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High volume materials distribution and control in the beverage and food industry in the Republic of South Africa

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BY

M. BAILEY

HIGH VOLUME MATERIALS DISTRIBUTION AND CONTROL IN THE BEVERAGE AND FOOD INDUSTRY IN THE REPUBLIC OF SOUTH AFRICA.

BY

M. BAILEY

A dissertation submitted to the Faculty of Engineering, University of the Witwatersrand, Johannesburg, for the Degree of Master of Science in Engineering.

October 1978.

Undertaking

I hereby certify that this dissertation is my own work and has not been submitted at any other university.

M. BAILEY

October 1978.

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CONTENTS

CHAPTER NO.	DESCRIPTION	PAGE
1	SYNOPSIS	1
2	INTRODUCTION	3
2.1.	Aims	3
2.2.	Background	3
2.3.	Distribution Range	4
2.4.	The Consumer of High Volume Products	5
2.5.	Marketing and Influence of Distribution	6
2.6.	Government Pressure and Traffic Congestion.	8
2.7.	The Returnable Container	10
2.8.	Product Packages	11
3	MATERIAL MOVEMENT AND CONTROL WITHIN PRODUCTION AND PROCESSING FUNCTION	15
3.1.	The Basic Production Units	15
3.2.	Efficiency	16
3.3.	Materials Control	16
3.4.	The Daily Operational Return	17
4	SALES AND WAREHOUSES	21
4.1.	Inventory	21
4.2.	Ordering and Selling	23
4.3.	Bottle Sorting and Types	26
4.4.	Distribution Centre Location	30
4.5.	Multiple Distribution Points	31
4.6.	Warehouse Layouts	46
4.7.	Forklifts and Trolleys	47
4.8.	Live Storage	49
4.9.	Making of Orders	52.

CHAPTER NO.	DESCRIPTION	PAGE
5	DISTRIBUTION OF PRODUCT TO AND FROM THE CONSUMER	54
5.1.	Aims	54
5.2.	Background	54
5.3.	Analysis of Self Recording Sheets	55
5.4.	Time Studies	56
5.5.	Comparison of Results	60
5.6.	A System of Delivery Control	61
5.7.	Minimising Distances	65
5.8.	Development of an Algorithm for loading, routing and scheduling	67
5.9.	Further Steps to Reduce Distribution Time	72
5.10.	Fleet Flexibility	74
5.11.	Incentives	74
5.12.	The Perfect Truck	75
5.13.	Mechanical Handling	77
5.14.	Distribution Fluctuation	79
5.15.	Computerised Loading	82
6	COST EFFECTIVENESS	85
6.1.	Distribution as a Cost Centre	85
6.2.	Cost Breakdown	86
6.3.	Discussion	88
6.4.	Savings	89
6.5.	Conclusion	89
7	FUTURE TRENDS	90
7.1.	Larger Containers	90
7.2.	Bulk Handling	91

../ (iii)

CHAPTER NO.	DESCRIPTION	PAGE
7.3.	Product Dispensers	91
7.4.	House-to-House Sales	91
7.5.	Professional Distributors	92
7.6.	Centralised depots serviced by electrical vehicles	
8	LIST OF REFERENCES	94
	APPENDICES	
	1.	97
	2.	99
	3.	116

CHAPTER 1

SYNOPSIS:

This dissertation sets out to examine the present status of distribution in the food industry in South Africa, and once this has been established, sets out a system whereby the existing distribution networks can be improved.

The complete range of distribution covered includes the movement of product from the production centre until it reaches the consumer. While the entire materials handling concepts of a producer/distributor have been discussed, attention has been paid to the setting up of new distribution standards and methods of control (Chapter 5).

Most of the dissertation deals with high volume product movement in the beverage industry - i.e. 20 million cases of product per annum, but many of the findings and results apply equally to the smaller distributor.

The actual savings that would come from the implementation of the recommendations of this study are in excess of 20% of the total costs of distribution and should save a large distributor in excess of one million rands per annum.

Besides setting up improved systems to save money, a complete strategic look is also taken at the future of distribution in South Africa, including the expected effects of proposed Government Legislation.

