A MANAGEMENT INFORMATION AND PLANNING SYSTEM FOR A FIRM IN A HIGHLY COMPETITIVE GROWTH MARKET

A thesis submitted by

ALAN NORMAN DUFTY

for the award of the degree of

MASTER OF PHILOSOPHY

"The University of Aston in Birmingham"

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SUMMARY

The original aim of this project was the development and implementation of a Management Planning System, to be used for the day-to-day running and financial budgeting of the Dunlop Oil and Marine Division based at Grimsby. The system was to meet the requirements of both the division and the Dunlop Group.

Initial research established that there would be a continued demand for oil until the early part of the next century. Thus, there should be a demand for the division's products for many years, confirming the need for better forecasting if the division is to make the most of the available opportunities in the face of growing competition.

The existing divisional management plan was based upon the sales forecasts, relying on the judgement of the management. This was not sufficiently accurate, so that alternative methods had to be adopted if results were to be improved. Further research indicated that the lack of information not only limited the accuracy of the current method, but also prevented the investigation of alternative approaches. It was therefore necessary first to develop a more appropriate information system.

Internal historical analysis and management reporting systems were developed to permit better monitoring and control of divisional performance and to form the basis of more systematic forecasting. To complement the internal system, market research procedures were established to supply external information from published statistics and field surveys.

With the time and resources made available by Dunlop, it has so far been possible only to develop the information system. This is the necessary foundation for the development of a more appropriate forecasting system and had not existed before the start of this project.

Oil
Hose
Management Information
Historical Statistics
Marketing Reports

ACKNOWLEDGEMENTS

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INTRODUCTION

The sponsoring organisation, Dunlop Oil and Marine Division (Grimsby) identified certain problem areas which were then offered as a student project in conjunction with the Interdisciplinary Higher Degrees Scheme of Aston University (Birmingham).

PROJECT TITLE:-

"A Management Information and Planning System for a Firm in a Highly Competitive Growth Market".

PROJECT DESCRIPTION:-

"The long term goal of this project is the development and implementation of a Management Planning System, to be used for the day to day running and the financial budgeting of the division. This system is to meet the requirements of the Oil and Marine Division, Grimsby and also to comply with Dunlop group requirements.

"The present system must consequently be reviewed to understand what information is available and how this is used. It will be necessary to develop a more appropriate sales information system than that provided currently, both to assist in the present

"investigation and to meet the requirements of the Grimsby staff. Thus liaison between the Newcastle computer staff and Grimsby staff will be necessary.

"The centre of planning for this project is the idea of prediction (forecasting) and consequently it will be necessary to develop methods of forecasting. These forecasts will be used as the basis for producing the core of the Management Plan."

PROJECT INITIATION:-

The division manufactures a wide range of hoses for many purposes. The major products, the large bore (e.g. 24") oil hoses, are sold to the oil industry firms for loading and unloading tankers. The rapid growth of the oil industry and the move to supertankers and offshore loading/unloading systems has resulted in considerable growth in the oil hose business. The division went through a period of rapid growth and became the market leader, however the supporting information and planning systems were not updated to cater for the new needs of the division. It was realised that a more appropriate information and planning system was needed if the division was to retain its position as market leader and hence the project was born.

PROJECT OVERVIEW:-

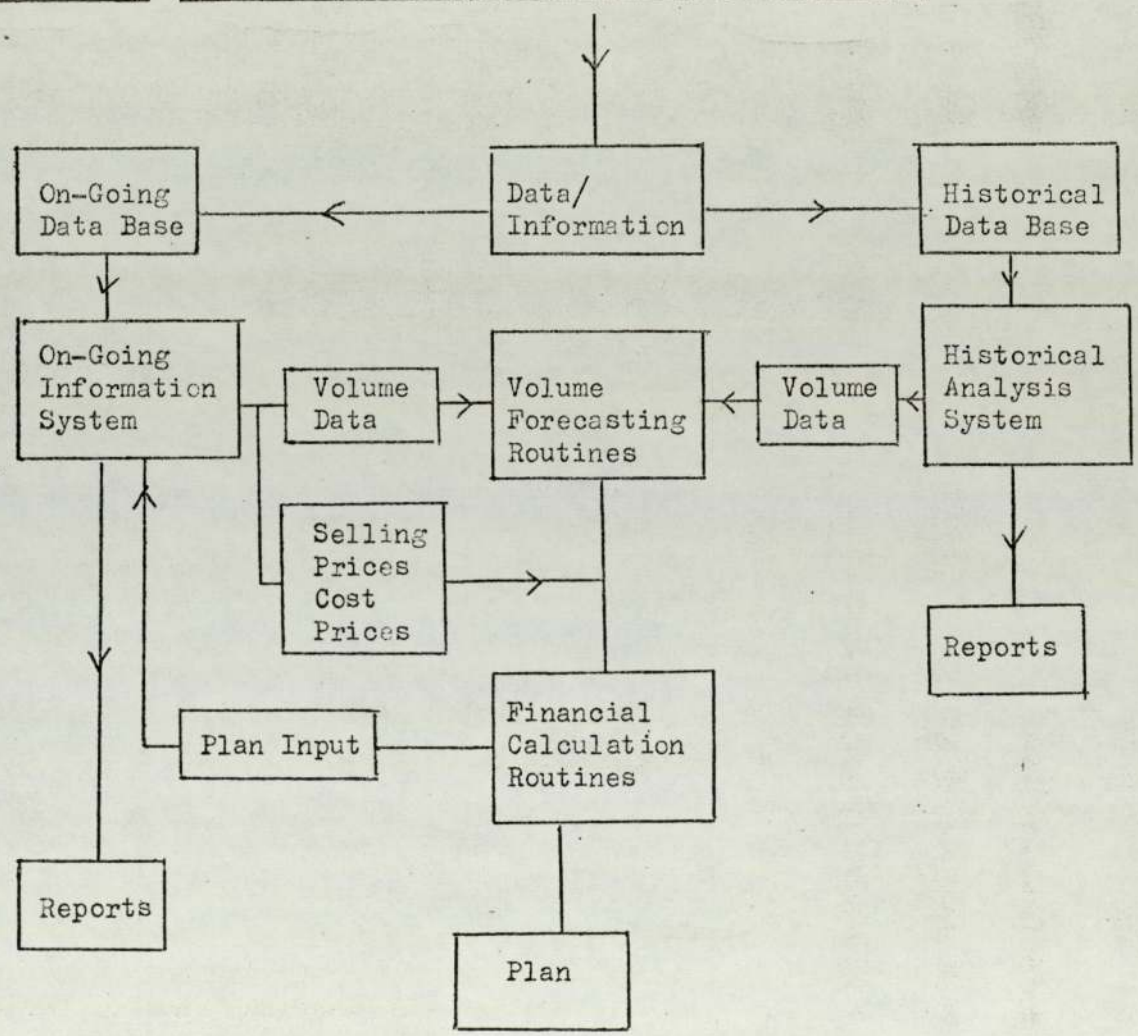
An initial study indicated that the problem should be tackled in three phases:-

1 The development of an historical analysis system

2 The development of an on-going information system

3 The development of a more systematic forecasting system on which to build the one-year operational plan.

FIGURE I.1 PROJECT OVERVIEW - DIAGRAMMATIC REPRESENTATION



THESIS STRUCTURE:-

The progress of this project has not been as smooth as anticipated and there were periods when work on all three phases continued in parallel and others when time was committed to one phase at the expense of the others. It is for this reason that this report will not take the form of a chronological account but instead will detail the facts in a logical and more meaningful structure.

The background to the project is presented in the first three chapters, which consider:-

1 the company, the division and its performance in the market
2 the old management information system
3 the old planning system.

The remaining chapters are concerned with the work done on the project and deal with:-

1 the new information system
2 the approaches to more systematic forecasting
3 the project review.

It is hoped that this structure will enable readers to understand the project and its importance to the division and that the approaches adopted are applicable to other problem solving exercises.

The project has proved to be most interesting, but, because of the lack of suitable information and the time taken to remedy this deficiency, only the first two phases have been completed successfully. The current work has built the necessary foundation on which to build in the future.

CHAPTER 1

BACKGROUND

1.1 INTRODUCTION

A brief background of the company and a more detailed treatment of the division, its products, its market and current position is presented. The division's products (i.e. hoses) are used in the transportation of liquids and solids in suspension. The major products are used to transport oil and its derivatives to and from giant supertankers, and the demand for these products is consequently dependent upon a continued demand for oil. The importance of oil, both as a fuel and raw material, its market growth and anticipated futures are discussed. Research (1-27) indicates that there will be a continued demand for oil, albeit at reduced growth rates, until at least the year 2000 and hence a continued need for a transportation system employing either hose or an alternative technology. To maintain its position as market leader, it is imperative that the division should adopt an on-going process of product improvement, replacement and diversification to meet the changing needs of the market. The division needs to develop more appropriate information systems to enable it to monitor its performance and plan for the future if it is to make the most of existing and anticipated opportunities.

1.2 THE COMPANY

Dunlop, today, is a huge organisation responsible for the manufacture and marketing of a wide range of rubber and related products. The company has production capacity in many countries and its products are sold throughout the world.

The original company was set up in 1889 to produce and market tyres. This was followed by a period of rapid growth both at home and abroad. This expansion was attributed to acquisition, technological innovation and product diversification. Expertise gained from the acquisitions and research permitted further diversification and expansion, particularly in the post World War II period.

The company acquired the John Bull Organisation in 1958. The John Bull factory at Grimsby, manufacturing rubber-to-metal bonded components, was later to become the site of the Dunlop Oil and Marine Division.

The most radical single step in the diversification of the company's range of products came in 1968 with the acquisition of the Newcastle firm of George Angus Limited. The products of the acquisition included fire hose and fire armour (now a very profitable division), fluid seals, industrial hose, belting, brake linings, protective clothing and an efficient marketing operation.

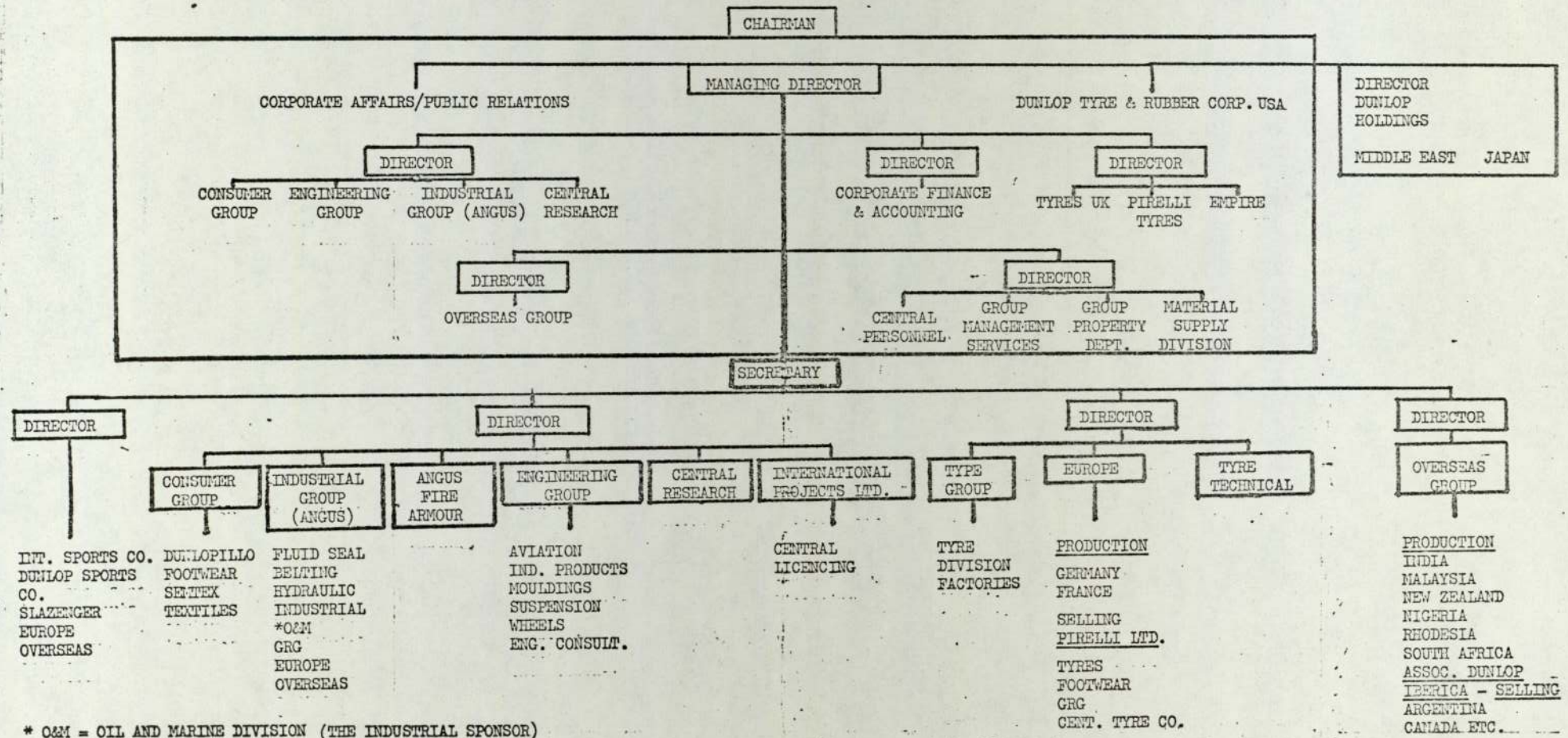
In January 1971 a new chapter in the history of the company was started with the union of Dunlop and Pirelli. There were many reasons for this union, but one of the major considerations was the fact that both groups were complementary in their geographic spread and this meant that Dunlop would acquire a share of traditionally strong Pirelli markets (and vice versa).

The company's on-going approach to acquisition, innovation and diversification has resulted in its continued strong position in the world markets today.

A diagram of the company structure (Fig. 1.1) shows the major activities of the organisation.

FIGURE 1.1

THE DUNLOP COMPANY STRUCTURE



* O&M = OIL AND MARINE DIVISION (THE INDUSTRIAL SPONSOR)

1.3 COMPANY PERFORMANCE

The performance of the Dunlop group for 1967-1976 is detailed in Table 1.1. These figures reflect the growth of the company and, when compared with the figures for the division (see later), indicate just how important the division is to the organisation.

TABLE 1.1 DUNLOP GROUP RESULTS 1967-1976

Year	Turnover £m	Profit after Tax £m	% Return before Tax and Interest on Average Funds Employed
1967	389	11.84	11.80
1968	450	14.40	13.60
1969	495	14.59	12.40
*1970	541/563	12.79/15.12	12.10/10.40
1971	585	19.73	11.50
1972	636	21.60	12.10
1973	750	16.20	11.50
1974	888	19.60	12.50
1975	1,015	23.50	13.10
1976	1,289	31.80	15.90

* 1967-1970 Former Dunlop Group as published
1970-1976 Dunlop Group consolidated on union basis

The information for this table was taken from company Annual Reports (1967-76).

1.4 THE DIVISION

The Dunlop Oil and Marine Division at Grimsby manufactures and markets a wide range of hoses. The division is the world leader in the offshore oil business and has been through a period of rapid growth associated with the increase in the demand for oil and its derivatives by the highly industrialised countries. However, rising oil prices and increased competition means that the division is having to modify its approaches to retain its market position.

The division is a small unit employing 595 people (209 staff, 348 rubber workers and 38 engineers), producing a low volume of high value products.

A short history of the division, the product, its application and the market follows.

1.4.1 Grimsby - Pre Oil & Marine

In 1954 the John Bull Rubber Company Limited embarked upon a programme of expansion. There had been a growth in demand for their products which necessitated the construction of a parallel production unit. Grimsby was chosen as the site

for this factory. The decision was based on the availability of female labour in the area. Female labour was difficult to obtain in the location of the parent firm, Leicester, due to competition from knitwear and hosiery industries.

Construction work began in 1955 and some training of operatives was accomplished in parallel. The first moulding processes were installed in 1956. However, Grimsby was a production centre and all management functions were controlled from Leicester.

John Bull was taken over by Dunlop in 1958 but the factory continued to trade under the name John Bull until 1961.

1.4.2 Oil & Marine Division Pre-Grimsby

Hose group,comprising Oil and Marine, Industrial and Hydraulics units,was a part of the General Rubber Goods Division until 1956. The Oil and Marine unit produced and marketed its hose from the Manchester factory. The major products were dock hoses used to load and unload tankers anchored in harbours.

Hoses have been used at S.P.M. (Single Point Mooring) terminals since their inception in 1958 and since this time tanker sizes have increased considerably leading to the production of larger bore hoses. In 1959 the Oil and Marine unit developed the world's first integral floating oil hose. This allowed VLCC's

(Very Large Crude Carriers) to load and unload oil without the necessity of berthing in a harbour using offshore terminals instead. The production of this "Selflote" hose continued at the Manchester works until 1963.

1.4.3 Oil & Marine Division, Grimsby Pre 1970

During the early sixties, the company rationalised the various production units and products and brought similar products and processes under the control of appropriate factories. Thus, the production of small bore oil discharge and industrial hoses was transferred from the General Rubber Goods factory at Manchester to the Grimsby unit.

The newly developed selflote hose was transferred to the Grimsby unit in 1963 for manufacture in bore sizes up to 12". The unit then specialised in the manufacture and development of offshore and petrochemical hoses for the international oil industry. Extensive research and development work increased the product range and the bore sizes offered in the offshore range increased with the introduction of 16" (in 1965), 20" (in 1967) and 24" (in 1968).

The management functions of Hose group (Oil and Marine, Industrial and Hydraulics units) were controlled from the Gateshead

headquarters. The salesmen worked from the Gateshead headquarters and the Grimsby unit was still only production orientated.

The final stages of rationalisation took place in 1969/70 when all the moulding and finishing operations were transferred from Grimsby to Skelmersdale.

1.4.4 Oil and Marine Division, Grimsby Post 1970

Production of hose at Grimsby got into full swing in the second half of 1970. At this time, the previous controls exerted over the division by the Gateshead headquarters were relinquished. This meant that there was a radical change from being a production unit only, to a division which encompassed all management and production responsibilities.

A management structure evolved, see figure 1.2 (previous structures are included for reference in Appendix 1.1, as is a new structure just recently implemented), and local staff and staff from the north-east unit filled many of the new positions. Thus, marketing, personnel, accounting and general office functions were established at Grimsby for the first time.

The Dunlop-Pirelli union of 1971 brought the offshore specialist sections of the two firms together. The product ranges and

market outlets of these units were complementary. Agreements were made whereby Dunlop would market Pirelli products in traditional Dunlop markets, and vice versa. The division applied its offshore expertise to the marketing of a new product, Pirelli fenders (developed as a result of an on-going research programme) to diversify its interests further. Fenders (products developed to protect the sides of ships in ship-ship and ship-harbour environments) could prove to be a growth area for the union.

Research and development work carried out by the division extended the range of hose products, important additions were made in the dredger hose range with increased bore sizes: 30" (in 1972) and 36" (in 1973). More recent work has led to the division pioneering an anti-pollution hose, "Saflote", in advance of its major competitors. This product should play a very important role in the future of the division, perhaps as great as that of its early floating predecessor "Selflote", developed in the sixties.

In 1974 the Oil and Marine unit became an autonomous division, as did the Industrial and Hydraulics units which formerly constituted Hose group. Thus the division gained even greater control over its activities than was previously the case. Also in 1974, an independent inspection team, working on behalf of Shell and other major customers, was established on site with full in-line inspection authority. The initial rejection

rate was high and this led to reduced production rates with more stringent quality control measures at each production stage. This had a twofold effect on the market:-

a) Dunlop's reduced production enabled competitors (not yet subjected to such inspection) to become better established.

b) Dunlop's improved quality increased the operating life cycles of the products and this complicated the replacement business situation.

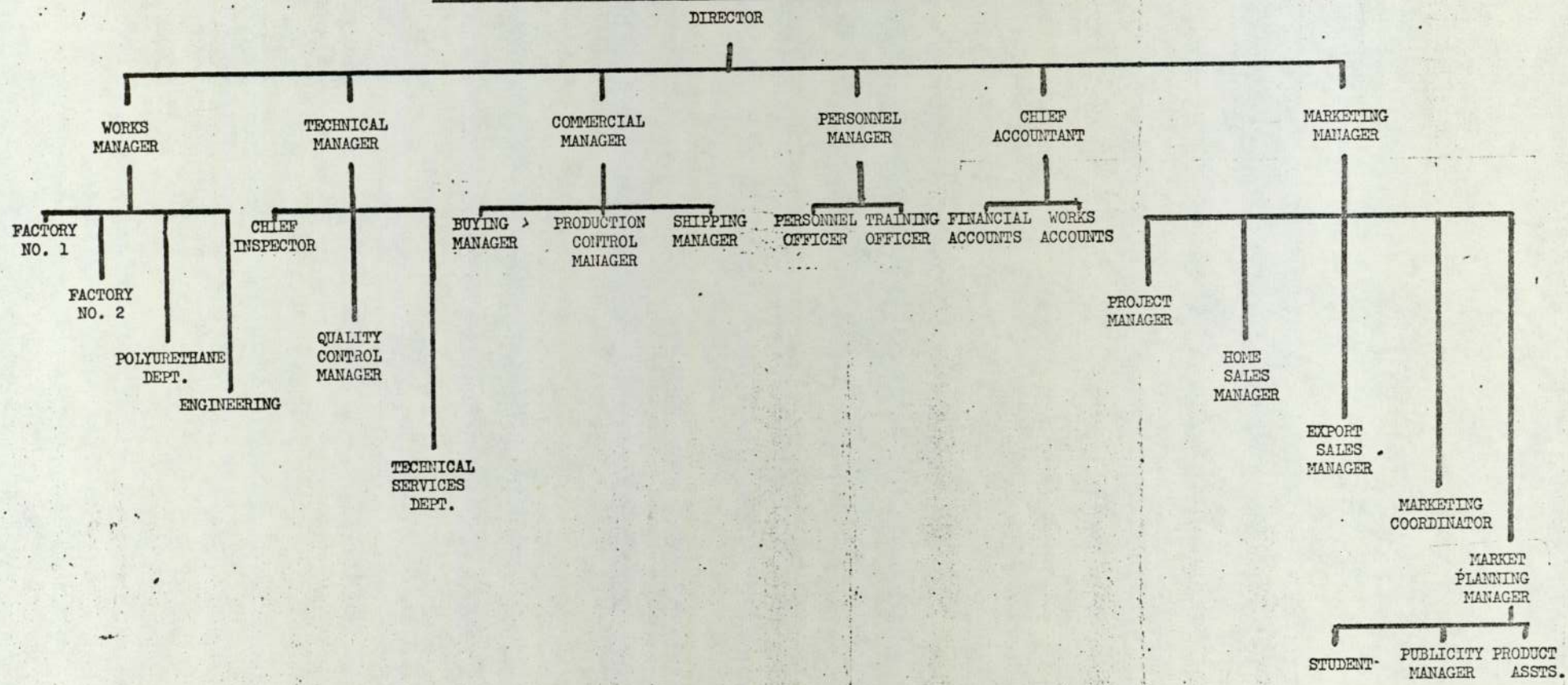
The division has also set up parallel production units in Spain and Japan (Sumitomo) where products were manufactured under licence and marketed only in agreed areas.

The division offers a very wide range of products comprising machine made, dock, petrochemical, offshore oil, offshore dredging and vacuum hoses with associated ancillary equipment. Other hose manufacturers have tended to specialise, offering smaller product ranges, and this has made the hose business very competitive.

The division has gained a reputation for service and product reliability and has retained its position as market leader in offshore business, inspite of severe competition. This

FIGURE 1.2

THE OIL AND MARINE DIVISION - ORGANISATIONAL STRUCTURE (1976-78)



position has been maintained by concentrated marketing activity and on-going research and development. The evolutionary rate of the division has meant that certain skills have become more advanced than others.

1.5 DIVISIONAL PERFORMANCE

The division has grown considerably since it first marketed the product Selflote in 1963. The sales turnover has increased, due to prices and inflation, but the volume of business has shown a general decline:-

TABLE 1.2 HISTORICAL DIVISIONAL PERFORMANCE

Year	Sales Turnover £000's	Volume		
		Offshore	Dredger	Dock
1963	146	-	-	-
1964	165	-	-	-
1965	225	-	-	-
1966	255	-	-	-
1967	299	-	-	-
1968	502	-	-	-
1969	1,156	-	-	-
1970	2,384	-	-	-
1971	3,459	1,858	27	4,104
1972	3,917	1,755	63	3,966
1973	4,554	2,355	55	4,619
1974	6,795	2,681	132	4,176
1975	10,193	1,858	49	2,607
1976	12,393	1,644	146	2,490

Graphical representation of the volume figures (i.e. the number of lengths of hose sold) are presented in figures 1.3 - 1.5.

The declining volume can be attributed to both internal measures (i.e. improved quality but reduced production rate) and external competition. The volume is a more meaningful measure of factory performance than the financial figures because inflation and its effect on cost and selling prices has caused increasing turnover to be realised for decreasing volume sales (as indicated in 1974, 1975 and 1976). It is for this reason that a volume forecast is the starting point of all divisional planning activities.

The financial figures of the division, when compared with company performance (Table 1.1), show that the division is a very important part of the company. Indeed, for its size the division is very profitable and realises its profit on a lower sales turnover than many other divisions. It is because of its ability to generate profit and show excellent returns on funds employed that it is rated as a Class IB division for the purpose of determining fund allocation. This 'B' rating was self-imposed due to the threat of increasing competition, notably Japanese.

FIGURE 1.3 OFFSHORE HOSE - VOLUMES.

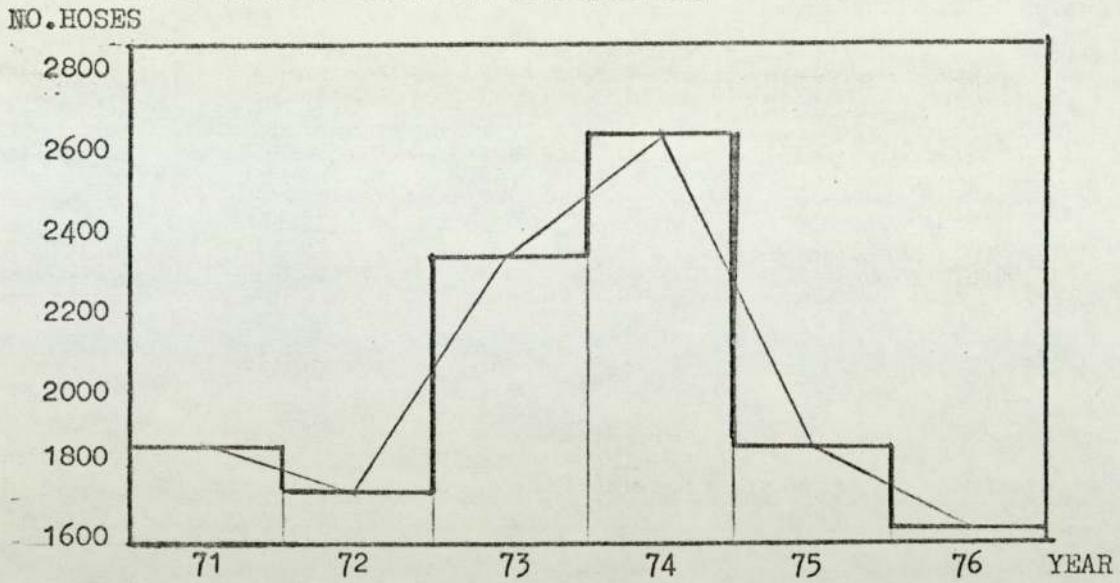


FIGURE 1.4 DREDGER HOSE - VOLUMES.

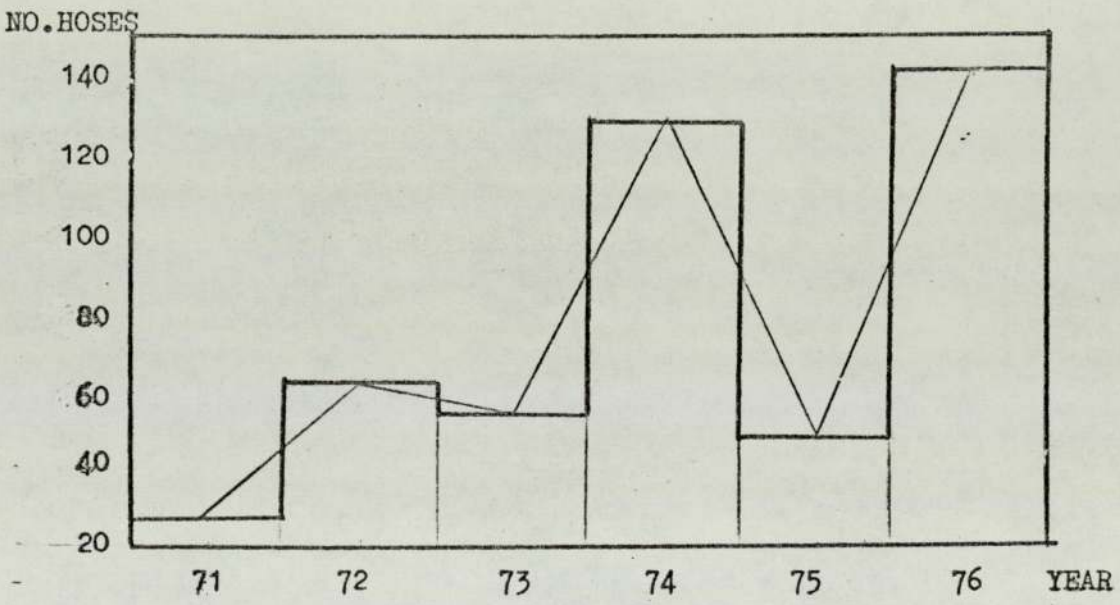
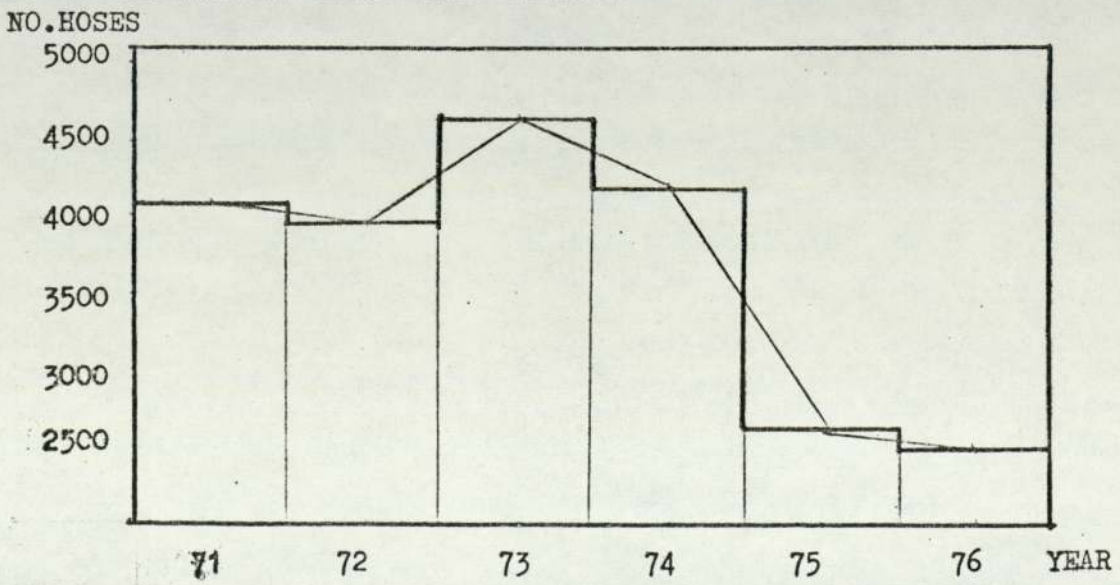


FIGURE 1.5 DOCK HOSE - VOLUME.



1.6 THE MARKETING OPERATION

The division has structured its global business into six markets:-

1 Home direct

2 Home associated companies (i.e. other Dunlop divisions in UK)

3 Export direct

4 Export associated companies (i.e. other Dunlop divisions abroad)

5 Original equipment (i.e. offshore projects)

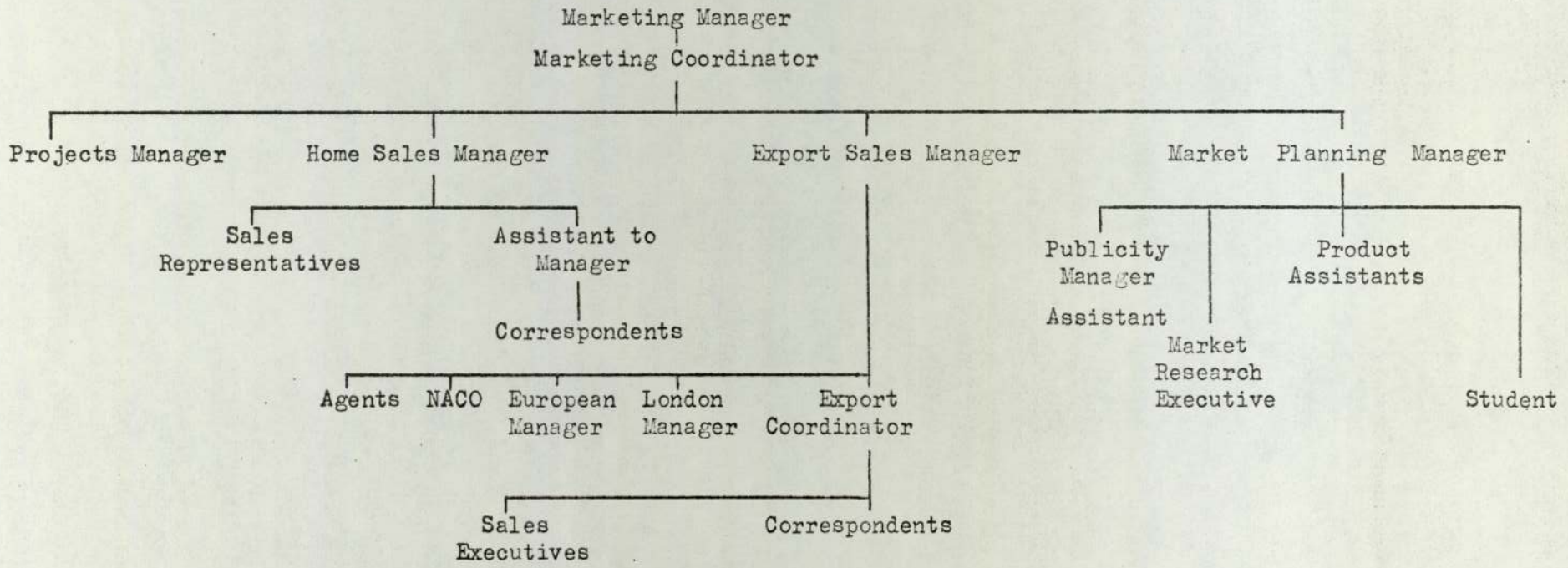
6 NACO (i.e. North American associated companies)
NACO comprises two outlets, one for USA (Angus Incorporated) and one for Canada (Angus Toronto). These outlets were part of the Oil and Marine's inheritance from the Dunlop acquisition of the George Angus organisation.

The marketing department is arranged as shown in Figure 1.6.

The basic role of the sales department is to obtain orders and then process, coordinate and control all related activities.

The sales force make frequent field trips and bring back or send back orders. Sometimes customers will place their

FIGURE 1.6 THE MARKETING DEPARTMENT - ORGANISATIONAL STRUCTURE



orders directly but usually orders stem from initial enquiries made in response to sales visits or publicity.

It is the function of sales office staff to handle customer enquiries and to make quotations. When an enquiry is placed, sales staff obtain as much information as possible before passing the paperwork into a well defined system involving technical (for product recommendation), costing, production planning (to determine production date) and purchasing (to determine if the necessary raw materials are available or can be made available for a specified production date). On the basis of this information, the quotation is prepared (price and delivery date), the price coming from standard lists or from the marketing coordinator if the order is non-standard.

When a firm order is placed, the sales office handle all the documentation and pass this into the traditional system following a sequence of production planning, purchasing, production planning, production inspection and then commercial. The sales office liaise with the customer and report on the progress of an order whilst remaining in contact with other departments to ensure that the operation is running smoothly.

The increase in competition has meant that marketing has itensified its activities and pays constant attention to customer requirements and research so that the best products

and services can be offered. The marketing effort is now ably assisted by the supporting functions of the newly formed market planning department (publicity, exhibitions, presentations, market research and product development with renewed emphasis on management information and planning systems).

1.7 THE PRODUCTS

The division manufactures a wide range of hoses and ancillary equipment. This product range is classified into six groups. The following table details the groups and their importance to the division in terms of turnover.

TABLE 1.3 PRODUCT GROUPS

Product Group	Description	Approximate % of Turnover
1	Machine made hose, e.g. aviation	3
2	Dock hose	18
3	Offshore oil hose	66
4	Offshore dredger hose	4
5	Vacuum hose, e.g. vacuum cleaner hose	6
6	Factored items, e.g. fenders	3

The hoses produced by the division are sophisticated products consisting of hollow rubber tubes which have to be resistant to the various chemicals to be transported and suitably reinforced to withstand both high pressure and vacuum conditions encountered in working environments.

These products, therefore, are not to be confused with, for example, the domestic garden hose which usually springs to mind at the mention of the word hose. This may be illustrated by reference to the unit lengths, bore size and values of some product examples in the following table.

TABLE 1.4 HOSE EXAMPLES

Product Group	Product Code	Name	Length (ft)	Bore (ins)	Value £
1	1875/C	Aviation	100	2	231
2	5128/1	Dock	25	6	385
2	5122/1	Petrochemical	25	6	489
3	5157/1	*Selflote	33	24	10,230
3	5154/1	*Saflote	33	24	13,000
3	5156/1	*Submarine	33	24	6,160
4	5170/1	*Dredgeflote	33	24	5,900
4	5174/1	*Sub. Dredger	33	24	4,120
5	5133	Vacuum Cleaner	7	2	-
6	12205	Gacoil	100	2	110

* Offshore hoses

The main products, offshore oil hoses (floating and submarine), are used to load and unload supertankers at offshore installations (discussed very briefly in the next section). The demand for these products is thus very dependent upon the demand for oil.

1.8 OFFSHORE SYSTEMS

The division has been the world's leading supplier of offshore hoses since it pioneered the integral floating hose (i.e. "Selflote") and has generally derived 65% of its annual turnover from this business. Thus, a series of diagrams are presented to enable the reader to gain a greater appreciation of the major products (i.e. offshore hoses) and their uses.

An offshore system comprises a monobuoy (usually 6 point chained moored) and one or more strings of floating and submarine hoses (see Figures 1.7 and 1.8).

The floating hose strings (see Figure 1.9) are more standardised (e.g. one string might comprise 25 lengths of 33 foot hoses coupled together) than the underbuoy (or submarine) hose systems, which have to be designed to meet the conditions prevailing at each geographic location (i.e. tidal depths, currents and storms). Several types of underbuoy system are possible and the one most suited to the operating conditions

is selected. The main types of submarine system are:-

1	Chinese Lantern	- CL	(See Fig. 1.7 and 1.10)
2	Lazy "S"	- LS	(See Fig. 1.8, 1.11 and 1.12)
3	Steep "S"	- SS	(See Fig. 1.13)
4	Modified Steep "S"	- MSS	(See Fig. 1.14)
5	Vertical Anchor Leg Mooring	- VALM	(See Fig. 1.15)
6	Single Anchor Leg Mooring	- SALM	(See Fig. 1.16)

The Chinese Lantern and Lazy "S" systems are the most common. An appreciation of the size of a typical Lazy "S" system is possible from Figure 1.17.

The different submarine systems require different numbers of hose, depending on location and depth (see Figure 1.18). The demand for hoses as replacements or as original equipment is therefore dependent upon the system.

1.9 THE MARKET

The division's major concern is to produce large bore hoses, to service the oil industry. The offshore business accounts for approximately 65% of annual turnover. The bulk of the division's business (85% by value) is conducted in export markets.

FIGURE 1.7 MONOBUOY INSTALLATION-CHINESE LANTERN SUBMARINE SYSTEM.

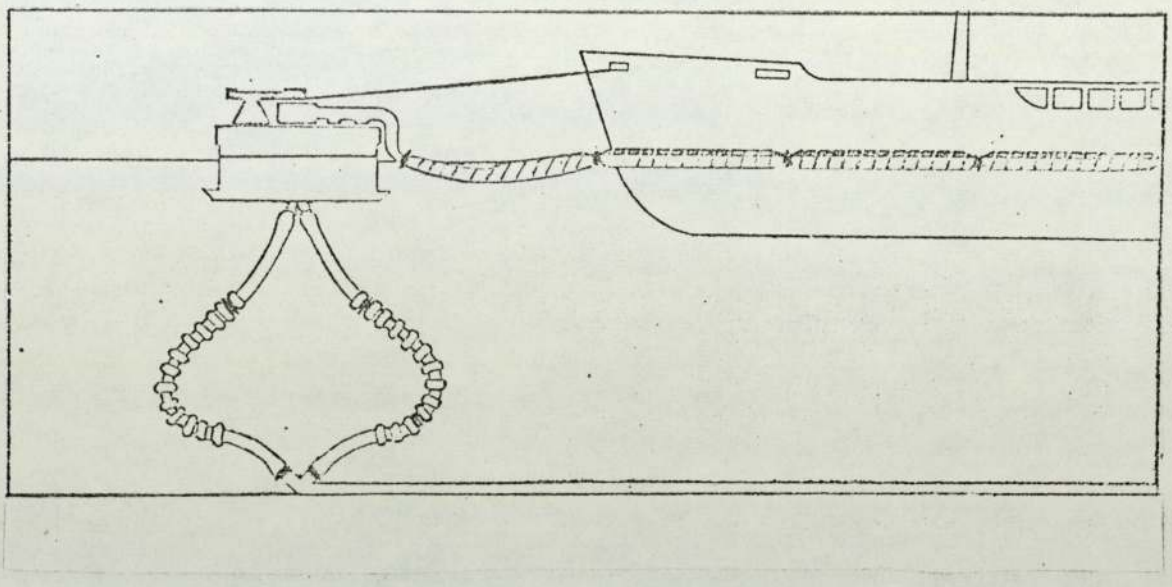


FIGURE 1.8 MONOBUOY INSTALLATION-LAZY 'S' SUBMARINE SYSTEM.

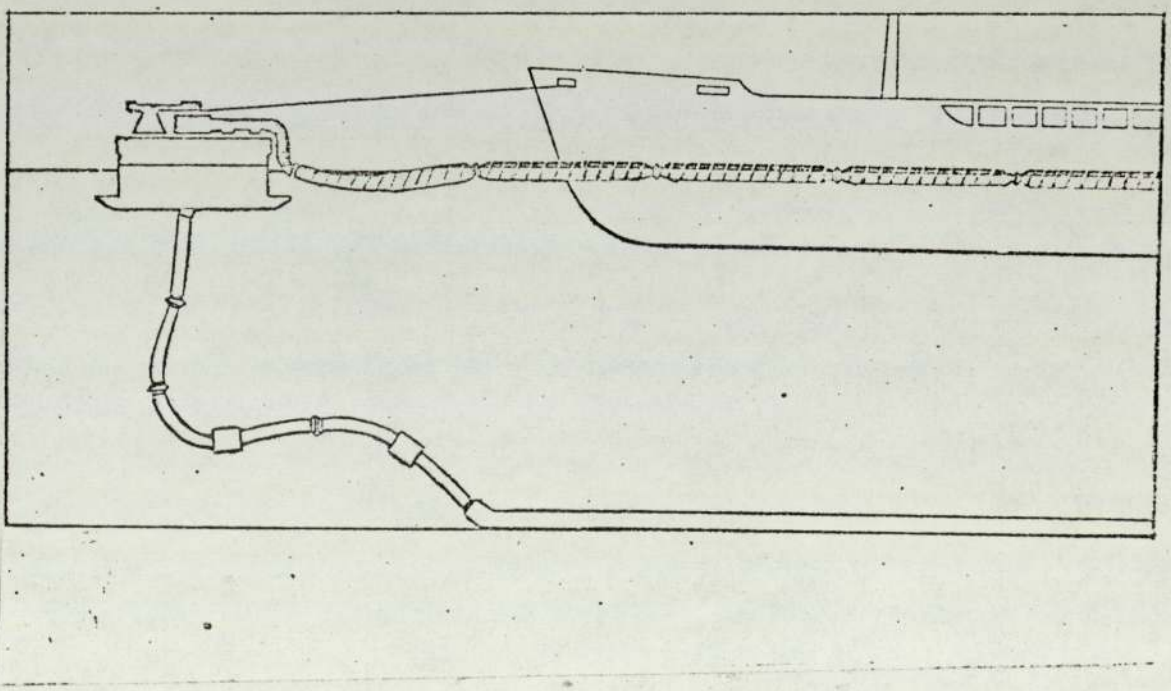


FIGURE 1.9 TYPICAL FLOATING HOSE ARRANGEMENT.

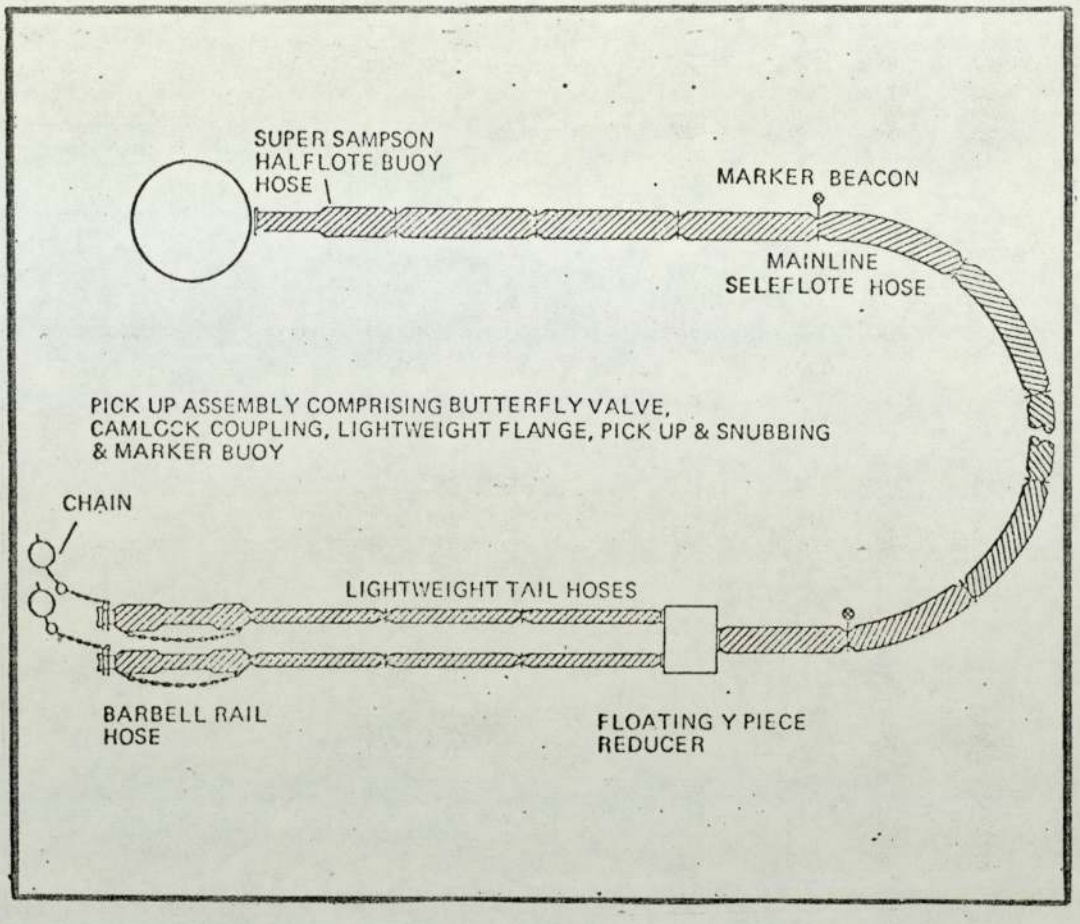


FIGURE 1.10 THE CHINESE LANTERN SYSTEM.

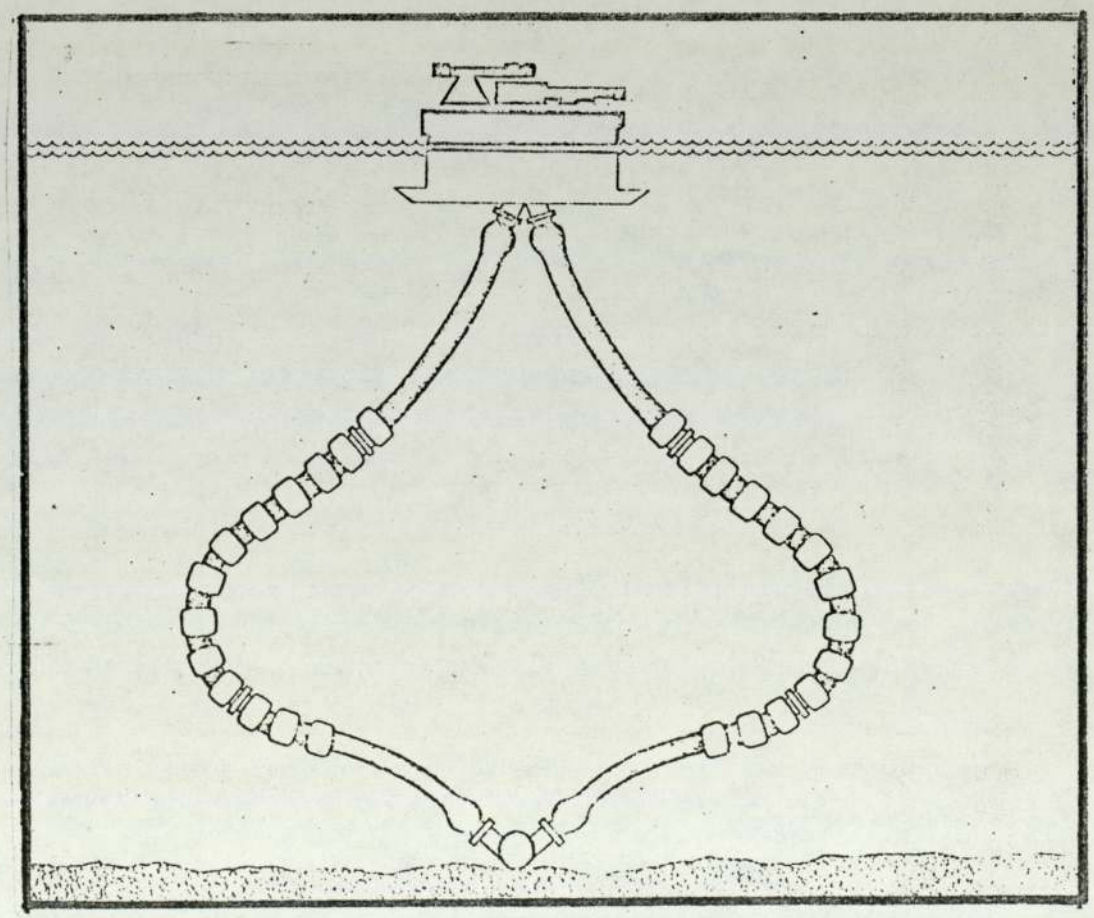


FIGURE 1.11 THE LAZY 'S' SYSTEM WITH BUOYANCY TANKS.

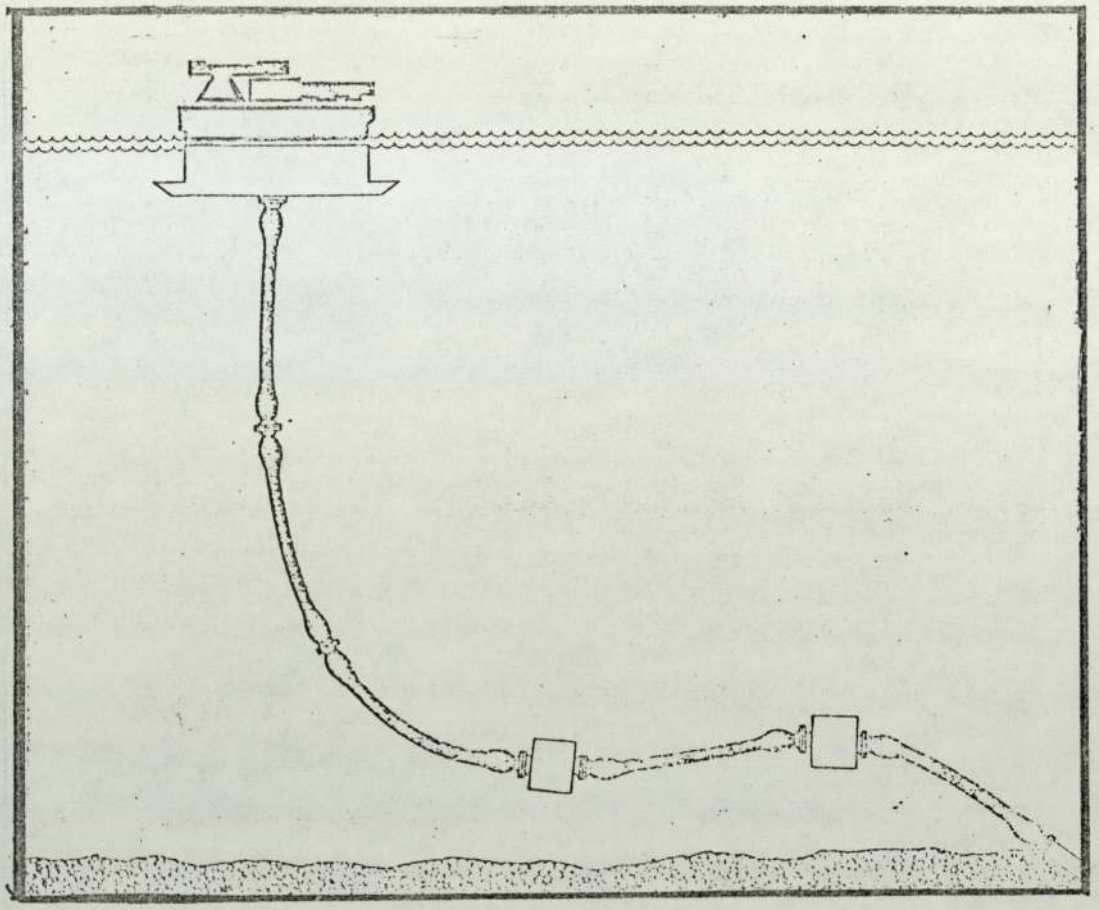


FIGURE 1.12 THE LAZY 'S' SYSTEM WITH SUBMARINE FLOATS.

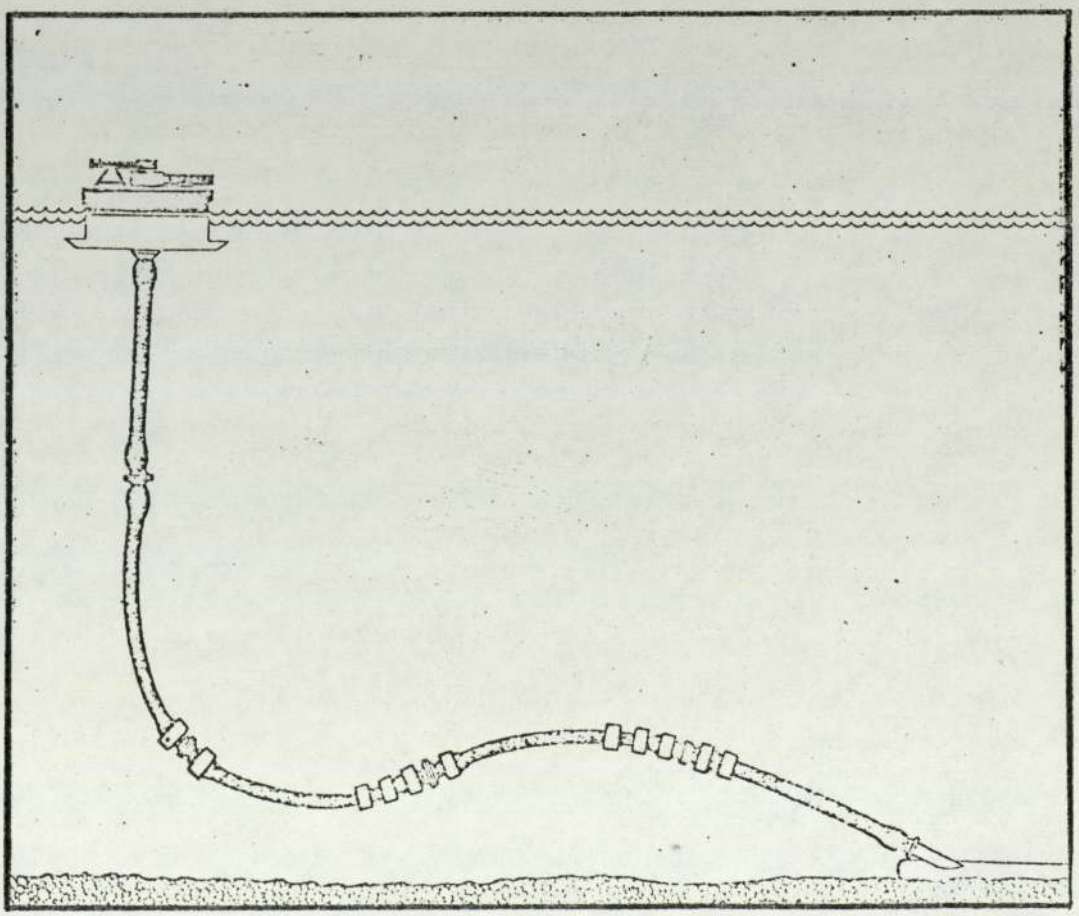


FIGURE 1.13 THE STEEP 'S' SYSTEM.

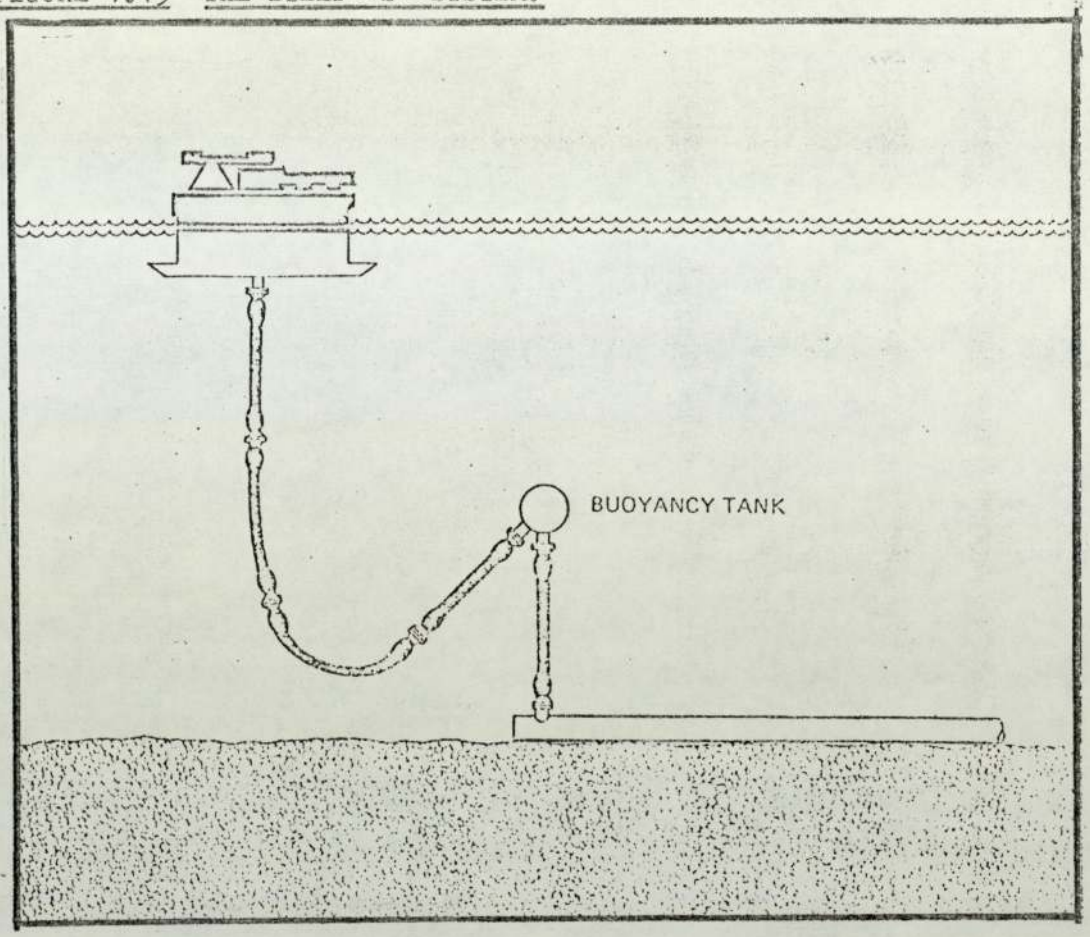


FIGURE 1.14 THE MODIFIED STEEP 'S' SYSTEM.

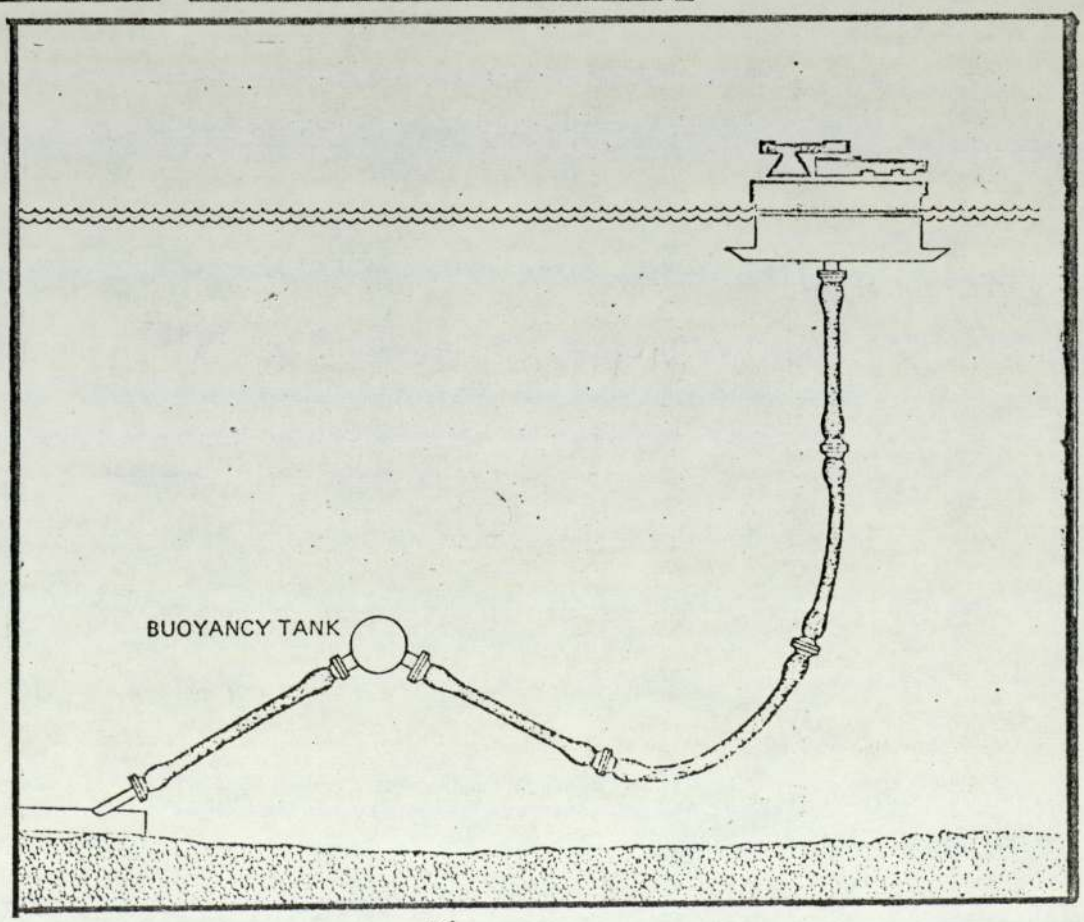


FIGURE 1.15 THE VERTICAL ANCHOR LEG MOORING SYSTEM.

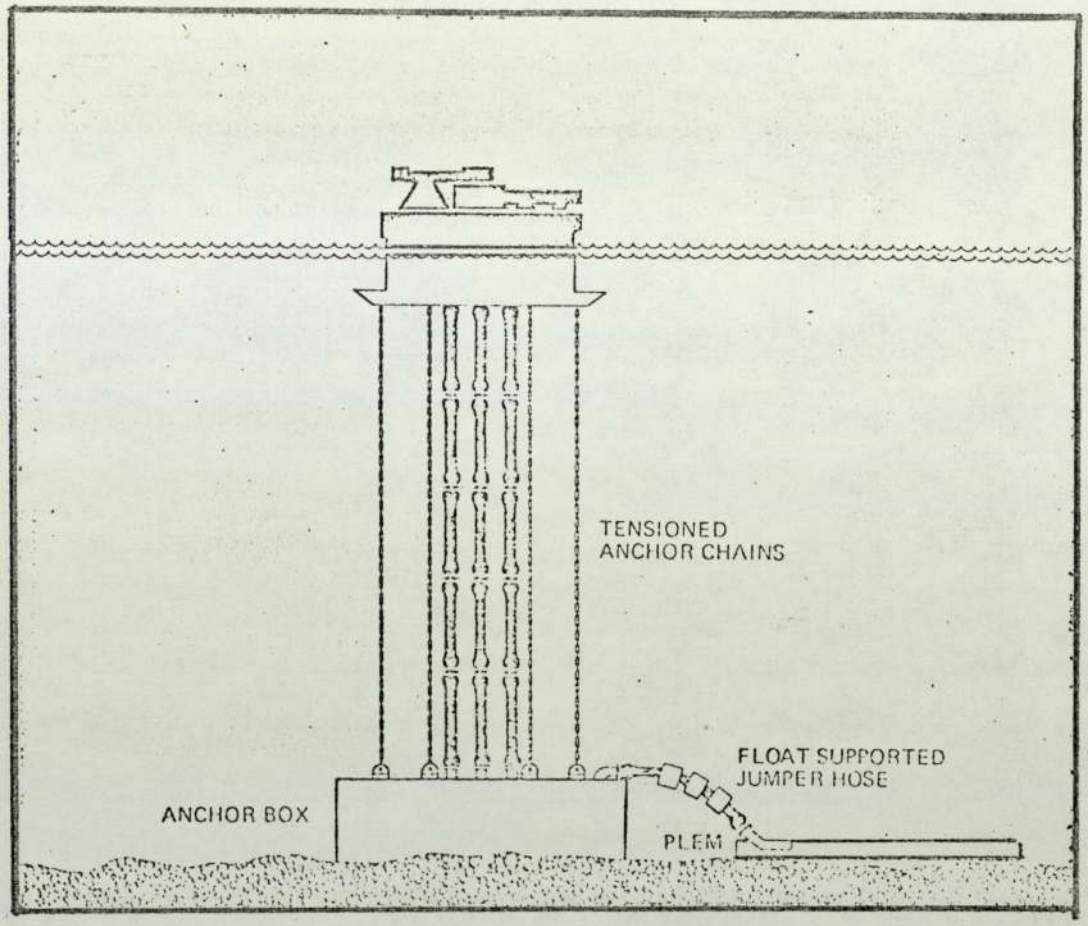


FIGURE 1.16 THE SINGLE ANCHOR LEG MOORING SYSTEM.

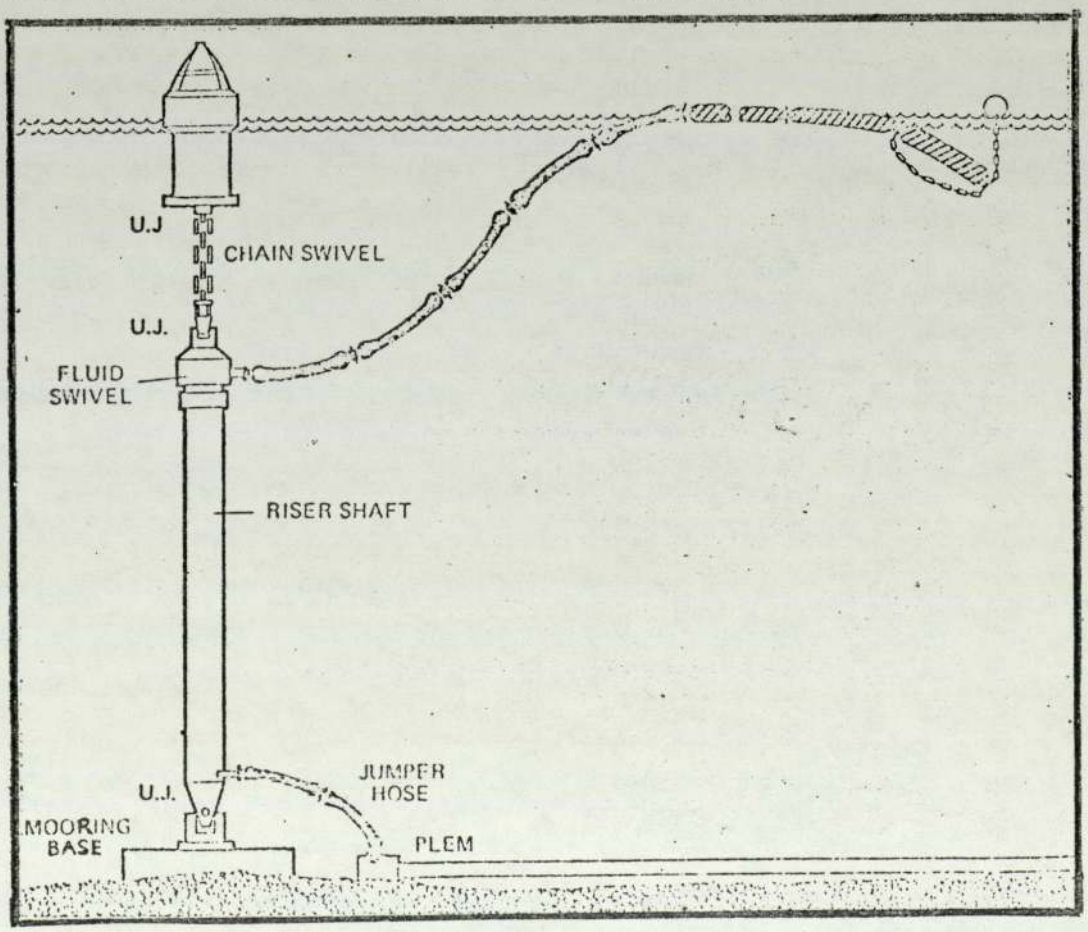


FIGURE 1.17 THE DIMENSIONS OF A TYPICAL LAZY 'S' SYSTEM.

