be affected, so the scope of the Convention is limited to containers having corner fittings -devices which permit handling, securing or stacking- and to those of a prescribed size, i.e., only those containers with a bottom area of at least 14 square metres, or 7 square metres if fitted with top as well as bottom corner fittings.

The Convention sets out procedures whereby containers used in international transport will be safety approved by an Administration of a Contracting State or an organization acting on its behalf (e.g., classification societies).5/ The Convention provides for approval of individual containers, those manufactured in a series and those containers which existed before the date the Convention came into force. Because of the difficulties involved in approving the thousands of containers manufactured before the Convention came into force (i.e., "existing containers"), less stringent transitional arrangements are provided, as well as a period of grace (until 6 September 1982), during which owners of such containers have to apply for approval.

Upon being granted approval of a container, the owner has to arrange for its examination and plating.

Approval evidenced by the safety approval plate granted by one Contracting State is required to be recognized by other Contracting States. This principle of reciprocal acceptance of safety approved containers is the cornerstone of the Convention and, once approved and plated, it is expected that containers will move in international transport with the minimum of safety control formalities. To ensure this "free flow", the control of the movement of containers by inspectors or safety officers would normally be limited to verifying that each bears a valid safety approval plate. However, if it is evident that the container is unsafe, the control officer is expected to ensure that the container is restored to a safe condition before it continues in service. If the container can be safely moved (e.g., to a place where it can be restored to a safe condition, or to its destination) the officer exercising control may permit this movement on such conditions as he may specify and with the proviso that the container be repaired as expeditiously as may be practicable and not reloaded before this has been done.

The owner is responsible for the maintenance of a safety approved container. Examination should be carried out at intervals appropriate to the operating conditions to ensure the continued safe condition of the container. The owner 6/ is therefore required to have the container periodically examined according to the procedures set down in the country in which he is domiciled or has his head office, provided of course that the country is a Party to the Convention.

The technical Annex of the Convention requires that, where appropriate to the design of the container, it should be subjected to lifting, stacking, concentrated roof and floor load, transverse racking, longitudinal restraint and end and side wall tests. These are internationally accepted tests which represent a combination of the safety requirements of both inland and maritime modes of transport. The test load values are intended to simulate the forces normally encountered in transport of containers by land and sea. A container may be made from any suitable material which allows it to meet the test requirements.

5/ Such an organization, in turn, may then authorize container repair establishments to carry out the repair, maintenance and plating/remarking of containers, either in accordance with an approval scheme or to the satisfaction of the administration/organization. General criteria for the approval of a container repair company will be dealt with on pp. 36-38.

6/ An owner/operator may have leased-in containers, and may have accepted responsibility for the examination and plating of the containers he has leased (whether or not he was wise to accept such responsibility is irrelevant). This in turn means that the actual owner is relieved of his responsibility for maintenance and examination for CSC purposes.

The previously mentioned simplified amendment procedure for the Convention Annexes makes it possible to adapt the test procedures to any future requirements of international container traffic.

Cargo should be stowed in a container in accordance with the recommended practices of the trade, so as to avoid undue stress. Proper handling, carriage and loading of containers is of course essential to safety.7/

Container manufacturing, maintenance and repair facilities

Lack of adequate manufacturing and repair facilities for containers, thus reducing their ready availability, can be a major constraint on full-scale container operation, since this would involve hauling on a large scale of empties from areas where they are in abundance.

From the large number of damaged containers that are left unused at terminals in ports without adequate repair and maintenance facilities for long periods of time, the impression is gained that the repair and maintenance of containers have not yet been given adequate consideration. This implies unnecessary movement of empty damaged containers and consequent loss of revenue. As in the case of technical equipment, there is in all regions a need to have personnel adequately trained to carry out all repairs to containers which become necessary. The same is especially applicable whilst the containers are within or in the vicinity of a port. Unless this matter is tackled seriously, developing countries could continue to pay for new containers which are used in one direction only, thus considerably raising costs and retarding container use development. Concerning the safety aspect there is, moreover, also the possibility that some operators might be tempted to ship unsafe containers in view of the fact that the chances of their return is remote.

Container owners, be they shipping lines or container leasing companies, tend to look to container depots for total service, and expect not only container storage, stuffing and unstuffing, but repairs as well. Planned maintenance and repairs serve to prolong the useful economic life of containers, thereby protecting owners' investment in them, as well as reducing the number of "spare" containers they need to keep in their fleets.

Common repair standards are unfortunately rather rare, since even within the same operator's trading routes there may be considerable divergence of quality of workmanship and price. Many companies have found that it pays them to bring their damaged equipment back to a selected location to ensure the standard of repair necessary to safeguard the unit's future. This particular approach is of course only practical when a considerable trade imbalance exists. Most companies have produced their own repair manuals with detailed standards required from each repair workshop. Theory and practice, unfortunately, are sometimes worlds apart, and technical inspectors/supervisors (be they surveyors from a classification society or other recognized body, or surveyors directly employed by the owner) are usually employed by individual owners/operators) to ensure harmonization of repair standards.

7/ The "IMCO/ILO Guidelines for Training in the Packing of Cargo in Freight Containers" provides useful information on the essentials of safe packing, for use as a training aid by those responsible for packing and stowage in freight containers.

The designers, manufacturers, quality control inspectors and purchasers of new containers all have a profound influence on a container's capability to withstand damage and deterioration. However, there are no standards for wear and tear, handling equipment, etc., in the industry. The most useful criteria that the purchaser and designer can find in establishing norms for containers are the ISO standards and those established by classification societies or regulatory bodies such as IMCO. The ISO standards are merely design criteria which are meant to facilitate interchange. ISO and related standards do address themselves to a number of aspects of container strength, but they are not too detailed as they were intended to cover practical questions only.

The classification societies' rules and governmental rules directly consider container strength. However, the main thrust of their requirements is to prevent serious damage to the container, in order to avoid crew, shore-based personnel and ships being exposed to safety hazards. Only to a lesser extent do they consider container life, repairability, maintainability, etc. These are economic considerations and as such mainly left to the designer and purchaser. Even so, it helps to know and to understand each container owner's policy on container repairs. The variance in policies from owner to owner can be quite surprising.

Some owners, like shipping lines, require only that their containers have no structural defects which might render them unsafe to use or difficult to handle and will therefore only approve the minimum of repairs, regardless of the damage to the boxes. Other, like leasing companies, prefer to maintain their containers in "like new" condition and request that repairs be carried out in accordance with e.g., Institute of International Container Lessors (IICL) Guidelines. Otherwise endless discussions would take place, on termination of the lease, as to who is responsible for damage and its repair.

This does not make life easy for container repairers, as they have to contend with different expectations and standards for each customer. In extreme cases a repairer may find himself in the invidious position of having to choose between lowering his standards or losing a customer.8/

Turning to the CSC Convention and how its introduction will affect the industry once its application becomes more widespread, it would be reasonable to expect that it will lead to some increase in operating costs. Nevertheless, the CSC is widely recognized as being beneficial to the industry as a whole. If properly interpreted, its requirements will ensure that all containers are inspected at least every two years, which again will help ensure them being maintained in an adequate state of repair, and will no doubt lengthen their useful life. It would not be surprising therefore, if, in the near future, container owners insist on their repairers being approved by a body such as a classification society, duly authorized by an appropriate authority. In anticipation of this move, repairers should upgrade their facilities and services

8/ In spite of the abundance of container repair standards, however, the repair industry has developed a general rule of thumb that whenever it is necessary to replace damaged material, it should be done with spare parts of the same type and characteristics. When this is not possible, repairers should ensure that material of an equivalent standard is used to ensure that the structural strength of the unit is maintained. Certification of these materials and components is normally required by the administration/organization, and means of identifying the component throughout all stages of repair should be ensured.

and seriously consider having their repair workshops approved by such a body. This requirement will affect not only the establishment of container repair facilities in the developing countries but also those in the developed part of the world.

On the subject of standards of repair and maintenance, it has been agreed within IMCO that the development of detailed guidelines on standards of repair would create an unnecessary burden for administrations attempting to implement the Convention, as well as for owners. It has been recognized that the Convention provides that the owner is responsible for maintaining the container in a safe condition, and it has been considered that the owner is responsible to the administration which approved his examination scheme. If the container is believed to be unsafe during a control verification, the owner would, of course, be subject to the authority of the control officer. In line with this way of thinking, IMCO recently expressed the opinion that no further consideration should, for the time being, be given to the detailed operation of repair companies. In considering this subject, IMCO identified the "Revised IICL Guide for Container Equipment Inspection" as a useful guide for examination procedures.

Approval of repair establishments

The principal classification societies have produced schemes for the approval of repair companies which in many ways are similar.

The basic objective of schemes for the approval of repair establishments is to ensure that these have the necessary facilities, personnel and quality control procedures to enable repair and refurbishment to be carried out in a satisfactory manner to acceptable standards, thus assuring a satisfactory degree of safety for the benefit of all concerned.

A container repair company is generally expected to be able to demonstrate that it has the following:

1. Adequate premises, clean and well illuminated, where repairs may be carried out under cover. If some repairs are conducted in the open, these should be done under reasonably sheltered conditions;
2. Lifting equipment with which containers may be handled and transported safely in the repair establishment;
3. An area with stands where a container may be thoroughly and effectively inspected both internally and externally, including the underneath;
4. Equipment for the cleaning and inspection of welds by such means as "dye-penetrant" or "magnetic particle" non-destructive welding testing;
5. A storage space with facilities for segregation of the stock of materials held into the various material grades and thicknesses commonly used in the container industry;
6. When complete components such as main strength members (i.e., corner posts, longitudinal and transverse members), already formed to the shapes used by the various manufacturers are required and the repairer is not able to produce them himself, he should have access to appropriate container component manufacturers;
7. Welding equipment must be adequate and well maintained and consumables should be kept in a suitable dry store. The provision of a heated storage oven on the shop floor is essential in warm and humid places;

8. The welding operations in a repair shop may be more complex than in the container factory, inasmuch as the former cannot benefit from planned construction progress and the use of component jigs to permit automatic welding or down-hand welding for the majority of welds. In the repair of containers positional welding, i.e., vertical and overhead, is much more widely used since the work is being carried out on a completed container;
9. All welders should be qualified to the satisfaction of the competent authority in the various methods of welding required, e.g., stick electrode or Argon/Co_2 continuous wire. The welders' qualifications should include capability in positional welding as referred to above.

Testing of repairs

Whilst in most cases it will not be necessary for a repairer to have a test rig capable of performing all the ISO tests applicable to containers, he must nevertheless have access to a test rig considered by the appropriate authority to be capable of carrying out all tests required for his operation.

As a minimum, a repair company should be capable of testing the welding of a replaced corner casting. This may be done with a simple frame over the container corner, capable of exerting a force of 0.5R where R is the maximum gross weight of the container.

Upon completion of a container repair, a test for weather tightness is essential.

Staff

It is important that management should display a responsible attitude to repairs, both as regards adequacy and standards of workmanship.

The person responsible for recommending the extent of repairs should be fully knowledgeable in this field, whilst the person responsible for quality of output and final inspection of completed repairs should have direct access to the overall management and not be unduly influenced by the necessity of maintaining quantity of output.

An inspector involved in container repairs should have a good background knowledge of the following:

1. Sheet metal work, including the forming of metal sections and welding;
2. The different grades of steel used and their strength characteristics and weldability;
3. The ISO recommendations on container construction and the applicable tests applied to a prototype;
4. The necessity that the inspector, whether employed by the repair company or the owner, should not be unduly influenced by speed of turn round of containers or the extent or costs of repairs. He should be expected to determine the extent of the damage and to give a reasonable recommendation for repairs sufficient to maintain the container in a safe working condition.

Certification, documentation and marking

A repair company must maintain a record-keeping system to record the results of initial inspection of damage, repairs recommended and those carried out, and also the results of final acceptance inspection for each container passing through the establishment.

Records kept for CSC purposes are of course subject to approval by individual administrations, but will probably, as a minimum consist of the following:

(a) Details to be entered on the safety approval plate to be fitted to existing containers, and also the location of the plate on the container;
(b) CSC re-examination record (undamaged containers);
(c) CSC inspection record (damaged containers) (if applicable).

When structural damage is repaired by replacing structural members, certificates should be provided for the material used.

When a lift test is required a test certificate should be issued.

When the use of de-infested timber is necessary, treated timber should be used and the appropriate certificate supplied to the container operator.

Epilogue

From the foregoing it is apparent that hard and fast rules concerning container repair standards are difficult to establish, particularly if they aspire to be globally acceptable.

However, it is hoped that this presentation will have given a general insight into the pertinent safety aspects of containerization and that, particularly in its last section, it has succeeded in giving guidance as to what is required to establish an efficient container repair service.

In the above respect, IMCO stands ready, through its technical co-operation programme, its Sub-Committee on Containers and Cargoes and other relevant technical bodies, to assist developing countries in the implementation of the CSC and recommendations concerning container traffic. IMCO can also arrange for expert technical assistance in the oeverall field of maritime container transport and related handling operations, not least the establishment of container repair facilities.

Appendix 1

INTERNATIONAL CONVENTION FOR SAFE CONTAINERS

Deposit of an Instrument of Accession by the Government of Israel

The Secretary-General of the Inter-Governmental Maritime Consultative Organization has the honour to refer to the International Convention for Safe Containers, done at Geneva on 2 December 1972, and to state that an Instrument of Accession was deposited by the Government of the State of Israel on 21 August 1981.

The Convention will enter into force for the Government of Israel on 21 August 1982 in accordance with Article VIII(2).

A list of the thirty-three Contracting States to the Convention appears overleaf.

INTERNATIONAL CONVENTION FOR SAFE CONTAINERS

Contracting States

	Date of deposit of instrument	Date of entry into force
Hungary (ratification)	9 January 1974	6 September 1977
Czechoslovakia (approval) 1/	8 May 1974	6 September 1977
Spain (accession)	13 May 1974	6 September 1977
German Democratic Republic (accession) 1/	27 September 1974	6 September 1977
France (approval) 1/	21 October 1974	6 September 1977
New Zealand (accession) 1/	23 December 1974	6 September 1977
Romania (ratification) 1/	26 November 1975	6 September 1977
Germany, Federal Republic of (ratification) 1/	27 July 1976	6 September 1977
USSR (ratification) 1/	24 August 1976	6 September 1977
Ukrainian SSR (ratification) 1/	6 September 1976	6 September 1977
Byelorussian SSR (ratification) 1/	6 September 1976	6 September 1977
Bulgaria (ratification) 1/	17 November 1976	17 November 1977
United States (ratification)	3 January 1978	3 January 1979
India (accession)	27 January 1978	27 January 1979
Liberia (accession)	14 February 1978	14 February 1979
United Kingdom (ratification) 1/2/	8 March 1978	8 March 1979
Japan (accession)	12 June 1978	12 June 1979
Saudi Arabia (accession)	6 October 1978	6 October 1979
Republic of Korea (ratification)	18 December 1978	18 December 1979
Bahamas (accession)	16 February 1979	16 February 1980
Denmark (accession) 1/	2 March 1979	2 March 1980
Yemen Arab Republic (accession)	6 March 1979	6 March 1980
Argentina (accession)	11 September 1979	11 September 1980
Italy (accession)	31 October 1979	31 October 1980
Poland (ratification)	14 January 1980	14 January 1981
Australia (accession)	22 February 1980	22 February 1981
Chile (accession) 1/	28 March 1980	28 March 1981
Sweden (accession)	9 June 1980	9 June 1981
China (accession)	23 September 1980	23 September 1981
Luxembourg (accession)	13 November 1980	13 November 1981
Guinea (accession)	19 January 1981	19 January 1982
Canada (ratification)	19 February 1981	19 February 1982
Israel (accession)	21 August 1981	21 August 1982

1/ Accompanied by a declaration/reservation/statement.

2/ Ratification by the United Kingdom was declared to be effective in respect of the Isle of Man on 19 June 1982.

Appendix 2

ANNEX 35

REVISED AND CONSOLIDATED RECOMMENDATION ON HARMONIZED INTERPRETATION AND IMPLEMENTATION OF THE INTERNATIONAL CONVENTION FOR SAFE CONTAINERS, 1972

1. GENERAL

1.1 The various points concerning harmonized interpretation and implementation of the International Convention for Safe Containers on which consensus has so far been reached are given below.

2. DEFINITIONS (Article II, paragraphs 8 and 9)

2.1 "New container" and "existing container". Where necessary, individual Administrations should determine the date on which the construction of a container shall be deemed to have commenced for purposes of determining whether a container should be considered as "new" or as "existing".

3. APPLICATION (Article III, paragraph 1)

3.1 "Swap Bodies/Demountables". It is agreed that the CSC Convention does not have to be applied to containers known as swap bodies/demountables and designed and used for carriage by road only or by rail and road only, and which are without stacking capability and top lift facilities. This agreement also applies to such swap bodies/demountables transported by sea on condition that they are mounted on road vehicles or rail wagons.
3.2 It does not, however, apply to Swap Bodies/Demountables used in transoceanic services.

4. ENTRY INTO FORCE? TERMINATION OF PERIOD OF GRACE, TRANSITIONAL ARRANGEMENTS (Articles III and VIII)

4.1 Every effort should be made by all concerned to have all existing containers approved and plated as soon as possible.
4.2 Container owners are free to get their existing containers approved at any time before 6 September 1982. If an owner plates an existing container prior to 1 January 1983, or if he plated a new container prior to 1 January 1980, he would have to have it re-examined before the time at which existing containers will be plated and control exercised.
4.3 While the Convention is clear concerning the requirement that approved existing containers should be re-examined at intervals of not more than 24 months, it is of the utmost importance that owners be encouraged not to delay obtaining approval and commencing an examination and plating programme for both new and existing containers.

4.4 Container owners will have to organize the examination and plating of their approved existing containers and new containers not approved at time of manufacture before 1 January 1985, and they will need to obtain an approximately constant re-examination work-load thereafter.

4.5 In view of the above, it is accepted that Administrations may, at their discretion, allow owners of containers plated before 1 January 1985 to mark the date of the next examination as follows:

Date of initial plating		Latest date for subsequent examination
existing containers and new containers not approved at the time of manufacture plated before 1 October 1981	)	12/1985
new containers plated before 1979	)	
existing containers and new containers not approved at the time of manufacture plated from 1 October 1981 to 30 September 1982, inclusive	)	4/1986
new containers plated in 1979	)	
existing containers and new containers not approved at the time of manufacture plated from 1 October 1982 to 30 September 1983, inclusive	)	8/1986
new containers plated in 1980	)	
existing containers and new containers not approved at the time of manufacture plated from 1 October 1983 to 31 December 1984, inclusive	)	12/1986
new containers plated in 1981	)	

5. TESTING, INSPECTION AND APPROVAL (Article IV, paragraphs 1 and 2) SELECTION OF ORGANIZATIONS ENTRUSTED TO CARRY OUT THESE FUNCTIONS

5.1 Administrations will require a basic description of the organizations to be entrusted with these functions, and evidence of their technical capability to carry out approvals, and will have to satisfy themselves as to the financial wellbeing of such organizations. The Administrations will furthermore have to satisfy themselves that the organizations are free from undue influence by container owners, operators, manufacturers, lessors, repairers and others concerned who may have a vested interest in obtaining container approval.

6. APPROVAL OF CONTAINERS FOR FOREIGN OWNERS OR MANUFACTURERS (Article IV, paragraph 3) AND RECIPROCITY

6.1 Where possible, Contracting Parties should make every effort to provide facilities or means to grant approvals to foreign container owners or manufacturers seeking approval of containers from them in accordance with the provisions of the Convention.

6.2 Approval of containers would be facilitated if classification societies or other organizations approved by one Contracting Party could be authorized to act for other Contracting Parties under arrangements acceptable to the parties involved.

7. MAINTENANCE (Article IV, paragraph 4)

7.1 Development of detailed guidelines on standards of maintenance will create an unnecessary burden for Administrations attempting to implement the Convention, as well as for owners. The interpretation of the statement "the owner of the container shall be responsible for maintaining it in safe condition" (Annex I, Regulation 2, paragraph 1 of the Convention) should be that: the owner of a container (as defined in Article II, paragraph 10 of the Convention) should be held accountable to the Government of any territory on which the container is operated for the safe condition of that container. The owner should be bound by the existing safety laws of such a territory and such law or regulation as may implement the control requirements of Article VI of the Convention. But the methods by which owners achieve under the provisions of Article IV the safe condition of their containers, that is, the appropriate combination of planned maintenance, procedures for refurbishment, refit and repair and the selection of organizations to perform this work, should be their own responsibility. If there is clear evidence for believing that an owner is repeatedly failing to achieve a satisfactory level of safety, the Government of the territory in which the owner has his Head Office or domicile should be requested to ensure that appropriate corrective action is taken. The responsibility of the owner to maintain his container in a safe condition should include the responsibility to ensure that any modifications carried out on an approved container would not adversely affect safety or render inaccurate the information recorded on the Safety Approval Plate.

8. WITHDRAWAL OF APPROVAL (Article IV, paragraph 5)

8.1 With regard to withdrawal of approval, the "Administration concerned" should be considered as the Administration which issued the approval. While any Contracting Party may exercise control over container movement pursuant to Article VI, only the Administration which approved the container has the right to withdraw its approval.

9. CONTROL (Article VI)

9.1 General

9.1.1 For the purposes of effecting control (as envisaged in Article VI of the Convention), Contracting Parties should only appoint government bodies.

9.2 Control up to 1 January 1985

9.2.1 It is agreed that Article VI applies only to containers which have been approved and which are now required to be plated by 1 January 1985 under Regulation 9 and 10. In so far as Administrations may wish to institute control measures before 1 January 1985, it is agreed that these measures shall be directed towards ensuring that containers are not in such a condition as to be unsafe (see 9.3.3 below for action to be taken for an unsafe container). Until 1 January 1985 no container should be stopped merely because it does not carry a Safety Approval Plate.

9.3 Control after 1 January 1985

9.3.1 Containers which are not defective but which have no Safety Approval Plate or which have an incorrectly completed Plate

9.3.1.1 Such containers should be stopped. However, where evidence can be produced either to the effect that such container has been approved under the terms of the Convention or to the effect that such container meets the standards of the Convention, then the authority exercising control may permit the container to proceed to its destination for unloading, with the proviso that it shall be plated as expeditiously as may be practicable and not reloaded before it has been correctly plated under the Convention.

9.3.2 Containers which are "out-of-date"

9.3.2.1 From 1 January 1987 where a container is found to have an examination date marked on or near to its Safety Approval Plate which is a date in the past, the competent authority exercising control may permit the container to proceed to its destination for unloading with the proviso that it should be examined and updated as expeditiously as may be practicable and not reloaded before this has been done. Until 1 January 1987 such containers should not be stopped.

9.3.3 Unsafe containers (Article VI, paragraph 1, third sentence)

9.3.3.1 Where a container is found by the authority exercising control to have a defect which could place a person in danger, then the container should be stopped. However, if the container can be safely moved (e.g., to a place where it can be restored to a safe condition, or to its destination) the officer exercising control may permit such a movement on such conditions as the officer may specify and with the proviso that the container be repaired as expeditiously as may be practicable and not reloaded before this has been done.

9.3.4 International movement of containers under control

9.3.4.1 It is recognized that in any of the cases set out in 9.3.1, 9.3.2 and 9.3.3 the owner may wish to move his container to another country where the appropriate corrective action can more conveniently be carried out. Control officers may permit such movements, in accordance with the provisions of 9.3.1, 9.3.2 and 9.3.3 as appropriate, but should take such action as may be reasonably practicable in order to ensure that the appropriate corrective action is indeed taken. In particular, the control officer permitting such a movement should consider whether it would be necessary to inform the control officer or officers in the other country or countries through which the container will be moved. Further consideration of the practical aspects of this matter is needed.