../2

DEFINITIONS AND ABBREVIATIONS:

Beverage	:	Soft drinks and beers.
D.O.R.	:	Daily Operational Return.
Drop	:	Total number of cases handled during a delivery i.e. number of fulls plus empties.
Empties	:	Empty bottles.
Horses	:	Power of truck which pulls semi-trailer (Tractor).
I.S.O.	:	International Organisation for Standardisation
Outlet	:	Any place to which distributor supplies products for resale.
Package	:	An individual product flavour, type or size.
Ref. No.	:	Reference number - referring to list of references in Chapter 8.
Returnables	:	Containers that once used are returned to the processing function for re-use.
Service	:	To visit an outlet and provide the outlet with its requirements.
Soft Drink	:	Flavoured, non-alcoholic drink. Usually carbonated. May also be a mixer for an alcoholic drink.
Trailers	:	Any trailer hitched to a semi-trailer or rigid truck.
Trucks	:	The complete delivery vehicle.

../3

CHAPTER 2

INTRODUCTION

2.1. AIMS

The aim of this dissertation is to set out a logical, practical and efficient distribution system in a large food producing organisation.

The main reason behind the setting up of this distribution system is economic i.e. to cut costs, but secondary considerations include better customer service, cutting down on the use of strategic raw materials, satisfying present and proposed government legislation and helping to keep up with future trends.

2.2. BACKGROUND

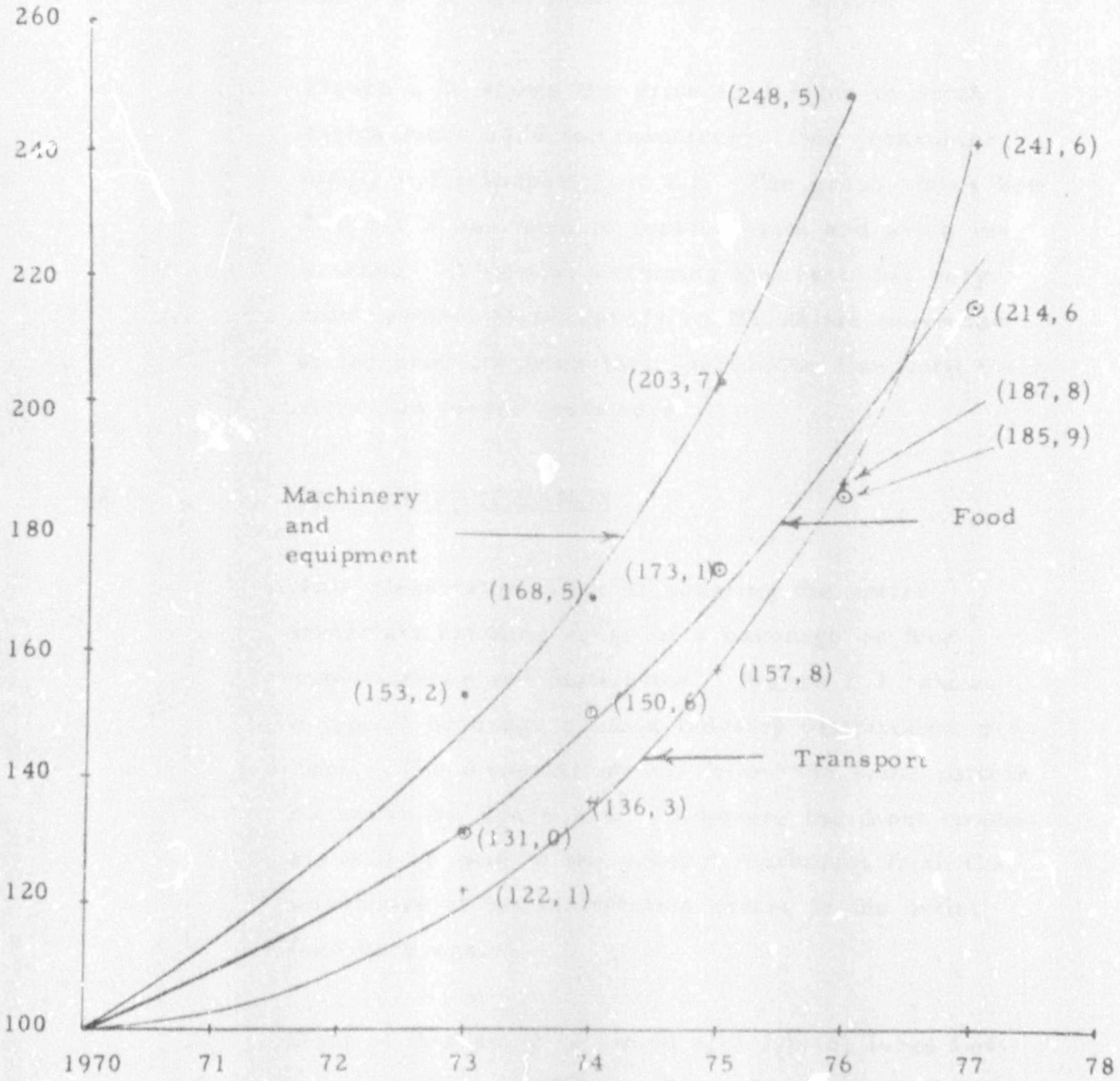
In the past few years with the huge petrol price increases, and rises in the capital costs of vehicles, more and more attention has been paid to product distribution and the many problems associated with product control and movement. Companies which have been especially hit by these price increases are organisations which need to distribute very high volumes of products such as the beverage industry, the milk industry, and the wine industry. This situation is aggravated by the relatively low profits made per case of products in this type of industry.