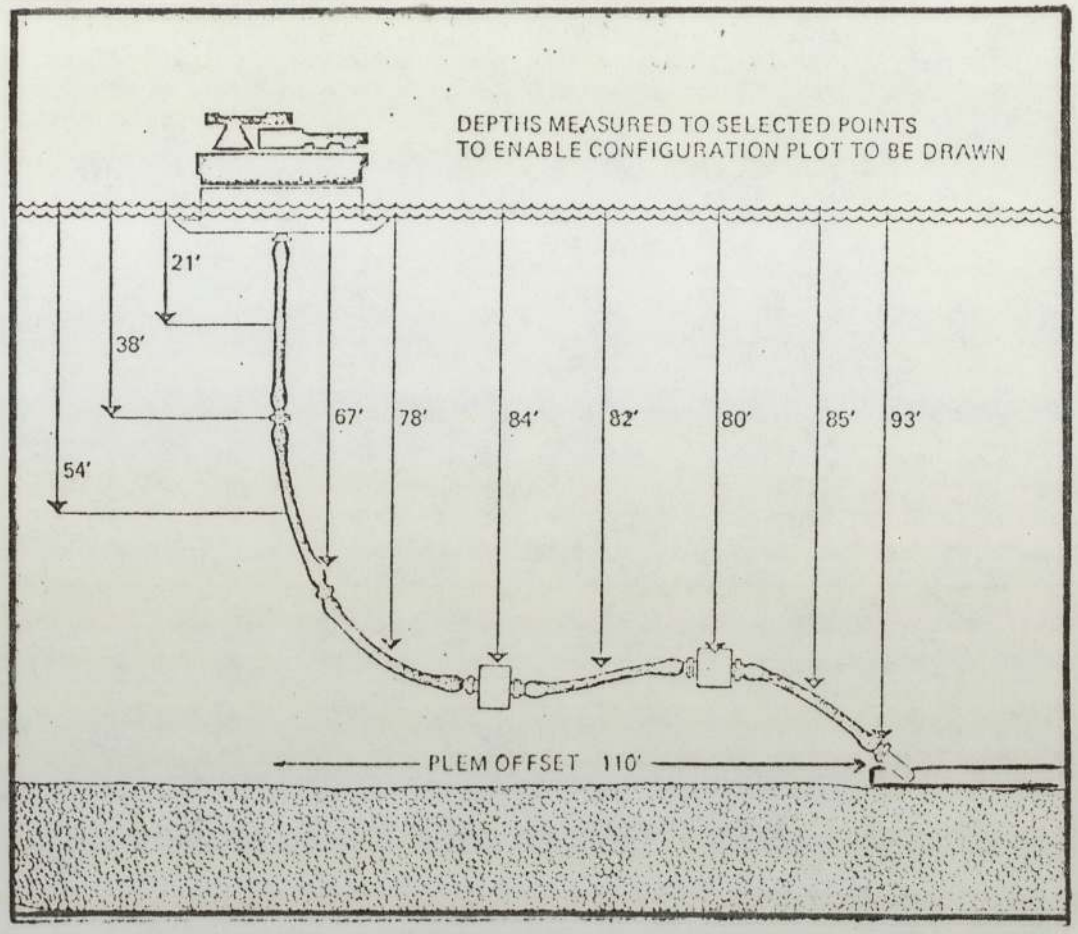
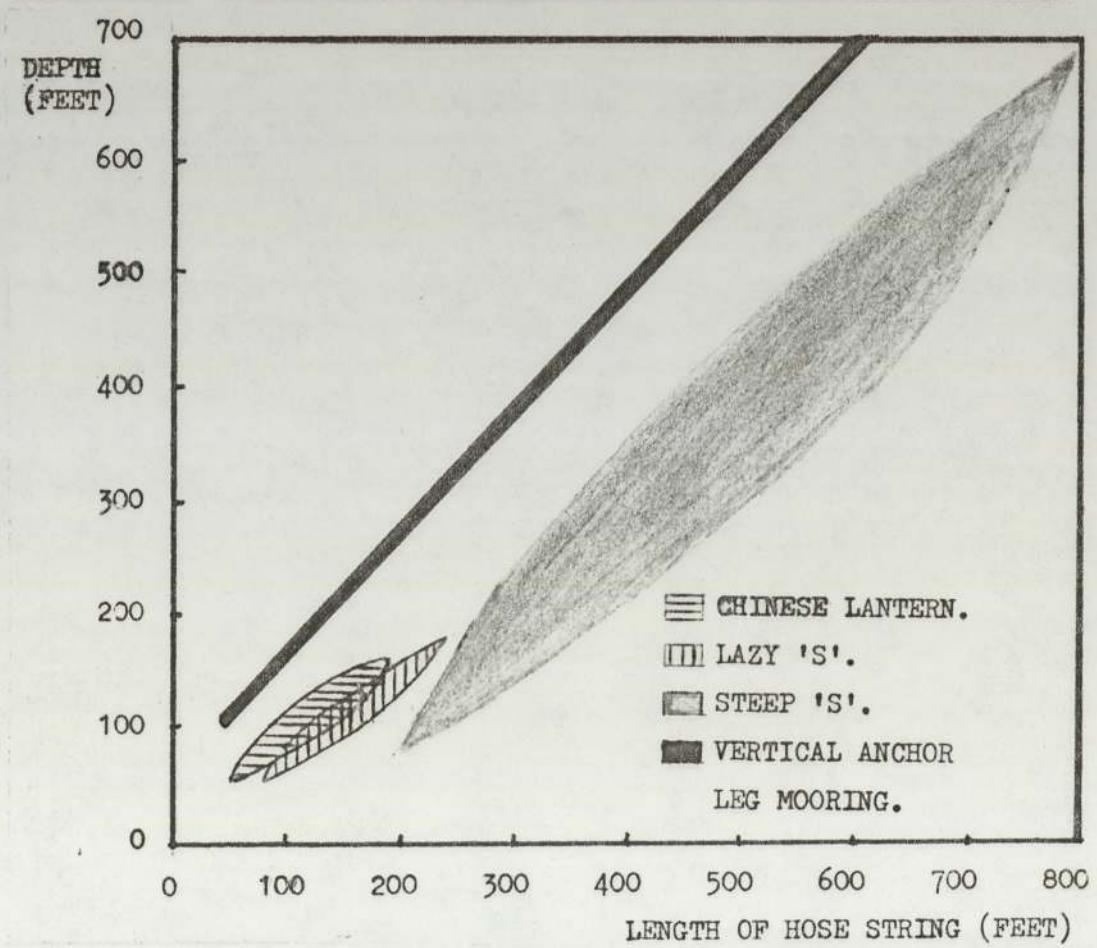


FIGURE 1.18 SUBMARINE SYSTEMS-DIMENSIONS FOR VARYING WATER DEPTH.



The growth of the hose market and the increase in the number of offshore installations is directly related to the rapid growth in the oil market. Therefore, both the oil and monobuoy markets will be considered.

1.9.1 The Oil Market

The demand for oil (1-26) has been increasing for many years to satisfy the thirst of the industrialised countries. This demand (4) is illustrated in Figures 1.19 and 1.20. Indeed, most of the world energy demand in this century has been supplied by oil. In recent years (1950-1975), oil's share of the world's energy market (5) has risen from 30 to 46 per cent (see Table 1.5).

TABLE 1.5 WORLD ENERGY DEMAND

MILLION BARRELS A DAY OIL EQUIVALENT

(Percentage shares are given in brackets)

Resource \ Year	1920	1950	1975
Oil	3 (14)	11 (30)	56 (46)
Solid Fuel	17 (81)	21 (57)	35 (29)
Natural Gas	0.5 (2.5)	3 (8)	21 (17)
Hydro-Electric	0.5 (2.5)	2 (5)	7 (6)
Nuclear	-	-	2 (2)
TOTAL WORLD DEMAND	21	37	121

FIGURE 1.19 WORLD OIL - CONSUMPTION (1964 - 74).

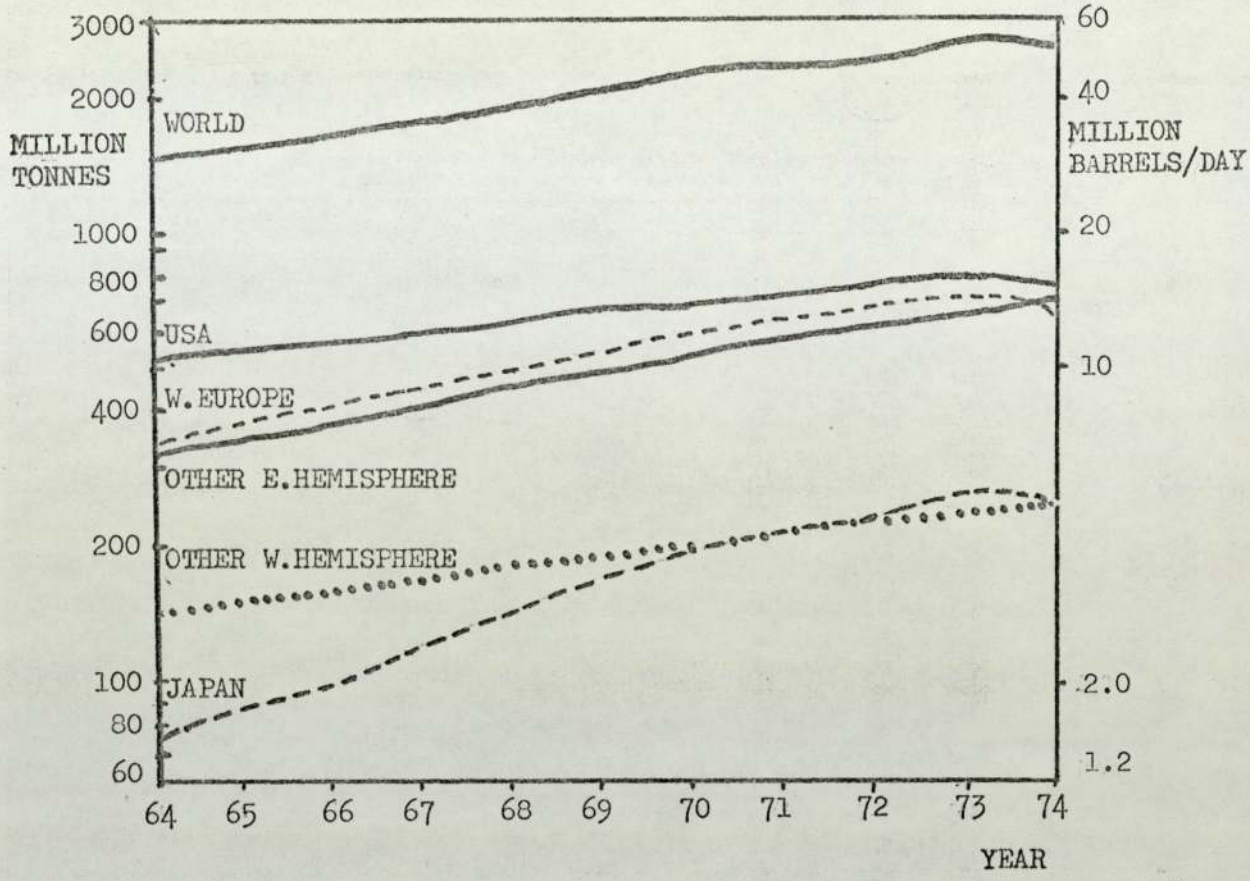
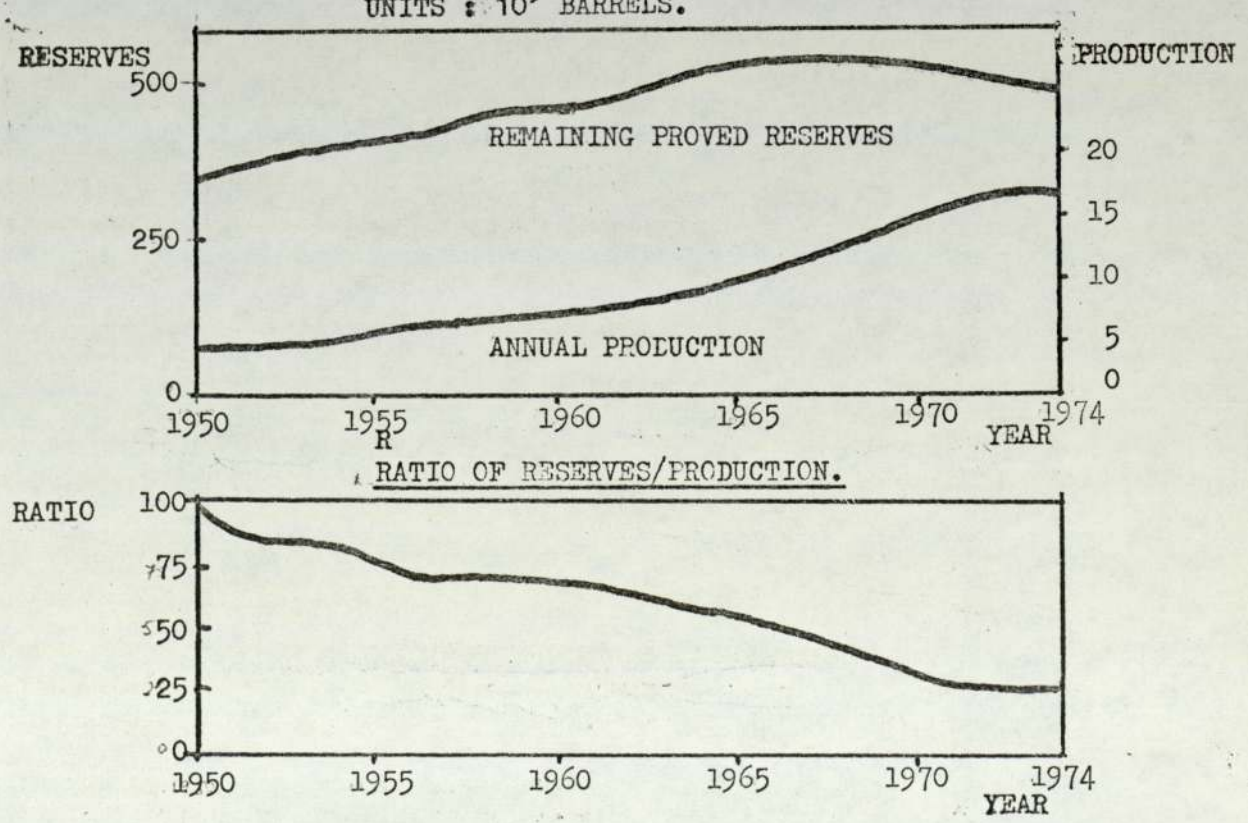


FIGURE 1.20 WORLD OIL - RESERVES AND PRODUCTION (1950 -74).

((EXCLUDING USSR,E.EUROPE AND CHINA).

UNITS : 10^9 BARRELS.



Oil is used both as a fuel and as a raw material. Increased demand for plastics, synthetic rubbers, synthetic fibres, explosives, drugs, paints, dyes, fertilizers, insecticides and other petrochemical derivatives caused a corresponding increased demand for crude oil. At the same time, there was an increased demand for oil as a fuel for industry, transport and electricity generation. This demand is illustrated for the U.K. (6, 7) in Figures 1.21 - 1.26.

The political manoeuvres of the oil exporting countries in recent years (starting with the energy crisis of 1973/4) have shown that oil is a commodity which can no longer be taken for granted, and the drastic increases in price have caused many users to make economies. Fortunately for a period after 1974, the situation stabilised and there was a slow return to a pattern of growth, although at a reduced rate. The most recent actions (1979) have further emphasised the need for slower growth and conservation. The world production of oil (5) and the contribution made by the OPEC countries is shown in Table 1.6.

TABLE 1.6 OPEC AND WORLD OIL PRODUCTION

MILLION BARRELS A DAY OIL EQUIVALENT

(OPEC percentage shares are given in brackets)

Year	OPEC Production	World Production
1972	25.7 (49)	52.8
1973	29.3 (51)	57.8
1974	29.6 (51)	58.2
1975	25.5 (46)	55.7
1976	28.6 (48)	59.7

FIGURE 1.21 U.K. FINAL ENERGY DEMAND BY SECTOR

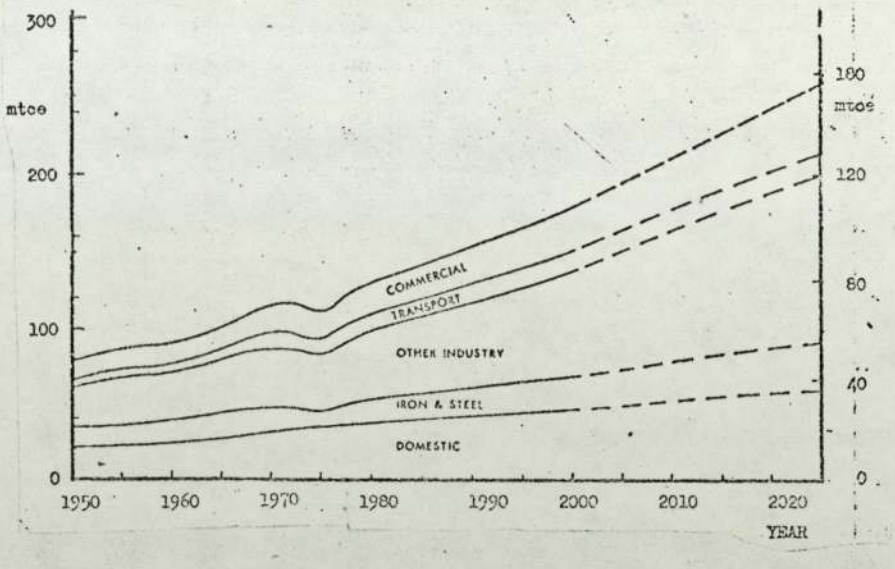
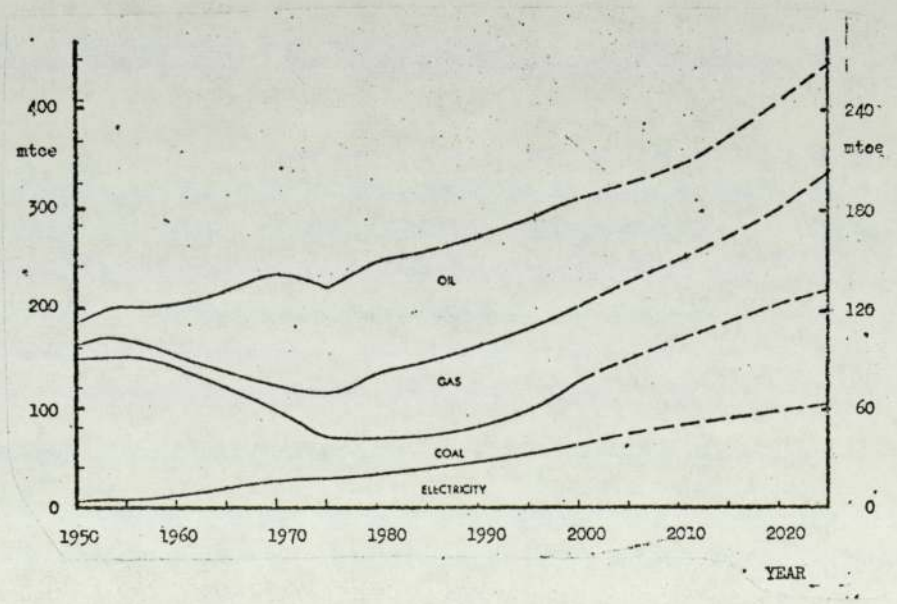


FIGURE 1.22 U.K. ENERGY CONSUMPTION BY RESOURCE



mtce - million tons coal equivalent
mtoe - million tonnes oil equivalent

FIGURE 1.23 U.K. PRIMARY FUEL CONSUMPTION

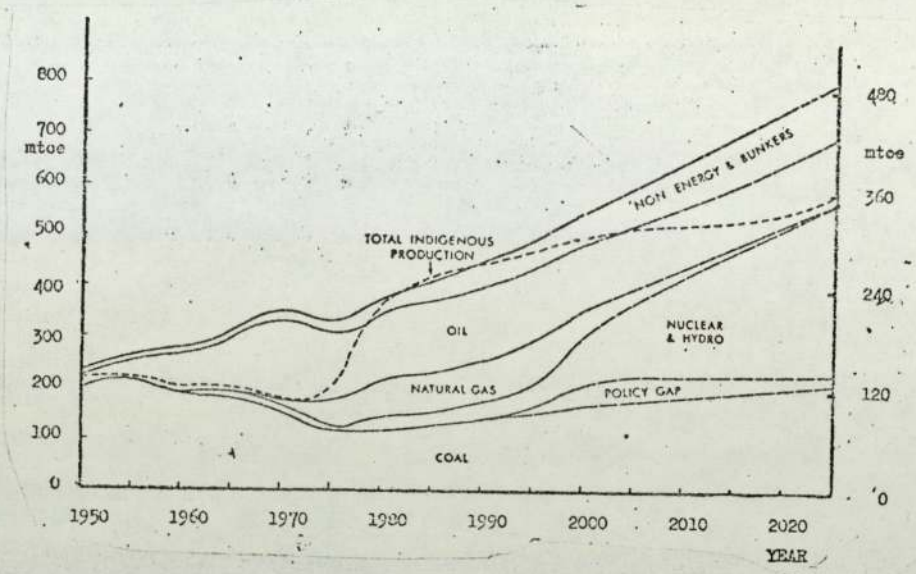
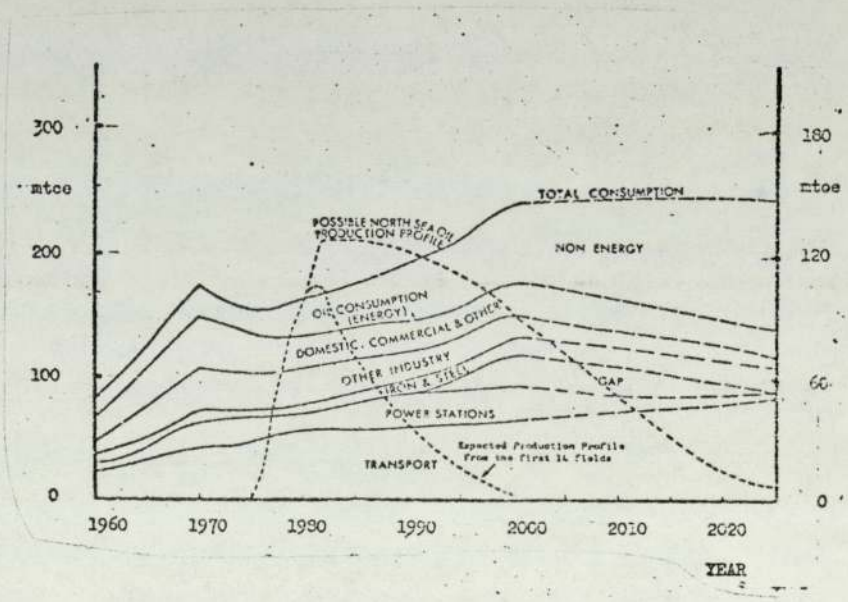


FIGURE 1.24 U.K. OIL CONSUMPTION



mtce - million tons coal equivalent
mtoe - million tonnes oil equivalent

FIGURE 1.25 U.K. POWER STATION FUEL MIX (LIMITED NUCLEAR CONTRIBUTION)

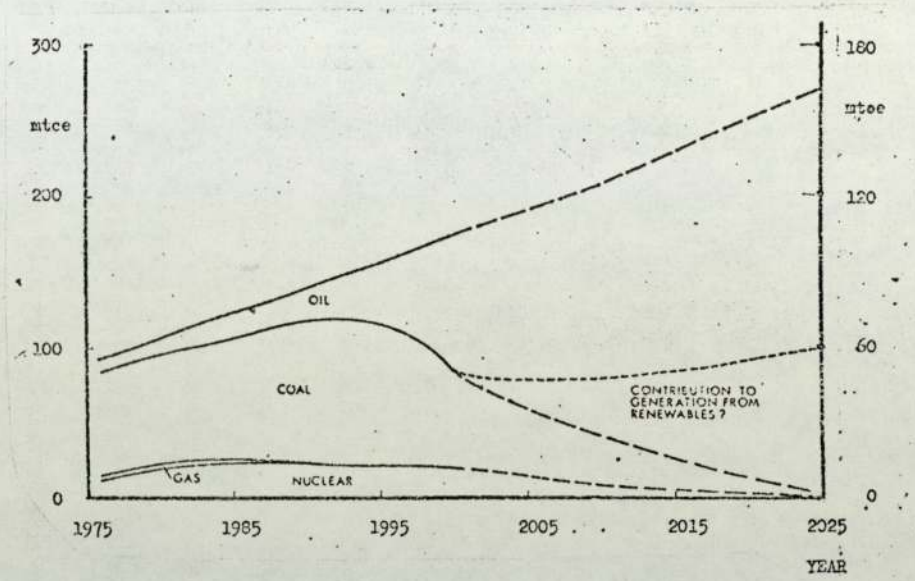
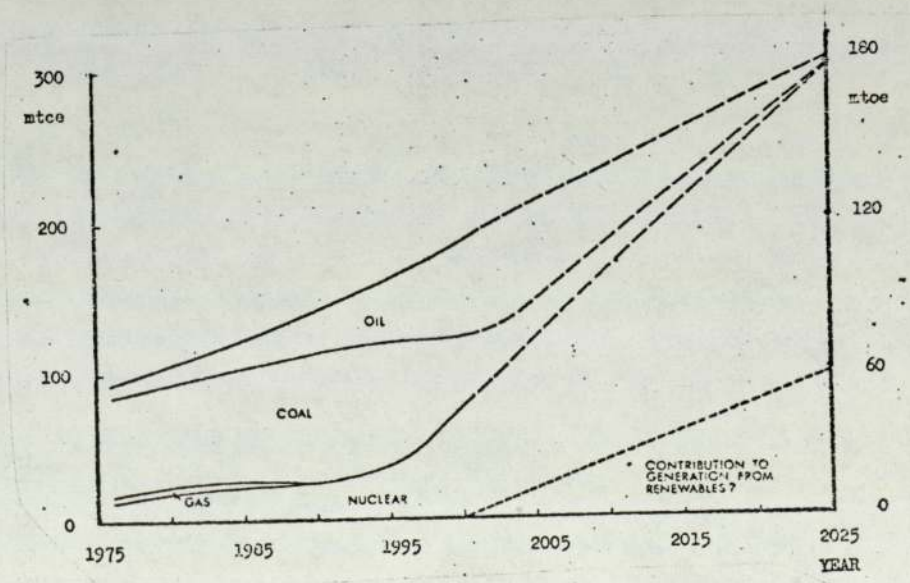


FIGURE 1.26 U.K. POWER STATION FUEL MIX (LOW COAL AVAILABILITY)



mtce - million tons coal equivalent
mtoe - mullion tonnes oil equivalent

Alternative forms of energy can be developed but substitute materials for industry are not readily available at economic prices.

The Club of Rome (8) have estimated the limited life spans of some of the world's non-renewable resources. Their figures indicate that the known reserves of oil and other common materials (often dependent upon oil for refining and processing) will last until the early part of the next century (see Table 1.7).

Indeed, crude oil production (5) has virtually doubled every ten years since 1935 (see Table 1.8) and, at the current rate, known reserves (5, 10) would only last for another 25 years (see Table 1.9). The events of 1973 underlined the world's dependence on oil and the need for new energy sources and efficient energy use.

TABLE 1.7

NON-RENEWABLE NATURAL RESOURCES

Resource	Global Reserves	Lifespan at Current Consumption (Years)	Lifespan in Growth Environment (Years)	Lifespan for (Reserves) x 5 in Growth Environment (Years)
Energy:				
Petroleum	4.55×10^9 bbls	31	20	50
Natural Gas	1.14×10^{15} cu.ft	38	22	49
Coal	5×10^{12} tons	2,300	111	150
Others:				
Lead	91×10^6 tons	26	21	64
Copper	308×10^6 tons	36	21	48
Aluminium	1.17×10^9 tons	100	31	55
Iron	1×10^{11} tons	240	93	173

TABLE 1.8 CRUDE OIL PRODUCTION HISTORY

BILLION BARRELS

Time Period	Production
Up to 1925	12
1926-1935	13
1936-1945	21
1946-1955	38
1956-1965	77
1966-1975	159
CUMULATIVE WORLD PRODUCTION	320

TABLE 1.9 CRUDE OIL RESERVES

BILLION BARRELS

Source	Known Reserves (at end of 1975)	Ultimately Recoverable Reserves (Estimated)
OPEC	403	-
Non-OPEC	164	-
WORLD TOTAL	567	2,000

Statistics obtained from other publications (5,9) indicate that there will be a continuing demand for oil until the early part of the next century (see Table 1.10).

TABLE 1.10

POTENTIAL WORLD ENERGY SUPPLY

MILLION BARRELS A DAY OIL EQUIVALENT

(Percentage shares are given in brackets)

Resource \ Year	1975	*1985		*2000	
		Low Growth	High Growth	Low Growth	High Growth
Hydro/Geothermal/Solar	6.0 (7)	8 (7)	8 (7)	11 (7)	14 (8)
Natural Gas	15.0 (18)	19 (17)	21 (17)	20 (13)	25 (13)
Nuclear	1.5 (2)	10 (8)	12 (10)	27 (17)	28 (15)
(Additional Nuclear or Coal)	-	-	-	12 (8)	15 (8)
Coal	15.0 (18)	19 (17)	19 (15)	25 (16)	29 (16)
Oil	45.5 (55)	58 (51)	63 (31)	60 (39)	74 (40)
Potential Supply	83.0	114	123	155	185
Desired Demand	-	-	-	160	200
Unsatisfied Demand	-	-	-	5	15

* Estimates for 1985 and 2000 are based on low and high growth scenarios (9) for the world outside the USSR, Eastern Europe and China.

The continued health of the oil industry and related industries is further supported (1-27) by the UK and world figures presented in Tables 1 - 18 in Appendix 1.2. The data in Appendix 1.2 shows a general increase in demand until 1973/74 when the "oil crisis" caused a cutback or stabilisation, whilst new demand levels were being determined (Tables 1 - 9), some imports and exports (Tables 10-16) and some global forecasts (Tables 17-18).

The existing reserves will last until the next century and new discoveries are being made (e.g. in the North Sea) that will further extend the life of the oil industries. Indeed, the oil from the North Sea should make the UK self-sufficient (6,7) by the 1980's (see Figures 1.23 and 1.24), possibly even an exporter.

Thus, whilst there is this demand for oil, there will be a need for transportation systems (using hoses or alternative technologies) for many years until oil reserves either diminish or alternative sources of energy and raw materials are developed.

1.9.2 The Monobuoy Market

The increased demand for oil and the closure of The Suez Canal (1956) led to an increase in tanker size, to make the long sea route round Africa more economical, and prompted the move to

offshore terminals (monobuoys). The number of monobuoys increased from 1 in 1959 to 182 in 1978, and so too did the demand for hoses. As tanker sizes increased, so did the hose sizes and, whereas in the early 1960's 8" and 12" hose systems were adequate, today 20" and 24" systems are needed to service the supertankers (also referred to as VLCC's, i.e. Very Large Crude Carriers).

An offshore installation has the advantage that it can be used in gale conditions, whereas in the past storms resulted in increased tanker downtimes (i.e. waiting times), because the vessels could not safely enter or leave the harbours. Furthermore, the new supertankers were too large for many ports and more offshore systems were built to accommodate them.

At the commencement of this study, the division possessed a knowledge of 152 of the monobuoys in service in the world. (See Table 1.11).

The division was responsible for the original installation of 66 of this group of 152 monobuoys. The division is the leading manufacturer and enjoys a very large share of the replacement business. Also, because of its expertise and reputation, the division obtains a large share of the smaller original equipment business.

TABLE 1.11 SUMMARY OF MONOBUOYS AND HOSES IN SERVICE

Geographic Area	No. Buoys	Floating Hose	Submarine Hose	Total Hose
Middle East & Egypt	30	1,808	351	2,159
Japan, Taiwan & Korea	24	1,234	215	1,449
Other S.E. Asia	24	1,040	293	1,333
S. America & Caribbean	15	689	135	824
W. Africa	16	678	124	802
Europe (excluding N. Sea)	13	660	72	732
N. Africa	12	442	98	540
N. Sea	10	205	114	319
Australasia	3	141	24	165
E. Africa	2	98	26	124
N. America	1	31	5	36
India	2	50	30	80
TOTAL	152	7,076	1,487	8,563

The literature (28,29) and the division's market intelligence indicate that there are now 200 offshore systems in the world, comprising 182 monobuoys and 18 systems using alternative technologies (see Figures 1.27 and 1.28). As a result of continued research, the division now possesses information on most of these and a more detailed treatment of findings is presented in Chapter 5.

FIGURE 1.27 OFFSHORE SYSTEMS - INSTALLED ANNUALLY.

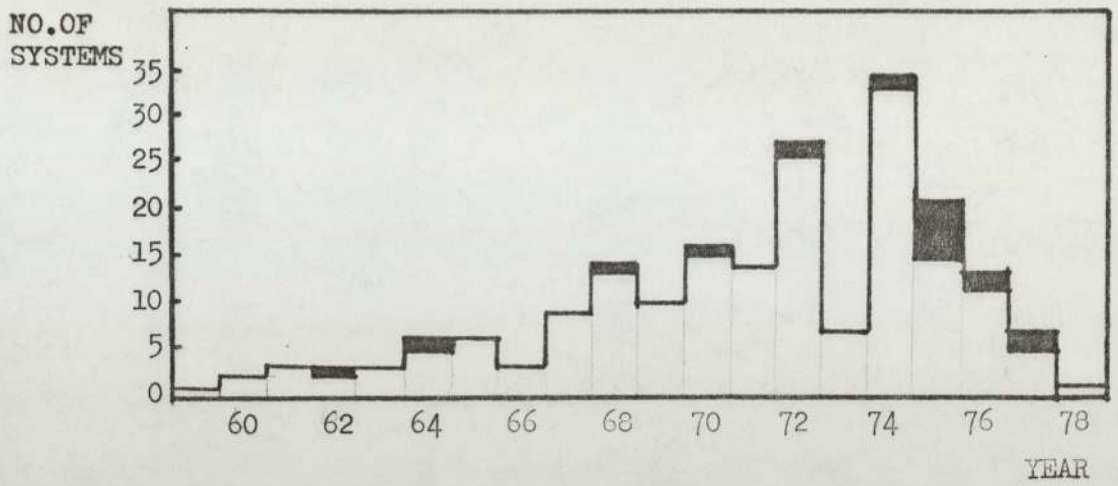
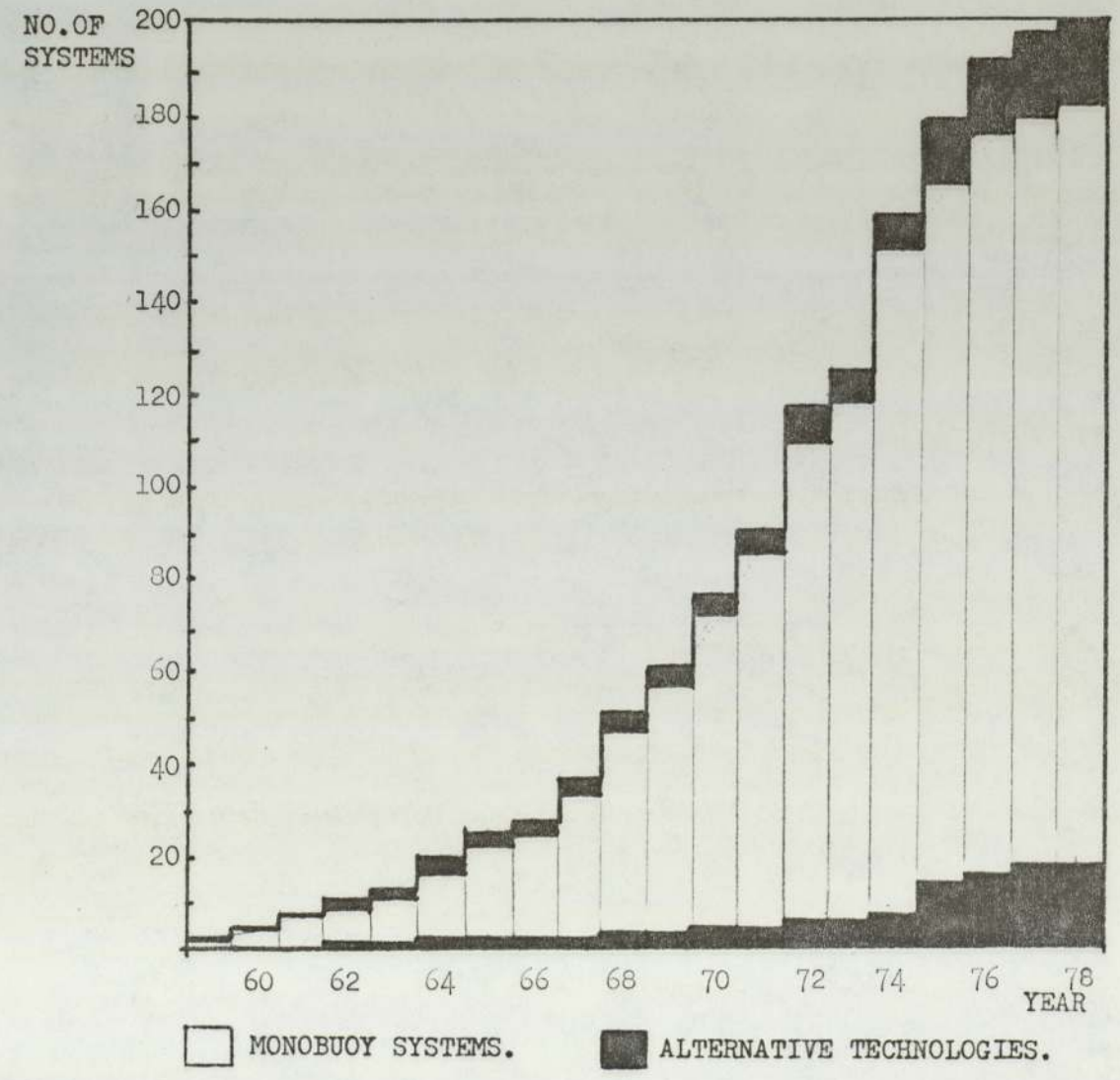


FIGURE 1.28 CUMULATIVE ANALYSIS OF OFFSHORE SYSTEMS INSTALLED. (ALL SYSTEMS, MONOBUOY SYSTEMS AND ALTERNATIVE SYSTEMS).



1.10 COMPETITION

The rapid growth in demand for hoses for many different operations caused an increase in the number of manufacturers operating in the market. These manufacturers did not offer as many products as the division and tended to develop smaller product ranges to serve specific market segments. The division faces competition from other hose manufacturers and alternative technologies. Competition is discussed separately for the offshore business (64% of annual turnover) and the other business (36% of annual turnover). Thus:-

1.10.1 Offshore Competition

Dunlop captured the major share of the offshore market in the sixties with the product Selflote (the first integral floating hose). The division went through a period of rapid growth whilst it had this technological lead. The main competition in those early days came from Uniroyal and Hewitt Robins. These two firms, like Dunlop, had expertise in submarine hose manufacture but their progress in the floating hose market was limited. Indeed, the products they offered initially for floating operation were submarine hoses with flotation beads. The integral floating hose far surpassed these other products and proved most reliable even in adverse operating conditions. A reputation for an excellent product and installation expertise gained the division a very large share of both replacement and original equipment business.

There are now eight major manufacturers (including Dunlop) competing for a share of this market. The declining demand for original equipment has led to fierce competition for replacement business. The firms produce products of similar quality and success in the market depends very much on company reputation, marketing skills and prices. The major threat to the division comes from Birdgestone (Japan) whose prices are 20-45% below Dunlop prices because of company discounts and Japanese government rebates. Additional competition comes from alternative technologies (e.g. the move to deeper waters and the use of fixed towers and articulated columns), requiring fewer hoses.

The effects of this competition, combined with lower production rates and improved quality (i.e. increased hose life) resulting from stringent internal and independent inspection, explain the decline in the offshore hose volume from 1974 (see Table 1.2).

Despite this competition, the division retains its position of market leader with a market share of about 50%. This market share may best be illustrated by means of a simple calculation performed on the total number of hoses given in Table 1.5. Thus:

Average operating life of a floating hose = 3 years

Average operating life of a submarine hose = 2 years

Hence potential replacement business $= \frac{7076}{3} + \frac{1487}{2} \simeq 3100$

In 1976 the division sold 1644 hoses, i.e. 53% of the estimated replacement business.

1.10.2 Other Competition

There are numerous manufacturers competing for business for other hose applications (e.g. dock, petrochemical, aviation and drilling). The other manufacturers offer smaller product ranges than Dunlop and have developed expertise in selected sections of the hose market, just as the division did in the offshore context. This expertise coupled to on-going research (limited in the case of the division because of its large product range) makes them a serious threat to the division's performance in the other hose sections. Furthermore, a change in technology (i.e. the use of metal arms in harbours) has considerably reduced the demand for new dock hose installations, whilst a large replacement business remains. This general decline in the dock hose business is shown in Table 1.2.

1.10.3 The Changing Market

The marketplace has changed considerably from the early years when the division faced limited competition and could demand high prices. The current market is very dependent upon price and Dunlop has to modify its approach to retain its market share against Bridgestone particularly and its much lower prices. In essence, the situation has changed from a seller's market to a buyer's market.

1.11 CONCLUSION

This chapter has traced the development of the division in a growth market. The increased demand for oil for use both as a fuel and a raw material by the industrialised countries of the world accounts for the rapid growth of the hose market. The division pioneered its floating hose, just as the oil industry was entering a new growth phase. The division, consequently, gained a very large share of the offshore market whilst it had this technological lead over its competitors. Competitors trying to gain a share of this very lucrative market had to develop comparable products and dynamic marketing approaches.

In the early years there were only a few competitors and the division retained its position as market leader by virtue of its reputation for product quality and supporting services. However, there are now more competitors capable of producing reliable products and pricing has become an important marketing tool. Furthermore, the rapid increases in oil prices in recent years have made the customers very price conscious. The division still has an excellent reputation but has had to revise its marketing activities and pricing policies to retain its position in a very competitive market.

Research has indicated that there will be a continued demand for oil for many years and therefore a demand for a transportation

service using hoses or an alternative technology. The division has realised that more appropriate management support will be required, to help monitor current performance and to improve planning activities, if it is to retain its market leadership. Much of this support will come from the newly formed marketing planning department which will be responsible for presentations, exhibitions, advertising, setting up formalised market research (to aid planning and direction of research activities to both improve and diversify the product range) and improving the quality of management information and planning.

The next two chapters describe the old information and planning systems and the remaining chapters describe the work done to improve these, their value and their scope for the future.

CHAPTER 2

THE OLD MARKETING AND SALES INFORMATION SYSTEM

2.1 INTRODUCTION

The division found that its old (computer and manual) information system was inadequate for its new needs. This was hardly surprising as the division went through a period of rapid growth, without modifying the system to provide relevant information in suitable formats. In the competitive market in which the division operates, relevant, reliable and timely information is required by the managers so that performance can be constantly monitored and corrective action taken as required.

The role of Management (30-33) is to plan, organise, motivate, control and (32,33) develop people. Management (30) has been defined as 'deciding what should be done and then getting other people to do it'. Therefore, managers are decision makers (33) and are responsible for:-

i) defining the problem (e.g. maintaining or improving the profitability of the firm)

ii) analysing the problem

iii) developing alternative solutions

iv) deciding upon the best solution

v) converting the decision into effective action.

Decision makers require accurate and timely information, at the desired level of detail, in order to exert effective controls, formulate strategies and make good plans.

2.2 HISTORICAL BACKGROUND

In the sixties the division had been a production centre and the major management functions had been controlled from the Gateshead Headquarters of Hose Group. The reports produced at Grimsby were thus related to production activities and are listed in Appendix 2.1.

In 1970 Marketing, Accounts and Personnel Departments were established at Grimsby. There was an information void which was remedied by the introduction of a manual system producing specific reports for marketing management on a regular basis. The most important reports were the orders received list, the sales synopsis, the product operating report and the management report.

The division's first experience with computers was with the payroll system which was standard to the company. The introduction of the payroll system was followed by a Marketing and Sales System. This had been developed for the division as an offshoot of a Hose Group system which was more suited to the needs of Industrial and Hydraulics divisions. Whilst the system permitted certain more detailed analyses of sales than the manual system, these did not greatly assist management. Indeed, many of the computer reports were found to be inaccurate and untimely and some fell into disuse. Even so, these reports were produced regularly by the system whilst management relied very much on the manual reports. The manual system complemented and supplemented the computerised reports and was fully controlled by the Grimsby users. A list of the reports produced appears in Appendix 2.2.

The information from all these reports should have formed a most effective tool for management. However, the reports were basically financial summaries and much useful detail was suppressed in their preparation. Thus, part of the project was to review the sub-system dealing with the requirements of the Marketing Department.

2.3 THE MANUAL SYSTEM

Many reports were produced by accounts and marketing departments to inform managers of the division's performance. The reports were distributed to various levels of management and strategies reviewed as required.

The reports were well structured and served as specific information sources to aid management to control their various activities. The most important reports detailed orders, sales and outstanding orders and compared actuals with plans in financial terms.

Unfortunately, the reports concentrated only on the financial aspects and detailed analyses of the volume mixes of the orders, sales and outstanding orders were not carried out. It was recognised that detailed analyses of both volume and value would form a much more useful management tool, but that this would be a mammoth task if performed manually.

The main reports are briefly discussed in the following sections.

2.3.1 The Orders Received List

SPECIMEN - Figure 2.1

ORIGINATOR - Export Sales Clerk (now Assistant to the Home Sales Manager)

REQUIRED - Weekly, due Monday/Tuesday of the following week

SOURCE DATA - UK, Export, Projects and NACO (i.e. North American Associated Companies) figures from customer orders

DISTRIBUTION -

Divisional Director	Chief Accountant	Export Coordinator
Divisional Marketing Manager	London Sales Manager	Export Executives
Management Committee	European Sales Manager	Home Representatives
Product Manager	Market Planning Manager	Sales Accounts
Export Sales Manager	Commercial Manager	Offshore Projects
Home Sales Manager	Traffic Manager	Production Planning Manager

OBJECTIVES - To monitor in-coming orders by type, by bore size, by value, by customer and by market

ACTION - Performance discussed by management
Trends analysed and future policies evaluated
Home Sales Manager able to assess performance of representatives
Performance may indicate weak areas or product lines and permit corrective action to be taken

Note - Historically, the orders were just classified as Home or Export Orders, but now are categorised by Home (Direct and Associated), Export (Direct and Associated), Original Equipment and NACO.

FIGURE 2.1

ORDERS RECEIVED LAST WEEK ENDING 14/1/78

U.K.

WEEK 2

CUSTOMER	O/NO	LOCATION	REP HOSE	TYPE	ITEM VALUE	TOTAL
KODAK LIMITED	50467	Hemel Hempstead	IWP 1 off x 3"i.d	5440	61	61
I.C.I.	50468	Mond	TNS 2 x 6"	5440	109	218
B.P. OIL	50469	Dundee	R.G. 4 x 50' x 4"	5128/2	405	1620
" "	"	"	" 4 x 50' x 4"	5128/2	405	1620
HAWKINS & TIPSON	50470	London	- 120 off x 3'6" x 8"	5118/1	48.07	5769
ASSOCIATED OCTEL	50471	Ellesmere Port	TNS 4 x 6"	5440	TBA	TBA
W.G. PHILIP	50472	Dundee	RG 2 x 75' x 1½"	18750	124	248
G.E.C. GAS TURBINES	50473	Leicester	TNS 4 x 3"	5440	80	320
					TOTAL U.K.	£9856

EXPORT

WEEK 2

CUSTOMER	O/NO	LOCATION	HOSE	TYPE	ITEM VALUE	TOTAL
ARCO	20996	Indonesia	5 x 16" x 33'	5152/6	2652	13260
ARCO	20994	Indonesia	8 x 16" x 33'	5152/6	2652	21221
ARCO	20994	Indonesia	2 x 16" x 33'	5156/7	3184	6368
RAZNO IMPORT	20929	Russia	40 x 7.5mrs x 4"	5128/1	140	7600
RAZNO IMPORT	20929	Russia	15 x 10mrs. x 12"	5128/4	921	13815
TEXACO	20998	Trinidad	1 x 4" x 25ft	5124	213	213
CALTEX (U.K.) LTD.	21002	Dubai	2 x 10"i.d. x 30ft	5130/1	1015	2030
VARIMA	21003	Saudi Arabia	4 x 6"i.d. x 40ft	5128/4	681	2724
DUNLOP KENYA	21005	Kenya	6 x 4" x 20ft	5128/2	256	1536
DE BOER	21006	Holland	4 x 30mrs. x 4"	12205	193.75	775
SHELL NETHERLAND	21007	Holland	7 x 6mtrs. x 4"	5128/1	200	1400
SHELL NETHERLAND	21007	Holland	2 x 6 mtrs. x 6"	5128/1	260	520
ARAMCO	21008	Saudi Arabia	Blind Flange 5 x 16"	5134	276	1380
IRANIAN OIL SERVICES	21009	Iran	5 x 102mm i.d. x 7.62	12205	49	245
OUDE LIJNBAAN	21010	Holland	104 x 3'6" x 5"	5118/3	35.14	3654
OUDE LIJNBAAN	21010	Holland	16 x 3'6" x 6"	5118/3	41.12	658
					TOTAL EXPORT	£77399

2.3.2 The Sales Synopsis

SPECIMEN - Figure 2.2

ORIGINATOR - Export Sales Clerk (now Assistant to the Home Sales Manager)

REQUIRED - Monthly, due Monday following a month end

SOURCE DATA - Orders Received Lists for the period
Sales figures - balances from previous weeks
Provisional monthly sales turnover and year to date figure
Period sales plan (not phased), i.e. 4 or 5 weeks proportion of annual plan

DISTRIBUTION -

Divisional Director	Chief Accountant	Export Coordinator
Divisional Marketing Manager	London Sales Manager	Export Executives
Management Committee	European Sales Manager	Home Representatives
Product Manager	Market Planning Manager	Sales Accounts
Export Sales Manager	Commercial Manager	Offshore Projects
Home Sales Manager	Traffic Manager	

OBJECTIVES - To monitor sales performance against financial plan and examine trends

ACTION - Performance discussed by management
Order intake compared with plan and trends analysed to permit evaluation of strategies and modifications if necessary
Outstanding order balance analysed and compared with previous weeks to indicate factory performance

FIGURE 2.2

STATISTICAL PERIOD OF ....4..... WEEKS ENDING 21/8/76...

SALES SYNOPSIS

	HOME	% OF PLAN	EXPORT	% OF PLAN	ORIGINAL EQUIPMENT	% OF PLAN	N.A.C.O.	% OF PLAN	TOTAL	% OF PLAN
ORDERS RECEIVED DURING PERIOD	109354	65.00	573906	88.35	NIL	NIL	34436	90.43	717696	67.78
TOTAL YEAR TO DATE	1421667	65.00	3424091	40.55	1758768	66.67	226006	45.67	6850532	49.62
ADD OPENING ORDERS OUTSTAND BEGINNING 1976	819375		3608409		2455910		65404		6949098	
	2241042		7032500		4214678		291410		13772630	
LESS SALES YEAR TO DATE	1437395		5044692		1961025		79019		8522131	
ORDERS OUTSTANDING	803647		1987808		2253653		212391		5257499	

PERCENTAGE OF YEARS PLAN

1. Including carry-over from previous year	100.1
2. Excluding carry-over	49.6

	HOME	EXPORT	O.E. (ORIGINAL EQUIPMENT)	NACO	TOTAL
ANNUAL SALES PLAN	2187000	8444000	2638000	4958000	13764000
PERIOD SALES PLAN	168230	649539	202923	38077	1058769

2.3.3 The Product Operating Report

SPECIMEN - Figure 2.3, for division and home totals. The report includes a similar analysis for each of the division's markets (Home Direct, Home Associated, Export Direct including Projects, Export Associated and North American Associated Companies)

ORIGINATOR - Financial accounts

REQUIRED - Monthly, due Monday/Tuesday following a month end

SOURCE DATA - Invoiced sales for period and year to date, by product group, by market
Monthly plan values and accumulated plan values

DISTRIBUTION -
Divisional Director
Divisional Marketing Manager
Management Committee
Chief Accountant
Financial Accounts
Export Sales Manager
Home Sales Manager
Market Planning Manager
Product Manager

OBJECTIVES - To assess profitability by product group by market
To assess the results of pricing policy
To be informed of performance (Turnover, Gross Contribution) by product group by market compared with plan

ACTION - Performance discussed by management
Problem areas identified (e.g. low turnover, low contribution when compared to plan) and Sales Managers formulate corrective measures

FIGURE 2.3 PRODUCT OPERATING REPORT

FIGURE 2.3

DUNLOP LIMITED - OIL AND MARINE DIVISION
PRODUCT OPERATING REPORT - JUNE 1976

MARKET DIVISION

PAGE 1

	PRODUCT GROUP	ACTUAL CURRENT MONTH			PLAN CURRENT MONTH			ACTUAL CUMUL. Y.T.D.			PLAN CUM. Y.T.D.			VARIANCES AGAINST PLAN							
														CURRENT				CUMULATIVE			
		T/O	G.C.	%	T/O	G.C.	%	T/O	G.C.	%	T/O	G.C.	%	T/O	%	G.C.	%	T/O	%	G.C.	%
1	OSTERMAN	20	6	30	37	13	35	89	25	28	286	94	33	(17)	(46)	(7)	(54)	(197)	(69)	(69)	(73)
2	DOCK HOSE	213	74	35	185	57	31	854	312	37	1399	441	32	28	15	17	30	(545)	(39)	(129)	(29)
3	OFFSHORE - OIL	607	284	47	571	227	40	4730	2109	45	4423	1743	39	36	6	57	25	307	7	366	21
4	OFFSHORE - DREDGING	10	5	50	48	17	35	158	60	38	369	133	36	(38)	(79)	(12)	(71)	(211)	(57)	(73)	(55)
5	VACUUM	64	8	13	35	7	20	359	78	22	262	47	18	29	83	1	14	97	37	31	66
6	FACTORED	42	18	43	69	5	7	737	165	22	536	42	8	(27)	(39)	13	260	201	38	123	293
7	SHELL SURCHARGE							14	14	100								14		14	
8	MISC. ERROR CODE							1	1	100								1		1	
9	1976 ACTIVITY-SUB TOTAL	956	395	41	945	326	34	6942	2764	40	7275	2500	34	11	1	69	21	(333)	(5)	264	11
10	1975 ADJUSTMENTS							(20)	(10)	50								(20)		(10)	
	TOTAL	956	395	41	945	326	34	6922	2754	40	7275	2500	34	11	1	69	21	(353)	(5)	254	10
NON U.K. INCLUDED IN FACTORED		1	1	100				484	83	17				1		1		484		83	

DUNLOP LIMITED - OIL AND MARINE DIVISION
PRODUCT OPERATING REPORT - JUNE 1976

MARKETS HOUSE

PAGE 2

	PRODUCT GROUP	ACTUAL CURRENT MONTH			PLAN CURRENT MONTH			ACTUAL CUMUL. Y.T.D.			PLAN CUM. Y.T.D.			VARIANCES AGAINST PLAN							
														CURRENT				CUMULATIVE			
		T/O	G.C.	%	T/O	G.C.	%	T/O	G.C.	%	T/O	G.C.	%	T/O	%	G.C.	%	T/O	%	G.C.	%
1	OSTERMAN	17542	5065	29	25000	10000	34	76741	23784	31	217000	72000	33	11458	40	4935	49	140259	65	48216	67
2	DOCK HOSE	109082	33432	31	51000	20000	37	348987	142468	41	405000	150000	37	55082	102	13432	67	56013	14	7532	5
3	OFFSHORE - OIL	30694	45260	147	23500	10000	43	99102	86299	87	173000	80000	46	7690	33	35260	353	73898	43	6299	8
4	OFFSHORE - DREDGING	10022	4538	45	1000	1000	100	84800	34299	40	6000	3000	50	9022	902	3583	358	78800	1313	31299	1043
5	VACUUM	68227	16752	25	33000	6000	18	342041	78283	23	245000	42000	17	35227	107	10752	179	97041	40	36283	86
6	FACTORED	21973	9222	42	4000	1000	25	70538	29514	42	31000	8000	26	17978	450	8222	822	39538	123	21514	269
	TOTAL	257541	114269	44		48000	33	10222	394653	39		355000	33	113541	79	66269	134	54791	5	39653	11
NON U.K. INCLUDED IN FACTORED		775	264	34				9685	3885	40				775		264		9685		3885	

2.3.4 The Marketing Report

SPECIMEN - Figure 2.4

ORIGINATOR - Product Manager (now Marketing Coordinator)

REQUIRED - Monthly, Monday/Tuesday following a month end

SOURCE DATA - Orders Received Lists for the period
Provisional monthly sales turnover and year to date figures
Updated orders outstanding situation and previous management reports

DISTRIBUTION - Divisional Director
Divisional Marketing Manager
Chief Accountant
Management Committee
Product Manager
Home Sales Manager
Export Sales Manager
Market Planning Manager

OBJECTIVES - To inform management about the month and year to date orders, sales and outstanding orders situation in financial terms
To outline trends and compare values and estimated contributions with plan figures

ACTION - Performance and trends discussed by management
Trends analysed in detail and strategies and pricing policies amended if and as required

FIGURE 2.4

DUNLOP LIMITED
OIL AND MARINE DIVISION

MARKETING REPORT - DECEMBER 1977

1. ORDER AND SALES POSITION

1.1

	December		Year to Date	
	£ 000	% Plan	£ 000	% Plan
Opening Orders	4492		3470	
Add: Orders received	543	42	12073	81
	5035		15543	
Less: Sales	1205	95	11713	78
	3830		3830	

1.2 Present Trade

	Related to 1976	
	Order Intake	Turnover
Month of December	145	152
Year to Date	132	95

1.3 Rates of Contribution

	Estimated		
	£ 000	G.C.	%
Turnover	11713	4545	38.80
Value of Outstanding Orders	3830	1400	36.55
	15543	5945	38.24
PLAN	14850	5163	34.76

2.3.5 Other Information

The manual reports already discussed briefly, except the weekly orders received list, were financial summaries omitting product and customer detail. More detailed informal analyses of internal figures were carried out to supplement the summarised formal reports. In addition to the analysis of internal figures, information on offshore systems was obtained from published statistics and market intelligence.

2.3.6 Historical Analyses

There was no formal detailed analysis of orders and sales but over the years the product manager had compiled certain volume and value statistics to help

i) monitor performance (against plan, volume and financial) and

ii) future management planning activities

The data sources for these statistics were the orders received lists and the sales invoices. Several analyses at different detail levels were produced on a year-to-date basis, culminating in full annual analyses at the year end.

Volume analyses of quantities of hoses by bore size by product group (e.g. Offshore Oil, Dredging and Dock) at divisional level (see Figure 2.5) and sometimes at market level were produced and often complemented by detailed product analyses by market and sometimes by country (for the more important large bore offshore oil business).

An analysis of sales turnover by product group was produced annually to update the historical statistics (see Figure 2.6).

2.3.7 Year End Evaluation of Outstanding Orders

It is important to know exactly what the outstanding order situation is so that divisional performance can be monitored and price changes made as required.

The monthly management report details the values of the orders received, the sales and the updated outstanding orders for that period in financial terms. Thus whilst the value of outstanding orders is known, the volume mix is not. At the year end the volume and value of outstanding orders is evaluated to check the accuracy of the management report and to permit the calculation of the anticipated profit of these orders using the new standard costs.

This evaluation task has been the responsibility of the author for all year ends since 1974. It is not a difficult task but is very time consuming and involves comparing the invoices with the original orders (in the order number range for that year).

There is usually a gap of about six months between receipt of an order and its corresponding invoice(s) and this means that the majority of the more recent orders are fully outstanding whilst the older orders are either fully or part invoiced. The major difficulty is the evaluation of the part invoiced orders and this involves lengthy searches through the files in the traffic department which are amended throughout the year as the hoses are made, despatched and invoiced. The task could have been made easier by monitoring the orders and sales situation throughout the year and, although this was discussed, it remained a year end function.

A list of the outstanding orders is compiled in the same format as the orders received list and the new costs are used to evaluate the gross contribution expected. The reduced contribution from the outstanding orders compared with that estimated when the orders were originally obtained

FIGURE 2.5

1974
OFFSHORE INCLUDING DREDGER
Offshore and Dredger Hose - Volume Analysis

A = Order Intake
B = Sales

SIZE	S		SS½S		LW		Barb		½ S		UB		UBC		SSUB		SSUBC		LWUB		TOTAL	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
4"	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
6"	49	15	-	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	55	15
8"	26	22	2	2	-	-	-	1	-	-	14	5	-	-	6	4	-	-	-	-	48	34
10"	22	130	7	13	-	-	1	1	4	1	4	10	-	15	14	4	1	9	-	-	53	183
12"	192	179	25	22	32	11	39	27	13	12	96	53	6	25	15	9	4	13	8	4	430	355
16"	269	272	45	28	69	97	120	38	3	2	161	121	44	26	21	31	14	11	4	6	750	632
20"	400	133	37	16	24	40	12	15	1	1	101	65	66	37	62	47	59	20	-	-	762	374
24"	290	343	57	38	-	-	-	-	-	-	16	20	27	32	17	19	7	36	-	-	414	488
28"	37	32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	37	32
30"	2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2
32"	20	22	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22	22
36"	1	20	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	20
	1308	1172	177	119	125	148	172	82	21	16	398	274	143	135	135	114	85	89	12	10	2576	1259

Key
S - Selflote
SS½S - Super Sampson half selfotes
LW - Light Weight Hose
BARB - Barbel

FIGURE 2.6

HISTORICAL SALES STATISTICS - FINANCIAL

£000'S

		1968	1969	1970	1971	1972	1973	1974	1975	1976
Offshore	Offshore Oil	-	801	1250	2078	2362	3093	4484	6487	8306
	Dredger	-	-	99	290	328	162	515	347	691
		-	801	1349	2368	2690	3255	4999	6834	8997
	Docks etc.	-	355	540	584	644	582	942	1736	2670
		-	1156	1889	2952	3334	3837	5941	8570	11667
	Miscellaneous	-	-	495	498	590	717	865	1643	2197
		502	1156	2384	3450	3924	4554	6806	10213	13764

are used as guides to future pricing policies.

The values and associated contributions are then used as the starting point for the production of the on-going management report.

2.3.8 Monobuoy Analysis

A reasonable knowledge of the composition, by bore size and hose type, of 152 of the existing 182 monobuoys has been built up over the years and is well documented. This information is based largely on feedback from the sales force and projects engineers complemented by some published statistics. (The sales force have recently investigated the other 30 monobuoys and are in the process of documenting their findings.)

Unfortunately, the reliability of these figures is suspect because they are based on feedback from the market built up over the years. Indeed, the division has a limited updated knowledge of several of the monobuoys which it installed as original equipment and this does little to stimulate confidence in the global estimates.

However, this information is needed to assist the division in evaluating the market and hence in its planning exercises (e.g. to form a basis for forecasting replacement business). More formalised market research is required in this area to update the current figures which are documented for each monobuoy.

A specimen monobuoy analysis sheet is presented in Figure 2.7. (The figures in Table 1.11 are a summary of these sheets.)

2.4 THE COMPUTER SYSTEM

Hose Group (comprising Industrial, Hydraulics and Oil and Marine Divisions) was formed after a period of company rationalisation. Dunlop Angus Industrial Group (DAIG) Management Services, Newcastle, designed a system comprising a suite of programmes to cater for the information needs of the group.

This system produced sales analysis reports for each member of the Group using the same programmes, the same report formats and the same reference files. Consequently, when

FIGURE 2.7

MONOBUOY ANALYSIS SHEET

MIDDLE EAST

INSTALLATION: EGPC, SUEZ NO.1, EGYPT
DATE INSTALLED: 1976
TYPE OF SYSTEM: CALM
BUOY INSTALLED BY: IMODCO

MAX. TANKER SIZE: 250,000
MAIN HOSE SUPPLIERS: PIRELLI
FLOATING STRING(S): 2 x 24" (2x16" TAILS)
SUBMARINE STRING(S): 2 x 24"

FLOATING HOSES

HOSE TYPE AND SIZE		HOSE LENGTHS IN USE
Super Sampson	12"	
	16"	
	20"	
	24"	2
Selflote	12"	
	16"	8
	20"	
	24"	42
Taper	24/20"	
	20/16"	
	16/12"	
W/W Tail	12"	
	16"	
Barbell	12"	
	16"	4
Estimated Hose Life: 3 Years		
	TOTAL	56

SUBMARINE HOSES

HOSE TYPE AND SIZE	HOSE LENGTHS IN USE
Sampson 24"	6
Standard 24"	4
Estimated Hose Life: 3 Years	
TOTAL	10

EUROPE

INSTALLATION: SHELL, ANGLESEY NO.1 U.K.
DATE INSTALLED: 1976
TYPE OF SYSTEM: CALM
BUOY INSTALLED BY: SBM

MAX. TANKER SIZE: ?
MAIN HOSE SUPPLIERS: APG, DUNLOP
FLOATING STRING(S): 1x24" (16" TAIL)
SUBMARINE STRING(S): 1 x 24"

FLOATING HOSES

HOSE TYPE AND SIZE		HOSE LENGTHS IN USE
Super Sampson	12"	
	16"	
	20"	
	24"	1
Selflote	12"	
	16"	
	20"	
	24"	20
Taper	24/20"	1
	20/16"	1
	16/12"	
W/W Tail	12"	
	16"	2
Barbell	12"	
	16"	1
Estimated Hose Life: 3 Years		
	TOTAL	26

SUBMARINE HOSES

HOSE TYPE AND SIZE	HOSE LENGTHS IN USE
Sampson 24"	2
Standard 24"	2
Estimated Hose Life: 2 Years	
TOTAL	4

the print-outs were split up for the three divisions, it was not unusual to have sections referring to the other members included. In 1976 the master files were split into three so that, although the report types and programmes were common to the Hose Group, the various reports produced referred only to the individual divisions.

2.4.1 The Oil and Marine Computer System

A series of computer reports were produced to make more information available to the division and to complement the manual reports. The system yielded various analyses of sales turnover figures only for the various markets.

The source documents for the system were invoices and thus the responsibility of the accounts department. Source documents were sent to Newcastle for data preparation (at the Walker Works) and processing (at Angus House). Later a telephone and terminal link was set up and data preparation and control became a divisional function.

Home sales data was prepared weekly and vetted by batch, an error report was sent via the terminal, so that corrections could be made. The system created a separate file every week for the division's data and reports on corrected data were sent to Grimsby. At the month end the division had to

inform management services staff that the weekly data was accurate before the monthly reports were produced. The weekly data files for a given month then had to be merged before the monthly reports were produced. A system of account numbers was used and home analysis by customer was possible.

The export department did not use customer account numbers and data preparation was accomplished once a month. The export data was vetted and an error report produced. These errors were corrected immediately and transmitted back to Newcastle using the terminal.

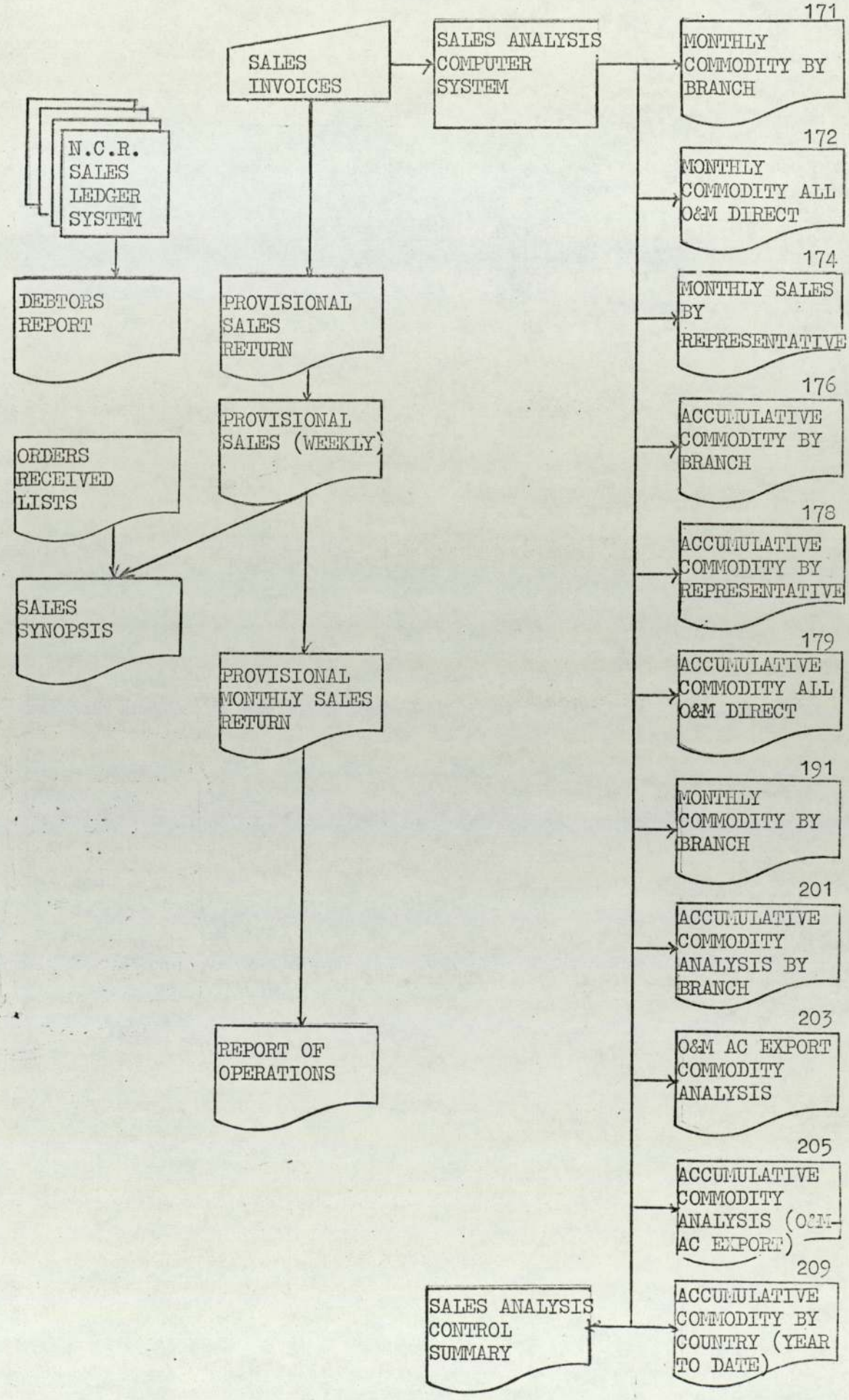
When the division was satisfied that the data was correct, the month and year to date reports were requested. These reports were sent to Grimsby by Securicor services and caused a time lag between reports being produced and used.