9.4 Notification concerning unsafe containers of a given approved series

9.4.1 It is suggested that if in future a considerable number of containers in a given approved series are found to be unsafe as a result of defects which may have existed prior to such approval (Article VI, paragraph 2), it may be desirable for Administrations to notify the Organization as well as the Contracting Party concerned.

10. SAFETY APPROVAL PLATE (Regulation 1):
USE OF OWNER'S IDENTIFICATION CODE

10.1 The following approach to complying with certain of the data requirements of the Convention shall be deemed to be in conformity therewith:

"A single approval number may be assigned to each owner for all existing containers in a single application for approval, which could be entered on line 1 of the Plate".

10.2 The example given in line 1 of the model Safety Approval Plate (see Appendix to Annex I of the Convention) should not be construed so as to require the inclusion of the date of approval in the approval reference.
10.3 The Appendix to Annex I of the Convention can be interpreted so as to allow the use of the owner's ISO alphanumeric identification codes, on either new or existing containers. This may be done even if the manufacturer's serial number is available, as long as the applicant keeps a record correlating his identification numbers with the manufacturer's serial numbers.
10.4 Where marking of the end-wall or side-wall strength on the Plate is not required (e.g., a container with an end-wall or side-wall strength equal to 0.4 P or 0.6 P, respectively) a blank space need not be retained on the Safety Approval Plate for such marking but can be used instead to meet other data requirements of the Convention, e.g., subsequent date marks.
10.5 Where end-wall or side-wall strength is required to be marked on the Safety Approval Plate, this should be done as follows:

- in the English language:
  END-WALL STRENGTH
  SIDE-WALL STRENGTH
- in the French language:
  RESISTANCE DE LA PAROI D'EXTREMITE
  RESISTANCE DE LA PAROI LATERALE

10.6 In cases where a higher or lower wall strength is to be marked on the Safety Approval Plate, this can be done briefly by referring to the formula relating to the payload P.

Example: SIDE-WALL STRENGTH 0.5 P

10.7 With respect to the material characteristics of the Safety Approval Plate (see Appendix to Annex I of the Convention), each Administration for purposes of approving containers may define "permanent", "non-corrosive" and "fireproof" in its own way or simply require that Safety Approval Plates be of a material which it feels meets this definition (e.g., a suitable metal).

11. MAINTENANCE (Regulation 2)
EXAMINATION PROCEDURES

11.1 Personnel carrying out examination
11.1.1 An examination scheme prescribed or submitted for approval should provide that the examination will be carried out by a person having such knowledge and experience of containers as will enable him to determine in accordance with 11.2.2 whether they have any defect which could place any person in danger.
11.2 Elements to be included in the examination
11.2.1 While Administrations may specify factors to be taken into account in a container examination scheme, at this time it should not be necessary to agree on a specific list of factors or minimum listing of parts of a container which should be included in an examination. However, each examination should include a detailed visual inspection for defects or other safety-related deficiencies or damage which will render the container unsafe.
11.2.2 It is accepted that a visual examination of the exterior of the container will normally be sufficient. However, an examination of the interior should also be performed if reasonably practicable (e.g., if the container is empty at the time). Furthermore, the underside of the container should be examined. This may

be done either with the container supported on a skeletal chassis or, if the examiner considers it necessary, after the container has been lifted onto other supports.

11.2.3 The person performing the external examination should have the authority to require a more detailed examination of the container if the condition of the container appears to warrant such examination.

11.3 Use of decals to indicate the date of the first examination and subsequent re-examination of containers

11.3.1 The use of decals should be allowed for indicating the date of the first examination and subsequent re-examinations of the container, such decals preferably to be coloured in accordance with the standardized scheme given in paragraph 11.3.3 below, designating a colour for each year subject to the following conditions:

1. that the relevant date (month and year) is shown in internationally recognizable words and/or figures on the decals or on the plate itself;
2. that for new containers the date of the first examination is shown (whether by decals or otherwise) on the plate itself as Regulation 2.2 of Annex I of the CSC Convention requires.

11.3.2 The use of decals should remain optional and in no way derogate the relevant provisions of the Convention to which reference is made above. The responsibility for developing and introducing such a system should remain with owners.

11.3.3 Colour scheme

BROWN	1986	1992	1998
BLUE	1987	1993	1999
YELLOW	1988	1994	2000
RED	1989	1995	etc.
BLACK	1990	1996	
GREEN	1991	1997	

12. RECORDS OF EXAMINATION

12.1 It will be desirable to require that owners keep an examination record, which should include in addition to identification of the containers a record of the date of last examination and a means of identifying the examiner. There is no need to standardize the method by which such records should be kept, and existing record systems may be accepted at least for a transitional period. Such record should be made available within a reasonable time to the Administration on its specific request.

13. FREQUENCY OF EXAMINATION

13.1 The Convention recognizes that it may be necessary to examine containers more frequently than every 24 months when they are subject to frequent handling and transshipment. It should be borne in mind, however, that any significant reduction in the 24 months interval between examinations would create severe examination control problems. It should be noted that where containers are subjected to frequent handling and transshipment they are also liable to be subjected to frequent checking.

13.2 Therefore, in determining whether it is acceptable that the interval between examinations under the Convention should be the maximum of 24 months, proper account should be taken of intermediate examinations, having regard to their extent and to the technical competence of the persons by whom they are performed.

14. MODIFICATIONS OF EXISTING CONTAINERS

14.1 Applicants for approval of existing containers might be required to certify that, to the best of their knowledge, any modifications previously carried out do not adversely affect safety or the relevance to those containers of the information presented with the application in accordance with Annex I, Regulation 9, paragraph 1(d)(ii) and (iii). Alternatively, applicants should submit details of the modification for consideration.

15. TEST METHODS AND REQUIREMENTS (Annex II)

15.1 Containers tested in accordance with the methods described in ISO Standard 1496 should be deemed to have been fully and sufficiently tested for the purposes of the Convention.

16. STACKING TEST (Annex II, 2)

16.1 The following can be used as guidance in interpreting paragraphs 1 and 2 of the stacking test:

"For a 6-high stacking of 20-ton (20,320 kg) (44,800 lb) containers the weight on the bottom container would be 5 x 20 tons (20,320 kg) (44,800 lb) i.e., 100 tons (101,600 kg) (224,000 lb). Thus, in the case of a 20-ton container with 6-high stacking capability the plate should indicate: 'Allowable stacking weight for 1.8 g - 101,600 kg/224,000 lb'".

16.2 The following may be useful guidance for determining allowable stacking weight:

"The allowable stacking weight for 1.8 g may be calculated by assuming a uniform stack loading on the cornerpost. The stacking test load applied to one corner of the container shall be multiplied by the factor $\frac{(4)}{(1.8)}$ and the result expressed in appropriate units".

16.3 The following is a useful example of how the allowable stacking weight could be varied as prescribed in paragraph 1 of the stacking test:

"If on a particular journey the maximum vertical acceleration on a container can be reliably and effectively limited to 1.2 g, the allowable stacking weight permitted for that journey would be the allowable stacking weight stamped on the plate, multiplied by the ratio of 1.8 to 1.2 (allowable stacking weight on the plate x $\frac{1.8}{1.2}$ = stacking weight permitted for the journey)".

Presentation 5

ESTABLISHMENT AND OPERATION OF A CONTAINER REPAIR ENTERPRISE: A CASE STUDY 1/

Introduction

Any specialized field, by its very nature, has not only a terminology and characteristics of its own but also procedures and even a philosophy that clearly differentiates it from other disciplines.

Moreover, if such an activity not only involves trade among nations but also constitutes the backbone of such trade, it takes on a unique dimension.

The container itself and the complex field of activities surrounding it have generated an irreversible process having many facets, each of which is constantly changing.

One of these facets is discussed in this paper. Although what has been learned to date on the subject is important, much remains to be done.

It would be impossible in the next few pages to review all the experience that has been gained over the last ten years with regard to container repair. Nor is it possible in this limited space to examine the infinite number of variations and technical details that might be of interest to persons considering the possibility of taking up this specialized activity, although such a study could be carried out later on if necessary.

We hope that this paper will contribute to the work of the Economic Commission for Latin America in connexion with the project on economic co-operation among the Latin American and Caribbean countries for the establishment of container repair and maintenance enterprises.

A. GENERAL CONSIDERATIONS ON THE FEASIBILITY OF THE ENTERPRISE

The frame of reference for this study is limited to the experience gained in Latin America and, more specifically in the area of influence of the port of Buenos Aires. It has only been slightly over 10 years since the first container arrived in Argentina and thus the elements on which one might judge the profitability of this activity are quite recent.

There are no more than six repair depots in the area surrounding the Port of Buenos Aires and half of them do not do work of a large enough scale to qualify as workshops. The others which make up the universe examined in this annex were established at different times and the oldest one in this specialty is Multimodal.

It might therefore be worthwhile to provide more complete information in order to make it possible to reach some preliminary conclusions regarding the results of this activity.

Following are some of the key aspects on which a feasibility study should be based.

1/ Prepared by Roberto A. Destefano, Multimodal S.A.

1. Traffic

The number of containers circulating in the country should be large enough to ensure that there will always be a minimum number of units in transit in the depot. The impact of world recessions on these enterprises will vary according to how many TEUs 2/ are moved per year in the country.

The size of the depot/workshop will of course depend on the amount of containerized traffic there is in the country. Moreover, the import-export centre should, of course, be located within the national territory; otherwise, it will only be a stopover; the units will not be stripped and will not remain there.

2. Rotation

The fact that a large number of containers may enter the national territory does not in itself justify the establishment of a repair enterprise; the same number of units must also go out, since otherwise the depots will become overcrowded, creating all kinds of serious problems and detracting from the profitability of the enterprise. An imbalance in the opposite direction -more units going out than coming in- is also detrimental, as the storage areas remain empty and units entering the country for replacement are governed by different terms. There must therefore be a constant turnover in order that all concerned may benefit.

3. Location

Any damage to a container represents a double loss to the owner. In the first place, there is the cost of repairs and, in the second place, there is the loss due to the time the unit remains idle awaiting approval of repairs, repairs per se, and so forth. Since in addition the container must be transported a long distance for repair or storage after use, the cost of transport must be added as the third negative factor. The owner will therefore prefer to minimize this cost by having the unit repaired as close as possible to the area of operations.

It is therefore apparent that the depot or workshop must be located near the loading and unloading centres.

In some door-to-door operations, units are unloaded at the importer's plant, but this does not occur frequently in this region.

4. Complementary activities

All depots currently operating in the country are in port areas. Those currently engaging in container repairs also perform other port-related jobs such as stevedoring or servicing shipping lines.

The exceptions, i.e., transport enterprises which also offer container storage and repair services, were unsuccessful.

All entrepreneurs currently operating depots/workshops perform these services as a supplement to their other activities. Their establishments repair not only containers but also related handling and transport equipment. Thus, during the slow periods for container repairs, the personnel may be kept busy with similar activities.

2/ Twenty-foot equivalent units.

The experience of the last ten years leads to the conclusion that stability cannot be guaranteed by engaging solely in container storage and repair services. The situation has become more complicated as a number of competitors, both large and small, have appeared on the scene, thus reducing the potential market.

5. Real exchange parity

Competition among the various services (repair, maintenance, refurbishment) of this type takes place on the international market and therefore any distortion of the relationship between local currency and the United States dollar has a definite effect on quotations.

When this disequilibrium affects the dollar, local prices cease to be competitive and the international users (container leasing companies, shipping lines) reduce their repair orders.

Special attention must be given to this factor before a contract is drawn up.

6. Financial costs

Aside from the solvency, efficiency or good will of the customer, collections in another country take time because repair bills must be analysed, verified and approved and go through other procedure before payment is made.

Experience shows that the time required for payment of invoices from another country is no less than fifty days from the date of issue of the invoice and that in some cases the procedure takes more than seventy days.

This factor is most important, as delays in the receipt of funds must be borne in mind when making a financial analysis of the operation of the enterprise.

B. MULTIMODAL S.A.

1. Origin and development

The enterprise now known as Multimodal S.A. was established as the result of a process that was begun by Empresa Murchison S.A. de Estibajes y Cargas in the late 1960s and continued over the last ten years.

In April 1967, this company, which for seventy years had been providing services in the port of Buenos Aires and others along the seacoast, received the first containers to arrive in the country. At that time it only handled the units in the port.

Between 1969 and 1970, it became the commercial representative of a container leasing company and also became its depot agent.

Some time later, using a container as a makeshift workshop, it began to repair some units in order to deliver them in good condition. It had storage capacity for no more than one hundred containers on a small 1 000 m2 lot. In 1972, a lot next to the existing one, on which there was an old shed belonging to the port services, was reconditioned so that the property was expanded to 2 000 m2, 200 m2 of which are covered.

Beginning in 1972, the group performing container repairs within the enterprise begun to expand. The container department was established, statistical records were started and part of the staff travelled abroad for training.

In 1974, in view of the large number of customers the depot/workshop had, the company stopped acting as commercial representative (of the container leasing company) and concentrated on providing container storage and repair services. At that time, the shop was servicing five of the seven leasing companies operating through the port of Buenos Aires.

The covered facilities were enlarged to hold the shotblasting, painting and drying section and the container testing devices, and in 1975 the maintenance and reconditioning services were installed. The shop acquired air-powered tools and increased its container transport services, using equipment belonging to the enterprise and to third parties. It purchased and fitted out a mobile shop for repairing minor and medium-scale damage in the port and at industrial plants.

In December of that year, as the result of a splitting-up process, the container department of Murchison S.A. became Multimodal S.A. In 1977, it moved to its current location within the port area and has since been actively engaged in its specialty.

The enterprise now occupies a total of 19 000 m2, with 800 m2 devoted to shops. Of the latter, 260 m2 are set aside for the shotblasting and painting section.

The administrative and operational offices, locker rooms and cafeteria total 280 m2 of covered space in a two-story building having a complete communications system, including telex, telephones and walkie talkies for use within the yard.

The shop has air-powered, hydraulic and welding equipment, with protective gas being used for the latter. Each operator has a mobile cabinet with 30 working tools in addition to safety equipment.

In 1978 the enterprise acquired chassis and Yard Commando type tractors for transporting containers.

At that time it served as depot agent for three large leasing companies and began to receive containers from shipping lines having stopovers at the port of Buenos Aires.

In 1979, as a result of the policy of opening up the economy, there was a considerable increase in imports, with the resulting overcrowding of depots and a drop in work orders. This brought about an increase in the number of idle units (not rotating) and of operators without much work, while at the same time the peso/dollar ratio was kept at a level that did not allow local shops to compete with those in other regions of the world.

This period of unbalanced container flow caused problems which led to a partial dismantling of the shops, and the temporary interruption of certain special jobs such as refurbishment and major maintenance. There were also many problems with container owners who were not able to store their empty units because of the unavailability of space.

In 1981, there was a trend towards recovery. The yard has gradually been cleared of stored containers and it is safe to say that the situation will return to normal within a relatively short time.

The movement and storage of containers in the Multimodal yard is controlled by means of a board backed up by the Murchison S.A. computer centre which is fed daily with information on operations. The same mechanized process is applied for the entire billing and administrative control system.

In addition to the usual certifications Multimodal has received through its agreements with the various companies serviced, it has International Certificate number 60492/1, qualifying it as a container repair and reconditioning shop, granted by the Société Générale de Surveillance (Geneva-Switzerland).

Finally, it should be noted that in addition to its physical capital, the enterprise has the basic elements essential for ensuring its solvency, i.e., the experience of its staff.

Although the staff is small, each of the key technical and operational functions of the enterprise is performed by persons who have received special training in the field since containers began to be repaired in the country. Their experience, acquired both locally and abroad, is the best guarantee that Multimodal views container servicing not only as a business but as a profession as well.

2. Production

Repair activities began in 1970, but information is available only from 1972 up to the present, as may be seen in the table on the following page.

The containers repaired by the Multimodal service centre belong, in different proportions, to the following enterprises: Transamérica ICS (ICSU); Container Transport International Inc. (CTIU); Moore Mc Cormack Lines (MMLU); Interpool (INTU); Uniflex (UFCU); Sea Containers Inc. (SCIU); SSI Container Corporation (SSIU); Ivarans Rederi A/S (IVLU); Transportes Vidal S.A. (TVSA); José Callegari e Hijos S.A. (JC); Nic Leasing Inc. (NICU-NICA-NICB-NICC); Blue Star Line (BSLU); CATU Containers S.A. (CATU); Contrans (CONU); Ferrocarriles Argentinos (FACU); Compagnia Italiana (ICCU); Johnson Line (JLCU); Lloyd Brasileiro (LLBU); Royal Mail Lines Ltd. (RMLU); Mitsui Osk Lines (MOLU).

Containers were refurbished for the following companies: Transamérica ICS (ICSU); Container Transport International Inc. (CTIU); Sea Containers Inc. (SCIU); Interpool (INTU); Contrans (CONU).

CONTAINER AND CHASSIS DEPOT AND SERVICE CENTRE, 1972-1981 a/ b/

	1972	1973	1974	1975	1976	1977	1978	1979 c/	1980 c/	1981 c/	Total	Flow
Flow of containers												
In	443	595	757	820	716	1 259	1 341	4 342	4 066	3 028	17 367	
Out	382	614	667	593	930	1 056	1 481	3 497	3 717	3 563	16 500	33 867
Percentages for materials												
Iron (%)	55	60	58	69	68	70	80	88	90	92	-	
Aluminium (%)	45	40	42	31	31	28	18	10	8	6	-	
GRP (%)	-	-	-	-	1	2	2	2	2	2	-	
Percentage damaged (Annual) (%) d/	100	99	88	88	87	88	85	68	60	50	-	
Quantity repaired	580	870	718	764	804	801	1 150	1 909	1 064	276	8 146	
Monthly average	48	72	60	64	67	67	96	159	89	46	-	
Refurbishment	-	-	-	32	38	54	98	103	22e/	-	347	

Source: Multimodal S.A.

a/ First semester.

b/ No information available for 1970-1971.

c/ Includes container leasing companies and shipping lines.

d/ The decrease in the percentage is due to improvements in handling and transport equipment and increased experience of operators.

e/ Refurbishing was done up to May 1980.

In some cases, Multimodal provides or has provided storage services; in other cases, it provides services as expressly requested.

The shop does the following types of work: repair, maintenance, washing, remodelling, remarking, refurbishing and post-repair testing. Repairs range from minor to structural rebuilding. Maintenance includes replacement of roofs and doors as well as of all parts corroded by rust. Washing includes different types of treatment with special materials.

Remodelling consists of replacing parts, according to owners' instructions, in equipment having manufacturing defects. Refurbishing is done by airless shotblasting and spray painting.

The materials used in the work are aluminium, iron and fiberglass. Because the market for fiberglass is small and limited to certain sectors, the shop has not specialized in that type of work.

There are several types of dry-cargo containers (10, 20 and 40 feet), for example, box, open top and platform. There are also tank containers, which have been tested for pressure after repair, and thermal units.

The Multimodal mobile unit operated up until 1979, when it was dismantled because there is practically no demand for mobile units in the port of Buenos Aires.

Repairs are carried out according to individual owner instructions. The manuals of the Institute of International Container Lessors (IICL), as well as specific manuals provided by individual leasing companies, are used as a basis. The inspection scheme is also governed by uniform standards and by those of individual companies. The same procedure is also applied with regard to repair time, which is previously agreed on with each customer.

Prior approval is obtained before repairs are made in all cases and in 60% of the cases, an inspection is carried out before repairs are authorized.

Equipment interchange receipts are in English and progress reports are transmitted daily to the regional manager of each company, as well as to the relevant shipping lines.

C. OPERATION OF THE ENTERPRISE

1. Size

The size of the area to be used for the repair centre will be directly related to the potential volume of work.

In order to determine what that volume should be, a study must be made that takes into account the following aspects:

(a) What leasing companies will be the future users?

(b) How much traffic does each of these companies have in the area? How much comes in and how much goes out?

(c) How many depots are currently in operation simultaneously?

(d) What is the damage ratio for each company in this area?

At the beginning it will be necessary to decide whether the facility should operate both as a storage depot for empty units and as a repair shop or whether it should offer services only in the latter.

This decision is crucial because it will determine whether a limited area is chosen for servicing damaged units or whether a property will be selected which, even though large, could become overcrowded should the problems of traffic imbalance be aggravated.

In order to keep this discussion within the purely technical aspects of the question, we will only consider the availability of property which would include a shop for the repair of damaged containers. There are, of course, differences of a commercial nature between having only a repair shop and having such shop with storage space, but we will comment on that in due time.

Elements (b) and (c) above should be considered together in order to determine how many units would need repair services. Element (d) is important because there are companies whose fleets are very deteriorated, while others have new equipment that has been less affected by negligent handling.

Likewise, some enterprises have very old equipment and are in the process of renewing it; thus, after a couple of years they may well have brand new containers and be in a better position than those companies whose equipment is now in good shape.

In view of the above, and bearing in mind that each region has unique characteristics, we reached the conclusion that any market study must be thorough and must not neglect to consider aspects that might be suggested by intuition or by possible clues to market trends.

Let us suppose that 100 damaged units will be coming in per month. Considering that the minimum time between receipt of the equipment and its dispatch would be 14 days, after one month the shop will simultaneously have units undergoing repairs, and other damaged units coming in, thus even doubling the number of units in the yard.

The 14 days mentioned above break down as follows: inspection, 1 day; approval, 7 days; repairs, 2 days; storage after repairs, 4 days.

The estimated time the unit would be in the shop is a minimum and could be longer, thus increasing the number of containers on the premises. Therefore, it would be advisable to consider having space to store a number of units equivalent to 2.5 times the average monthly inflow.

Thus, if the inflow is estimated at 100 TEUs, space should be available for 250 TEUs. If the units are stacked three high, five deep, with 8 metres between each row, the surface required would be 7.08 m2 per 20-foot container and for 100 TEUs, 850 m2 would be needed. For 240 TEUs, the requirement would be 1 700 m2. There are, of course, limitations as regards lineal dimensions. In this specific area, we are considering a single access lane between two blocks of containers.

To this area must be added the space required for a shop with a capacity for simultaneously serving four 20-foot units; at 60 m2 per 20-foot container, the area would be 240 m2. To this should be added a room equivalent to the area of two 40-foot containers, i.e., 60 m2, and an office, lockers and toilets, totalling 60 m2.

Assuming the shop would have chassis for moving containers to and from the yard, allowance should be made for space for ten 40-foot chassis and tractors. Taking into account their turning radius, it is estimated that 800 m2 should be sufficient for parking and manoeuvring.

If the areas required are added up, the total comes to 2 500 m2, to which must be added 30% as reserve space for unforeseen situations, parking, fork-lift trucks, etc. Thus, the minimum area required to store 240 TEUs stacked three by three and provide shop space would be 3 250 m2.

The above analysis is for a hypothetical case and is based on the assumption that the property would be rectangular, which is not always the case. Actually, the area where units are stored would have to be adapted to the surface and shape of the property available, as well as to the equipment available.

Although boxes can be repaired during bad weather without protection, the availability of a covered area guarantees a minimum amount of permanent work.

If instead of having four units under cover simultaneously, it should become necessary to shelter twice that amount, the workshop area would of course have to be increased; however, a minimum of four is a good measure to begin with.

When the premises become overcrowded, containers are grouped in blocks and the number of access lanes is reduced. Obviously, the problems multiply; nevertheless, in our area we do not know of any cases where a depot has refused to receive units for reasons of convenience of movement as long as some space could be found.

There are formulas for determining the area needed for parking containers based on the number of units, the projected area per container and the utilization factor. The latter itself is variable, as it depends on what equipment is available (side-loader, crane, chassis, etc.) and the number stacked. In general, however, this type of estimate is taken into account for the purposes of terminals for loaded containers. With empty containers, the matter is much more simple and the units are usually stored in blocks.