../4

FIG: 2.2.

PRICE TENDENCIES IN SOUTH AFRICA

- Ber - Beo Trends (ref No. 3)



Typically a large factory in one of these industries needs to distribute over 1 million cases of product per month. A very small increase in distribution costs such as 1c per case could thus mean a total effect of several million rands per annum.

Figure 2.2. shows the price tendencies in South Africa since 1970 for machinery, food (consumer index) and transport (ref. 3.). The graph shows how difficult it has been to control costs and price increases. It is also becoming apparent that very close control is necessary on the entire movement of the products from their production line until their return as empty containers.

2.3. DISTRIBUTION RANGE

This dissertation aims at covering the entire materials handling range of a beverage or food manufacturer and distributor. Figure 2.3. shows a typical beverage or food industry distribution process. The dissertation will follow the same pattern as shown by figure 2.3. However, the most emphasis will be paid to the product movement from the warehouse at the distribution centre to the outlet (and back again).

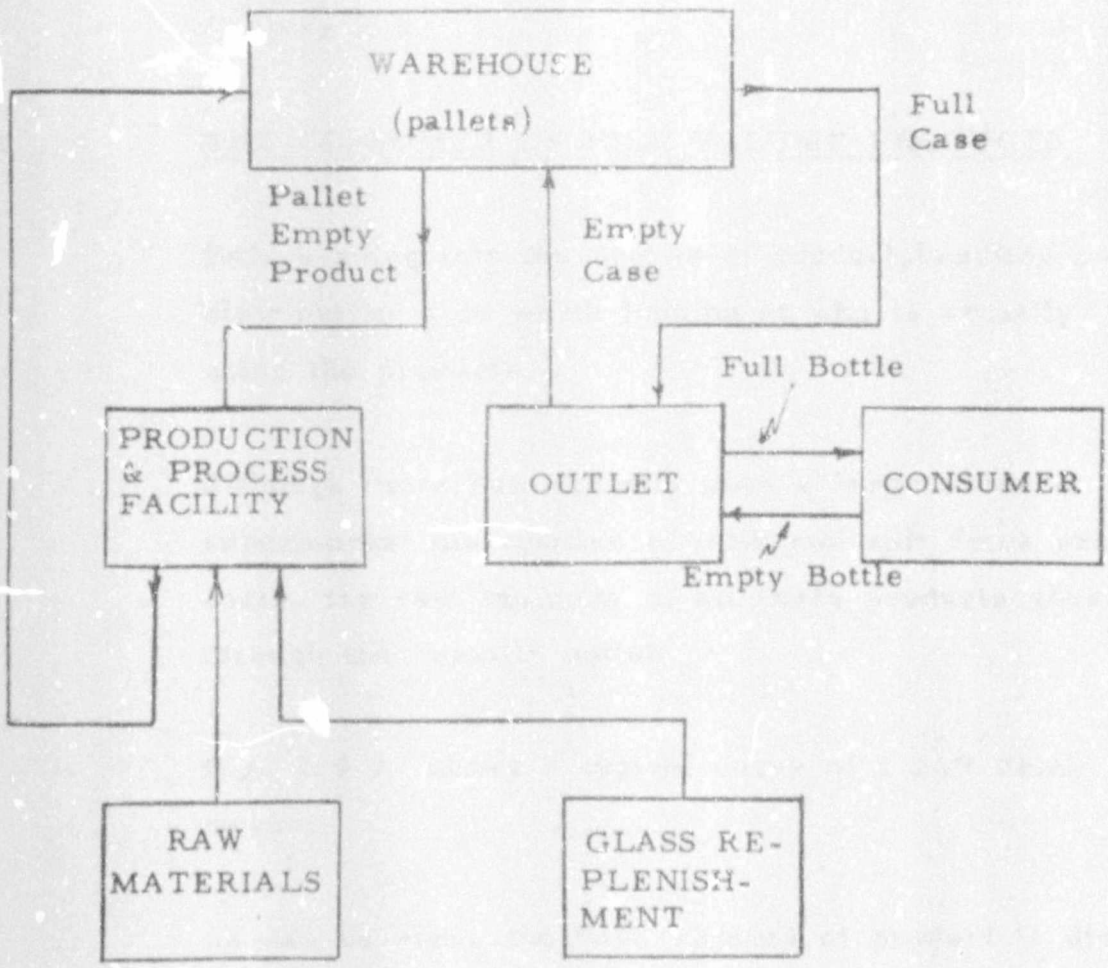
Most of this study is aimed at a typical large beverage producer. This producer is a hyrothetical production/distribution centre situated in a large city (population 1 million and over) and distributes somewhere in the region of 20 million cases per annum.