An overview of the old system follows, as presented in Figure 2.8 and specimens of the reports appear in Appendix 2.3.

2.4.2 The Reports and Their Formats

Eleven computer reports were produced for the division, six dealt with Home Sales and five with Export Sales.

FIGURE 2.8 THE OIL AND MARINE COMPUTER SYSTEM



Eight of these reports had a common format whilst the other three were significantly different.

The basic format was:-

COMMODITY CODE	COMMODITY NARRATIVE	FOOTAGE	NETT TURNOVER	GROSS CONTRIBUTION (i.e. GC)	GC % OF TURNOVER

The reports which took this form were:-

HOME

171 - Monthly Commodity by Branch

172 - Monthly Commodity all O & M Direct

176 - Accumulative Commodity by Branch

179 - Accumulative Commodity all O & M Direct

EXPORT

191 - Monthly Commodity by Branch

201 - Accumulated Commodity by Branch

203 - O & M A.C. Export Commodity Analysis

205 - O & M A.C. Export Accumulative Commodity Analysis

(where O & M = Oil and Marine and A.C. = Associated Company)

The other reports and their formats were:-

HOME

174 - Monthly Sales by Representative:-

REPRESENTATIVE	MONTH YEAR B/F YEAR TO DATE	NETT TURNOVER	GC	GC % OF TURNOVER

178 - Accumulative Commodity by Representative:-

COMMODITY CODE | COMMODITY NARRATIVE | REP. CODE | REP. NARRATIVE | FOOTAGE | NETT TURNOVER | GC | GC % OF TURNOVER

(REP. = Representative)

EXPORT

209 - Accumulative Commodity Analysis by Country (Year to date):-

COMMODITY CODE | COUNTRY NARRATIVE | COMMODITY CODE | COUNTRY NARRATIVE | FOOTAGE | NETT TURNOVER | GC | GC % OF TURNOVER

The home reports 171 and 176 were further subdivided (see Table 2.1).

TABLE 2.1 HOME COMPUTER REPORTS - SUBDIVISIONS

Class Number	Class
619	O & M Project Engineering
620	O & M House Accounts
621	O & M Home A.C.
622	O & M Home Direct

The export reports 191, 201 and 209 were also further subdivided (see Table 2.2).

TABLE 2.2 EXPORT COMPUTER REPORTS - SUBDIVISIONS

Class Number	Class	
651	O & M Dunlop Direct Export	
652	O & M Dunlop A.C. Export	
655	O & M Angus Tor. (Canada)	NACO
656	O & M Angus Inc. (USA)	NACO
659	O & M Project Engineering	

2.4.3 The Computer Reports - Background

SPECIMEN - Figure 2.9 'Home Monthly Commodity by Branch' - the basic computer format. (Additional specimen computer reports are presented in Appendix 2.3)

ORIGINATOR - Financial Accounts

REQUIRED - Monthly, Monday/Tuesday after month end

SOURCE DATA - Sales Invoices

DISTRIBUTION - Home reports to:

Home Sales Manager (plus representatives)
Product Manager
Divisional Marketing Manager
Divisional Director

perusal only

Export reports to:

Export Sales Manager (plus executives)
Product Manager
Divisional Marketing Manager
Divisional Director

OBJECTIVES - Reports were used by management to monitor the month and year to date financial status of the division
The reports provided more detailed volume and financial information than the manually compiled reports:
product by market, product by representative and product by country
The greater detail permitted a more vigorous analysis of actual performance against plan

ACTION - The figures were studied in depth by the managers and then circulated to the salesmen
If the performance against the plan in terms of volume and value was poor, marketing activities were reviewed and strategies formulated to correct the situation (e.g. increased marketing efforts - more customer visits)
Analysis of figures often indicated that price changes were needed to maintain profitability
Sales lag behind orders by about six months and consequently management action in response to the reports was limited

FIGURE 2.9 REPORT 171 - MONTHLY COMMODITY BY BRANCH

COMM CODE	COMMODITY NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
01875	AVIATION REFUELLING.	2	415	191	46.02
01876	AVIATION REFUELLING & DEFUELLING (CCPP)	3	146	50	34.25
01877	TANK CLEANING.	120	8044	2722	33.84
	TOTAL FOR SOURCE OF MANUFACTURE	125	8605	2963	34.43
	TOTAL FOR PRODUCT GROUP	125	8605	2963	34.43
59250	MISC MANDREL MADE HOSES(EXCL PVC)	121	14362	6157	42.87
	TOTAL FOR SOURCE OF MANUFACTURE	121	14362	6157	42.87
	TOTAL FOR PRODUCT GROUP	121	14362	6157	42.87
05118	LINEFLOTE (ROPEFLOTE)	60	3932	2534	64.45
05124	SMOOTH BORE PETROCHEM HOSE	4	767	201	26.21
05128	DOCK LOADING HOSE.	12	5135	2930	57.06
05130	LIGHTWEIGHT OIL DISCHARGE.	11	2276	1317	57.86
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS	0	1112	367	33.00
05152	OFFSHORE HOSES. SUBMARINE.	6	16254	8424	51.83
05154	OFFSHORE HOSES.SELFLOTE - WIRE CORD.	3	15337	10255	66.86
05155	OFFSHORE HOSES. SELFLOTE-ABR. RESISTANT	12	19984	12733	63.72
05158	SMALL BORE DOCK LOADING WIRE CORD HOSE	3	3220	1852	57.52
05160	OXYGEN LANCING.	2	765	464	60.65
05172	SAND SUCTION HOSE (U.S.A)	1	179	117	65.36
05180	ROTARY HOSE	1	2029	742	36.57
	TOTAL FOR SOURCE OF MANUFACTURE	115	70990	41936	59.07
	TOTAL FOR PRODUCT GROUP	115	70990	41936	59.07
05330	VACUUM CLEANER - DOMESTIC.	4700	6891	3068	44.52
05400	NON-UK PRODUCTS	12	636	235	36.95
05440	EXPANSION JOINTS.	2	167	41	24.55
05542	OXYGEN BREATHER TUBES.	101	339	101	29.79
	TOTAL FOR SOURCE OF MANUFACTURE	4815	8033	3445	42.89
	TOTAL FOR PRODUCT GROUP	4815	8033	3445	42.89
90912	U.K. V.A.T. AT 8% INVOICED	0	8497	8497	100.00
90960	PACKAGES	0	68	68	100.00
90965	CARRIAGE	0	1753	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	10318	8565	83.01
	TOTAL FOR PRODUCT GROUP	0	10318	8565	83.01
BRANCH	TOTAL ROUNDED		112308	63066	56.15
	TOTAL MM PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£87625.43	£48346.23	55.17
	TOTAL OTHER PRODUCTS		£16183.07	£6225.15	38.47

HOSE DIV 622 OIL&MARINE-HOME DIRECT MONTHLY COMMODITY BY BRANCH MONTH OF DECEMBER 1976 REPORT N/EOP 171

2.5 THE WEAKNESSES OF THE COMPUTER SYSTEM

The system had been developed as an offshoot of the Hose Group system. There had been little involvement of Grimsby users in the design phase and the requirements of Industrial and Hydraulics divisions had been used as the basis for the development work. The establishment of management functions at Grimsby had only taken place in 1970 and the structure was just evolving and the specific information requirements were not fully appreciated. The system was effective for the other divisions because of the nature of their businesses, namely the manufacture of large quantities of long length small bore hoses. These divisions had a low turnover to volume ratio and the lag times between receipt of orders and processing of invoices was short.

The Oil and Marine division manufactured more sophisticated hoses (i.e. lower quantities of short length large bore hoses) and had a high turnover to volume ratio. Thus depending on the product, the bore and the length, the division's unit selling prices varied between £4,000 - £15,000 for large bore hose. The situation was further complicated by the lag of about six months between orders and their invoices. The old formats have a column headed FOOTAGE which was an appropriate measure of performance for the other divisions, whereas number of lengths was more suitable for the Grimsby

situation. In fact, the Grimsby unit replaced footages on the input sheets with QUANTITIES (i.e. the number of lengths of hose).

In the early years, the division had very limited control over the system and all source documents, completed at Grimsby, were sent to Newcastle for data preparation and processing. This led to the production of inaccurate reports because of errors in source document preparation and others attributed to data preparation. The data for the three divisions of hose group often became mixed, making the end products meaningless. Also, if the Newcastle staff detected an omission, they inserted figures to make the data acceptable to the division which then caused anomalies in the output. The reports were printed at Newcastle and sent to Grimsby by Securicor services and this meant that the reports were always received late (often more than ten days after the month end).

The setting up of a terminal and telephone link relinquished the control of data preparation to the division. This improved the accuracy of the data and the timeliness of the final reports. The data was transmitted to Newcastle and vetted. Error listings were transmitted back to Grimsby for correction that same day. When both divisional and computer staff were convinced that the data was correct, the

reports were produced. Unfortunately, the division shared the Newcastle transmission/receiving equipment with another division and transmission of the reports was not possible on time considerations. Thus the finished reports were still delivered by Securicor.

The reports gained a reputation for inaccuracy and untimeliness and fell into disuse. The computer reports were reconciled to the manual report by the sales accounts staff responsible for source document preparation and errors were regularly found.

Two further disadvantages made the computer reports less useful to the division. One, the level of detail was inadequate for the division's specific needs and commodity code and footage, although more detailed than in the manual reports, were poor substitutes for commodity code, bore size and unit length. Two, the time lag between orders and invoices made these reports on sales turnover into a set of historical analyses which could not be used to effect any great control over divisional activities.

The computer system as used by the division did not help the division to monitor orders (the control stage) or the on-going outstanding order situation and left the division with many information problems which had to be tackled manually. Although a good idea of the value of outstanding orders

was available from the marketing report, the volume mix responsible was unknown and it was realised that such information deficiencies were no longer acceptable to the division as the market leader in the offshore business.

2.6 CONCLUSION

As the management structure at Grimsby evolved, manual reports were designed to meet the early information needs. These reports, except for the orders received list, were financial summaries only, although some ad hoc volume analyses were compiled by the product manager to facilitate more detailed performance analysis. As the business grew, more detailed analyses of volume and value were required and a computerised sales information system was introduced to serve Hose Group (i.e. the Oil and Marine, Industrial and Hydraulics divisions). This computer system produced analyses every month but the volume figures were in a form more appropriate to the other divisions.

The manual reports were held in high esteem by the Grimsby users whereas the computer reports gained a reputation for poor accuracy and timeliness. The nature of the business changed and demand, prices, lead times and competition increased but the computer system was not modified to cater for these changes. Management found it increasingly difficult

to extract useful information from the "inaccurate" computer reports and many of these fell into disuse. Thus the managers continued to rely strongly on the manual reports.

The major failing of the computer system, apart from inadequate product detail, inaccuracy and untimeliness, was that it dealt only with sales turnover. A period of about six months between receiving an order and invoicing it was common and this made the information on the reports too old to be used as an effective controlling agency. Furthermore, the division generally had a substantial outstandingorder book, consisting of fully and partly outstanding orders. This meant that,whilst management had a good idea of the value of such orders, their knowledge of the volume mix was negligible. Faced with rising costs, it became necessary to monitor this volume mix so that on-going gross contribution calculations could be performed. A detailed knowledge of outstanding orders was needed to enable production priorities to be set (to retain customer goodwill) and prices to be reviewed. The orders received stage was thus identified as the phase at which management could take corrective measures if indicated (e.g. low volume/value of orders compared to plan).

The feedback from the users indicated that the use of the computerised system was limited and that a new system more appropriate to the division's needs was required. It was fully appreciated that the potential of the computer resource

was not being used. The need for a system to monitor (in various levels of detail) the orders received, the sales, the outstanding orders and the performance against plan was identified. The development of a new computer system to satisfy these requirements would save a considerable amount of staff time (i.e. manual compilations would require mammoth clerical efforts) and produce detailed, accurate and timely reports on a regular or ad hoc basis that would improve management efficiency and control. This indicated that a detailed investigation of the marketing and sales requirements should be undertaken (see Chapter 4) and then developed as part of the division's on-going commitment to computerisation.

CHAPTER 3

THE MANAGEMENT PLANNING SYSTEM

3.1 INTRODUCTION

Planning (30-34) is a very important function of management. In its broadest sense (34,35) it is 'deciding in advance what is to be done'.

From an organisational viewpoint, planning (31) is concerned with:

i) setting organisational goals or objectives

ii) determining the approach by which the goals and objectives are to be accomplished.

Thus planning (31,34) serves as a vehicle for coordinating the activities of the organisation toward defined and agreed upon objectives. It permits a manager to act with initiative and to create situations to the organisation's advantage instead of reacting to problems (crisis management).

Planning (36,37) has also been defined as:

i) 'Decision making concerning the future'

ii) A decision making process involving the commitment of resources - money, people, time, capital - today; the payback or return on which will not be realised until some future period.

Thus planning will require predictions about future events for which decisions have to be made. Forecasting (36) must supply these necessary inputs for planning.

Formal planning (34) requires information processing. The way planning is carried out therefore depends heavily on the current state of information technology. The division's management information system was described in the last chapter and it is therefore easy to understand why the division's planning activities depended very heavily upon managerial judgement.

Thus the history of planning in the context of the company and the division is presented in this chapter. **Planning is considered further in Chapter 5.**

3.2 THE MANAGEMENT PLAN - COMPANY CONTEXT

3.2.1 History

The current approach to planning was introduced in 1963 and the company required each division to submit a Management

Plan, annually, for consolidation into a Corporate Plan. This followed the decision of the company to decentralise and appoint Divisional General Managers with responsibility for all the affairs of their divisions (other than corporate structure and the supply of capital). The Corporate Plan was to serve as a control document for the company and operating funds were to be allocated to the divisions on the basis of their Management Plans. The detailed Management Plans were to constitute a basis for monitoring divisional performance and effecting control.

Before the Management Plan was introduced, divisional planning and control had been achieved by means of an Annual Budget Statement, which detailed the anticipated performance for the next operating year. This budget was expressed entirely in financial terms and was mainly an accountant's exercise.

The Management Planning Process was introduced so that the Executive Directors could ensure that divisional management directed their efforts towards achieving acceptable levels of earnings and return on capital. Against a background of corporate objectives, therefore, divisional managements were required to set out their objectives, strategies and action programmes for the three years of the plan period (i.e. for the detailed one year plan and summaries for a

further two years) and to quantify the plans in financial terms.

The three year period was chosen to emphasise the importance of planning on influencing future activities, as opposed to accepting or reacting to situations (or crises) as they happened (31), without knowing whether the actions taken were in the best long-term interest of the divisions and the company. However, only the first year of each Management Plan was used for control purposes, both by the divisions and the head office. The divisions monitored their progress against their Management Plans and monthly reports were issued. The figures for the first year of the Management Plans were reviewed and updated (if necessary) twice a year in March and September.

The Management Plan was also designed to give the Executive Directors, Head Office staff and Corporate Planners the necessary detailed information for determining company policies, consolidation into the Corporate Plan and the distribution of operating funds. Much of the content and detail of the Management Plan was dictated by Head Office requirements and not by the divisional managements.

From both the company and divisional viewpoint, the advantages of the Management Plan were to:-

i) facilitate control of divisional operations

ii) encourage divisional management to take a longer term view of activities as a matter of habit, despite the day to day pressures

iii) bring together all the aspects of the division's operations and direct efforts to achieve the long term objectives

iv) detail clearly where the division is going in the three year period

v) form a basis for orderly action and thereby minimise crisis management situations, without destroying flexibility and initiative.

3.2.2 The Format

The format of the plans prepared by the divisions was specified by Head Office staff.

A pro forma was sent to the divisions early in the year and this detailed the format, the content and the accounting rules to be used. (The format headings and the plan schedules are listed in Appendices 3.1 and 3.2 respectively.)

The use of a standard format and the systematic approach to planning enabled the corporate planners to analyse and review individual plans more easily, and this was important

when dealing with so many divisions (and Pirelli units too) engaged in different businesses all over the world.

Divisional managements could exercise only minimal discretion over the level of detail to be included in, or omitted from the specified structure.

3.2.3 The Planning Operation

The planning operation (see figure 3.1) is a time consuming exercise (involving about six man-months of effort in the case of the Oil & Marine Division). It starts early in the year (preliminary work is started in late April or early May) and is completed in late September or early October. The exercise involves many people from each division in its many stages which include:-

1 the statement of assumptions and objectives for the plan period
2 the forecasts of general economic factors and major key indicators (from central economic planning)
3 the preparation of sales forecasts by representatives in conjunction with area sales managers
4 the coordination of the sales forecast consolidation and amendments, if necessary, by marketing management
5 the preparation of production budgets for one year

6 the derivation of cost standards and preparation of other functional budgets (e.g. research and development, advertising and training)

7 the profit estimates (i.e. the reconciliation of marketing budgets and established costs)

8 the capital expenditure forecasts (working capital, cash requirements)

9 the preparation of Master Plan, balance sheet, profit and loss account, together with a quantitative analysis of internal functions and market substantiated by key indicator data.

The planning cycle begins each year, as early as April or May, when the overall objectives and strategies of the divisions are formulated by the Divisional Directors and the Executive Directors.

The objectives and strategies of divisions have to be:-

1 consistent with corporate strategy

2 capable of producing the desired return on capital, appropriate to the division

3 consistent with the amount of capital that will be allocated to the division, within the operating year.

At the beginning of June, guidance notes are issued to the divisions. These contain the timetable, responsibilities

and cost assumptions for the planning exercises. The major forecasting work on the markets is carried out in May and June and the standard costs are established in June and July.

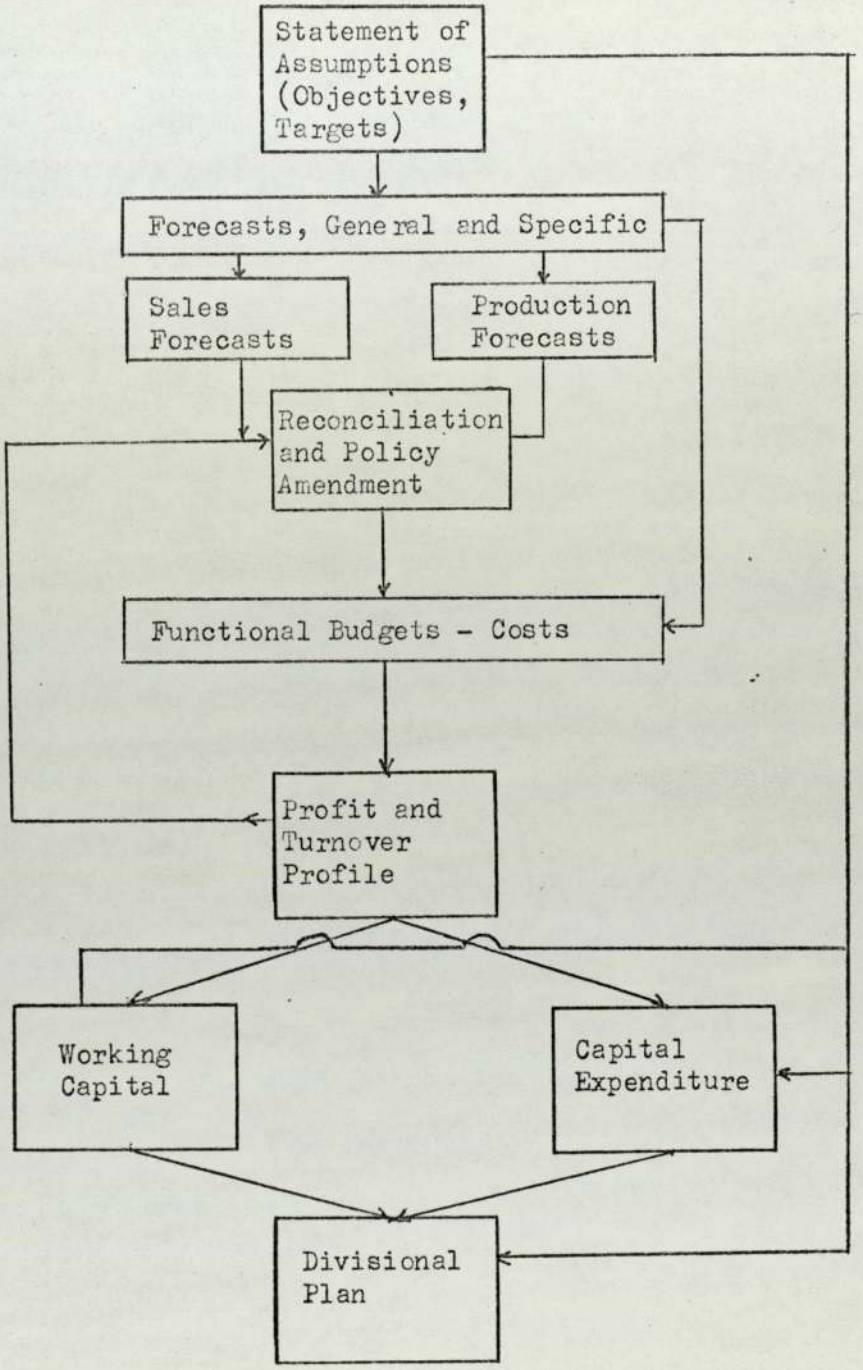
In August, pricing policy is established by the divisions and prices are set, together with advertising appropriations and the capital expenditures and agreed by the Divisional Directors. At this stage, the action programmes to be included in the Management Plans are reviewed.

By September preliminary sales figures for the plan period are reviewed. These figures are consolidated by each division and submitted to Head Office in early October.

The Divisional Management Plans are then studied in detail by the Corporate Planners and Executive Directors. This is the critical stage of the planning cycle and, if the Management Plans are challenged, amendments may have to be made. Once the Management Plans are accepted by both the responsible divisions and Head Office management, they are consolidated into a Corporate Plan and reviewed by the central committee.

The final company plan is presented to the Board in January and, if accepted, each Divisional Management becomes responsible for the implementation of its own plan.

FIGURE 3.1 MANAGEMENT PLAN - STAGES OF PREPARATION



The operating budgets and standards produced in the preparation of each Divisional Management Plan are then transmitted through each division to become the major instrument of control and measurement during the first year of operation.

Major reviews of the Management Plans are carried out by the divisions in March and September, by which time the next plans are under preparation.

3.2.4 Corporate Activity

The Corporate Planners make a consolidation of the figures for all the divisions and analyse the future prospects of the company. They then determine how the operating funds should be allocated to the divisions.

Funds are allocated on the basis of the total company picture, the divisional categorisation, the past performance of the divisions and current and future divisional plans.

The company has a three category divisional classification system which is described in Table 3.1.

TABLE 3.1 DIVISIONAL CLASSIFICATIONS

Class	Description
1A	Highly profitable, with a high technology base and a strong growth forecast
1B	Highly profitable, with a high technology base (not as great as Class 1A) and strong growth
2	Less profitable, with an old established technology (and mature products) and negligible growth
3	Similar to Class 2 but even less efficient

It is usual to find that Class 1A and 1B divisional managements receive the funds which they request, assuming that funds are available, with some reservations about Class 1B.

Class 2 divisions are usually given momentum capital only. This is the working capital required to cover the additional turnover requirements (indicated in the Management Plans) plus some modernisation capital to keep the factory equipment in order. These funds are insufficient to take the divisions into new markets which would involve new risks. Class 2 divisions are big earners in what could be described as well established and traditional markets.

The Class 3 divisions have to compete, on their own merits, for proportionate shares of the remaining funds (if any).

Funds for innovation acquisitions are treated as a separate issue and are judged on their own merits and not as part of the normal allocation process.

Thus the Divisional Management Plans are very important documents which not only form the basis for the allocation of operating funds but serve as running manuals against which performances are measured and corrective actions are taken as necessary.

3.2.5 Recent Developments

In the sixties the divisions used to produce three plans, the short term (1 year), the medium term (3-5 years) and the long term (10 years).

The ten year plan has been removed from the planning scheme because of the gross inaccuracies experienced. However, the five year plan has been retained as a strategy document to encourage divisional managements to think about the future over more reasonable time period.

The main plan used to consist of a detailed one year plan (i.e. the Management Plan) with projections for the next two years given as a summary, in financial terms, of a possible strategic outcome. Shortly after the author joined the company there was a shift in emphasis to favour the one year plan which became known as the Operational Plan. The longer term strategies were still formulated and controlled by the Divisional Directors and were based, in part, on the projection of the detailed one year plan. Thus, the current strategy plans were a result of the streamlining of the old three and ten year plans.

It was accepted by the company that the medium term strategy plans could not be quantified to any degree of accuracy but would serve as a guide to future planned activities of the divisions. This change in emphasis was in part due to the high inflation of recent years and a general business recession.

The one year plan (i.e. the Operational Plan) is carried out as previously described (Section 3.2.3), adhering to the same format and method, whilst the second and third year of the plan are now replaced by a separate five year strategy document. This strategy document makes no claim to accuracy but outlines future policies, sets financial objectives and suggests methods of achieving these.

3.3 THE MANAGEMENT PLAN - DIVISIONAL CONTEXT

3.3.1 Introduction

The Management Plan is produced to reflect accurately the thinking of the management, in both volume and financial terms. The plan is constructed (tailor-made) using two constraints:-

1 what marketing management think they can sell

2 the physical limitations placed upon point (1) by the factory production capacity.

The form of the Management Plan is determined by the needs of the corporate planning section. Thus, the division submits its plan in the prescribed format (see Appendix 3.2). As the major function of the plan is to give the division a control facility, the plan is first produced in the most useful operational form. The information is then translated into the corporate format.

The core of the divisional plan is the sales forecast (in volume terms) and this is the weakest part of the planning exercise. The method of planning has not changed over the years and the current results indicate that more systematic approaches are required if accuracy is to be improved.

3.3.2 Plan Formats

The division produces a very detailed one year plan (see Figure 3.2 and Appendix 3.3) and a more consolidated strategy document (see Figure 3.3 and Appendix 3.4). A key to the abbreviations used to describe the plan formats appears in Table 3.2.

FIGURE 3.2 OPERATIONAL PLAN FORMAT

YEAR = Y

Product Code, Description, Bore Size	Markets																										
	HD				HAC				ED				EAC				OE				NACO				TOTAL		
	Q	F	£	GC%	Q	F	£	GC%	Q	F	£	GC%	Q	F	£	GC%	Q	F	£	GC%	Q	F	£	GC%	Q	F	£

where Turnover (£) = Quantity (Q) x Unit Selling Price (USP)

and GC% $= \left(\frac{\text{Total Selling Price} - \text{Total Cost Price}}{\text{Total Selling Price}}\right) \times \frac{100}{1}$

i.e. GC% $= Q \times \left(\frac{USP - UCP}{USP}\right) \times \frac{100}{1}$

FIGURE 3.3 STRATEGY PLAN FORMAT

YEARS Y+1, Y+2

Product Codes	Volumes														Values	
	Markets															
	HD		HAC		ED		EAC		OE		NACO		TOTAL		TOTAL	
	Y+1	Y+2	Y+1	Y+2	Y+1	Y+2	Y+1	Y+2	Y+1	Y+2	Y+1	Y+2	Y+1	Y+2	Y+1	Y+2
	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	F (Q)	£	£

TABLE 3.2 KEY TO MANAGEMENT PLAN ABBREVIATIONS

Market Sectors	Other Symbols
HD - Home Direct	Q - Quantity (i.e. No lengths or No items)
HAC - Home Associated Companies	F - Footage
ED - Export Direct	£ - Turnover
EAC - Export Associated	GC% - Gross Contribution % of Turnover
OE - Original Equipment	USP - Unit Selling Price
NACO - North American Companies	UCP - Unit Cost Price

The figures from these detailed plans are used by the division to monitor and control its progress in the market and to prepare the consolidated company plan in accordance with the format (Appendix 3.2) prescribed by Head Office. The

consolidation of the figures into the company format removes the means by which operational management effect control and it is for this reason that the division produces two versions of the plan.

The divisional version of the operational plan (Appendix 3.3) is a lengthy document and contains the one year picture for 170 products each with several bore sizes. Fortunately, not all the products are sold in each market sector and thus the content is reduced. Running horizontal and vertical totals complete the detailed plan matrix.

The strategy document detailed the volume demand (footage and quantity) for each product for each market and included divisional volume and value totals. This document was used to indicate the future in broad terms and a summarised version was sent to Head Office. No great accuracy could be attached to the volumes because the assumptions used to project the financial picture were subject to change in the lifetime of the document due to inflation, rising costs and other factors. The two year strategy document has now been extended to cover a five year period.

3.3.3 The Planning Cycle

The planning cycle (Figure 3.4) is an on-going process and starts with the implementation of the plan (prepared in the previous year) in January. The actual plan figures are monitored monthly and in March the plan is reviewed, in the light of the performance during the first quarter. This first review is usually an appraisal of financial expectations, but some attention is paid to the product volumes.

The new planning phase commences as soon as this review is completed. Senior divisional management focus their attention on strategy formulations for the next calendar year and some guidance is given by Head Office staff. The sales forecast formats are produced and distributed in May/June. The volume plan is produced in June and July and turned into the financial plan in July and August. This detailed divisional plan is translated into the company format in August and September and is submitted to Head Office in October.

In the final stages of the new plan, in September, the second review of the current plan is undertaken. The major concern is the financial performance and alterations may

be made based on the performance during the previous three quarters. Some attention is again paid to the volume of business and this serves to complement and explain the financial analyses.

At the end of the year the performance against plan is evaluated and the new plan is implemented to restart the cycle.

3.4 THE DIVISIONAL PLANNING OPERATION

The divisional one year operational (formerly management) plan is based on a volume forecast. Since the marketing department was established at Grimsby in 1970, only two methods of producing a volume forecast have been used, namely:-

1 The Executive Judgement Approach

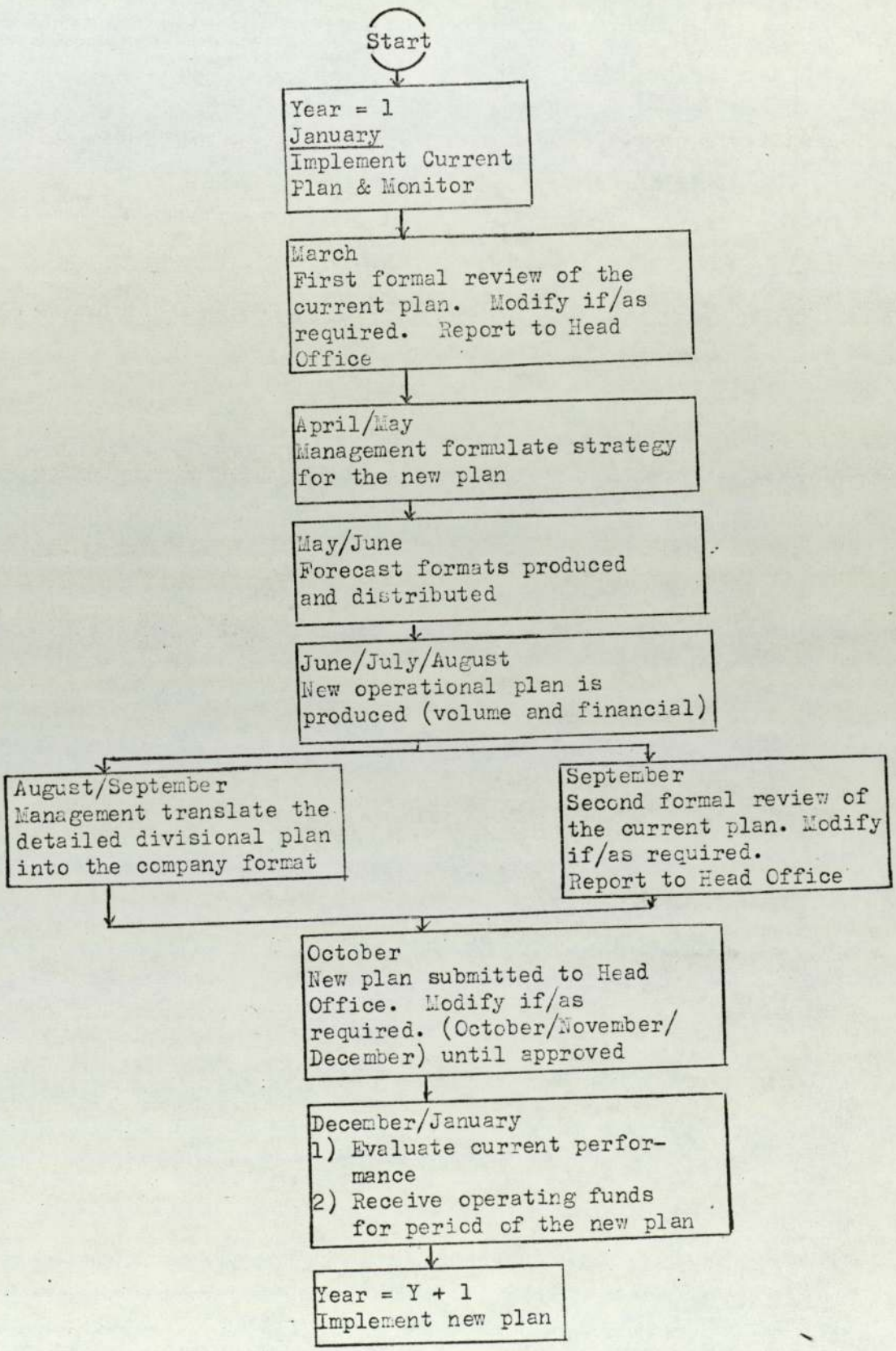
2 The Sales Force Composite plus Executive Judgement Approach

The first method was only used for one year (1971) and was then replaced by the second method. These methods are outlined in the following sub-sections.

3.4.1 The Executive Judgement Approach

The plan was created by the Product Manager (now the Marketing Coordinator) and the Divisional Marketing Manager (now the

FIGURE 3.4 THE PLANNING CYCLE



Commercial Director), after discussing the situation with the Sales Manager. The plan was based upon their volume forecast produced by virtue of their experience (38) in the market. The volume figures were produced in the light of the available sales history, order history, market knowledge, competitive knowledge and an instinctive feeling for the likely trends.

This method has been referred to as 'The Jury of Executive Opinion' (39) or Panel Consensus (40). In brief, the method consisted of combining and averaging managers' views concerning the items to be forecast in order to get the benefit of broad experience and opinion. This technique (38,39) is based on the assumption that several experts can arrive at a better forecast than one person because of the cross-fertilisation of ideas.

The interchange of ideas and experience meant that the product manager and the divisional marketing manager also made use of historical analogy (40) and visionary forecasts (40) during the preparation of the Management Plan.

The planning exercise was a long and tedious manual exercise as the volume plan was converted into the financial plan

without the aid of electronic calculators.

The volume and financial plan, so produced, was studied in depth and adjustments made until it was considered to be acceptable both from the production and financial viewpoints.

This method has been used, and is still used, by many organisations (39). It is now often used to appraise and modify results obtained by using other techniques.

The method has produced acceptable results where the market is well defined, the product range is small and the bulk of the business is transacted with a few major customers. It is very dependent upon the experience of the 'planners' and becomes more inaccurate as the number of products, customers and competitors increases.

3.4.2 The Sales Force Composite, plus Executive Judgement Approach

The divisional management currently use, and have done so since 1971, the sales force composite plus executive judgement approach to planning.

The sales force composite approach (39) involves obtaining the views of the sales force and the sales managers on the likely

future sales of the products in their areas. The individual forecasts are then combined to get an aggregate (i.e. a composite) forecast of the division's potential sales.

The figures are then analysed by senior management who may make modifications based on their executive judgement (i.e. their knowledge of the factory production capacity, the market environment and other factors) to produce an acceptable plan.

A fuller description of this approach in the divisional context follows and a diagrammatic representation of the procedures is presented in Figure 3.5.

The senior divisional managers formulate their objectives and strategies for the plan period. Their proposals are presented to Head Office staff and may need to be modified to comply with the company guidelines. After these proposals have been approved, the divisional managers formulate detailed goals and policies to achieve these.

Sales forecast formats (see Appendix 3.5) listing all the products and bore sizes to be included in the plan are prepared. These formats, with an explanation of requirements and assumptions (e.g. which unit lengths are to be used) are issued to the sales force four to six weeks before the specified

deadline, to allow plenty of time for thought and preparation. Even so, the formats are usually returned late after reminders have been issued.

The salesmen return their forecasts to their managers who study the figures, apply judgement (based on their wider experience and knowledge of the market and divisional policies) and combine these into the market forecasts. Thus, the Home Sales Manager produces consolidations of his salesmen's figures for the Home Direct and Associated Markets, whilst the Export Sales Manager does the same for the Export Direct, Associated, Projects and NACO Markets. The NACO forecasts are usually handled by telex and have a record of late submissions. Thus, the sales managers apply the first stage of executive judgement to the forecasts.

These consolidated market forecasts are submitted to the Product Manager who might make some slight modifications at this stage, based on his greater experience. The volumes are entered on the Management Plan format (Figure 3.2). The volume plan, so produced, is distributed to other management functions for analysis. The major functions interested in the volume plan are Production (to assess whether the plan volume and the plant capacity are compatible), Production Planning, Purchasing (to formulate buying requirements and policies) and Accounts (for costing).

Comments and criticisms result in the Product Manager studying the volume plan in detail and comparing the figures with previous plans and manually compiled statistics (see Chapter 2 - Other Information) of orders and sales making certain modifications (the next stage of executive judgement).

The volume plan is then converted into a financial plan by the use of discounted selling prices and standard costs for the plan period. This is a lengthy exercise and is accomplished in two stages.

The first stage, the preparation of the turnover plan, involves the multiplication of quantities (for each bore size, product and market) by the appropriate unit selling prices. Horizontal and vertical running totals are also calculated. The plan, so produced, is reviewed and modifications may again be made (in terms of volume and/or value adjustments) to bring it into line with the initial plan objectives.

The second stage involves the calculation of the gross contribution as a value and as a percentage of turnover. This is also a length exercise, and the following calculations are performed for every bore size, product and market:-

1 Gross Contribution (GC) = Total Selling Price - Total Cost Price

2 Gross Contribution % (GC%) = $\left(\frac{\text{GC}}{\text{Total Selling Price}}\right) \times \frac{100}{1}$

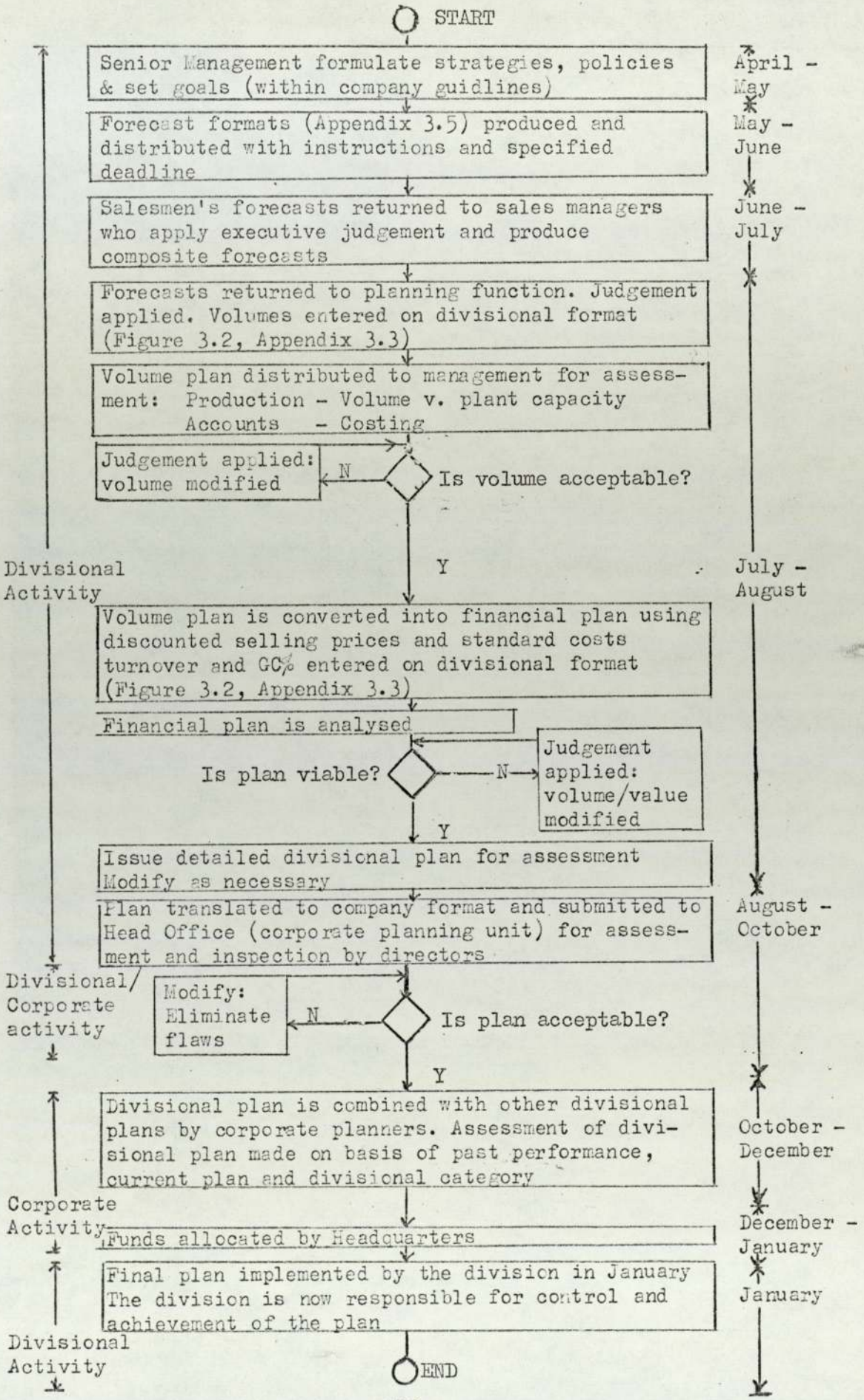
The financial calculations (turnover and GC%) are entered on the plan format (Figure 3.2).

When the two stages are completed a number of analyses (both volume and value) of the full plan are made (by product group and/or major product and bore sizes) to assist in the evaluation of the plan. Again judgement may be applied using past orders, statistics, sales statistics (see Chapter 2), previous plans, performance against previous plans, current orders, current sales and a knowledge of the market environment to produce a plan that has acceptable volume, turnover and profitability levels.

The plan is then distributed to senior and middle managers. Further review takes place and alterations may be made. The detailed divisional operational plan (Figure 3.2 and Appendix 3.3) is then translated into the company format (Appendix 3.2).

The plan, in the company format, is then presented by divisional management to the executive director responsible for the Oil and Marine Division. The plan is discussed and altered if and as necessary. The agreed plan is

FIGURE 3.5 DIVISIONAL PLANNING PROCEDURE



submitted to Head Office (and further modified if necessary). The plan is consolidated with those of the other divisions and corporate planners make their recommendations on the basis of the total plan, the divisional plans, the divisional categories and the past divisional performances. The Dividional Director and the Board discuss the plan (and alterations may again be made) and funds are allocated to the division on the basis of the accepted one year plan.

The division then becomes responsible for the task of implementing, monitoring and controlling the plan and hopefully achieving the initial objectives.

3.5 THE CURRENT METHOD - CRITICISM

The present planning operation is based on forecasts submitted by the sales force compiled to the judgement of the managers. This method has been used by the division for many years and no alternatives have been investigated. Thus:-

3.5.1 The Advantages

1 The method relies upon the experience of the sales force (based on 2)

2 Face to face contact with the customers and the feedback of customer intentions (i.e. either indirectly via each salesman's assessment of customer intentions or directly via a definite statement of customer intentions)

3 It can be applied where historical data may not be available or applicable (e.g. the launch of a new product).

Unfortunately, the method becomes increasingly inaccurate when the business grows and the number of products, customers and competitors increases. Thus:-

3.5.2 The Disadvantages

1 There are many sources of potential error as the method relies very much upon guesswork

2 There is the problem of bias. The salesman may be either optimistic or pessimistic

3 The individuals in the customer firm are often unable to predict accurately their own requirements and may deliberately over-estimate in an attempt to guarantee their supplies

4 The salesmen are often unable to factor into their estimates variables such as the changing market structure and the competitive forces

5 The judgemental amendments applied by the managers may be erroneous (optimistic - pessimistic). Indeed, the managers may be unable to assess correctly the bias of their salesmen and may therefore introduce compound errors

6 The method is susceptible to the biases of those who are most influential in the group (39).

7 The method is poor when there is a turnover of staff. A person new to the job and the business cannot be expected to have a 'feeling' for the market and consequently cannot be expected to produce accurate forecasts

8 The ability to produce accurate forecasts decreases as the number of variables (e.g. products, customers, competitors) to be considered increases. (In the case of the division, there are about 170 products, 1,000 customers and 10 main competitors.)

9 The sales force make their estimates with very limited statistical support and rely heavily on their 'experience' built up by long service in the market

10 The sales forecasts are prepared in June for the next operational year and thus the sales force are having to look eighteen months into the future. An assessment of the remaining six months of the current year is required for this may affect the potential for the plan period

11 The current planning operation is a very time consuming exercise (involving twenty people from the marketing

department alone, from the divisional director to the typists) and involves about six man-months of effort. The personnel involved in the planning exercise are not planners and their time commitment to planning at the expense of their other activities is often resented. The feeling of resentment is not conducive to accurate forecasting. Indeed, the past record of poor volume accuracy has only served to increase this feeling of resentment

12 The plan produced from the sales forecasts is costly (in terms of staff time and related salaries), rigid and contains no error limits (i.e. no indication of the uncertainties attached to the various figures).

13 The preparation of the plan is, unfortunately, an annual operation and it is very difficult to modify at the detailed level once it has been accepted

14 The financial plan, only, is reviewed twice a year and adjustments are made in value terms, if thought to be necessary. (A financial amendment of $\pm$ 10% is permissible within the company structure without having to alter the volume plan, i.e. without having to repeat the entire planning process)

15 The method is not amenable to continuous planning (i.e. the production of more than one plan a year) because of the prohibitive demands made on staff time. Indeed, the

division has made no attempt to make planning into a continuous exercise although it has already been mentioned that work related to the preparation and monitoring of the plan continues throughout the year.

3.5.3 The Accuracy of the Current Method

The sales force composite plus executive judgement currently used by the division gives far from acceptable results. Although there has been reasonable agreement between the total value of the forecast and that actually realised (see Table 3.3), the volume mix responsible differed very considerably from that forecast (see Appendix 3.6).

TABLE 3.3 DIVISIONAL FINANCIAL PERFORMANCE - PLAN v. ACTUAL

Year	Method	Plan £000's	Actual £000's	Actual / Plan x 100/1
1971	EJ	3,612	3,450	95.5
1972	SFC + EJ	4,777	3,924	82.1
1973	SFC + EJ	5,203	4,554	87.5
1974	SFC + EJ	6,600	6,806	103.1
1975	SFC + EJ	10,246	10,213	99.6
1976	SFC + EJ	13,764	12,360	89.8
1977	SFC + EJ	14,850	11,710	78.9

Where EJ = Executive Judgement

SFC + EJ = Sales Force Composite plus Executive Judgement

This can be explained quite simply by reference to the following two equations:-

1 FORECAST $n_1c_1 + n_2c_2 + n_3c_3 + \ldots\ldots + n_ic_i = V$

2 ACTUAL $n_1'c_1 + n_2'c_2 + n_3'c_3 + \ldots\ldots + n_i'c_i = V$

where n_1 = volume forecast for product one
c_1 = unit selling price for product one
n_1' = actual volume sales for product one

In each case the value for all quantities of all products is V. The descrepancies between actual and forecast summing to zero in value terms.

The division has six market classifications and offers about 200 products (not all products are sold in each market) and so in crude terms there are between 600 - 1,200 possible contributions to V. It is, therefore, quite easy to appreciate that the actual results above the forecast will have a balancing effect on those below the forecast. The overall result is thus a value which is acceptably close to V but generated by a volume mix (Appendix 3.6) quite different from that forecast.

3.6 CONCLUSION

The division went through a period of very rapid growth. A management structure evolved, at Grimsby, but the approach to planning was not modified. The division became the market leader in the large bore offshore hose business, a position which it has retained in spite of increasing competition, by virtue of its reputation for product quality and service and concerted marketing efforts.

The financial performance has improved but the volume of business has been declining (see Table 1.2) and this reflects the rising prices and increased competition from other hose manufacturers and alternative technologies. The comparison of results with those obtained in previous years is not a very satisfactory method of measuring performance as it does not indicate the market potential, hence the need for an accurate plan. Indeed, the global demand has increased over the years and yet the division's volume of business has declined, indicating that other manufacturers have improved their market shares at the division's expense. Thus the division realises that it must improve the quality of its volume forecasts to permit management to review the situation and formulate strategies to maintain if not improve its performance (in both volume and financial terms).

The need for accurate planning is great both at divisional and Head Office levels. The forms of the plan for divisional and Head Office use are well structured and serve to justify requests for operating funds and as a basis for monitoring performance. Significant deviations from the plan figures should cause management to take corrective action or else to re-assess the plan and make changes as necessary. However, at the detailed divisional level the use of the plan as a control agency is over-shadowed by the limited credibility attached to the sales force forecasts in the light of the past record of inaccuracy.

The current planning procedure, i.e. the sales force composite plus judgement approach, is very time consuming and represents about six man-months of effort each year. The method involves people from many departments: marketing, production, production planning, production services (formerly work study), purchasing and accounts. Indeed, twenty people from the marketing department, from the divisional director to typists, are engaged for different lengths of time in the preparation of the plan. The volume forecasts are produced by the sales force and sales managers and these are analysed and form the basis of the volume plan. The volume plan is converted into a financial plan by the product manager and staff from the newly created market planning department, and this exercise takes

approximately one month to complete, allowing for alterations. The record of the sales forecasts for inaccuracy has meant that there has been a need to modify and remodify the plan and review it constantly throughout its construction.

The end result of all this activity is a costly (in terms of time and salary of the preparers), rigid plan with no error estimates, that is theoretically acceptable in volume, turnover and profitability terms. Unfortunately, when the plan is implemented and monitored, discrepancies between actual and plan are evident. At the end of the year detailed analyses have shown that there is fair agreement between actual and planned turnover (see Table 3.2) but poor comparison between actual and planned volume (Appendix 3.6). Thus the plan fulfils its corporate function but its rigidity and past record of inaccuracy at the detailed level mean that its use at divisional level is not as great as it should be.

The method of plan preparation and its past record does little to stimulate confidence in plan accuracy and as a consequence the best is not being made of the potential business demands which are continually changing. Whilst the potential benefits to the many departments is appreciated, the measurable, tangible benefits are small and limited by the level of inaccuracy. The accuracy of the plan must be

improved so that the departments can place greater reliability in the figures and use these to improve their efficiencies.

The changing market environment (i.e. the increase in the number of manufacturers, the similarity of products and the competitiveness of prices) and the division's past performance (i.e. increasing turnover for declining volumes) indicate that a more systematic approach to planning must be adopted by the division. An improvement should be possible if the emphasis is switched to continuous planning instead of being concentrated on the production of one rigid plan. The new divisional aim must be to plan and not just to produce a plan. The current planning system is too time consuming to justify its use to produce more than one plan a year. Thus, as the division bases its plan on a volume forecast, a detailed study of alternative approaches to forecasting (manual and/or computerised), in the context of divisional requirements, will be an important part of future work (see Chapter 5).

CHAPTER 4

THE NEW INFORMATION SYSTEM

4.1 INTRODUCTION

The division and its information requirements have grown whilst the old information system, outlined in Chapter 2, has remained unchanged. Many of the computer reports had a record of inaccuracy and untimeliness and had consequently fallen into disuse and management relied heavily upon the limited, but accurate, information from the manual reports.

Today the complexity of business operations and the rate of change demand (41) that those who manage must be prepared to provide themselves with pertinent information. Indeed, systematic information has become essential to systematic management.

Thus, information, the failure of the old system and the development of the new system will be discussed. Indeed, the division, in line with company policy, had a commitment (see Figure 4.1) to computerisation.

FIGURE 4.1 OVERVIEW OF EXISTING AND PROPOSED GRIMSBY COMPUTER SYSTEMS

(Position in September 1974)

Marketing	Planning & Supplies	Production	Accounts	Engineering	Technical	Industrial Engineering
B Order Intake B Order Control A Sales Analysis C Sales Forecasting	C Capacity Planning C Production Plans B Materials Requirements C Scheduling A Finished Goods B Stock Control B Material Stock Control C Goods Received C Despatch Packing Transport	- B Production v. Plan B Production Monitoring	B Product Costing A Evaluation of Production A Expense Analysis B Material Variances B Payroll & Wages Analysis C Ledger - Sales - Purchase - Nominal C Operating Reports C Fixed Assets Accounting C Management Plan	C Planned Maintenance C Equipment Development C Expense Analysis	B Product Design B Cost Enquiries C Development Project Control C Quality Control C Test Analysis KEY A Existing Systems B Urgently Required C To Be Developed Later	A Labour Performance B Evaluation of Standards

The analysis of the old system, discussions with the managers and an appreciation of the literature (41-56) aided the development of a new and more appropriate information system.

4.2 INFORMATION

Knowledge, information, intelligence and data (42) are the components that management decisions are made of. A business encompasses many activities (e.g. marketing) and it is the function of management to control these activities for the economic good (33) of the business.

Managers (42) are constantly making decisions, more often than not based upon insufficient information. Sometimes, management (42) just does not know enough about what it is doing in terms of information to make the best decisions, or even know what the feasible alternatives are in every situation. This is because of

1 the lack of time
2 the necessity for assimilating much of the useless information which is presented to management.

Management is expected to have many characteristics, including comprehension, experience, cognizance, insight, perception, as well as substantial talents for communication, enlightenment, acquisition of knowledge and others which insure the skilful use of information.

However, while information is basic to all good management decisions and actions, it certainly does not insure good management. Nevertheless, it can be equally stated that bad information can almost certainly nullify good management.

Information (42,43) differs from data in that data is raw information, described (42) as facts in "isolation", appertaining to day-to-day activities, which does not enable decisions of any consequence to be made. Information is the aggregate of facts organised into knowledge or intelligence. Thus information is, necessarily, meaningful data, whereas data has no intrinsic meaning or significance in itself.

The distillation (43) of data through its being processed results in the creation of information. Information, if it is of proper quality, facilitates decision making and planning on the part of management.

In the pre-computer era (42) both data and information were rare commodities. Indeed, the manager, especially the innovator (41), was forced to rely upon meagre unsystematic information and his ideas had to be developed from his own unaided experience, flair and imagination. The facilities are now vastly improved and are capable of meeting the manager's needs. However, his ideas will still need to be created from his own innate flair and imagination, but it is possible for him to make use of far more effective information than his predecessors ever had (i.e. information that he can use to stimulate his creative faculties (31) and test the soundness of his ideas). Today, data (42) is available in inverse proportion to the need for information. Thus the manager must now ascertain that the data collected will furnish the information required and then sift out the information found within the data.

4.3 INFORMATION - CATEGORIES

There are three main categories of business information, and these are related to the purpose for which the information is used. Thus, managers require information to help them make decisions in the areas (43,44) of Strategic Planning, Management (i.e. Tactical) Control and Operational Control.

TABLE 4.1 INFORMATION - CATEGORIES, CHARACTERISTICS AND ACTIVITIES

Category	Characteristic Information Inputs	Activities
Strategic Planning	"External" data: Market Analyses Technological Developments Government Actions Economic Data Trends Predictions "Internal" information Competitive intelligence	Choose company objectives Plan the organisation Set the personnel policies Set marketing policies Set research policies Choose new product lines Decide on non-routine capital expenditure
Management Control	Control: Internal Information Historical Summaries Performance Comparisons Regular Reports Decision making: Trends Regular Reports Special Studies Product & Market Data Customer & Product Profiles Production - Process Efficiency	Formulate budgets Plan staff levels Plan working capital Formulate advertising programme Select research projects Choose product improvements Decide on plant rearrangement Decide on routine capital expenditure Formulate decision rules on operational control Measure, appraise & improve management performance
Operational Control	Product Data Inventory Reports Production Schedules Production Costs	Control hiring Control credit extension Control placement of advertisements Schedule production Control inventory Measure, appraise & improve workers' efficiency

The information requirements of each are different and examples of the information characteristics and related activities for the three areas (44) are detailed in Table 4.1.

4.4 MANAGEMENT INFORMATION

Management information is produced by processing raw data. The term 'management information system' has become (43) synonymous with computer-based data processing systems.

The effective management information system (42) does specific things in response to specific requirements. It furnishes relevant data in useful form to the right person, at the right time, for use in management decisions.

The system (42) once defined tends to develop or evolve into a specialised hierarchy of information subsystems (some examples of systems and substems appear in Figure 4.1). Management information (43) arises from the routine data processed regularly in the organisation.

Management is responsible (42) for the important components of the Management Information System, which include:

1 recognising the need

2 planning the system

3 implementing the system

4 operating the system

5 evaluating the operation

6 recycling additional requirements as needed

Each of these stages requires commitment and involvement on the part of management. Indeed, recognition (42) is perhaps the most important single management function in Management Information Systems, without it no system will be implemented.

Management has made its major decisions (often required early in the management process) with very little information. In the past, management has mustered the available information in an impromptu approach, usually having information which is neither well organised nor timely. Unfortunately, a Management Information System can provide no better support than the quality of management that has been introduced into it. Since the system cannot perform the impossible, early decisions will still be made on less information than the later, more routine decisions. It is also regrettable (42) that the information supplied by the system does not always insure that management will make full use of it.

The decisions made by management cannot (43) be based entirely upon internal information. Additional information concerning customers, competitors, suppliers, new technologies and many other environmental factors is required and this tends to be of a diverse and subjective nature. The environmental information is derived from sales force reports and market research (38) studies involving surveys and analyses of published statistics. Thus, management decisions are usually made, consciously or unconsciously, on the basis of combined internal and external information.

4.5 THE NEW MANAGEMENT INFORMATION SYSTEM

A management information system is a set of procedures and methods for the regular, planned collection, analysis and presentation of information for use in making management decisions.

The failure of the old system to produce timely, accurate and relevant information for management control and planning activities suggested that a new, more systematic approach was required. The steps taken to remedy this deficiency of information by developing a new system are described in the following sections.

4.5.1 The Steps in the Development of a System

The development of a Management Information System may be regarded as (45) a process of eight discrete steps:-

1 Establish or refine an information requirement

2 Develop gross system concepts

3 Obtain approval to detail a particular gross system

4 Prepare the detailed system specifications

5 Test

6 Implement

7 Document

8 Evaluate

These steps in the system development often overlap. Thus, it is not always possible to finish one step before going on to the next. It is also necessary to note that the process is iterative and that designers are often forced to recycle.

4.6 THE INFORMATION REQUIREMENT

The need for a new information system was established by considering:

1 the failure of the old computer system

2 the report appraisals

3 management decisions

4.6.1 The Failure of the Old Computer System

The old information system was outlined (46) in Chapter 2. Management had become increasingly dependent upon manually produced reports because the computer reports had gained a reputation for untimeliness and inaccuracy and had fallen into disuse.

The computer system failed because of four main reasons;

1 The system had been developed by adapting a system designed for the other two divisions in the Hose Group (i.e. Industrial and Hydraulics Divisions), with very little involvement of Oil and Marine staff (42,44,48, 49,52). This meant that the specific requirements of the division were never catered for. This was not an example of failure caused by management delegating the responsibility for design to the specialists, indeed the failure was caused by the system being imposed upon the division as a result of the company's policy on computerisation.

2 The control of the information system rested not with the divisional staff in Grimsby, but with data preparation staff in Newcastle. The divisional staff prepared the data input documents and sent these to Newcastle for punching and processing. If errors were detected these were returned to Grimsby for correction and this was time consuming and accounted for the

untimeliness and inaccuracy of the reports which were often produced late with incomplete data or worse still, produced with data that had been incorrectly corrected by Newcastle staff. The delivery of the reports to Grimsby by road also contributed to the delay.

3 The system produced sales analysis reports only. These reports could not be used as the basis for management control because of the time differential between the receipt of an order and the processing of the related invoice(s) which was often in excess of six months.

4 The level of detail produced in the standard reports (because of point 1) did not meet the specific requirements of the division. The reports (see Appendix 2.3) concentrated on financial analysis and paid little attention to product volumes. Although turnover and contribution were listed for the various product codes, there was no facility to produce analyses by bore size and unit length for each product code. The reports had a column heading "FOOTAGE" which was an appropriate volume indicator for Industrial and Hydraulics Divisions which dealt in long lengths of small bore hoses. However, "FOOTAGE" was not an appropriate volume measure for the division and instead the division used this column to show "NUMBER OF LENGTHS".

4.6.2 The Report Appraisals

The manual and computer reports were discussed with the managers and examples of the findings are presented in Tables 4.2 - 4.5 and Appendix 4.1. A scoring system:

1 = Very bad

2 = Bad

3 = Fair

4 = Good

5 = Very good

was used to assess the reports.

The manual reports obtained higher scores than the computer reports. This was because they were designed and controlled by the users for the users. However, whilst the manual reports were held in high regard, it was appreciated that the level of detail was limited because the clerical effort involved was great and often accounted for the late issue of the reports.

The computer reports obtained low scores because they had been designed with little user involvement and were usually untimely and inaccurate. Furthermore, the level of detail was inappropriate to the divisional needs and the financial analyses produced by product code took no account of product sub classification and the related bore sizes and unit lengths. Thus the poor performance, due to say rising

TABLE 4.2 ORDERS RECEIVED LIST - APPRAISAL BY SALES MANAGERS

(Manual : Weekly, see Figure 2.1)

Objectives	To inform management of incoming order position	
Action	Identification of weekly contribution made by each salesman - stimulate performances	
Assessment:		Score:
Relevant	Yes	5
Timely	Yes	5
Accurate	Yes	5
Understandable	Yes	5
		TOTAL 20 (i.e. 100%)

TABLE 4.3 SALES SYNOPSIS - APPRAISAL BY DIVISIONAL DIRECTOR

(Manual : Monthly, see Figure 2.2)

Objectives	To assess current performance - monitor trends	
Action	Discuss with divisional manager marketing - reappraise targets if necessary	
Assessment:		Score:
Relevant	Yes	4
Timely	Yes	4
Accurate	Yes	4
Understandable	Yes	4
		TOTAL 16 (i.e. 80%)

TABLE 4.4 PRODUCT OPERATING REPORT - APPRAISAL BY HOME SALES MANAGER

(Manual : Monthly, see Figure 2.3)

Objectives	To assess performance against plan (by product group)	
Action	Corrective measures initiated (e.g. more sales visits) if performance against plan is down	
Assessment:		Score:
Relevant	Yes	5
Timely	No	2
Accurate	Moderately	3
Understandable	Yes	4
		TOTAL 14 (i.e. 70%)

TABLE 4.5 MONTHLY COMMODITY BY BRANCH - APPRAISAL BY HOME SALES MANAGER

(Computer : Monthly, see Figure 2.9)

Objectives	To inform manager and his salesmen of up to date position of area with respect to turnover and profitability	
Action	Figures scrutinised by manager and circulated to representatives to stimulate action to increase turnover and improve profitability	
Assessment:		Score:
Relevant	Yes. It is essential that this information is received	5
Timely	No, usually very late	2
Accurate	Statistics often difficult to reconcile	3
Understandable	New format is desirable	1
		TOTAL 11 (i.e. 55%)

costs, of one product/sub-product size was often concealed at the expense of another size. This meant that the information in the computer reports was unsuitable for use as a control agency.

It was appreciated that a more systematic method of producing information appropriate to management needs was required.

4.6.3 Management Decisions

Managers make decisions (44) concerning planning, management control and operational control activities. Thus an understanding of the main decisions helps to determine the information requirement.

The main decision areas, the information characteristics and the decisions or activities, have in essence been presented in Table 4.1.

It is clear from Chapter 2 and from sections 4.6.1 and 4.6.2 that the existing system was capable of furnishing only a fraction of the information requirement listed in Table 4.1. The lack of this information limited management's ability to control and plan (see Chapter 3) effectively.

4.6.4 The Information Requirement Established

A consideration of the existing information system (Chapter 2), the planning system (Chapter 3), section 4.6 and discussions with managers established that there was a need for a new and improved information system. Indeed, a threefold requirement was identified:

1 An Historical Analysis System - to produce various analyses of the data from previous years to help planning activities

2 A Management Reporting System - to produce various analyses of current data to permit performance to be monitored and hence better control of activities

3 A Market Research System - to provide information on the environment

The development of the historical analysis and management reporting systems was undertaken by the author whilst formalised market research was undertaken, for the first time, by other staff in the newly formed Market Planning Department.

The historical analysis and management reporting systems will be described in this chapter and market research will be referred to in Chapter 5.

4.7 SYSTEM CONCEPT

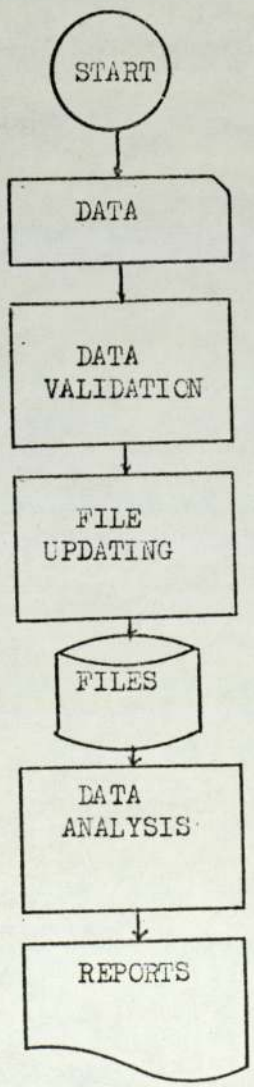
The need for internal management information was estblished in section 4.6. A twofold internal information requirement was identified and comprised:

1 Historical Analysis Reports - analysing old data

2 Management Reports - analysing current date

An overview of a system to produce this information by manual mechanical or electronic means is shown in Figure 4.2.

FIGURE 4.2 SYSTEM OVERVIEW



4.7.1 Historical Analysis System

A lack of statistics, in appropriate levels of detail, limited the accuracy of the division's management plan, described in Chapter 3. The plan was based upon the sales force estimates and the judgement of the managers. The judgement of the managers was based upon their experience of the market and a qualitative feeling for what had happened in the past, augmented by some manually prepared statistics of a limited nature.

A historical analysis system, capable of producing more appropriate statistics, was needed to:

1 enhance the present planning system
2 form the basis for more systematic planning, based for example on statistical forecasting
3 aid the sales force, especially those members new to the business, to prepare for business trips. (Thus a knowledge of previous orders, at product level detail, by customer could be used to assess the likely replacement business and hence more systematic field trips.)

The processing of invoices often occurred six months after the receipt of orders. Consequently, the importance of order analysis as an aid to management control and planning

activities was appreciated.

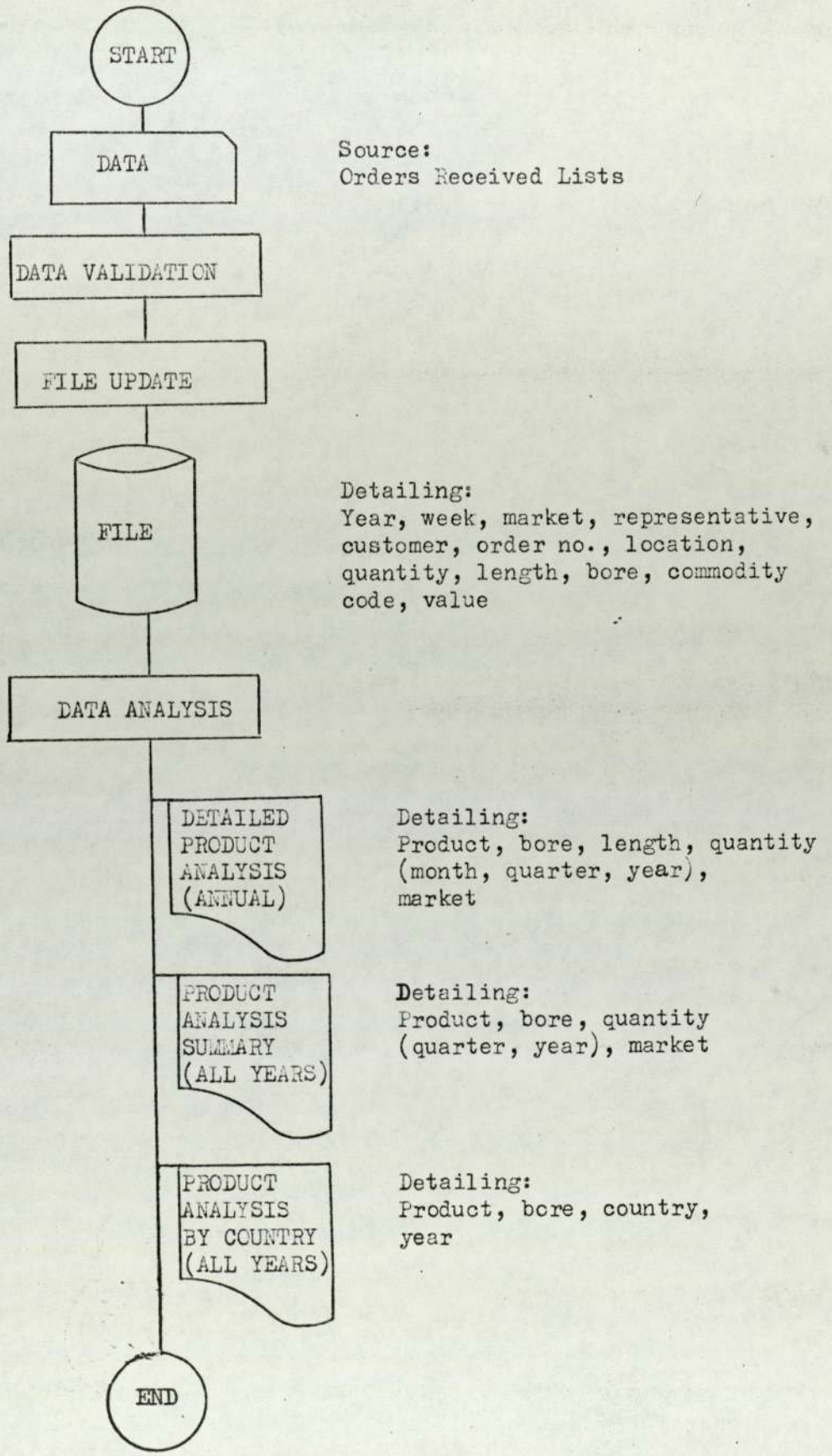
Orders received lists (see Figure 2.1) were available from 1970 to date. A wealth of data was contained in these lists but analysis was required to produce information at appropriate detail levels for use in planning activities. The orders received lists contained market, customer, location, product and financial details and numerous analyses were possible.