2. Surface of storage areas

Empty containers weigh from 1.8 tons to 3.8 tons in the case of 20 and 40-foot units made of materials such as aluminium, steel and G.R.P.

The impressive sight of the large terminals in ports may lead to the erroneous belief that all containers must rest on an even surface of reinforced concrete or similar material.

On the other hand, because containers are metal and have a low relative weight and a solid appearance, they are often placed on wholly unsuitable surfaces because of an erroneous impression that it is not worthwhile to incur expenses for storing huge immobile units.

Actually, the solution is to have a surface of intermediate strength. A reinforced concrete surface or one of gravel and soil cement treated with an asphalt spray has the disadvantage of being very costly, with the investment only being recovered slowly (utilization with empty units). It has the following advantages, however: (a) it allows for the stacking of more than three units; (b) it guarantees that the basic structure of the container will not become deformed because of an uneven ground surface; (c) it keeps the unit sheltered from water in case of rain; (d) it allows for identification by floor markings; (e) it allows for the use of equipment such as straddle carriers; (f) it facilitates cleaning such as removal of all cuttings or other sharp objects that might get in the way of handling equipment.

The least suitable surface unimproved earth, which quickly turns into mud when it rains. Such surfaces do not allow for the stacking of more than two containers, cause deformities in container structures, and often cause water damage to wood floors of containers. Handling equipment, of course, cannot be utilized for several days after a rain. The only advantage of this surface is that it requires no investment whatsoever.

The intermediate solution between the two alternatives is a dirt floor improved with gravel or similar material (cinder, etc.) that allows for both stacking and moving.

Sometimes different solutions can be combined; for example, the access lanes where equipment is moved may be improved while dirt may be left in storage areas. There is a risk in such cases. Since access lanes are arched, water drains towards sides, flooding the adjacent ground and thus exposing the base of the containers to water damage.

All improved surfaces should receive maintenance regularly.

3. Purchasing or leasing

With respect to the question whether land should be purchased or leased, it is difficult to give advice because of the countless factors that must be borne in mind. One of these is the value of land in the country concerned, the profit margins of the business and container movement through the area.

In the specific case of the country studied, 80% of the shops are located on land in the port and are leased for periods of around ten years.

Leasing is very important when buildings have to be constructed, the characteristics of which will depend on market projections. Naturally, when investments are made on land that is owned by the enterprise, the basis for analysis will be entirely different.

In Argentina, most shops are located on properties in the port of Buenos Aires, because in this business it is essential to be near the areas where cargo is consolidated and disconsolidated and containers are loaded on and discharged from ships.

It may be said that in Buenos Aires, the maximum radius of operation is 20 km from an imaginary point in the lineal centre of the port.

There are importers who receive cargo from greater distances, but the units are returned empty to the area within that radius. To date there are not many depots for empty containers outside that radius.

Most of the area in that radius is occupied by city construction and the only open spaces available are under port jurisdiction.

Container operators and others entering this business who need land for their operations have no alternative but to lease the land.

4. Design

As was the case with regard to size, the design of the yard will depend on several factors. There are, however, some aspects that may be considered fundamental to the smooth running of the business.

One of these is the location of the shop. If it is inadequate, it may become a serious obstacle to planning for orderly storage, in view of the fact that work is usually done outside and in the surrounding area. Therefore, in speaking of the shop, one must bear in mind that it does not only consist of the space enclosed by walls but that it also includes an area of influence of no less than 15 metres on every side.

This space must be available for storing containers that are being repaired and containers awaiting inspection, receipt of materials for storage, and placement of assorted tools of different sizes that can only be used in open spaces.

If the shop is located near the entrance to the yard or in the middle of the yard, it will take away a critical percentage of the useful storage and manoeuvring area. It is therefore recommended that the shop should be located to one side or at the far end of the entrance. It should be borne in mind that these comments refer only to repair work.

In the case of refurbishment, the shotblasting and painting areas should not be located within the shop itself. These are independent jobs which to a large extent, because of their effect (generation of suspended particles of sand, metal and enamels), deteriorate tools and repair equipment.

As regards the shop itself, it should have a height of no more than 4 metres, which is enough for raising a container on stands when repairs must be made to the base.

There are huge properties where large cranes move containers over other units, but in the case at hand, we are concerned with areas having relatively little turnover where there would be no justification for investing in complex equipment that is better suited for quasi-industrial plants.

The number and size of points of access to the shop will depend on how much handling equipment is to be used and what type it is.

As we know, a container may be brought into the shop on a chassis, on a rolling platform or on a side or end-loading fork-lift truck. The type or types of such equipment that are available will determine what type of access should be provided. The shop might also consist of a shed with no walls; in that case, however, climatic conditions would have to be taken into account.

Turning to other matters, it should be pointed out that it is important to have space for the scrap that accumulates over time which, in the absence of such extra space, takes up a large proportion of the container storage space.

In the section on size, brief reference was made to the manner of storing containers. It is worth adding now that the easier access is to containers, the greater is the space wasted and vice versa.

One of the fundamental rules of a container repair shop is that work must be done in the order that it comes in. Likewise, damaged containers should be stored in such a way that when one unit is taken out, as few containers as possible should be moved. The ideal arrangement would be to have containers stacked two high in double rows, but that would mean having access lanes with the resulting loss of space. The worst arrangement would be to have containers stored in stacks of four or more, in rows of five. An intermediate formula would be to stack the containers three high, in rows of five, with an access lane on either side.

In the case of 40-foot containers, the situation is more difficult because access lanes must be large; the actual size will, of course, depend on what equipment is to be used.

There should be only one access to the yard, so that a container is brought into the centre and also so that the office personnel manning the control boards and handling customs documentation may see the unit as it enters or leaves the yard.

5. Equipment

One question that is often raised by those who carry out feasibility studies on container repair is whether handling equipment should be bought or leased.

Experience in Latin America -at least the experience gained in the southern region- indicates that a moderate flow of containers is not in itself enough to amortize the investment that would have to be made in this type of machinery.

On the other hand, however, it is obvious that the equipment must be available at all times, i.e., that it cannot be rented by the day or month but must remain in the yard during the entire time the shop is in operation.

The conclusion that has been reached, and what we recommend, is that handling equipment should be a part of the patrimony of the enterprise. In any event, during the initial stage, used equipment can be bought.

With respect to the question of what machinery is appropriate for a repair shop, the answer would be any machinery capable of stacking containers three high that can be easily moved and operated.

It should be borne in mind that in any business of this nature, safety and time are vital in the handling of units.

It should be remembered that from the time the unit enters the yard until it leaves, it is moved at least seven times, as follows:

(a) It is taken off the transport equipment and inspected upon entry.

(b) It is transported to the storage area.

(c) It is removed from the stack for verification by the inspector.3/

(d) It is returned to the stack.

(e) It is removed from the stack for repair.

(f) It is returned to the stack after repair.

(g) It is removed from the stack and placed on transport equipment to be taken away.

To these seven movements must be added the indirect movements involved in removing other containers from the stack.

Of all these movements, only the first and the last generate income. The cost of the other movements must be absorbed by the company and therefore its profitability will be increased by reducing these movements to a minimum, both in time and space.

The most common equipment is the fork-lift truck with a capacity for 7 1/2 or 15 tons that is equipped with devices for picking up the 40-foot units from the top corners. In this respect, it should be pointed out that the proportion of 20-foot to 40-foot units varies from region to region, but in the southern hemisphere it can safely be said that 20-foot units outnumber 40-foot units three to one.

Most of the handling equipment available on the market is designed for loaded containers and therefore the medium-sized fork-lift truck is best for empty containers.

6. Administrative and operational infrastructure

An ordinary repair shop -for automobiles, refrigerators, etc.- has separate systems for its administrative and operational procedures.

In the case at hand, a third aspect should be considered which has features of both, i.e., inspection, which, while a part of operations, also has important administrative elements. This is discussed below.

The number of operators to be hired will depend on production projections for the shop, but it should be borne in mind that a container is serviced on average by one and a half shop workers. In other words, it cannot be estimated that four workers will repair four containers; rather, they will only repair three. Because of the nature of the materials used, this work is not very complex but does require strength, e.g., for straightening metals and for basic welding.

3/ Inspections are not necessarily made in all cases.

Nevertheless, repair workers must be able to judge the importance of the work on structural members and the future effect of poor repair work on certain vital parts of the container. There are two types of workers: welders and their assistants. Each, however, must do metal straightening work, using percussion or hydraulic systems.

The foreman, who must keep in touch with the inspector, will be in charge of recording the time spent on each part of the job in order to compare actual times with estimated times and make the necessary adjustments for similar work in the future.

In addition, there should be a fork-lift operator, this equipment being of crucial importance in the plant.

The prestige of the shop and, to a large extent, the success of the enterprise depend on the inspector.

With regard to administration, there must be one or two persons in charge of bookkeeping, billing and collections.

The administrator of the enterprise does not necessarily have to be a technical expert, but he must be familiar enough with the subject to corroborate technical and economic appraisals of jobs. He will often have to justify quotations for repair work to leasing company inspectors and insurance company adjustors.

Disagreements regarding the work centre on the question of repair time and methods used in making quotations.

The person in charge of the enterprise must have a complete knowledge of these matters or be assisted by someone who does.

7. Inspection

The importance of this work has already been pointed out. Unfortunately, it is only recently that enough attention has begun to be paid to it in this region.

There is a conceptual confusion with regard to the classification of damages to a container among those who are beginning in this specialty and even among those who have been working in it for some time.

It is not within the scope of this study to define what is understood to be damage or wear and tear but rather to point out the need for persons who will be acting as inspectors to receive adequate instruction in order to minimize the problems that currently arise in this connexion.

The best way to achieve an adequate level of knowledge, aside from learning through manuals and information provided by container leasing companies, is to keep constantly in touch with the shop and be thoroughly familiar with containers.

There are basic rules on the subject, but inspection requirements change because equipment is constantly being improved. Naturally, how qualified an inspector is will depend directly on the number of containers he has inspected and on his own personal judgement. Former container repair workers are more likely to be good inspectors.

Anyone can describe a dent in a panel or a hole in the roof without being a specialist, but when there is a combination of minor damages and corrosion, it is more difficult to determine the degree of deterioration.

Anyone who has done repair work knows that if a container had received adequate maintenance, there would have been no corrosion and, consequently, that defective handling would not have caused the damage that now makes it necessary to undertake repairs.

In such cases, the distinction between the user's and the owner's liability is not clear. If the inspector is not sufficiently qualified to differentiate each damage, he should be able to reflect this in his report so that the shop does not mistakenly repair some damage on which no quotation has been given or have to inspect the unit again because of uncertainty regarding its condition.

The case often arises where a particular job is ordered which in turn, without its being actually specified, involves the performance of other complementary jobs such as dismantling parts or replacing parts around the damaged area. If this is not clearly set forth in the equipment interchange receipt, the shop will have to do the work without charging for it.

Another aspect that must be borne in mind by the person in charge of inspections is the level of verification. The amount of inspection required for a leasing company to decide to interrupt a lease will not be the same as that performed on a unit belonging to a shipping line which is sent to the shop only for minor repairs (holes, cuts).

The inspector must be aware of these details in order not to make the mistake of either performing an inadequate inspection and neglecting some of the damage to the container or performing too thorough an inspection and noting details that the shipping lines do not classify as damage. Finally, the inspector will be responsible for detecting and indicating in the relevant record any inadequate repairs on other parts of the container in question.

As a result, inspectors must know how container repair work is done. A critical approach to the work of other enterprises gives rise to quite a few difficulties with depots and leasing companies, increasing administrative tasks and sometimes creating tensions that are detrimental to trade relations. However, experience shows that such observations (with respect to inadequate repairs) cannot be omitted.

Moreover, it must be borne in mind that the inspector will sometimes have to fill out interchange receipts in English. This is becoming increasingly important.

The above remarks point to the importance of the inspector's functions in a container depot/repair shop.

8. Quotations

It is not easy to estimate the monetary value of repair work. Repair estimates have always given rise to conflicts and, although a great deal of progress has been made, such conflicts will continue to occur.

The subdivision of repair work into separate elements has helped to clarify the picture. These elements are: manpower, materials and incremental costs. Sometimes a percentage of overhead cost is added to manpower, thus creating the "labour" category, which is more complete than "manpower". Also included sometimes are factors relating to the time that a container remains idle in the shop awaiting approval of repairs, removal for inspection by the relevant specialist and transfer before and after repair.

Repair time plays an important role in the "labour" category. International experience has made it possible to tabulate jobs according to size and location on the container. Nonetheless, there are still differences between the leasing companies themselves with regard to the amount of time assigned for certain repair jobs.

Several different methods are used to arrive at an actual quotation. One is to separate materials and labour, another includes the relevant materials under labour and there are even fixed values per container independent of damage.

Each alternative has advantages and disadvantages. If a quotation includes only labour, it is assumed that the cost of materials represents, on average, a certain percentage of manpower. In this case, there is the risk, when damage is serious and the total for materials is higher than the amount estimated on the basis of statistics, of erring on the short side.

The incremental cost is made up of all those jobs that are complementary to the main job. These are usually quoted separately but are included in labour or materials as the case may be.

No single system can be recommended, since much depends on the qualifications of the workers, the availability of materials, the flow of units, the age of the containers, the requirements of the companies contracting for the shop's services and the lack of uniformity among the customers. Nevertheless, the persons responsible for preparation of repair work quotations should make use of reliable international information regarding repair time and should be aware of the possibilities for obtaining container parts locally.

D. FACTORS BEYOND THE CONTROL OF THE ENTERPRISE

1. The economic situation

The activity with which we are concerned takes place on the international scene, where there is much competition. Thus, the trends in the domestic economy of each country have a considerable effect on the business.

Most of the Western countries apply a series of taxes that are common to almost all of them. These include taxes on capital, on profits, on gross income and on value-added. The basis for applying each tax may vary from country to country. In Argentina, only three of these taxes are levied on container repairs.

The extent to which such taxes affect an enterprise depends on how profitable it is; thus, in this study it is difficult to make any generalization on the subject.

Another factor that affects the business and is in turn affected by economic policies and market trends, is the exchange parity with respect to the dollar. If the dollar is undervalued, the dollar value of the local currency price of a job will increase proportionately to the extent that the dollar is undervalued. Thus, a job that is worth US$ 100 when the parity with local currency is normal (where there is neither over nor undervaluation) becomes US$ 300 when the dollar is undervalued in a ratio of 3:1 with respect to the national currency.

Although the variation of repair prices may not be significant, on the international scene the distortion at the local level completely changes the value of quotations. This leads to the cancellation of work orders and the removal from the country of unrepaired units. The industry could even disappear because of such a situation.

Container repair entrepreneurs can do little or nothing to solve this problem unless they have sound financial backing from other sources and can work at a loss while waiting for the dynamic equilibrium of circumstances to correct this situation, thus making it possible for them subsequently to reactivate their business.

Local financial support services for this type of business include prefinancing and financing of export services granted by banking institutions in compliance with governmental regulations.

Repair, maintenance and refurbishment services benefit from such provisions. For the purposes of the banking control, however, the latter offers the greatest possibilities.

The special nature of refurbishment, as well as major maintenance work (replacement of roofs and doors), allows for systematic verification throughout the process, as well as verification of the materials used. Because of their complexity, repairs are more difficult to verify.

In some cases, prefinancing provides the best way of offsetting substantial drops in profitability caused by other factors that affect it. However, when interest rates are positive, this is not the best recourse.

A similar measure, although different in some regards, is the system of reimbursements granted by the State to promotional export activities, which is actually a tax rebate. This option has not yet been utilized as much as it should because there is no specific legislation regarding container repairs. Nevertheless, because it is a non-traditional service using domestic materials and manpower, it could fall within the category of exports of goods processed of the country.

2. Availability of materials

This is directly related with the requirements of the users of the shop and naturally with local capacity to provide the necessary materials.

As we know, the possibilities for doing this in Latin America are very different from those in North America.

In our countries, large quantities of complete container parts are not available simply because the industry that might supply possible orders simply does not exist.

It is likely that once container manufacturing is reactivated and a reasonable continuity is established, such parts might be available in the necessary amounts, but in the meantime, it will not be easy to obtain them. We are speaking specifically of rails, main and side vertical supports, and complete fronts and sides.

Since there are differences in the sections, the thickness of materials and the adhesive elements used in the construction of containers, it is practically impossible to keep stocks of most of the different elements used.

In the early 1970s, a large percentage of the fleet was made up of aluminium containers most of which were of similar construction. At that time, it was more feasible, for example, to have side vertical supports or sheets for patches.

Subsequently with the gradual shrinking of the aluminium fleet and the introduction of new and more modern steel containers, the situation became more complicated.

There are container parts, such as weather stripping, which vary not only from one container manufacturer to another but also from one year to another, for the same product. It is impossible to keep stocks of this component.

How can these problems be solved? Up to now, in our region, there have been two options. The first one is to use the damaged part as a pattern (for example, a rail) and have another one made to order. In addition to being more costly than mass production, this alternative involves a waiting period.

The other alternative is to import the materials discussed in the following section.

A third possibility is to make use of materials that are still in satisfactory condition taken from containers that have been scrapped. Although this is not a rational or sophisticated solution, it does sometimes allow the shop to make up for the lack of necessary parts. This is only possible, of course, in those shops which also operate as depots and where there are enough scrapped containers.

In countries such as Brazil, where containers are now manufactured, there are more possibilities of getting needed spare parts. In the specific case of Argentina, which manufactured containers during the 1970s, parts suppliers worked only for that industry and when manufacturing ceased, they also disappeared.

Up to now we have discussed the supply of major parts. In the case of minor parts, corrugated sheet, smooth sheet, floor beams, etc., the problem is easier to solve, as it is enough to take a mold and make them in the shop or have them made by third parties. In such cases, of course, thickness and type of material must be considered, as these must meet the requirements established by leasing companies for the shop.

We must not neglect to mention protective materials, such as enamels, anticorrosive bases or bituminous coating. Strict priority must be given to the protective treatment of a container and this is included in the basic agreement between the owner and the shop.

The necessary materials may be purchased locally or imported, but in either case, prior approval of the container owner is required. In practice, this requirement is stricter for refurbishment than for retouching. Nevertheless, experience shows that the standard should be applied to all repairs.

Finally, in our view, container repair shops in areas such as ours should keep only minimum stocks of parts.

3. Alternatives to the importation of materials

There are advantages and disadvantages to importing container parts. One advantage might be that the shop would be able to locate the best parts suppliers in any area of the world and could purchase an item of good quality that would be satisfactory to the container owner. Although the price might be slightly higher than that of a part supplied locally, the container owner could be sure of the quality of the material used in maintaining his equipment.

The disadvantages of buying parts abroad for repairing equipment that is constructed differently lies precisely in the differences in technical characteristics.

For example, one might import handles for closing bars, but how many? and of what specifications? One must not buy five or ten, but many more. The same is true in the case of a bottom rail. How thick or what shape should it be? What will be the shape or thickness of the rails on containers brought into the shop in future? And when they do arrive, will they actually have to be replaced or will they be repaired? These questions point to one of the problems involved.

The second one concerns the delay in getting the part. We all know that import procedures are not simple or rapid and thus a repair might depend on the delay in delivery of the imported materials with the resulting commercial risk.

In the third place, the instability of regulations governing flows, quotas and import tariffs must be borne in mind.

The orientation of the policies of the different countries tends to change according to the situation of the industry, the balance of payments, etc. Thus, a price that is considered reasonable from the economic standpoint at one point in time might later become prohibitive.

A shop cannot allow its efficiency to depend on the ups and downs of the import trade. At least that would not be sufficient justification for its customers.

We must now turn to the subject of enamels and antirust coverings, the importation of which may be considered, as these items are easy to choose, in view of their physical characteristics, and it is easy to order specific colours. The only difficulty would lie in the abovementioned possibility that the government might change its import regulations.

Floor wood is another material which, like paints, might be imported. Although it can easily be obtained locally, the possibility of importing it at better prices should not be discarded; this is true in general for all containers. In this regard, application of the treatment recommended by the Ministry of Health of Australia should be borne in mind.

Finally, it is suggested that every effort should be made first to acquire materials locally and that complete parts which, as mentioned above, are difficult to obtain in Latin America should be imported.

4. Contractual relationship with the leasing companies

First we shall briefly mention what services a container owner may request from a depot. A depot is defined as a place used for the storage of empty containers where repairs may also be made. Such services include: (a) receipt and delivery of empty units; (b) information on movements; (c) storage; (d) repairs; (e) maintenance; (f) refurbishment; (g) technical treatments of various types; and (h) transport.

Once a potential depot shows its capacity and suitability for providing the leasing company all or any of the services mentioned above, an agreement is signed which has a duration of six months or one year and may be cancelled by mutual agreement.

In addition to having local and/or international certifications, a depot and/or shop must back its claim to solvency by replying to certain questions which leasing companies address to enterprises desiring to provide container storage, repair or refurbishment services.

The questionnaires on depot services include questions on such aspects as the characteristics of the surrounding areas (residential, industrial, etc.), the type of workshop floor available, the type of storage surface covering, the drainage system, type of lighting, distribution method to be used in the yard and the type, capacity and specifications of equipment to be used. Questions regarding personnel refer not only to the number of workers and their special qualifications but also to their experience in years.

The questionnaire on repair shops asks for information on personnel and equipment available, as well as on the individual certifications of welders, the type of materials kept in stock and descriptions of covered and open air operating areas.

With regard to refurbishment, the questionnaire covers a range of matters, from the size of the shotblasting nozzle to waiting times between applications antirust base, the painting system used, and drying and humidity control procedures.

It will be seen from the above that although there may be cases where, pressed by circumstances, a leasing company might begin to use the services of a depot without thoroughly investigating its qualifications, in the end the depot or shop must fulfil the aforementioned requirements or lose the customer.

The agreement between the leasing companies and the depot will include some provisions that will vary depending on the policy of each container owner.

In this case, we are not referring to any specific company but rather we are summarizing the main requirements established by some of them.

The maximum number of units to be stored by a depot is established, but not the minimum. The depot must take insurance to cover civil liability, damages to properties or to the container, and even total loss of the container. The leasing company sets the amounts.

The depot must inspect the units when they come in and prepare the relevant documentation following the company's instructions.

The rate charged upon receipt of a unit should include interior sweeping and removal of any outside markings which belong to the former user.

The depot provides daily, weekly and monthly reports and, if the company so stipulates, reports on operational aspects to be determined in due time. Such reports refer to such entry-exit operations as inventories, physical descriptions of units and miscellaneous information.

The shop must have adequate facilities and repairs must be made without delay, following industrial standards and those provided by the leasing companies or associations of leasing companies.

Repairs to be made with materials that are the same or similar to those used in the container must have the prior approval of the leasing companies and prices must be competitive.

In general, the companies stipulate in one of the clauses that the price agreed on with the shop, e.g., for labour, will be the lowest price currently charged by the shop.

Sometimes the company asks for a six-month or one-year guarantee on repairs and the shop is always required to pay compensation for defective repairs.

The company has the option of reviewing the shop's books at any time and if the shop decides to subcontract work, it must have the prior approval of the company to do so.

The depot is not allowed to lease containers itself, as that would create a conflict of interest.

There are other clauses, such as provision relieving the leasing company from any claim by the shop in the event a container user does not pay for repairs. Finally, the companies reserve the right to request quotations from third parties if the price quoted by the shop under contract is not satisfactory.

Actually, all the aforementioned terms would appear to favour the interests of only one party and seem to have little or no regard for the interests of the depot/shop. However, if a depot/shop operates efficiently and lives up to a certain standard of conduct, these clauses do not hinder the growth of the business. On the other hand, there are other circumstances that sometimes conspire against the normal development of relations. These are discussed in the following section.