../5

FIG: 2. 3.

THE DISTRIBUTION PROCESS

A typical beer, beverage and food industry distribution process



Most of the study will however also apply to smaller distribution centres, and should therefore be of use to any distributor.

The various background production processes are briefly explained in Chapter 3, while the background to the marketing methods used are explained in Chapter 2.5.

2.4. THE CONSUMER OF HIGH VOLUME PRODUCTS

Before going into the details of product handling and distribution it is worth looking at who is actually using the products.

Although there has recently been a large swing to supermarket distribution of milk and soft drink products, the vast majority of all these products goes through the "small" outlet.

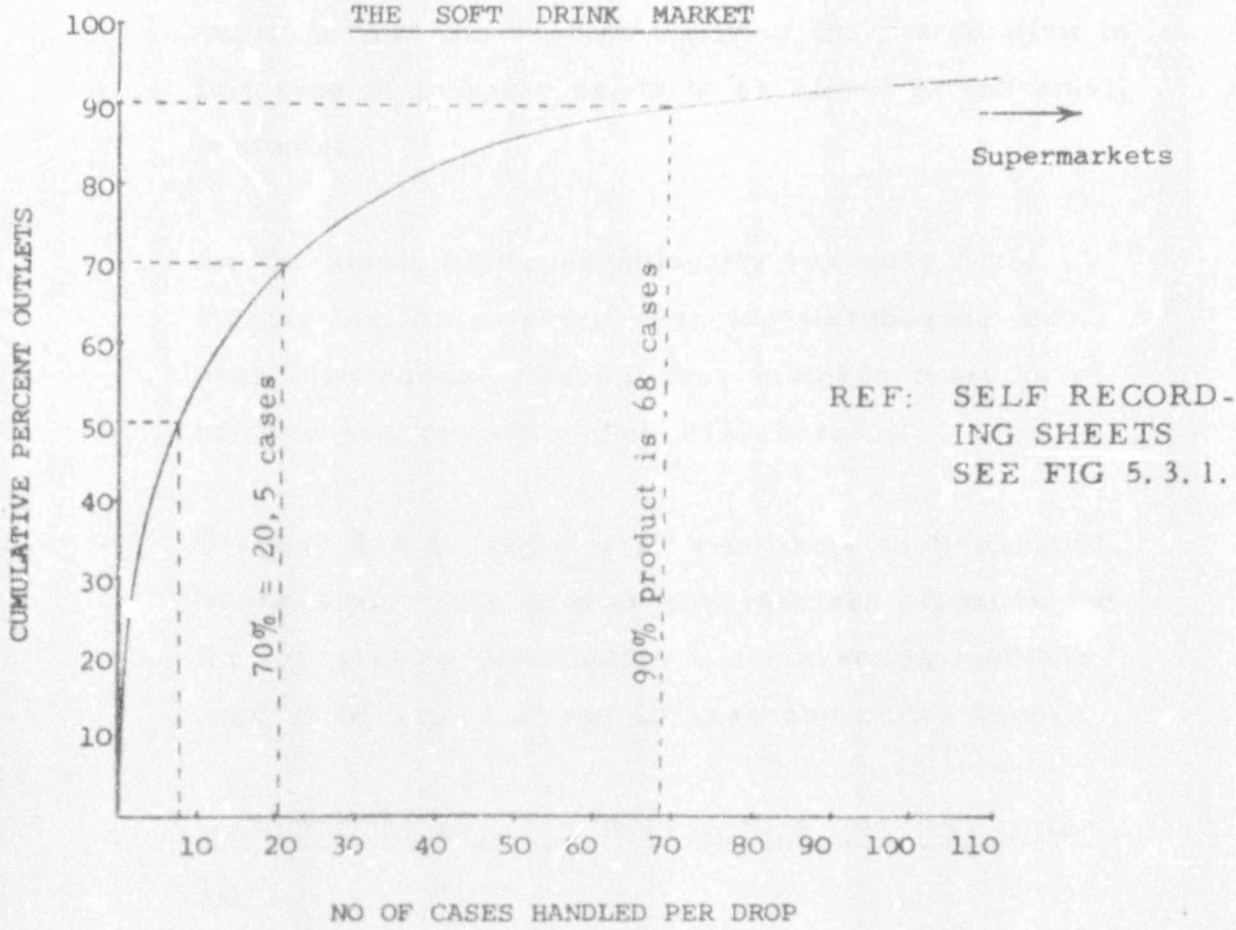
Fig. 2.4.1. shows a typical curve of a soft drink market.