Three main information requirements were identified to aid planning activities, using the orders received lists as source documents. These are outlined in figure 4.3.

The volume of data to be analysed was large and it was estimated that there were some 10,000 lines of orders received data per year. This meant that, for the period July 1970 (when the orders received list was issued) to December 1976 there were some 65,000 lines of data to be analysed.

A consideration of the time taken to produce the limited statistics currently available, and a discussion of the problem with local managers and group systems staff indicated that the historical analysis system should be computerised. It was further appreciated that, by computerising the data, additional analyses could be produced, as required, by means of simple interrogations.

FIGURE 4.3 HISTORICAL ANALYSIS SYSTEM - OVERVIEW



4.7.2 The Management Reporting System

Information was not available in the level of detail required to permit effective monitoring and control of divisional activities.

Discussions with the managers indicated that a reporting system was needed to

1 produce information which is relevant, timely, accurate and easily understandable

2 produce information on orders, outstanding orders, sales and performance against plan, in various levels of detail (e.g. market, area, country, representative, customer and product) to permit better control of the business. The use of information for control is outlined further in points 3 to 6

3 produce detailed information at the product level to permit the evaluation of individual product profitability and hence control of the range of products offered

4 enable performance to be monitored (by market, area, country, representative, customer value and volume) to permit decisions to be made concerning sales representation, advertising, pricing policy and market research

5 enable constant monitoring of performance against plan (by value and/or volume) to permit corrective measures to be formulated (e.g. more sales representation, pricing) if necessary

6 monitor outstanding orders (not previously done) to permit the assignment of production priorities, the formulation of pricing policies to maintain profitability and the setting of marketing objectives concerning undersubscribed products

7 to provide accurate current statistics to complement the historical statistics and aid planning activities

An appreciation of the literature (41-55) and discussions with marketing staff formed the basis for the design of the system.

The future potential (52,55) and the possible pitfalls(42, 44,48,49,50,52) were used to ensure that the information requirement was met and had scope for future development. Indeed, it was indicated (52,55) that a broader view of the information requirement be considered than that for one department.

The managers were interviewed to determine their requirements and were encouraged to participate (42,44,48,49,52) in the problem defining and solving stages. The approach finally adopted was a composite of the committee and low level approaches (51).

Report formats were designed to meet the requirements discussed with the managers. These formats were analysed (50) and discussed with the managers, over a period of time, and changes were made. (The formats are discussed in greater detail in section 4.9.2).

The system was designed, initially, for the marketing department but the inputs and outputs were found to be suitable for other departmental needs (52,55). Thus the order inputs would be used by production planning and buying and the sales inputs would be used by accounts. Consideration, therefore, was given not only to marketing needs but also to future divisional needs (see Figure 4.1) and it became essential to ensure that the basic data would meet these needs.

The marketing department required four types of reports:

1 Orders Received Reports

2 Sales Reports

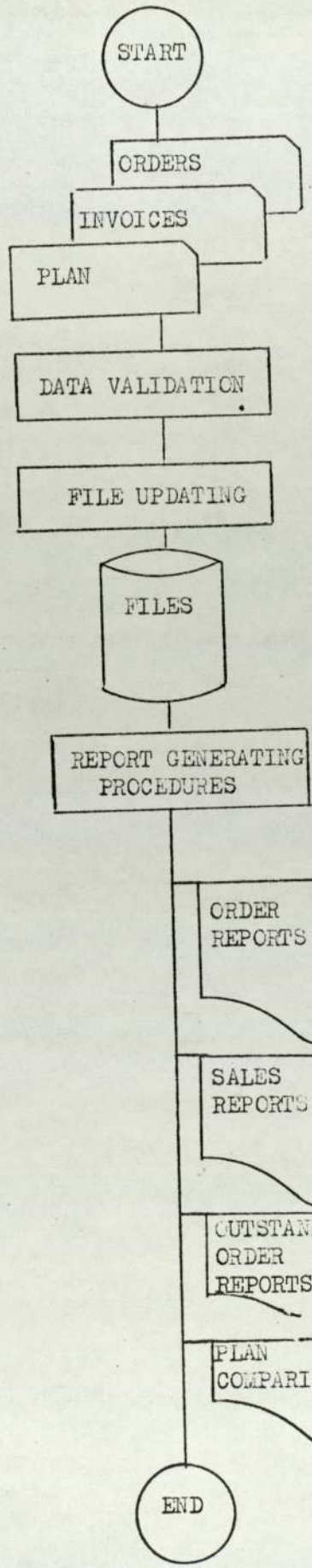
3 Outstanding Order Reports

4 Performance versus Plan Reports

An overview of the envisaged system is presented in Figure 4.4.

A consideration of the data volumes (see Table 4.6), the level of detail produced by the current manual method and the level of detail desired suggested that a computerised

FIGURE 4.4 OVERVIEW OF THE MARKETING/SALES SYSTEM



Detailing:
Date, market, customer, area, country, representative, order number, account number, quantity, length, bore size, commodity code, product group, value, cost

Detailing:
Volume and/or value, customer, country, product group, market (period & year to date)

Detailing:
Volume and/or value, customer, country, product group, market (period & year to date)

Detailing:
Value, product group, market

Detailing:
Value (monthly), volume & value quarterly by product group, market (period & year to date)

TABLE 4.6 MANAGEMENT REPORTING SYSTEM - DATA VOLUMES

Data Type	Time Period	Number of Source Documents	Number of Data Items
Orders Received	Week	40	200
	Month	160	800
	Quarter	500	2,500
	Year	2,000	10,000
Invoices Received	Week	120	160
	Month	500	640
	Quarter	1,500	3,000
	Year	4,500	9,000
Orders Outstanding	'On average'	600	1,800
Plan - Value	Month	-	720
Plan - Volume/ Value	Quarter	-	5,100

management information system should be developed. It was appreciated that by holding all the data in computer files additional analyses would be possible as new needs were identified.

The nature of the business and the decisions made meant that there was no demand for a rapid turn around of information and a batch processing system, rather than an on-line system (56), was preferred.

4.8 APPROVAL FOR SYSTEMS DESIGN

The approval to develop the proposed systems was obtained after a report detailing the likely costs and benefits was presented to management.

4.8.1 Cost Survey

A report outlining the systems and the required reports (the finalised versions of which are detailed in section 4.9) was presented to Group Management Services (Newcastle) and four external bureaux. The bureaux consulted were:

1 Time Sharing Limited - (Birmingham)

2 Comshare - (Wakefield)

3 Honeywell - (Manchester)

4 LeascoResponse - (London)

The division's requirements were discussed in detail and development and running cost estimates were obtained. These costs are detailed in Table 4.7.

TABLE 4.7 COST SURVEY RESULTS

Computer Organisation	Development Cost £	Annual Running Cost £
In-House	9,850	1,600
Time Sharing Limited	400	1,100
Comshare	200	1,200
Honeywell	200	1,300
Leasco	10,500	2,500

On the basis of the cost survey, it was recommended that Time Sharing Limited should develop the proposed systems.

However, Group Management Services staff persuaded divisional management that the quality of the systems developed for the

quoted prices would be poor. The divisional management were wary of using outside facilities and decided to use in-house facilities to develop the marketing/sales application as part of the longer term commitment (see Figure 4.1) to computerisation.

4.8.2 System Justification

The divisional management, because of their previous poor experiences with computer systems (Chapter 2), exhibited resistance to change (47) and this was only overcome by the timely arrival of the Chief Accountant and the Market Planning Manager who supported the need for the system. It was advocated that the system should be evaluated in terms of its estimated effects on efficiency and not just on cost savings (47,51). Unfortunately, managers found it very difficult at this stage, because of their lack of experience of the worth of good information, to quantify the potential benefits. Thus the system was justified on the basis that the information was needed and that the computer approach produced a saving over a manual approach (see Table 4.8).

Thus analysis indicated that the break even point would be reached late in the second year, after which an annual saving of £5,750 could be expected.

TABLE 4.8 BENEFIT ANALYSIS - IN HOUSE COMPUTER VERSUS MANUAL METHOD

System	Development Cost	Annual Cost	Years & Cumulative				
			1	2	3	4	5
Manual (2 clerks + over-heads)	-	7,000	7,000	14,000	21,000	28,000	35,000
Computer System	9,850	1,600					
(Old System)		-350					
	9,850	1,250	11,100	12,350	13,600	14,850	16,100
SAVING			-4,100	650	6,400	13,150	18,900

4.9 DETAILED SYSTEM SPECIFICATIONS

The detailed system specifications were developed by the author and Group Systems staff, whilst the users were involved (42,44,48,49,52) to ensure that their requirements were met.

Attention was paid to the proposed reports (50) and every effort was taken to provide information at the right level of detail.

The historical analysis system (section 4.9.1) had to be developed independently of the management reporting system (section 4.9.2). The reporting system required more detailed data than was available from the orders received lists, and the transformation of some 65,000 data lines from one format to another was dismissed. Thus the historical analysis system was developed using the existing orders received lists as source documents. The data for the new reporting system would be accumulated to produce fresh statistics as those for 1970-1976 lost their value through age.

4.9.1 Historical Analysis System - Specification

Three main analyses, to help planning activities, were identified:

1 Detailed product analysis by market - showing the volume of business by product, bore, length, market, month, quarter and year, separate analysis for each year (1970-1976).

2 Product Analysis Summary (1970-1976) - showing the volume of business by product, bore, market, quarter and year. One analysis for 1970-1976.

3 Product Analysis by Country (1970-1976) - showing the volume of business by product, bore, country and year. One analysis for 1970-1976.

Diagrammatic representations of the output formats are presented in Appendix 4.2.

The orders received lists (see Figure 2.1) were the source documents for these analyses. Discussions with the Data Processing staff resulted in coded orders received lists (see Appendix 4.3) being used as input documents.

A standard package, QUEST (Query, Extract, Sort and Tabulate), was used to produce the required analyses. The package also permitted additional analyses of the data to be carried out.

4.9.2 Management Reporting System - Specification

The preliminary output forms were examined (50) and the information requirement reappraised. The possibility of producing (43) on-demand, exception, and ad hoc reports to complement or replace the standard reports was considered. Managers were unable to define their business well enough at this stage to permit an exception reporting system (43) to be developed. It was realised that ad hoc reports, to complement the standard reports, could be produced by use of the standard QUEST package. However, the users favoured the standard and regular reporting approach.

A need for various analyses of:

1 orders received

2 sales

3 outstanding orders

4 performance against plan

was established. An example of the detail and format of one of the proposed reports is presented in Figure 4.5. The other reports are presented in Appendix 4.4.

The input documents for this system were designed and examples are presented in Appendix 4.5. There were four types of inputs:

1 Master file inputs (e.g. area/country codes)

2 Data inputs (e.g. orders)

3 Plan inputs

4 Maintenance inputs (e.g. order amendments)

A diagrammatic representation of the marketing/sales system is presented in Figure 4.6.

Data validation procedures were specified to prevent corrupt data from entering the system and included the standard field checks (i.e. alpha, numeric, alpha/numeric) and checks against master file data (customer account number, area/country code, product group/product code).

FIGURE 4.5

REPORT 01 — WEEKLY ORDERS RECEIVED LIST

Objective	-	To report in a readily assimilated format a detailed breakdown of orders received in the previous week
Distribution	-	Marketing Management
Frequency	-	Weekly
Action	-	To assess the order intake situation for the previous week and raise any resulting queries. To arrange for all order/items with no estimated gross contribution shown to have an estimated cost input before the month end run.

Format:

Market
Area
Country
Territory
Customer

ON	CC	Commodity Description	B	L	NI	Value	Est GC	Est GC%	CIF

Where - ON = Order No., CC = Commodity Code, B = Bore, L = Length, NI = No Items, Est = Estimated, GC = Gross Contribution

The existing product group classification was extended (see Appendix 4.6) by the introduction of product sub groups to permit the grouping together of like products (and hence easier ad hoc interrogation).

A new area/country classification (Appendix 4.7) was introduced to replace the old inappropriate classification (Appendix 4.8).

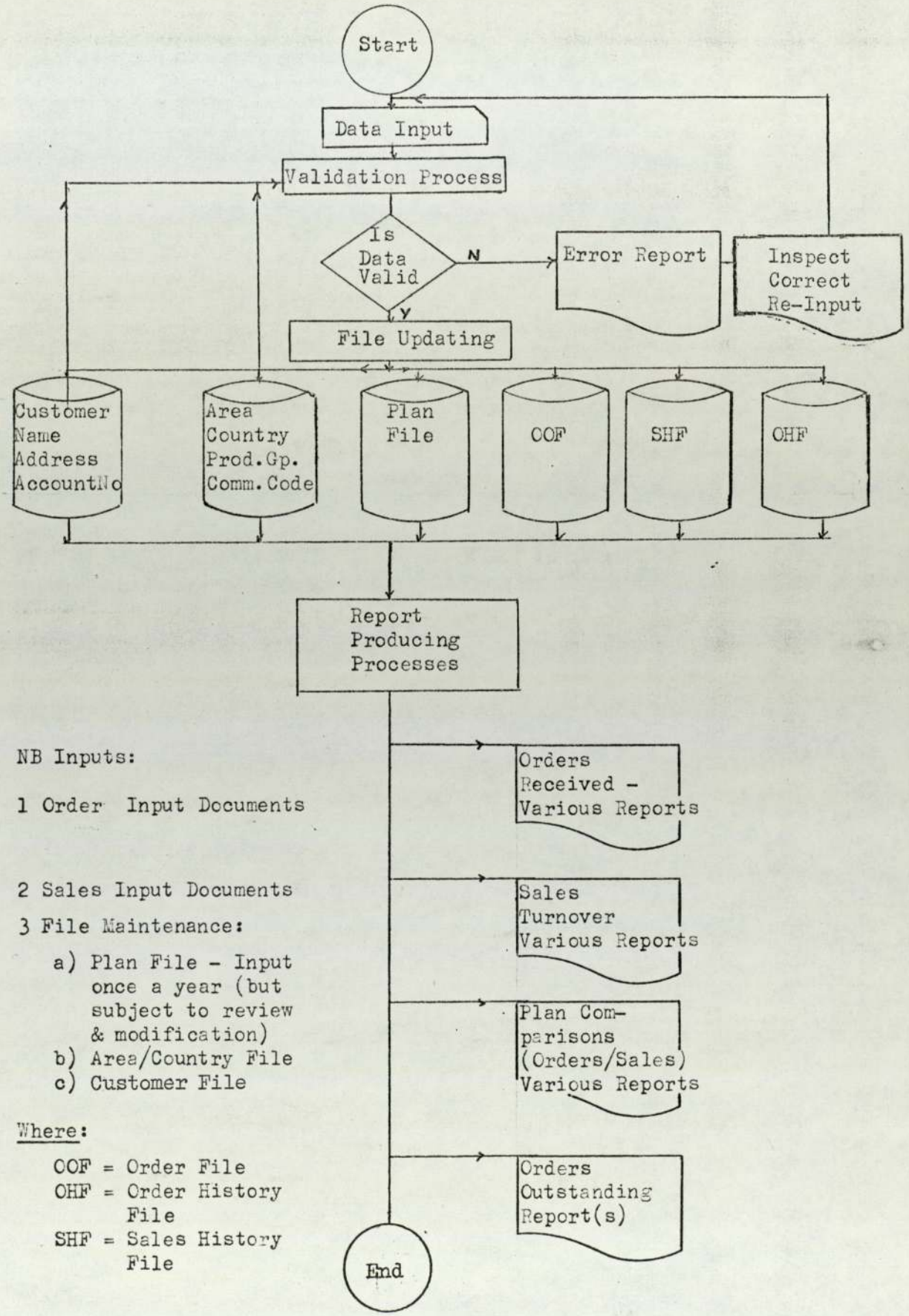
To permit customer analyses an account numbering system was introduced. The account number contained ten digits, the last being a check digit to eliminate possible transcription and transposition errors.

A more detailed set of diagrammatic representations of the system is presented in Appendix 4.9 and report distribution is detailed in Appendix 4.10.

4.10 TESTING

The author produced test data and specimen results for both the historical analysis system and the management reporting system.

FIGURE 4.6 THE MARKETING/SALES SYSTEM



NB Inputs:

1 Order Input Documents

2 Sales Input Documents

3 File Maintenance:

a) Plan File - Input once a year (but subject to review & modification)
b) Area/Country File
c) Customer File

Where:

COF = Order File
OHF = Order History File
SHF = Sales History File

4.10.1 Historical Analysis System - Test

The production of test data for this system was quite straightforward. Data from various orders received lists were coded (see Appendix 4.3).

The three reports produced were checked against the specimen answers. Excellent agreement was obtained for the two product analyses by market (Appendix 4.2 and 4.3) but the results for the country analysis were poor.

The failure of the country analyses was attributable to mis-punching and transpositions of letters in the country name. The validation process for the historical analysis system only checked the input fields for their alpha, alpha-numeric or numeric nature and no checks against standard tables of countries and product codes was undertaken.

The punching error on numeric fields was established from the test sample as less than 1% and this was most acceptable.

To achieve this accuracy for the country analysis, it was decided to compare all country names against a standard file and correct the rejections.

4.10.2 Management Reporting System - Test

The preparation of the test data for this system was more involved than for the historical system. This time, order, sales, credit and master file (account number, area/country, product group/product code) inputs had to be prepared.

The results compared most favourably with the specimens and proved that the validation processes were working by reporting on the deliberately wrong elements.

The checking of the maintenance facilities was undertaken by group systems analysts.

As a result of the detailed checking undertaken by the systems staff, a few problems were identified and resolved.

4.11 IMPLEMENTATION

As a result of the successful testing of the two systems, an implementation plan was established. Timings were determined and responsibilities were assigned (46).

4.11.1 Historical Analysis System - Implementation

The historical analysis system was completed before the reporting system. Thus the author was able to accomplish the implementation whilst the development work for the management reporting system was still in progress.

The author collected all the orders received lists for 1970-1976 and checked these for completeness. Copies were missing from marketing department's master file but replacements were obtained from other recipients of the report.

The lists were then coded (see Appendix 4.3) and passed to data preparation staff on a weekly basis. Extremely poor quality lists were retyped and coded.

The data once punched was verified. The annual analyses by market were produced as soon as the data for each year was transmitted to Newcastle. However, because of their size the reports were delivered by road rather than being transmitted down the telephone line.

The summary analysis (1970-1976) was produced when all the data had been prepared, verified and transmitted.

The analyses were shown to members of the marketing department and the results seemed to compare favourably with their qualitative assessments.

The country analysis was produced after some months, once country elements had been verified and errors corrected.

Specimen historical analyses are presented in Appendix 4.11

4.11.2 Management Reporting System - Implementation

The implementation of the reporting system was a longer term exercise when compared to the historical analysis system.

Group systems staff produced a Job Instruction Manual (see section 4.12) detailing the system. In November of 1976 the timescales and responsibilities for a January 1977 systems launch were established. The Systems staff held a half-day training session to explain the system to the managers and to the clerical staff who were to be responsible for data preparation. The bulk of the work was assigned to the author who was responsible for:

1 Product group/product code classifications (see Appendix Appendix 4.5.1 and 4.6

2 Area/country code classifications (see Appendix 4.5.2 and 4.7)

3 Customer account number creation (see Appendix 4.5.3)

4 Evaluating the outstanding order situation

5 Training the local clerical staff

6 Preparing outstanding order inputs (see Appendix 4.5.4 and 4.5.5)

7 Dating and batching outstanding inputs (see Appendix 4.5.6 and 4.5.7)

8 Correcting errors (see Appendix 4.5.8 - 4.5.13)

9 Preparing the monthly value plan inputs (see Appendix 4.5.14 and 4.5.15)

10 Preparing the quarterly volume/value plan inputs (see Appendix 4.5.16 and 4.5.17)

11 Controlling the input of new orders (from January 1977)

12 Report distribution (see Appendix 4.10)

Sales accounts were responsible for:

1 preparing and correcting sales inputs (see Appendix 4.5.18)

2 preparing and correcting credit inputs (see Appendix 4.5.19)

3 checking and batching of input (see Appendix 4.5.6 and 4.5.7)

4 requesting the standard reports (see Appendix 4.5.20)

The timescales were intended to have the master files, plans and outstanding orders prepared, on magnetic tape, ready for the systems launch on 1st January 1977.

The pre-implementation exercises (product classification, country classification and account number creation) were accomplished promptly.

The training of staff was undertaken first in groups and then on a one to one basis. Job instruction manuals, product classifications (Appendix 4.6), country classifications (Appendix 4.7) and customer account number files were made available to all clerical staff in the marketing and sales accounting areas. (The job instruction manual was a training document which fully explained the management reporting system in simple terms.) Considerable resistance was encountered but this was gradually overcome by close supervision and guidance until experience was gained.

The system was launched and there was still much work remaining to be done on the outstanding orders and the preparation of the plan. New orders were prepared by the sales clerks and this action was run in parallel with the preparation of outstanding orders.

The processing of sales invoices served as an aid in establishing outstanding orders. If a sales invoice was rejected because an order was not on file, it indicated that the order was outstanding and corrective measures were taken.

After three months, the situation stabilised and rigorous monitoring of input and outstanding order files gradually brought the figures into line with the manual figures produced by the marketing coordinator.

The responsibilities and timings for order processing are detailed in figure 4.7. This was subject to delay because the marketing coordinator had to estimate the costs applying to each order. These estimates often differed from the costs calculated by costing department and entered on the invoice inputs. This caused discrepancies when the orders and sales file were interrogated to produce the reports.

Thus an improved approach, detailed in figure 4.8, was introduced to ensure that the data reached data processing staff on time and that both orders and invoices contained the same costs. Discrepancies still occurred because of rising cost over the life time of an order and these were closely monitored and corrected by marketing and sales accounts staff.

A similar set of responsibilities existed for sales accounts staff. The marketing and sales accounts staff were responsible for the correction of their own errors but jointly responsible for correction of errors caused by order/invoice clashes.

In this rather hectic period certain deficiencies in the order maintenance procedures (for example, the inability to amend a part invoiced order) were detected. The findings were communicated to systems staff who corrected the situation.

Close liaison between marketing and sales accounts departments ensured the accuracy of the reports which gradually became accepted as valuable management tools.

Specimen management reports are presented in Appendix 4.12.

FIGURE 4.7 ORDER PROCESSING - RESPONSIBILITIES AND TIMINGS - INITIAL APPROACH

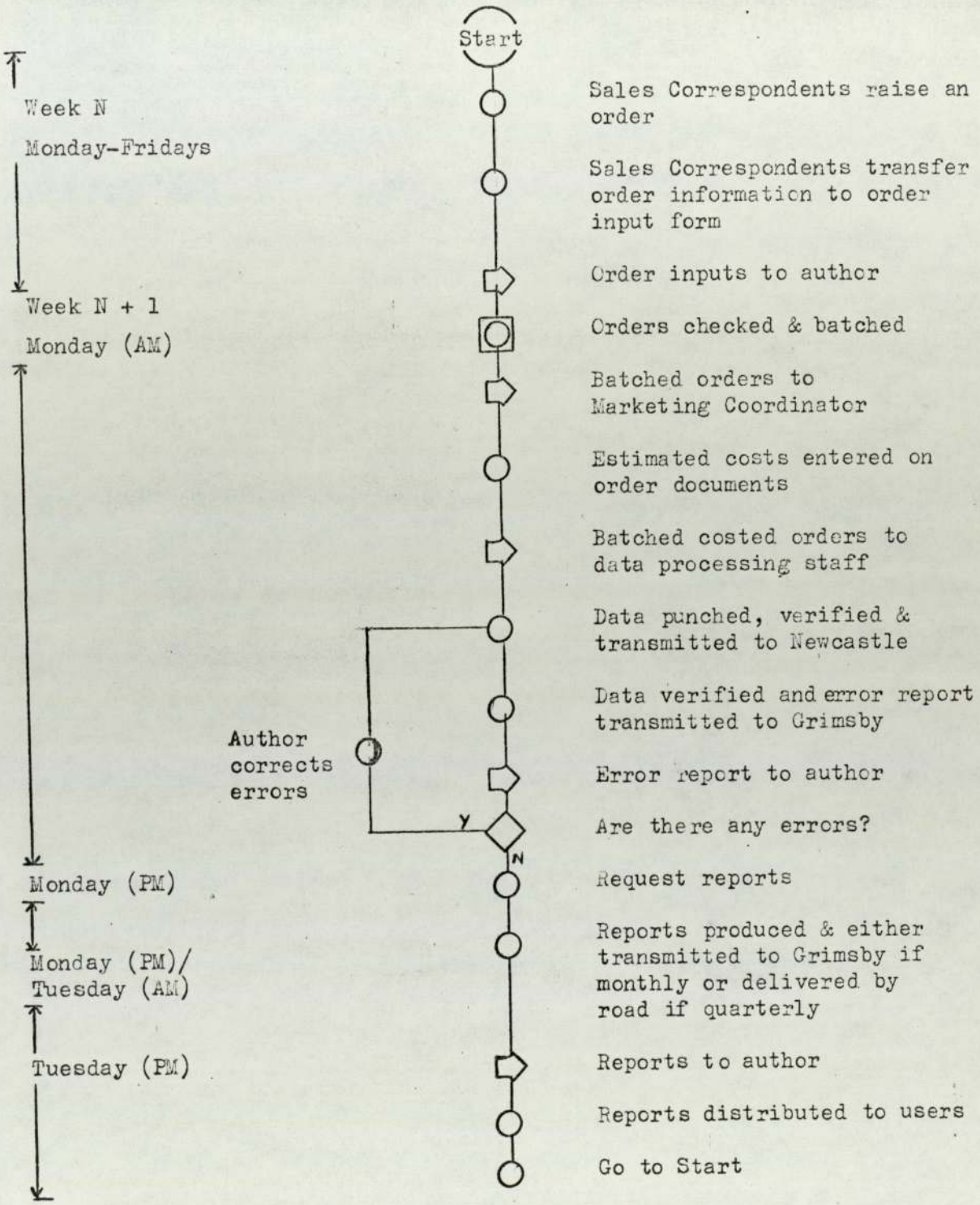
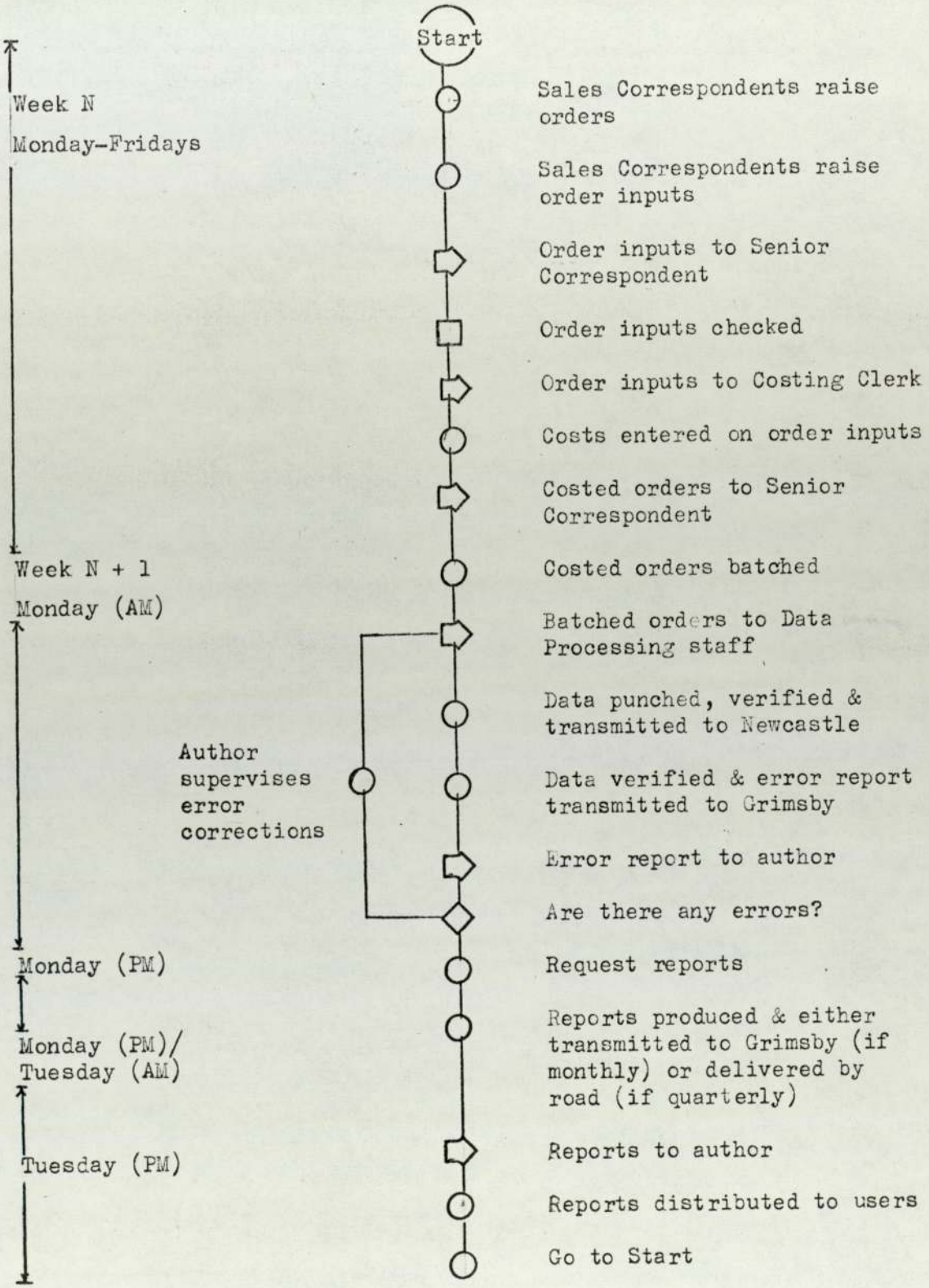


FIGURE 4.8 ORDER PROCESSING - RESPONSIBILITIES AND TIMINGS - MODIFIED APPROACH



4.12 DOCUMENTATION

The documentation was twofold and was undertaken by group systems analysts who:

1 detailed the systems and the programmes (to permit easy maintenance and even modification, if required)

2 produced the job instruction manual (a comprehensive training guide for the user, explaining the use of all the standard input documents, the error messages that may appear on error reports and the corrective measures).

4.13 EVALUATION

The historical analysis and management reporting systems have been operational for over $2\frac{1}{2}$ years. They provide information that was not available from the old information system, described in Chapter 2, and have proved to be very useful management aids.

4.13.1 The Historical Analysis System - Evaluation

The historical analysis system was designed to produce information to aid management planning activities, described in Chapter 3. The management plan was produced from sales force estimates, modified by judgement, based on a qualitative feeling of the past because of the limited statistics that were available. The problems of producing estimates for 170 products, without a detailed knowledge of the past, were great and the accuracy of the volume plan was poor.

The historical analysis system produced statistics at the product level (i.e. the planning level) that were not previously available to

1 aid the present planning system by providing the sales force, especially those new to the business, with

detailed information by product, market and country, to complement their field experience

2 form the foundation for either the selection of a more appropriate forecasting method (38-40) or the development of a model to meet the specific needs of the division.

The statistics have been compared with the manual analyses produced for selected products by the marketing coordinator and agreement was good for the more recent years (1973-76). The figures for the period 1970-72 were believed to be less accurate because many alterations made to customer orders were not reported on the orders received lists. A further limitation of the early information was caused by products being phased out, product codes being changed and new products being introduced. Even so, the early statistics provide a picture of the market which is not available from management experience alone, especially when there has been a turnover of staff and management experience has been lost.

The information was produced, using the Quest package, for a cost of £500. Benefits were realised in the saving of the management time previously spent on manual analyses and in savings made by phasing out

certain low profitability products. The combination of the historical analysis and management reporting information permitted Market Planning staff to identify certain low-volume profit items that were occupying production capacity capable of producing higher returns. These products were removed from the range.

The information produced formed a valuable starting point for further work but it was also realised that there was a need for new information to complement the historical statistics. Some of the division's products have working life times of three years and six years of past data could not provide a full picture of trends. The information produced from analysis of the orders received file (1970-76) was to be extended by producing reports, in the same format, by interrogating the reporting system files by use of the Quest package. It is believed that, as the information is built up over the years, better forecasts will be produced.

4.13.2 The Management Reporting System - Evaluation

The management reporting system was designed to produce information, not previously available, to help managers to monitor, control and plan their business activities.

The accuracy of the reports produced in the first months of operation was not good. This was attributable to

1 an imprecise knowledge of the outstanding order structure prevailing at the time of the systems launch, which led to much incorrect data being entered on file

2 poor data preparation

However, stringent control of data input by the author and analysis and correction of the outstanding order file improved the accuracy of the reports.

The agreement between the computer reports and the manual summaries was encouraging and the managers began to make more and more use of the new reports.

The reports were produced in the formats requested by management and the comments (see representative examples in Appendix 4.13) were very favourable.

The example set by the Chief Accountant stimulated greater confidence and further promoted managerial use of the reports. For example, the Product Operating Reports (orders and sales) were used at the monthly Management Committee meetings and at the frequent marketing meetings.

The new reports enabled marketing department to

1 set new order targets

2 monitor outstanding orders and consequently set production priorities and establish which product groups were performing badly against plan and thereby initiate corrective action

3 establish the value and gross contributions for both orders and sales for the period and the year to date

4 establish which products were making low returns and consequently (in conjunction with the historical analyses) permit product range rationalisation

5 gauge the shift in profitability, caused by rising costs, by comparing the estimated contributions of orders with the actual contributions of the sales to permit more realistic pricing policies to be formulated.

The system was developed for £9,560 and the running cost for the first year was £800. These costs were less than those estimated by Group Management Services (see Table 4.7).

The information in the reports meets the specifications detailed in section 4.9.2 and initial observations

indicate that the managers are satisfied. However, because judgement and intuition as well as information plan an important part in overall management effectiveness, it was very difficult to quantify the effects of improved information flow. It was appreciated that the managers might be unable to make efficient and immediate use of all the available information and that in-depth training sessions would be required to permit both optimal use and effective evaluation of the system. The training was supplied and the users have learnt to control the information and apply it to their business activities.

The system has been responsible for a reduction in the amount of management time spent on collecting and analysing data both for day-to-day activities and longer term planning requirements. It has been estimated that some 280 man days of effort, for the marketing department alone, worth some £7,000, could subsequently be released for use in other activities as a result of the new information system. This,added to the benefits detailed in Table 4.8 coupled to the potential improvements in management control and planning activities fully justifies management commitment to the development of the system.

Managers have become more experienced in the skills required to control and use their information to help their

business activities and have paid renewed attention to the changing nature of the business. Indeed, new requirements have been identified, some of which have been implemented (e.g. materials requirements - based on orders received, sales ledger and nominal ledger), whilst others are planned (e.g. production scheduling - based on orders received, sales force performance against quota - unheard of previously, and management planning).

The system continues to evolve and the users continue to gain experience. Further new aids to management, possibly in the form of extensions to the existing system, will be developed to encompass the needs of many of the departments of the division as management experience and familiarity with computer potential grows and the resistance to change and prejudices caused by the old system are dispelled by success of the new system. Managers have indicated that the use of the standard reports and the ability to request more detail using the Quest facility has helped them to improve the quality of their business activities and that they expect further improvement as their experience increases and new information needs are satisfied.

4.14 CONCLUSION

The need for a new information system was established by considering the limitations of the old system and the

information required by managers to help them make decisions of various types. The eight stages of development outlined in section 4.5.1 were followed and resulted in the successful implementation of a new information system to meet the identified needs of the users. The development of the new system was enhanced by the involvement of the managers in the design phase but the latent reluctance to change had to be overcome during implementation. The timely appointment of the Chief Accountant and the Market Planning Manager, both having previous experience of successful computer systems, greatly assisted the implementation activities.

The reluctance to change was overcome when the use of the reports was demonstrated and the accuracy of the figures established against the trusted manual reports, produced in parallel during the implementation of the system.

The managers were satisfied with the system and often requested ad hoc reports to supplement the standard reports. Further management requirements have been identified and the prospects for more systematic management involving decisions based on timely and relevant information and judgement, rather than on judgement alone, are promising.

The objective of producing an information system capable of meeting day to day control and longer term planning requirements was satisfactorily accomplished.

CHAPTER 5

TOWARDS MORE SYSTEMATIC PLANNING

5.1 INTRODUCTION

In Chapter 3 the current operational, formerly management, planning system was described. This plan is compiled by marketing staff who are responsible for implementing, monitoring and amending it.

The plan is a very important document and is used extensively at divisional level and also in summarised form as a unit to be built into the company corporate plan. It is on the basis of this summary that the divisional objectives and plan are sanctioned and operating funds, for the next calendar year, are allocated. At the detailed level for divisional use, the plan serves as a running manual for the many functions of the business. Thus, for example, the detailed plan is used by Marketing to monitor performance, by Production to determine manning levels and plant capacity, and by Purchasing to determine raw materials requirements.

The limitations of the planning system discussed in Chapter 3 indicated that a more systematic approach was

needed to help divisional management, not only to maintain, but also to improve divisional performance. The current planning procedure is limited by the accuracy of the forecasts produced by the sales force. Consequently, better forecasts are required if the accuracy of the plan is to be improved.

5.2 PLANNING

Planning is a very important business function and must be carried out as systematically as possible in order to make the most of the existing and anticipated future opportunities.

5.2.1 Planning - Definitions

Planning has been described as:-

1 'Deciding in advance what is to be done' (34,35)

2 'Decision making concerning the future' (36)

3 'A decision making process involving the commitment of resources - money, people, time, capital - today; the payback or return on which will not be realised until some future period' (37)

4 'A continous decision making process' (37)

5 'The continuous process of making present entrepreneurial (risk-taking) decisions systematically and with the

'best possible knowledge of their futurity, organising systematically the efforts neededto carry out these decisions and measuring the results of these decisions against the expectation through organised systematic feedback' (57)

6 'A current creative thought process, which aims to anticipate accurately the trends and patterns of future events and their incidence; and to formulate a series of appropriate actions which will result in the fullest advantage being taken of the opportunities presented' (58)

7 'The systematic development of action programmes aimed at reaching agreed business objectives by a process of analysing, evaluating and selecting from among the opportunities which are foreseen' (59)

8 'Identifying alternative courses of action and presenting them and their effect for decision before their respective lead times are reached' (60)

5.2.2 Planning - Purpose

The purpose of planning (61) is to achieve the greatest possible success and efficiency in the conduct of a business, large or small.

The planning process (37) produces a road map for the organisation, by focussing on the future and hence providing a stable decision making environment for today.

Planning (59) provides a means whereby management can do things in anticipation of changes which are forecast, and,

more importantly, make things happen rather than be forced to react to pressures when they arise from the environment. (Better planning reduces the occurrence of crisis management situations.)

The planning process (37) produces a plan which is intended (34) to bring about the behaviour that leads to desired outcomes. The plan (see Chapter 3) must (59) therefore:

1 describe the actions and outcomes
2 serve as a formal vehicle for coordination

Formalised planning encourages managers to think (58) about the future of the business and hence to be ready to face change. It requires that current strengths and weaknesses be appraised so that meaningful objectives can be set and strategies formulated to achieve these. The objectives (for example, increasing product sales) must be consistent with the available resources (e.g. product production capacities).

There are six characteristics (58) of a good plan:-

1 It should be based on clearly defined objectives
2 It should be simple
3 It should provide for a proper analysis and classification of actions

4 It should be flexible

5 It should be balanced

6 It should use available resources to the utmost before creating new authorities and new resources

To produce good plans to meet the objectives of the firm, a systematic approach involving a number of steps must be adopted.

5.2.3 The Planning Process

The effective planning (61) of business activities is a task which is placing a heavy responsibility on management. Policy decisions regarding future activities must be based upon sound and careful appraisal of those factors (e.g. competition, technological change, production capacity, manpower) which could have an important bearing upon the achievement of the plans envisaged for the future development of the firm.

The planning process (37,60) involves a number of steps (60):-

1 Study the opportunities, influences and constraints

2 Refine the initial objectives

3 Develop forecasts based on current strategies

4 Propose alternative or additional strategies to meet objectives

5 Evaluate strategies and develop new forecasts

6 Decide on the 'best plan'

7 Document the plan (see Chapter 3 and (59))

8 Allocate resources to implement the plan and resolve conflict

9 Control implementation of the plan

These steps permit the managers to consider the various business and environmental factors in the context of the planning process, and form a systematic basis for planning.

These steps impose a discipline on the managers to help them (62) maximise the anticipated opportunities. To make decisions about future courses of action, managers require information (63-65) about economic trends, political trends, social trends, competition, technological change, the market environment and internal performance. The internal information is produced by analysing the orders and sales statistics (see Chapter 4) and environmental information is (63) usually produced by market research (38,63-65).

Planning (36) concerns itself with future events as does forecasting. Forecasting can provide predictions about the state of these events in such a way that the planning concerning them can become more accurate. Forecasting (67) has to be regarded as an integral part of planning, as its "inventive core".

It is from the picture (59) of the future, obtained from the information derived from forecasts, oriented to the particular interests of the firm, that the business opportunities facing it can be seen. The extent to which these opportunities can be exploited leads tospecific operational objectives. Strategies are then formulated to achieve the defined objectives.

5.3 FORECASTING

Business forecasting (61) has been developed to give a logical and comprehensive means of providing management with the information to determine the most advantageous plans which can be made with the anticipated resources of the business.

Traditionally, until the last two decades, the dominant approach to forecasting (67) was that of subjective 'judgement'. For many companies, the judgement approach remains the most significant but in others simple extrapolation techniques have been adopted and in some cases have been replaced by more sophisticated models.

Extensive use was made of the published literature (36-40, 59-121).

5.3.1 Forecasting - Definitions

The purpose of forecasting, which has beendescribed in various ways (compare Planning in Section 5.2.1), is:

1 'to provide predictions about the state of future events in such a way that the planning concerning them can become more accurate' (36)

2 'to predict future events so as to be able to take meaningful action now to allow future opportunities to be exploited as they occur' (38)

3 'to predict on the basis of scientific observations and applied experience' (68)

4 'to minimise uncertainty and to identify and evaluate risk' (69)

5 'to minimise the unknown factor' (58,61)

6 'the calculation of probable events' (61)

7 'not merely prediction ..... it has to be regarded as an integral part of planning, as its inventive core' (66)

8 'a service whose purpose is to offer the best available basis for management expectations of the future, and to help management understand the implications for the firm's future of alternative courses of action available to them at the present' (70)

5.3.2 Forecasting - Purpose

Forecasts (59) are prepared to create a picture of the future so that the business opportunities facing the firm can be evaluated and plans made accordingly.

The good manager (71) is not so much one who can minimise the effects of past mistakes, but rather one who can successfully manage the future. The manager needs to be able to answer many questions, for example:-

1 What will next month's sales be?

2 How much should be produced this month?

3 How much material should be bought?

4 What should the sales targets be?

5 What prices should be charged?

6 What will the profit be?

To obtain the best answers to questions like these, the manager would need to be able to see into the future. To be able to give the best practical answers, the manager needs to be able to forecast the future.

In the past most answers to such questions have been based (71) on unconscious or semiconscious forecasts. In these forecasts it was frequently assumed that the future would be just like the recent past. The growing interest in forecasting is based on the belief that conscious and careful thought cannot fail to help improve forecasting skill and thus the ability to get answers to questions concerning the future.

Forecasting is a tool to help managers decide what needs to be done to maintain and improve performance in the market. In the short term, it is used to gauge the sales demand, for example for the products for the next year. In the longer term it is used to help managers answer questions such as:

1 What business will the firm be in in ten years?

2 What products will the firm be manufacturing?

3 Who will be the customers?

It has been said (72,73) that "The plain simple fact is that sales affect the operations of every department. No company function can afford to ignore the future outlook for the firm's products. The sales forecast is, in one form or another, the basic planning tool for every department - the master schedule upon which all other operations depend".

It is only by thinking about the future that the performance of the firm can be maintained in a changing environment (e.g. rising competition, rising costs - material - labour, new technologies - new manufacturing processes - new products). Forecasting is a planning tool (36,66) used to provide information about the future to permit better management decisions today (37) that will not realise a payback until some future period.

5.4 FORECASTING METHODS

Numerous methods of forecasting have been developed (36,40). Many are subjective (99) depending upon judgement whilst others are objective and depend upon historical data (107). Judgement applied to results obtained from the more sophisticated methods of projection can improve the accuracy.

The basic methods can be classified (40) into three general types:

1 qualitative techniques

2 time series analysis and projection

3 causal methods

5.4.1 Qualitative Techniques

These methods use qualitative data (expert opinion for example) and may or may not take the past into consideration. This group of methods includes:-

1 The Sales Force Composite

This approach (39) to forecasting involves obtaining the views of sales persons, sales management, or both on the outlook for individual products and/or total sales.

It has the advantages of integrating judgement and experience in situations where historical data may not be available or applicable. However, it has the disadvantage of being susceptible to the biases of those who are the most influential in the sales group.

2 The Jury of Executive Opinion (Panel Consensus)

This method (38,39,40,72,99) consists of combining and averaging top executives' views concerning the item to be forecast. It is based on the assumption (40) that several experts can arrive at a better forecast than one person. There is no secrecy and communication is encouraged (unlike the Delphi method). It has the advantages (39) that forecasts can be provided easily and quickly without elaborate statistics and a range of management viewpoints can be considered. However, it is also susceptible to the biases of those who are the most influential in the group.

3 The Delphi Method

This approach (36,38,40,88,105) involves the independent interrogation of a panel of experts by a sequence of questionnaires. The responses to the questionnaires are used to produce another questionnaire

(and so on). Any set of information available to some experts and not others is thus passed on, enabling all experts to have access to all information for forecasting. This technique limits the bandwagon effect of majority opinion because the experts do not come into contact with each other and the originator of the information on each of the circulated questionnaires is not named. However, it is often difficult to select a panel with the necessary experience.

4 Market Research

This is a systematic (38,39,40,114,120) formal and conscious procedure for evolving and testing hypotheses about real markets. It involves the gathering of information from both published statistics and the marketplace (surveys) to be used to gauge the future potentials.

5 Historical Analogy

This involves a comparative analysis (36,38,40,105) of the introduction and growth of similar new products and bases the forecast on similarity patterns. This method is obviously very useful for forecasting the demand for a new product, having no historical statistics, when data on a similar product is available.

5.4.2 Quantitative Techniques - Time Series Analysis and Projection

These methods focus on patterns (36) and pattern changes (95). These are illustrated in figures 5.1 and 5.2.

The methods (40) rely entirely upon historical data. This group includes:-

1 Last period demand

This is a 'primitive' method (71,94,110,115) which uses the actual sales for the last time period as the best estimate of the next time period.

2 Simple Average

This involves (36,71,115) the averaging of all data, or a well-selected sample of them and using their mean as a forecast for the future, or the rest of the population. The mean forecast can only be used when the type of data is horizontal (see Figure 5.1), i.e. when there is no growth or decline. Otherwise, it will result in a large error between the actual and the predicted values.

3 Moving Average

This method (36,38,40,91,94,110,112,115) is similar to the simple or mean average (method 2) except that the

FIGURE 5.1 COMMON DATA PATTERNS

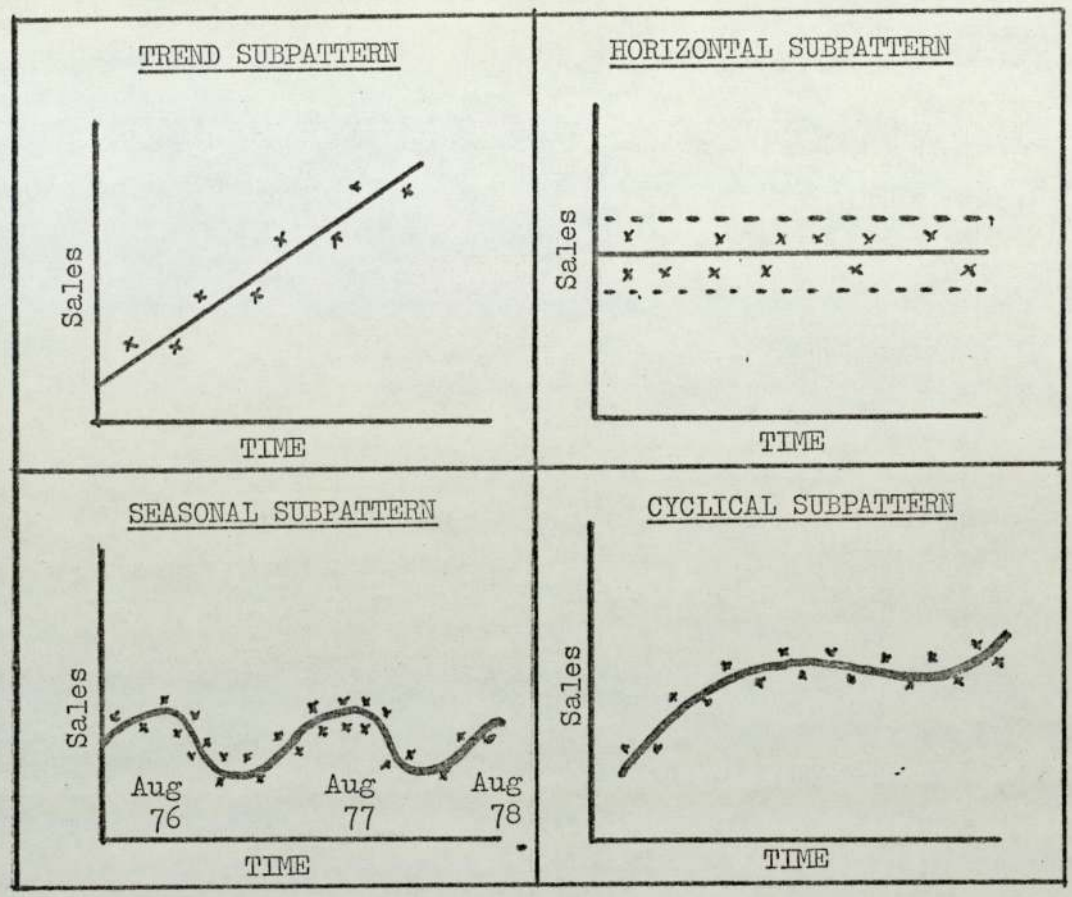
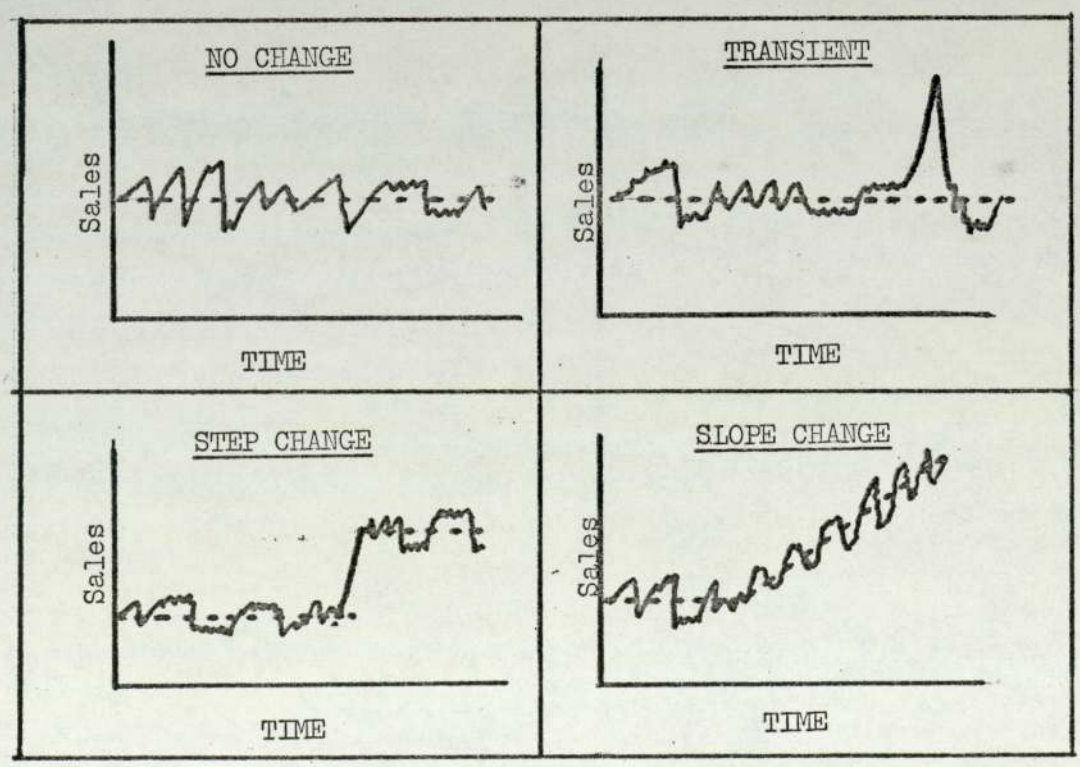


FIGURE 5.2 COMMON DATA PATTERN CHANGES



number of data points averaged remains constant. In a time series this involves dropping the oldest information as a new value becomes available. The moving average can only be used for horizontal type data since it is a special form of the simple average method.

This method can be modified by assigning weights to the data to attach more significance to new data than to the old. The sum of the weights must be one.

The method requires (40) at least two years of past data.

4 Exponential Smoothing

This technique (36,38,39,40,71,74,75,79,82,84,89,91,94, 100,106,107-110,115,117) is very similar to the moving average, except that more recent points are given more weight. Descriptively, the new forecast is equal to the old one plus some portion of the past forecasting error.

Linear smoothing (36,75,82,83,106,115) is very similar to the simple exponential smoothing method and provides for an adjustment in case the data includes a trend.

Adaptive forecasting (or filtering) can be used (36,71, 77-79, 94,100,101,107) for any type of data (seasonal,

cyclical or trend) and is very similar to the smoothing techniques in that it weights past observations in a manner which is determined by the technique itself in such a way that the error between the actual and forecast values is minimal. (It is called Adaptive Filtering because, in the process of minimising the error, it filters the disturbances out of the data).

The method (40) requires at least two years of past data.

5 Box-Jenkins

This technique (36,39,40,71,105,106,112) is a highly sophisticated approach to time series forecasting. It seeks to identify (39) patterns in the historical values of a time series and then to extrapolate these patterns into the future.

The time series (40) is fitted with a mathematical model that is optimal in the sense that it assigns smaller errors to history than any other model.

It is a very accurate method, but it is also (36,39,40) very expensive and difficult to use.

This method (40) requires at least two years of past data.

6 Trend Projections

This technique (36,38,40,71,98,101,113,116) fits a trend line to a mathematical equation and then projects it into the future by means of this equation. Some examples are:

1 Straight line	:	$\text{Demand} = a + bt$
2 Parabola	:	$\text{Demand} = a + bt + ct^2$
3 Simple Exponential	:	$\log(\text{Demand}) = a + bt$
4 Logarithmic Parabola	:	$\log(\text{Demand}) = a + bt + ct^2$
*5 Simple Modified Exponential	:	$\text{Demand} = a - br^t$
*6 Gompetz	:	$\log(\text{Demand}) = a - br^t$
*7 Logistic	:	$\text{Demand} = 1/(a + br^t)$

where: a,b,c are constants
and * a,b,r are positive constants with r less than one

The amount of data required varies with the technique used. However, a good rule of thumb (40) is to use a minimum of five years' annual data to start. Thereafter, the complete history.

5.4.3 Causal Methods

These methods (40) use highly refined and specific information about relationships between system elements and are powerful enough to take special events formally into account. As

with time series analyses and projection techniques, the past is important to causal models. The methods in this group include:

1 Regression Model

This type of model (36,38-40,71,72,91,96,100,110,112,115) relates sales to time or to other economic, competitive or internal variables and estimates an equation using the least squares technique. For example:

1 Simple Regression $Y = a + bX$

2 Multiple Regression $Y = a + b_1X_1 + b_2 + b_3X_2 + \ldots$

Multiple Regression (36) is one of the most powerful and flexible techniques. It determines the existence of some form of functional relationship between a dependent variable (e.g. sales) and a number of independent variables (e.g. prices, advertising, etc.) and estimates the parameters of equation 2 above. Through simple procedures Multiple Regression can handle trend, seasonal or cyclical type data and can provide confidence intervals, tests of significance and measures of goodness of fit between the forecast values and the data.

This method (40) requires several years' quarterly history to obtain good, meaningful relationships. (It is mathematically necessary to have two more observations than there are independent variables.)

2 Econometric Models

An econometric model (36,38-40,99,100,105) is a system of interdependent regression equations that describes some sector of economic sales or profit activity. The paramaters of the regression equations are usually estimated simultaneously. As a rule (40) these methods are relatively expensive to develop. However, due to the system of equations inherent in the models, they will better express the causalities involved than an ordinary regression equation.

This method (40) also requires several years' quarterly history to obtain good, meaningful relationships.

5.4.4 Other Methods

The methods mentioned in sections 5.4.1 - 5.4.3 are those most commonly used to produce, for example, sales forecasts. There are a number (36,40) of other quantitative (e.g. Product Life Cycle Analysis) and causal (e.g. Intention-to-buy and anticipation surveys, Input-output models, Leading indicators and economic input-output models) methods, each of which can contribute to better predictions if they can fulfil some particular need which cannot be met by the common methods.

5.5 FORECASTS - CHARACTERISTICS

A forecast is produced to help managers make decisions about activities, that will realise a payback (37). Its ability to help managers must be assessed against five characteristics:

1 OBJECTIVITY - the particular forecast values should not be dependent on the prejudices of the individual making the forecast. Even when 'predicting' values on the basis of objective judgement, an element of objectivity can be introduced by feeding back to the forecaster some measure of his performance. Thus a knowledge of the difference between actual and predicted values could permit modifications to be made. This is useful as most people are either optimistic or pessimistic. Some formal reporting of errors is therefore useful.

2 BIAS - every forecast is inherently subject to error (there will be cases when the future event is larger than the forecast and cases when it is smaller. Usually the penalties of being over forecast are different from those for being under forecast (e.g. production capacity could be exceeded, causing delays and loss of customer satisfaction)).

A bias can be introduced to minimise the expected sum of these penalties. In many cases, however, the difference between being over or under forecast may be small and

zero bias should be aimed for.

3 ESTIMATION OF ERROR - it is very desirable to know the possible error the forecast might have, together with the probability of having an error that size. It is also desirable that the error be normally distributed, i.e. the probability of an error of a particular size gets smaller as the size of the error gets larger.

4 THE ERROR SIZE - the smaller the error, the more powerful the forecast and the smaller the risk. Error size can be reduced by improving the forecasting system, usually at some expense, but even so there is a limit to the accuracy of any system. Another way of reducing risk is to reduce the lead time. It is nearly always possible to forecast with greater accuracy over a short lead time than over a long lead time.

5 TIME TAKEN TO PRODUCE THE FORECAST - this is a very important factor in the business situation when very often answers are needed quickly. A rapid forecasting system will ensure the very latest information can be utilized, having the effect of shortening the lead time.

5.6 FORECASTING METHOD - CHOICE

To handle the increasing variety and complexity of managerial forecasting problems, many forecasting techniques (40) have been developed (see section 5.4) in recent years. Each method has its special use, and care must be taken to select the correct technique for the particular application. The manager as well as the forecaster (40,119) has a role to play in technique selection. Indeed, models (119) must have management support or, better yet, a champion to make them succeed. The better the manager understands the range of forecasting possibilities, the more likely it is that a company's forecasting efforts will be successful.

The selection of the method depends on many facturs - the context of the forecast, the relevance and availability of historical data, the degree of accuracy desirable, the time period of the forecast, the cost/benefit (or value) of the forecast to the company, and the time available for making the analyses.

Where a company wishes to forecast with reference to a particular product, it must consider the stage of the product's life cycle (105,119,120). The availability of data and the possibility of establishing relationships

between the factors depend directly on the maturity of a product, and hence the life-cycle stage is a prime determinant of the forecasting method to be used.

Some suggested methods (40,105) and information available for the product life cycle stages are shown in figure 5.3.

Method selection is further constrained by cost, or more accurately by the cost of accuracy. Errors can be reduced by improving the forecasting system or selecting another more costly technique. A new technique (40) which offers potentially greater accuracy may require non-existent information, or information that is difficult to obtain. This kind of trade-off is relatively easy to make, but others will require considerably more thought. A balance must be obtained between technique accuracy and the cost of that technique. An indication of the cost of forecasting versus the cost of inaccuracy (40) is shown in Figure 5.4.

5.7 FORECASTING - INFORMATION REQUIREMENT

Forecasts are based upon a knowledge of the past internal and external environment compared with an appreciation of present and likely future events.

FIGURE 5.3 PRODUCT LIFE CYCLE - FORECASTING TECHNIQUES

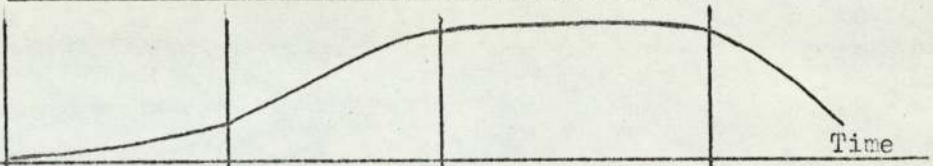
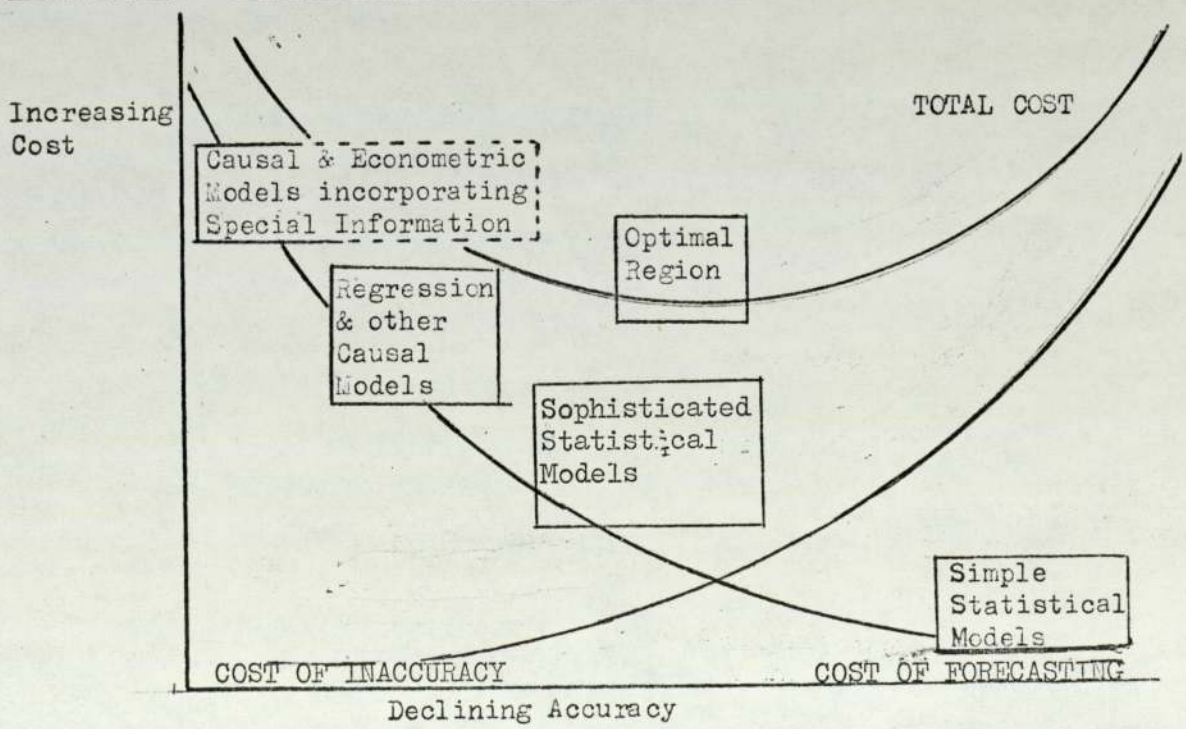
Volume/ Value of Business				
Product Life cycle Stage	Launch	Growth	Maturity	Decline
Information	"None"	Orders Sales Market Intelligence	Orders Sales, Market Research Environmental Appraisal Competitive Information	Environmental Information - Dynamic Marketing Role to retain market share
Suggested Forecasting Techniques	Predictive Qualitative: Panels, Delphi, Judgement, Historical, Analogy	Market Research, Surveys, Exponential Smoothing, Trends	Extrapolation Regression, Time Series, Econometric Models, Statistical Control Models, 'Tracking'	Predictive, (Case of survival of most aggressive firm - signals phasing out of weak products

FIGURE 5.4 FORECASTING COST VERSUS COST OF INACCURACY



Information (64,65,71,121) is essential to forecasting (and hence to planning). This need is shown diagramatically in Figure 5.5 - 5.8:

FIGURE 5.5 FORECASTING - GENERAL MODELLING APPROACH

(Reference (71)

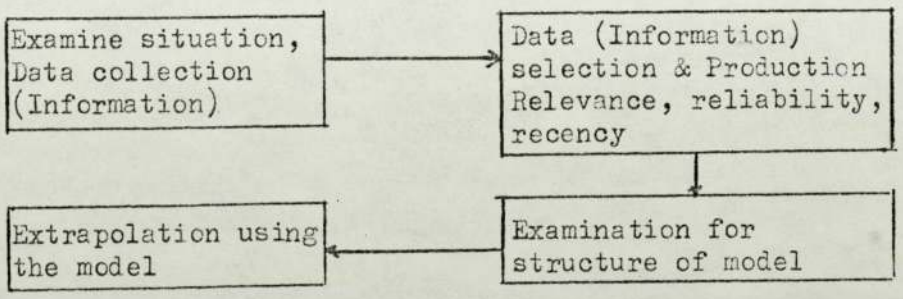


FIGURE 5.6 FORECASTING - PRACTICAL STRUCTURE

(Reference (111)

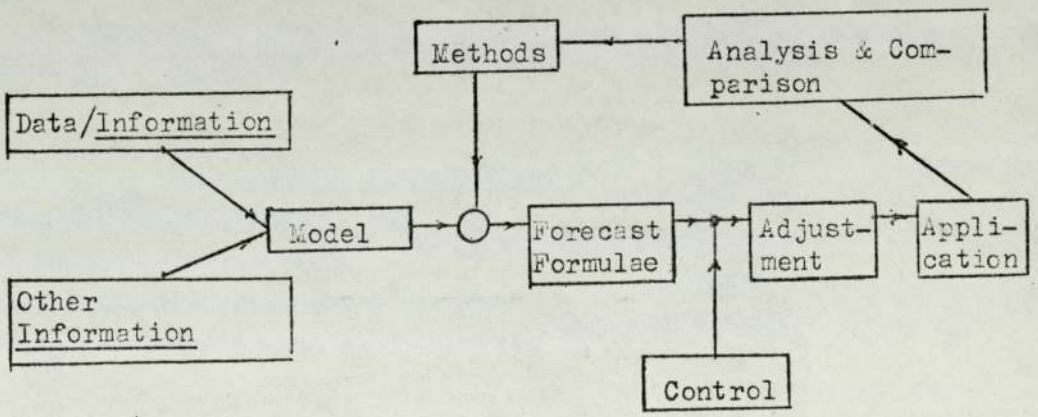


FIGURE 5.7 ENVIRONMENTAL INFORMATION SYSTEM

Reference (64)

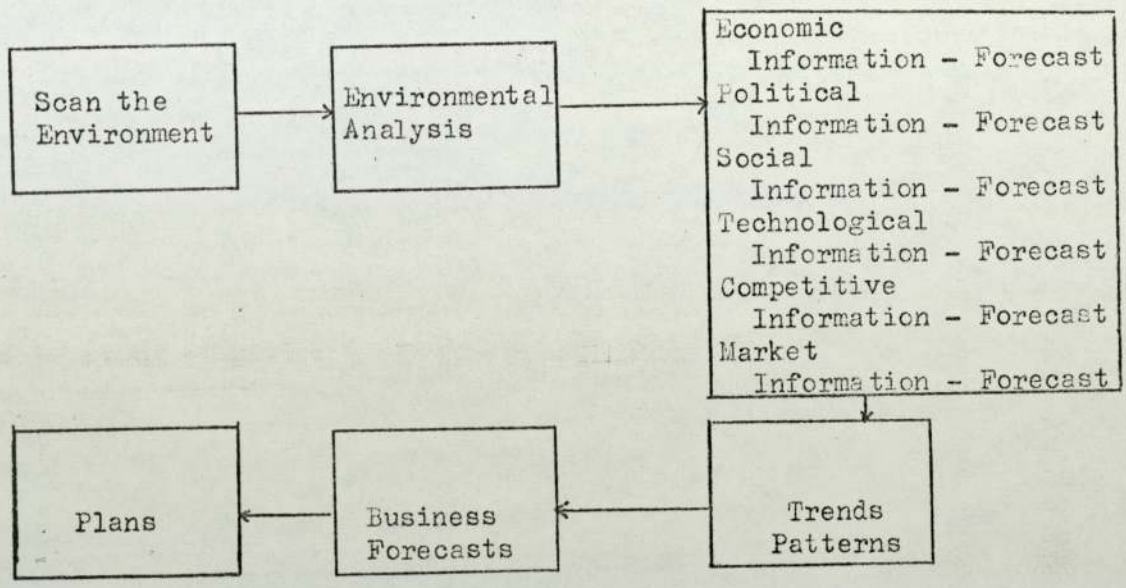
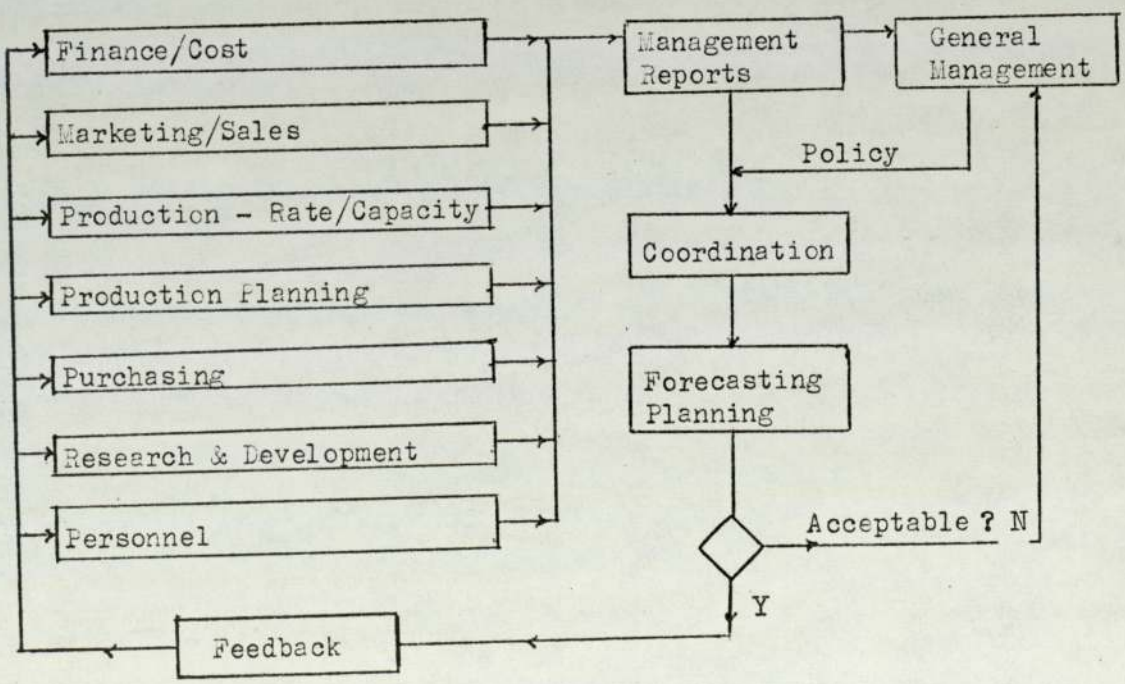


FIGURE 5.8 COMPANY KNOWLEDGE - INTERNAL INFORMATION

Reference (121)

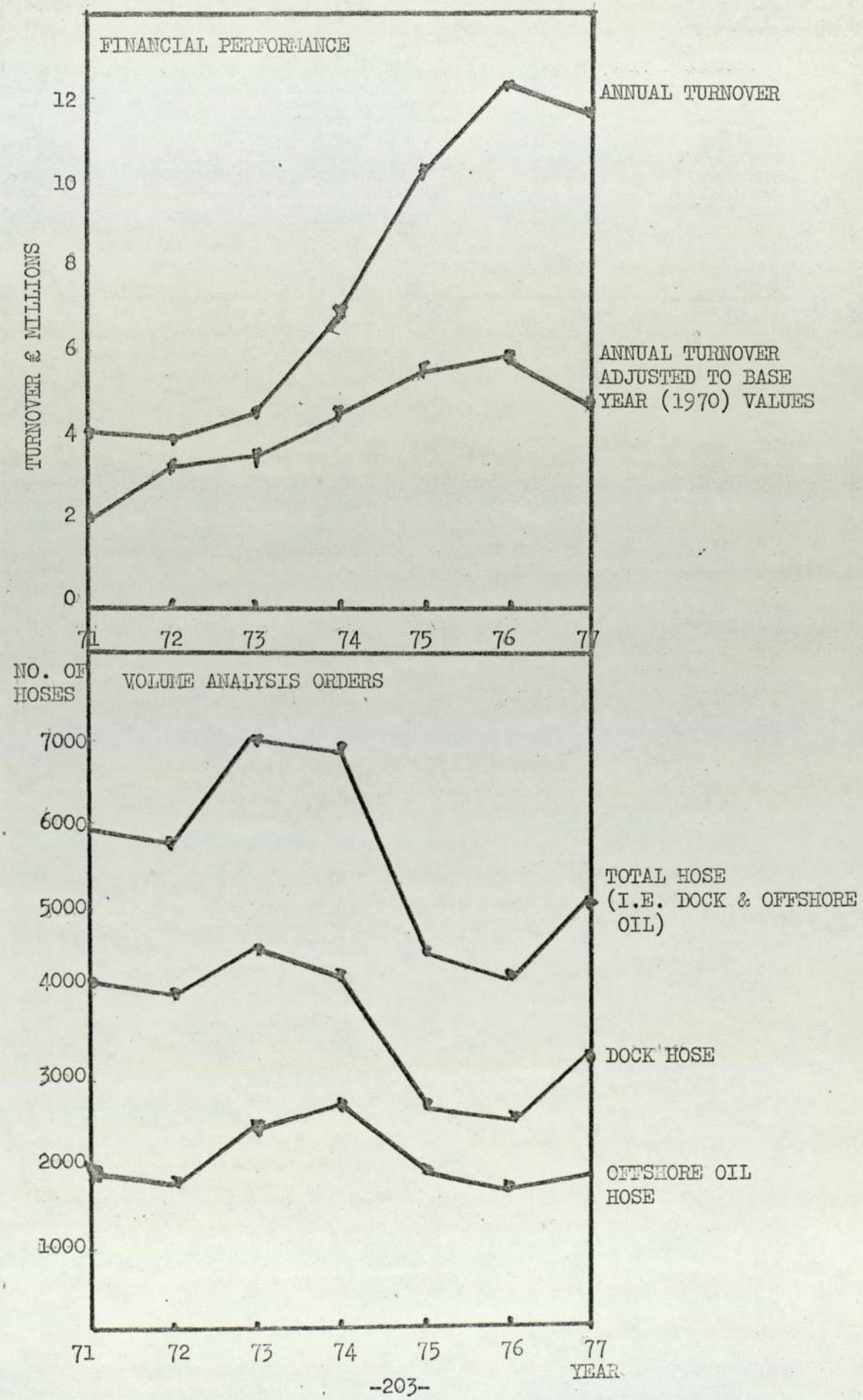


5.8 THE DIVISIONAL PROBLEM

The purpose of planning, based on forecasting, is to help the division make the most of its opportunities (58). However, a consideration of the financial and volume performance, illustrated in Figure 5.9, shows that opportunities have not been exploited. The graphs show that the turnover has been increasing for a decreasing volume of business, due largely to spiralling prices. The indexing of the financial performance to a base year (1970) emphasises the poor performance. The business, i.e. the global demand for hoses, has increased in the time period illustrated and yet the division is selling fewer products now than in 1974 which indicates that the competitors are making more of the opportunities than the division. This is further emphasised by the fact that, for slightly increased volumes in 1977, the financial situation showed a general decrease for the first time - this was due to fierce competition and price reductions.