5. Dynamics of relations between the leasing company and the depot

Each container owner acts according to its own policies, which are not always in harmony with the aspirations and needs of the container depot and repair shop, particularly when the market shows intense activity. The policies followed by a container owner depend on its experience, the number of units it owns and where it operates.

In this regard, it should be noted that its requirements also depend on the technical and commercial characteristics of the region where its commercial activity is carried out.

We wish to stress that, in principle, no leasing company is able to give a shop a guarantee that it will have a certain amount of work, simply because it is not possible to know how many units will be damaged and, moreover, because no enterprise wishes to see its equipment damaged. On the other hand, it can commit itself to deliver for repair a percentage of the units entering the country. Because these units are in transit, how busy the shop will be will depend on the flow of imports into the country where it is located.

There are two extreme situations in which a shop such as the one under consideration might find itself. One of these occurs when only a small number of damaged containers come in and idled workers become a financial burden to the enterprise, with all the obvious consequences. A leasing company can do little or nothing about such situations because they are caused, for example, by a lack of import traffic or by the fact that the company's fleet is in good shape.

The other situation arises when there is a constant and massive inflow of damaged containers but no outflow. In this case, there is not so much pressure on the part of the leasing companies because there is not so much demand for containers. The shop becomes crowded with units, many with no repair authorization, and when approved repairs are finished, new units must be rejected for lack of space.

The situations described above have arisen during the past decade and have taught important lessons to both parties with regard to relations between the company and the shop.

Between 1970 and 1974, the demand for units increased and there was an imbalance between the number of units leaving the shops and those coming in, so that the shops had very little to do. During and after the world recession of 1974 and up until 1976, the inflow increased, overcrowding the depots and shops.

The leasing companies cut down on their maintenance and refurbishment programmes, except in special cases.

After periods of critical decline or inactivity in the shops, technical and human resources are cut back, with the resulting negative implications for the members of this particular group. The leasing companies, for their part, must absorb a series of additional expenses, including those entailed in defective inspections, excessive handling, overtime labour, deterioration of equipment during the idle period and, finally, problems with the shop because of disagreements regarding liability for the physical condition of units.

So far we have studied the extreme situations, but now let us look at the situation when relations between a container repair enterprise and its customer, the container owner, are normal. A shop usually provides services to more than one container enterprise and the curious circumstance arises that sometimes a company will first find out which other companies are customers of a shop before deciding whether to use its services or not.

The agreement between the parties establishes a price for storage, handling and labour.

Some companies only enter into agreements with a shop with regard to labour, while others establish maximum repair times and prices of materials. There are agreements establishing fixed prices per container, independently of damage, provided the damage does not go over a certain amount. In other words, there are many alternatives as regards rates governing relations between a shop and a company.

For special work such as refurbishment or total replacement of roofs and doors, fixed sums may be agreed which are relatively independent of the value of labour established for other work.

In the specific case of refurbishment, prices may vary according to the number of units received.

On the basis of the agreement established, billing may take two forms. If the container is returned by a user who has RSP or DPP coverage, the container owner is billed directly. Otherwise, the shop deals directly with the user.

The second alternative causes quite a few problems for the shop, particularly if the user is not familiar with the workings of the system and only wishes to get rid of the unit. In such cases, the shop must maintain a delicate balance between its services to leasing companies and to container users in order not to jeopardize commercial relations between the two.

There have been many cases in which a user presents a document showing that a unit has been received in damaged condition and therefore, upon returning it, does not accept liability for such damage. The solutions for such situations are varied and not always easy.

Nevertheless, if there is mutual trust between a leasing company and a shop, these problems are settled without serious consequences.

In the last few years, container owners have gathered sufficient information to set repair standards with a certain technological backing. They have established stricter programmes and this has been reflected in an improvement of the services provided by shops and the elimination of inefficient shops.

In the beginning, independent of whether or not approval was required for repairs, operations were based on good faith on the part of the container leasing companies. This led to not a few unpleasant surprises.

Currently, most of the leasing companies have a regional or local inspector or both, who inspect the units before and after the repair work is done. With this system, the previous deficiencies have gradually been overcome. Thus, the shops now work under a principle by virtue of which no unit is approved until it has been inspected by a representative of the leasing company and any unit may be inspected after repair. If this is not done, the inspection carried out by the user before the container leaves the depot will show whether the work done is satisfactory.

In this regard, it should be pointed out that language is sometimes a problem. Equipment interchange receipts should be prepared in the language of the owner and sometimes the owners require this. It should be borne in mind that in Latin America, the average inspector is not always fluent in the container owner's language.

There are of course other options for the leasing company: for example, it may have its own shop or be associated with a shop. This is usually viable in areas where the leasing company has its headquarters and control is more effective. In remote areas, it is easier for a leasing company to subcontract the services of a shop and exercise control through an inspector.

In view of the fact that the repair business is a fluctuating one and depends on many factors over which the enterprise has no control, the investment must be made rationally and the number of persons working in the business should be kept at a minimum.

When traffic is normal, there may be one week when no units come in and another week when fifty damaged containers might be received within two days' time for repair and delivery to the leasing company three days later. To handle such a situation, the shop must be dynamic enough to have the necessary materials available, schedule its time, and have its staff ready to finish at least fifteen units per day. Overtime and non-working days are usually required to take care of rush jobs such as these. Otherwise, the shop would have to have a large staff which would be partly idle during slow times.

It should also be remembered that a leasing company requires prompt service and naturally does not agree to its request being delayed because of other competing companies being in a similar situation. Thus, the shop must treat each company as if it were the only customer.

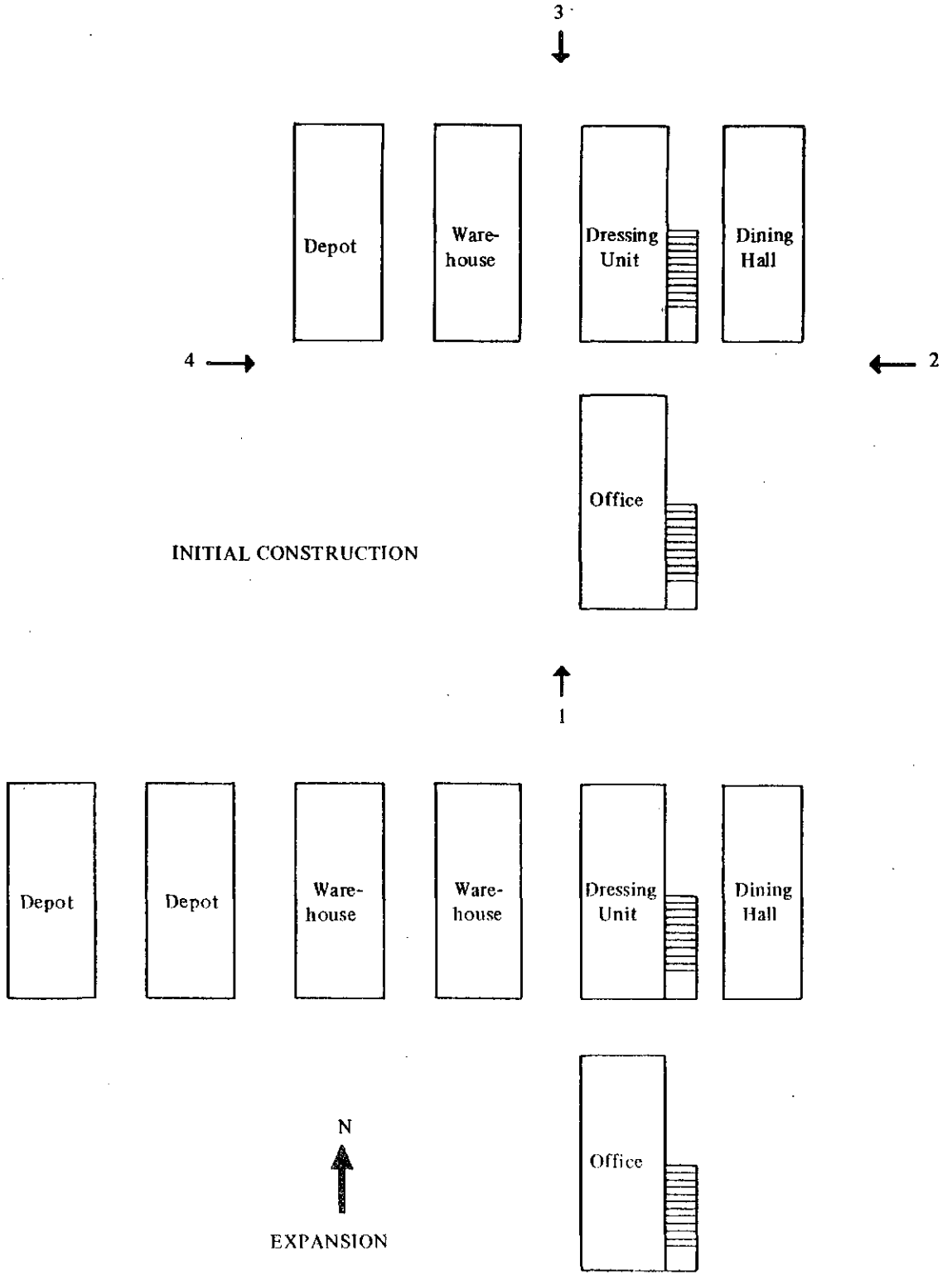
It is very difficult to achieve a balance under such circumstances. The situation may be partially solved if (a) the shop carries out a complementary activity (chassis, ship and tractor repairs) that keeps the staff busy during the aforementioned slow periods, and (b) the shop does not take on too many customers.

All these aspects should be clearly discussed if there is a possibility of starting a container repair business.

It is important to point out that pressure has no place in this relationship. In other words, the shop cannot ask for a minimum quota of units to repair because the company does not know how many units will be damaged nor can it set unreasonable prices because the container company will simply choose another shop. And there will always be some other shop that is willing to make discounts, either because its services are of inferior quality, it needs the work, it has less infrastructure, or simply because it wishes to get more business.

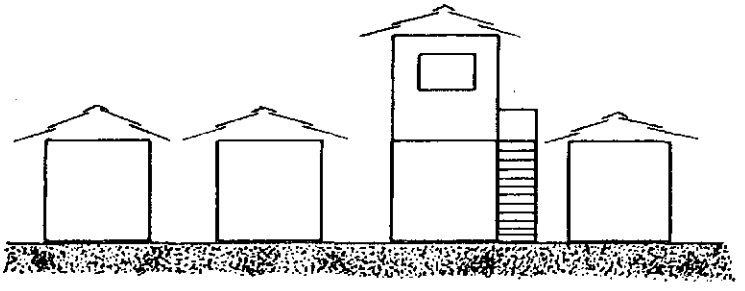
Figure 1

ERECTION OF OUTDOOR CONTAINER WORKSHOP BY MODULES

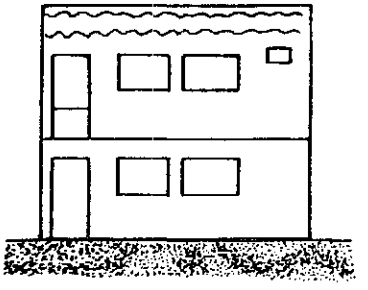


Source: Container Comércio e Indústria S.A.

Figure 1 (cont.)



Elevation 1



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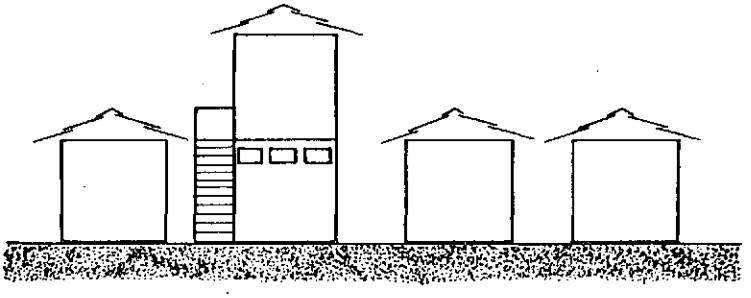
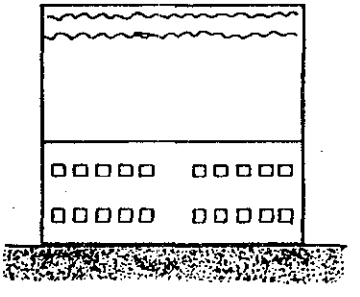


Elevation 3



Elevation 4

Presentation 6

MOBILE REPAIR UNITS

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For:

Economic Commission for Latin America (CEPAL)

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I. INTRODUCTION AND BRIEF HISTORY

In the U.K. in the mid 1960s, ISO freight containers were beginning to emerge as a major means of transporting goods by road, rail and sea in cellular units.

This meant that containers arriving on the dockside which had been damaged in transit would have to be unloaded and effective repairs carried out by dock labour before the units could be repacked for transshipping.

This caused many problems, not least the quality of repair, speed of repair and cost.

The types of skills available from the dock labour force, together with the lack of suitable equipment, were not conducive to repairing containers.

Union work rules in force at that time meant that a container requiring, for example, just a patch, entailed three different operators: a fabricator, a welder and a painter. This practice was extremely costly and time consuming. Eventually, specialized companies, such as REPCON (U.K.) Limited, started to emerge.

Mobile vans, specially equipped to undertake any type of repair were provided at locations where containers were stored or landed. These vans had the advantage that personnel operating them were skilled in the various aspects of repair, and that the above-mentioned union work rules were avoided.

Spare parts had to be ordered in advance from general engineering fabrication shops. This would sometimes cause delays due to parts only being completed in order of priority.

The need for a back-up to the mobile facility quickly followed, resulting in setting up moveable (containers modified to serve as workshops and permanent workshops) capable of fabricating steel panels. Other parts were obtained from alternative manufacturers and suppliers.

First, as volumes of repairs increased in specific areas, containers modified to serve as workshops were set up. These units could support a larger number of workers, more equipment and a wider variety of spare parts. This development resolved the problem of communication and made available office accomodation, now required because of the additional documentation.

As repair volumes increased still further, comprehensive stationary repair workshops began to emerge as the facility offered to container operators, thus giving continuity of major repairs in covered premises.

At the present time in the U.K., stationary workshops exist alongside the mobile and moveable units, each having its own part to play in giving a fast, efficient and quality repair service to the container industry.

Mobile and moveable repair units are designed to meet freight container repair demands away from the base workshop. Both types are equipped to enable virtually any major repair to be undertaken, dependent only upon materials and, in some cases, lifting facilities being available.

There are two main types of non-stationary repair units being operated by REPCON in the U.K. One is the motor vehicle, with a box van body, the interior being equipped as a small compact workshop, and the other is the container modified to serve as a workshop, which can be transported to site on a road trailer, These units will be referred to as <u>mobile</u> (vans) and <u>moveable</u> (one, or a combination of modified containers) for clarity of description.

II. DESCRIPTIONS

1. Mobile

These trucks would normally come within the following specifications:

Engine capacity:	2.5 litre diesel engine, minimum
Minimum carrying capacity:	2 tonnes
Internal dimensions of the workshop:	approximately 3.5 m long, 2.0 m wide, 1.8 m high.

This section has a metal work bench secured to the floor, with an engineer's vice fitted.

The workshop equipment is stored in a tidy manner, as shown in figures 1 and 2.

The full equipment list will be described later.

2. Moveable

This type of unit makes use of a standard freight container adapted internally to offer compact workshop facilities within. The layout is generally the same as the mobile, with work benches, equipment and a small material stock.

The front end of the container can be utilized as an administration unit with a partition between the workshop section, or as a power and generating area, having a generator and air compressor installed.

There is basically little difference between the capabilities of the units.

The determining factors when deciding on which one to use are basically:

Workload - continuity

Location - work area.

III. ECONOMIC ENVIRONMENT

1. Costs

(a) Mobile (trucks)

Basic cost of recommended type vehicles in the U.K. presently stand at approximately £ 10 000 including painting and signwriting with company logos, the fitting-out inside the pegboard sides, and a metal bench with a 100 mm engineer's vice attached. The cost of the portable items, as listed later, would total £6 000 giving a grand total of £ 16 000.

(b) Moveable (container)

Dependent on the size of container, the costs for this type of unit would be as follows:

Cost of second hand 40-ft steel container	£ 600.00
Equipment as above, with the addition of extra benches and material racks, and administration office portion at the front end	7 000.00
	£ 7 600.00

Figure 1

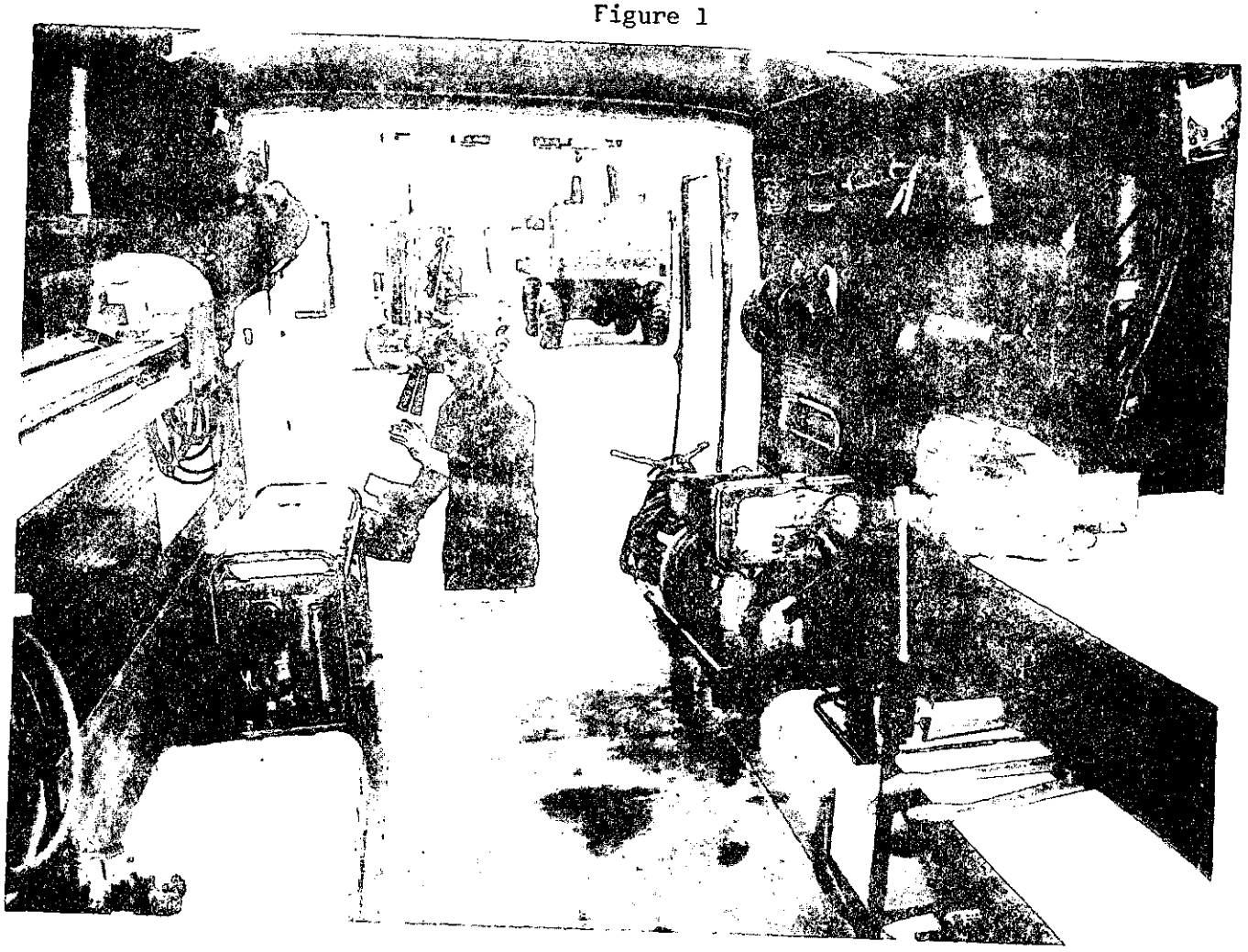
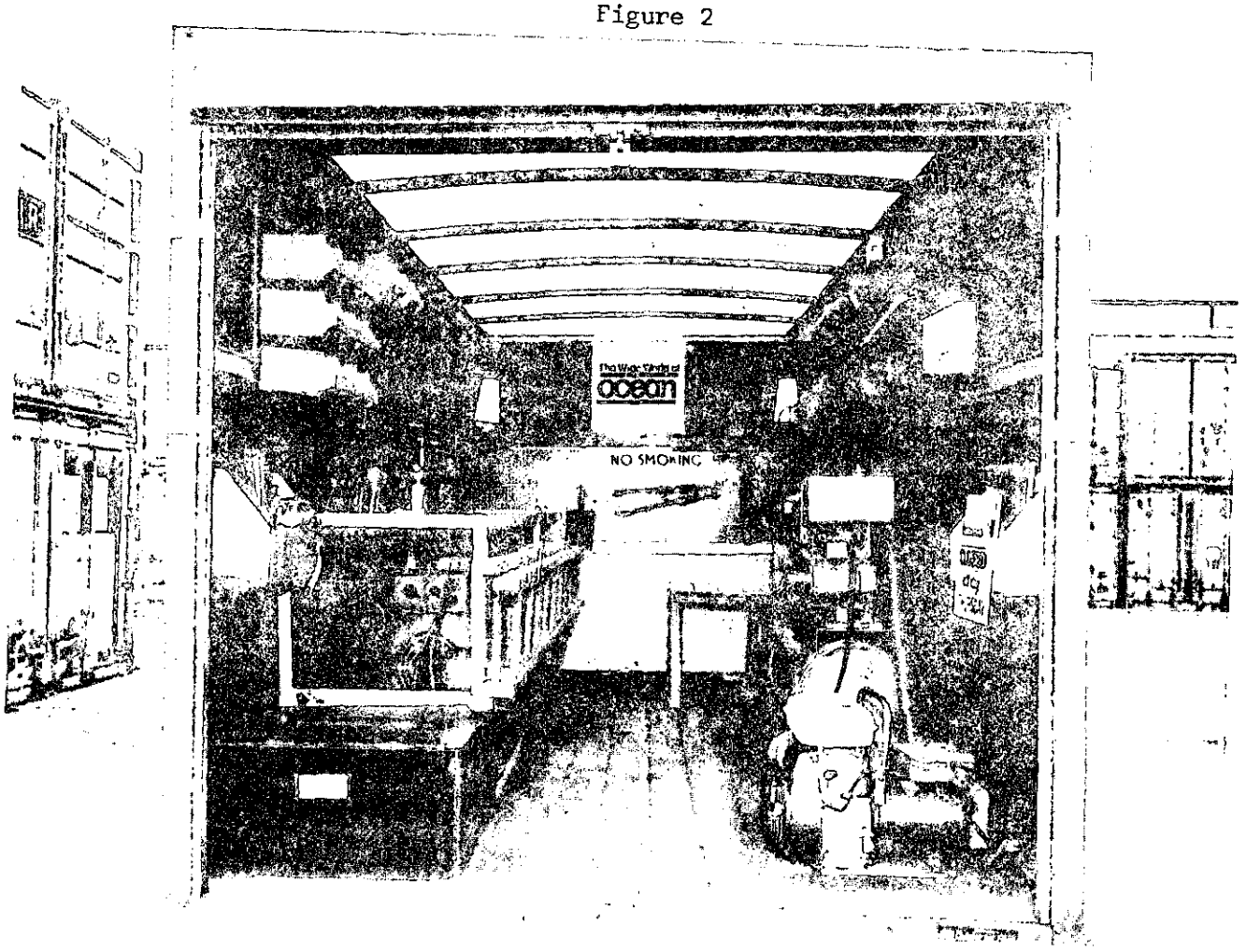


Figure 2



It should be noted that this cost excludes charges levied by the owners of the land on which the moveable is temporarily sited. This cost can be up to £ 1 250 per annum.