As can be seen, the vast majority of product is distributed to the small customer i.e. 70% of all sales are made up of drops of 20 cases or less.

This curve is even steeper for the milk industry and somewhat flatter for the beer industry (see Fig. 2.4.2).

FIG : 2.4.1

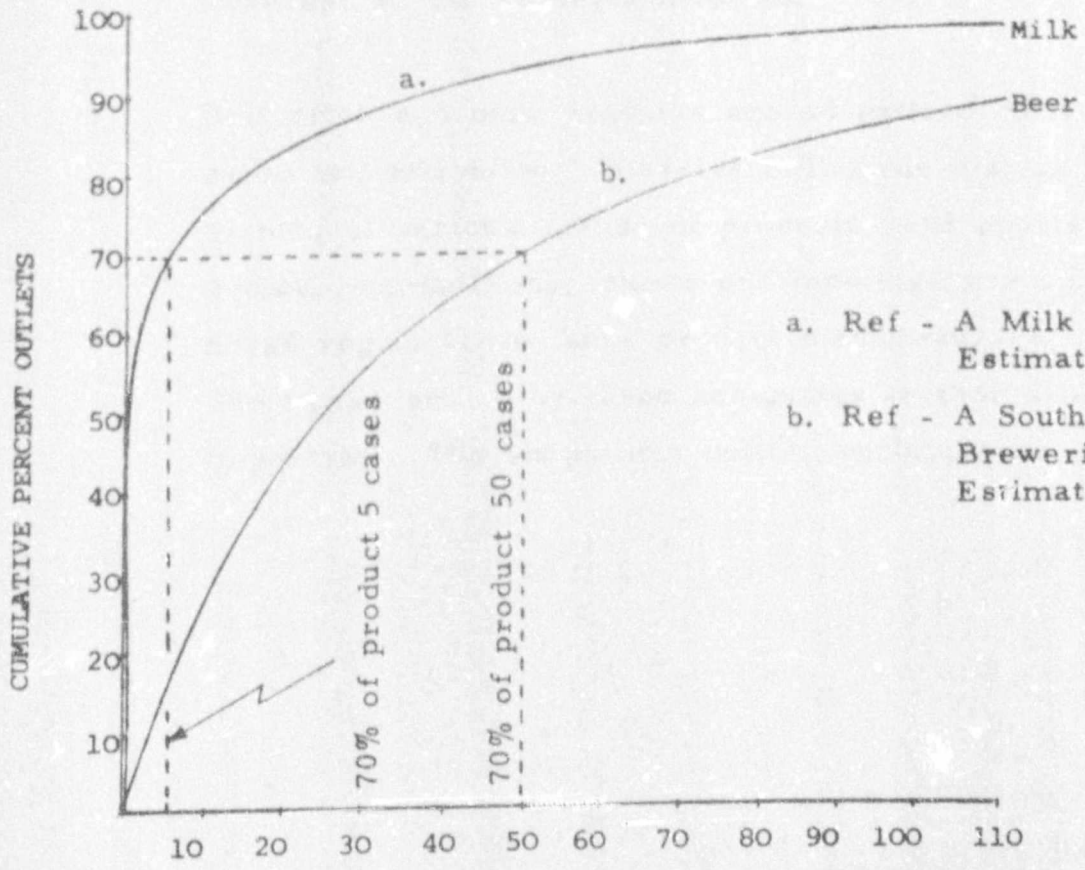
THE SOFT DRINK MARKET



REF: SELF RECORDING SHEETS SEE FIG 5.3.1.

FIG : 2.4.2

THE BEER AND MILK MARKETS



a. Ref - A Milk Board Estimation

b. Ref - A South African Breweries Estimation

However, the most important thing shown by the curve is that the vast majority of the distribution in this type of industry needs to be aimed at the small customer.

As the small customer normally has very little loading facilities, small cramped warehouses and even less capital, the delivery methods must be adapted accordingly. (See Fig. 2.4.3.).