The division bases the construction of its operational plan (see Chapter 3) on a sales forecast. The structure of this plan is well defined (59) but the accuracy is limited by the forecast result obtained from the sales force composite plus executive judgement method. Whilst the financial estimates (see Table 3.3) have been good, the volume mix (see Appendix 3.6) has been very poor.

FIGURE 5.9 DIVISIONAL PERFORMANCE - FINANCIAL AND VOLUME



The division plans at the product level and so forecasts at the product level. The division offers approximately 200 products and operates in 6 markets. Fortunately, the problem does not involve 1,200 forecasts because not all products are sold in all markets. Even so, the accuracy of the plan is dependent upon the quality of about 600 product/market forecasts. These forecasts, unfortunately, have been based on management experience assisted by very limited statistics and the accuracy has left much to be desired. Consequently the benefits associated with an accurate volume/value plan are not being realised.

5.8.1 Divisional Forecasting - Reasons

The divisional marketing staff produce detailed volume forecasts to aid planning exercises. The volume forecasts are analysed by production staff who determine whether the figures are consistent with the production capacity - often modifications are required. The volume forecasts are used:

1 by Production to determine new plant needs

2 by Production to determine manning levels

3 indirectly by Personnel, in accord with point 2, to determine recruitment and training needs

4 by Production Planning to produce advance schedules

5 by Purchasing to determing raw materials requirements and negotiate favourable terms and regular deliveries with the suppliers

6 by Marketing to determine pricing and discount policies

7 by Marketing to prepare the detailed volume/value plan against which to monitor performance and take corrective action, if needed

8 by Marketing to prepare the summarized financial plan, in the company format (see Chapter 3) for submission to Corporate headquarters to obtain operating funds for the next year

9 by Accounts, in conjunction with the financial plan, for analysis and costing

10 by Marketing to determine the level of sales representation and the amount of advertising required to achieve the forecast level of sales

11 by Marketing as the basis for preparing, in conjunction with the financial plan, strategy plans for divisional and corporate use (see Chapter 3).

5.8.2 Divisional Forecasting - Potential Value

The development of a new, more systematic approach to forecasting could prove (40) to be expensive and in general

the more accurate the technique the more costly it will be. To justify any expenditure on an improved system, and indeed to determine how much should be spent, it is necessary to place a value on the planning/forecasting exercise. This may be done by attempting to assign values to the cost of producing the current plan and to the possible savings due to a quicker and more accurate method. Thus:

1 CURRENT COST - Planning and planning reviews have become a routine function of divisional activity over the years. The potential of accurate planning is appreciated, and desired, but no conscious thought has been given to the cost of producing the plan. This cost can be approximately measured in terms of staff time spent on planning and the value of this time in terms of salary. The preparation of the plan involves no fewer than twenty people from the marketing department, for varying periods of time, from the divisional director to typists. It is difficult to assess the amount of time each individual spends on planning activities, but a conservative estimate of the cost, to the marketing department, would be £5,000 p.a. Additional costs are incurred in terms of staff time contributed by production, production planning, purchasing and accounts. This cost produces a rigid plan, without error limits, which experience has shown to be acceptable in financial terms but unacceptable in volume terms.

2 POTENTIAL SAVINGS - These are twofold namely

1 Staff time - Senior management's time commitment to planning (e.g. setting objectives) is assumed, here, to be constant, regardless of the method employed. However, savings in time commitments of all other marketing staff, engaged in planning could be realised. It is estimated that savings of £2,000 p.a. could be possible.

2 Accuracy - Improved accuracy would benefit many departments (see section 5.8.1). An accurate plan would form a basis for the smooth running of departmental activities. However, it was difficult to quantify the benefits of accuracy in most areas apart from purchasing.

In the past Purchasing Department has had an excellent record and has usually realised savings against standard. This was attributable to the large outstanding order book which meant that the raw materials requirement was based largely on known orders, complemented to a small degree by the forecast. However, the situation is changing and the outstanding order book is not so large and different raw materials are required for new products. Purchasing have stated that they will become more and more dependent upon the sales forecast in the future. Accurate forecasts would permit early negotiations with suppliers, the establishment of goodwill, scheduling of deliveries, purchases to be made in economic order quantities and better stock control. The division holds £½m stock and this is turned over monthly. A one per cent saving on purchasing activity could represent £60,000 p.a. Discussions with Purchasing indicated that greater savings would be expected.

5.9 DIVISIONAL REQUIREMENTS

The division has a requirements for better management plans, derived from marketing plans, based on sales forecasts.

5.9.1 Market Planning -Requirement

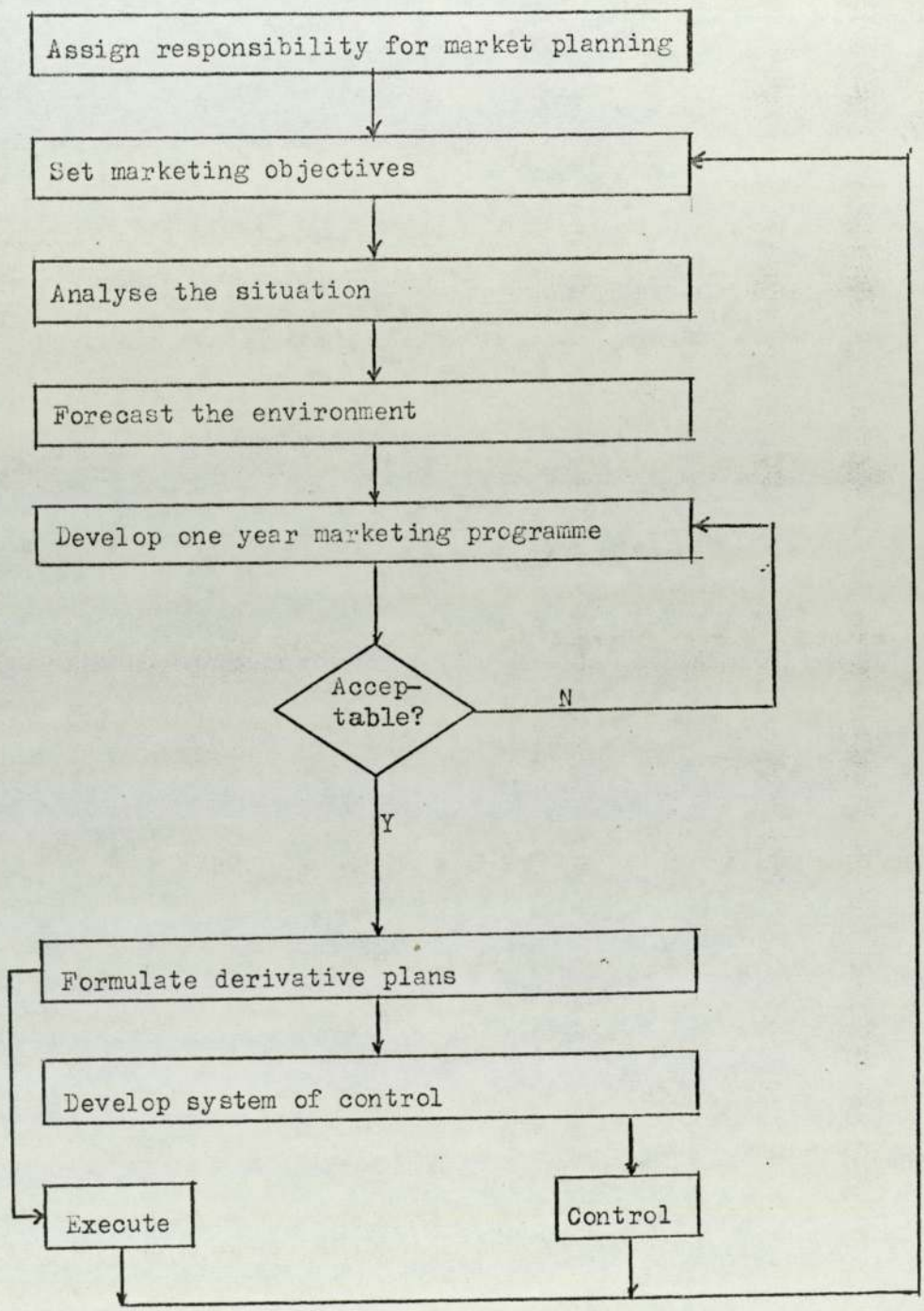
Market planning (58) aims to produce profitable growth and development through advantageous exploitation of change, whether it be by innovation, diversification or straight-forward expansion. The plan so produced is based upon the interpretation of market intelligence, the apparent potential of the total market, the firm's estimated market share, the finances available and other resources, for example, personnel and plant needed to optimise the production and marketing operations within a stated timescale and specified budget.

A model market planning procedure (58) is outlined in Figure 5.10.

5.9.2 Divisional Forecasting - Requirement

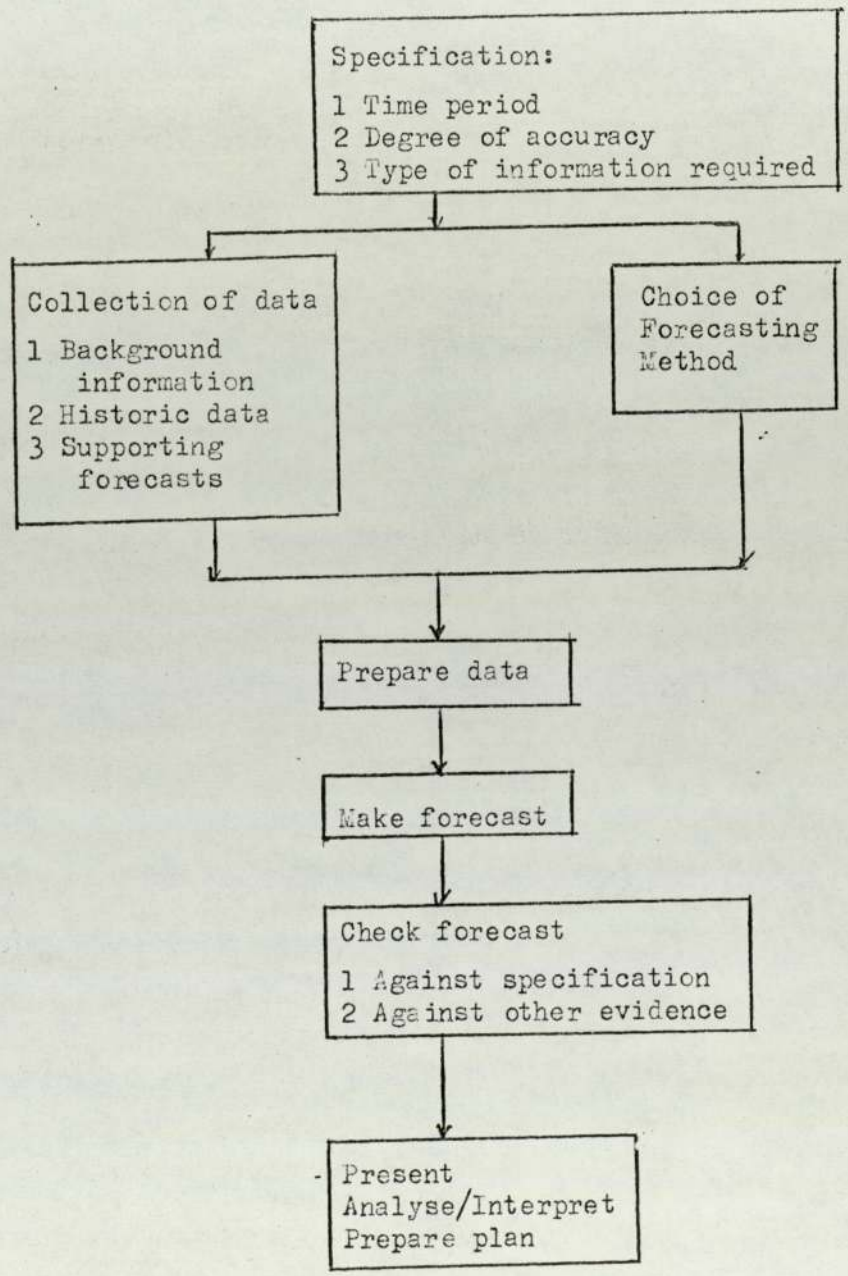
The division requires more systematic forecasts in order to produce better management plans.

FIGURE 5.10 A MODEL MARKET PLANNING PROCEDURE



There are numerous forecasting techniques that have been well documented, and selection becomes a problem. A model forecasting procedure (38) is outlined in Figure 5.11.

FIGURE 5.11 A MODEL FORECASTING PROCEDURE



5.9.3 DIVISIONAL REQUIREMENTS - OVERVIEW

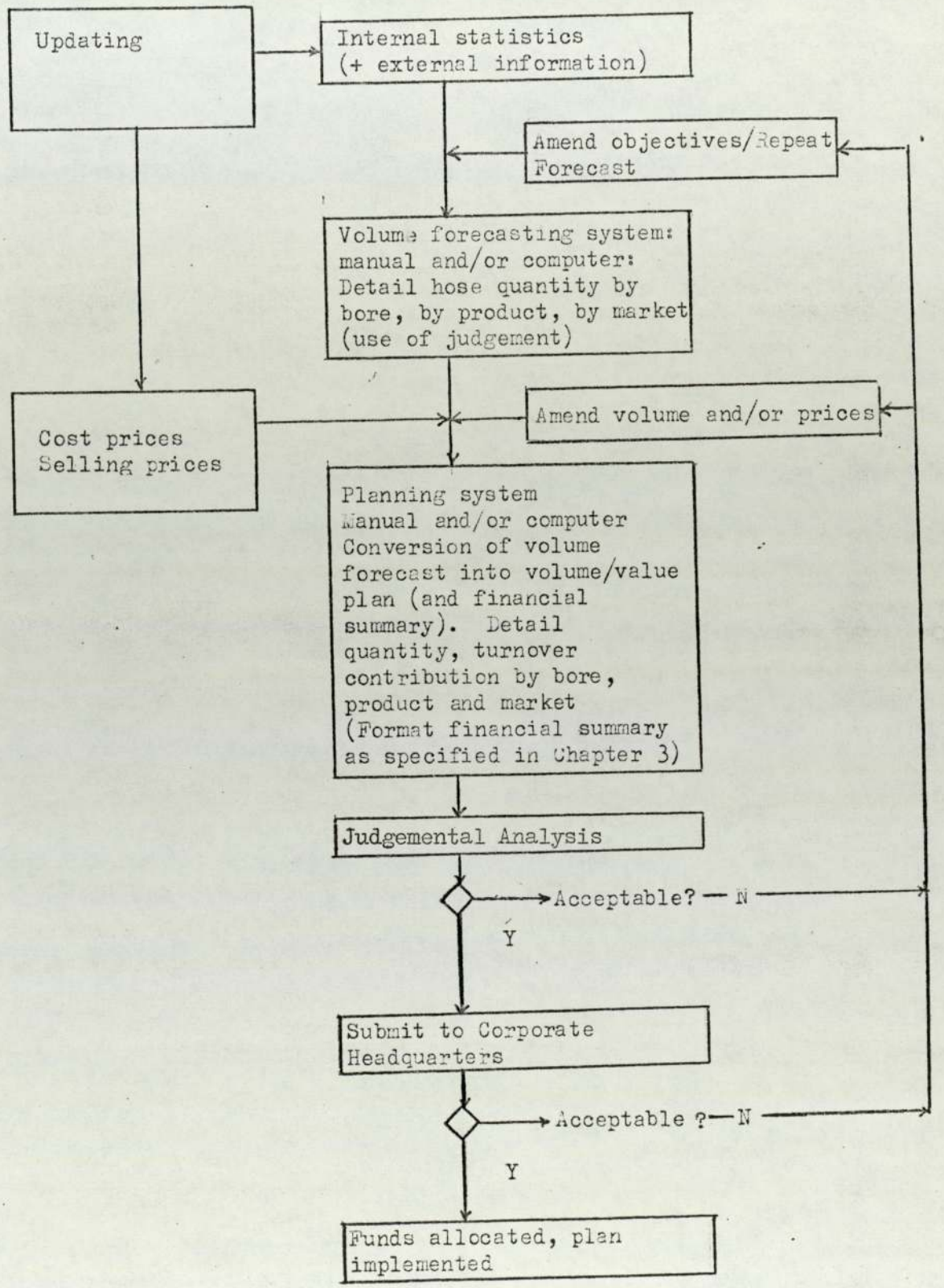
The entire planning exercise currently hinges on the accuracy of the volume forecast and so new methods (possibly different methods for different products), capable of fulfilling the division's requirement, must either be selected from existing standard methods, or developed.

An overview of the requirement system is presented in Figure 5.12 .

5.10 ABC ANALYSIS - A FURTHER AID TO FORECASTING METHOD SELECTION

It was necessary to identify one or more forecasting techniques appropriate to the division's situation which involved the selling of low volumes of highly profitable products. The product range consisted of more than 170 products (each with several bore sizes) and the possibility of developing 170 models was not contemplated. Indeed, efforts were made to reduce the size of this problem to expedite the investigation of standard methods or customised models. There were numerous standard methods available (see Section 5.4)

FIGURE 5.12 DIVISIONAL REQUIREMENTS - OVERVIEW

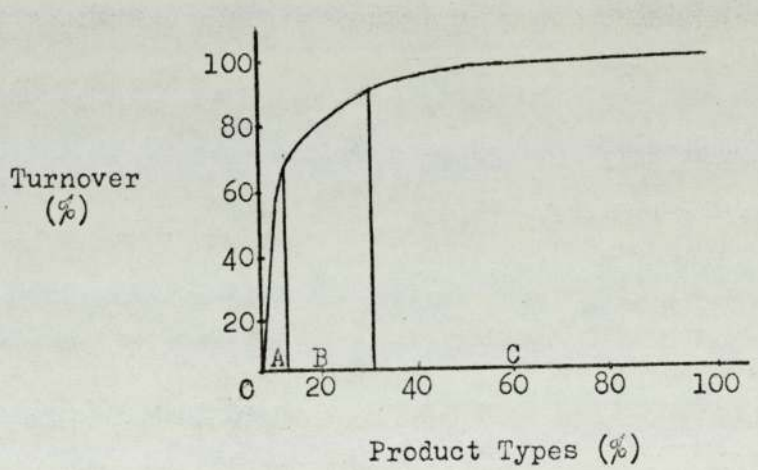


varying from the simple and inexpensive to the sophisticated and expensive. It was, therefore, necessary to study the products and classify them by importance (and life cycle stage, Figure 5.3) to facilitate the choice of methods.

Thus an ABC analysis (94) was undertaken. This is based on the fact that, in many companies, a large proportion of the turnover is derived from the sales of a small part of the product range.

This characteristic is illustrated in Figure 5.13 which is based on the Pareto curve.

FIGURE 5.13 PARETO CURVE - ABC ANALYSIS



A - expensive or much used
- use most sophisticated forecasting and monitoring method

B - medium priced or moderately used products
- use adaptive forecasting techniques without forecasting

C - lower priced products, often with low demands
- no formal forecast, value assessed annually (judgement)

The division's products ar classified into six product groups (see Appendix 4.6). This classification provides a basis for ABC analysis and subsequent forecasting method selection.

The financial performance by product group (for several years) is detailed in Table 5.1.

TABLE 5.1 FINANCIAL PERFORMANCE BY PRODUCT GROUP (1975-77)

Product Group	Hose Type	1973 V	1973 %	1974 V	1974 %	1975 V	1975 %	1976 V	1976 %	1977* V	1977* %
1	Machine	58	1	138	2	282	3	182	2	311	3
2	Dock	658	14	942	14	1641	16	1341	11	1619	13
3	Oil	3074	67	4484	65	6486	64	8802	71	7781	64
4	Dredger	162	4	515	8	347	3	309	3	823	7
5	Vacuum	386	9	464	7	587	6	742	6	917	8
6	Factored	222	5	263	4	870	8	1014	7	658	5
	TOTALS	4560	100	6806	100	10213	100	12390	100	12109	100

Where V = Value £000's * = Estimated figures

These figures indicate that the percentage contribution by product group to annual turnover has reamined fairly constant for the past years and divisional managers believe that this trend will continue.

The figures suggest the following forecasting requirement:

Offshore Oil Hose	- sophisticated methods
Dock Hose	- less sophisticated methods
Others	- judgement methods (as at present)

5.11 DATA COLLECTION

It has been stated (section 5.7) that information is an essential element in forecasting exercises. The results from section 5.10 indicate that data collection efforts should be concentrated on the important product groups, namely the Offshore Oil Hose and Dock Hose groups.

Internal and external information was needed as a basis for forecasting.

5.11.1 Internal Statistics

The need for historical statistics for forecasting (36,40, 71,94,101) was appreciated. At the outset of this peoject, detailed product level information (i.e. the level of detail forecast) was not available. Thus the development of an appropriate internal information system (see Chapter 4) formed the prelude to any forecasting activity.

The internal information system, designed, comprised two parts:

1 The historical analysis system (1970-1976)

2 The management reporting system

The cost, in terms of preparing new style order input documents (see Chapter 4 and Appendix 4.5) for the years 1970-1976 was considered to be prohibitive. Consequently, the historical analysis system was developed, as a separate system, to use coded orders received lists (see Figure 2.1 and Appendix 4.3).

A routine was written (using the Quest facility, mentioned in Chapter 4) to interrogate the management reporting data, annually, to update the historical analyses available for 1970-1976. Specimens of these reports appear in Appendix 4.9.

The two systems could also be interrogated, using Quest, to produce ad hoc reports to aid forecasting activities.

The information available from these systems permitted other analyses to be made, for example:

1 Offshore Hose - order volumes 1975-77 (see Appendix 5.1)

2 Divisional Financial Performance by Sector 1971-77 (see Appendix 5.2)

3 Orders received - Value Analysis by Country 1971-77 (see Appendix 5.3)

4 Offshore Hose - Orders received by Customer 1977 (see Appendix 5.4)

5 Offshore Hose - Orders received by Country 1977 (see Appendix 5.5)

Analysis 4 shows that orders placed by the top ten customers accounts for 81.9% of the total value of offshore hose business. Also, analysis 5 shows that 77.25% of the total value of the offshore business is conducted with ten countries.

The internal statistics provide a firm foundation for the selection and/or development of alternative forecasting methods.

5.11.2 External Information

Market research activities (38,114,122) were instituted to obtain information (see section 5.7) to complement the internal statistics. These took two forms:

1 ANALYSIS OF PUBLISHED STATISTICS :-

The published statistics consulted served to supply more general information about the market and related external factors.

Statistics detailed in Chapter 1 concerning the oil market were obtained from numerous publications (1-27). These served to show that oil will continue to be an important commodity until the early part of the next

century and hence establish the need for hoses or some alternative technology.

Additional information was obtained by using the Export Trade Library facilities. The various publications detailed information by commodity and by country for imports and exports. The coding employed in these journals corresponded to two standards:

1) S.I.T.C.(R) - The United Nations Standard International Classification (revised)

2) B.T.N. - The Brussels Trade Nomenclature

Each commodity code has a sub classification and examples are:

CODE	621.05	- Hose piping, rubber (piping and tubing of unhardened vulcanised rubber)
SUB CLASSIFICATION	4009.0009	- Suction Hose
	4009.0144	- Wire braided hose
	4009.0265	- Long length moulded and braided
	4009.0404	- Mandrel made, wrapped ply hose
	4009.0532	- Other

The journals provided statistics in weights, lengths and volumes for these categories for both import and export. Unfortunately, the statistics concerning hoses are not sufficiently well categorised to be useful to the division for forecasting purposes.

Some of the journals consulted were:-

Overseas Trade Statistics (The government statistical service)

Japan - Exports and Imports

France - Statistique du Commerce Extérieur

Iran - Foreign Trade Statistics

Singapore - External Trade

The survey of the published statistics indicated that external information required by the division, to complement the internal statistics, for forecasting would have to be obtained by market research field surveys.

2 MARKET RESEARCH SURVEYS :-

It was accepted (63,64,65) that additional (external) information was required to complement the available internal historical statistics if better forecasts were to be produced. Thus information (65) was needed, for example, on the market, competitors and alternative technologies.

This additional information was to be supplied by market research (38,114,122). Market planning staff interviewed the sales force to collect the 'market intelligence' information gained on field trips. This information was analysed and filed for use.

The knowledge possessed about the number of monobuoys in the world was thought to be poor and a questionnaire (see Appendix 5.6) was designed to collect information to check the results presented in Table 1.11 (see also section 2.3.8). This form was sent to the major customers (see Appendix 5.4) but the response was poor. The market planning staff then issued these analysis sheets to the sales force to be completed during business trips. Examples of the results are summarised in Appendix 5.7.

A consideration of the monobuoy figures and the feedback from the sales force concerning competition enabled the global demand to be assessed and permitted the market shares of the division and its competitors to be estimated (see Appendix 5.8).

5.12 DATA ANALYSIS

The abundant data made available as a result of the work mentioned in Chapter 4 and in section 5.11 had to be analysed to aid forecasting efforts.

5.12.1 Historical Data Analysis

The historical data available from the historical analyses (see Appendices 4.2 and 4.5) was:

1 used, in the short term, as a basis for hopefully improving the quality of the existing method (the sales force composite plus judgement method) described in Chapter 3. The sales force composite forms (see Appendix 3.5) were issued earlier than in previous years (i.e. 6-8 weeks before the data specified for their return) to give the sales force longer to prepare their estimates. This time, however, instead of having to rely upon their experience alone they were supplied with the historical figures (by market and by country). Whilst some volume estimates were in closer agreement with actuals than realised in previous years, the overall performance (see Table 3.3 - 1977) was down due to increased competition, reduced prices and reduced global demand.

2 to be used, in the longer term, as a basis for selecting and developing forecasting methods appropriate to the division's needs. To gain an appreciation of the data, numerous graphs of annual (see Appendix 5.9) and quarterly data (see Appendix 5.10) were drawn to see

if any underlying patterns (see figure 5.1) were easily discernible. It was generally accepted by divisional managers that there were groups of products having working life times of one, two and three years. It was hoped that underlying one, two and three year replacement cycles could be identified. A consideration of the graphs in Appendices 5.9 and 5.10 show that the pattern is more complex. Tier charts (71) in which quarterly data for several years were superimposed, were constructed (see Appendix 5.11) as further aids to identify seasonal and/or cyclical variations. This preliminary graphical analysis indicated that the data was very complex and often involved a combination of growth and/or decay trend, seasonal and cyclical behaviour. The simple methods (averages, moving averages, weighted moving averages, exponential smoothing, trend curve analysis and linear regression) do not seem to be immediately applicable to the data. Furthermore, given the postulated working life times of the products, more data would be needed for the newer products to permit trends to be established. Methods capable of coping with combinations of trend, seasonality and cyclical behaviour such as modified exponential smoothing techniques (71,75,82,83,94,110) and adaptive techniques (36,71,77,79,94,100,101,107) are indicated. Sufficient

data is not yet available to permit multiple regression and econometric models (see section 5.4) to be considered.

5.12.2 Market Research Data - Analysis

The information obtained from the questionnaire (see section 5.11.2 and Appendix 5.6) and summarised by major area (see Appendix 5.7) was used to calculate the potential replacement business using the estimated product working life cycles. Some of the results of this analysis are presented in Appendix 5.12. These figures formed the basis for the global estimate and market shares (see Appendix 5.8) were used to calculate the potential business for the division and for its competitors. These estimates were not used as the basis of the operational plan but were used by managers to aid their manipulations, based on experience, of the plan produced by the current method.

A more precise knowledge of the date of installation of each hose in each monobuoy installation coupled to more accurate working life times (calculated from the historical internal data - globally or for the geographic region under consideration, or from more detailed feedback from the customers) would increase the accuracy and usefulness of

this method. Indeed, this approach could incorporate specialist information (e.g. the life cycle in given geographic areas) and form the basis of a customised model. This approach must be supported by more accurate information, constant/regular updating and better estimates of the market shares held by the division and its competitors.

More detailed data collection could permit monobuoys, oil consumptions and customer activites/prices to be built into a regression or econometric model.

5.13 FUTURE WORK

The divisional route to successful forecasting must be based on a more detailed analysis of the data to permit the selection or development of appropriate techniques (see Section 5.4).

The divisional problem can be simplified by considering the forecasting requirement in two phases:

1 Replacement business (about 75% of annual turnover)

2 Original equipment (about 25% of annual turnover)

It is hoped that historical statistics can be used to develop more systematic methods of forecasting the replacement

business whilst market research can provide estimates of original equipment.

There are four routes to be explored to produce a solution to the forecasting problem:

1 Manual - the present system could be improved by training the sales force to make better use of the statistics (and other approaches) and by using a computer procedure to convert the forecasts into the final plan (thereby reducing the staff effort involved in computation and typing).

2 Computer bureaux - the availability of many techniques as standard packages does away with the expensive development work. The costs involved relate only to data preparation, data storage, model building and running time. The ability to analyse easily the same data using several techniques (each producing error estimates) permits the best model to be selected. (Costs Comshare - ca. £1,000)

3 In-house computer (total systems development) - discussions with in-house computer staff indicated that there were no standard techniques available and that it would be some considerable time (1-2 years) before they could undertake any development work, because of other commitments. Problem solution by this approach

would be expensive (and would depend on the nature of the forecasting techniques selected - £1,500 per technique and £10,000 for a full system was suggested). Indeed, the systems staff recommended the use of external services.

4 In-house computer (development of purchased packages) - discussions with systems staff indicated that this would be a cheaper approach than the total systems development mentioned in point 3. The package(s) would have to be identified by divisional staff. Systems staff would, before purchase, investigate the application possibilities for other divisions for the greater the demand, the easier the justification. The cost would depend on the number of packages needed and the systems support to adapt and implement these. (Systems analysis estimated that a cost of £5,000 would not be unreasonable.)

The need for data reduction (71) is essential. It is not economically feasible to prepare forecasts for each product - bore - market combination (i.e. 5,000 estimates). It is necessary to select product indicators from like families, so that the forecast of the 'indicator' can be used to generate the other product forecasts. Suitable models have to be selected

to produce the 'indicator forecasts'.

The suitability of qualitative methods was thought to be limited except for

1) forecasting the demand for a new product (no historical data)

2) long term forecasting (when accuracy is not expected)

Greater analysis of quantitative (i.e. time series analyses and projection) techniques is required and selection will be aided as more data becomes available and the older data (of dubious accuracy) can be dropped. Substantially more data is required (on competitors - prices - products, alternative technologies, oil trends and customer trends) if causal methods are to be developed.

A process of evolution is indicated, and the division must progress from the qualitative techniques to the more sophisticated techniques gradually. This change can be accomplished with greater ease when the abilities of the preparer, the user and the user-preparer are considered (39) and management support and participation is given (118). Indeed, a champion of the cause (118) is needed. The arrival of the Market Planning

Manager expedited the development of the information systems and introduced fresh stimulus into the forecasting problem.

5.14 CONCLUSION

Internal (Chapter 4) and external (section 5.11.2) data collection procedures have been established to produce information for forecasting.

At the commencement of this project, detailed product level information was not available and forecasts were based upon judgement. The sales force composite and judgement method (39) is still widely used but accuracy decreases as the variables to be considered increase. The division offers 170 products, each with 5 bore sizes and requires a forecast to be returned by each product and bore for each of the appropriate markets (this represents 5,000 product - bore - market combinations) and this is just too much for the current method. The volume accuracy is poor but the financial accuracy is tolerable.

The failure of the division to produce accurate forecasts, and hence plans, has meant that it has failed to make the most of its opportunities and indeed whilst the global demand

has increased, the division's market share has dropped.

The production of one rigid plan has contributed to this failure to seize opportunities and a choice of plans, applicable under different circumstances and involving different objectives and strategies (i.e. Contingency plans) would greatly help matters. Unfortunately, the division finds it difficult enough to produce one plan and the idea of producing more than one, with the effort that would be involved, was not considered.

The managers did not involve themselves in the forecasting study and were wary of mathematical techniques. Consequently, the support and participation (118) required for a successful outcome were missing initially.

The internal information system and the market research activities form a sound basis for the development of more appropriate forecasting systems. The magnitude of the problem suggests that a computer solution should be investigated. The use of external (bureau) services is recommended as the standard techniques are readily available. The testing of the standard techniques using the data available should allow appropriate techniques or customised models to be developed for the two important product groups (Offshore Oil Hose and Dock Hose).

The identified models should then either be maintained on a bureau machine or developed by Group Systems Staff for internal use.

The ability to produce forecasts speedily by computer would mean that detailed reviews of the plan, its objectives and strategies could be carried out regularly which is not possible with the present approach.

The plan which is carved in stone and criticised when wrong, must be replaced with the ability to produce several plans easily.

The benefits to be derived from planning based on more accurate forecasts are great, but much work remains to be done before these can be realised.

CHAPTER 6

PROJECT OVERVIEW

6.1 INTRODUCTION

The division went through a period of rapid growth (see Table 1.2) without changing its supporting information and planning systems. The record of plan accuracy (see Table 3.3) was not good and divisional management realised that corrective measures must be taken if the division was to retain its position as market leader, in the face of increasing competition (see Appendix 5.8).

6.2 PROBLEM REVIEW

The division operated in a highly competitive growth market and the managers required more accurate plans to permit better direction and control of its activities.

The accuracy of the plans decreased as the product range expanded and the number of customers and competitors increased. The turnover of sales staff, with market knowledge, further limited the accuracy of the plans.

The division's approach to planning was dependent upon the experience of the sales force and senior marketing management. All decisions (69) are about the future and rest upon a view of the future. Forecasting (36) can provide information about future events to help decision making. Thus the problem of forecasting needs (69) to be approached in as scientific a manner as possible. Precise techniques need to be adopted. The literature (40) indicated that there were numeous forecasting techniques available and that the quantitative (i.e. time series analysis and projection) and causal methods required considerable amounts of data (63-65). This data was not available from the old information systems.

It was, therefore, necessary to make more information available to permit more systematic forecasting methods to be selected and/or developed.

Thus, the initial overview of the problems facing the division indicated that there were three phases to be tackled:

1 the development of an historical analysis system
2 the development of a management reporting system
3 the development of a more systematic forecasting system to aid planning activities.

6.3 PROGRESS

The information required to expedite forecasting activities and help managers in the day-to-day running of the division fell into two categories, namely internal and external statistics.

The internal information was of two types, namely historical statistics and current statistics. Systems were designed (see Chapter 4) to supply this information in the level of detail required.

The historical analysis system was designed to produce statistics to give managers a more quantitative (69) feeling for the past, to complement their qualitative experience, and also to form the basis for more systematic forecasting. The system produced statistics at product level detail (by country - see Appendix 4.2 and by market - see Appendices 4.2 and 4.11) which was the level of detail at which division planned.

The management reporting system was designed to:-

1 supply managers with up-to-date information

2 monitor performance against plan

3 update planning data (i.e. to update the statistics for 1970-76 supplied by the historical analysis system).

This system fulfilled these three functions well and became accepted by managers as a valuable management tool.

The external information was supplied by market research involving literature surveys and field surveys. Market research had not been used as a formal tool until the marketing planning department was created in 1976. Before 1976 external information was derived from the reports written by the sales force after business trips. Attempts to encourage the sales force to collect more information during their field trips was not very successful. The sales force and sales managers concentrated their efforts on selling and believed that market research should be undertaken by other staff so as not to interfere with their activities. Thus, the market planning staff undertook many formalised market research projects (to evaluate global potential and competitor activity) whilst the sales force were gradually persuaded to report back more fully on the market intelligence obtained during their trips.

The information now available was greater than ever before and managers began to use it more and more to help them make decisions that had previously been based on judgement alone. However, the availability of more and better information did not immediately improve the quality of management

decisions (50), because the managers had first to learn to use the information effectively and it was realised that this would take time.

The information available was intended not only to help the managers on a day to day basis, but also to provide the basis for better planning. The information was used extensively to try to improve the current forecasting exercises whilst alternative methods were being considered.

Unfortunately, commitment to the development, implementation and control of the information systems (the first two phases of the project) limited the progress made on the third phase (see Chapter 5). Management accepted that the information systems were a necessary prerequisite to a more systematic forecasting system and realised that such a system would have to be developed at a later stage.

6.4 CONCLUSION

The positive outcome of the project has been the implementation of a management information system to help managers in their day to day activities. The level of detail possible, and the availability of extra reports using the Quest facility has meant that managers now have an effective tool for

monitoring and controlling divisional performance. (Thus, for example, if estimated contributions for a product are low, corrective pricing activities can be initiated to remedy the situation for the future).

The system has been justified (see section 4.8.2) when compared with the cost of producing the required information manually. It also produces savings in terms of management time released for other activites (e.g. additional business trips - the worth of which are difficult to assess). The divisional management are well satisfied with the system (see Appendix 6.1). The Market Planning Manager has commented:

> 'As you know, the manual system in existence prior to 1977 was somewhat disjointed and unreliable with great amounts of time, effort and patience necessary to get at the information. Although the computerised MIS at first appeared to baffle and confuse many of the people operating and using the system, I am pleased to report that, after great effort, initially by yourself of course, and individual education of all concerned, that the system has now become extremely efficient and effective.
>
> The analysis reports, based on orders, sales and marketing information, are now being used by management to good advantage. Perhaps the most dramatic improvement has been the accessibility of information held on file via the Quest facility. This has certainly helped my own department a great deal.'

The combination of the historical analysis system and the management reporting system permitted certain weak products (119,120) to be phased out.

The introduction of market research, as a formal management tool, established that there would be a demand for oil until the early part of the next century (see Chapter 1 and Appendix 1.2) and consequently that there would be a continued demand for hose or an alternative technology for transportation purposes. Market research provided a vehicle for determining new uses for existing products, new customers for existing products, the possible demands for the products and the need for new products, their uses, the users and anticipated demands. Indeed, market research activities permitted marketing management to direct, for the first time, the efforts of research and development staff.

The information now available from internal and external sources forms a sound foundation for future work, namely the development of the planning system and systems for other divisional departments (e.g. Production Planning). The information required for effective forecasting (64,65) was just not available at the commencement of this project and this deficiency has now been rectified.

A considerable amount of work remains to be done to develop a more systematic forecasting system (which may involve the use of several techniques). The scope for the future has been discussed and the use of computer bureau facilities

to develop appropriate models, using the information available, has been recommended. It is believed that the problem will be tackled with renewed vigour now that management resistance has been overcome by virtue of the successful implementation of the information system. The development of a forecasting system will be an evolutionary process and methods will be superseded by others as management experience and the demand for better accuracy increases. The initial system will probably be based on time series techniques (see section 5.4.2) and these will probably be replaced by causal models, for the major products, when more information from market research activities is available to complement the internal statistics.

One area of possible future development which has been highlighted by the results from the information system (see Appendix 5.4) was that 81.9% of offshore hose turnover (i.e. 54.4% of divisional turnover) for 1977 was realised from business with only 10 customers. It should therefore be possible to conduct market research surveys to establish potential offshore hose business to a high level of accuracy.

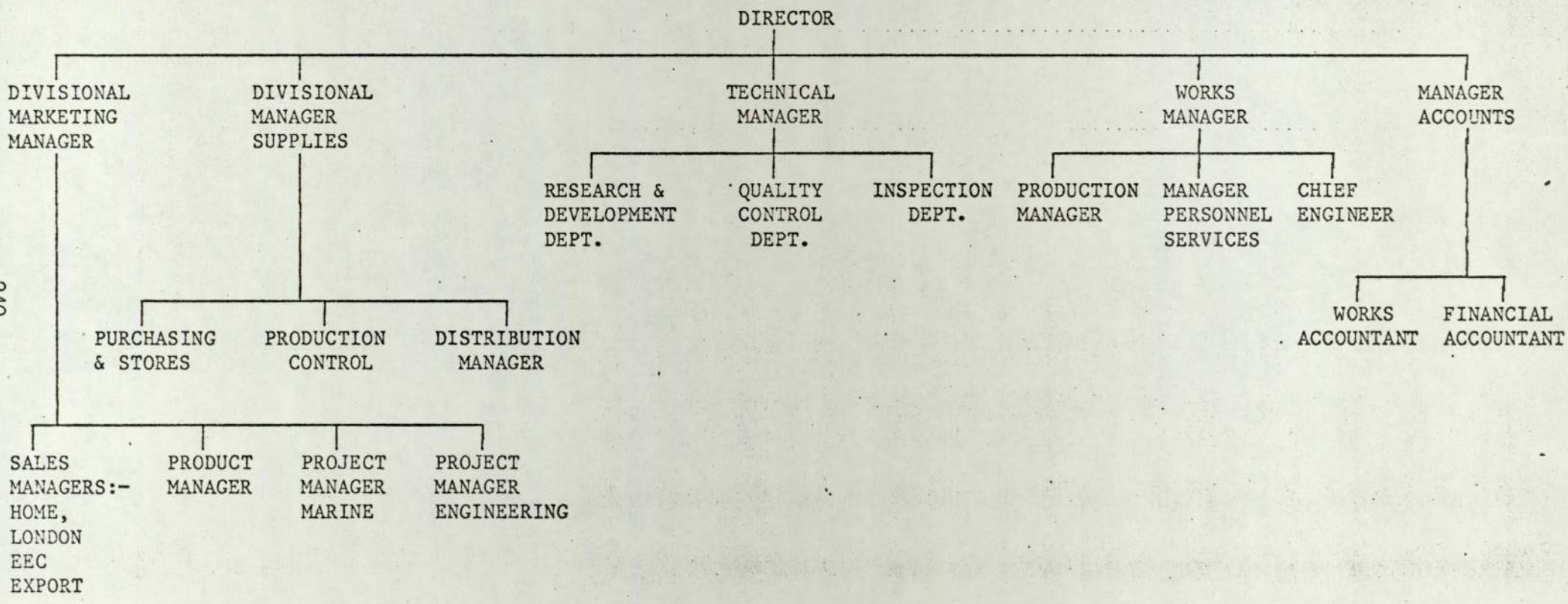
The information system has proved to be a valuable management tool and has stimulated much thought about future applications, for example forecasting, for which it forms a sound foundation for development.

APPENDICES

APPENDIX 1.1

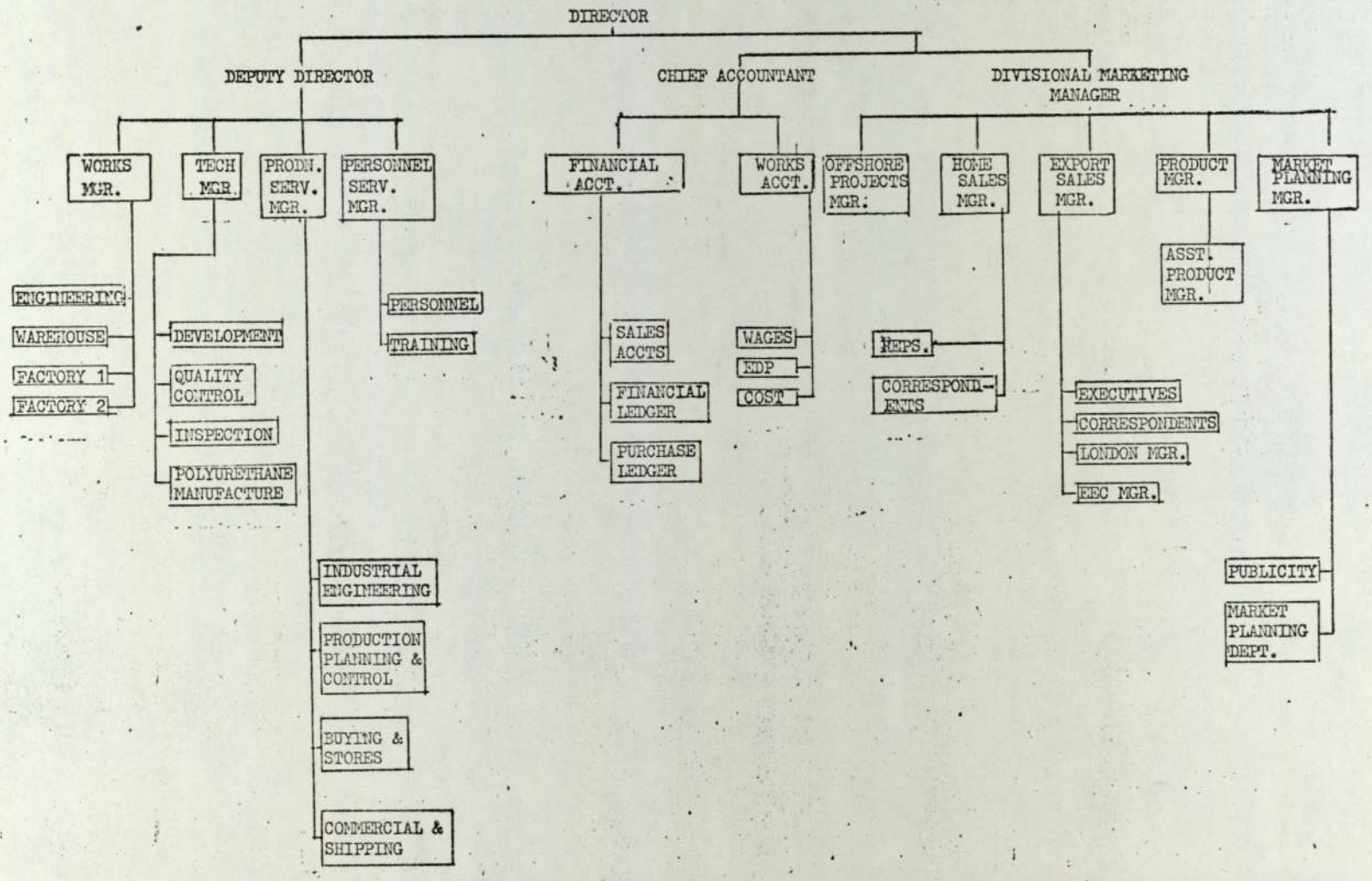
ORGANISATIONAL STRUCTURES

OIL & MARINE DIVISION : ORGANIZATIONAL STRUCTURE (PRE 1974)



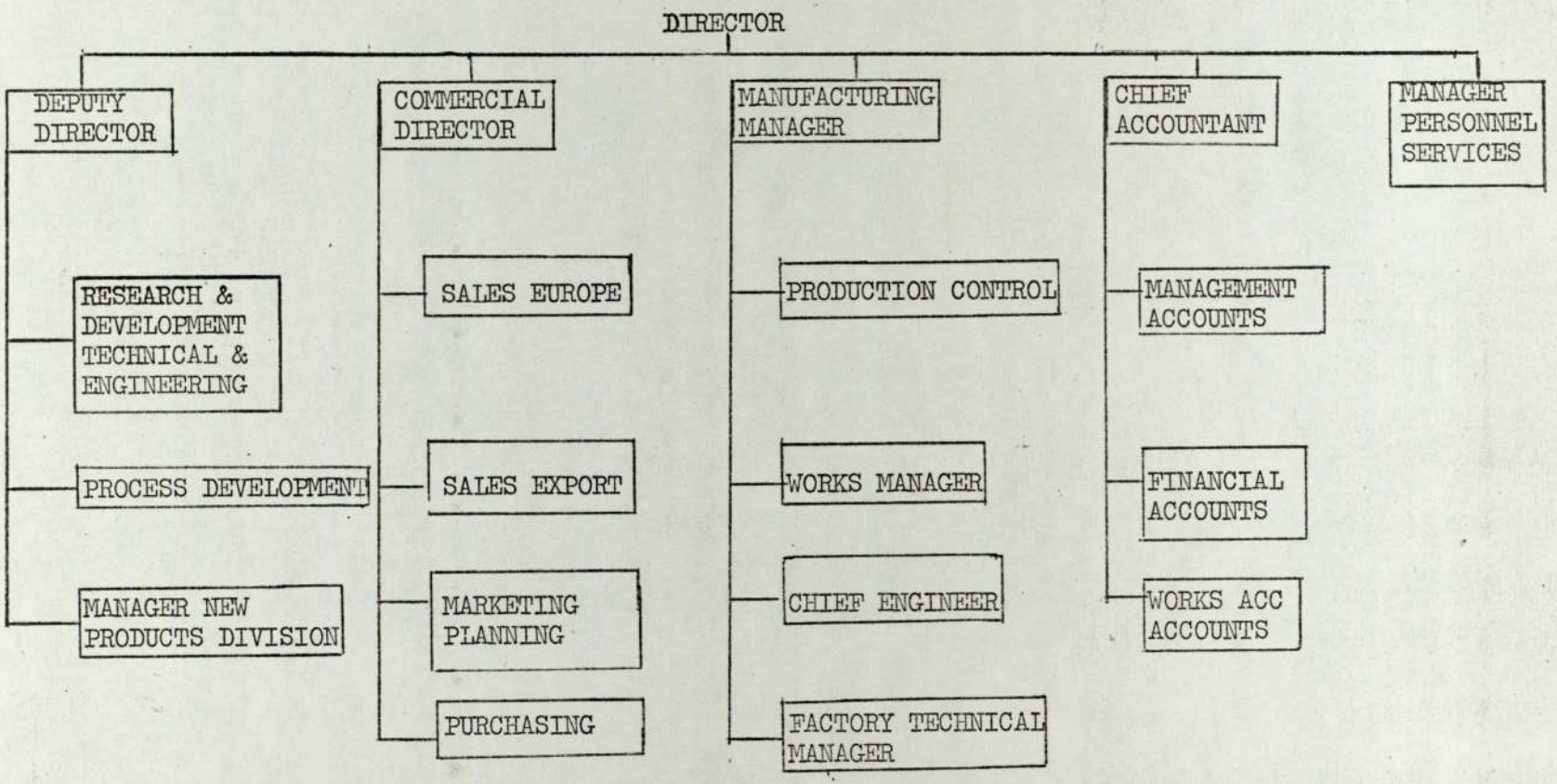
APPENDIX 1.1 (Cont.)

OIL-AND MARINE DIVISION ORGANISATIONAL STRUCTURE (1976)

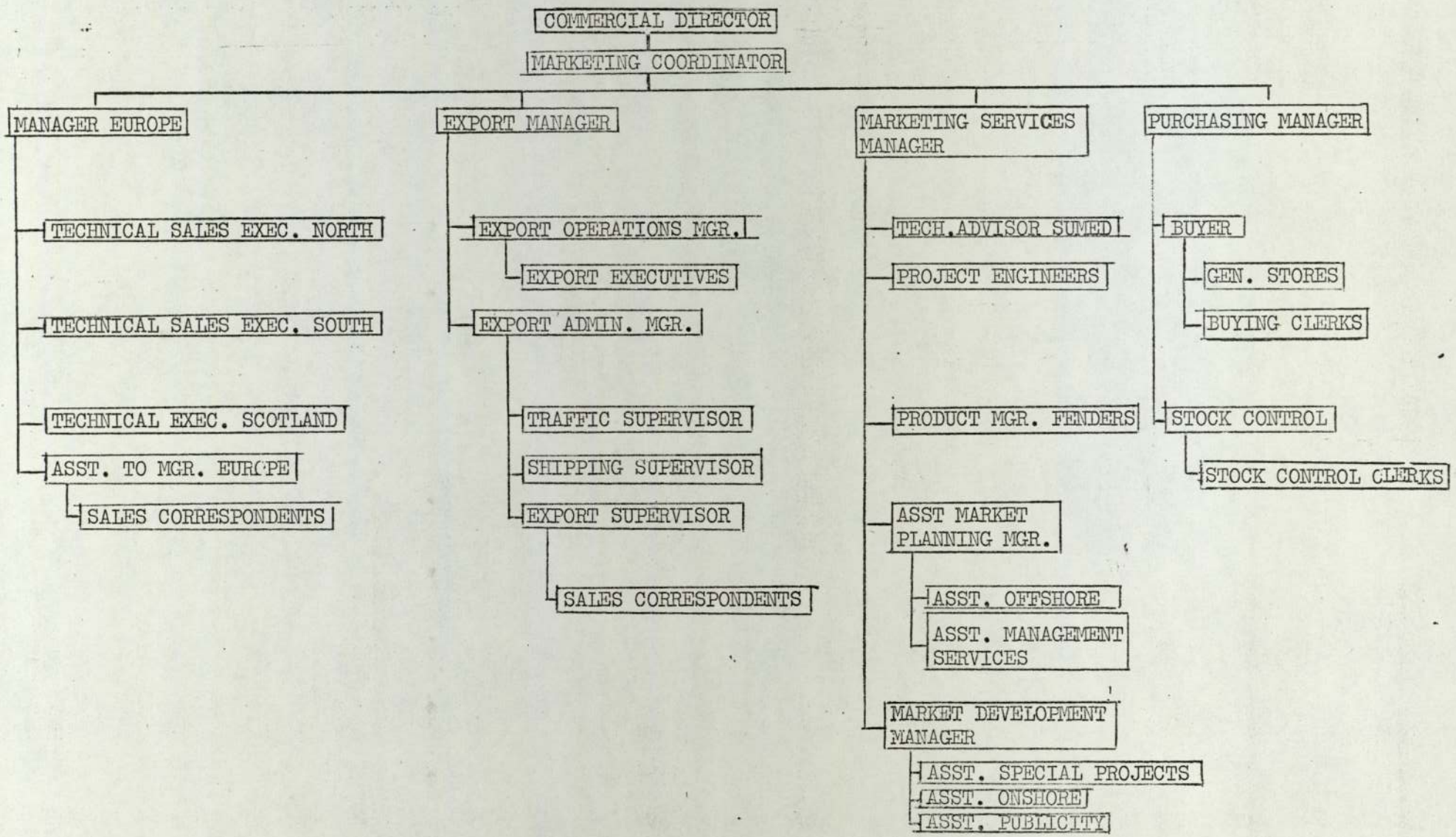


APPENDIX 1.1 (Cont.)

DIVISIONAL MANAGEMENT STRUCTURE (JUNE 1978)



APPENDIX 1.1 (Cont.) COMMERCIAL DEPARTMENT STRUCTURE (JUNE 1978)



APPENDIX 1.2 ENERGY STATISTICS

TABLE 1 TOTAL U.K. INLAND CONSUMPTION OF PRIMARY FUELS

% SHARES

Fuel \ Year	1963	1964	1965	1966	1973	1974	1975	1976
Petroleum	30.0	32.6	35	37.9	46.0	45.0	42.0	40.7
Coal	68.4	65.5	61.8	58.3	37.9	35.0	37.0	37.0
Natural Gas	0.1	0.1	0.4	0.4	12.6	15.8	13.0	17.8
Nuclear/Hydro	1.5	1.8	2.8	3.4	3.5	4.2	4.0	4.5
CONSUMPTION m TONS COAL EQUIVALENT	283.8	286.0	298.5	298.3	346.1	331.0	397.0	324.7

References: (12 - 15)

TABLE 2 ANALYSIS OF ENERGY USED BY ALL U.K. CUSTOMERS

% SHARES

Fuel \ Year	1963	1964	1965	1973	1974	1975	1976
Petroleum	33	36	38	49	47	46	46
Coal	38	34	32	13	13	11	10
Other Solid Fuels	14	14	14	8	7	7	7
Gas	6.5	7	7	18	21	23	24
Electricity	8.5	9	9	12	12	13	13

References: (12 - 15)

APPENDIX 1.2 (Cont.)

TABLE 3 ANALYSIS OF ENERGY USED IN U.K. INDUSTRY

% SHARES

Fuel \ Year	1963	1964	1965	1973	1974	1975	1976
Petroleum	32	33	36	44	42	40	38
Solid Fuel	54	52	49	25	24	23	23
Gas	6	6	6	20	23	25	27
Electricity	8	9	9	11	11	12	12

References: (12 - 15)

TABLE 4 ANALYSIS OF ENERGY USED BY SECTOR IN U.K.

% SHARES

Sector \ Year	1963	1964	1965	1973	1974	1975	1976
Industry	28	29	30	32	32	31	31
Iron/Steel	13	14	14	11	9	9	9
Domestic	29	27	27	24	26	26	25
Air	2	2	2	3	3	3	3
Road	11	12	12	16	16	17	17
Rail/Water	5	4	3	1.5	2	2	2
Miscellaneous	6	6	6	5	5	5	6
Public Services	5	5	5	6	6	6	6
Agriculture	1	1	1	1.5	1	1	1

References: (12-15)

APPENDIX 1.2 (Cont.)

PETROLEUM FIGURES

TABLE 5 PETROLEUM ANALYSIS - U.K. ENERGY AND NON-ENERGY USES

UNITS MILLION TONNES OIL

Sector \ Year	1965	1966	1973	1974	1975	1976
Power Stations	6.5	7.4	16.9	17.2	12.8	10.2
Domestic	2.2	2.2	3.8	3.4	3.3	3.3
Road Transport	14.8	15.5	22.6	23.0	21.5	22.5
Iron & Steel	4.9	4.8	5.0	4.0	3.3	3.1
Other Industry	14.9	16.5	22.2	19.8	17.9	17.9
Other Customers	14.0	15.8	17.7	15.1	14.6	14.5
Total Energy Use	57.3	62.2	88.2	81.5	73.4	71.5
Non-Energy Use	6.4	6.8	11.1	10.8	8.3	8.8
Total Consumption	63.7	69.0	99.3	92.3	81.7	80.3
Refinery Output	60.9	66.3	106.0	103.1	86.6	90.3

References: (13 - 17)

The non-energy use, i.e. use as a raw material in industry, runs at approximately 10% of the total oil use per year.

TABLE 6 ANALYSIS OF ENERGY RESOURCES USED IN U.K. ELECTRICITY GENERATION - THE IMPORTANCE OF OIL

UNITS MILLION TONNES COAL EQUIVALENT

Fuel \ Year	1965	1966	1973	1974	1975	1976
Coal, Coke	70.1	68.8	75.7	66.0	73.6	76.6
Oil	10.6	12.2	28.0	28.5	21.1	16.8
Natural Gas	-	-	1.1	3.9	3.4	2.5
Nuclear Power	4.5	6.4	8.2	10.3	9.3	11.2
Hydroelectric Power	1.8	1.9	1.7	1.8	1.6	1.6
Total Fuel Input	87.0	89.3	114.7	110.5	109.0	108.7
Oil %	12.2	13.6	24.4	25.8	19.8	15.5

References : (13 - 17)

TABLE 7 ANALYSIS OF DELIVERIES INTO U.K. CONSUMPTION: GAS, DIESEL AND FUEL OILS - INLAND TRADE (EXCLUDING DERV)

THOUSANDS OF TONS

Year	Gas, Diesel Oils	Fuel Oils	Total
1961	-	-	26,280
1962	-	-	29,648
1963	-	-	32,033
1964	6,001	28,824	34,825
1965	6,856	31,463	38,319
1966	7,587	33,663	41,250
1967	8,073	35,298	43,372
1968	9,025	35,694	44,719
1969	10,348	38,957	49,305
1970	11,918	43,908	55,827
1971	12,370	44,859	57,219
1972	14,874	46,973	61,847
1973	14,861	45,765	60,626
1974	13,366	43,572	56,938
1975	12,844	35,925	48,769

References : (19 - 26)

APPENDIX 1.2 (Cont'd)

TABLE 8 ANALYSIS OF FUEL DELIVERIES INTO UK CONSUMPTION (INLAND TRADE) BY SECTOR - (THOUSAND OF TONS)

SECTOR \ YEAR	64	65	66	67	68	69	70	71	72	73	74	75
AGRICULTURE	271	297	254	282	400	423	401	357	348	369	306	295
MARINE	632	602	548	473	357	364	373	396	221	236	228	134
FOOD	1292	1442	1560	1737	1844	1992	2107	2189	2197	2261	2114	1836
MINES/QUARRIES	139	170	177	194	216	259	299	235	209	133	70	41
CHEMICALS	1458	1643	1744	2120	2119	2083	2370	2779	3101	3537	3047	2628
METALS	4428	4898	4746	4740	4985	5378	5551	5007	4761	4657	3788	3156
ENGINEERING	2151	2374	2445	2577	2755	2792	2853	2563	2319	2167	1952	1836
TEXTILE/LEATHER	1206	1346	1542	1585	1626	1671	1620	1412	1428	1410	1240	1133
BRICKS/CERAMICS/CEMENT	2268	24422	2494	2459	2452	2415	2388	2121	1792	1605	1507	1036
TIMBER/RUBBER/PAPER	1173	1339	1492	1604	1714	1782	1901	1917	1842	1505	1501	1288
OTHER MANUFACT. IND	286	328	359	361	356	415	495	498	573	623	707	640
BUILDING/CONTRACTING	115	135	787	267	128	145	139	107	120	106	78	49
PUBLIC UTILITIES	6207	6670	7328	7842	6791	8369	12046	14310	17322	16104	16928	12884
LAUNDRIES	241	238	258	270	270	262	244	198	192	178	156	145
CENTRAL HEATING	2824	3117	3264	3558	3869	3994	4110	3683	3266	2814	2393	2179
MICELLANEOUS	148	267	372	344	366	552	577	671	564	540	397	298
PETROLEUM IND	4228	4412	4900	4943	5445	6095	6431	6521	6718	7324	7160	6349

References (19-26)

TABLE 9

PUBLIC UTILITIES

ANALYSIS OF DELIVERIES INTO U.K. ELECTRICITY GENERATION: GAS, DIESEL AND FUEL OILS - INLAND TRADE (EXCLUDING DERV FUEL)

THOUSANDS OF TONS

Year \ Fuel	Gas, Diesel Oils	Fuel Oils	Total
1961	-	-	5,698
1962	-	-	6,025
1963	-	-	5,493
1964	390	5,506	5,895
1965	571	5,965	6,536
1966	754	6,882	7,636
1967	438	7,359	7,788
1968	443	6,359	6,802
1969	606	7,984	8,590
1970	958	11,717	12,675
1971	706	14,115	14,821
1972	1,615	17,124	18,739
1973	840	15,884	16,724
1974	715	16,760	17,475
1975	415	12,119	13,134

References: (19 - 26)

APPENDIX 1.2 (Cont.)

TABLE 10 TOTAL EXPORTS OF CRUDE OIL AND REFINED PRODUCTS BY PRODUCERS

THOUSAND BARRELS PER DAY

Country	1970	1971	1972	1973	1974	1975
Algeria	985.5	693.4	1,006.8	999.5	937.6	939.6
Gabon	100.7	114.6	122.6	137.4	195.1	212.6
Iran	3,625.7	4,288.5	4,804.9	5,572.5	5,664.1	4,984.1
Kuwait	2,830.9	3,009.4	3,135.5	2,847.4	2,395.7	1,943.9
Saudi Arabia	3,786.4	4,718.2	6,012.7	7,598.2	8,499.3	7,081.2
Venezuela	3,469.6	3,282.3	3,064.9	3,150.1	2,751.9	2,086.1
Others	16,527.9	17,394.8	18,535.0	20,144.3	19,096.0	-
World Total	31,326.7	33,501.2	36,682.4	40,449.4	39,539.7	-
OPEC Total	22,191.1	23,833.5	25,862.0	29,287.6	28,889.8	-
OPEC % Share	70.8	71.1	70.5	72.4	73.1	-
World Total Crude	23,441.6	25,541.2	28,341.7	31,376.9	31,116.7	-
OPEC Crude	20,229.2	22,031.8	24,077.3	27,354.9	27.031.5	-
OPEC % Crude	86.3	86.3	85.0	87.2	86.9	-
World Total Refined	7,885.1	7,960.0	8,340.7	9,072.5	8,423.0	-
OPEC Refined	1,961.9	1,801.7	1,784.7	1,932.7	1,858.3	-
OPEC % Refined	24.9	22.6	21.4	21.3	22.1	-

Reference: (18)

APPENDIX 1.2 (Cont.)