2. Repair throughout to justify investment

The repair throughout necessary to justify the investment of either type of unit has to be sufficient to cover depreciation of vehicle and equipment, labour, material and operating costs, and to give a return on capital in the region of 20%. To profitably employ a mobile repair unit, the enterprise should be assured of, for example, a minimum of one day's work at each repair location.

This means that mobile units are not intended to provide emergency repair services but planned services to meet consistent demands. Nonetheless, an emergency service can be, and often is, provided. Such service should be costed on a different basis, consideration being made to the travelling distance covered. For example, to travel 20 miles to effect repair work which takes only two hours would have to be costed accordingly.

3. Charges

Compared to the overhead and operating costs of a stationary container workshop, the charging out rates for the services of mobile and moveable units can be more competitive. To achieve profitability, REPCON (U.K.) has found that it is not necessary to stipulate a minimum hourly charging rate, but that a charge is determined by the work volume levels, plus a predetermined travel time/distance charge.

Example of a typical mobile or moveable charge. (Based on a 40-hour week with six men.)

Revenue	Productive hours:	210 (6 x 35 hours)	
	Average earnings per hour:	£ 10.00 (labour	£ 8.00
		materials	- £ 2.00)
	Productive sales:	2 100.00 (labour	£ 1 680.00
		materials	- £ 420.00)

From this £ 2 100.00, take:

Fixed costs	Productive labour
	Non-productive labour
	Material cost (33% markup on sale of £ 420.00)

This leaves the gross margin.
Take from this:

Variable costs	Fuel (mobile only) Vehicle repair (mobile only) Plant maintenance Tools Consumables Protective clothing Hire of equipment Sundry trade expenses (re-work, cleaning, canteen welfare)

This leaves the net margin.
Take from this:

Administration costs	Supervisor's or manager's salary Office costs (accounts, invoicing, etc.) Insurance Telephones Printing and stationery Rent and rates (moveable only) General expenses (audit fees, bank charges, etc.)

Depreciation over four years, giving a profit figure per week.

If this amount can be achieved over 50 weeks in the year, the total amount when added up should give a minimum 20% return on capital investment.

These examples do not take into account any overtime, holiday pay or payroll taxes (social security, pension contributions, sick pay).

4. Locations where mobile and moveable repair units might be utilized

(a) Mobile units

These vehicles are ideally suited to locations as follows:

(i) Any location where repairs to containers are to be carried out on a site and where permanent repair workshop facilities are not available.

(ii) Where containers are distributed over a large area of land and repairs have to be performed in place.

(iii) On a multioperation site such as a dock quayside, where a damaged container requiring attention must be repaired without being moved. This may entail the contents of the box being unloaded and reloaded after repair if goods may be damaged during the repairs.

(iv) Storage container parks and yards where many small and varying types of repairs are required.

(v) Container stuffing and stripping area, i.e. docksides, containerbases, rail terminals, high volume warehouses, major exporting plants.

(b) Moveable units

This type of facility is ideally suited where the volume of repairs can support the investment, but cannot justify a permanent workshop.

Adequate space must be given to the siting of the moveable facility and a repair area. This space must be away from the container loading and unloading area.

The ideal area for such a unit would be a container park or base belonging to either a major company or to a consortium in which all companies contribute towards the costs.

In this environment there is the advantage that boxes are loaded and unloaded and any necessary movement of goods to or from a box in order to carry out the repair can be dealt with immediately.

IV. INDUSTRIAL ENVIRONMENT

1. Customers

For both types of units, the major demand comes from customers such as
- Shipping and leasing companies;
- Forwarders and agents;
- Haulage companies;
- Industrial users.

2. Repair standards

Repair work of any form which is undertaken outside the control and supervision of quality inspection procedures of a stationary workshop is obviously subject to less stringent checks; it is, therefore, most important that to maintain quality work the following points must be adopted:

(a) Trust in the staff operating mobile units to always give conscientious service and a satisfactory quality repair. This is essential to ensure that each part of the facility is operating efficiently.

(b) A first-class foreman in control of mobile operations.

(c) Random quality checks by management to ensure standards are being maintained. The use of the repair quality report form is a useful means of supporting the level of workmanship (see figure 3).

(d) Close contact with container owners at the repair site to ensure that repair times and standards are satisfactory to their requirements.

(e) Care in making sure that repair personnel are aware of and utilize equipment innovations and new repair techniques.

In order to maintain repair standards, it is also necessary to have all technical instructions available to the craftsman carrying out the work.

Various container owning and leasing companies have in their possession repair manuals issued by the manufacturer of the containers. Many also employ their own engineers to monitor repair standards.

Each repair unit should endeavour to obtain identical replacement parts where possible, in order to ensure that they are made with the correct specifications and materials.

It is also advisable to build up a company method of repair manual and a code of practice, and to keep informed of the latest Customs regulations concerning containers.

Figure 3

REPAIR QUALITY REPORT

DATE 8.12.81

TYPE OF WORK TO BE CARRIED OUT
INSERT INFRONT SILL
NEW CORNER POST. RENEW F/BEARER

LOCATION
CHURCH ST
LIVERPOOL

OWNER A.C.E. (AFRICAN CONTAINER EXPRESS)

MAKE YORK

TYPE STEEL

SIZE 20 FT

NUMBER ACEU 1605526

SHOTBLAST

PAINT O.K.

WELDING GOOD

SEALS

CLEANLINESS TIDY FINISHED JOB. BOX SWEPT CLEAN ON COMPLETION

UNDERSIDE EXTRA UNDERSEAL REQUIRED TO NEW BEARERS

REPAIR COMPLETED ON TIME TO REQUIRED STANDARD

MISCELLANEOUS

JEM

3. Types of repairs

Virtually any type of repair can be undertaken by a mobile unit if suitably equipped. The majority of repairs, however, tend to be of a minor nature which are handled on a routine basis after identification. Some programmed work is also carried out (mainly routine), e.g., sweep-out, oiling and greasing, etc.

V. OPERATIONAL ENVIRONMENT

1. Equipment

The repair equipment most commonly carried by both unit types depends mainly on the trend of repairs which develop for individual units. These trends develop because units may find that perhaps only aluminium or glass-reinforced plywood containers are handled in the areas in which they operate, and therefore equipment need only be capable of coping with the one type of material. The majority of units, however, should be equipped to facilitate repairs for any variety of container. The following equipment list is, therefore, a comprehensive one and includes items which may not be used or required frequently:

- Steel workbench (dimensions 2 m long x 1 m high x 0.5 m deep) fitted with an engineer's vice having 100 mm jaws.
- Petrol-driven generator, 115 to 230 volts alternating current of 3.5 KVA (3 500 watts) capacity.
- Petrol-driven air compressor, 100 p.s.i. and 15 c.f.m. minimum.
- Petrol-driven welding plant, range 20-200 amperes A.C.
- Oxy-acetylene bottles with pressure valve and hoses.
- Small burning equipment bottles with heating and welding torches.

Note: The above equipment should be firmly secured within the unit.

Hand tools	Approximate cost
2 electric drills, 3/8" chucks, 2 speed	200.00
1 small hand grinder	100.00
1 hot-air plastic-welding gun	150.00
1 rubber roller for use with above	5.00
1 jig saw	35.00
1 nibbler	100.00
1 Avdel rivet gun and oil filler	100.00
1 pop rivet gun	20.00
1 Zip rivet gun	80.00
1 sealer gun	20.00
1 grease gun	10.00
Sledge hammer and 7 lb hammer	40.00
Hand-held metal-cutting shears	40.00
Case of Snap-on tools	150.00
Carriage-builder's chisel	80.00
Set of taper punches	20.00
Impact driver	20.00
2 18" Stillson wrenches	50.00
2 3' Stillson wrenches	100.00

Hand tools	Approximate cost £
Hacksaw	5.00
Wire brush	5.00
2 hand lamps, 110 v	20.00
Oil can	
Stanley knife	
Wood saw	5.00
2 air drills	80.00
Lazy tongs	45.00
Other items of equipment	
2 junction boxes	10.00
2 welding masks	10.00
2 electric cable leads	10.00
Centre stand - king pin	10.00
TIR rope kit	20.00
Yale pull lift	40.00
Porto-Power jack set with extension tubes to 8'	300.00
Small jack (hydraulic bottle type)	40.00
Crowbar	10.00
Airline	10.00
Ramps	20.00
2 C clamps, 2	10.00
Paint and sealer trays	10.00
Fire extinguishers, 5 kg (PSKS or Chubb BCF)	40.00
Paint brush rack	20.00
First aid kit	20.00
Gas-welding goggles	10.00
2 safety helmets	10.00
2 ear muffs	10.00
Various tote bins and racks	50.00
2 pairs welding gauntlets	10.00
Extending ladder with self-stand attachment	40.00
Sweeping brush	
Stowage locker	20.00
Paint locker	30.00

2. Spare parts carried

The spare parts held in a moveable unit differ only marginally from a mobile unit. It would be possible, however, to hold a greatly more varied supply of repair materials in the moveable, basically due to its larger size. Parts normally stocked include:

- Patch materials of various thicknesses, including steel sheets, alloy sheets and treated timber.
- Sections of steel and alloy for common container equipment encountered (Rectangular Hollow Section, angles, etc.).
- Roof bows and floor bearers.
- Fastenings, including a variety of rivets, screws, bolts and Avdel rivets.

- A selection of items including retaining wires for canvas and plastic sheeting, patching materials for canvas and plastic sheeting, locking gear components, handles, hinges, cams, rubber door seals, sealer, tapes, adesive and a variety of brush-on paints.

These items are carried at all times and are available for unforeseen repairs of a minor nature. Formed panels, corner posts, side rails, headers, sills and other special items which have been predetermined for the more complicated and specialized repairs are also carried.

3. Number of workers employed and necessary skills required

Together with the capital investment, a labour force capable of performing various tasks to a required standard must be employed to operate this type of repair service.

With regard to the mobile, it is standard procedure to have a two or three-man team per vehicle. The one in charge must not only be a reliable technician, but must also be able to work independently, have a capacity to schedule work and possess a good understanding of the port and depot.

A moveable unit's work force would be determined by the volume of work available. A figure of six men is normal, with one man a foreman.

The two basic skills required of the men would be:

(a) Vehicle body building experience, including workshop procedure knowledge, and

(b) Welding skills.

In selecting repair personnel, care should be taken that they are familiar with a wide range of welding techniques, such as the use of CO_2, electric arc and gas on various metals, including mild steel, Corten steel, possibly stainless steel and aluminium.

The method used by REPCON in personnel selection involves the prospective employee's completing the form shown in figure 4, which lists various skills required for container repair and also the level of experience gained in each one. It would not be expected of anybody to tick the experienced column for each item, but a successful applicant would have to be conversant with the sheet metal and one or more of the welding skills. The form can also be used as a record for training purposes and skills available.

4. Work procedures

The man in charge of a repair unit is responsible for:

(a) Identifying repair requirements for or on behalf of the customer;

(b) Preparing and presenting a quotation, verbally or in writing (generally verbally), and

(c) Obtaining approval of and following customer repair standards, where necessary.

The repair quotation form used by REPCON (U.K.) Limited shown in figure 5 indicates the work required and the estimate cost. It is prepared in four copies:

(a) Top copy -yellow- retained by the operator carrying out the repair;

(b) Second copy -white, with the standard trading conditions printed on the reverse- presented to the customer.

(c) Third copy -blue- given to accounts department for invoicing.

(d) Fourth copy -pink- given to stores for replenishing or ordering parts.

Figure 4

EXPERIENCE

We require competent employees who are skilled in the following duties, or who are prepared to undergo training to the required level. Please fill in the table to show your levels of experience:

SKILL	EXPERIENCED	SOME WORKING EXPERIENCE	LITTLE OR NO EXPERIENCE
Woodwork			
Fibreglass			
Sheet Metal Work (steel)			
Sheet Metal Work (aluminium)			
Welding (gas)			
Welding (arc)			
Welding (MIG and TIG)			
Industrial Painting			
Tilt Repairs			
Trailer Servicing			
Trailer Repairs			
Reading Engineering Drawings			
Fan Insulation			
Fridge Unit Servicing			
Fridge Unit Repairs			
Industrial Safety			
Firefighting			
Use of Normal Hand Tools			
Supervision			
Use of air or electric power tools for drilling, sawing, grinding, pop riveting or screwdriving.			

DECLARATION

I certify that the information given by me in this application is correct.

Signed ..... Date .....

FOR OFFICE USE ONLY

Interview Notes

Figure 5

repcon [UK] Ltd.

HEAD OFFICE
CANAL STREET
BOOTLE L20 8NP
Telephone: 051-922 8781/9
Telex: REPCON [UK] Lpool 627808

CONTAINER QUOTATION No. _____

PLEASE REPLY TO

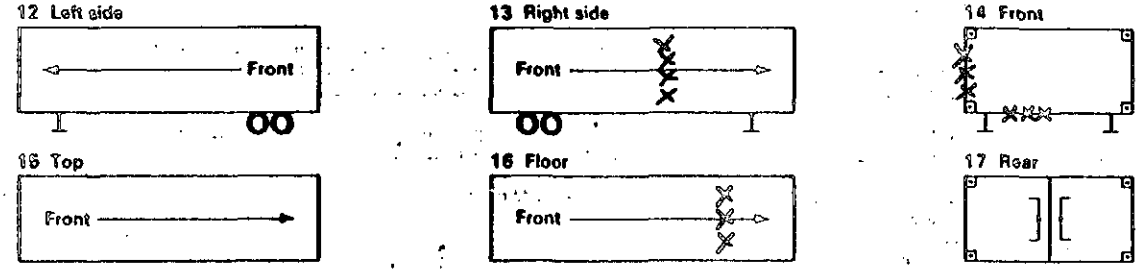
1 PRINCIPAL AFRICAN CONTAINER EXPRESS

2 YOUR REF. _____ 3 OUR REF. TPM/SB 4 DATE 6-12-81

5 ADDRESS 148 NEW STRAND ROAD BOOTLE

6 Container No.	7 Location	8 Type
ACEU 1605526	CHURCH STREET YARD	20' STEEL
9 Manufacturer	**10 Date of Inspection**	**11 Inspected by**
YORK	6-12-81	T. P. MULCAHY

INSPECTION REPORT:– b/B – Bent or Bruised, br/BR – Broken, c/C – Cut or Cracked, d/D – Dented, h/H – Hole, M – Missing.



TBDS 7102

DIA. No.	SUMMARY OF DAMAGE AND REQUIRED REPAIR	Estimated Cost of Repair: Material £	Material p	Labour £	Labour p	Total £
	RENEW Nº4 SIDE PANEL R/H. SIDE	32	00	48	00	80
	FIT 12" INSERT TO FRONT SILL	1	50	12	00	13
	RENEW R/H FRONT CORNER POST	45	00	96	00	141
	RENEW Nº4 FLOOR BEARER	12	00	24	00	36
	PAINT WORKED AND NEW PARTS	7	55	16	00	23
	TOTAL	98	05	196	00	294

COMMENTS

Signed T P Mulcahy

For and on behalf of repcon [UK] Ltd.

PLEASE NOTE: Trading terms and Conditions detailed overleaf

Figure 5 (conc.)

REPCON (U.K.) LIMITED
STANDARD TRADING CONDITIONS

1. All contracts are subject to Repcon (U.K.) Limited's Standard Trading Conditions. In these Conditions the "Client" means the party with whom the contract is made. All terms, whether conditions or warranties which would otherwise be implied are hereby excluded. These Conditions may only be omitted, varied or waived by the written authority of the Company.

2. By contracting with the Company the Client undertakes:-
   (a) that he or it is and will at all material times remain either the owner or the authorised agent of the owner of, and all other (if any) persons interested in the goods or any part of them.
   (b) that he or it is authorised to and does accept these Conditions including (but not limited to) the settlement of accounts for and as binding upon itself and all other interested parties.
   (c) in any event to indemnify the Company and keep it indemnified against all claims or demands whatsoever by third parties in respect of any loss, detention, delay, misdelivery or damage however caused whether or not by the negligence of the Company or its servants, agents, subcontractors or others for whom it may be responsible.

3. Quotations, which may be withdrawn at any time before acceptance, and in any event become invalidated in the absence of acceptance 30 day after they are dated, are subject to variation in accordance with any changes in the price of materials and parts or in wage rates.

4. Unless instructions to the contrary are received in writing prior to the commencement of the work, every endeavour will be made to use manufacturers recommended spare parts.

5. Transport costs to and from our repair bases are additional to the quoted repair or maintenance charges unless otherwise stated.

6. The Client undertakes to notify the Company of any contaminating substances where containers and/or boxes are presented for cleaning and shall indemnify the Company against all claims of whatsoever nature arising out of or in way connected with any breach of this Condition.

7. The Company will not be responsible for any loss or damage due to or arising from:
   (a) Act of God, invasion or other action of foreign enemy, hostilities (whether war be declared or not), civil war, civil commotion, riot, rebellion, looting, insurrection, politically inspired disturbance, military or usurped power, confiscation, requisition, destruction of or theft or damage to property by or under the order of any government or public or local authority.
   (b) Combinations, industrial action, lockouts, general partial stoppage or restraint of labour from whatever cause or official or unofficial strikes of any persons in the Company's employment or in the employment of others.

8. The Company shall not be liable for any consequential loss or loss of profits, directly or indirectly caused by or contributed to or arising from its failure to perform or its defective or delayed performance of any services which it undertakes to perform (including but not in any way limited to delay arising in whole or in part from combinations, industrial action, lockouts or official or unofficial strikes of any persons in the Company's employment or in the employment of others) and whether or not resulting from its act default or negligence or that of its servants, agents or subcontractors or of others for whom it may be responsible.

9. The Company shall be entitled to arrange for the performance of or any part of the contracted services by subcontractors who shall be under no liability whatsoever to the Client in respect of the goods in addition to or separately from that of the Company.

It should be noted that this system can be modified to suit different types of operations. Approval of quotation is given either directly at the repair site, or is confirmed by telex from the main office.

Obviously, certain types of repairs, i.e, roof bow replacement, small steel patches, etc., have been carried out many times and the prices (man/hours and material costs) determined. These are known as tariff costs, and each main customer should have cost sheets on which they appear. Therefore, it should be normal practice for such repairs to be carried out immediately, without waiting for approval.

Authorization can also be made through a pre-arranged agreement with the customer, i.e.:

- Automatic approval to proceed with a pre-set cash limit;
- Agreed price tariffs;
- Routine reporting system;
- Invoices presented individually or in groups.

5. Documentation

Both unit types employ essentially the same documentation as the base workshop including:

- Quotation form (as previously described);
- Mobile work card (see figures 6 and 7);
- Daily time sheet (see figure 8).
- In the case of the mobile, a vehicle log sheet (U.K. legal requirement) to record mileage covered, fuel used, maintenance services performed and replacement items fitted, i.e., new tyres, exhausts, etc.

This paperwork is a minimum and is designed to keep records for audits, payments and invoicing.

6. Back-up facility

In the U.K., mobile and moveable units are sometimes provided as an additional service to a base workshop (as is the case with REPCON) and sometimes as a private enterprise venture by individuals. In both cases, the supply of parts and equipment is not a problem. Many sources of materials and pressings are available within easy reach. (It should be emphasized that this appertains to the U.K.).

It is not absolutely necessary to have a base workshop capable of fabricating spare parts, but lack of one can make it very difficult to operate and control repair units. As an alternative, customers might hold stocks of spare parts, or spares might be purchased (from abroad if necessary) but with a consequent effect on inventory levels and repair times. In these circumstances, the acceptance by the customers of the costs charged would determine the economic viability.

7. Problems

Various problems are encountered when operating mobile and moveable repair facilities. The main problem areas affecting their profitability are as follows:

Figure 6

repcon [UK] Ltd.

MOBILE WORK CARD

Branch No 57 Job No 150125

Owner A.C.E. Container/ ~~Trailer No~~ ACEU 1605526

Customer to be Invoiced A.C.E. Date Started 7.12.81

Address 148 NEW STRAND Date Completed

BOOTLE, LIVERPOOL Customer Order/ Authorization 6485

Material Used			Cost Price		Selling Price	
Repcon No	Description	Quantity				
	BEARER	1	9	00	12	00
	5" x 2" x 10 SWG ANGLE	12"	1	13	1	50
	CORNER POST	1	33	75	45	00
	8' x 4' CORRUGATED PANEL	1	24	00	32	00
	PAINT	3 Litres	5	66	7	55
		TOTAL			98	05

Form No P/119 Signed Foreman/Chargehand

Figure 6 (conc.)

JOB DESCRIPTION

RENEW N°4 PANEL R/H SIDE
FIT 12" INSERT TO FRONT SILL
RENEW R/H FRONT CORNER POST
RENEW N°4 FLOOR BEARER
PAINT WORKED AND NEW PARTS

D. SPEED 4 HRS. 7.12.81

Comments :–

Figure 7

repcon[UK] Ltd.

MOBILE WORK CARD

Branch No 57

Job No 150126

Owner B·H·L·R

Container/ ~~Trailer No~~ BSLU 3010323

Customer to be Invoiced B·H·L·R

Date Started 7·12·81

Address CHURCH ST

Date Completed 8·12·81

LIVERPOOL L20 8NP

Customer Order/ Authorization B·H·L·R 6974

Material Used			Cost Price		Selling Price	
Repcon No	Description	Quantity				
1496	BEARERS	5	37	50	50	00
2845	UNDERSEAL	2 litre	1	88	2	50
1996	WELDING ROD 3·5mm	100	3	75	5	00
		TOTAL	43	13	57	50

Form No P/119

Signed _____ Foreman/Chargehand

Figure 7 (conc.)

JOB DESCRIPTION

RENEW N° 4, 6, 8, 10 & 11 BEARERS
FAIR AND STRAIGHTEN L/H. BOTTOM RAIL
REFASTEN FLOOR

D. SPEED 4 HRS 7.12.81

Comments :—

Figure 8

REPCON (UK) LIMITED

Branch No. 57

DAILY WORK SHEET

Day MONDAY

Date 7-12-81

Name D. SPEED

Works No. 369

Job No. (if any)	Equipment No.	Location No.	CAT.	Hours		
				Basic	Overtime	
150125	ACEU 1605526			4		
150126	BSLU 3010323			4		
			TOTAL	8		

* Enter 'T' if Trainer

Authorised Signature .....