Graphs 2.4.1. and 2.4.2. are likely to flatten out in the future with greater supermarket pressure but for the present distribution and marketing methods need to be aimed at the 20 case and under buyer.

2.5. MARKETING AND ITS INFLUENCE ON DISTRIBUTION.

One of the main features of the beverage industry is the immense size of the marketing and advertising coverage of the products involved.

Soft drink and beer products are advertised daily on radio and television. Mass billboards display the virtues of various brands of products, and sports events, competitions, shows and meetings are sponsored regularly by these product manufacturers. The image set up by these companies is thus all-important. The shape of a bottle, container or

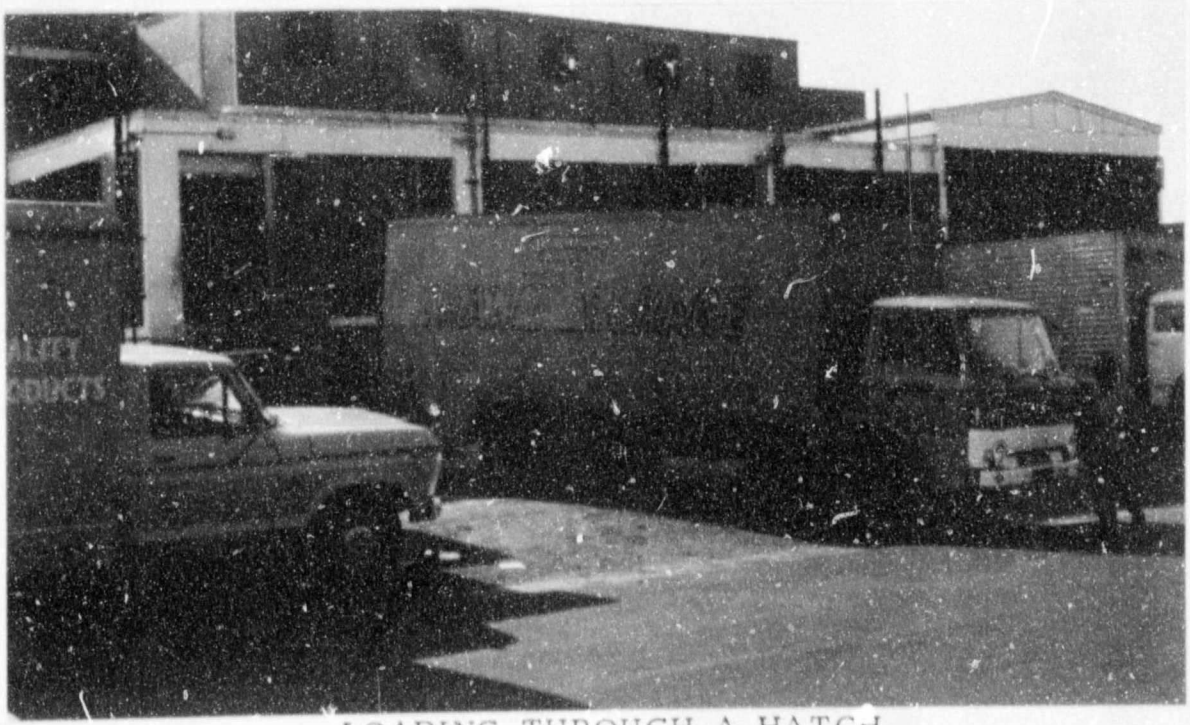
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FIG: 2. 4. 3.