TABLE 11 U.K. IMPORTS OF CRUDE OIL AND REFINED PRODUCTS

THOUSAND BARRELS PER DAY

Origin \ Year	1970	1971	1972	1973	1974	1975
Algeria	26.3	9.6	21.2	*	13.3	36.3
Gabon	*	*	1.3	12.2	17.7	1.3
Iran	*	484.5	709.4	977.4	943.3	*
Kuwait	534.9	549.1	507.2	904.1	431.8	171.7
Saudi Arabia	289.2	420.9	496.6	576.2	780.4	420.9
Venezuela	154.7	188.1	119.5	98.1	79.8	79.9

Reference: (18)

TABLE 12 W. EUROPE IMPORTS OF CRUDE OIL AND REFINED PRODUCTS

THOUSAND BARRELS PER DAY

Origin \ Year	1970	1971	1972	1973	1974	1975
Algeria	878.9	604.8	829.2	*	582.5	557.5
Gabon	38.4	54.3	52.1	68.5	93.5	100.9
Iran	739.7	978.9	1,633.2	2,207.1	2,398.1	*
Kuwait	1,630.7	1,689.9	1,694.5	1,507.5	1,103.3	697.8
Saudi Arabia	1,728.1	2,385.3	3,271.6	3,932.5	4,315.5	3,084.5
Venezuela	4,467.1	423.7	332.5	296.3	247.0	227.7

Reference: (18)

* Exports by destination not available

TABLE 13 NORTH AMERICA IMPORTS OF CRUDE OIL AND REFINED PRODUCTS

THOUSAND BARRELS PER DAY

Origin \ Year	1970	1971	1972	1973	1974	1975
Algeria	7.0	1.1	82.9	*	233.4	286.5
Gabon	0.1	0.7	23.5	15.5	45.3	39.2
Iran	71.1	159.4	272.3	368.2	561.9	*
Kuwait	46.1	38.6	47.2	53.4	34.7	25.3
Saudi Arabia	57.2	200.6	362.7	397.3	405.6	345.0
Venezuela	1,529.4	1,510.0	1,431.7	1,547.6	1,399.0	956.0

Reference: (18)

* Exports by destination not available

TABLE 14 WORLD EXPORTS OF CRUDE OIL AND REFINED PRODUCTS

THOUSAND BARRELS PER DAY

Exporter	1970	1971	1972	1973	1974
N. America	934.9	1,002.5	1,267.6	1,434.6	1,218.8
Latin America	5,173.5	5,110.1	5,019.4	5,379.5	4,947.7
W. Europe	2,561.8	2,550.8	3,126.2	3,143.1	2,646.6
Middle East	13,393.7	15,499.3	17,503.6	20,208.5	20,798.6
Africa	5,956.5	5,544.7	5,542.2	5,632.7	5,161.2
Asia (Far East)	1,162.8	1,413.8	1,726.7	1,921.7	1,882.6
Others	2,143.7	2,380.0	2,506.7	2,729.9	2,884.2
TOTAL	31,326.7	33,501.2	36,682.4	40,449.4	39,539.7

Reference: (18)

APPENDIX 1.2 (Cont.)

TABLE 15 WORLD IMPORTS OF CRUDE OIL AND REFINED PRODUCTS

THOUSAND BARRELS PER DAY

Importer	1970	1971	1972	1973	1974
N. America	4,182.5	4,740.8	5,670.0	7,225.0	6,793.8
Latin America	2,816.6	3,192.3	3,350.2	3,741.3	3,690.7
W. Europe	15,083.5	15,594.2	17,037.4	18,041.6	16,713.9
Middle East	601.3	526.3	537.7	544.1	646.3
Africa	682.5	782.7	815.2	882.0	771.2
Asia (Far East)	5,756.9	6,380.5	7,046.7	7,775.8	7,446.9
Others	1,546.8	1,388.9	1,684.6	2,058.6	1,885.0
TOTAL	30,670.1	32,605.7	36,141.8	40,268.4	37,947.8

Reference: (18)

TABLE 16 CRUDE OIL EXPORTERS EXHIBITING GROWTH

THOUSAND BARRELS PER DAY

Exporter	1970	1971	1972	1973	1974
Iran	3,309.3	3,979.0	4,498.4	5,276.8	5,369.2
Saudi Arabia	3,216.9	4,186.8	5,444.1	7,014.6	7,904.1
U.A. Emirates	777.0	1,054.8	1,200.1	1,531.1	1,663.6
Angola	83.9	92.9	134.5	144.6	148.3
Nigeria	1,050.8	1,466.4	1,756.1	1,978.1	2,179.4
Indonesia	625.4	656.4	817.2	1,012.4	1,036.6

Reference: (18)

APPENDIX 1.2 (Cont.)

TABLE 17 WORLD ENERGY CONSUMPTION BY SOURCE

% SHARES

Resource \ Year	1960	1970	1980	1990
Coal	46.7	30.8	26.7	22.1
Petroleum	34.4	44.7	44.7	39.6
Natural Gas	13.7	18.7	19.2	18.5
Hydro/Geothermal	5.2	5.4	5.2	4.5
Nuclear	-	0.4	4.3	15.3
World Totals:				
m. bbl/day	60.0	100.0	136.0	192.0
m. tonnes oil equivalent	3,029.0	4,989.0	6,815.0	9,579.0
m. tons coal equivalent	5,048.0	8,315.0	11,358.0	15,965.0

Reference: (27)

TABLE 18 WORLD ENERGY CONSUMPTION BY REGION

% SHARES

Region \ Year	1960	1970	1980	1990
U.S.A.	33.9	30.9	29.1	29.3
W. Europe	20.0	21.2	21.1	20.9
Japan	2.8	5.5	6.9	8.2
Communist Countries	29.6	26.9	27.7	26.2
Rest of World	13.7	15.5	15.2	14.5
World Totals:				
m. bbl/day	60.0	100.0	136.0	192.0
m. tonnes oil equivalent	3,029.0	4,989.0	6,815.0	9,579.0
m. tons coal equivalent	5,048.0	8,351.0	11,358.0	15,965.0

Reference: (27)

APPENDIX 2.1

LIST OF REPORTS AVAILABLE TO THE DIVISION ON THE OLD SYSTEM

PRODUCTION

Debased Compounds

Inspection Reject Report

O.S. & D. Balances Outstanding to Manufacture

Overtime Report

Process Control Report

P12. Production Report

No. 3 Factory Weekly Report

R. & D. Report

Large Bore Hoses to Inspection

Shell hoses awaiting R.T.D. release

Waste Material Return

P6 Production Report

Factory Operating Report (Weekly)

Factory Operating Report (Monthly)

Major Contract Report

Productivity Bonus Report

Report on Non-productive Man-hours

Production Achieved/Load

Forward Production Position

Waste Materials Report

Daily Inspection Report

Hoses in Limbo

Monthly Quality Control

Production Report - Weekly Summary

Enquiry Progress Report

R. & D. Quarterly Summary

Hose Packing - Daily Production Record

Weekend Working List

Hoses to Produce List

Fittings in Store List

Fittings Requirements List

Daily Report - Quality Control

Shell Hoses awaiting R.T.D. Inspection

Stock Hoses for Disposal

MATERIALS REQUIREMENTS (& OUTPUT EVALUATION)

Material Requirements

Cost of Production

Cost of Packing

Stock Evaluation (Hoses packed, not packed)

APPENDIX 2.1 (Cont.)

MISCELLANEOUS REPORTS

Accident Report Form

Average Hourly Earnings

Capital Expenditure Analysis

Volume/Profit Report

Personnel Report

Report of Operations

Selling & Administration Expenses

Monthly M.S.D. Report

Foreign Currency Exposure

VAT Return

Creditors Report

NACO Profitability

Wage Anslysis

Payroll

APPENDIX 2.2

MARKETING REPORTS

MANUAL:-

Customer Complaints
Orders in Circulation
Orders Received List
Sales Synopsis
Home and Export Items held, not invoiced
Product Operating Report
Debtors Report
Provisional Monthly Sales (weekly return)
Monthly Sales Return
Projected Turnover
Provisional Sales Return
Home Sales Stop List
Commission Credit Balances
Marketing Report

COMPUTER:-

Home:

Monthly Commodity Sales by Branch
Monthly Commodity all O. & M. Direct
Monthly Sales by Representative
Accumulative Commodity by Branch
Accumulative Commodity by Representative
Accumulative Commodity all O. & M. Direct

Export:

Monthly Commodity by Branch
Accumulative Commodity by Branch
O. & M. A.C. Export Commodity Analysis
O. & M. A.C. Export Accumulative Commodity Analysis
Accumulative Commodity Analysis by Country (year to date)

APPENDIX 2.3 SPECIMEN REPORTS - OLD SYSTEM

COMM CODE	COMMODITY NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
05128	DOCK LOADING HOSE.	1	905	472	52.15
05144	AIRCRAFT REFUELLING HOSE	15	775	41CR	
05156	OFFSHORE HUSES. SUBMARINE - WIRE CCFC.	2	14180	8069	56.90
	TOTAL FOR SOURCE OF MANUFACTURE	18	15860	8500	53.59
	TOTAL FOR PRODUCT GROUP	18	15860	8500	53.59
05330	VACUUM CLEANER - DOMESTIC.	55900	62390	18306	29.34
	TOTAL FOR SOURCE OF MANUFACTURE	55900	62390	18306	29.34
	TOTAL FOR PRODUCT GROUP	55900	62390	18306	29.34
99912	U.K. V.A.T. AT 8% INVOICED	0	9103	9103	100.00
99965	CARRIAGE	0	158	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	9261	9103	98.29
	TOTAL FOR PRODUCT GROUP	0	9261	9103	98.29
BRANCH	TOTAL ROUNDED		87511	35909	41.03
	TOTAL HW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£78249.09	£26806.15	34.26
	TOTAL OTHER PRODUCTS		£158.00	£0.00	
	TOTAL VAT		£9102.51	£9102.51	100.00
	TOTAL ACTUAL SALES		£78249.09	£26806.15	34.26
	TOTAL FOR MONTH		£87509.60	£35908.66	41.03

HOSE DIV 620 OIL&MARINE-HOUSE ACCOUNT MONTHLY COMMODITY BY BRANCH MONTH OF DECEMBER 1976 REPORT N/EDP 171

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
01875	AVIATION REFUELLING.	2	415	191	46.02
01876	AVIATION REFUELLING & DEFUELLING (CCPP)	3	146	50	34.25
01877	TANK CLEANING.	120	8044	2722	33.84
	TOTAL FOR SOURCE OF MANUFACTURE	125	8605	2963	34.43
	TOTAL FOR PRODUCT GROUP	125	8605	2963	34.43
59250	MISC MANDREL MADE HOSES(EXCL PVC)	121	14362	6157	42.87
	TOTAL FOR SOURCE OF MANUFACTURE	121	14362	6157	42.87
	TOTAL FOR PRODUCT GROUP	121	14362	6157	42.87
05118	LINEFLOTE (ROPEFLOTE)	60	3932	2534	64.45
05124	SMOOTH BORE PETROCHEM HOSE	4	767	201	26.21
05128	DOCK LOADING HOSE.	13	6039	3402	56.33
05130	LIGHTWEIGHT OIL DISCHARGE.	11	2276	1317	57.86
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS	0	1354	418	30.87
05144	AIRCRAFT REFUELLING HOSE	15	775	41CR	
05152	OFFSHORE HOSES. SUBMARINE.	6	16254	8424	51.83
05154	OFFSHORE HOSES.SELFLOTE - WIRE CCRD.	3	15337	10255	66.86
05155	OFFSHORE HOSES. SELFLOTE-ABR. RESISTANT	12	19984	12733	63.72
05156	OFFSHORE HOSES. SUBMARINE - WIRE CCRD.	2	14180	8069	56.90
05158	SMALL BORE DOCK LOADING WIRE CCRD HOSE	3	3220	1852	57.52
05160	OXYGEN LANCING.	2	765	464	60.65
05172	SAND SUCTION HOSE (U.S.A)	1	179	117	65.36
05180	ROTARY HOSE	1	2029	742	36.57
	TOTAL FOR SOURCE OF MANUFACTURE	133	87091	50487	57.97
	TOTAL FOR PRODUCT GROUP	133	87091	50487	57.97
05330	VACUUM CLEANER - DOMESTIC.	60600	69281	21375	30.85
05400	NON-UK PRODUCTS	12	636	235	36.95
05440	EXPANSION JOINTS.	2	167	41	24.55
05542	OXYGEN BREATHER TUBES.	101	339	101	29.79
	TOTAL FOR SOURCE OF MANUFACTURE	60715	70423	21752	30.89
	TOTAL FOR PRODUCT GROUP	60715	70423	21752	30.89
90912	U.K. V.A.T. AT 8% INVOICED	0	17618	17618	100.00
90960	PACKAGES	0	68	68	100.00
90965	CARRIAGE	0	1911	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	19597	17686	90.25
	TOTAL FOR PRODUCT GROUP	0	19597	17686	90.25
BRANCH	TOTAL ROUNDED		200078	99045	49.50
	TOTAL MW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£166116.81	£75202.83	45.27

APPENDIX 2.3 (Cont.)

REP CODE			NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
11	D.T.GOW	- MONTH	11616	5234	45.06
		- YEAR B/F	220362	105302	47.79
		- YEAR TO DATE	231978	110536	47.65
12	D.W.PETTIT	- MONTH	32238	13686	42.45
		- YEAR B/F	367190	165998	45.21
		- YEAR TO DATE	399428	179684	44.99
13	R.GOODWIN	- MONTH	59958	35648	59.45
		- YEAR B/F	324109	181221	55.91
		- YEAR TO DATE	384067	216869	56.47
BRANCH TOTAL ROUNDED		- MONTH	103812	54568	52.56
		- YEAR B/F	911661	452521	49.64
		- YEAR TO DATE	1015473	507089	49.94
TOTAL		- MONTH	£103808.50	£54571.38	52.57
		- YEAR B/F	£911663.07	£452514.60	49.64
		- YEAR TO DATE	£1015471.57	£507085.98	49.94

HOSE DIV 622 OIL&MARINE-HOME DIRECT MONTHLY SALES BY REPRESENTATIVE MONTH OF DECEMBER 1976 REPORT N/EDP 174

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
05118	LINEFLOTE (ROPEFLOTE)	1	0	14CR	
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS	0	663	6CR	
05160	OXYGEN LANCING.	7	9462	3156	33.35
05161	WATER COOLING.	7	2684	840	31.30
	TOTAL FOR SOURCE OF MANUFACTURE	15	12809	3976	31.04
	TOTAL FOR PRODUCT GROUP	15	12809	3976	31.04
05542	OXYGEN BREATHER TUBES.	7695	40731	10586	25.99
	TOTAL FOR SOURCE OF MANUFACTURE	7695	40731	10586	25.99
	TOTAL FOR PRODUCT GROUP	7695	40731	10586	25.99
99965	CARRIAGE	0	392	1CR	
	TOTAL FOR SOURCE OF MANUFACTURE	0	392	1CR	
	TOTAL FOR PRODUCT GROUP	0	392	1CR	
BRANCH	TOTAL ROUNDED		53932	14561	27.00
	TOTAL WW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£53540.83	£14561.80	27.20
	TOTAL OTHER PRODUCTS		£391.92	£0.50CR	
	TOTAL VAT		£0.00	£0.00	
	TOTAL ACTUAL SALES		£53540.83	£14561.80	27.20
	TOTAL YEAR TO DATE		£53932.75	£14561.30	27.00

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	REP. CODE	REP NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
05118	LINEFLOTE (ROPEFLOTE)	CO	OFFICE/HOUSE A/C	1	0	14CR	
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS			0	663	6CR	
05160	OXYGEN LANCING.			7	9462	3156	33.35
05161	WATER COOLING.			7	2684	840	31.30
	TOTAL FOR SOURCE OF MANUFACTURE			15	12809	3976	31.04
	TOTAL FOR PRODUCT GROUP			15	12809	3976	31.04
05542	OXYGEN BREATHER TUBES.			7695	40731	10586	25.99
	TOTAL FOR SOURCE OF MANUFACTURE			7695	40731	10586	25.99
	TOTAL FOR PRODUCT GROUP			7695	40731	10586	25.99
90965	CARRIAGE			0	392	1CR	
	TOTAL FOR SOURCE OF MANUFACTURE			0	392	1CR	
	TOTAL FOR PRODUCT GROUP			0	392	1CR	
REP.	TOTAL ROUNDED				53932	14561	27.00
	TOTAL WW PRODUCTS				£0.00	£0.00	
	TOTAL TVTE PRODUCTS				£53540.83	£14561.80	27.20
	TOTAL OTHER PRODUCTS				£391.92	£0.50CR	
	TOTAL ACTUAL SALES				£53540.83	£14561.80	27.20
	TOTAL YEAR TO DATE				£53932.75	£14561.30	27.00

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	FOOTAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
	TOTAL FOR PRODUCT GROUP	231	219	179	81.74
05330	VACUUM CLEANER - DOMESTIC.	662675	699388	177854	25.43
05331	VACUUM CLEANER - INDUSTRIAL.	380	855	473	55.32
05400	NON-UK PRODUCTS	189	15676	5505.	35.12
05440	EXPANSION JOINTS.	354	47554	21530	45.27
05542	OXYGEN BREATHER TUBES.	3685	9419	2957	31.39
	TOTAL FOR SOURCE OF MANUFACTURE	667283	772892	208319	26.95
	TOTAL FOR PRODUCT GROUP	667283	772892	208319	26.95
90912	U.K. V.A.T. AT 8% INVOICED	0	185692	185692	100.00
90960	PACKAGES	0	724	824	113.81
90965	CARRIAGE	0	15449	ICR	
	TOTAL FOR SOURCE OF MANUFACTURE	0	201865	186515	92.40
	TOTAL FOR PRODUCT GROUP	0	201865	186515	92.40
BRANCH	TOTAL ROUNDED		2348725	1061008	45.17
	TOTAL MM PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£2048024.91	£833680.11	40.71
	TOTAL OTHER PRODUCTS		£115006.82	£41635.33	36.20
	TOTAL VAT		£185692.10	£185692.10	100.00
	TOTAL ACTUAL SALES		£2146858.73	£874492.44	40.73
	TOTAL YEAR TO DATE		£2348723.83	£1061007.54	40.73

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
05128	DOCK LOADING HOSE.	5	3501	503	14.37
	TOTAL FOR SOURCE OF MANUFACTURE	5	3501	503	14.37
	TOTAL FOR PRODUCT GROUP	5	3501	503	14.37
05130	LIGHTWEIGHT OIL DISCHARGE.	2	837	299	35.72
05152	OFFSHORE HOSES. SUBMARINE.	16	15160	7058	46.56
	TOTAL FOR SOURCE OF MANUFACTURE	18	15997	7357	45.99
	TOTAL FOR PRODUCT GROUP	18	15997	7357	45.99
05400	NON-UK PRODUCTS	10	842	279	33.14
	TOTAL FOR SOURCE OF MANUFACTURE	10	842	279	33.14
	TOTAL FOR PRODUCT GROUP	10	842	279	33.14
90980	C.I.F. ETC. - EXPORT DIVISION ONLY	0	245	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	245	0	
	TOTAL FOR PRODUCT GROUP	0	245	0	
BRANCH	TOTAL NW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£20340.40	£8138.85	40.01
	TOTAL OTHER PRODUCTS		£245.21	£0.00	
	TOTAL VAT		£0.00	£0.00	
	TOTAL ACTUAL SALES		£20340.40	£8138.85	40.01
	TOTAL FOR MONTH		£20585.61	£8138.85	39.54

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
05100	LIGHTWEIGHT SELFLOTE	48	158798	57466	36.19
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS	0	152001	43818	28.83
05150	OFFSHORE HOSES. SELFLOTE.	3-	2864CR	2800CR	
05152	OFFSHORE HOSES. SUBMARINE.	40	125278	47949	38.27
05155	OFFSHORE HOSES. SELFLOTE-ABR. RESISTANT	250	982847	391501	39.83
05156	OFFSHORE HOSES. SUBMARINE - WIRE CORD.	51	249727	109556	43.87
05157	OFFSHORE HOSES - SELFLOTE - WIRE CORD	135	879670	339990	38.65
05170	FLOATING DREDGER	10	16771	6726	40.10
05174	DREDGER SUBMARINE HOSE	23	22324	14714	65.91
05199	SHELL SURCHARGE	0	444	434	97.75
	TOTAL FOR SOURCE OF MANUFACTURE	554	2584996	1009354	39.05
	TOTAL FOR PRODUCT GROUP	554	2584996	1009354	39.05
05400	NON-UK PRODUCTS	3	16448	568CR	
	TOTAL FOR SOURCE OF MANUFACTURE	3	16448	568CR	
	TOTAL FOR PRODUCT GROUP	3	16448	568CR	
90910	U.K. V.A.T. AT 10% INVOICED	0	3852	3852	100.00
90980	C.I.F. ETC. - EXPORT DIVISION ONLY	0	183428	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	187280	3852	2.06
	TOTAL FOR PRODUCT GROUP	0	187280	3852	2.06
BRANCH	TOTAL WW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£2601444.36	£1008785.63	38.78
	TOTAL OTHER PRODUCTS		£183428.17	£0.00	
	TOTAL VAT		£3852.11	£3852.11	100.00
	TOTAL ACTUAL SALES		£2601444.36	£1008785.63	38.78
	TOTAL YEAR TO DATE		£2788724.64	£1012637.74	36.31

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	FOOTAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
05128	DOCK LOADING HOSE.	5	3501	503	14.37
05130	LIGHTWEIGHT OIL DISCHARGE.	2	837	299	35.72
05152	OFFSHORE HOSES. SUBMARINE.	16	15160	7058	46.56
	TOTAL FOR SOURCE OF MANUFACTURE	23	19498	7860	40.31
	TOTAL FOR PRODUCT GROUP	23	19498	7860	40.31
05400	NON-UK PRODUCTS	10	842	279	33.14
	TOTAL FOR SOURCE OF MANUFACTURE	10	842	279	33.14
	TOTAL FOR PRODUCT GROUP	10	842	279	33.14
90980	C.I.F. ETC. - EXPORT DIVISION ONLY	0	245	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	245	0	
	TOTAL FOR PRODUCT GROUP	0	245	0	
	TOTAL NW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£20340.40	£8138.85	40.01
	TOTAL OTHER PRODUCTS		£245.21	£0.00	
	TOTAL VAT		£0.00	£0.00	
	TOTAL ACTUAL SALES		£20340.40	£8138.85	40.01
	TOTAL YEAR TO DATE		£20585.61	£8138.85	39.54

HOSE DIV. OIL AND MARINE A.C. EXPORT MONTHLY COMMODITY ANALYSIS MONTH OF DECEMBER 1976 REPORT N/EDP 203

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	FOOTAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
01875	AVIATION REFUELLING.	4	922	365	39.59
01876	AVIATION REFUELLING & DEFUELLING (CCMM)	2	54	35	64.81
01877	TANK CLEANING.	3	410	110	26.83
	TOTAL FOR SOURCE OF MANUFACTURE	9	1386	510	36.80
	TOTAL FOR PRODUCT GROUP	9	1386	510	36.80
05100	LIGHTWEIGHT SELFLOTE	19	86620	50188	57.94
05118	LINEFLOTE (ROPEFLOTE)	50	324	124	38.27
05119	CHAINFLOTE	2	0	830CR	
05128	DUCK LOADING HOSE.	84	41521	19462	46.87
05130	LIGHTWEIGHT OIL DISCHARGE.	11	3005	1360	45.26
05131	SUBMARINE HOSE.	10	265	5CR	
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS	0	9420	3785	40.18
05152	OFFSHORE HOSES. SUBMARINE.	22	28300	14983	52.94
05155	OFFSHORE HOSES. SELFLOTE-ABR. RESISTANT	40	129928	72000	55.42
05156	OFFSHORE HOSES. SUBMARINE - WIRE CCRC.	13	49826	28188	56.57
05157	OFFSHORE HOSES - SELFLOTE - WIRE CCRC	32	269299	157563	58.51
05184	FLOATING ROOF RANK DRAIN HOSE	9	1835	799	43.54
	TOTAL FOR SOURCE OF MANUFACTURE	292	620343	347617	56.04
	TOTAL FOR PRODUCT GROUP	292	620343	347617	56.04
05400	NON-UK PRODUCTS	27	62042	14172	22.84
05440	EXPANSION JOINTS.	2	822	300	36.50
	TOTAL FOR SOURCE OF MANUFACTURE	29	62864	14472	23.02
	TOTAL FOR PRODUCT GROUP	29	62864	14472	23.02
90980	C.I.F. ETC. - EXPORT DIVISION ONLY	0	46813	0	
	TOTAL FOR SOURCE OF MANUFACTURE	0	46813	0	
	TOTAL FOR PRODUCT GROUP	0	46813	0	
	TOTAL WW PRODUCTS		£0.00	£0.00	
	TOTAL TVTE PRODUCTS		£684593.76	£362599.34	52.97
	TOTAL OTHER PRODUCTS		£46812.54	£0.00	
	TOTAL VAT		£0.00	£0.00	
	TOTAL ACTUAL SALES		£684593.76	£362599.34	52.97
	TOTAL YEAR TO DATE		£731406.30	£362599.34	49.58

APPENDIX 2.3 (Cont.)

COMM CODE	COMMODITY NARRATIVE	COUNTRY CODE	METREAGE	NETT TURNOVER	GROSS CONTRIBUTION	G.C.% OF TURNOVER
	AREA 02					
	GHANA	02				
01879	LIQUID PETROLEUM GAS.		2	192	96	50.00
	TOTAL FOR SOURCE OF MANUFACTURE		2	192	96	50.00
	TOTAL FOR PRODUCT GROUP		2	192	96	50.00
05118	LINEFLOTE (ROPEFLOTE)		24	2727	1458	53.47
05128	DOCK LOADING HOSE.		7	1556	840	53.98
05156	OFFSHORE HOSES. SUBMARINE - WIRE CORD.		1	4448	2400	53.96
	TOTAL FOR SOURCE OF MANUFACTURE		32	8731	4698	53.81
	TOTAL FOR PRODUCT GROUP		32	8731	4698	53.81
90980	C.I.F. ETC. - EXPORT DIVISION ONLY		0	23	0	
	TOTAL FOR SOURCE OF MANUFACTURE		0	23	0	
	TOTAL FOR PRODUCT GROUP		0	23	0	
	COUNTRY TOTAL MM PRODUCTS			£0.00	£0.00	
	TOTAL TVTE PRODUCTS			£8922.78	£4793.56	53.72
	TOTAL OTHER PRODUCTS			£23.37	£0.00	
	TOTAL VAT			£0.00	£0.00	
	TOTAL ACTUAL SALES			£8922.78	£4793.56	53.72
	TOTAL YEAR TO DATE			£8946.15	£4793.56	53.58
	NIGERIA	03				
01875	AVIATION REFUELLING.		2	153	41	26.80
01876	AVIATION REFUELLING & DEFUELLING (CCMM)		13	2652	1417	53.43
	TOTAL FOR SOURCE OF MANUFACTURE		15	2805	1458	51.98
	TOTAL FOR PRODUCT GROUP		15	2805	1458	51.98
05100	LIGHTWEIGHT SELFLOTE		17	58046	29078	50.09
05121	NEFTE OIL SUCTION & DISCHARGE HOSE		1	296	149	50.34
05128	DOCK LOADING HOSE.		119	35064	15538	44.31
05129	DOCK LOADING HOSE (BS. 1102)		6	1145	607	53.01
05133	BITUMEN HOSE.		8	5706	2537	44.46
05134	ANCILLIARY EQUIPMENT/LOOSE FITTINGS		0	22633	10712	47.33
05152	OFFSHORE HOSES. SUBMARINE.		73	107770	45123	41.87
05155	OFFSHORE HOSES. SELFLOTE-ABR. RESISTANT		2	6340	2904	45.80
05156	OFFSHORE HOSES. SUBMARINE - WIRE CORD.		14	53757	26313	48.95

APPENDIX 3.1

FORMAT HEADINGS

Definition of the business and its plan objectives
Summary of Financial aspects
Political, social and economic trends in the U.K.
Main economic indicators and major price movements
Objectives and strategies
Plan objectives
Marketing environment
Performance analysis
Key problems, opportunities and action programmes
Impact on resources
Analysis of profit and turnover
Analysis of Profit and movement
Production
Capital expenditure plan
Research and development expenditure
Research and development projects
Profit summary
Balance sheet
Finance forecast
Working capital schedule
Market trends
Organisation and personnel
Other indicators

APPENDIX 3.2

MANAGEMENT PLAN - COMPANY FORMAT - SCHEDULES

The present management plan is constructed from 11 sections and sub-sections:-

SECTION 1 Birds eye:

- B1 Plan summary
- C1 Financial aspects

SECTION 2 Political, social and economic trends
3 Long term objectives and strategies
4 Plan objectives
5 Analysis of marketing environment
6 Analysis of division's performance
7 Key problems and opportunities
8 Action programmes
9 Impact on resources
10 Financial schedules:

- C2 Analysis of turnover and profit
- C3 Analysis of profit movement
- C4 Product summary
- C4(D) Market to product results
- C5 Production information
- C5(D) Additional information
- C6 Capital expenditure plan
- C7 Research & development to technical expenditure
- C8 Research & development
- D1 Profit summary
- D1(D) Analysis of profit
- D2 Balance sheet
- D3 Finance forecast
- D4 Working capital schedule
- D5(D) Taxation schedule
- Divisional earnings

SECTION 11 Indicators:

1. Market, Market share & Sales estimates
2. Production requirements: Capacities & Utilisations
3. Production quantities
4. Price trends - Main products
5. Concession & service returns
6. Purchasing usage & prices of main materials
7. Organisation & Personnel
8. Licencing Income/Payments

APPENDIX 3.3 OPERATIONAL PLAN

MANAGEMENT PLAN 1977	HOME Q	F	£ GC%	HOME AC Q	F	£ GC%	EXPORT Q	F	£ GC%	EXPORT AC Q	F	£ GC%	PROJECTS Q	F	£ GC%	NACO Q	F	£ GC%	TOTAL Q	F	£
			1365287						2397440			210497			240536			493582			4712342
5101/2																					
16" - 12"							5	165	11550										5	165	11550
20" - 16"							5	165	18185										5	165	18185
24" - 20"							11	363	65835										11	363	65835
5150/4 SALM Submarine																					
12"							10	330	26000										10	330	26000
16"	5	165	20000																5	165	20000
20"																					
24"							17	561	138890				3	99	24510				20	660	163400
5150/3																					
12"							11	363	26807										11	363	26807
16"																					
20"																					
24"							16	528	122544				3	99	22977				19	627	143521
5152/1 Submarine Hose																					
8"							36	1188	34308										36	1188	34308
10"							12	396	16200										12	396	16200
12"							24	792	37968	1	33	1582	4	132	6328				29	957	45876
16"	5	165	11925				149	4917	355365	3	99	7155	8	264	19080				165	5445	393525
20"							45	1485	167040	6	198	22272	8	264	29696				59	1947	219008
5152/2 Super Sampson Submarine																					
6"																					
8"																			5	165	8250
10"							5	165	8250										28	924	54600
12"	2	66	3900				22	726	42900	1	33	1950	3	99	5850						
																		493582			5961409
			1401112						1469282			243456			348977						

APPENDIX 3.4 STRATEGY PLAN

- 3 -

		HOME 1975	HOME 1976	HOME AC 1975	HOME AC 1976	EXPORT 1975	EXPORT 1976	EXPORT AC 1975	EXPORT AC 1976	PROJECTS 1975	PROJECTS 1976	N. AMERICA 1975	N. AMERICA 1976	TOTAL 1975	TOTAL 1976	TOTAL VALUE (£) 1975	TOTAL VALUE (£) 1976
5133 Bitumen		175 7 Lens	200 8 Lens			375 15 Lens	400 16 Lens					550 22 Lens	600 24 Lens	1100 44 Lens	1200 48 Lens	9379	10317
5140	Fuel Hose	6270 319 Lens	6900 351 Lens											6270 319 Lens	6900 351 Lens	15675	17242
	Canada	9240 407 Lens	10170 448 Lens											9240 407 Lens	10170 448 Lens	16479	18127
	All Purpose (Ateam)	645 27 Lens	720 30 Lens											645 27 Lens	720 30 Lens	1585	1744
5141	Astern Fuel Hose	11040 423 Lens	12135 465 Lens											11040 423 Lens	12135 465 Lens	20537	22591
5150/1	Lightweight Tail	165 5 Lens	198 6 Lens			2673 81 Lens	2937 89 Lens			2772 84 Lens	3036 92 Lens			5610 170 Lens	6171 187 Lens	254258	279684
5150/2	Barbell	165 5 Lens	198 6 Lens			2409 73 Lens	2640 80 Lens			363 11 Lens	396 12 Lens			2937 89 Lens	3234 98 Lens	155610	171170
5151/1	Beadflote					330 11 Lens	360 12 Lens							330 11 Lens	360 12 Lens	14919	16411
5152/1	Submarine					8349 253 Lens	9174 278 Lens			2178 66 Lens	2409 73 Lens			10527 319 Lens	11583 351 Lens	306748	337423
5152/4	Super Sampson Submarine					1980 60 Lens	2178 66 Lens			957 29 Lens	1056 32 Lens			2937 89 Lens	3234 98 Lens	90773	99850
5153/2	Lightweight Selflote Discharge					1320 44 Lens	1584 48 Lens							1320 44 Lens	1584 48 Lens	17600	19360
5153/1	Selflote					7260 220 Lens	7986 242 Lens			11616 352 Lens	12771 387 Lens			18876 572 Lens	20757 629 Lens	927896	1020685
5155/4	Super Sampson Selflote					3399 103 Lens	3729 113 Lens			957 29 Lens	1056 32 Lens			4356 132 Lens	4785 145 Lens	247025	271728
5156/1	Submarine	66 2 Lens	66 2 Lens			660 20 Lens	726 22 Lens			2904 88 Lens	3201 97 Lens			3630 110 Lens	3993 121 Lens	207903	228267
5156/4	Super Sampson Submarine					429 13 Lens	462 14 Lens			726 22 Lens	792 24 Lens			1155 35 Lens	1254 38 Lens	73146	80461

APPENDIX 3.5 SALES FORECAST FORMATS

Pre 1975

Market =		
Uninhibited Sales Forecast 19__	Q	F
Commodity Details		

1975

Market =				
Uninhibited Sales	RB		OE	
Forecast 19__	Q	F	Q	F
Commodity Details				

1977

Market =										
Uninhibited Sales	Qtr 1		Qtr 2		Qtr 3		Qtr 4		Total	
Forecast 19__	Q	F	Q	F	Q	F	Q	F	Q	F
Commodity Details										

Where Q = Quantity (i.e. No. Items)
F = Footage
RB = Replacement Business
OE = Original Equipment
Qtr = Quarter

and Commodity Details = Commodity Code/Description/Bore Size

APPENDIX 3.6

DIVISIONAL VOLUME PERFORMANCE PLAN v. ACTUAL

Product Category	Data Description	Product/Size	HD	HAC	ED	EAC	OE	NACO	TOTAL
Offshore Oil Floating Hose	74 Plan	5155/1 16	0	0	90	0	50	0	140
	74 Actual		0	0	200	4	42	0	246
	Difference		0	0	+110	+4	+ 8	0	+106
	75 Plan		2	0	100	5	34	0	141
	75 Actual		0	0	195	37	41	0	273
	Difference		2	0	+ 95	+32	+ 7	0	+132
	74 Plan	5157/4 24	2	0	30	0	20	0	52
	74 Actual		2	0	26	3	4	0	35
	Difference		0	0	- 4	+ 3	-16	0	- 17
	75 Plan		1	0	30	2	21	0	54
	75 Actual		0	0	8	0	0	0	8
	Difference		-1	0	- 22	- 2	-21	0	- 46
Submarine Hose	74 Plan	5152/1 16	0	0	80	0	10	0	90
	74 Actual		0	0	160	2	0	0	162
	Difference		0	0	80	2	-10	9	+ 72
	75 Plan		0	0	150	2	0	0	152
	75 Actual		0	0	64	0	4	0	68
	Difference		0	0	- 86	- 2	4	0	84
	74 Plan	5156/1 24	2	0	18	0	80	0	100
	74 Actual		0	0	11	0	3	0	14
	Difference		-2	0	- 7	0	-77	0	- 86
	75 Plan		2	0	30	0	44	0	76
	75 Actual		5	0	8	1	0	0	14
	Difference		3	0	- 22	1	-44	0	- 62

APPENDIX 3.6 (Cont.)

DIVISIONAL VOLUME PERFORMANCE PLAN v. ACTUAL

Product Category	Data Description	Product/Size	HD	HAC	ED	EAC	OE	NACO	TOTAL
Dock Hose	74 Plan	5728/1 6	10	0	40	0	0	0	50
	74 Actual		7	0	56	0	0	1	64
	D		- 3	0	16	0	0	1	14
	75		0	0	50	10			60
	75		10	0	44	0			54
	D		10	0	- 6	-10			- 6
	74P	5122 6	10	0	20	0	0	20	50
	74A		6	0	22	0	0	9	37
	D		- 4	0	2	0	0	-11	-13
	75P		10	0	30	0	0	15	55
	75A		0	0	10	0	0	0	10
	D		-10	0	-20	0	0	-15	-45
Offshore Dredger Hose Floating	74A	5770 24"	0	0	0	0	20	0	20
	74P		14	0	0	0	24	0	38
	D		14	0	0	0	4	0	18
	75A		0	0	0	0	20	0	20
	75P		5	0	0	0	20	0	25
	4		5	0	0	0	0	0	5

APPENDIX 3.6 (Cont.)

DIVISIONAL VOLUME PERFORMANCE PLAN v. ACTUAL

Product Category	Data Description	Product/Size	HD	HAC	ED	EAC	OE	NACO	TOTAL
Factored Hose	74 Plan	1735 4"	320	0	140	7	0	0	467
	74 Actual		1,495	0	147	30	0	0	1,672
	Difference		1,175	0	7	23	0		1,205
	75 Plan		200	0	40	6	0	0	246
	75 Actual		148	0	37	0	0	0	185
	Difference		-52		- 3	-61			-61
Machine Made Hose	74 Plan	1879 2	3	0	11	2	0	0	16
	74 Actual		8	0	22	4	0	8	42
	Difference		5	0	11	2	0	8	26
	75 Plan		20	0	10	2	0	0	32
	75 Actual		10	0	32	0	0	1	43
	Difference		-10	0	22	- 2	0	1	11

APPENDIX 4.1 REPORT APPRAISALS

TABLE 1 ORDERS RECEIVED LIST - APPRAISAL BY DIVISIONAL DIRECTOR

(Manual : Weekly, see Figure 2.1)

Objectives	To advise on order value and follow trends	
Action	Discuss with divisional manager marketing and marketing managers, assess trends and policies	
Assessment:		Score:
Relevant	Yes	4
Timely	Yes	4
Accurate	Yes	3
Understandable	Yes	4
		TOTAL 15 (i.e. 75%)

TABLE 2 ORDERS RECEIVED LIST - APPRAISAL BY DIVISIONAL MANAGER MARKETING

(Manual : Weekly, see Figure 2.1)

Objectives	To monitor incoming orders, prices and customer activity	
Action	-	
Assessment:		Score:
Relevant	Yes	4
Timely	Yes	3
Accurate	Yes	3
Understandable	Yes	3
		TOTAL 13 (i.e. 65%)

APPENDIX 4.1 (Cont.)

TABLE 3 ORDERS RECEIVED LIST - APPRAISAL BY MANAGEMENT ACCOUNTANT

(Manual : Weekly, see Figure 2.1)

Objectives	To advise of business obtained by type, size and value	
Action	Study value and compare with planned sales value	
Assessment:		Score:
Relevant	Yes, simply states order values; would prefer to see summary compared with plan	3
Timely	Yes	4
Accurate	Variable	3
Understandable	Yes	5
		TOTAL 15 (i.e. 75%)

TABLE 4 SALES SYNOPSIS - APPRAISAL BY DIVISIONAL MARKETING MANAGER

(Manual : Monthly, see Figure 2.2)

Objectives	To monitor sales performance against financial plan	
Action	Discuss performance with staff, stimulate sales force activity, reappraise targets	
Assessment:		Score:
Relevant	Yes	4
Timely	Yes	4
Accurate	Yes	4
Understandable	Yes	4
		TOTAL 16 (i.e. 80%)

TABLE 5 SALES SYNOPSIS - APPRAISAL BY CHIEF ACCOUNTANT

(Manual : Monthly, see Figure 2.2)

Objectives	Management Information	
Action	Monitor performance against plan	
Assessment:		Score:
Relevant		3
Timely		2
Accurate		3
Understandable		3
		TOTAL 11 (i.e. 55%)

TABLE 6 SALES SYNOPSIS - APPRAISAL BY MANAGEMENT ACCOUNTANT

(Manual : Monthly, see Figure 2.2)

Objectives	To advise of order intake performance against plan	
Action	1 Study report and note rate of order intake versus plan 2 Note value of outstanding orders and compare with previous months 3 Note trends	
Assessment:		Score:
Relevant	Yes, but no note of volume	3
Timely	Reasonable	3
Accurate	Yes	4
Understandable	Yes	4
		TOTAL 14 (i.e. 70%)

TABLE 7 PRODUCT OPERATING REPORT - APPRAISAL BY DIVISIONAL DIRECTOR

(Manual : Monthly, see Figure 2.3)

Objectives	To assess product profitability	
Action	Discuss with Chief Accountant and Divisional Manager Marketing to determine steps needed to achieve acceptable profit levels	
Assessment:		Score:
Relevant	Yes	3
Timely	No	2
Accurate	Moderate	3
Understandable	Yes	4
		TOTAL 12 (i.e. 60%)

TABLE 8 PRODUCT OPERATING REPORT - APPRAISAL BY DIVISIONAL MANAGER MARKETING

(Manual : Monthly, see Figure 2.3)

Objectives	To assess the results of pricing policy by market by product group	
Action	Discuss with sales managers to determine steps needed to achieve acceptable profit levels	
Assessment:		Score:
Relevant	Yes	4
Timely	No	1
Accurate	No	2
Understandable	Yes	3
		TOTAL 11 (i.e. 50%)

TABLE 9 PRODUCT OPERATING REPORT - APPRAISAL BY CHIEF ACCOUNTANT

(Manual : Monthly, see Figure 2.3)

Objectives	To inform management of product group profitability by market, and monitor performance against plan	
Action	To question trends and detail	
Assessment:		Score:
Relevant	Yes	4
Timely	Often late - because of the clerical effort	3
Accurate	Yes	4
Understandable	Yes	4
		TOTAL 15 (i.e. 75%)

TABLE 10 PRODUCT OPERATING REPORT - APPRAISAL BY MANAGEMENT ACCOUNTANT

(Manual: Monthly, see Figure 2.3)

Objectives	To advise of operating profit per product group	
Action	1 Study turnover per product group versus plan 2 Study contribution per product group versus plan 3 Study allocated constant expenses	
Assessment:		Score:
Relevant	Yes, if marketing need it	3
Timely	No, far too late	1
Accurate	Yes	3
Understandable	Yes	4
		TOTAL 11 (i.e. 55%)

APPENDIX 4.1 (cont.)

TABLE 10 COMPUTER REPORTS - APPRAISAL BY USERS

(Monthly, see Appendix 2.3)

Objectives	To supply the users with detailed information about the volume & financial situation of the division so that appropriate actions can be taken to influence and control activities	
Action	The figures are studied by the managers and then circulated to the sales force. If performance against plan in terms of volume and value is poor, strategies are formulated to correct the situation. Market penetration is monitored so that flexible marketing policies may be invoked to improve and control divisional performance. Returns may indicate that changes in prices are required to maintain profitability levels	
Assessment:		Score:
Relevant	In part only. Only sales turnover is monitored & invoicing occurs about 6 months after an order is received. Analyses of orders received and outstanding orders are not available. Reports must be restructured to yield information more appropriate to the product and the user requirements	3
Timely	Due to the way in which data is prepared and validated and the delay in transporting the reports by road from Newcastle to Grimsby the reports are invariably late(2-4 wks)	2
Accurate	The accuracy is poor due to 1 Poor and late data preparation 2 Late correction - often this month's figures appear on next month's reports	2

APPENDIX 4.1 (Cont.)

TABLE 10 (Cont.)

. Understandable	Discrepancies usually exist between manual and computer reports and users have become dependent on the manual report and prejudiced against the computer reports All the computer reports are straightforward and easy to understand. Unfortunately the level of detail is wrong and this presents meaningful action from being taken. Thus deficiencies exist in product level detail (e.g. analyses by type and bore and length) and the area analyses are not appropriate to the division. More analyses appropriate to the division are required if the reports are to become useful management tools. Sales lag behind orders by about 6 months and cannot be used (without other information) as a tool of management control for invoices would continue to be processed for a time even if no new orders were received	3
		TOTAL 10 (i.e. 50%)

APPENDIX 4.2 HISTORICAL ANALYSIS FORMATS

DETAILED PRODUCT ANALYSIS BY MARKET

HISTORICAL ORDERS ANALYSIS YEAR =

Time Period (M)	WR	CC	B	L	Markets							
					HD NI	HAC NI	ED NI	EAC NI	EE NI	OP NI	NACO NI	DT NI
1	1-4											
2	5-8											
3	9-13											
ST Q1												
4	14-17											
5	18-21											
6	22-26											
ST Q2												
7	27-30											
8	31-34											
9	35-39											
ST Q3												
10	40-43											
11	44-47											
12	48-52											
ST Q4												
YT(CC,B,L)												
YT(CC,B)												
YT(CC)												

WHERE:

M = Month
WR = Week Range
Q = Quarter
ST = Sub Total
YT = Year Total
NI = No Items (Quantity)
CC = Commodity Code
B = Bore Size
L = Length
HD = Home Direct
HAC = Home Associated
ED = Export Direct
EE = Export Europe
OP = Offshore Projects
NACO= North American Associated
DT = Divisional Total

APPENDIX 4.2 (Cont.)

PRODUCT ANALYSIS SUMMARY 1970-1976

Time Period				Markets							
Y	Q	CC	B	HD NI	HAC NI	ED NI	EAC NI	EE NI	OP NI	NACO NI	DT NI
1	1	1	1								
1	2										
1	3										
1	4										
YT1											
⋮											
6	1	1	1								
6	2										
6	3										
6	4										
YT6											
1	1	1	2								
1	2										
1	3										
1	4										
YT1											
⋮											

PRODUCT ANALYSIS BY COUNTRY (1970-1976)

Country	CC	B	Year						
			1970 NI	1971 NI	1972 NI	1973 NI	1974 NI	1975 NI	1976 NI
A	1	1							
A	1	2							
A	1	3							
A	2	1							
A	2	2							
⋮									
B	1	1							
B	2	1							
⋮									

APPENDIX 4.3

HISTORICAL ANALYSIS SYSTEM - INPUT

(Coded Orders Received List)

Y WN M R	Customer	Order No.	Location	Card No.	NI	Length m	Bore m	CC	Item Value
0	1 2		3 4		5		6	7	8
1 23 4 5	6789012345678901 23	45678	9012345678901 23456	7	89012	345 6 7	890 12 34	56789 012	345678 90
5 50 H A	Hector Booth	19999	Harrogate	1	2000	7 5	1 5	Z5330 152	1 00
5 50 H A	ICI	20000	Teeside	1	2		10	5440	
				2	2		8		
5 50 G	Dunlop Aviation	20001	Coventry	1	10			5542	1 00
5 50 E	Shell	20002	Nigeria	1	1	30	20	5155 1	5000 00
				2	1	30	20	P5157 1	6000 00
				3	10	10 M	20	5152 1	3000 00
				4	10	10 M	20	5156 1	4000 00
5 50 F	Shell	20003	Holland	1	1		900 mm	5440	
5 50 X	Dunlop Singapore	20004	Singapore	1	1	30	20	5155 1	5000 00
5 50 P	Texaco	20005	Nigeria	1	20	33	20	5155 1	5000 00
				2	20	33	20	5152 1	3000 00
5 50 A I	Angus Inc.	20006	USA	1	1	30	8	5158 1	
5 50 A T	Angus Tor.	20007	Canada	1	1	30	8	5158 1	

Where: Y = Year; WN = Week No.; R = Representative; M = Market; NI = No. Items (ie Quantity); m = metre; mm = millimetre; CC = Commodity Code (ie Product)

Market codes: H = Home Direct; G = Home Associated; E = Export Direct; F = Export Europe; X = Export Associated; P = Projects; A = North American Associated (Angus).

APPENDIX 4.4 MANAGEMENT REPORTING SYSTEM - DETAIL AND FORMATS

REPORT S2WM MONTH TO DATE: SUMMARY OF SALES BY MARKET COMPARED WITH PLAN

Objective - A divisional overview by market of invoiced sales performance/control

Distribution - Senior marketing and accounting management

Frequency - Weekly (at month end replaced by report S4M)

Action - To study variance between actual and plan and take corrective action if necessary

Format:

		ACTUAL				PLAN			VARIANCE			
Market	Period	Nett Turnover	FVC	STD VD	GC GC%	Nett Turnover	GC	GC%	Nett Turnover	GC	GC%	Nett Turnover as % Year Plan
HD	MTD											
	YTD											
HAC	MTD											
	YTD											
.....												
OE	MTD											
	YTD											
Division Total	MTD											
	YTD											
Credits	MTD											
	YTD											

APPENDIX 4.4 (Cont.)

REPORT 03 — ORDERS RECEIVED MONTHLY: SUMMARY BY CUSTOMER

Objective - Report value and estimated profitability of orders by customer

Distribution - Sales management

Frequency - Monthly

Action - Assess the value and profitability of customers' orders taken in the month

Format:

Market
Area
Country
Territory

Customer	MONTH Value	CIF	EST GC	EST GC%	YEAR TO DATE Value	EST GC	EST GC%
TerritoryTotals	-	-	-	-	-	-	-

Note:
1 One detail line per customer
2 Totals by territory/country/area/market/division
3 Print options (i) (Standard) Customer YTD statistics will only be shown if customer has an order in the current month
(ii) (On Request) All customers' YTD statistics will be shown irrespective of current month

APPENDIX 4.4 (Cont.)

REPORT 53 — SALES YEAR TO DATE BY CUSTOMER (EXCLUDING HOME MARKETS)

Objective	-	Report value and profitability of sales by customer (excluding home markets)
Distribution	-	Sales management
Frequency	-	On request (- Quarterly, half yearly)
Action	-	To assess the value and profitability of customers' sales, invoiced in the current year

Format:

Market
Area
Country
Territory

Customer	YTD Turnover	GC	GC%
Territory Totals	-	-	-

Note:
1 One detail line per customer (all customers' with turnover in current year will be shown)
2 Totals by territory/country/area/market
3 Refers to export/NACO

APPENDIX 4.4 (Cont.)

REPORT HS3

HOME SALES ANALYSIS BY CUSTOMER

Objective	- Report value and profitability of sales by product for all home customers
Distribution	- Home sales management
Frequency	- Six monthly
Action	- Assess the value of invoiced sales, calculate representatives' commission

Format:

Market
Area
Country
Territory

Customer	NI	CC	B	L	YEAR TO DATE Turnover	GC	GC%
Customer Totals					-	-	-

Note: Totals by customer/territory/country/area/market (All customers' with turnover in the current year will be shown)

APPENDIX 4.4 (Cont.)

REPORT 04/04Q — ORDERS RECEIVED PRODUCT OPERATING REPORT

Objectives - To provide by product group within market orders received performance/control details. Order value reconciliation

Distribution - Relevant market managers/divisional totals to senior marketing management

Frequency - Monthly (also modified set of sub-totals at quarter ends)

Action - To study variance between actual and plan and take corrective action if necessary

Format:

Market

PG	Period	ACTUAL Value	FVC	STD	VD	EST	EST	PLAN Value	GC	GC%	VARIANCE Value	GC	GC%	Value as % Year Plan
Machine Made	MTD													
	YTD													
Dock Hose														
Offshore Oil														
Offshore Dredging														
Vacuum														
Factored														
Total														
Ancillary														
Overseas														

Note: 1 Divisional totals will be shown in the above format (with a reconciliation - see next page)
2 At quarter end additional product group totals by area/country/territory will be shown but there will be no comparison with plan (this will be Report 04Q)

APPENDIX 4.4 (Cont.)

REPORT 04/04Q CONTINUED — ORDERS RECEIVED PRODUCT OPERATING REPORT - MONTHLY RECONCILIATION SUMMARY

Format:

MARKET	GROSS VALUE	VAT	CIF	DISCOUNTS	NET VALUE	COMMISSION	STD VD
Home							
Home AC							
Export							
Export AC							
NACO							
Offshore Projects							

Note:

REPORT S4/S4Q — SALES PRODUCT OPERATING REPORT

Takes the same form as 04/04Q except turnover replaces value and GC and GC% are actuals not estimates.

Note also:

Objective - To provide by product group within market sales performance/control details

Distribution - Operational management, accounts, forecasting and planning/divisional totals to Management Committee

Frequency - Monthly (at quarter end additional totals will be produced)

Action - To study variance between actual and plan and take corrective action if necessary
To extract details for profit analysis calculations, finished goods stock reconciliation and report of operations

Note: 1 At quarter end additional product group totals by area/country/territory will be shown but there will be no comparison with plan, this will be Report S4Q. For home markets S4Q will be produced monthly

2 A column for credits is included in the monthly reconciliation summary

APPENDIX 4.4 (Cont.)

REPORT 05(S5) ORDERS (SALES)ANALYSIS BY BORE COMPARED WITH PLAN

Objective - To report at the level of detail to which the division plans, all correlation and divergence with plan. Orders (Sales) planning and forecasting/product and market development

Distribution - Market planning and forecasting personnel (sales management)

Frequency - Quarterly

Action - Analyse deviations between actual and plan. Interpret impact on division, and take action as necessary

Format:

Market Product Group	CC	B	QUARTER NI	F	Value	GC	GC%	YEAR TO DATE NI	F	Value	GC	GC%
Actual												
Plan												
% Plan												

Note:
1 Totals by product group/market and division
2 For S5 value is replaced with turnover

APPENDIX 4.4 (Cont.)

REPORT 06 (S6) ORDER (SALES)ANALYSIS BY UNIT LENGTH YEAR TO DATE

Objective - To provide a detailed analysis of products ordered (invoiced). Orders (Sales) planning and forecasting/product and market development

Distribution - Market planning and forecasting personnel (sales management)

Frequency - On request (possibly 6-monthly to coincide with management planning/reviewing activities)

Action - Analyse the detail of this report to clarify possible areas of uncertainty, produced by the regular more consolidated reports

Format:

Market
Area
Country
Territory
Product Group

CC	B	L	NI	F	Value	GC	GC%
Totals			-	-	-	-	-

Note:
1 Totals by bore/commodity code and product group for NI F Value GC and GC%
2 Totals by territory, country, area, market, division for value, GC and GC% (spurious totals if Quest package used)
3 For S6 value is replaced by turnover (and EST GC/GC% by actuals)

APPENDIX 4.4 (Cont.)

REPORT 007 — ORDERS OUTSTANDING BY PRODUCT GROUP WITHIN MARKET (COMPARED WITH PLAN)

Objective	- To report by product group/market estimated potential turnover, gross contribution(and comparison with outstanding order plan)
Distribution	- Senior marketing management, management committee and operating sales management
Frequency	- Monthly
Action	- Relate estimated potential turnover and gross contribution to current turnover (and study of the variance between actual and plan) and take corrective action if necessary

Format:

Market Product Group	Value	GC	GC%	(Plan (Value	Variance) Value)
Machine Made					
Dock Hose					
Offshore Oil					
Offshore Dredging					
Vacuum					
Factored					
Market Total at Discounted Net					

Note: A divisional total will be shown in the above format

APPENDIX 4.5 MANAGEMENT REPORTING SYSTEM - INPUTS

APPENDIX 4.5.1

DUNLOP LIMITED - OIL AND MARINE DIVISION

COMMODITY CODE TABLE

DATA TYPE	COMMODITY CODE	PROD GRP	DESCRIPTION
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
C C			
1 2	3 10	11 12	13 24

APPENDIX 4.5.2

DUNLOP LIMITED - OIL AND MARINE DIVISION

AREA / COUNTRY CODES

DATA TYPE	AREA / COUNTRY CODE	DESCRIPTION
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
A C		
1 2	3 6	7 18

APPENDIX 4.5 (Cont.)

OIL AND MARINE DIVISION - DUNLOP LIMITED - BIY/IBM INPUT DOCUMENT

APPENDIX 4.5.3

CUSTOMER FILE - ADDITION

RAISED BY: _____

DATE : _____

DATA TYPE	DIV/FILE CODE	ACCOUNT NUMBER
1	3	4 5 6 7 8 9 0 11 12 13 14 15
1	3	02
1	3	02

INPUT ON SCREEN 2

CD SQ		IND CODE	ALPHA SORT CODE	CUSTOMER NAME
16	17 18 19	20 21	22 23 24 25 26 27 28 29 30 31 32 33	34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71
1	b b b			

CD SQ	ADDRESS - LINE 1
16	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42
2	

CD SQ	ADDRESS - LINE 2
16	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
3	

CD SQ	ADDRESS - LINE 3
16	17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
4	

INPUT NOTES:

1. Ignore pre-printed Data for input to BIY File.
2. If 2 account numbers are entered to cater for separate branches, duplicate input for each number.

DATA PROCESSED - BIY _____

- IBM _____

CD SQ		AREA/ COUNTRY CODE	ASS CO	CUST CLASS	CUST SIGN	CASH SETTLE	INV INST	INPUT ON SCREEN 1 TOWN CODE	CREDIT LIMIT	STOP LIST
16	12 18 19 20 21	22 23 24 25	26	27 28	29	30 31	32	33 34 35 35		
5	X A C C F									

APPENDIX 4.5 (Cont.)

APPENDIX 4.5.4

MARKETING AND SALES REPORTING

DUNLOP LTD - OIL AND MARINE DIVISION

ORDER INTAKE DIGEST

HEADER INFORMATION

Data Type	ACCOUNT NUMBER	ORDER NUMBER	No. of Items	AREA/ COUNTRY CODE	ORDER DATE	CUSTOMER ORDER NUMBER	CUSTOMER ORDER DATE	QUANTITY SUM	ORDER DATE £ £ £ £ £ £ £ p p	VAT
6 1										
1 2	3 12	13 17	18 19	20 23	24 29	30 52	53 58	59 65	66 75	76

ORDER INFORMATION

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	Prod GRP	COMMODITY CODE	PRODUCT DESCRIPTION	BORE	UNIT LENGTH	ACK DATE	MIF UNIT	PUC	No. OF UNITS ORDERED
6 2				1									
1 2	3 12	13 17	18 19	20	21 22	23 24 27 28 30	31 38	39 43	44 48	49 51	52 54	55	56 62

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	ITEM VALUE £ £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p	Commision	PROD WEEK
6 2				2				
1 2	3 12	13 17	18 19	20	21 30	31 40	41 45	46 47

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	Prod GRP	COMMODITY CODE	PRODUCT DESCRIPTION	BORE	UNIT LENGTH	ACK DATE	MIF UNIT	PUC	No. OF UNITS ORDERED
6 2				1									
1 2	3 12	13 17	18 19	20	21 22	23 24 27 28 30	31 38	39 43	44 48	49 51	52 54	55	56 62

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	ITEM VALUE £ £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p	Commision	PROD WEEK
6 2				2				
1 2	3 12	13 17	18 19	20	21 30	31 40	41 45	46 47

APPENDIX 4.5 (Cont.)

ORDER INFORMATION

APPENDIX 4.5.5

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	Prod GRP	COMMODITY CODE	PRODUCT DESCRIPTION	BORE	UNIT LENGTH	ACK DATE	MIF UNIT	PUC	No. OF UNITS ORDERED
62				1									
1 2	3 12	13 17	18 19	20	21 22	23 24 27 28 30	31 38	39 43	44 48	49 51	52 54	55	56 62

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ p p	Commision	PROD WEEK
62				2				
1 2	3 12	13 17	18 19	20	21 30	31 40	41 45	46 48

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	Prod GRP	COMMODITY CODE	PRODUCT DESCRIPTION	BORE	UNIT LENGTH	ACK DATE	MIF UNIT	PUC	No. OF UNITS ORDERED
62				1									
1 2	3 12	13 17	18 19	20	21 22	23 24 27 28 30	31 38	39 43	44 48	49 51	52 54	55	56 62

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	SEQ	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ p p	Commision	PROD WEEK
62				2				
1 2	3 12	13 17	18 19	20	21 30	31 40	41 45	46 48

APPENDIX 4.5 (Cont.)

APPENDIX 4.5.6 DATE LEAD CARD

DT	DATE	MESSAGE
0 0		
1 2	3 4 5 6 7 8 9 10	11 12 13 14 15 16 17 18 19 20 21 22

APPENDIX 4.5.7 BATCH CONTROL RECORD

DT	BATCH No.	No.OF Trans.	BATCH QUANTITY	BATCH VALUE
5 0				
1 2	3 4 5	6 7 8	9 10 11 12 13 14 15 16	17 18 19 20 21 22 23 24 25 26

Trans. = TRANSACTIONS.

APPENDIX 4.5.8

DUNLOP LIMITED - OIL AND MARINE DIVISION

ORDER / ITEM DELETION

DATA TYPE	ACCOUNT NUMBER	ORDER NUMBER	ITEM No.
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 5			
1 2	3 12	13 17	18 19

APPENDIX 4.5 (Cont.)

APPENDIX 4.5.9

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

ORDER AMENDMENT TYPE .1.

DATA TYPE	ACCOUNT NUMBER	ORDER NUMBER	ITEM No.-	AREA/ COUNTRY CODE	ORDER DATE D D M M Y Y	CUSTOMER ORDER NUMBER	CUSTOMER ORDER DATE D D M M Y Y
72							
72							
1,2	3 ... 12	13 ... 17	18 19	20 ... 23	24 ... 25	30 ... 52	53 ... 58

APPENDIX 4.5.10

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

ORDER AMENDMENT TYPE .2.

Data Type	ACCOUNT NUMBER	ORDER NUMBER	ITEM No.	PROD GRP	COMMODITY CODE	PRODUCT DESCRIPTION	BORE	UNIT LENGTH	ACK. DATE	M'F UNIT	PUC	NUMBER OF UNITS
73												
73												
1,2	3 ... 12	13 ... 17	18 19	20 21	22 23 ... 26 27 29	30 ... 37	38 ... 42	43 ... 47	48 ... 50	51 ... 53	54	55 ... 61

APPENDIX 4.5.11

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

ORDER AMENDMENT TYPE.3.

DATA TYPE	ACCOUNT NUMBER	ORDER NUMBER	ITEM No.	ITEM VALUE £ £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p	COMMISSION	PROD. WEEK	
74								
74								
1,2	3 ... 12	13 ... 17	18 19	20 ... 29	30 ... 39	40 ... 44	45 ... 47	48

APPENDIX 4.5 (Cont.)

APPENDIX 4.5.12

MARKETING AND SALES REPORTING

DUNLOP LIMITED - OIL AND MARINE DIVISION

INVOICE AMENDMENT / ORDER AMENDMENT TYPE.4.

DATA TYPE	ACCOUNT NUMBER	INVOICE NUMBER	ITEM No.	NUMBER OF UNITS	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p
8 5						
1 2	3 12	13 17	18 19	20 26	27 36	37 46
DATA TYPE	ACCOUNT NUMBER	ORDER NUMBER	ITEM No.	NUMBER OF UNITS	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p
7 5						
1 2	3 12	13 17	18 19	20 26	27 36	37 46

APPENDIX 4.5.13

MARKETING AND SALES REPORTING

DUNLOP LIMITED - OIL AND MARINE DIVISION

CREDIT NOTE AMENDMENT / ORDER AMENDMENT TYPE.4.

DATA TYPE	ACCOUNT NUMBER	CREDIT NOTE NUMBER	ITEM No.	NUMBER OF UNITS	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p	LAST YEARS CREDIT MKR
9 5							
1 2	3 12	13 17	18 19	20 26	27 36	37 46	47
DATA TYPE	ACCOUNT NUMBER	ORDER NUMBER	ITEM No.	NUMBER OF UNITS	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ £ p p	
7 5							
1 2	3 12	13 17	18 19	20 26	27 36	37 46	

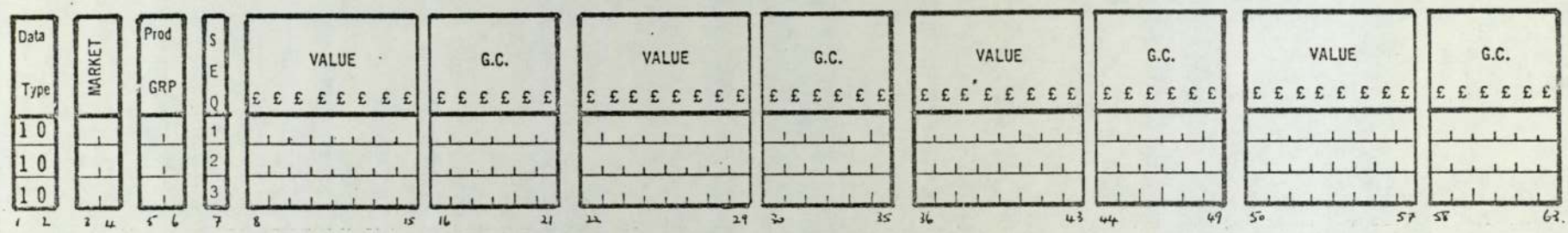
APPENDIX 4.5 (Cont.)

APPENDIX 4.5.14

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

MONTHLY PLAN FILE ORDERS

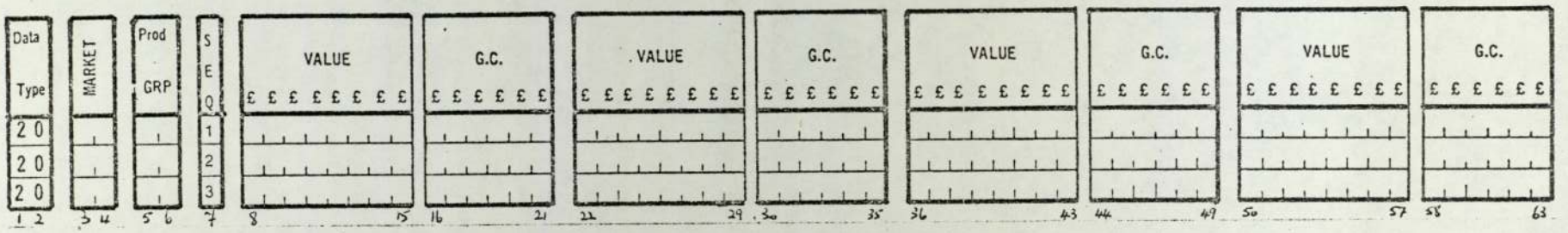


APPENDIX 4.5.15

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

MONTHLY PLAN FILE SALES



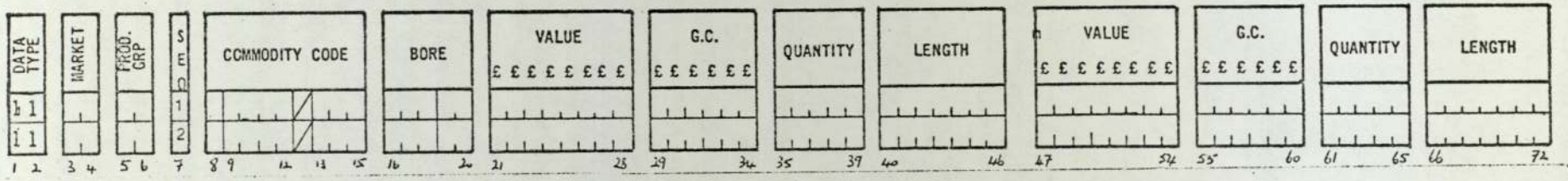
APPENDIX 4.5 (Cont.)

APPENDIX 4.5.16

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

ORDERS QUARTERLY PLAN FILE



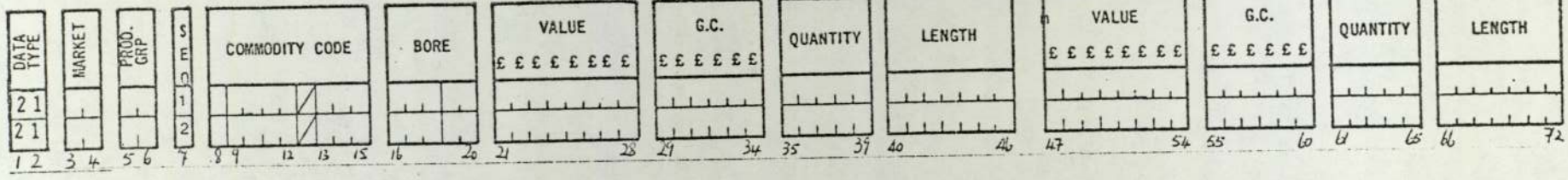
-305-

APPENDIX 4.5.17

DUNLOP LIMITED - OIL AND MARINE DIVISION

MARKETING AND SALES REPORTING

SALES QUARTERLY PLAN FILE



APPENDIX 4.5 (Cont.)

APPENDIX 4.5.18

MARKETING AND SALES REPORTING — DUNLOP LIMITED OIL AND MARINE DIVISION — INVOICE INTAKE

HEADER INFORMATION

Data Type	ACCOUNT NUMBER	ORDER NUMBER	No. of Items	AREA / COUNTRY CODE	INVOICE NUMBER	INVOICE DATE	INVOICE VALUE £ £ £ £ £ £ £ p p	QUANTITY SUM	NOMINAL LEDGER A/C CODE	VAT	RSB	LYM
81												
1 2	3 12	13 17	18 19	20 23	24 28	29 34	35 44	45 51	52 58	59	60	61

INVOICE INFORMATION

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	Prod GRP	COMMODITY CODE	BORE SIZE	UNIT LENGTH	NUMBER OF UNITS	PUC	CMKR	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ p p
02												
82												
1 2	3 12	13 17	18 19	20 21	22 23 26 27 29	30 34	35 39	40 46	47	48	49 58	59 65

MARKETING AND SALES REPORTING — DUNLOP LIMITED - OIL AND MARINE DIVISION — CREDIT NOTE INTAKE

APPENDIX 4.5.19

HEADER INFORMATION

Data Type	ACCOUNT NUMBER	ORDER NUMBER	No. of Items	AREA / COUNTRY CODE	CREDIT NOTE NUMBER	CREDIT NOTE DATE	CREDIT NOTE VALUE £ £ £ £ £ £ £ p p	QUANTITY SUM	NOMINAL LEDGER A/C CODE	VAT	RSB	LYM
91												
1 2	3 12	13 17	18 19	20 23	24 28	29 34	35 44	45 51	52 58	59	60	61

CREDIT INFORMATION

Data Type	ACCOUNT NUMBER	ORDER NUMBER	Item No.	Prod GRP	COMMODITY CODE	BORE SIZE	UNIT LENGTH	NUMBER OF UNITS	PUC	CMKR	ITEM VALUE £ £ £ £ £ £ £ p p	F.V.C. £ £ £ £ £ £ £ p p
92												
	13 17		18 19	20 21	22 23 26 27 29	30 34	35 39	40 46	47	48	49 58	59 68

APPENDIX 4.5 (Cont.)