Form No P1 (1) Dec 74)
R.2.

x 1½ x 2

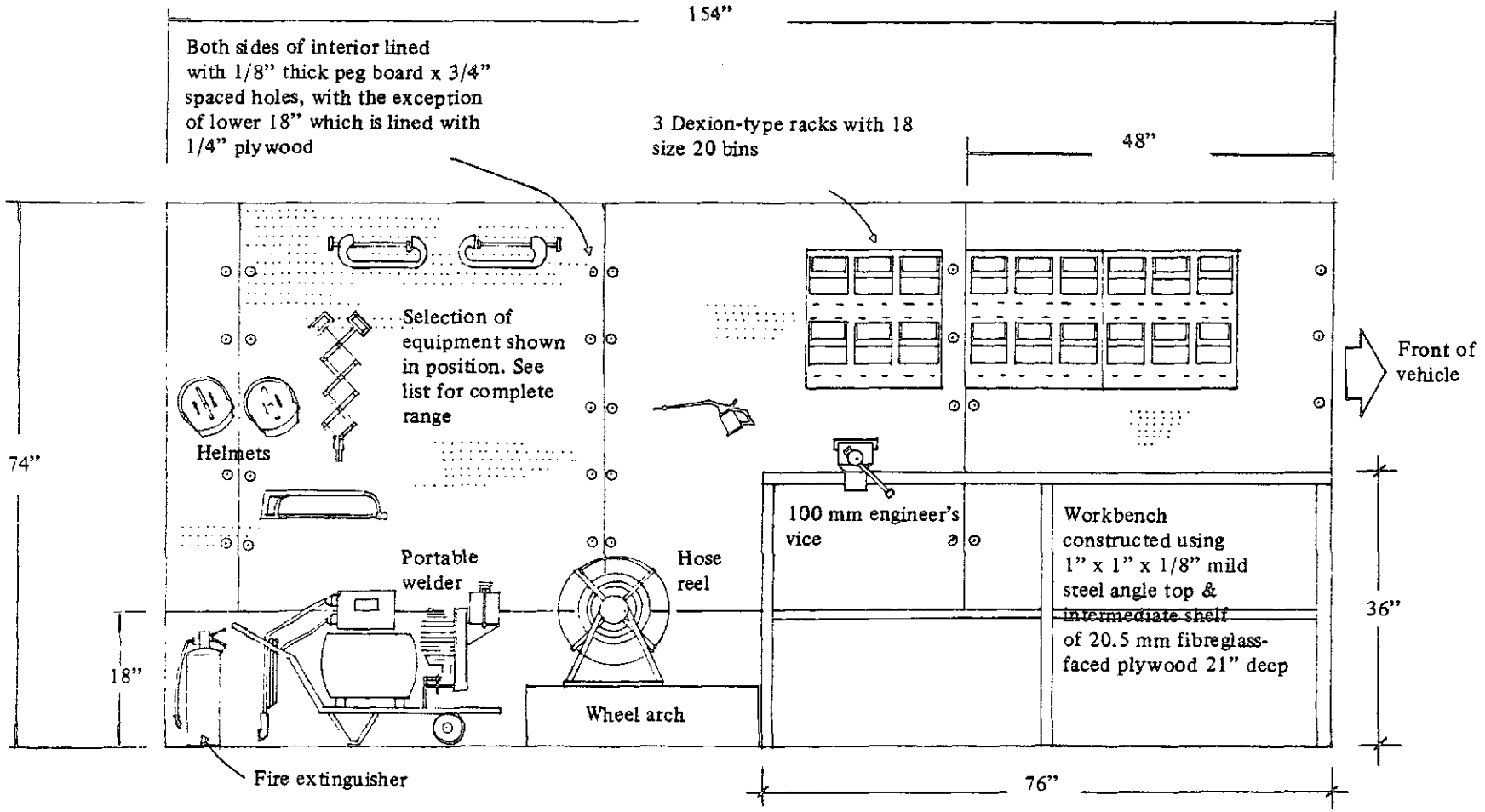
(a) Lack of or excess volume, i.e., fluctuating work load. This situation, on the one hand, causes loss of profitability and idle time and, on the other, dissatisfaction of the customer in not having his containers returned to service quickly enough.
(b) Equipment reliability. Repairs may not be completed on time due to failure of, for example, a welding plant or air compressor. Therefore, maintenance of all items of equipment, including the vehicle, for mobiles is imperative.
(c) Parts availability. It must be possible to obtain the correct spares promptly, in order to complete repairs on time to the customer's satisfaction.
(d) Suitable personnel with adequate skills. It is important to have a reliable, conscientious and skilled work force employed in these units.
(e) Price levels. Charges must be structured to give a fair return on capital investment.
(f) Weather conditions. In the U.K., bad weather in the winter months can cause disruptions to repairs. Obviously, rain makes any form of welding or painting impractical unless some cover is provided.

VI. CONCLUSION

In conclusion, this presentation has endeavoured to cover a brief history of the units' emergence as a viable repair service and show that, given an adequate work volume, they can provide a good profit margin while offering a first-class repair service to the customer.

Figure 9

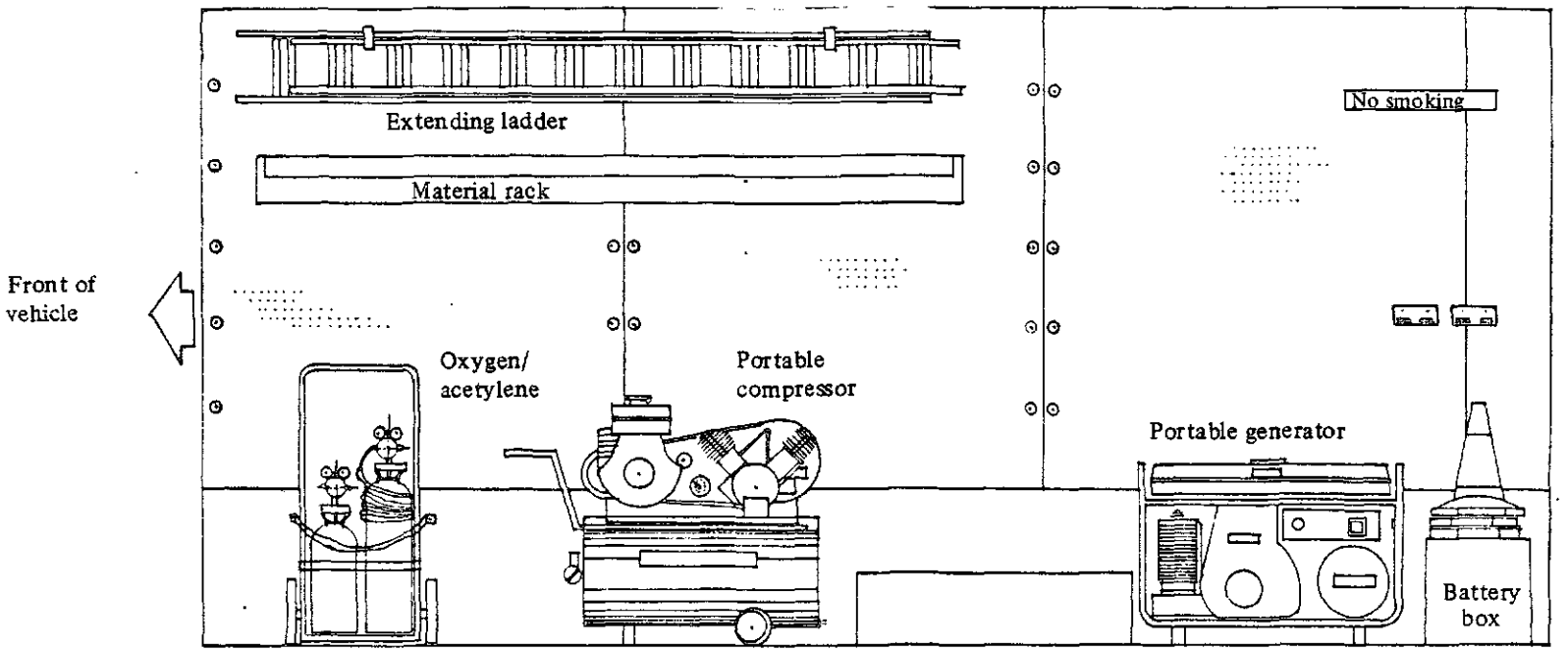
MOBILE CONTAINER REPAIR UNIT



Left hand side of vehicle

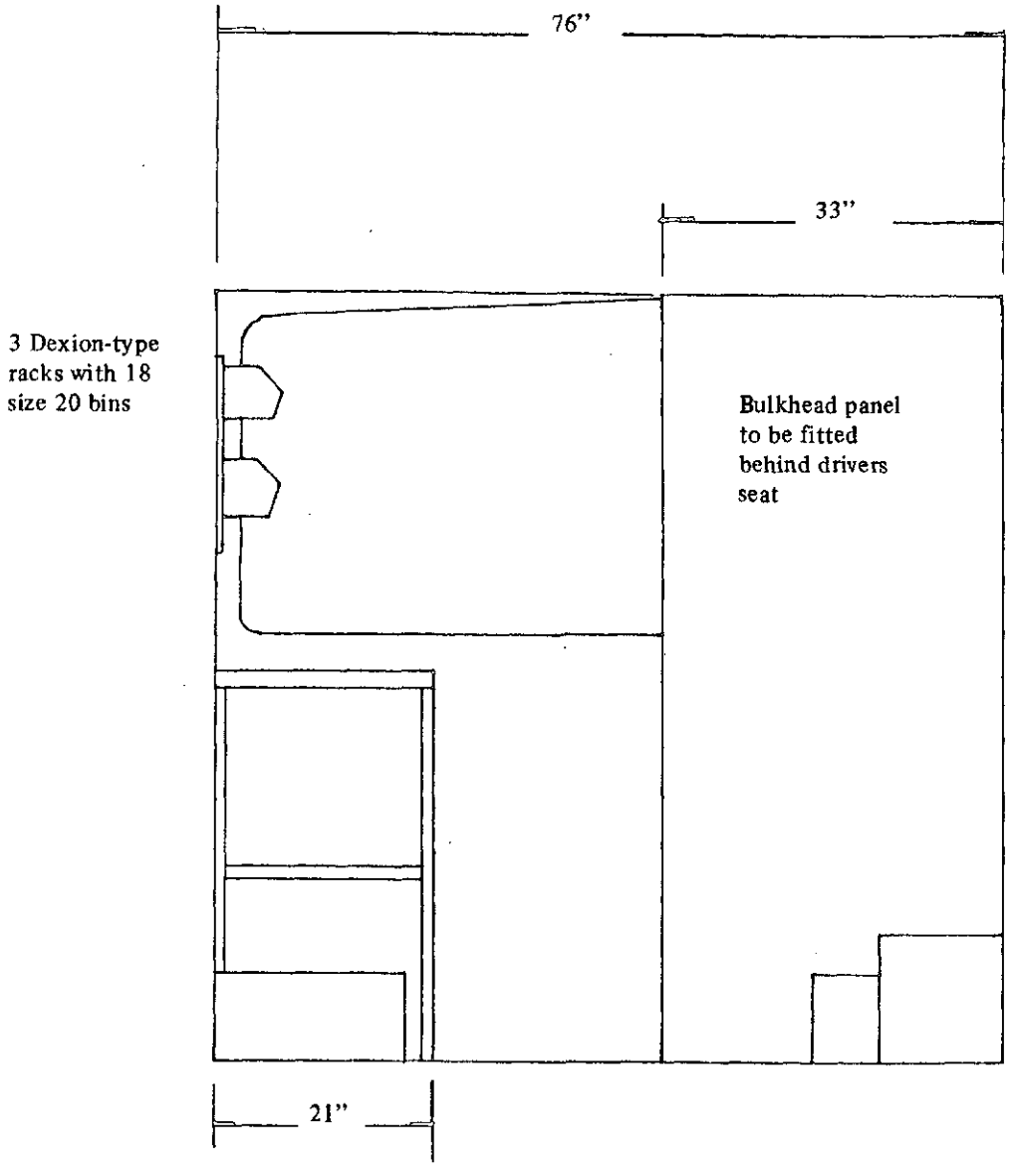
Source: REPCON (UK) Ltd.

Figure 9 (cont.)



Right hand side of vehicle

Figure 9 (cont.)

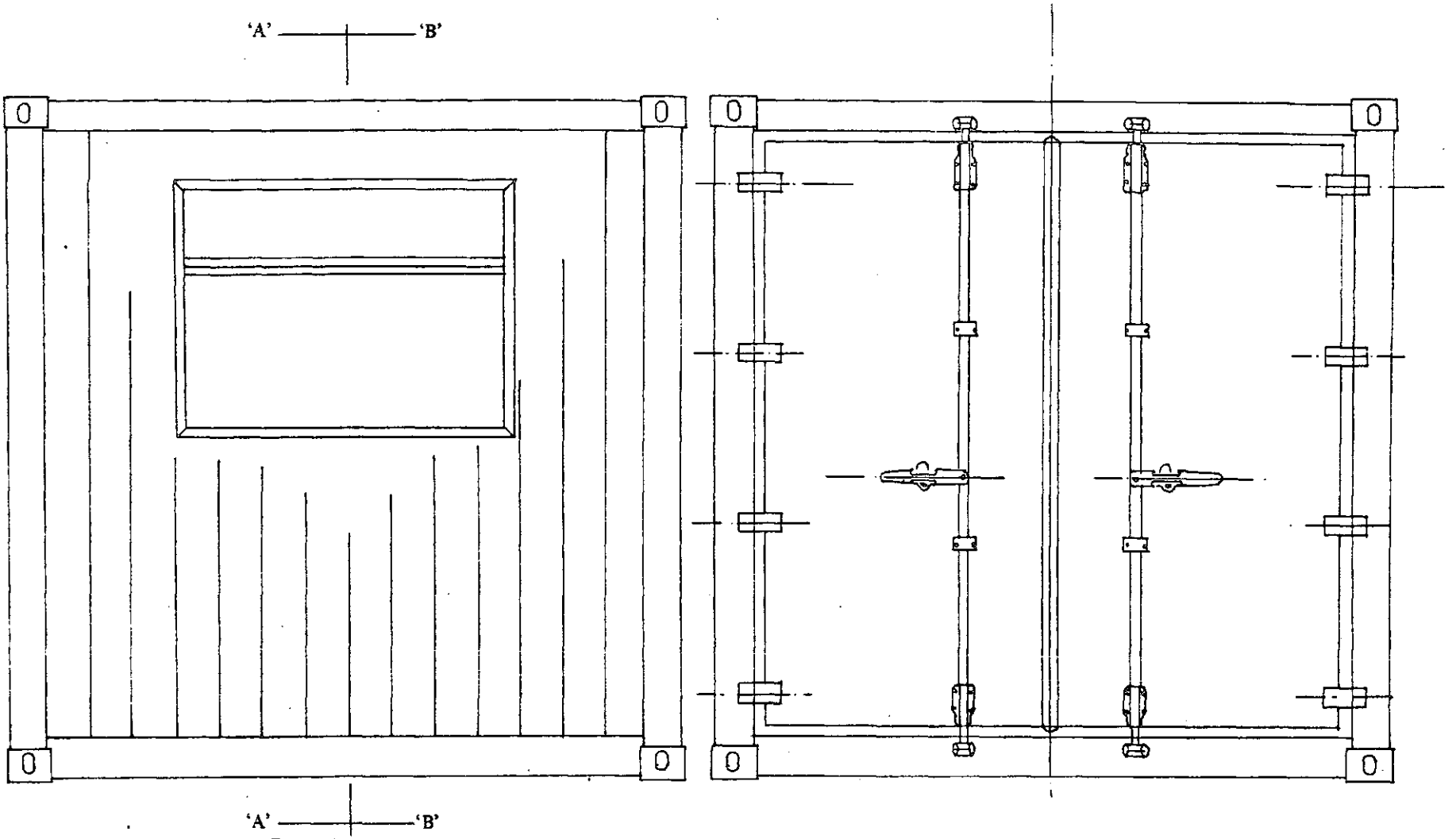


Rear view

Notes: Stowage lockers, roof-bow racks and paint lockers fitted as required.
Electrical equipment: Primary source comes from generator wired through heavy-duty cable to a bank of 4 wall sockets as shown.
A yellow beacon is fitted to roof and wired through to vehicle dash.
In addition, 2 interior lights (fluorescent fittings) are located over the work bench and wired into vehicle electric circuit.

Figure 10

20-FOOT MOVEABLE CONTAINER REPAIR UNIT

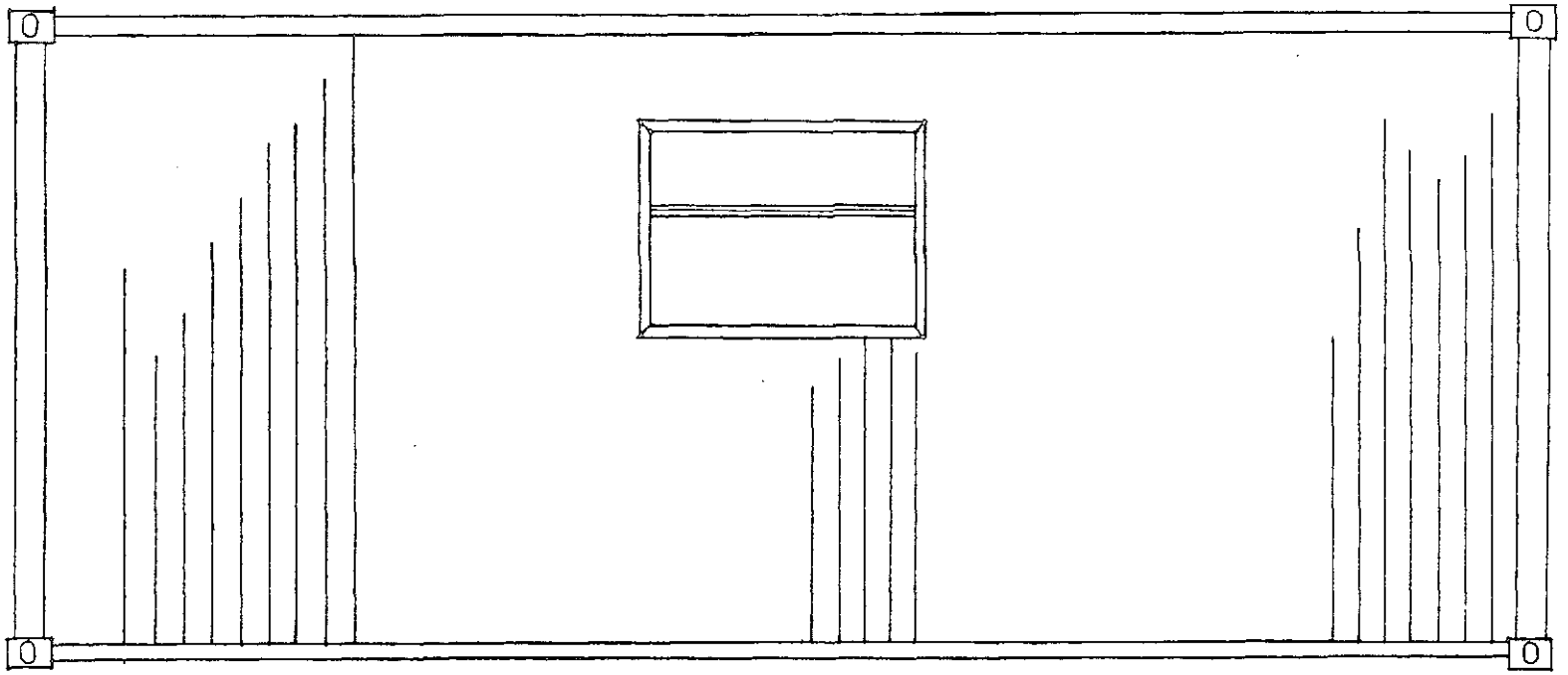


Front elevation

Rear elevation

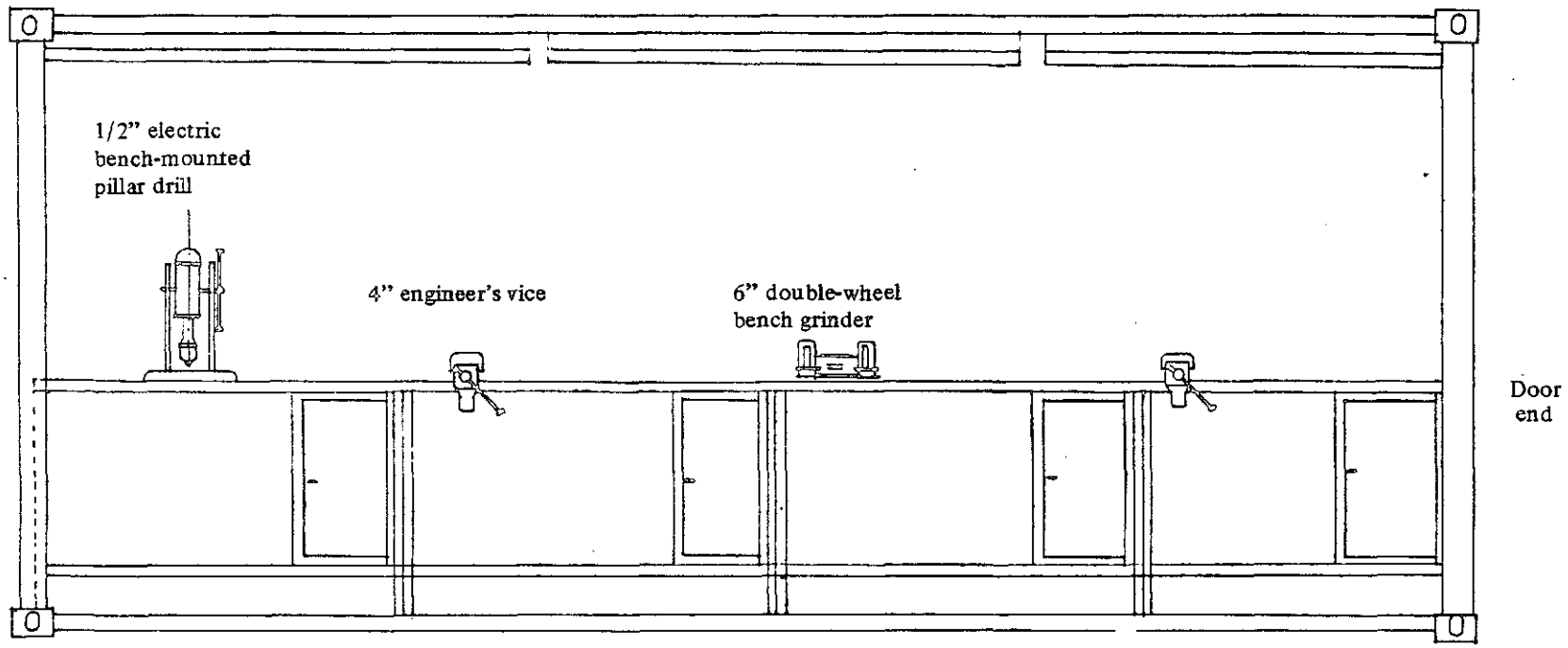
Source: REPCON (UK) Ltd.

Figure 10 (cont.)



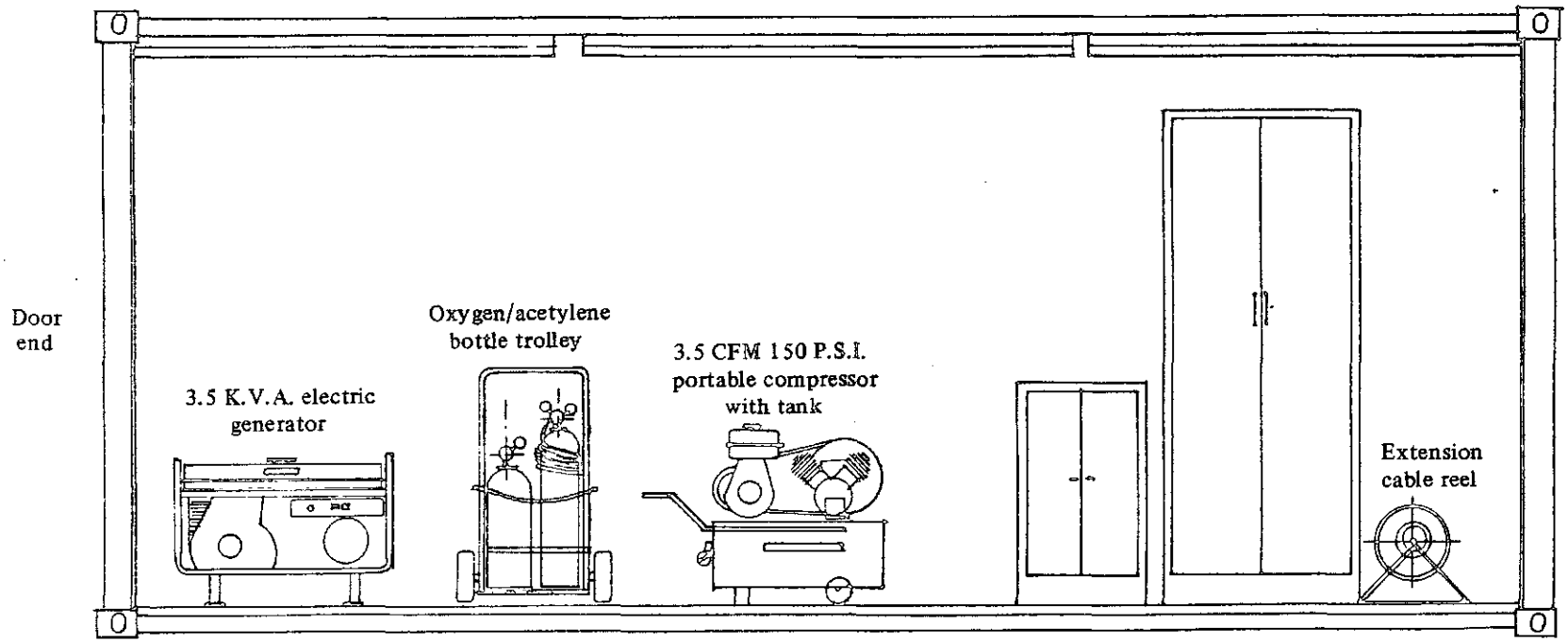
Side elevation

Figure 10 (cont.)