HANDLING FACILITIES OF TWO OF THE LARGEST SUPERMARKETS IN SOUTH AFRICA



PALLETISED LOADING/OFFLOADING



LOADING THROUGH A HATCH

truck is therefore not always dictated by pure efficiency but often it is more related to consumer demand and competitor tactics.

Distribution is also closely related to the entire marketing concept. Often products are distributed to areas where the cost of transport far exceeds the profit margins made on the product, in order to keep competition out of an area or even to boast that a product may be obtained anywhere in the country/ world.

Customer relations are also extremely important. It is often necessary to send one case of product several kilometers to satisfy the whims of a customer. The need to keep the customer happy might mean that truck crews are delayed while tidying a customer's stores or merely waiting for the customer to pay his account.

The type of customer who buys the product also has a profound influence on the distribution function. One often finds that the smaller type of customer runs his entire operation on a shoestring. Payments are thus sometimes late in coming and orders often have to be returned to the factory. Often customers refuse to make any attempt to sort their empty bottles - mixing brands and sizes, how and where they like. This adds to sorting problems and glass breakage.

Even the positioning of the warehouse may be affected by marketing approaches, i.e. positioning such that the maximum status may be realised rather than maximum efficiency. Delivery routes, schedules and truck loading can also be dominated by the desire to service each and every customer in the best way possible.

The marketing function seems thus to dominate the beverage industry. Company image and marketing ideals are usually a primary consideration. However, it is certainly still possible to slot a balanced materials handling system into the marketing functions of the company.

All purely theoretical distribution analyses should thus be considered with enough flexibility to accommodate the aforementioned marketing approaches.

2.6. GOVERNMENT PRESSURE AND TRAFFIC CONGESTION.

In March, 1972 a Committee of Inquiry into Urban Transport Facilities in the Republic of South Africa was appointed. This led to the Driessen Report and a white paper published by the government on the Driessen Report (see ref. 8 and 9). The committee recognised that there was a great deal of congestion in the cities in South Africa and this was likely to increase in the future.

The committee thus decided that the best solution to this problem would be to take "remedial measures in accordance with an explicit transport policy".

These remedial measures include:

2.6.1. Greater power should be granted to transport authorities in the form of the National Transport Commision and Urban Transport Division.

2.6.2. "The on-street loading and unloading of goods vehicles in central urban and congested areas should be shifted as far as possible to night or early morning hours, and furthermore, prohibited entirely during peak hours. Local authorities are requested to implement this recommendation as soon as possible" (Par. 5.11.4. ref. 8, 1.3.16 ref. 9).

2.6.3. "The possibility of using more compact delivery vehicles in the Republic's city areas should be investigated by the proposed Urban Transport Research Division of the C.S.I.R., and for this purpose the possibility of establishing more distribution deports and extending containerisation should be considered". (Par. 5.11.5. ref. 8, 1.3.17. ref. 9).

2.6.4. "Control should be excercised over the size of goods vehicles entering central city and congested areas". (Par. 5.11.6. ref. 8, 1 3.18. ref. 9).

../10

2.6.5. "The principle of charging for parking space and loading zones in central city areas should be applied, and charges should cover all direct and non-direct economic costs". (Par. 6.4.6. ref. 8, 1.4.3. ref. 9).

As can be seen, these measures will have a profound effect on distribution in city areas. Both the beer and soft drink industries will have to change their entire methods of deliveries - i.e. smaller trucks, night time deliveries, town depots and small electric delivery vehicles. (See fig: 2.6.).

These changes are likely to come about as soon as South Africa's economic situation improves sufficiently to allow the government to implement them. It is thus necessary that distributors begin immediate planning for this eventuality.