DUNLOP LTD - OIL AND MARINE DIVISION

APPENDIX 4.5.20

MARKETING/SALES REPORTING - SYSTEM PARAMETER RECORDS

CNTRL	DATE (D D M M Y Y)	PROGRAM NUMBERS REQUIRED (1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30)
1 2 3 4 5	6 7 8 9 10 11	12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41

PROGRAM NO.	Y Y M M D D	REPORT I.D.	PROGRAM
PARAM 01	M-IDATE NG	S3	-QUEST
PARAM 02	M-IDATE NG	HS3	-QUEST
PARAM 03	M-IDATE NG	06	-QUEST
PARAM 04	M-IDATE NG	S6	-QUEST
PARAM 05		QQFPRINT	-QUEST

PROGRAM NO	WEEK NO. Y W W	PARAMETERS	REPORT I.D.	PROGRAM
PARAM 10			S2WM	-KAP03

PROGRAM NO	MONTH NO. M M	OPTION	PARAMETERS	REPORT I.D.	PROGRAM
PARAM 15				03	-KAP04

PROGRAM NO	MONTH NO. M M	PARAMETERS	REPORT I.D.	PROGRAM
PARAM 16			04	-KAP07
PARAM 17			S4	-KAP09
PARAM 18			S4M	-KAP11
PARAM 19			007	-KAP12

PROGRAM NO.	QUARTER NO. Q Q	PARAMETERS	REPORT I.D.	PROGRAM
PARAM 21			04Q	-KAP08
PARAM 22			S4Q	-KAP10
PARAM 23			05	-KAP05
PARAM 24			S5	-KAP06

1 2 3 4 5	6 7	8 9	10	11 12 13 14 15	16 17 18 19 20	21 22 23 24 25 26 27 28 29 30	31 32 33 34 35	36 37 38 39 40	41	42 43 44 45 46 47 48 49 50	51 52 53 54 55 56

APPENDIX 4.6 COMMODITY CODE LIST

Commodity Code	Product Group	Commodity Description
1820/	11	Adm Gasoline
1875/A	11	Av Ref
1875/B	11	Av Ref
1875/C	11	Av Ref
1875/C	11	Av Re/Def
1877/1	12	Tanker Clean
1877/2	12	Tanker Clean
1877/3	12	Tanker Clean
1879/	13	L.P.G.
1880/	11	Av Re/Def
1881/	11	Av Re/Def
1882/	11	LW Av Ref
1882/C	11	LW AV Ref
1883/	11	Av Re/Def
4001/	39	Testing
4002/	39	Refurbishing
4003/	39	Design/Devel
4004/	39	O/O Scrap
5100/S	32	LWSF Special
5100/1	32	LWSF. Tail
5100/1S	32	LWSF. Tail
5100/2	32	LWSF. Bar
5100/2S	32	LWSF. Bar
5100/3	32	LWSF. Bar
5100/3S	32	LWSF. Bar
5100/4	32	LWSF. Bar.Sp
5100/4S	32	LWSF. Bar.Sp
5100/5	32	LWSF. Bar.Sp
5100/5S	32	LWSF. Bar.Sp
5100/9	32	LWSF. Taper
5100/9S	32	LWSF. Taper
5101/1	33	LW.Sub
5101/1S	33	LW.Sub
5101/9	33	LW.Sub Taper
5101/9S	33	LW.Sub Taper
5102/1	41	SF.MS.H
5102/1S	41	SF.MS.H
5102/3	41	1/2SFMSHSSBE
5102/3S	41	1/2SFMSHSSBE
5102/4	41	1/2SFMSH.TR
5102/4S	41	1/2SFMSH.TR
5102/5	41	SS.SF.MSH
5102/5S	41	SS.SF.MSH-SF

APPENDIX 4.6 (Cont.)

Commodity Code	Product Group	Commodity Description
5103/1	42	Sub MSH
5103/1S	42	Sub MSH
5103/2	42	SS Sub MSH
5103/2S	42	SS Sub MSH
5103/6	42	Sub MSH.LC
5103/6S	42	Sub MSH.LC
5103/7	42	SS.Sub MSHLC
5103/7S	42	SS.Sub MSHLC
5118/	21	Ropeflote
5119/	21	Chainflote
5121/1	22	NEFTE Oil 50
5121/1S	22	NEFTE Oil 50
5121/2	22	NEFTE Oil 52
5121/2S	22	NEFTE Oil 52
5122/1	23	NEFTE A/C 51
5122/1S	23	NEFTE P/C 51
5122/2	23	NEFTE P/C 53
5122/2S	23	NEFTE P/C 53
5124/	23	P/C SB
5124/M	23	P/C SB
5124/S	23	P/C SB
5128/S	22	Dock
5128/1	22	LD.DH.SB
5128/1S	22	LD.DH.SB
5128/10	22	Mud Suction
5128/10S	22	Mud Suction
5128/11	22	Fish Suction
5128/111	22	Fish Suction
5128/112	22	Fish Suction
5128/113	22	Fish Suction
5128/12	22	Barge Load
5128/12S	22	Barge Load
5128/2	22	LD.DH.SB
5128/2M	22	LD.DH.SB
5128/2S	22	LD.DH.SB
5128/3	22	LD.DH.SB
5128/3S	22	LD.DH.SB
5128/4	22	DL.H.SB
5128/4S	22	DL.H.SB
5128/5	22	DL.H.RB
5128/5S	22	DL.H.RB
5128/6	22	HD.DLH.SB
5128/6S	22	HD.DLH.SB
5128/7	22	HD.DLH.RB
5128/7S	22	HD.DLH.RB

APPENDIX 4.6

Commodity Code	Product Group	Commodity Description
5128/8	22	EHD.DLH.SB
5128/8M	22	EHD.DLH.SB
5128/8S	22	EHD.DLH.SB
5128/9	22	EHD.DLH.RB
5128/9S	22	EHD.DLH.RB
5129/1	22	DLH.RB
5129/1S	22	DLH.RB
5129/2	22	DLH.RB
5129/2S	22	DLH.RB
5130/1	22	LW.Oil Disch
5130/1S	22	LW.Oil Disch
5130/2	22	LW.Oil Disch
5130/2S	22	LW.Oil Disch
5131/1	31	CBM.Sub. SB20
5131/1S	31	CBM.SUB. SB20
5131/2	31	CBM.SUB. RB20
5131/2S	31	CBM.SUB. RB20
5131/2S	31	CBM.SUB. SB25
5131/3S	31	CBM.SUB. SB25
5131/4	31	CBM.SUB. RB25
5131/4S	31	CBM.SUB. RB25
5132/	22	L.P.G.
5132/S	22	L.P.G.
5133/	22	Bitumen
5133/S	22	Bitumen
5133/1	22	Bitumen
5133/1S	22	Bitumen
5134/	61	Ancillary
5134/B	61	Beads
5134/BF	61	Blind Flange
5134/BPL	61	Ballast Flat
5134/BV	61	Butterfly V
5134/CAM	61	Camlocks
5134/CH	61	Chains
5134/CL	61	Clamps
5134/FY	61	Fltg Y Piece
5134/GAS	61	Gaskets
5134/HS	61	Hinge Sets
5134/MIS	61	Misc.
5134/PUA	61	Pick Up Ass
5134/PUB	61	Pick Up Bucy
5134/RED	61	C. Reducers
5134/RK	61	Repair Kit
5134/SB	61	Spreader Bar
5134/SBN	61	Stud Bolt N
5134/SP	61	Spool Pieces

APPENDIX 4.6 (Cont.)

Commodity Code	Product Group	Commodity Description
5134/TB	61	Tie Bolts
5134/WL	61	Winker Light
5140/	24	Adm. AB
5141/	24	Adm. AST
5142/	24	Probe Hose
5144/	24	Mod. Mexe
5145/	24	Dracone-H
5150/4	33	Salm. Sub. 1ST
5150/4S	33	Salm. Sub. 1ST
5150/5	33	Salm. Sub. 2nd
5150/5S	33	Salm. Sub. 2nd
5151/1	32	Beadflote
5151/1S	32	Beadflote
5152/1	33	Sub.H.
5152/1S	33	Sub.H.
5152/2	33	SS. Sub.H.
5152/2S	33	SS. Sub.H.
5152/3	33	Sub.H. SSBE
5152/3S	33	Sub.H. SSBE
5152/6	33	Sub.H.LC
5152/6S	33	Sub.H.LC
5152/7	33	SS.Sub.H.LC
5152/7S	33	SS.Sub.H.LC
5152/8	33	Sub.H.SSBELC
5152/8S	33	Sub.H.SSBELC
5153/1	32	LWSF.DIS 15
5153/1S	32	LWSF.DIS 15
5153/2S	32	LWSF.DIS 20
5154/1	34	ML.Safe
5154/1S	34	ML.Safe
5154/11	34	LW.SafeTail
5154/11S	34	LW.SafeTail
5154/2	34	SS.Safe
5154/2S	34	SS.Safe
5154/3	34	SF H SS BEWC
5154/3S	34	SF H SS BEWC
5154/9	34	Safe Taper
5154/9S	34	Safe Taper
5155/3	32	SF Special
5155/1	32	ML.SF
5155/1S	32	ML.SF
5155/10	32	ML 1/2 SF
5155/10S	32	ML 1/2 SF
5155/2	32	SS 1/2 SF
5155/2S	32	SS 1/2 SF

APPENDIX 4.6 (Cont.)

Commodity Code	Product Group	Commodity Description
5155/3	32	SFH.SS.BE
5155/3S	32	SFH.SS.BE
5155/4	32	SS PART SF 1
5155/4S	32	SS PART SF 1
5156/S	33	Sub Special
5156/1	33	Sub.H.WC
5156/1S	33	Sub.H.WC
5156/2	33	SS.Sub.H.WC
5156/2S	33	SS.Sub.H.WC
5156/3	33	Sub.H.SSBEWC
5156/3S	33	Sub.H.SSGEWC
5156/6	33	Sub.H.LCWC
5156/6S	33	Sub.H.LCWC
5156/7	33	SS Sub. HLCNC
5156/7S	33	SS Sub. HLCNC
5156/8	33	SUBHSSBELCWC
5156/8S	33	SUBHSSBELCWC
5157/1	32	ML.SF
5157/1S	32	ML.SF
5157/10	32	1/2SF.W.LC
5157/2	32	SS.1/2.SFWC
5157/2S	32	SS.1/2.SFWC
5157/3	32	SF.H.SS BEWC
5157/3S	32	SF.H.SS BEWC
5157/4	32	SF-H
5157/4S	32	SF-H
5157/6	32	ML.SF
5158/1	22	WC.Disch
5158/1S	22	WC.Disch
5158/2	22	WC.CSD
5158/2S	22	WC.CSD
5158/3	22	WC
5158/3S	22	WC
5158/4	22	WC. Sub Disch
5158/4S	22	WC.Sub Disch
5158/5	22	WCD (FS)
5158/5S	22	WCD (FS)
5158/6	23	WCD (PIC)
5158/6S	23	WCD (PIC)
5160/1	25	Oxygen Lance
5160/1S	25	Oxygen Lance
5160/2	25	Oxygen Lance
5160/2S	25	Oxygen Lance
5160/3	25	Oxygen Lance
5160/3S	25	Oxygen Lance

APPENDIX 4.6 (Cont.)

Commodity Code	Product Group	Commodity Description
5161/1	25	Water Cool
5161/1S	25	Water Cool
5161/2	25	Water Cool
5161/2S	25	Water Cool
5161/3	25	Water Cool
5161/3SS	25	Water Cool
5170/S	43	ML. D-F.S
5170/1	43	ML. D-F
5170/1S	43	ML. D-F
5170/2	43	SS. D-F
5170/2S	43	SS. D-F
5170/3	43	D-F SS.BE
5170/3S	43	D-F SS.BE
5171/	26	D-Sleeves
5171/S	26	D-Sleeves
5172/	26	Sand Suction
5172/S	26	Sand Suction
5173/	26	Sand Disch
5173/S	26	Sand Disch
5174/1	44	Sub.D-H
5174/1S	44	Sub.D-H
5174/2	44	SS.Sub.D-H
5174/2S	44	SS.Sub.D-H
5180/A	27	Rotary
5180/B	27	Rotary
5180/C	27	Rotary
5180/D	27	Rotary
5181/A	27	Vibrator
5181/B	27	Vibrator
5181/C	27	Vibrator
5181/D	27	Vibrator
5182/	27	Jetting
5182/S	27	Jetting
5183/	28	Long LTM. OSD
5183/S	28	Long LTM. OSD
5184/	28	Roof Tank DR
5184/S	28	Roof Tank DR
5184/1	28	Roof Tank DR
5184/1S	28	Roof Tank DR
5184/2	28	Roof Tank DR
5184/2S	28	Roof Tank DR

APPENDIX 4.6 (Cont.)

Commodity Code	Product Group	Commodity Description
5185/	28	Barge Disch
5185/S	28	Barge Disch
5187/	22	LL.LW.BH.S/D
5331/	52	VAC-IND
5400/2	62	EJ-PIR
5400/2S	62	EJ-PIR
5400/3	63	Booms-PIR
5400/3S	63	Booms-PIR
5400/4	64	Fenders-PIR
5400/4S	64	Fenders-PIR
5400/5	65	Factored H
5400/5S	65	Factored H
5400/6	66	FAC-Sleeves
5440/	29	Dunlop EJ
5440/S	29	Dunlop EJ
5542/	53	Oxygen BT
5753/2	32	LWSF.DIS 20
6001/	49	Test-Dr
6002/	49	Refurr.-Dr
6003/	49	Design/DE DR
6004/	49	DR-Scrap
P5100/1	32	LWPSF. Tail
P5100/1S	32	LWPSF. Tail
P5100/2	32	LWPSF. Bar
P5100/2S	32	LWPSF. Bar
P5100/3	32	LWPSF. Bar
P5100/3S	32	LWPSF. Bar
P5153/1	32	LWPSF Dis 15
P5153/1S	32	LWPSF Dis 15
P5153/2	32	LWPSF.Dis 20
P5153/2S	32	LWPSF Dis 20
P5154/1	34	MLP Safe
P5154/1S	34	MLP Safe
P5154/11	34	LW.Safe Tail
P5154/11S	34	LW.Safe Tail
P5154/2	34	SSP. Safe
P5154/2S	34	SSP. Safe
P5154/3	34	PSFH SS BEWC
P5154/3S	34	PSFH SS BEWC
P5154/9	34	Safe Taper
P5154/9S	34	Safe Taper
P 5155/1	32	MLP. SF
P5155/1S	32	MLP. SF
P5155/2	32	SSP 1/2 SF
P5155/2S	32	SSP 1/2 SF

APPENDIX 4.6 (Cont.)

Commodity Code	Product Group	Commodity Description
P5157/1	32	MLP.SF
P5157/1S	32	MLP.SF
P5157/2	32	SSP 1/2 SFWC
P5157/2S	32	SSP 1/2 SFWC
P5157/3	32	PSFH.SS BEWC
P5157/3S	32	PSFH.SS BEWC
25330/152	51	Vac-Dom
25330/345	51	Vac-Dom
25330/90	51	Vac-Dom
12205/	61	Gacoil
90910/	90	Export VAT
90912/	90	Home VAT
90960/	90	Home Packing
90965/	90	Home Carr
90980/	90	Export CIF

APPENDIX 4.7 AREA/COUNTRY CODE LIST

	Area Code	Country Code	Country Description
EEC	01	01	Belgium
	01	02	Denmark
	01	03	France
	01	04	Germany
	01	05	Holland
	01	06	Italy
	01	07	Luxembourg
	01	08	Greenland
EFTA	02	01	Austria
	02	02	Finland
	02	03	Norway
	02	04	Portugal
	02	05	Sweden
	02	06	Switzerland
N. MEDITERRANEAN	03	01	Albania
	03	02	Balearic Is.
	03	03	Cyprus
	03	04	Gibraltar
	03	05	Greece
	03	06	Ibiza
	03	07	Israel
	03	08	Malta
	03	09	Minorca
	03	10	Spain
	03	11	Turkey
E. EUROPEAN BLOCK	04	01	Bulgaria
	04	02	Czechoslovac
	04	03	East Germany
	04	04	Hungary
	04	05	Poland
	04	06	Rumania
	04	07	Russia
	04	08	Yugoslavia
NEAR EAST	05	01	Algeria
	05	02	Libya
	05	03	Morocco
	05	04	Tunisia
	05	05	U.A.R.

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
AFRICA	06	01	Angola
	06	02	Botswana
	06	03	
	06	04	Cameroon
	06	05	C. Africa Rep.
	06	06	Chad
	06	07	Congo
	06	08	Dahomey
	06	09	Equat. Guinea
	06	10	Ethiopia
	06	11	Afars Issas
	06	12	
	06	13	The Bambia
	06	14	Ghana
	06	15	Guinea
	06	16	Ivory Coast
	06	17	Kenya
	06	18	Lesotho
	06	20	Madagascar
	06	21	Malawi
	06	22	Mali
	06	23	Mauritania
	06	24	Mosambique
	06	25	Namibia
	06	26	Niger
	06	27	Nigeria
	06	28	Port. Guinea
	06	29	Rhodesia
	06	30	Rwanda
	06	31	Senegal
	06	32	Sierra Leone
	06	33	Somalia
	06	34	South Africa
	06	35	Span. Sahara
	06	36	Sudan
	06	37	Swaziland
	06	38	Tanzania
	06	39	Togo
	06	40	Uganda
	06	41	Upper Volta
	06	42	Zaire
	06	43	Zambia

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
MIDDLE EAST	07	01	Abu Dhabi
	07	02	Ajman
	07	03	Al Fujayrah
	07	04	Bahrain
	07	05	Dubaj
	07	06	Iran
	07	07	Iraq
	07	08	Jordan
	07	09	Kuwait
	07	10	Lebanon
	07	11	Oman
	07	12	Qatar
	07	13	R. El Khaymah
	07	14	Saudi Arabia
	07	15	Sharjah
	07	16	Syria
	07	17	Ummal Bawayn
	07	18	Yemen
	07	19	S. Yemen
INDIAN GROUP	08	01	Afghanistan
	08	02	Bangladesh
	08	03	Brutan
	08	04	Burma
	08	05	India
	08	06	Nepal
	08	07	Pakistan
	08	08	Sri Lanka
FAR EAST	09	01	Borneo
	09	02	Brunei
	09	03	Hong Kong
	09	04	Indonesia
	09	05	Malaysia
	09	06	Moluccas
	09	07	New Guinea
	09	08	Philippines
	09	09	Singapore
	09	10	Sulawesi
	09	11	Taiwan
	09	12	Thailand
	09	13	Tjmur

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
CHINA	10	01	China
JAPAN	11	01	Japan
CHINESE SATELLITES	12	01	Cambodia
	12	02	North Korea
	12	03	South Korea
	12	04	Laos
	12	07	Tibet
	12	08	N. Vietnam
	12	09	S. Vietnam
AUSTRALASIA	13	01	Australia
	13	02	New Zealand
S. AMERICA	14	01	Argentina
	14	02	Bolivia
	14	03	Brazil
	14	04	Chile
	14	05	Colombia
	14	06	Ecuador
	14	07	Fr. Guiana
	14	08	Guyana
	14	09	Paraguay
	14	10	Peru
	14	11	Surjnam
	14	12	Uruguay
	14	13	Venezuela
CENTRAL AMERICA	15	01	Belize
	15	02	Costa Rica
	15	03	El Salvador
	15	04	Honduras
	15	05	Nicaragua
	15	06	Panama
	15	07	Quatemala

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
CARIBBEAN	16	07	Anguilla
	16	08	Antigua
	16	09	Aruba
	16	12	Bahamas
	16	14	Barbados
	16	15	Barbuda
	16	18	Bermuda
	16	33	Cuba
	16	35	Curacao
	16	37	Dominica
	16	38	Dominican Rep.
	16	46	Grenada
	16	49	Haiti
	16	52	Jamaica
	16	58	Martinique
	16	66	Puerto Rico
	16	74	St. Kitts
	16	75	St. Lucia
	16	76	St. Martins
	16	77	St. Vincent
	16	83	Trinidad
	16	84	Tobago
MEXICO	17	01	Mexico
USA	18	01	USA
CANADA	19	01	Canada
NORTH SEA	20	01	North Sea
ATLANTIC ISLANDS	21	01	Annobon
	21	02	Ascension
	21	03	Azores
	21	04	Bonvey I
	21	05	Canaries
	21	06	Cape Verde I
	21	07	Falkland I
	21	08	Faroes

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
ATLANTIC ISLANDS (Cont.)	21	09	Gough I
	21	10	Graham I
	21	11	Iceland
	21	12	Madeira
	21	13	Rockhall
	21	14	St. Helena
	21	15	S. Pauls Rock
	21	16	S. Pierre Mir
	21	17	Sao Tome
	21	18	S. Georgia
	21	19	S. Orkneys
	21	20	S. Sandwich
	21	21	S. Shetlands
	21	22	Staten I
	21	23	T. Da Cunha
INDIAN ISLANDS	22	01	Ageleba
	22	02	Aldabra
	22	03	Amjranie I
	22	04	Amsterdam I
	22	05	Andaman I
	22	06	Brit. Ind. Ter.
	22	07	Comuro
	22	08	Crozet I
	22	09	Farquhar
	22	10	Keard I
	22	11	Kerguelen I
	22	12	Laccadive I
	22	13	Maldive I
	22	14	Manion I
	22	15	Mauritius
	22	16	Nicobar I
	22	17	Pr. Edward I
	22	18	Providence
	22	19	Reunion
	22	20	Rodriguez
	22	21	St Pauls I
	22	22	Seychelles
	22	23	Socotra
	22	24	Tromelin

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
PACIFIC ISLANDS	23	01	Aleutia I
	23	02	Caroline I
	23	03	Clipperton I
	23	04	Cook I
	23	05	Easter I
	23	06	Ellice I
	23	07	Fiji
	23	08	Galapagos
	23	09	Gilbert I
	23	10	Guam
	23	11	Guadeloupe I
	23	12	Hawaiian I
	23	13	J Fernandez
	23	14	Kermadee
	23	15	Marianas
	23	16	Maquesas
	23	17	Marshall I
	23	18	Midway I
	23	19	Nauru
	23	20	N. Britain
	23	21	N. Caledonia
	23	22	N. Hebrides
	23	23	N. Ireland
	23	24	Norfolk I
	23	25	Ocean I
	23	26	Palau I
	23	27	Phoenix I
	23	28	Pitcairn I
	23	29	Sala Y Grome
	23	30	Samoa
	23	31	W. Samoa
	23	32	Society I
	23	33	Tonga
	23	34	Truk
	23	35	Tuamoto
N. AMERICAN ASSOCIATED	80	01	USA /AINO
	80	02	Canada /AIOR

APPENDIX 4.7 (Cont.)

	Area Code	Country Code	Country Description
HOME AREAS	91	01	UK-Rep. 1
	91	02	UK-NS-Rep. 1
	92	01	UK-Rep. 2
	92	02	UK-NS-Rep. 2
	93	01	UK-Rep. 3
	93	02	UK-NS-Rep. 3
	94	01	UK-House
	95	02	UK-BR Sector

APPENDIX 4.8 'OLD' AREA/COUNTRY CODES

Code	Name
AREA 01	
0100	Malta
0101	U.A.R.
0102	Libya
0103	Bahrain
0104	Australia & Tasmania
0105	New Zealand
0106	Kuwait
0107	Qatar
0108	Trucial States
0109	Indian Ocean Islands
0110	India
0111	East Pakistan
0112	West Pakistan
0113	Singapore
0114	Malaysia (Sabah & Sarawak)
0115	Ceylon
0116	Brunei
0117	Hong Kong
0118	Syria
0119	Lebanon
0120	Jordan
0121	Saudi Arabia
0122	Yemen
0123	Muscat & Oman
0124	Iraq
0125	Afghanistan
0127	Burma
0128	Thailand
0129	South Vietnam
0130	North Vietnam
0131	Laos
0132	Cambodia
0133	Indonesia
0134	China
0135	Taiwan
0136	North Korea
0137	South Korea
0138	Japan
0139	Philippines
0140	Other Pacific Islands
0141	Iran
0142	Portuguese Timor
0143	Macao
0144	Maldive Islands
0145	Western Samoa
0146	New Caledonia
0147	Ryukyu Islands
0148	Nepal
0149	Bhutan
0150	Fiji
AREA 02	
0200	Gambia
0201	Sierra Leone
0202	Ghana
0203	Nigeria
0204	Tanzania
0205	Kenya
0206	Uganda
0207	Mauritius
0209	Burundi
0210	Afars & Issas
0214	Congo Republic
0215	Dem. Rep. of Congo
0216	Central African Rep.
0219	Senegal
0220	Mali
0221	Guinea
0222	Liberia
0223	West Cameroon
0225	Domali Rep.
0226	Sudan
0228	Southern Yemen
0229	Canada
0230	Bermuda
0231	Bahamas

Note: First two digits = Area
Last two digits = Country

APPENDIX 4.8 (Cont.)

Code	Name
0232	Jamaica
0235	Barbados
0236	Trinidad & Tobago
0238	British Honduras
0239	Guyana
0243	U.S.A.
0244	Puerto Rico
0245	Cuba
0246	Haiti
0247	Dominican Rep.
0248	Mexico
0249	Guatemala
0250	Honduras Rep.
0251	El Salvador
0252	Nicaragua
0253	Costa Rics
0254	Colombia
0255	Panama
0256	Venezuela
0257	Ecuador
0258	Peru
0259	Chile
0260	Brazil
0261	Uruguay
0262	Bolivia
0266	Rhodesia
0267	Malawi
0268	Zambia
0269	Mozambique
0270	South Africa
0271	Algeria
0272	Tunisia
0273	Morocco
0275	Lesotho
0276	Botswana
0277	Swaziland
0278	British Vrigins
0279	Falkland Isles
0280	U.S. Virgins
0281	Surinam
0282	French Guiana
0283	Mauritania
0284	Ivory Coast
0285	Upper Volta
0286	Dahomey
0287	Togo
0288	Niger
0289	Chad
0290	Angola
0291	Portuguese Guinea
0292	Spanish Morocco
0293	Spanish Sahara
0294	Malagasy Rep.
0295	Reunion
0296	Comoro
0297	Cameron

AREA 03

0300	Gibraltar
0301	Cyprus
0302	U.S.S.R.
0303	Finland
0304	Sweden
0305	Norway (Spitzbergen)
0306	Iceland
0308	Poland
0309	German Fed. Rep.
0310	German Dem. Rep.
0311	Netherlands
0313	France
0317	Italy
0318	Austria
0319	Hungary
0320	Czechoslovakia
0321	Yugoslavia
0322	Albania
0323	Greece
0324	Bulgaria
0325	Rumania
0326	Turkey

APPENDIX 4.8 (Cont.)

Code	Name
0330	Israel
0331	Andorra
0332	Faroes
0333	Spain
0334	Liechtenstein
0335	Portugal
0336	Denmark (Greenland)
0337	Switzerland
0338	Belgium
0339	Luxembourg
0340	Azores & Madeira

AREA 04

Code	Name
0400	Antigua
0401	Nevis
0402	Monserrat
0403	Dominica
0404	Grenada
0405	St. Lucia
0406	St. Vincent
0407	Turks Island
0408	Caicos Island
0409	Cayman Island
0410	Bonaire
0411	St. Martin
0412	St. Kitts
0413	St. Estatius
0414	Saba
0415	Aruba
0416	Curacao
0417	Guadaloupe
0418	Newfoundland
0419	Anguilla
0420	St. Pierre & Mequelon
0421	Martinique
0422	San Tome
0423	Fernando Po
0424	Rwanda
0425	Spanish Guinea
0426	Ascension
0427	St. Helena
0428	Cape Verde Isles
0429	British Antartic Territory
0430	Gabon
0431	Canaries
0432	British Indian Ocean Territory
0433	Seychelles

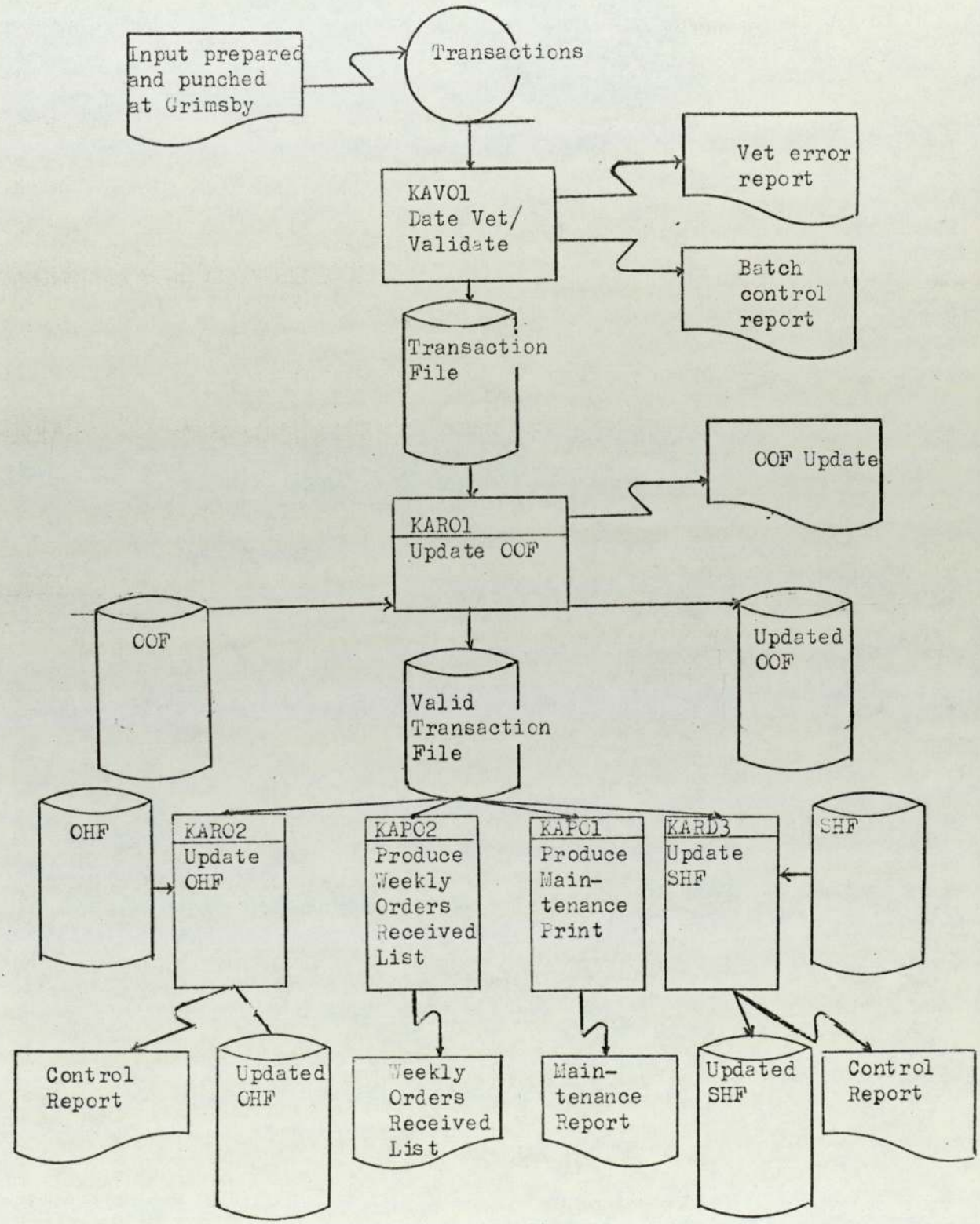
APPENDIX 4.8 (Cont.)

AREA 05

Code	Company	Country
0500	Dunlop Australia Ltd	Australia
0501	Dunlop Brazil S.A.	Brazil
0502	Dunlop Canada Ltd	Canada
0503	George Angus (Canada) Ltd	Canada
0504	Dunlop S.A.	France
0505	Angus Guniard S.A.	France
0506	Eau et Fru	France
0507	Deutsche Dunlop Gummi Cie A.C.	German Fed. Rep.
0508	Dunlop India Ltd	India
0509	George Angus (India) Ltd	India
0510	Jayshree Angus Sales Co Ltd	India
0511	Dunlop Japan Ltd	Japan
0512	Dunlop New Zealand	New Zealand
0513	Dunlop Rhodesia Ltd	Rhodesia
0514	George Angus (Rhodesia - Private)	Rhodesia
0515	Dunlop South Africa Ltd	South Africa
0516	Dunlop Industrial Products Ltd	South Africa
0517	George Angus & Co. South Africa Ltd	South Africa
0518	Dunlop Tyre and Rubber Corp.	U.S.A.
0519	Angus Incorporated	U.S.A.
0520	Dunlop Malaysian Industries Berhad	Malaysia
0521	Dunlop Iberica S.A.	Spain
0522	Dunlop Zambia	Zambia
0523	Dunlop East Africa Ltd	Kenya
0524	Dunlop Penumatic Tyre Co (S.A.) Ltd	Argentine
0525	Dunlop Belgium Ltd	Belgium
0526	Angus Guinard (Belgique) S.A.	Belgium
0527	Dunlop Ceylon Ltd	Ceylon
0528	Dunlop Hong Kong Ltd	Hong Kong
0529	The Dunlop Company A/S	Denmark
0530	The Dunlop Company Ltd	Netherlands
0531	P.T. Dunlop Indonesia	Indonesia
0532	Pakistan Tyre & Rubber Co Ltd	Pakistan
0533	Neumaticos Dunlop S.A.	Peru
0534	Sociedade Commercial Garland Laidley	Portugal
0535	Dunlop Thailand Ltd	Thailand
0536	Svenska Dunlop AB	Sweden
0537	Angus Reddanay Co A/B	Sweden
0538	Dunlop (Suisse) SA	Switzerland
0539	Dunlop Nigeria Industries (Sales) Ltd	Nigeria
0540	Societe Italiana Dunlop	Italy
0541	Angus SPA	Italy
0542	Oy F. Reddaway A.B.	Finland
0543	Angus Shippers Account	-

APPENDIX 4.9 MANAGEMENT REPORTING SYSTEM - SCHEMATIC

WEEKLY UPDATE OF MASTER FILES

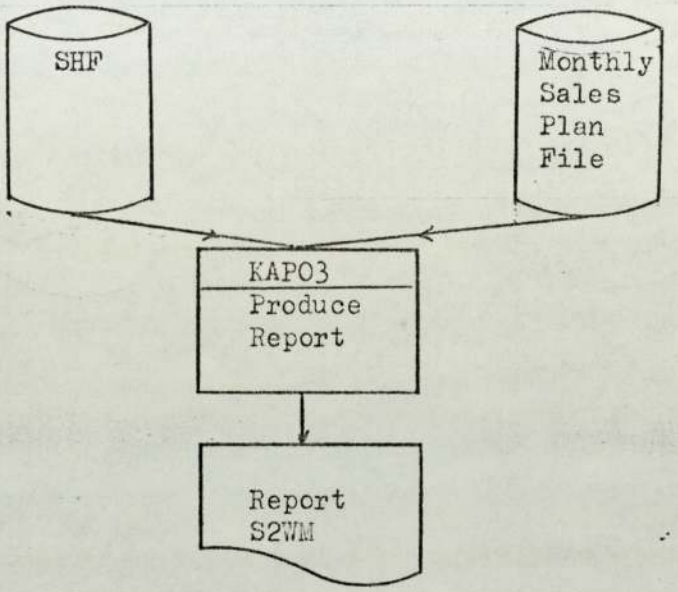


Cont'd

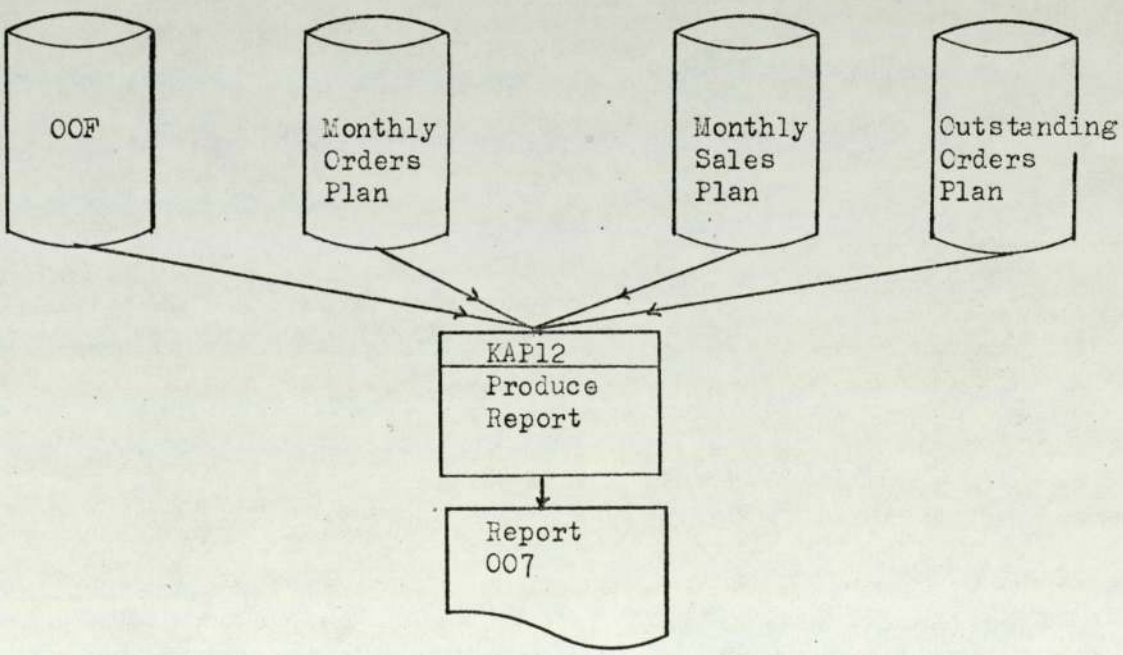
APPENDIX 4.9 (Cont.)

PRODUCTION OF REPORTS

1. WEEKLY



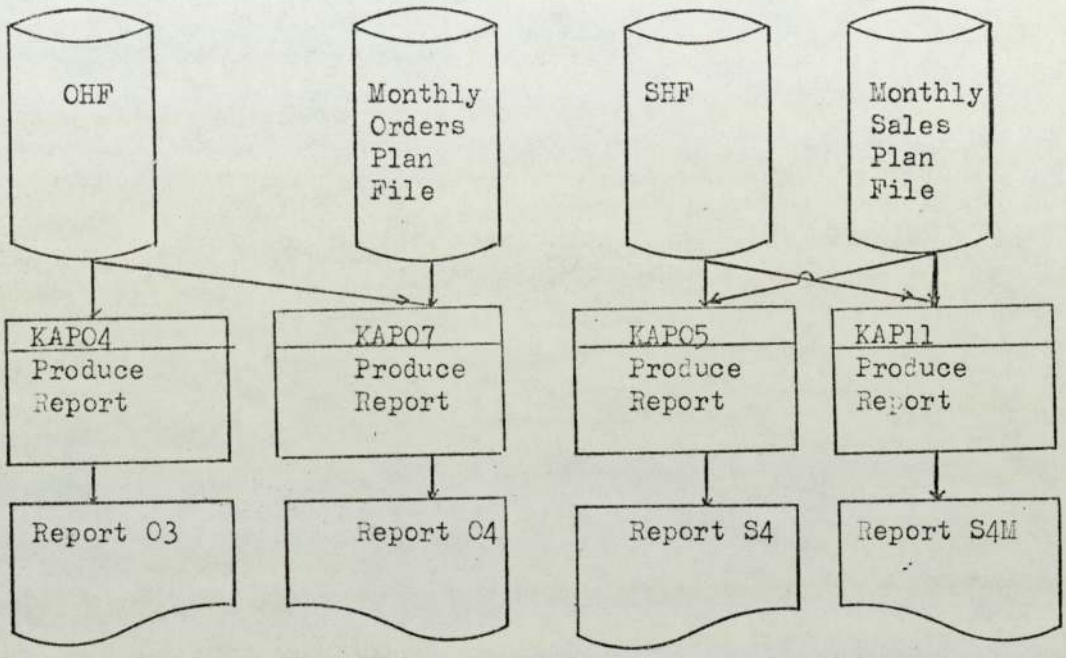
2. MONTHLY USING OUTSTANDING ORDERS FILE



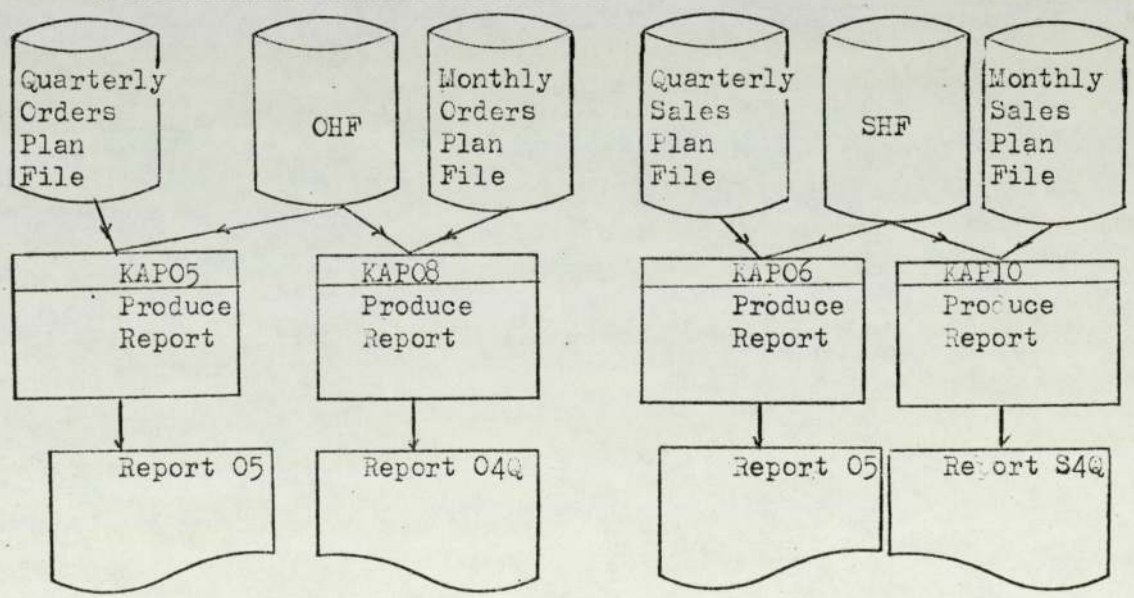
Cont'd

APPENDIX 4.9 (Cont.)

3. PRODUCTION OF MONTHLY REPORTS

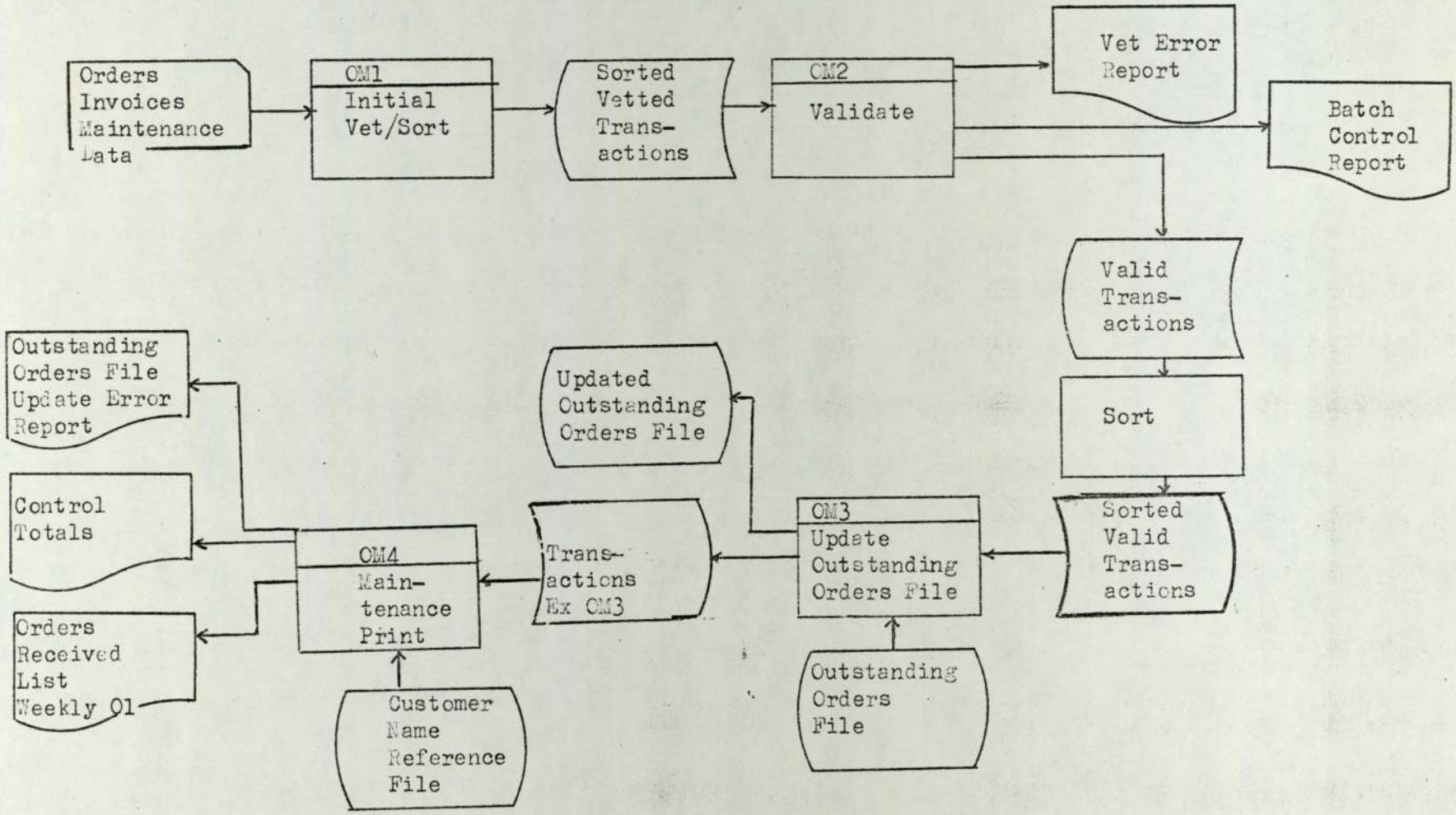


4. PRODUCTION OF QUARTERLY REPORTS



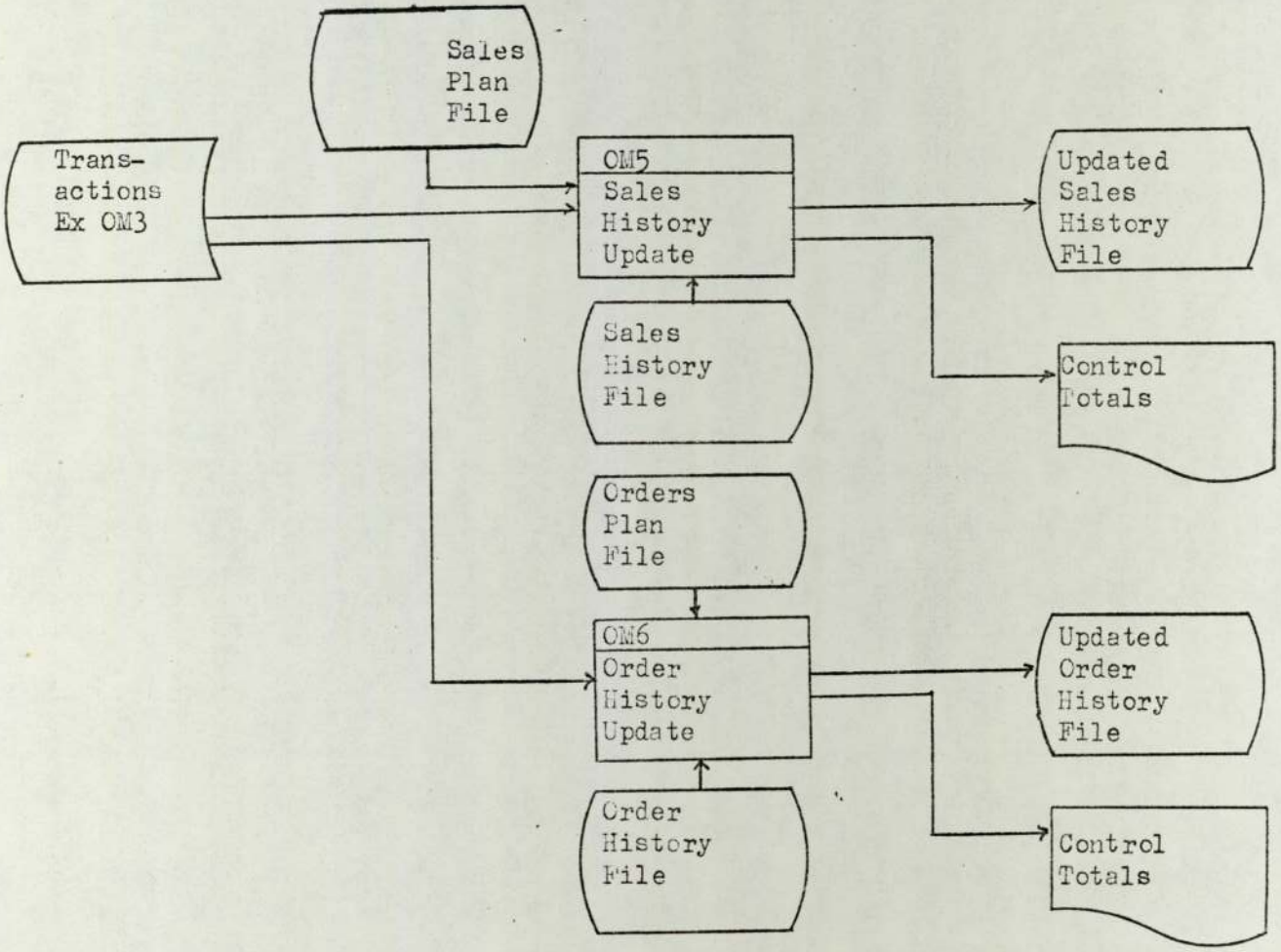
APPENDIX 4.9 (Cont.)

MAINTENANCE SUITE - WEEKLY UPDATE (PLUS REPORT 01)

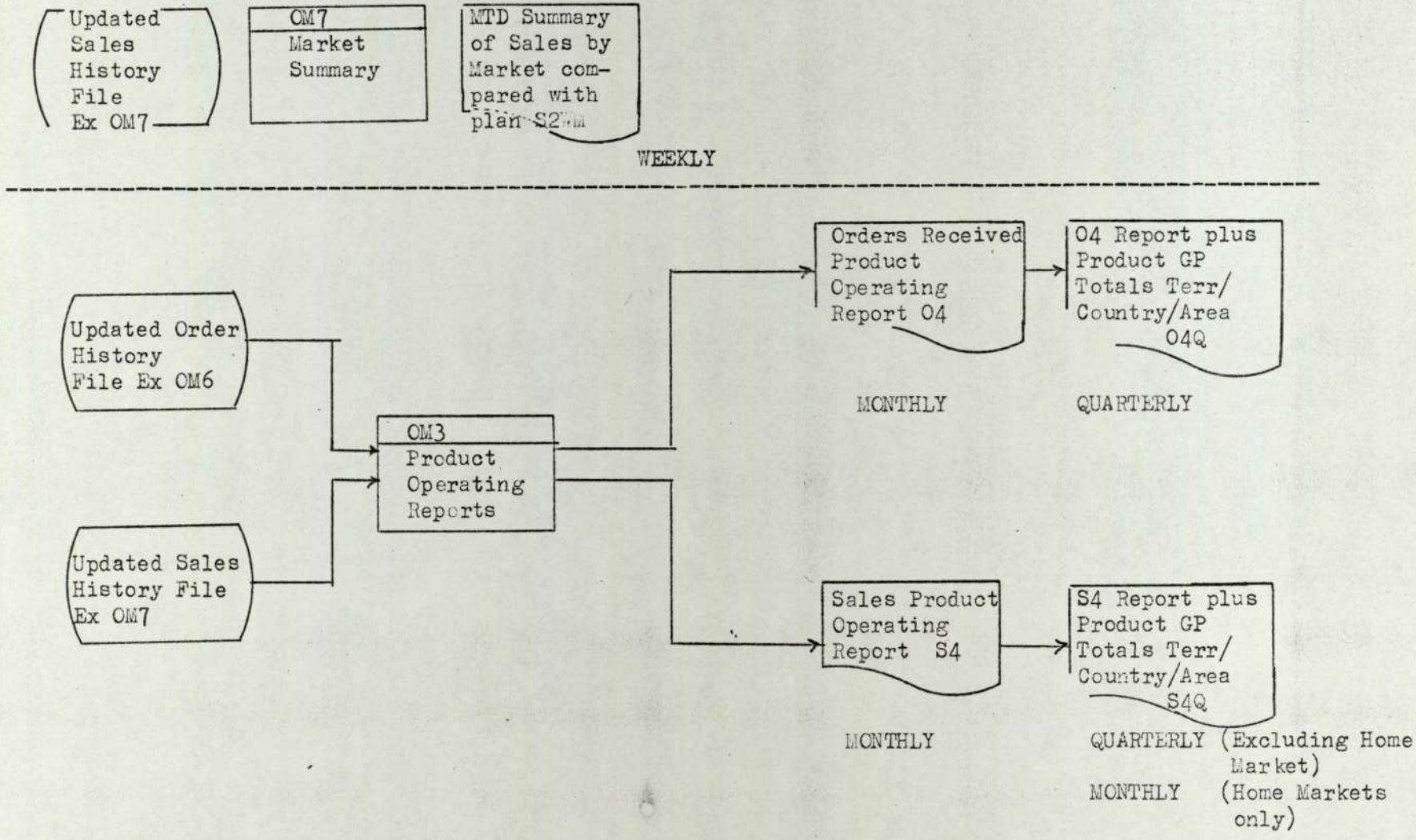


APPENDIX 4.9 (Cont.)

MAINTENANCE SUITE - WEEKLY UPDATE (Cont.)

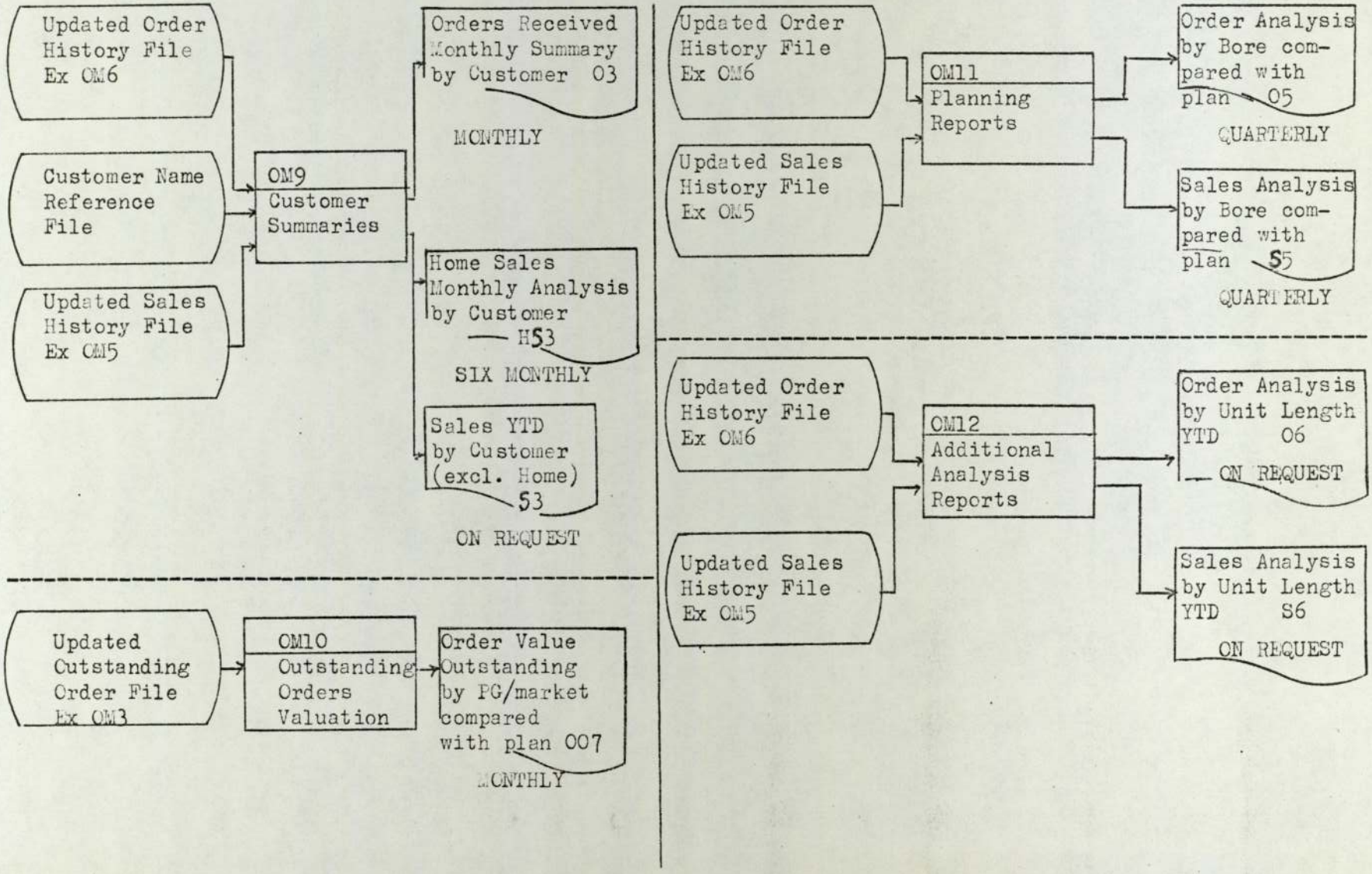


APPENDIX 4.9 (Cont.) REPORTING SUITE (REPORTS S2WM, 04, Q49, S4 and S4Q)



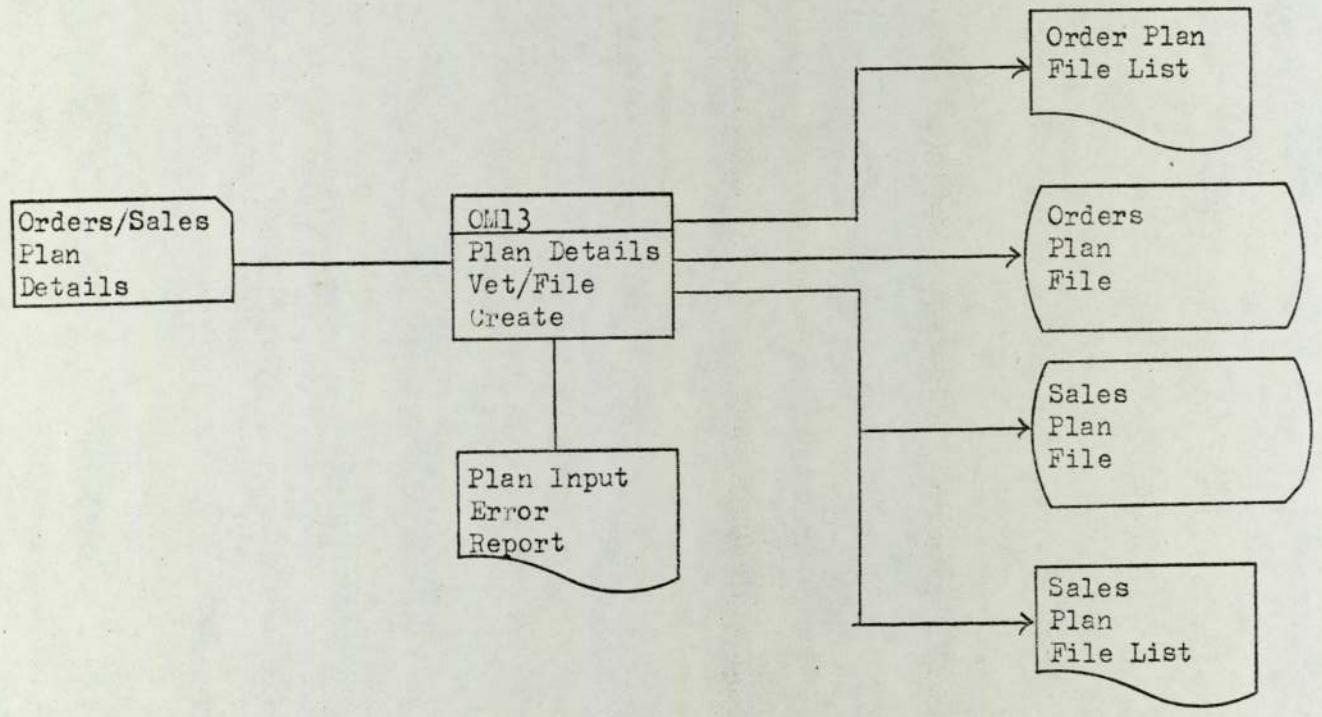
APPENDIX 4.9 (Cont.)

REPORTING SUITE (REPORTS 03, H53, 53, 007, 05, 55, 06 and 56)



APPENDIX 4.9 (Cont.)

MAINTENANCE SUITE - PLAN FILE CREATION YEARLY



APPENDIX 4.10

MARKETING/SALES REPORT DISTRIBUTION

Users	F	Marketing Sales Reports													
		01	S2WM	03	H53	53	04	04Q	S4	S4Q	05	35	06	S6	007
Senior Management: Divisional Director, Divisional Marketing Manager and Management Committee	W M Q R	X	X	X			X	X	X	X					X
Operating Sales Management: Product Manager, Home Sales Manager, Export Sales Manager, (London & European Managers/Salesman) and Accounts	W M Q R	X	X	X	X	X	X	X	X	X X					X
Forecasting & Planning Users: Product Manager, Market Planning Manager, Market Planning Department and the Author	W M Q R	X	X				X	X	X	X	X	X	X	X	

KEY F - Frequency
W - Weekly
M - Monthly
Q - Quarterly
R - On Request

NOTE: Master copies of all reports are to be kept (a statistics library) for reference (so that users can consult any reports, not usually distributed to them, as required).

APPENDIX 4.11 REPORT SPECIMEN - HISTORICAL ANALYSIS SYSTEM
PRODUCT ANALYSIS SUMMARY (ALL YEARS).

QUEST 08/12/76 GRIMSBY SALES BY MARKET PAGE 142

YEAR	QTR	COMM CODE	BORE BXI	HOME DIRECT	HOME A/C	EXPORT DIRECT	EXPORT A/C	EXPORT EUROPE	PROJECTS	AMERICA	TOTAL QUANTITY
1	2	1879/	2.	0	0	0	0	4	0	0	4
1		1879/	2.	0	0	0	0	4	0	0	4
2	1	1879/	2.	0	0	0	0	2	0	0	2
2	3	1879/	2.	1	0	0	0	0	0	0	1
2	4	1879/	2.	0	0	15	0	0	0	0	15
2		1879/	2.	1	0	15	0	2	0	0	18
3	2	1879/	2.	0	0	59	0	0	0	0	59
3	3	1879/	2.	0	0	6	0	1	0	0	7
3	4	1879/	2.	0	0	0	0	2	0	0	2
3		1879/	2.	0	0	65	0	3	0	0	68
4	1	1879/	2.	1	0	0	0	0	0	5	6
4	2	1879/	2.	0	0	6	0	16	0	0	22
4	3	1879/	2.	6	0	0	0	0	0	2	8
4	4	1879/	2.	1	0	0	4	0	0	1	6
4		1879/	2.	8	0	6	4	16	0	8	42
5	1	1879/	2.	4	0	1	0	15	0	1	21
5	2	1879/	2.	0	0	7	0	2	0	0	9
5	3	1879/	2.	3	0	5	0	0	0	0	8
5	4	1879/	2.	3	0	2	0	0	0	0	5
5		1879/	2.	10	0	15	0	17	0	1	43
		1879/	2.	19	0	101	4	42	0	9	175

APPENDIX 4.11 (Cont.)

QUEST 08/12/76 GRIMSBY SALES BY MARKET PAGE 440

YE	QTR	COMM CODE	BORE	BMI	HOME DIRECT	HOME A/C	EXPORT DIRECT	EXPORT A/C	EXPORT EUROPE	PROJECTS	AMERICA	TOTAL QUANTITY
0	3	5128/7	3.		1	0	7	0	0	0	0	8
0		5128/7	3.		1	0	7	0	0	0	0	8
1	1	5128/7	3.		0	0	3	0	0	0	0	3
1	3	5128/7	3.		0	0	8	0	0	0	0	8
1		5128/7	3.		0	0	11	0	0	0	0	11
2	1	5128/7	3.		0	0	3	0	0	0	0	3
2	3	5128/7	3.		0	0	4	1	0	0	0	5
2		5128/7	3.		0	0	7	1	0	0	0	8
3	1	5128/7	3.		0	0	18	0	0	0	0	18
3	3	5128/7	3.		0	0	4	0	0	0	0	4
3	4	5128/7	3.		0	0	2	3	0	0	0	5
3		5128/7	3.		0	0	24	3	0	0	0	27
4	1	5128/7	3.		0	0	8	8	0	0	0	16
4	2	5128/7	3.		0	0	4	0	0	0	0	4
4	3	5128/7	3.		0	0	8	0	0	0	0	8
4	4	5128/7	3.		0	0	4	0	0	0	0	4
4		5128/7	3.		0	0	24	8	0	0	0	32
5	1	5128/7	3.		0	0	7	0	0	0	0	7
5		5128/7	3.		0	0	7	0	0	0	0	7
		5128/7	3.		1	0	80	12	0	0	0	93

APPENDIX 4.12 REPORT SPECIMENS – THE MANAGEMENT REPORTING SYSTEM

REPORT 01 — OIL AND MARINE DIVISION - DUNLOP LTD — PAGE 1
PROGRAM KAPO2 — WEEKLY ORDERS RECEIVED LIST — WEEK ENDING 29/07/78FINAL 7830
RUN DATE 28/07/78

MARKET - HOME

CUSTOMER	ACCOUNT NO	COUNTRY	ORDER NO.	IT NO	COMMODITY CODE	DESCRIPTION	BORE	UNIT LENGTH	QUANTITY	GROSS VALUE	ESTIMATED G.C.	EST. G.C. %	C.I.F.
AREA - U.K.-REP 1													
BOOTS CO LTD	0106801005	UK-REP 1	70037	01	5440	DUNLOP EJ	8.00		1	122.00	119.62	99.04	
				97	90912	HOME VAT				9.52			
				98	90960	HOME PACKING				0.00			
				99	90965	HOME CARR				0.00			
										131.52			
						COUNTRY TOTAL				131.52			
						AREA TOTAL				131.52			
AREA - U.K.-REP 2													
SMIDTH F.L.	0155311005	UK-REP 2	50711	01	5128/8	END.DLH.SB	12.00	6.50	1	620.00	228.35	37.20	
				97	90912	HOME VAT				48.36			
				99	90965	HOME CARR				0.00			
										668.36			
						COUNTRY TOTAL				668.36			
						AREA TOTAL				668.36			
AREA - U.K.-REP 3													
ROSS CHEMICA	0150501003	UK-REP 3	50725	01	5128/4	DL.H.SB	8.00	30.00	2	1588.00	791.45	50.34	
				97	90912	HOME VAT				123.86			
				98	90960	HOME PACKING				0.00			
				99	90965	HOME CARR				0.00			
										1711.86			
						COUNTRY TOTAL				1711.86			
						AREA TOTAL				1711.86			
AREA - U.K.-HOUSE													
BRIDON FIBRE	0110101007	UK-HOUSE	50719	01	5118/3	SLUTE TAP.RF	5.00	3.50	104	4202.64	2114.52	50.82	
				02	5118/3	SLUTE TAP.RF	6.00	3.50	16	658.08	314.05	48.20	
				97	90912	HOME VAT				379.14			
				99	90965	HOME CARR				0.00			
										5239.86			
MOD	0138902007	UK-HOUSE	70042	01	1820	ADM GASOLINE	3.00	60.00	0	2907.00	-967.89		

APPENDIX 4.12 (Cont.)

REPORT S2WM — OIL AND MARINE DIVISION - DUNLOP LTD — RUN DATE 28/11/78

PROGRAM KAP03P

MONTH TO DATE SUMMARY OF SALES BY MARKET COMPARED WITH PLAN

WEEK ENDING 25/11/78 — WEEK NO 4 OF MONTH NOV

MARKET	PERIOD	ACTUAL NET T/O £	ACTUAL FVC £	ACTUAL STD VD £	ACTUAL EST GC £	ACTUAL GC%	PLAN NET T/O £	PLAN EST GC £	PLAN GC%	VARIANCE % NET T/O £	VARIANCE EST GC £	VARIANCE EST GC%	T/O AS % OF % YR PLAN	T/O AS % OF % YR PLAN
HOME	WEEK	108298.55	56583.18	1039.22	50676.15	47								
	MTD	188098.36	108974.32	1804.99	77319.05	41	305000	99000	32	-116901.64	-21680.95	+19	62	5.53
HOME AC	WEEK	1307.64	669.03	12.16	626.45	48								
	MTD	4360.63	2338.49	40.56	1981.58	45	5000	2000	40	-639.37	-18.42	+3	87	7.27
EXPORT	WEEK	363669.13	257582.91	3857.12	102229.10	28								
	MTD	738170.72	495243.57	7029.13	235898.02	32	894000	304000	34	-155829.28	-68901.98	+44	83	7.86
EXPORT AC	WEEK	9414.14	9708.71	98.85	-393.42	-4								
	MTD	17452.78	14943.13	183.26	2326.39	13	58000	21000	36	-40547.22	-18673.61	+46	30	2.71
OE	WEEK	14282.00	12132.59	151.47	1997.94	14								
	MTD	14282.00	12132.59	151.47	1997.94	14	297000	108000	36	-282718.00	-106002.06	+37	5	0.43
NACO	WEEK	0.00	0.00	0.00	0.00	0								
	MTD	8759.68	9622.28	91.99	-954.59	-11	46000	3000	7	-37240.32	-3954.59	+11	19	1.72
DIVISION TOTAL	WEEK	496971.46	336676.42	5158.82	155136.22	31								
	MTD	971124.17	643254.38	10101.40	317768.39	33	1605000	537000	33	-633875.83	-219231.61	+35	61	5.61
CREDITS	WEEK	12011.08	0.00	127.07	-11884.01	99								
	MTD	12966.77	55.24	137.18	-12774.35	99								
	YTD	154900.02	90320.15	1636.86	-62943.01	41								
PREV YEARS CREDITS	YTD	0.00	0.00	0.00	0.00	0								
ANCILLARY	WEEK	29300.81	21019.24	308.64	7972.93	27								
	MTD	73983.70	62210.23	772.71	11000.76	15								
OVERSEAS PRODUCTION	WEEK	0.00	0.00	0.00	0.00	0								
	MTD	501.38	361.66	5.26	135.12	512								

MONTHLY RECONCILIATION	GROSS T/O£	VAT £	CIF/CAR £	PACKING £	DISCOUNT £	CREDITS £	NET T/O £	STD.V.D. £	FVC £
WEEK	501883.06	10530.29	15940.92	0.00	4911.60	12011.08	496971.46	5158.82	336676.42
MTD	980624.66	21671.17	19587.38	48.00	9500.49	12966.77	971124.17	10101.40	643254.38
YTD	10748699.47	252988.27	421880.02	368.00	100019.53	154900.02	10648679.94	110325.18	7106574.55

YTD SELLING DAYS 208 — DAYS OF YEARS PLAN 93 %

*** END OF REPORT ***

APPENDIX 4.12 (Cont.)