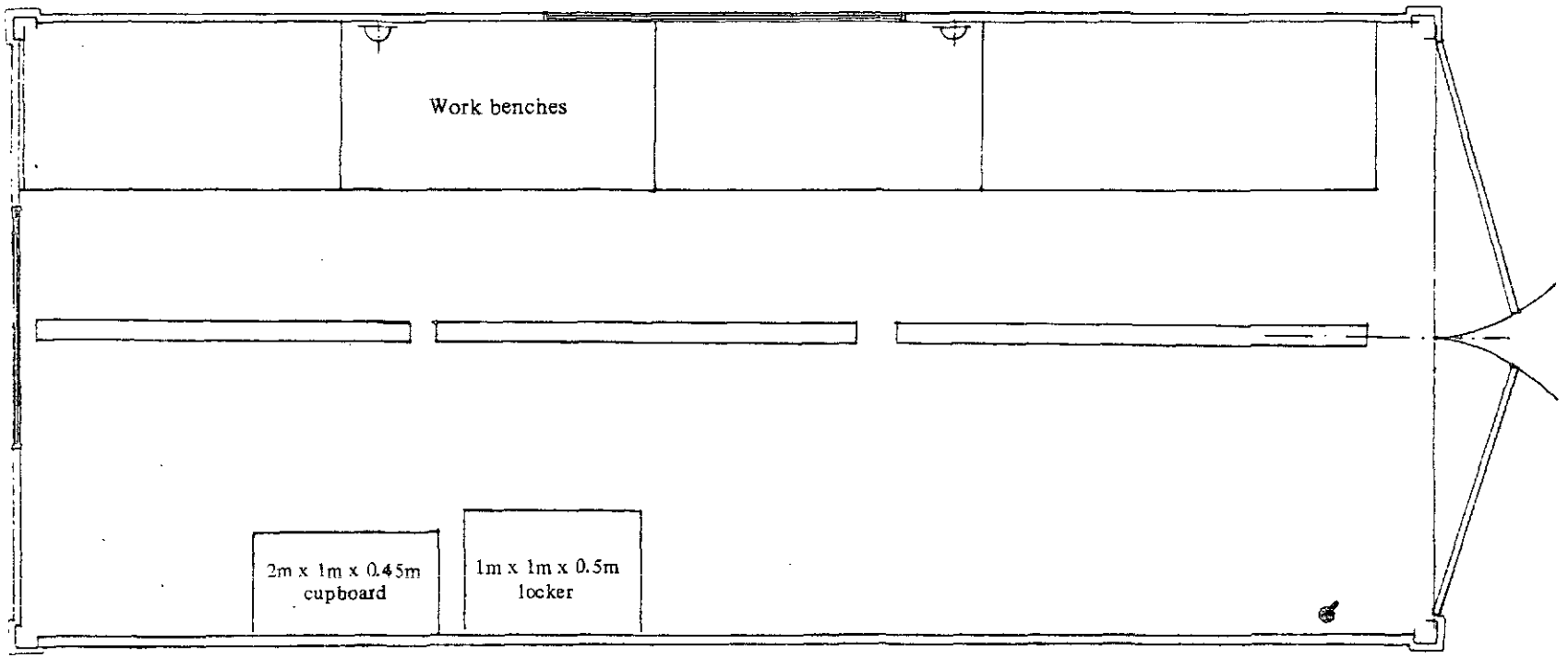
Section 'A' – 'A'

Figure 10 (cont.)



Section 'B' – 'B'

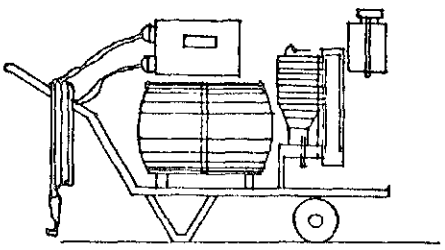
Figure 10 (cont.)



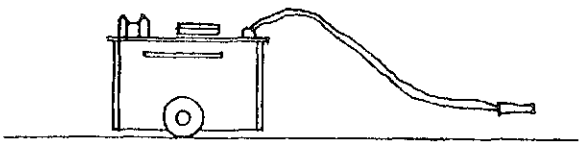
Plan

Figure 10 (cont.)

Additional equipment not shown in container



220 amp. inert-gas welding set



Oxford stick welding set

Key:

13 amp. twin socket outlets

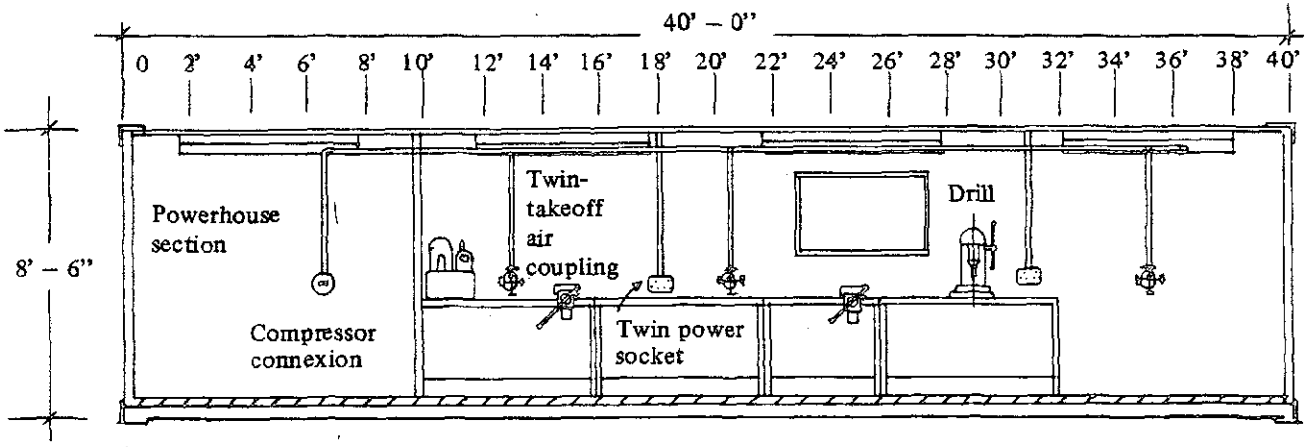
Light switch

Fluorescent light fitting

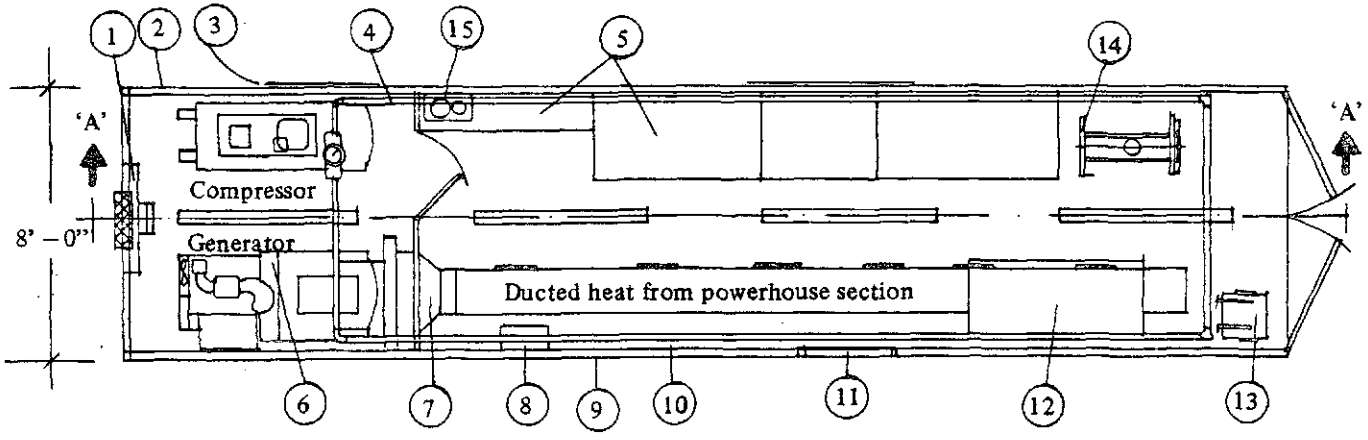
Note: Installed in a standard 20-foot freight container

Figure 11

40-FOOT MOVEABLE CONTAINER REPAIR UNIT (with powerhouse)



Section 'A' – 'A'



Plan

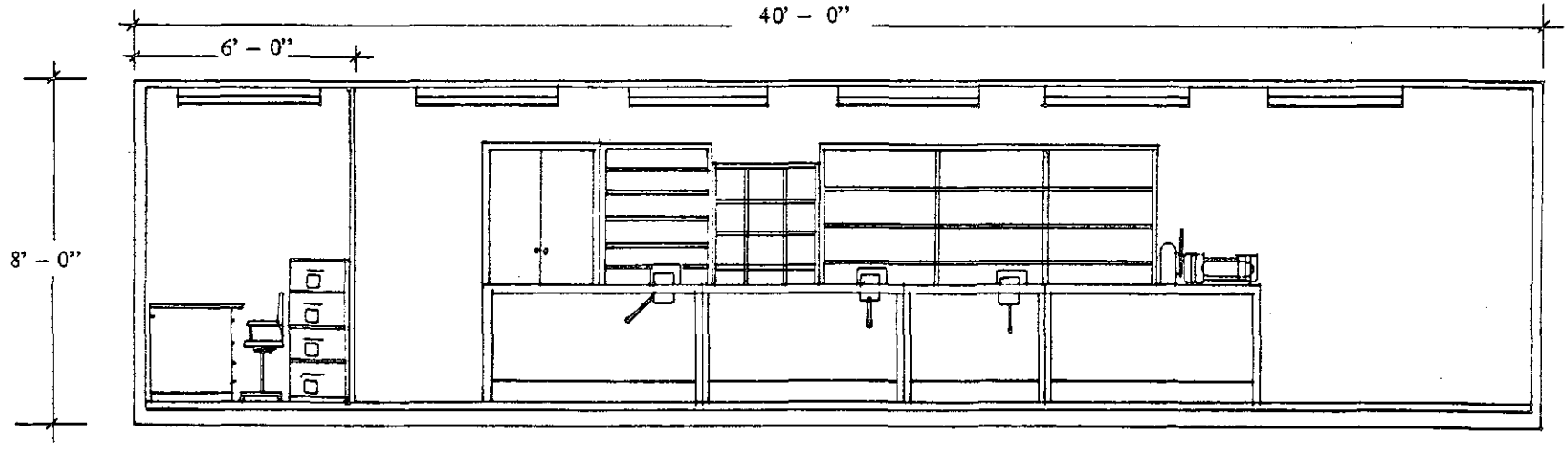
Nº	PART	Quan.
15	Fuel injector test rig	1
14	Hydraulic press	1
13	Welding rectifier	1
12	Folding machine	1
11	Double-skin transparent perspex	2
10	Electrical trunking	1
9	6' fluorescent lights	4
8	Electrical distribution board	1
7	Extractor and filter	1
6	Power generator	1
5	Fitters benches	4
4	Air ring main	1
3	Bolt-on hatch cover	2
2	Air compressor	1
1	Ventilation intake fan	1

WORKSHOP COMPONENT LIST

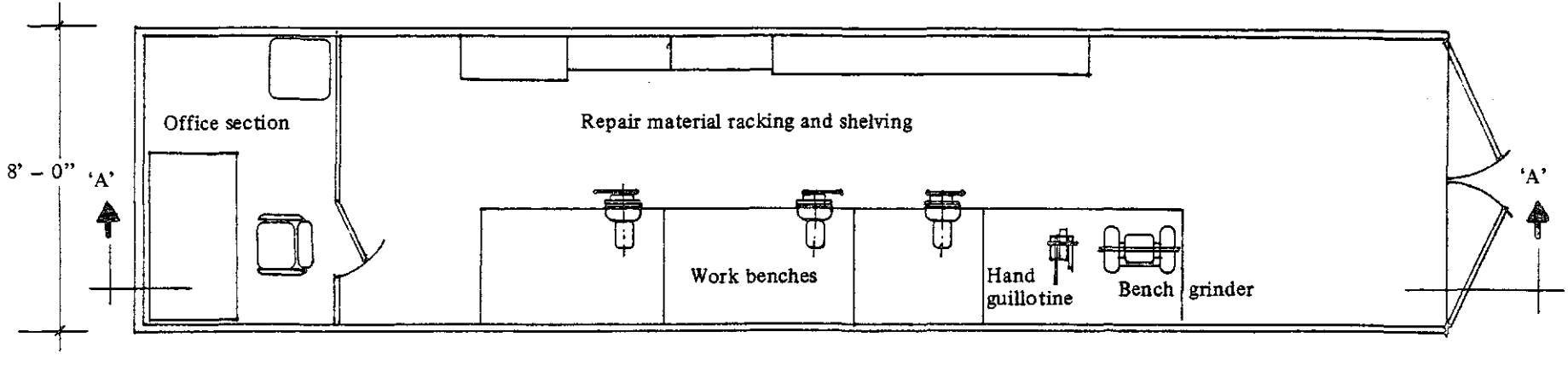
Note: Installed in a standard 40-foot freight container
Source: REPCON (UK) Ltd.

Figure 12

40-FOOT MOVEABLE CONTAINER REPAIR UNIT (with office)



Section 'A' – 'A'



Plan

Note: Installed in a standard 40-foot freight container
Source: REPCON (UK) Ltd.

Presentation 7

MODULES FOR THE ESTABLISHMENT OF CONTAINER REPAIR ENTERPRISES 1/

As the demand for container repair and maintenance services is expanding all over the world, port authorities, carriers, major exporters and others are giving serious consideration to the establishment of enterprises for this purpose. To properly evaluate the feasibility of establishing such enterprises, one must carefully match the service demand -i.e., type, quality and speed- with an appropriate level of investment in order to assure a profitable operation.

Bearing in mind that the establishment of such enterprises will occur in places where the climate, the availability of various factors of production, and the type of manpower are completely different, it was considered necessary to design an initial container repair and maintenance shop as a nucleus or matrix which might be expanded according to demand. As a result, it was decided that the most useful, simple and economic way to enter this new and growing industry would be to create a standard module for a self-supporting repair operation. This module, basic in design, can be utilized by any country or region with, obviously, adaptations for differences in the kind and availability of construction materials and facilities encountered locally for the fabrication of door, windows, roofing, etc. Further, this module was designed as a complete and movable unit so that it might be located and later relocated in response to changes in service demand patterns.

The principal idea behind the design of container repair modules was to combine in one place those factors -plant, equipment, spare parts and personnel skills- needed to start a sound operation and penetrate a certain market. Initially, it was decided that two modules would be designed, with throughputs of 30 and 100 TEU repaired per month, respectively and all required installations, personnel skills, tools and spare parts for an operating period of 45 days. According to our experience and as a practical rule, installations based upon these modules and operated by experienced management personnel can offer quality repair services without major difficulties.

If the demand for repair services increases, thereby calling for the expansion of shop facilities, these modules can be utilized as a reference point which can be enlarged depending on the extent of such demand. For example, if more space is needed for spare parts or offices or sanitary facilities, additional containers can be easily joined, horizontally or vertically as desired, to the existing installations. However, it must be emphasized that to increase the repair throughput from 30 to 90 TEU/month does not mean that we have to triple the original module. While some items of the module would have to be increased more than others or in different proportions, such as personnel, the basic module has sufficient flexibility for intensive utilization, at least in the short term. Nonetheless, for certain items it would be imperative to increase capacity to meet the additional demand. These items might include the hiring of additional mechanics or welders and the purchase of more tools. The shop owner should therefore carefully evaluate the additional demand for container repair services and expand those items of the module which are needed to meet that demand.

1/ Prepared by Container Comércio e Indústria S.A., Rio de Janeiro, Brazil.

As can be seen in figure 1, five to seven used containers which have been repaired and modified by shop personnel are employed to create the needed storage, sanitary and office space. It should be understood that these modules represent initial self-supporting shops which were designed with reference to prudent financial and economic standards. For this reason, only open areas for container repair operations were considered. Tables 1 and 2 list the equipment, tools, personnel and installations necessary for the two modules.

When choosing a site for a workshop module, it is important to consider the availability of the following essential public services: water supply, electricity, sewage, trash collection, telephone, telex and transportation. Consideration must also be given to site preparation, including requirements for leveling, compacting, paving and drainage. These factors in turn are related to the type of equipment -forklift trucks, cranes, etc.- that will be used for handling empty containers in the shop yard.

Table 1

OUTDOOR WORKSHOP MODULE FOR REPAIR OF 30 TEU CONTAINERS PER MONTH

WELDING EQUIPMENT

Arc welding

One set. Approximate value - US$ 2 310

Oxyacetylene welding and cutting

One set, consisting of:
1 Cylinder acetylene
2 Cylinders oxygen
1 Cylinder dolly
Related equipment
Approximate value - US$ 2 500

TOOLS

1 Spring pickaxe
1 Steel wire brush
1 Hammer
1 Mallet
2 Chisels
1 Hand bending machine, 2.50 m long
1 Electric drill, 1/2"
2 Electric grinders
1 Jigsaw
1 Hacksaw
1 Cold chisel
1 "Pop" riveter
1 5-ton hydraulic jack
4 Sawhorses, 1.70 m
4 Sawhorses, 1.20 m
2 Wooden ladders, long
2 Wooden ladders, short
1 Air compressor
2 Spray guns for paint
1 Applicator for caulking compound
1 Putty knife
1 Screwdriver set
1 Spanner set
1 Universal pliers
1 Blind-rivet finder
5 Arc welding safety goggles
5 Arc welding masks
5 Scrape aprons and gloves

5 Safety helments
5 Earmuffs
1 Vise
3 Brooms, hoses and spouts for floor cleaning
3 Tool chests for welders, each containing:
- Hammer
- Spring pickaxe
- Universal pliers
- Cutting pliers
- Screwdriver
- Pipe wrench
- Spanner
- Steel wire brush

2 Tool chests for helpers, each containing:
- Mallet
- Hammer
- Chisel
- Spring pickaxe
- Tape measure
- Lighter
- Steel wire brush
- Needle kit for cleaning purposes
- Chalk
- Putty knife
- Punch
- Set square
- Scriber

Approximate total value - US$ 6 405

MATERIALS (Supply for approximately 30 to 45 days)

Bolts with nuts and washers

150 3/8" x 2"
150 3/8" x 1 1/2"
150 5/16" x 1 1/2"
300 1/4" x 1 3/4"
500 1/4" x 2", countersunk heads

Screws, self-threading

500 3/16" x 1 5/8"
500 1/4" x 1 3/4"

"Pop" rivets

500 1/4", long
500 3/16", short
500 3/16", medium
500 3/16", long

Blind rivets

500 3/16" x 1/2", flat heads
500 1/4" x 1", button heads

Caulking compound

2 Boxes cartridges for applicators

Metal profiles

30 2.40 m x 30 mm x 50 mm x 1.5 mm
20 2.50 m x 6" x 2" x 3/16" "L" profiles
20 2.50 m x 2" x 1" x 3/16" "L" profiles
50 2.50 m x 1/4" x 2" x 2" x 5/32" "C" profiles
40 2.50 m x 5" x 2" x 2" x 5/32" "C" profiles
10 2.40 m "⌐¬" or "I" profiles for aluminium roofs

Plates

8 3.00 m x 1.22 m x No. 16, steel
3 3.00 m x 1.22 m x 1/8", steel
2 3.00 m x 1.22 m x 3/16", steel
1 2.40 m x 2 mm x available length (6 m or 10 m roll), aluminium
2 2.40 m x 1.20 m x No. 19, steel, for door panels

Marine plywood

3 3.00 m x 1.20 m x 3 mm sheets

Lumber

8 6.0 m x 30 cm x 3 cm, pine

Drill bits (high-speed steel)

10 1/8"
10 3/16"
10 7/32"
10 1/4"
5 5/16"
5 3/8"
5 1/2"

Sand paper

20 Sheets

Nails

200 Each assorted sizes

Paint (naval grade)

8 Gallons gray
10 Gallons blue
10 Gallons black underseal
50 Litres paint thinner
Approximate total value, all materials - US$ 10 100

PERSONNEL

1 Foreman
1 Welder
1 Locksmith fitter
2 Helpers
1 Clerk
Approximate total monthly cost - US$ 1 950

Work clothes

Trousers, shirts and boots for all personnel
Approximate total value - US$ 340

STRUCTURES

5 Used containers, repaired, for office, warehouse, depot, dining hall and dressing unit. Total cost - US$ 4 500
Water and sanitary installations. Estimated cost - US$ 2 400
Electrical installations. Estimated cost - US$ 1 500
(Note that costs of furniture, air conditioning, windows, doors, stairs, supports, etc., are not included, nor are rental charges for the property on which the workshop module is set up.)