2.7. THE RETURNABLE CONTAINER.

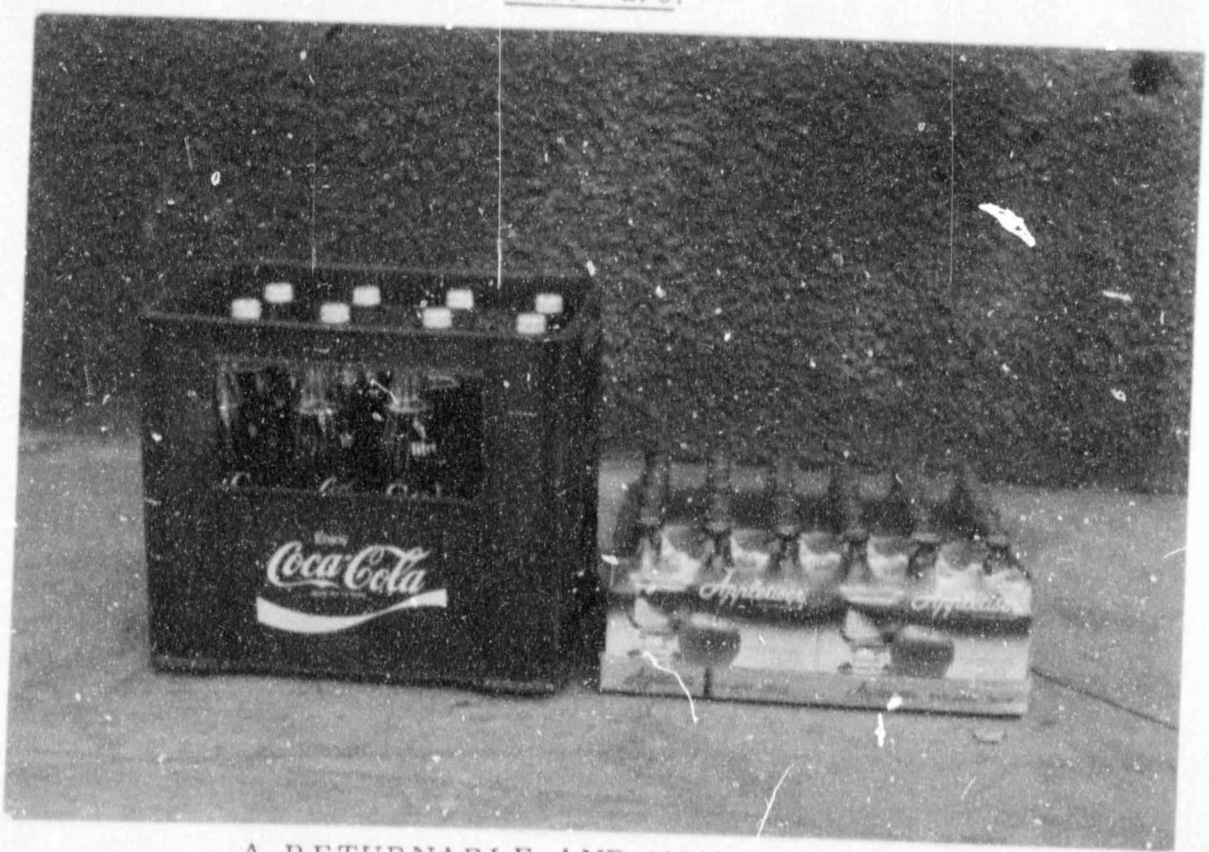
Throughout the world there have recently been outcries that we are using up the worlds' raw material resources, and soon we will have none left. The value of the raw materials involved in packaging materials such as foodstuffs is becoming more and more prevalent. The soda ash needed for the manufacture of glass is becoming very difficult to obtain and the entire food industry has been forced to look at returnable containers. Today a typical 300ml beer bottle would cost ± 10c and a can of the same capacity ± 7c.

FIG: 2.6



AN ELECTRIC BEVERAGE DELIVERY TRUCK IN WEST GERMANY

FIG: 2.8.



A RETURNABLE AND NON-RETURNABLE PACKAGE

The future trends in the industry will therefore certainly be to returnable containers. In the United States of America non-returnable containers have already been banned in several states and deposits and taxes placed on them in other states. It is likely that by the year 2000 there will virtually be no non-returnable (non-recycleable) containers used in the food industry.

The returnable container has had a profound effect on general distribution costs. It is not merely the actual cost of bringing the container back from the outlet that is involved, but also the storage and handling of this container. The most commonly used container - the glass bottle - especially needs care. Every time it is manhandled, its life is considerably reduced and costs thus increased. This means sturdy protective crates and very "soft" materials handling.

This dissertation concentrates only on the returnable container although much of the information may be used for non-returnable containers.

2.8. PRODUCT PACKAGES

Basically the following product packages are used in the beverage industry.

../12

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