Table 2

OUTDOOR WORKSHOP MODULE FOR REPAIR OF 100 TEU CONTAINERS PER MONTH

WELDING EQUIPMENT

Inert-gas welding (MIG)

One set, consisting of:
1 Power source
1 Wire feeder
1 MIG torch
1 Pressure regulator for carbonic acid gas
1 Pressure regulator for argon
1 Feeder roller
1 Outlet guide spout
1 Guide insert
1 Conduit
1 Supporting conduit
1 Gas hose
1 Pressure roller
20 Contact tubes for aluminium
10 Contact tubes for steel
1 Internal conduit
1 Cylinder carrying device, 45 kg MIG 0.80 m
Wire for steel
1 Cylinder carrying device, 15 kg MIG 0.76 m wire for aluminium
4 Cylinders oxygen
4 Cylinders acetylene
Approximate total value - US$ 6 540

Arc welding

Five sets, each consisting of:
Portable coil transformer, cables, ground clamps and electrode holders
Approximate total value - US$ 11 300

Oxyacetylene welding and cutting

Four sets, each consisting of:
1 Cylinder acetylene
2 Cylinders oxygen
Welding torches
Cutting torches
Extension for welding
Cylinder dolly
Green hose for oxygen
Red hose for acetylene
Pressure regulator for oxygen

Pressure regulator for acetylene
Retention valves for oxygen and for acetylene
Needle kit for cleaning purposes
Lighter
Hoop
Approximate total value - US$ 9 620

TOOLS

Basic

3 Electric drills, 1/2"
3 Jigsaws
4 Electric grinders, with discs
3 Hand riveters for "Pop" rivets
1 Air compressor, 1/2 HP
4 Spray guns for paint
1 Electric screwdriver
1 Electric shears
3 5-ton hydraulic jacks
1 10-ton gear jack
2 Riveting tools for blind rivets
1 Hand bending machine, 2.50 m long
5 Tool chests for welders, each containing:
- Hammer
- Spring pickaxe
- Universal pliers
- Cutting pliers
- Screw driver
- Pipe wrench
- Spanner
- Steel wire brush
4 Tool chests for helpers, each containing:
- Mallet
- Hammer
- Chisel
- Spring pickaxe
- Tape measure
- Lighter
- Steel wire brush
- Needle kit for cleaning purposes
- Chalk
- Putty knife
- Punch
- Set square
- Scriber
Approximate total value - US$ 10 580

Common

1 Spring pickaxe
1 Steel wire brush
1 Hammer
1 Mallet
2 Chisels
1 Hacksaw
2 Cold chisels
2 "Pop" riveters
8 Sawhorses, 1.70 m high
8 Sawhorses, 1.20 m high
8 Wooden ladders, long
4 Wooden ladders, short
3 Applicators for caulking compound
1 Putty knife
1 Set of screw drivers
1 Set of spanners
1 Universal pliers
2 Blind-rivet finders
5 Arc welding safety goggles
5 Arc welding masks
10 Scrape aprons and gloves
11 Safety helmets
10 Earmuffs
2 Vises
Approximate total value - US$ 920

MATERIALS (Supply for approximately 45 days)

Bolts with nuts and washers

300 3/8" x 2"
300 3/8" x 1 1/2"
300 5/16" x 1 1/2"
1000 1/4" x 1 3/4"
1500 1/4" x 2", countersunk heads

Screws, self-threading

2000 3/16" x 1 5/8"
2000 1/4" x 1 3/4"

"Pop" rivets

2000 1/4", long
2000 3/16", short
2000 3/16", medium
2000 3/16", long

Blind rivets

2000 1/16" x 1/2", flat heads
1000 1/4" x 1", button heads

Caulking compound

2 Boxes cartridges for applicators

Metal profiles

5 2.40 m x 30 mm x 50 mm x 1.5 mm
5 2.50 m x 6" x 2" x 3/16" "L" profiles
50 2.50 m x 2" x 1" x 3/16" "L" profiles
60 2.50 m x 4 1/2" x 2" x 2" x 5/32" "C" profiles
50 2.50 m x 5" x 2" x 2" x 5/32" "C" profiles
30 2.40 m "⊥⊤⊥" or "I" profiles for aluminium roofs
25 2.50 m x 2" x 1" x 3/16" "L" profiles for gutters, steel
2 6 m aluminium bars for gutters in aluminium containers
4 Tubes for 6 m rods, 1 1/2" diameter
10 2.40 m x 30 mm x 30 mm x 60 mm x 4 mm aluminium side columns

Plates

25 3.00 m x 1.22 m x No. 16, steel
5 3.00 m x 1.22 m x 1/8", steel
5 3.00 m x 1.22 m x 3/16", steel
2 2.40 m x 2 mm x available length(6 m or 10 m roll), aluminium
4 2.40 m x 1.20 m x No. 19, steel, for door panels

Marine plywood

6 3.00 m x 1.20 m x 3 mm sheets

Lumber

24 6.0 m x 30 cm x 3 cm, pine

Drill bits (high-speed steel)

10 1/8"
10 3/16"
10 7/32"
10 1/4"
5 5/16"
5 3/8"
5 1/2"

Nails

100 Each assorted sizes

Paint (naval grade)

16 Gallons gray
20 Gallons blue
12 Gallons black underseal
20 Gallons primer
50 Litres paint thinner
Approximate total value, all materials - US$ 2 600

PERSONNEL

1 Chief of shop
1 Foreman (also in charge of inspection and outlining)
1 Welder
4 Locksmith fitters
4 Helpers
1 Painter/helper
1 Clerk
Approximate total monthly cost - US$ 4 000

Work clothes

Trousers, shirts and boots for all personnel
Approximate total value - US$ 2 000

STRUCTURES

5 Used containers, repaired, for office, warehouse, depot, dining hall and dressing unit. Total cost - US$ 4 500
Water and sanitary installations. Estimated cost - US$ 2 400
Electrical installations. Estimated cost - US$ 1 500
(Note that costs of furniture, air conditioning, windows, doors, stairs, supports, etc., are not included, nor are rental charges for the property on which the workshop module is set up.)

Presentation 8

CONTAINER MARKINGS 1/

Introduction

The use of external markings on mobile equipment such as vehicles, containers, airplanes, construction plants, etc., has increased dramatically over the last 25 years for advertising, legal and public relations purposes. To meet this demand, a whole new industry based on pressure-sensitive films has grown up, offering high performance products. The self-adhesive film is, as a result, occupying an increasingly dominant part of the market at the expense of earlier methods such as hand-painted lettering, stencils and transfers.

Criteria for selecting a marking system

Containers encounter by far the most rigorous weather conditions of any type of transportation equipment. They may travel from areas such as Saudi Arabia, with air temperatures as high as 130°F, to areas such as Alaska, where temperatures may be as low as -50°F. Extremes in temperatures, ultraviolet rays, salt spray and moisture are the major reasons for aging and deterioration of both coatings and markings on sea containers. For this reason we have researched many inks and base materials through the past 18 years to determine which of these materials would be most successful.

In selection of a marking system, the buyer should consult with his technical people to establish a realistic life cycle for the container between refurbishments. It is important to note that the development of CORTEN steel and new and improved exterior coating systems have greatly extended the refurbishing cycle. Most buyers today hope to achieve a seven-year cycle for refurbishing steel containers. It is of the utmost importance that the marking system chosen should perform for that period as a minimum without serious discoloration, and that it should not craze, crack, peel or delaminate within the warranted period. Not only are the markings on a container extremely important for the identification of the unit, but also for ensuring respect of the load capacity and for safety in handling. The next important area of consideration for the buyer should be the surface to which the marking will be applied. The marking supplier should be completely familiar with the various coating systems used on steel containers, and should have tested them to assure that they are compatible with his films and adhesives. Selecto-Flsh conducts such tests worldwide on the products of paint and coating manufacturers of all countries. Our knowledge has been extremely helpful to many container manufacturers, as we have helped to alleviate problems which are not necessarily connected with the markings themselves, but rather with the proper drying of the coating during cold and hot weather. Many coating systems contain exotic solvents and additives such as plasticizers which could have an effect on the marking system in the long term.

Next, the marking supplier should be able to direct the buyer as to the best adhesive systems to use on steel, aluminium, fiber-glass, and other materials which are currently being tested. It is also important to note that containers which have never been refurbished generally have a smoother surface than those that have been sandblasted during refurbishment. The rougher surface on the latter creates a need for a flow-type adhesive to fill in the hills and valleys left by the blasting.

1/ Prepared by Selecto-Flash Inc., West Orange, New Jersey, U.S.A.

It is also important that the marking supplier be familiar with the plant conditions under which the marking is to be applied. As an example, many container factories in the colder regions of the world operate at low ambient temperatures. Some factories have inside air temperatures close to 0°C, and this creates potential problems in the preparation of the steel for priming and coating and also affects the application of the markings. In this case the supplier should provide a cold weather-type adhesive. In warmer climates, where the inside temperature of a container factory may be considerably higher, the marking supplier should recommend a type of adhesive especially adapted to such conditions.

The marking supplier should offer a minimum warranty period on his product that coincides with the refurbishing cycle of the container buyer. If for any reason the markings should fail during this period, the supplier should be expected to determine the cause of the failure and recommend a satisfactory solution so that markings are replaced without cost to the container owner. If it is determined that they failed due to normal exposure to temperature extremes and salt spray, it should be the responsibility of the supplier to replace them at no cost to the buyer. However, it should be noted that imbalance in coating additives, improper drying of coatings at the time of manufacture, and improper application are in almost all cases the reason for marking failures. In this case, the container manufacturer should be responsible to the buyer.

Types of markings

Container markings may be classified as follows:

(a) Transfers, and

(b) Pressure-sensitive films.

(a) Transfers are a type of marking which consists of a film of paint and/or ink carried on a paper backing or carrier from which it is separated by a water-soluble solution. The sheet is generally soaked in water or a solvent which activates the release agent and separates the transfer from the paper carrier. The marking is usually slid off the paper carrier onto the container surface and an adhesive system activated by the same water and/or solvent cures and anchors the paint or ink transfer on that surface.

(b) Pressure sensitive markings are a self-adhesive film of plastic. The most commonly used plastic, vinyl, has a pressure-sensitive adhesive which is protected by backing paper. To apply this type of marking no water or solvent is required. One simply removes the backing paper, affixes the marking to the container surface and smooths out the marking by use of a plastic squeegee.

Production methods

The method of producing both transfers and pressure-sensitive markings is silk screen printing. Silk screening enables the manufacturer to deposit a heavy layer of ink or paint onto the marking substrate to achieve durability on exterior surfaces. Any other printing method leaves a very thin layer of ink which rapidly deteriorates when exposed to the weather.

In the case of transfers, the marking release agent and adhesive are screened onto the paper substrate. Normally, it is necessary to screen a white coating underneath darker pigments as white reflects light rather than absorbs it. The use of darker pigments will lead to the rapid deterioration of the marking when exposed to the weather. After the colours are screened, a final clear coat is put over the

transfer and the marking is ready for application. On the other hand, pressure-sensitive decals utilize a base material or plastic which is normally white and/or clear. As a result, the desired colours are simply screened onto the substrate and a final clear protection coat is added to assure durability of exterior surfaces.

Advantages and disadvantages of transfer markings

The only relative advantage of a transfer is the fact that irregular design shapes can be silk screened onto the transfer substrate of the paper carrier. Use of a die for cutting this irregular shape is not necessary. However, the disadvantages are quite numerous:

1. A transfer is extremely difficult to apply to any surface.
2. Application of a transfer in cold weather is virtually impossible unless a solvent similar to anti-freeze is used to prevent freezing.
3. The use of a solvent and/or water as a release agent requires a long drying cycle. Normally, overnight drying is required.
4. The durability of the transfer is not as good as that of a pressure-sensitive system. The durability of transfers is normally 3-5 years at the most, and they will not last any longer than a relatively inexpensive paint system.

Advantages and disadvantages of pressure-sensitive markings

The only disadvantage of the pressure-sensitive system is that its cost is slightly higher than that of a transfer. This cost difference is easily overcome, however, when we consider all the major advantages.

1. A pressure-sensitive marking can be applied in cooler weather with the assistance of some external form of heat such as a heat gun and/or by activating the adhesive with alcohol, which makes it a little stickier in cold weather.
2. The pressure-sensitive vinyl can be applied over irregular surfaces, including corrugations, rivets and weld seams. This system conforms easily to irregular surfaces whereas a transfer would have to be cut around the irregular surface and paint applied to make up for the void areas.

A pressure-sensitive marking manufactured from quality inks and clearcoated for protection has an average durability of 7-9 years. Nonetheless, many Selecto-Flash markings have been in service for over 12 years with some of the major container leasing and shipping companies.

The overnight drying required for transfers is completely unnecessary with pressure-sensitive markings. Once the marking is applied to the substrate it is permanently affixed. There is a cure period of approximately 72 hours in which the adhesive bond builds up to about a 6-6 1/2 pound peel strength. This cure period is considered necessary in order to permit applicators to reposition markings, if necessary. The initial contact strength of the marking is normally about 3 pounds, which is considered sufficient for a permanent anchorage to the container surface, but this does give the applicator the opportunity to reposition if necessary.

The relative ease with which a pressure-sensitive marking can be applied is a very favourable point compared with water or solvent-based transfers. It has been noted by some container manufacturers who utilize transfers that the waste factor, at the time of application, is 5-10% whereas in the case of pressure-sensitive markings the waste factor is only 0-1/2%. This is primarily due to the fact that pressure-sensitive markings can be removed and repositioned during the application procedure whereas once a water or solvent-activated marking is put into place, it is extremely difficult to effect such removal without puncturing the thin film of paint and/or ink, thereby rendering the transfer useless. As a result, transfers create many problems for the applicator and there has to be a supply of spares on hand.

Application

The application of both pressure-sensitive markings and solvent or water-based transfers requires the same surface preparation. It is imperative that the surface upon which the marking is to be applied should be clean and free of oil, grease, or any other contaminates. It should be understood that in the production of steel containers, paint overspray, which is often present in the air, settles on the sides and roof of a container and must be removed prior to application of either type of marking. The principal requirement for the application of markings is cleanliness.

The application of pressure-sensitive markings requires very little training and skill. However, it should be noted that different shapes and sizes of markings normally require different skills. It is for this reason that from time to time we find it necessary to give some guidance and assistance to applicators at the various container plants throughout the world. Another reason for visiting container plants is that the turn-over of labour sometimes necessitates the training of new people. However, training for the application of pressure-sensitive adhesive markings is normally done through a technical bulletin issued by the manufacturer.

By way of comparison, the application of transfers requires skills which can only be obtained through constant practice. From our experience we have noted that the only people who are consistently successful in applying transfers are the Japanese. As a marking system in a factory which has a normal labour turn-over rate, transfers may be very impractical.

It is worth noting that certain container shipping companies previously used another marking system. This was the rigid sign system, which normally utilized aluminium signs. This system is highly impractical, however, as maintenance costs are extremely high since the rigid system is very prone to puncture and damage in dock areas, particularly when a container is being handled on and off the ship.

Temperature

The temperature at which markings should be applied vary for pressure-sensitive adhesives. Some of the adhesives manufactured by companies such as 3M require a minimum application temperature of 60°F, while others, such as MACtac adhesives, are warranted at 40°F, and MACtac films can even be applied at temperatures as low as 32°F. Nonetheless, it should be understood that below

32°F ice crystals are always present in the pores of the steel and/or aluminium. In applying decals at 32°F or slightly below, it is suggested that the surface first be wiped down with alcohol to eliminate these ice crystals. Immediately the alcohol has evaporated, the surface is ready for application.

Film composition

In the manufacture of vinyl films a number of chemical ingredients must be blended together to achieve the desired properties. It is this blend of different types and amounts of chemicals that imparts such useful characteristics as flexibility, conformability and strength to the film.

PVC resin is the basis or backbone of the film, but additional chemicals must be added to the resin to produce a film with the desired properties. Most vinyl films contain such materials as stabilizers for protection against degradation from heat, light and other chemicals. Processing aids or lubricants may also be used to assist in the manufacturing process. Filler and extender pigments provide opacity and help reduce the total cost of the product. Various colour additives may be used to achieve the wide variety of colours currently avaialable.

Although all of the aforementioned materials may be used to modify the basic PVC resin, it is the family of chemicals known as plasticizers that frequently exert the greatest influence on the physical properties of the vinyl film. The type and amount of plasticizer dictates the degree of softening action that will occur in the film. This in turn affects the flexibility, strength and stability of the final product.

Vinyl classes of flexibility

Rigid vinyls are products which contain no plasticizers and are consequently quite hard and brittle. This characteristic is a limiting factor in the usefulness of this grade of vinyl as a thin film.

Conversely, soft vinyl contains a considerable quantity of plasticizer, resulting in excellent flexibility, conformability, drape or hang. This class of vinyl film is perhaps the most widely used.

Semi-rigid vinyl lies somwhere between rigid and soft. Although a sufficient amount of plasticizer is used to prevent brittleness, its level is kept relatively low so as to prevent the plasticizer from interfering with properties such as ease of printing, dimensional stability, and adhesive compatibility.

It should be understood that there are many levels of plasticizer usage and corresponding flexibility within the two broad classes of soft and semi-rigid vinyl.

Plasticizer types

Along with having the option of using varying quantities of plasticizer to achieve the desired flexibility, this characteristic as well as others, can be greatly influenced by the type of plasticizer selected.

In general, there are two broad categories of plasticizers -"monomeric" and "polymeric". The former is a chemical whose molecules are rather small and quite mobile. As a consequence, this type of plasticizer migrates easily within the vinyl film and often comes to the surface or volatilizes. In extreme cases, where large amounts are used, its migration to the surface imparts a slippery or oily feel to the film, and this concentration on the film surface can inhibit the adhesion of paints, inks or adhesives.

Polymeric plasticizers are chemicals that have been polymerized (individual molecules chemically bonded together to form longer and often branched chains) and are physically large in size. This larger size and more complex configuration limits their mobility. As a result, there is less potential plasticizer migration, volatilization and compatibility problems.

Why aren't polymeric plasticizers used exclusively in vinyl films? The major reason is that they are more costly and sometimes less efficient. It is, therefore, a delicate balance between cost and desired properties which must be considered in satisfying the total product requirement.

Manufacturing processes

Another important factor to be considered in product selection is the type of manufacturing process used to produce the film. There are two basic methods of manufacturing -"calendering" and "casting". These methods have inherent advantages and disadvantages which directly affect the final cost and performance of the films.

In its simplest form, the calendering process is a procedure in which the vinyl formulation is heated and passed between hot metal rolls. These rolls squeeze the vinyl into a film of the desired thickness and impart the required texture (gloss or matte) to the surface. This is a very cost-effective process for manufacturing very large quantities of film having an identical formula, thickness, surface texture, etc. However, it is both costly and impractical for small quantities.

The casting process consists of applying a uniform coating of a liquid solution or suspension of the vinyl formulation onto a casting sheet having the desired surface texture. The solvent is then evaporated leaving a uniform, stress-free film of vinyl. This manufacturing technique is generally more expensive than calendering, due to the fact that expensive solvents must be used and production speeds are much slower. However, this higher cost is offset by the flexibility to produce small quantities of film which possess other inherent advantages that will be discussed later.

Another difference between these two processes is that vinyl formulations for calendering normally require high levels of plasticizer, lubricants or other processing aids. When these plasticizers are monomeric, which is generally the case, the compatibility and dimensional stability of the film are decreased. In contrast, the amount and type of plasticizer used in vinyl formulations for the casting process is not a function of the manufacturing process. As a result, the selection of a vinyl formulation for casting can be made solely in the light of the requirements for the intended application.

A very important distinction between calendering and casting is that a tremendous amount of stress is put into the film as the vinyl formulation is squeezed and pulled through the hot calender rolls. At some future date, when conditions are right, the built-in stress will relieve itself, resulting in a dimensional change (shrinkage) in the film. The casting process, however, deposits an unstressed solution of vinyl onto a casting sheet and the resulting cast film has essentially no stress to relieve. Hence, cast films are very stable dimensionally.

The film thickness range and control varies with each process. Calendering has the capability of producing thick films, since there is no solvent to evaporate. However, it becomes increasingly difficult to produce and control thicknesses in the .002" - .003" range. On the other hand, the casting process is well suited to

the thinner gage films and can produce them with exacting uniformity. Because of the need to evaporate solvent from casting formulations, the degree of difficulty and cost increases as the film thickness increases. Since the intended application normally dictates the thickness of the film required, the choice of manufacturing method is thus often predetermined. For those ranges of thickness that can be produced by both processes, one must consider carefully the other factors which were previously mentioned.

Summary

After a number of years in the manufacture of external markings, we would recommend to all buyers of markings that they should observe the following rules if they want a high quality, value for money, long life marking:

1. Specify a cast vinyl marking. This will overcome almost all likely application and adhesion problems.
2. Specify that any inks used are vinyl or acrylic based, overprinted with a protective clear covering. This is essential, particularly if long life is desired.
3. Ask for the required life warranty in writing from the marking manufacturer, the film supplier and the ink supplier.

How to select a supplier of markings

The selection of a marking supplier is as important as the markings themselves. The container industry is a worldwide industry, and once they have been manufactured containers travel to the four corners of the world. If there is a problem with the marking system, the supplier should (1) honour his product warranties and (2) provide service to determine the cause of problems anywhere in the world. In order to do this it is obvious that the supplier should be a worldwide company with representation in all the major shipping areas.

Secondly, the supplier should be a company large enough to financially back-up its warranty commitments, with capacity to produce container markings in sufficient quantities to keep its representatives anywhere in the world supplied.

Third, the supplier of markings should have in-house testing equipment. Certain manufacturers often make broad warranty statements which they cannot support by testing data. It is therefore important that the marking supplier selected is a company which has in-house testing procedures and knows the durability of its products.

Fourth, the availability of technical assistance is a very important factor. As mentioned earlier, special application techniques are often required for certain types of markings. Moreover, technical assistance should include, if necessary, Customs clearance and transport from seaport area or airport to the container repair facility.

Technical assistance also requires the marking supplier to have knowledge of the paints and coatings systems used on containers, since markings are applied to container coatings and not to base metals, and unless the supplier has a good knowledge of the coatings the marking system and adhesive may fail.

Marking requirements

The marking requirements for containers can be divided as follows:

(1) Mandatory markings

These represent the legal requirements if containers comply with ISO and UIC standards. If we take a standard 20ft x 8ft x 8ft 6ins dry freight container, then the minimum mandatory markings requirement is:

Total number of markings per container	
6	Owner's Identification Code, followed by a six figure serial number of the owner's choice, followed by a check digit in a box, e.g., CTIU 000000(0). These are usually 100mm high digits but some operators use 150mm high and other sizes. They are positioned one per side of container plus two on the roof. The check digit is calculated using a formula provided by ISO.
3	Country of Origin and Container Type consists of three letters (it is possible that only two will be necessary soon) indicating the country of the owners' registered office, e.g., USA - United States of America, GBX - United Kingdom, CHX - Switzerland, followed by four numbers indicating the type of container. For example, 2200 is a standard 20ft x 8ft x 8ft 6 ins continer: the first 2 indicates that the container is 20ft in length, the second 2 that it is 8ft 6 ins tall, and the two 0's that the container has no extras. If small ventilation openings were put on each side of container then the number would be 2210.
1	Gross and Tare Weight Specifications. The minimum requirement is for the Gross Weight and the Tare Weight to be shown in pounds and the metric equivalent. e.g. GROSS WT 44800 lbs 20320 kgs TARE WT 39290 lbs 18000 kgs The minimum height requirement of each letter or number is 50 mm. Many operators also show the Payload (or Net Capacity) and Cubic Capacity.
2	UIC Marking. This standard marking, used throughout the world, consists of an 'IC', printed each letter in a separate box side by side, with a number beneath in a larger box. This number is decided basically by the country of manufacture of the container, providing that country is listed. For example, the British Railways code number is 70, Swedish State Railways is 74, and French National Railways is 87.

2 Height marking. If a container is over 8ft high then a marking must show the container height. For 8ft 6 ins this again is a standard marking used throughout the world, consisting of a black printed 2-6 above an 8 1/2 with a yellow background on all containers of this size.

NOTE: It is also possible that the height for a standard container not requiring a marking may be raised to 8ft 6ins, thus eliminating the two 2.6/8 1/2 markings.

The above are the minimum requirements, but naturally, as in any other business, extra markings are used for many reasons, e.g., if the containers are built to a higher specification and therefore can carry more weight in certain countries. Examples of these extra markings are as follows:

(1) A USA Department of Labour marking is used on 20ft containers to show that they can carry increased payload in the USA.

(2) When containers have empty lift fork lift pockets fitted, a marking is usually applied each side reading 'EMPTY LIFT ONLY' or similar.

(3) If a ladder is fixed to any of the sides or even any equipment to make possible easy climbing onto the roof of the container is fitted, then a warning symbol is used for overhead electrical danger.

There are many more but the ones listed make up the majority.

(2) Company name and address

Most container owners also take the opportunity to advertise their name on their containers. This can take the form of the complete name on two or three sides or a symbol representing the company.

A marking showing the address (usually just the company name, town or city and country) is applied to one of the doors.