REPORT 03 — OIL AND MARINE DIVISION - DUNLOP LTD — PAGE 16
PROGRAM KAP04P
RUN DATE 12/01/79 — ORDERS RECEIVED MONTHLY SUMMARY BY CUSTOMER — MONTH ENDING 30/12/78 OPTION 2

MARKET 04-EXPORT AC

AREA	COUNTRY	CUSTOMER NAME	CUSTOMER ACCOUNT NO	MONTH NET VALUE £ (FOB)	MONTH CIF £	MONTH EST GC £	MONTH EST GC%	YEAR TO DATE NET VALUE £ (FOB)	YEAR TO DATE EST GC £	YEAR TO DATE EST GC%
E.E.C	FRANCE	PROTECMO PTM	0497500009	0.00	0.00	0.00	0.00	14220.02	5963.57	41.94
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	14220.02	5963.57	41.94
	HOLLAND	PROTECMO PTM	0497500009	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	0.00	0.00	0.00
	AREA TOTALS			0.00	0.00	0.00	0.00	14220.02	5963.57	41.94
N.MED.	SPAIN	DLP IBERICA	0497003005	0.00	0.00	0.00	0.00	165297.21	70336.97	42.55
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	165297.21	70336.97	42.55
	AREA TOTALS			0.00	0.00	0.00	0.00	165297.21	70336.97	42.55
AFRICA	KENYA	DLP KENYA	0497010000	0.00	0.00	0.00	0.00	1536.01	717.12	46.69
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	1536.01	717.12	46.69
	AREA TOTALS			0.00	0.00	0.00	0.00	1536.01	717.12	46.69
FAR EAST	HONG KONG	DP HONG KONG	0497002003	1073.00	0.00	410.69	38.27	4535.50	1671.13	36.85
		COUNTRY TOTALS		1073.00	0.00	410.69	38.27	4535.50	1671.13	36.85
	INDONESIA	DP SINGAPORE	0497007003	0.00	0.00	0.00	0.00	27396.00	6954.07	25.38
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	27396.00	6954.07	25.38
	MALAYSIA	DLP MALAYSIA	0497005009	478.00	0.00	106.40	22.26	5627.40	1899.03	33.75
		COUNTRY TOTALS		478.00	0.00	106.40	22.26	5627.40	1899.03	33.75
	SINGAPORE	DP SINGAPORE	0497007003	208.00	0.00	72.55	34.88	216687.31	76548.50	35.33
		DUNLOP GRIMS	0498600002	0.00	0.00	0.00	0.00	0.01	0.01	100.00
		COUNTRY TOTALS		208.00	0.00	72.55	34.88	216687.32	76548.51	35.33
	THAILAND	DLP THAILAND	0497003005	0.00	0.00	0.00	0.00	224.00	65.74	38.28
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	224.00	65.74	38.28
	AREA TOTALS			1759.00	0.00	589.64	33.52	254470.22	87158.48	34.25
AUSTRALASIA	NEW ZEALAND	VICTORY ENGG	0498500000	0.00	0.00	0.00	0.00	2441.61	2415.96	98.95
		COUNTRY TOTALS		0.00	0.00	0.00	0.00	2441.61	2415.96	98.95

APPENDIX 4.12 (Cont.)

REPORT 04
PROGRAM KAP07P
RUN DATE 28/11/78

OIL AND MARINE DIVISION — DUNLOP LTD — PAGE 2

ORDERS RECEIVED PRODUCT OPERATING REPORT — MONTH ENDING 25/11/78

MARKET 02-HOME AC

PRODUCT GROUP	PERIOD	ACTUAL NET VALUE £	ACTUAL FVC £	ACTUAL STD VD £	ACTUAL EST GC £	ACTUAL GCX	PLAN NET VALE	PLAN EST GCX	PLAN EST GCX	VARIANCE NET VALUE £	VARIANCE EST GCX	VARIANCE EST GCX	VALUE AS % VR PLAN
MACHINE MADE	MONTH	0.00	0.00	0.00	0.00					+0.00	+0.00		
	YTD	0.00	0.00	0.00	0.00					+0.00	+0.00		
DOCK HOSE	MONTH	0.00	0.00	0.00	0.00					+0.00	+0.00		
	YTD	11550.00	11430.19	107.42	12.39					+11550.00	+12.39	+0	
OFF SHORE OIL	MONTH	0.00	0.00	0.00	0.00					+0.00	+0.00		
	YTD	0.00	0.00	0.00	0.00					+0.00	+0.00		
OFF SHORE DREDGING	MONTH	0.00	0.00	0.00	0.00					+0.00	+0.00		
	YTD	0.00	0.00	0.00	0.00					+0.00	+0.00		
VACUUM	MONTH	0.00	0.00	0.00	0.00		5000	2000	40	-5000.00	-2000.00	+40	0.00
	YTD	220023.00	116059.27	2046.22	101917.51	46	55000	22000	40	+165023.00	+79917.51	+48	366.71
FACTORED	MONTH	0.00	0.00	0.00	0.00					+0.00	+0.00		
	YTD	0.00	0.00	0.00	0.00					+0.00	+0.00		
MARKET TOTAL	MONTH	0.00	0.00	0.00	0.00		5000	2000	40	-5000.00	-2000.00	+40	0.00
	YTD	231573.00	127489.46	2153.64	101929.90	44	55000	22000	40	+176573.00	+79929.90	+45	388.96
ANCILLARY	MONTH	0.00	0.00	0.00	0.00								
	YTD	0.00	0.00	0.00	0.00								
OVERSEAS PRODUCTION	MONTH	0.00	0.00	0.00	0.00								
	YTD	0.00	0.00	0.00	0.00								

MONTHLY RECONCILIATION	GROSS VALUE £	VAT £	CIF/CAR £	PACKING £	DISCOUNTS	NET VALUE £	COMMISSIONS	STD.V.D.£
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

APPENDIX 4.12 (Cont.)

REPORT S4
PROGRAM KAP09P
RUN DATE 12/01/79.

OIL AND MARINE DIVISION - DUNLOP LTD

PAGE 3

SALES PRODUCT OPERATING REPORT

MARKET 03-EXPORT

MONTH ENDING 30/12/78

PRODUCT GROUP	PERIOD	ACTUAL NET T/O £	ACTUAL FVC £	ACTUAL STD VD £	ACTUAL EST GC £	ACTUAL GC%	PLAN NET VAL	PLAN EST GC£	PLAN EST GC%	VARIANCE NET T/O £	VARIANCE EST GC£	VARIANCE EST GC%	NET T/O AS % OF YR PLAN
MACHINE MADE	MONTH	372.24	395.66	3.95	-27.37	-7	18000	5000	28	-17627.76	-5027.37	+29	0.18
	YTD	49267.91	38583.98	522.61	10161.32	21	202000	55000	27	-152732.09	-44838.68	+29	24.39
DOCK HOSE	MONTH	79279.65	54261.08	840.88	24177.69	30	82000	27000	33	-2720.35	-2822.31	+104	8.76
	YTD	696431.13	505746.93	7386.62	183297.58	26	905000	294000	32	-208568.87	-110702.42	+53	76.95
OFF SHORE OIL	MONTH	463563.38	283344.46	4916.59	175302.33	38	642000	244000	38	-178436.62	-68697.67	+38	6.55
	YTD	5577676.60	3631630.37	59157.34	1886888.89	34	7079000	2677000	38	-1501323.40	-790111.11	+53	78.79
OFF SHORE DREDGING	MONTH	43472.89	29357.08	693.49	13422.32	31	16000	4000	25	+27472.89	+9422.32	+34	24.70
	YTD	429325.77	317117.90	4553.46	107654.41	25	176000	44000	25	+253325.77	+63654.41	+25	243.94
VACUUM	MONTH	0.00	0.00	0.00	0.00					+0.00	+0.00		
	YTD	0.00	0.00	0.00	0.00					+0.00	+0.00		
FACTORED	MONTH	10824.90	6305.07	114.82	4405.01	41	95000	10000	11	-84175.10	-5594.99	+7	1.05
	YTD	458658.65	394503.07	4864.67	59290.91	13	1034000	120000	12	-575341.35	-60709.09	+11	44.36
MARKET TOTAL	MONTH	597513.06	373663.35	6569.73	217279.98	36	853000	290000	34	-255486.94	-72720.02	+28	6.36
	YTD	7211360.06	4887582.25	76484.70	2247293.11	31	9396000	3190000	34	-2184639.94	-942706.89	+43	76.75
CREDITS PREV.YR.CR	MONTH	-40980.05	-19483.64	-667.05	-20829.36	51							
	YTD	0.00	0.00	0.00	0.00								
ANCILLARY	MONTH	10824.90	6305.07	114.82	4405.01	41							
	YTD	321363.40	271032.06	3408.49	46922.85	15							
OVERSEAS PRODUCTION	MONTH	0.00	0.00	0.00	0.00								
	YTD	112251.52	98933.21	1190.56	12127.75	11							

MONTHLY RECONCILIATION	GROSS T/O£	VAT £	CIF/CAR £	PACKING £	DISCOUNT£	CREDITS £	NET T/O £	STD.V.D.£
MONTH	603548.57	790.69	15999.41	0.00	6035.51	-40980.05	597513.06	6569.73
YEAR	7284202.25	26538.33	279168.18	0.00	72842.19	-143996.97	7211360.06	76484.70

APPENDIX 4.12 (Cont.)

REPORT 040 — OIL AND MARINE DIVISION — DUNLOP LTD — PAGE 119
PROGRAM KAP08P
RUN DATE 16/01/79 — ORDERS RECEIVED PRODUCT OPERATING REPORT — QUARTER ENDING 30/12/78

MARKET 04-EXPORT AC
AREA 09-FAR EAST
COUNTRY 09-SINGAPORE

PRODUCT GROUP	PERIOD	ACTUAL NET VALUE £	FVC £	STD VD £	EST GC £	GC%
MACHINE MADE	QTR	0.00	0.00	0.00	0.00	
	YTD	80.00	34.89	0.84	44.27	55
DOCK HOSE	QTR	6728.00	5373.57	70.64	1283.79	19
	YTD	34142.00	26164.20	358.51	7619.29	22
OFF SHORE OIL	QTR	5742.00	4060.00	80.29	1681.71	29
	YTD	148714.00	99874.28	1561.50	47278.22	32
OFF SHORE DREDGING	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
VACUUM	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
FACTORED	QTR	0.00	0.00	0.00	0.00	
	YTD	15520.80	11790.20	162.97	3567.63	23
COUNTRY TOTAL	QTR	12470.00	9373.57	130.93	2965.50	24
	YTD	198456.80	137863.57	2083.82	58509.41	29
ANCILLARY	QTR	0.00	0.00	0.00	0.00	
	YTD	15520.80	11790.20	162.97	3567.63	23
OVERSEAS PRODUCTION	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	

APPENDIX 4.12 (Cont.)

REPORT S49
PROGRAM KAPIOP
RUN DATE 06/10/78

OIL AND MARINE DIVISION - DUNLOP LTD

SALES PRODUCT OPERATING REPORT

QUARTER ENDING 30/09/78

MARKET 03-EXPORT
AREA 04-E.E.B.
COUNTRY 07-RUSSIA

PRODUCT GROUP	PERIOD	ACTUAL NET T/O £	PVC £	STD VD £	EST CC £	CC%
MACHINE MADE	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
DUCK HOSE	QTR	0.00	0.00	0.00	0.00	
	YTD	21200.85	20282.30	224.86	693.69	3
OFF SHORE OIL	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
OFF SHORE DREDGING	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
VACUUM	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
FACTORED	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
COUNTRY TOTAL	QTR	0.00	0.00	0.00	0.00	
	YTD	21200.85	20282.30	224.86	693.69	3
CREDITS PREV.YR.CR	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
ANCILLARY	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	
OVERSEAS PRODUCTION	QTR	0.00	0.00	0.00	0.00	
	YTD	0.00	0.00	0.00	0.00	

APPENDIX 4.12 (Cont.)

REPORT 05
PROGRAM KAP05P
RUN DATE 16/01/79

OIL AND MARINE DIVISION - DUNLOP LTD

PAGE 14

ORDERS ANALYSIS BY SCRE COMPARED WITH PLAN

QUARTER ENDING 30/12/78

MARKET 01-HOME

	COMM.CODE	BORE	QUARTER QTY	QUARTER FOOTAGE	QUARTER NET VALUE £	QUARTER EST GC £	QUARTER GC%	YEAR TO DATE QTY	YEAR TO DATE FOOTAGE	YEAR TO DATE NET VALUE £	YEAR TO DATE EST GC £	YEAR TO DATE GC%
ACTUAL	5122/2	6.00	5	100.00	2252.25	901.14	40	5	100.00	2252.25	901.14	40
PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
VARIANCE			5	100.00	2252.25	901.14	40	5	100.00	2252.25	901.14	40
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5124	3.00	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
PLAN			2	32.00	1199.00	438.00	37	5	125.00	1799.00	658.00	37
VARIANCE			-2	-32.00	-1199.00	-438.00	37	-5	-125.00	-1799.00	-658.00	37
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5124	4.00	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
PLAN			4	94.00	1679.00	614.00	37	13	375.00	3716.00	1357.00	37
VARIANCE			-4	-94.00	-1679.00	-614.00	37	-13	-375.00	-3716.00	-1357.00	37
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5124	6.00	2	60.00	764.28	256.95	34	9	210.00	2765.07	700.62	25
PLAN			2	50.00	1522.00	727.00	48	8	200.00	3088.00	1297.00	42
VARIANCE			0	10.00	-757.72	-470.05	62	1	10.00	-322.93	-596.38	185
% PLAN			100	120.00	50.22	35.34	70	113	105.00	89.54	54.02	60
ACTUAL	5124	8.00	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
PLAN			0	0.00	0.00	0.00	0	2	50.00	684.00	250.00	37
VARIANCE			0	0.00	0.00	0.00	0	-2	-50.00	-684.00	-250.00	37
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0

APPENDIX 4.12 (Cont.)

REPORT S5
PROGRAM KAP06P
RUN DATE 16/01/79

OIL AND MARINE DIVISION - DUNLOP LTD

PAGE 11

SALES ANALYSIS BY BORE COMPARED WITH PLAN

QUARTER ENDING 30/12/78

MARKET 01-HOME

	COMM.CODE	BORE	QUARTER QTY	QUARTER FOOTAGE	QUARTER NET T/O £	QUARTER EST GC £	QUARTER GC%	YEAR TO DATE QTY	YEAR TO DATE FOOTAGE	YEAR TO DATE NET T/O £	YEAR TO DATE EST GC £	YEAR TO DATE GC%
ACTUAL	5118	10.00	0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
PLAN			13	125.00	3038.00	1510.00	50	50	500.00	10650.00	5426.00	51
VARIANCE			-13	-125.00	-3038.00	-1510.00	50	-50	-500.00	-10650.00	-5426.00	51
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5118	12.00	0	0.00	0.00	0.00	0	13	76.00	1417.69	602.02	42
PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
VARIANCE			0	0.00	0.00	0.00	0	13	76.00	1417.69	602.02	42
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5118	14.00	0	0.00	0.00	0.00	0	1	4.50	0.01	0.01	100
PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
VARIANCE			0	0.00	0.00	0.00	0	1	4.50	0.01	0.01	100
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5118/1	6.00	0	0.00	0.00	0.00	0	46	460.00	3583.01	1820.49	51
PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
VARIANCE			0	0.00	0.00	0.00	0	46	460.00	3583.01	1820.49	51
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
ACTUAL	5118/1	7.00	16	160.00	1585.58	558.52	35	16	160.00	1585.58	558.52	35
PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0
VARIANCE			16	160.00	1585.58	558.52	35	16	160.00	1585.58	558.52	35
% PLAN			0	0.00	0.00	0.00	0	0	0.00	0.00	0.00	0

APPENDIX 4.12 (Cont.)

QUEST 06 05/07/78 — ORDERS ANALYSIS BY UNIT LENGTH - YTD — PAGE 14

MKT CODE	AREA CODE	COUNTRY DESCRIPTION	PRO GRP	COMMODIT CODE	SCRE SIZE	UNIT LENGTH	NO OF UNITS	LENGTH ORDERED	NETT VALUE	GROSS CONTRIBN	M-GCPE
01	92	UK-REP 2	22	51285	.00	6.00	1	6.00	.01	95.87-	700.0-
01	92	UK-REP 2	22	51285	.00	6.00	1	6.00	.01	.01	100.0
01	92		22	51285	.00	6.00	2	12.00	.02	95.86-	300.0-
01	92		22	51285	.00		2	12.00	.02	95.86-	300.0-
01	92	UK-REP 2	22	51285	4.00	15.00	2	30.00	495.00	154.11	31.1
01	92		22	51285	4.00	15.00	2	30.00	495.00	154.11	31.1
01	92		22	51285	4.00		2	30.00	495.00	154.11	31.1
01	92	UK-REP 2	22	51285	6.00	30.00	2	60.00	1290.88	348.12	26.8
01	92		22	51285	6.00	30.00	2	60.00	1298.88	348.12	26.8
01	92		22	51285	6.00		2	60.00	1298.88	348.12	26.8
01	92	UK-REP 2	22	51285	12.00	20.00	2	40.00	2059.20	456.52	22.1
01	92		22	51285	12.00	20.00	2	40.00	2059.20	456.52	22.1
01	92		22	51285	12.00		2	40.00	2059.20	456.52	22.1
01	92		22	51285			8	142.00	3853.10	862.89	22.3
01	92	UK-REP 2	22	51281	6.00	10.00	6	60.00	1395.90	584.32	41.8
01	92		22	51281	6.00	10.00	6	60.00	1395.90	584.32	41.8
01	92		22	51281	6.00		6	60.00	1395.90	584.32	41.8
01	92		22	51281			6	60.00	1395.90	584.32	41.8
01	92	UK-REP 2	22	51282	4.00	30.00	2	60.00	718.74	368.50	51.2
01	92	UK-REP 2	22	51282	4.00	30.00	6	180.00	2156.22	1063.33	49.3
01	92		22	51282	4.00	30.00	8	240.00	2874.96	1431.83	49.8
01	92		22	51282	4.00		8	240.00	2874.96	1431.83	49.8
01	92	UK-REP 2	22	51282	8.00	25.00	1	25.00	718.74	425.38	59.1
01	92		22	51282	8.00	25.00	1	25.00	718.74	425.38	59.1
01	92		22	51282	8.00		1	25.00	718.74	425.38	59.1
01	92	UK-REP 2	22	51282	10.00	25.00	1	25.00	778.14	382.06	49.0
01	92		22	51282	10.00	25.00	1	25.00	778.14	382.06	49.0
01	92		22	51282	10.00		1	25.00	778.14	382.06	49.0
01	92		22	51282			10	290.00	4371.84	2239.27	51.2
01	92	UK-REP 2	22	51284	8.00	15.00	1	15.00	457.38	201.46	44.0
01	92		22	51284	8.00	15.00	1	15.00	457.38	201.46	44.0
01	92	UK-REP 2	22	51284	8.00	25.00	1	25.00	653.40	311.17	47.6
01	92		22	51284	8.00	25.00	1	25.00	653.40	311.17	47.6
01	92		22	51284	8.00		2	40.00	1110.78	512.63	46.1
01	92		22	51284			2	40.00	1110.78	512.63	46.1
01	92	UK-REP 2	22	51288S	10.00	30.00	2	60.00	2647.26	901.86	34.0

APPENDIX 4.12 (Cont.)

QUEST S6 05/07/78 — SALES ANALYSIS BY UNIT LENGTH - YTD — PAGE 15

MKT CODE	AREA CODE	COUNTRY DESCRIPTION	PRO GRP	COMMODITY CODE	BORE SIZE	UNIT LENGTH	NO OF UNITS	LENGTH ORDERED	NETT VALUE	GROSS CONTRIBN	M-GCPER
01	91		90	90912	.00	.00	0	.00	43106.04	42692.47	99.04
01	91		90	90912	.00		0	.00	43106.04	42692.47	99.04
01	91		90	90912			0	.00	43106.04	42692.47	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	35.64	35.30	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	15.84	15.69	99.05
01	91	UK-REP 1	90	90960	.00	.00	0	.00	31.68	31.38	99.05
01	91	UK-REP 1	90	90960	.00	.00	0	.00	27.72	27.45	99.02
01	91	UK-REP 1	90	90960	.00	.00	0	.00	35.64	35.30	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	47.52-	47.06-	99.03
01	91	UK-REP 1	90	90960	.00	.00	0	.00	55.44-	54.91-	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	51.48	50.99	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	158.40-	156.88-	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	43.56	43.14	99.03
01	91	UK-REP 1	90	90960	.00	.00	0	.00	55.44-	54.91-	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	71.28	70.60	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	39.60	39.22	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	71.28	70.60	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	43.56	43.14	99.03
01	91	UK-REP 1	90	90960	.00	.00	0	.00	79.20	78.44	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	59.40	58.83	99.04
01	91	UK-REP 1	90	90960	.00	.00	0	.00	7.92	7.84	98.98
01	91		90	90960	.00	.00	0	.00	59.40-	58.83-	99.04
01	91		90	90960	.00		0	.00	237.60	235.33	99.04
01	91		90	90960			0	.00	237.60	235.33	99.04
									237.60	235.33	99.04
01	91	UK-REP 1	90	90965	.00	.00	0	.00	7.92	7.84	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	7.92	7.84	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	.99	.98	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	7.92	7.84	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	7.92	7.84	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	6.93	6.86	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	80.78	80.00	99.03
01	91	UK-REP 1	90	90965	.00	.00	0	.00	11.88	11.77	99.07
01	91	UK-REP 1	90	90965	.00	.00	0	.00	3.01	2.98	99.00
01	91	UK-REP 1	90	90965	.00	.00	0	.00	11.88	11.77	99.07
01	91	UK-REP 1	90	90965	.00	.00	0	.00	6.93	6.86	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	9.90	9.80	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	12.70	12.58	99.05
01	91	UK-REP 1	90	90965	.00	.00	0	.00	6.93	6.86	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	17.82	17.65	99.04
01	91	UK-REP 1	90	90965	.00	.00	0	.00	4.95	4.90	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	76.72	75.98	99.03
01	91	UK-REP 1	90	90965	.00	.00	0	.00	11.88	11.77	99.07
01	91	UK-REP 1	90	90965	.00	.00	0	.00	17.83	17.66	99.04
01	91	UK-REP 1	90	90965	.00	.00	0	.00	11.88	11.77	99.07
01	91	UK-REP 1	90	90965	.00	.00	0	.00	16.95	16.79	99.05
01	91	UK-REP 1	90	90965	.00	.00	0	.00	52.02	51.52	99.03
01	91	UK-REP 1	90	90965	.00	.00	0	.00	5.94	5.88	98.98
01	91	UK-REP 1	90	90965	.00	.00	0	.00	11.86	11.77	99.07
01	91	UK-REP 1	90	90965	.00	.00	0	.00	39.60	39.22	99.04
01	91	UK-REP 1	90	90965	.00	.00	0	.00	19.80	19.61	99.04
01	91	UK-REP 1	90	90965	.00	.00	0	.00	42.89	42.48	99.04
									8.91	8.82	98.98

APPENDIX 4.12 (Cont.)

REPORT 007 — OIL AND MARINE DIVISION - DUNLOP LTD — PAGE 4
PROGRAM KAP12P
RUN DATE 12/01/79 — ORDERS OUTSTANDING BY PRODUCT GROUP WITHIN MARKET COMPARED WITH PLAN — MONTH ENDING 30/12/78

MARKET 04-EXPORT AC

PRODUCT GROUP	VALUE £	EST G.C.£	EST G.C. %	PLAN VALUE £	VARIANCE VALUE £
MACHINE MADE	930.50	224.12	24.09	0.00	+930.50
DOCK HOSE	28072.94	7956.41	28.34	0.00	+28072.94
OFFSHORE OIL	111572.40	53342.53	47.81	0.00	+111572.40
O/S DREDGING	0.01	0.01	100.00	0.00	+0.01
VACUUM	0.00	0.00		0.00	+0.00
FACTORED	754.01	37.53	4.98	0.00	+754.01
MARKET TOTAL AT DISCOUNTED NET	141329.86	61580.60	43.56	0.00	+141329.86
ANCILLARY	400.01	137.25	34.31	0.00	+400.01
OVERSEAS	354.00	-99.72	-28.17	0.00	+354.00

APPENDIX 4.13 MANAGEMENT REPORTS - APPRAISALS

TABLE 1 REPORT 04 - ORDERS RECEIVED PRODUCT OPERATING REPORT - APPRAISAL BY MARKETING MANAGERS

(Monthly : Computer, see Appendices 4.4 and 4.12)

Objective	To provide financial information on order intake performance by product group by market, compared with plan for the month and year to date situation	
Action	If performance against plan is poor, the detailed information by customer (Report 03 - Orders Received Monthly Summary by Customer) and product (Report 01 - Weekly Orders Received Lists) is studied and corrective measures (e.g. level of sales representation, pricing - discounts) are discussed with divisional manager marketing and marketing coordinator. The sales force are then briefed (It must be noted that the accuracy of the plan is questionable.)	
Assessment:		Score:
Relevant	Yes, this information was not available previously	5
Timely	Yes	5
Accurate	In the early stages, the accuracy was poor when compared with the manual reports (produced in parallel). However, stringent control of data preparation has made the report a very accurate management tool.	4
Understandable	Yes	5
		TOTAL 19 (i.e. 95%)

APPENDIX 4.13 (Cont.)

TABLE 2 REPORT 007 - ORDERS OUTSTANDING REPORT
- APPRAISAL BY MARKET PLANNING MANAGEMENT

(Monthly : Computer, see Appendices 4.4 and 4.12)

Objective	To report the value and estimated gross contribution of outstanding orders by product group and market. (The facility to compare outstanding orders against a plan has been provided for the future.)	
Action	To relate outstanding value and estimated gross contributions to the present order situation (Report 04 - Orders Received Product Operating Report) and sales situation (Report S4 - Sales Product Operating Report). To enable action to be taken to assign production priorities and set pricing policies/discounts to maintain/improve profitability and take steps to improve performance of undersubscribed products. Bottlenecks in production to be overcome by other investment in plant or selling emphasis placed on other products. The report identifies problems and managers make use of detailed information in other reports or additional information produced, on request, by use of the Quest facility, to aid strategy formulation.	
Assessment:		Score:
Relevant	Yes. This sort of information was not previously available to divisional management. The marketing coordinator monitored the situation in value terms only and this did not permit action to be taken at the product level.	5
Timely	Yes	5
Accurate	The accuracy for the first months of use was poor due to problems in resolving the uncertain outstanding order backlog. The file contained much corrupt data which has now been corrected. The reports now agree favourably with the manual summaries.	3
Understandable	Yes, very easy to understand. The situation by product group is highlighted and directs the manager's attention to problem areas which may require more information (from standard or ad hoc reports) to aid resolution.	5
		TOTAL 19 (i.e.95%)

APPENDIX 4.13 (Cont.)

TABLE 3 REPORT 06 - ORDER ANALYSIS BY UNIT LENGTH YEAR TO DATE
- APPRAISAL BY MARKET PLANNING MANAGER

(Quarterly/On Request : Computer, see Appendices 4.4 and 4.12)

Objective	To provide a detailed analysis of products ordered to aid planning, forecasting, product and market development	
Action	To analyse the detail of this report to clarify possible areas of uncertainty identified by the regular consolidated reports. To show the trends in unit lengths and bore sizes ordered for each product. To identify products having low estimated contributions and to determine whether prices should be altered to maintain profitability, or whether products should be removed from the range.	
Assessment:		Score:
Relevant	Yes. Detailed monitoring of orders and sales (Report S6) is essential to business efficiency	5
Timely	Yes. These reports are produced on request but quarterly issue has become the norm with further reports produced if and as required	5
Accurate	Yes. After initial problems with data preparation a very high standard of accuracy has been realised	5
Understandable	Yes. The report is used primarily by the market planning department but figures have been made available to other users to help planning and problem solving activities. The level of detail is too great for general management use.	5
		TOTAL 20 (i.e. 100%)

APPENDIX 5.1

Offshore Hose - Order Volumes 1975-77

	1975	1976	1977
5100/1	71	111	158
5100/2	88	58	39
5100/3	6	0	2
5100/4	8	4	14
5100/5	0	0	12
5100/9	10	4	24
5101/1	4	0	2
5101/9	6	0	6
5150/2	0	5	0
5150/4	0	0	1
5151/1	0	4	4
5152/1	322	170	221
5152/2	2	8	21
5152/4	3	1	0
5152/6	27	50	31
5152/7	12	12	13
5152/8	5	0	0
5154/1	2	102	103
5154/2	0	27	13
5154/3	1	45	2
5154/9	0	4	2
5154/11	0	6	6
5155/1	554	424	253
5155/2	24	30	15
5155/3	4	0	0
5155/4	12	0	0
5155/9	13	4	0
5155/10	0	11	9
5156/1	24	20	25
5156/2	17	46	46
5156/3	0	2	0
5156/4	33	0	0
5156/6	9	21	13
5156/7	33	56	22
5156/8	0	0	1
5157/1	147	162	201
5157/2	18	44	17
5157/3	0	1	0
5157/5	2	0	0
5157/6	158	7	21
5157/10	0	6	1
P5100/2	0	0	14
P5154/1	0	0	12
P5155/1	0	0	58
P5157/2	0	0	7
"Specials"	62	71	149
TOTAL	1677	1516	1538

APPENDIX 5.2

DIVISIONAL FINANCIAL PERFORMANCE BY SECTOR 1971-77
£000'S
(PERCENTAGES OF TOTAL IN BRACKETS)

Sector \ Year	1971	1972	1973	1974	1975	1976	1977
U.K.	(14) 500	(18) 708	(15) 673	(14) 939	(17)1784	(17)2149	(22)2551
EEC	(8) 287	(17) 688	(3) 153	(5) 325	(6) 596	(3) 332	(8)1004
Europe (Others)	(7) 228	(7) 257	(6) 237	(5) 341	(4) 398	(9)1094	(3) 332
C & S America	(17) 594	(10) 387	(9) 428	(7) 500	(9) 899	(6) 718	(7) 808
N. America	(6) 206	(4) 165	(4) 192	(7) 495	(4) 400	(5) 608	(5) 556
Africa	(32)1097	(26)1036	(58)2635	(53)3602	(24)2417	(27)3301	(19)2237
Asia	(11) 387	(16) 616	(4) 181	(8) 537	(27)2785	(33)4133	(32)3744
Australasia	(5) 160	(2) 60	(1) 55	(1) 56	(9) 914	(0) 58	(4) 477
TOTAL	3459	3917	4554	6795	10193	12393	11709

APPENDIX 5.3

ORDERS RECEIVED - VALUE ANALYSIS BY COUNTRY 1971-77

COUNTRY	1971	1972	1973	1974	1975	1976	1977
EEC							
Belgium	12,593	3,847	3,725	1,443	7,620	805	243,380
Denmark	2,999	12,192	4,728	13,932	6,282	9,824	33,693
France	12,331	289,897	100,053	32,976	168,948	157,766	326,619
Germany	140	30			5,386	750	632
Holland	216,141	285,490	109,502	221,920	224,329	140,936	326,678
Italy	30,531	100,568	40,267	54,548	112,445	30,723	73,258
Luxembourg				400	6,389		
	274,735	692,024	258,275	325,219	531,399	340,804	1,004,260
EFTA							
Austria	317						
Finland	5,539	2,112		160	504	16,989	2,801
Norway	14,061	57,038	85,539	68,327	266,239	49,125	40,382
Portugal	3,294	12,811	4,756	6,400	10,566	9,542	8,842
Sweden	1,209	5,955	5,687	3,601	5,561		2,133
Switzerland	6,523				998	72,209	134
	30,943	77,916	95,982	74,488	283,868	147,865	54,292

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
N. Med.							
Albania							
Cyprus	126	623	632	121		3,181	6,087
Gibraltar		2,962					
Greece	3,253	6,698	5,242	12,712	14,844	32,257	35,991
Israel	38,097	154,878	126,443	104,674	201,142	195,737	111,104
Malta	853		484		14,950	4,085	
Spain	19,215	27,259	3,871	233,591	155,865	1,015,889	217,950
Turkey	14,474	12,111	4,423	12,932	14,391	5,770	1,194
	76,018	204,531	141,095	364,030	401,192	1,256,919	372,326
EEB							
Bulgaria							10,253
Czechoslovakia						6,520	
German Dem. Rep.			6,879			3,351	
Hungary			246				
Poland							
Rumania		603	3,140				
Russia		493					
Yugoslavia	3,117	1,467	8,985				5,504
	3,117	2,563	19,250			9,871	15,757

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
NE							
Algeria	7,789	14,739			5,892	928	1,980
Libya	102,145	16,975	48,546	94,457	259,815	419,566	423,332
Morocco							
Tunisia	479	314					1,338
U.A.R. = (Egypt)	10,638	14,890			328,198	1,382,191	512,190
	121,051	46,918	48,546	94,457	593,905	1,802,685	938,840
AFRICA							
Angola	16,384	15,975	19,689	15,024	3,415	15,057	42,043
Botswana							
Burundi						602	
Cameroon	83						
C. African Rep.							
Chad							
Dem.Rep. Congo	2,185		122,545	23,783	69,538	43,142	635
Dahomey		244		6,352			
Equat. Guinea							
Ethiopia	980	1,887	12,749			2,830	4,201
Affars & Issas	515		1,099	372	7,500	348	2,457
Gabon	22,162	7,619	5,587	50,505	104,513	34,293	35,047
Gambia				39,651			
Ghana	5,648	460	638	654	16,098	8,946	14,516
Guinea							
Ivory Coast	1,187						
Kenya	1,380	5,386	2,813	14,648	34,416	707	4,066
Lesotho							
Madagascar (Malagasy Rep.)	1,592	1,006	852				
Malawi							
Mali				1,308			

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
Mauritania							
Mosambique	261	407			2,485		248
Namibia							
Niger	1,915						
Nigeria	495,791	507,109	513,439	1,117,192	1,645,638	1,164,870	1,012,449
Port Guinea							
Rhodesia							
Rwanda							
Senegal				217			
Sierra Leone		2,072	1,321		4,388		
Somalia (Somali Rep)	1,413			2,072			
South Africa	84,029	171,016	21,424	258,658	529,259	284,286	168,694
Span Sahara							
Sudan	798	294	1,794	6,884	400	245	888
Swaziland							
Tanzania	564	49,284	1,024		8,030	7,510	515
Togo							
Uganda	96				1,246		
Upper Volta							
Zaire				60,066	69,538		12,797
Zambia	599		121				
	637,582	762,759	705,095	1,597,386	2,496,464	1,562,836	1,298,556

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
ME							
Abu Dhabi							168,166
Ajman							
Al Fujayrah							
Bahrain	18,470	225,448	5,451	2,127	17,271	21,308	8,894
Dubai							189,471
Iran	50,369	24,726	22,393	31,861	132,511	164,698	52,204
Iraq	13,798	4,394	8,953	10,755	48,139	29,689	345
Jordan	11,960	111,416					
Kuwait	2,064	517	4,977	7,051	32,478	13,977	9,516
Lebanon	2,708	3,008	1,786	840	6,660	8,570	718
(Muscat &) Oman	6,365	13,051	77,113	4,699	74,842	117,296	358,821
Qatar	190,634	32,734	140,218	195,013	264,192	556,864	497,437
R. El. Kaymah							
Saudi Arabia	178,497	330,531	558,838	1,386,855	91,650	859,331	1,422,856
Sharjah							13,563
Syria			4,953		2,891		
Ummal Qawayn							
Yemen	4,098	715	1,225			705	189
(Fed.S. Arabia					9,878	9,532	
(S. Yemen	1,410		1,851	426	24,311		1,114
Trucial States = UAE	29,000	15,538	918,608	164,262	776,456	547,518	
	509,373	761,978	1,746,366	1,803,889	1,481,279	2,329,488	2,723,294

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
INDIA							
Afghanistan							
Bangladesh (E.Pakistan)	2,359	1,770	5,199	12,733		7,249	11,411
Bhutan							
Burma		8,961	4,094	715	2,836	20,728	6,187
India	1,914		9,772	46	2,408	91,642	451,199
Nepal							
Pakistan (W.Pakistan)	1,336	363	895	845	4,415	22,338	
Sri Lanka (Ceylon)	129	119	979				8,138
	5,738	11,213	20,939	14,339	9,659	141,957	476,935
FE							
Borneo							19,748
Brunei	3,582	28,763	8,012	12,625	352,998	312,919	127,331
Hong Kong	6,085	7,421	778	1,849	9,610	3,336	3,747
Indonesia	1,361	30,694	28,575	190,542	117,286	813,248	55,889
Malaysia	136,882	88,634	58,774	5,314	674,582	215,040	105,704
Moluccas							
New Guinea							
Philippines	11,992	1,241	4,105	7,219	4,007	13,936	4,585
Singapore	13,909	166,656	57,866	282,784	1,384	305,798	106,980
Sulawesi							
Taiwan			529	16,591	13,632	368	
Thailand	4,484	1,888	4,716	4,768	11,157	2,683	1,173
Timor							
	178,295	325,297	163,355	521,692	1,184,656	1,667,328	425,157
CHINA		11,929					

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
JAPAN	135,517	32,904	7,720			297	
FE OTHERS							
Cambodia							
N. Korea	1,085	554					
S. Korea	5,683	237					1,862
Laos							
Tibet							
N. Vietnam			22				
S. Vietnam							
	6,768	791	22				1,862
AUSTRALASIA							
Australia	104,291	13,891	17,296	4,738	42,459	61,384	305,208
New Zealand	6,198	45,735	26,621	51,487	59,408	22,476	171,219
	110,489	59,626	43,917	56,225	101,867	83,860	476,427

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
SA							
Argentina	431	220				800	
Bolivia							
Brazil	28,383	3,459	14,471	17,095	46,200		201,269
Chile	3,577	13,017	11,789	15,594	339,132	54,381	9,281
Colombia	3,653		1,588	697	150	150	1,537
Ecuador	323,664	55,342	61,413	45,444	39,017	14,003	16,723
Fr. Guiana	185		6,435				
Guyana	860	821	858	1,076	1,797	836	3,245
Paraguay							
Peru	1,457	1,695	571		9,537		
Surinam							
Uruguay	161						349,213
Venezuela	317	29,147	2,533	89,193	14,479		30,670
	362,688	103,701	99,658	169,099	450,312	70,170	611,938
CA							
Belize (British Honduras)			315			339	
Costa Rica					16,538		
El Salvador							
Honduras							
Nicaragua							
Panama	10,842	1,338	7,848		2,012	137	29,103
Guatemala		837					
	10,842	2,175	7,848		18,550	476	29,103

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
SA							
Argentina	431	220				800	
Bolivia							
Brazil	28,383	3,459	14,471	17,095	46,200		201,269
Chile	3,577	13,017	11,789	15,594	339,132	54,381	9,281
Colombia	3,653		1,588	697	150	150	1,537
Ecuador	323,664	55,342	61,413	45,444	39,017	14,003	16,723
Fr. Guiana	185		6,435				
Guyana	860	821	858	1,076	1,797	836	3,245
Paraguay							
Peru	1,457	1,695	571		9,537		
Surinam							
Uruguay	161						349,213
Venezuela	317	29,147	2,533	89,193	14,479		30,670
	362,688	103,701	99,658	169,099	450,312	70,170	611,938
CA							
Belize (British Honduras)			315			339	
Costa Rica					16,538		
El Salvador							
Honduras							
Nicaragua							
Panama	10,842	1,338	7,848		2,012	137	29,103
Guatemala		837					
	10,842	2,175	7,848		18,550	476	29,103

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
MEXICO				150,316	264,474	143,417	10,118
U.S.A.	106,482	56,160	120,871	328,954	326,614	183,277	474,131
CANADA	49,710	109,103	71,619	165,786	99,668	471,727	81,599
ATLANTIC OCEAN ISLANDS							
Ascension		556		206	99		
Canaries	579	363		1,078	4,235	19,335	
Cape Verde Is.				362	8,500	6,051	
Iceland	4,768	1,816	1,409	51	3,545	316	361
	5,347	2,735	1,409	1,697	16,379	25,702	361
INDIAN OCEAN ISLANDS							
Comoro					35,707		
Mauritius	439	669		157	5,858		
Seychelles	534	1,681					2,693
	973	2,350		157	41,565		2,693

APPENDIX 5.3 (Cont.)

COUNTRY	1971	1972	1973	1974	1975	1976	1977
PACIFIC OCEAN ISLANDS							
Fiji		436	176	65			3,440
Other Pacific Is.		238	86	456	5,464	3,814	
		674	262	521	5,464	3,814	3,440
MISC.							
Liechtenstein		199					
Andorra			411				
		199	411				
TOTAL EXPORT	2,798,231	3,297,244	3,879,057	5,852,929	8,501,819	10,752,378	9,158,319
(U.K.	500,000	707,760	672,616	950,598	1,757,376	2,205,000	2,306,747)
(TOTAL	3,298,231	4,005,004	4,551,673	6,803,527	10,259,195	12,957,378	11,465,066)

APPENDIX 5.4

OFFSHORE OIL HOSE* - ORDERS RECEIVED BY CUSTOMER 1977

	Customer	Order Value	% of Total	Cumulative %
1)	Shell	2,560,276	32.87	32.87
2)	Binzagr	1,213,169	15.57	48.44
3)	Mobil	495,464	6.36	54.80
4)	SBM (India)	472,027	6.06	60.86
5)	Occidental	320,894	4.12	64.98
6)	Amoco	315,123	4.04	69.02
7)	Dubai Pet. Co.	263,855	3.38	72.40
8)	Sumed	260,872	3.49	75.89
9)	Conoco	244,239	3.13	79.02
10)	Texaco	224,573	2.88	81.90
11)	Aramco	151,675	"	"
12)	Sedco	146,631	"	"
13)	Dunlop Iberica	132,043	"	"
14)	Oasis Oil	125,797	"	"
15)	Victory Engineering	117,448	"	"
16)	British Petroleum	94,707	"	"
17)	Gulf Oil	88,175	"	"
18)	Samarco	59,051	"	"
19)	Eilat Ashkel	58,571	"	"
20)	Abu Dhabi PC	57,064	"	"
21)	Protecmo	52,641	"	"
22)	Canaport	49,569	"	"
23)	SBM	44,858	"	"
24)	Hamilton Brothers	39,122	"	"
25)	Atlantic Richfield	38,658	"	"
26)	Doris Howard	33,933	"	"
27)	BNOC	30,435	"	"
28)	Dunlop Singapore	25,366	"	"
29)	Pertamina	24,689	"	"
30)	Dansk Bores	24,684	"	"
31)	Crescent Petroleum	21,822	"	"
	TOTAL	7,787,431		

* Includes magnetite slurry hose and all ancillary equipment.

APPENDIX 5.5 OFFSHORE HOSE - ORDERS RECEIVED BY COUNTRY 1977

	Country	Order Value	% of Total	Cumulative %
1)	Saudi Arabia	1,364,844	17.69	17.69
2)	Nigeria	1,185,073	15.36	33.05
3)	U.K.	1,012,615	13.25	46.30
4)	Oman	524,660	6.80	53.10
5)	India	440,046	5.70	58.80
6)	Libya	305,821	3.96	62.76
7)	France	293,664	3.80	66.56
8)	Egypt	287,608	3.72	70.28
9)	Abu Dhabi	283,631	3.67	73.95
10)	Qatar	254,917	3.30	77.25
11)	Dubai	246,332		
12)	Brazil	203,501		
13)	Norway	193,487		
14)	Spain	132,951		
15)	New Zealand	115,621		
16)	Singapore	111,283		
17)	Malaysia	100,079		
18)	Trinidad	92,009		
19)	South Africa	73,860		
20)	Indonesia	54,680		
21)	Israel	53,708		
22)	Canada	49,569		
23)	Congo	45,758		
24)	Angola	42,043		
25)	Brunei	38,127		
26)	Iran	36,209		
27)	Venezuela	30,671		
28)	Denmark	26,685		
29)	Sharjah	21,822		
30)	Dominican Republic	19,176		
31)	Australia	18,235		
32)	Gabon	13,833		
33)	Thailand	13,418		
34)	Zaire	12,797		
35)	Borneo	9,712		
36)	Italy	5,495		
37)	Mauritius	2,993		
	TOTAL	7,714,933		

APPENDIX 5.6 MONOBUOY RESEARCH ANALYSIS FORM

DUNLOP OIL AND MARINE DIVISION

MONOBUOY RESEARCH ANALYSIS FORM

Ref. O & M 6/77

1. What type of buoy is used? . . . . . .
2. When was the buoy installed? . . . . . .
3. What is the average number of tanker loadings/discharge per month? . . . . . .
4. What is the average volume throughput per month? . . . . . .

FLOATING HOSES

5. i) Number of strings . . . . Main Line ☐ Rail/Tail ☐
   ii) Number of hoses per string . . . . Main Line ☐ Rail/Tail ☐
   iii) Bore Size . . . . Main Line ☐ Rail/Tail ☐
   iv) Number/Types of special hoses per string:
   a) Sampson first off buoy . . . . . .
   b) Rail . . . . . .
   c) Barbell Tail . . . . . .
   d) Tapered . . . . . .

SUBMARINE HOSES

6. i) Configuration
   Lazy 'S' ☐
   Chinese Lantern ☐
   Other please state . . . . . .
   ii) Number of underbuoy strings . . . . . ☐
   iii) Number of hoses per string . . . . . ☐
   iv) Type of buoyancy used in submarine strings . . . Submarine Floats ☐
   Buoyancy Tanks ☐

8. Who was the original hose supplier? . . . . . .
9. Who is the replacement hose supplier/s? . . . . . .
10. Hoses are replaced after . . . . . Time in use . . . . . ☐ yrs.
    Number of loadings . . . . ☐
11. What is the recorded hose life at site, if available?
    Sampson ☐
    Rail/Tail ☐
    Main Line ☐
    Submarine ☐
12. Hoses are stored . . . . . in a warehouse ☐
    under canvass ☐
    in the open ☐
13. Present stockholding . . . . . Sampson ☐
    Rail/Tail ☐
    Main Floating Line ☐
    Submarine ☐
    Others please state . . . . . ☐
14. What oil industry magazines are read on site? i) . . . . . .
    ii) . . . . . iii) . . . . . .
    iv) . . . . . v) . . . . . .
15. General Comments . . . . . .
    . . . . . .
    . . . . . .
    . . . . . .

Respondents Name . . . . . Position . . . . . .

APPENDIX 5.7 MONOBUOY ANALYSIS SUMMARY

NORTH SEA

COUNTRY	USER	DATE INSTALLED	MAJOR HOSE SUPPLIER	FLOATING HOSES (NO.LENGTHS)															SUBMARINE HOSES (NO.LENGTHS)											
				SUPER SAMPSON			SELFLOTE			TAPER				RAIL/TAIL		BARBELL			SAMPSON					STANDARD							
				6"	12"	24"	6"	12"	24"	24"/16"	20"/16"	16"/12"	12"/6"	12"	16"	6"	12"	16"	6"	10"	12"	16"	24"	6"	8"	10"	12"	16"	24"
DENMARK	GULF	1971	DUNLOP	1	1		19	16						2			1		2		2			3			3		
U.K.	HAMILTON BROS.	1975	DUNLOP HEWITT				5				1	1	1			1					1						9		
U.K.	OCCIDENTAL	1976	DUNLOP HEWITT			2			44	2					4			2				8							2
U.K.	OCCIDENTAL	1976	DUNLOP HEWITT			2			44	2					4			2				8							2
U.K.	AMOCO	1976	DUNLOP		1		9	2												1						10			
U.K.	AMOCO	1976	DUNLOP		1		9	2												1						10			
U.K.	SHELL / ESSO	1976	DUNLOP HEWITT																							26			
U.K.	SHELL / ESSO	1976	DUNLOP APG																					10		4			
U.K.	MOBIL	1976	DUNLOP KLEBER																									5	
U.K.	BURMAH	1976	DUNLOP																			2						29	
			TOTALS	1	3	4	42	20	88	4	1	1	1	2	8	1	1	4	2	2	3	2	16	3	10	46	16	34	4

TOTAL FLOATING 181

TOTAL SUBMARINE 138

TOTAL HOSE 319

APPENDIX 5.7 (Cont.)

NORTH AFRICA

COUNTRY	USER	DATE INSTALLED	MAJOR HOSE SUPPLIER	FLOATING HOSES (NO.LENGTHS) SUPER SAMPSON 6"	8"	10"	16"	20"	24"	SELFLOTE 6"	8"	10"	16"	20"	24"	TAPER 24"/20	20"/16	RAIL/TAIL 16"	BARBELL 16"	SUBMARINE HOSES (NO.LENGTHS) SAMPSON 6"	8"	10"	20"	24"	STANDARD 6"	8"	10"	20"	24"
SPANISH GUINEA	CEPSA	1961	-		1						17										2				3				
SPANISH GUINEA	CEPSA	1963	-	2	2					36	36									4	4				6	6			
TUNISIA	AQUITANE	1972	UNIROYAL KLEBER																		4				4				
TUNISIA	AQUITANE	1975	UNIROYAL KLEBER			1		2				24		40			2	4	2			2	4				3	6	
LIBYA	ESSO	1961	-						1						18	1		2	1					3				2
LIBYA	ESSO	1969	-												11	1	1	2	1										
LIBYA	OASIS	1965	DUNLOP				1						24						1					2					3
LIBYA	OASIS	1970	DUNLOP				1						18					2	1					2					3
LIBYA	OCCIDENTAL	1968	DUNLOP UNIROYAL						1						20			4	2					2					3
LIBYA	OCCIDENTAL	1969	DUNLOP UNIROYAL						2						44			8	2					4					6
LIBYA	OCCIDENTAL	1969	DUNLOP UNIROYAL						2						44			8	2					4					6
LIBYA	MOBIL	1970	DUNLOP				2						40					4	2				4						
LIBYA	LNOC	1977	-					2						40									4				6		
LIBYA	LNOC	1977	-					2						40									4				10		
	TOTALS			2	3	1	4	6	6	36	53	24	82	120	137	2	3	34	14	4	10	2	16	17	6	13	3	32	23

TOTAL FLOATING 527

TOTAL SUBMARINE 126

TOTAL HOSE 653

APPENDIX 5.8 MARKET SHARES - OFFSHORE BUSINESS

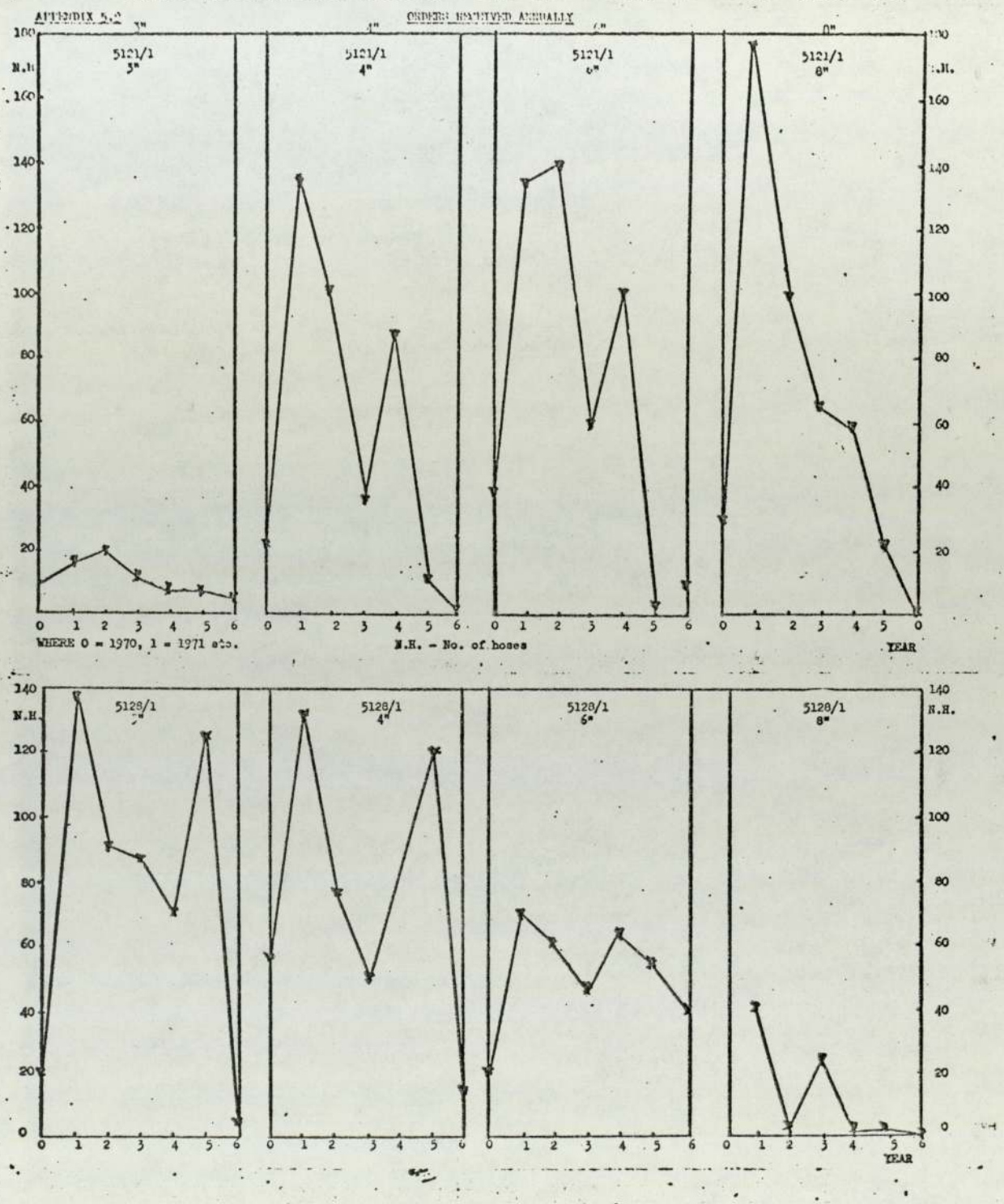
TABLE 1 THE DIVISION'S MARKET SHARE 1975-77

Year	Total Annual Hose Market	Orders Received by the Division	Market Share (%)
1975	4,429	1,677	38
1976	4,227	1,516	36
1977	4,881	1,538	32

TABLE 2 OFFSHORE BUSINESS - ESTIMATED HOSE PRODUCTION AND MARKET SHARES (1977)

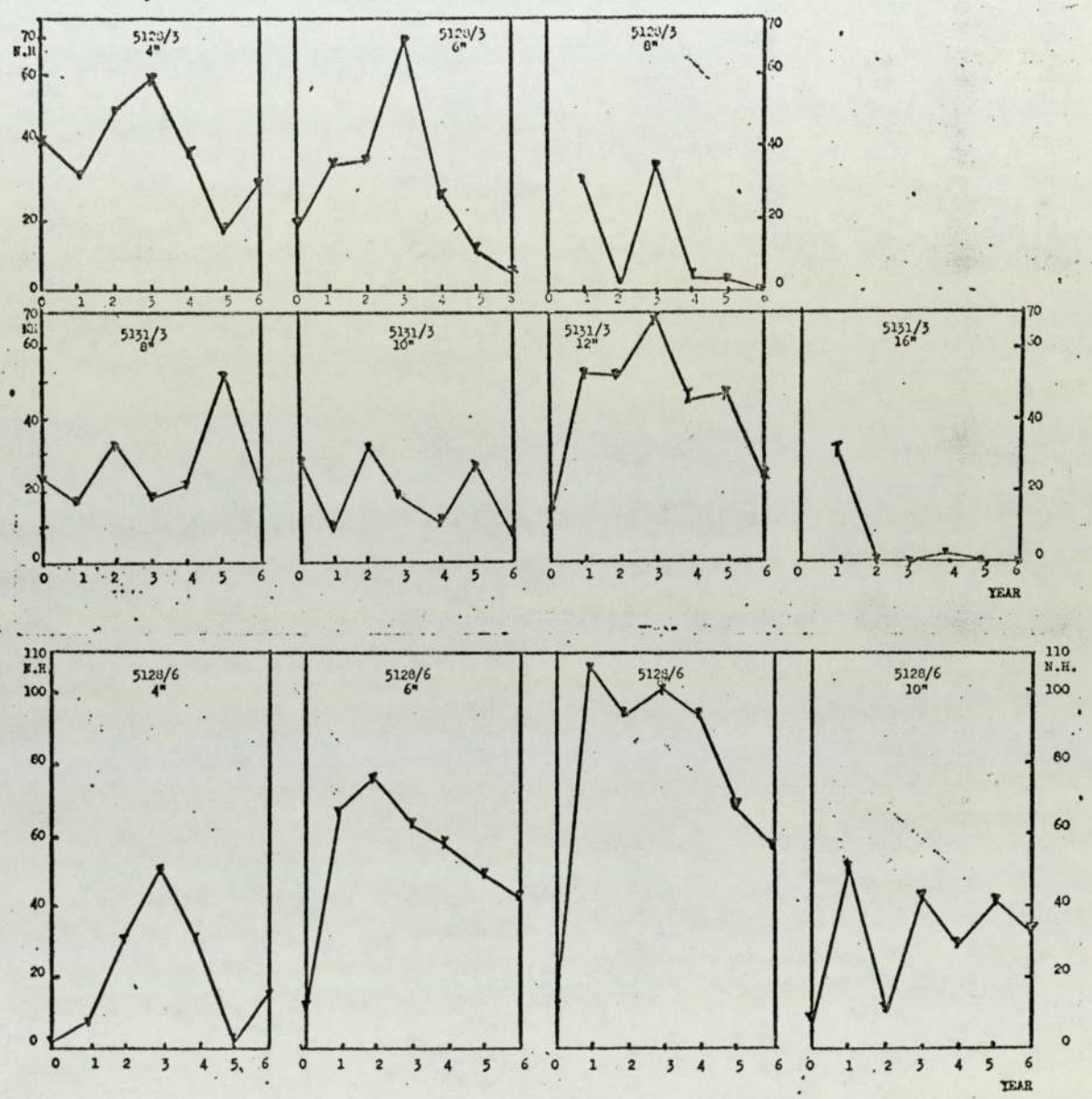
Manufacturer	Hose Production	Market Share %
Dunlop	1,538	32
Bridgestone	1,230	25
Uniroyal	740	15
Pirelli	492	10
Hewitt Robins	393	8
Kleber	244	5
Goodyear	146	3
Yokohama	98	2
TOTAL	4,881	100

APPENDIX 5.9 - ORDERS RECEIVED ANNUALLY



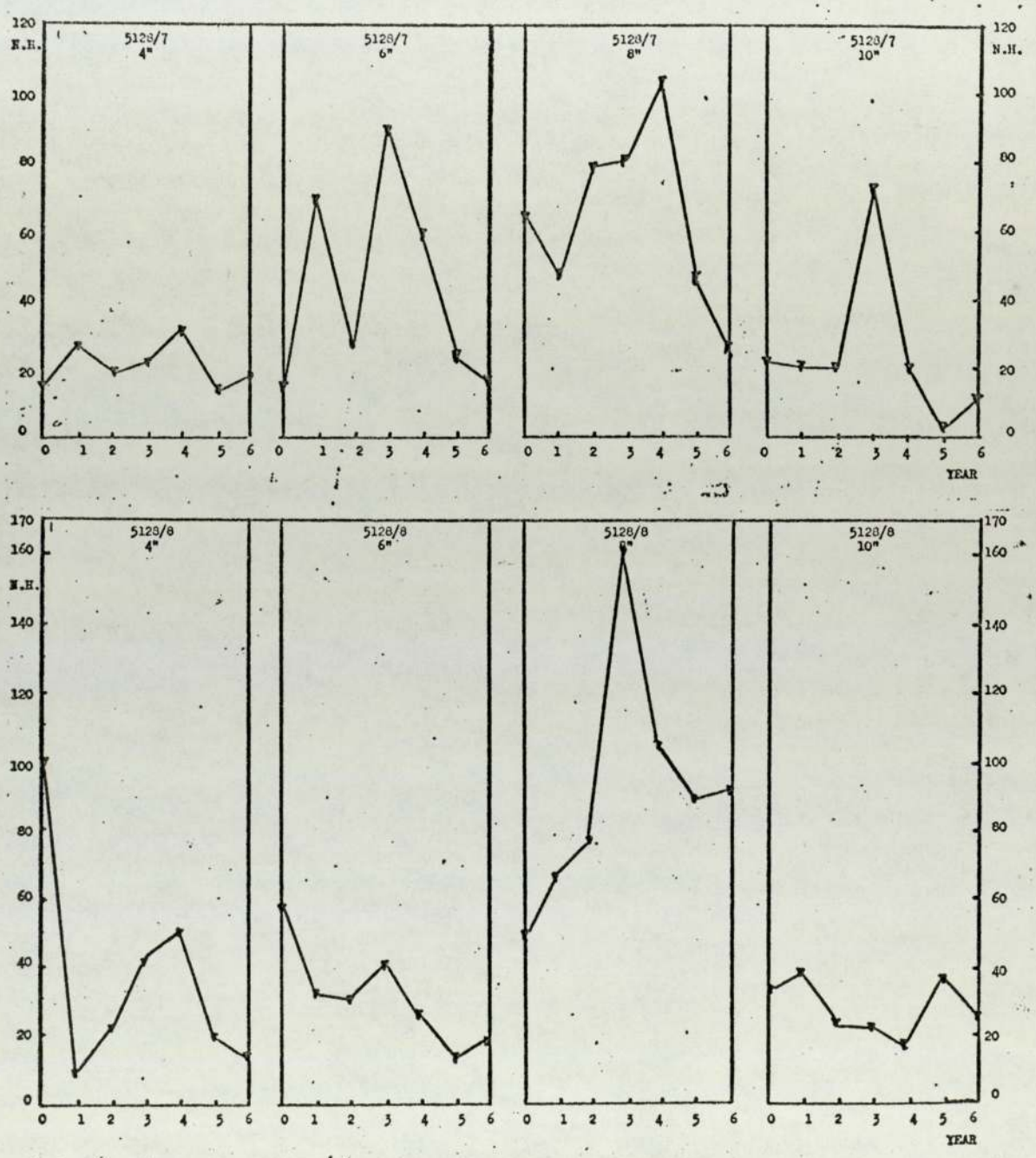
APPENDIX 5.9 (Cont.)

APPENDIX 5.9 (Cont.)

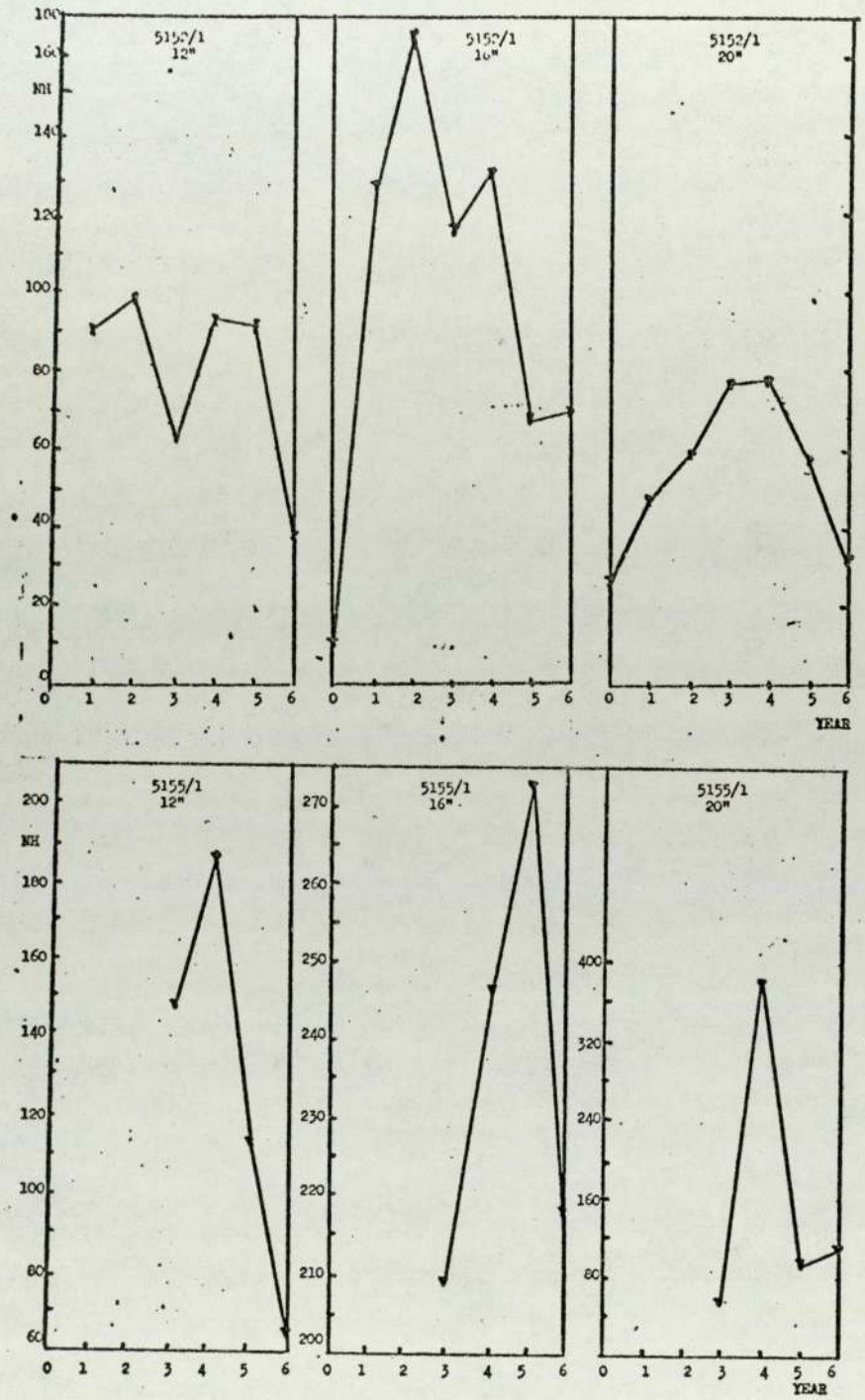


APPENDIX 5.9 (Cont.)

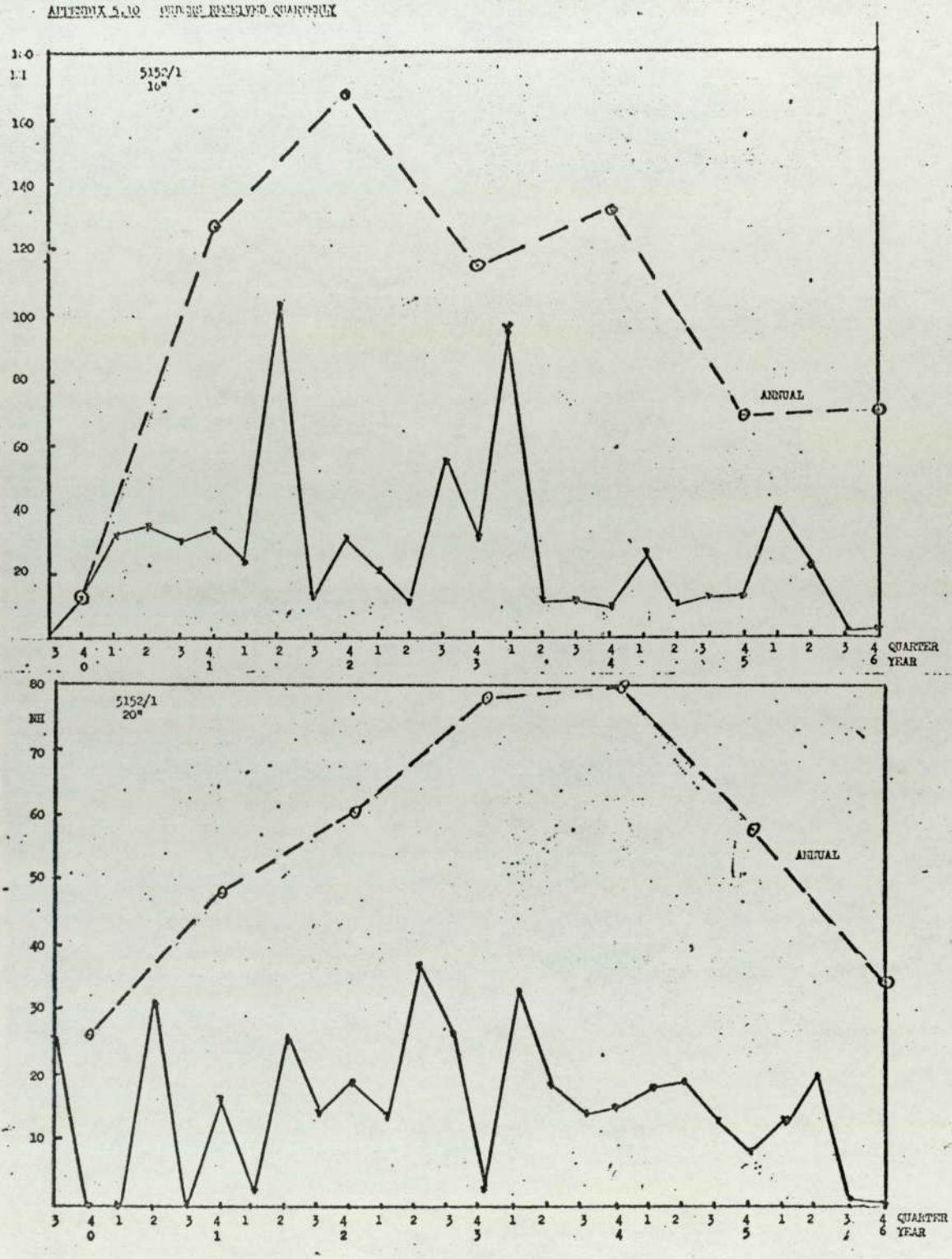
APPENDIX 5.9 (Cont.)



APPENDIX 5.9 (Cont.)

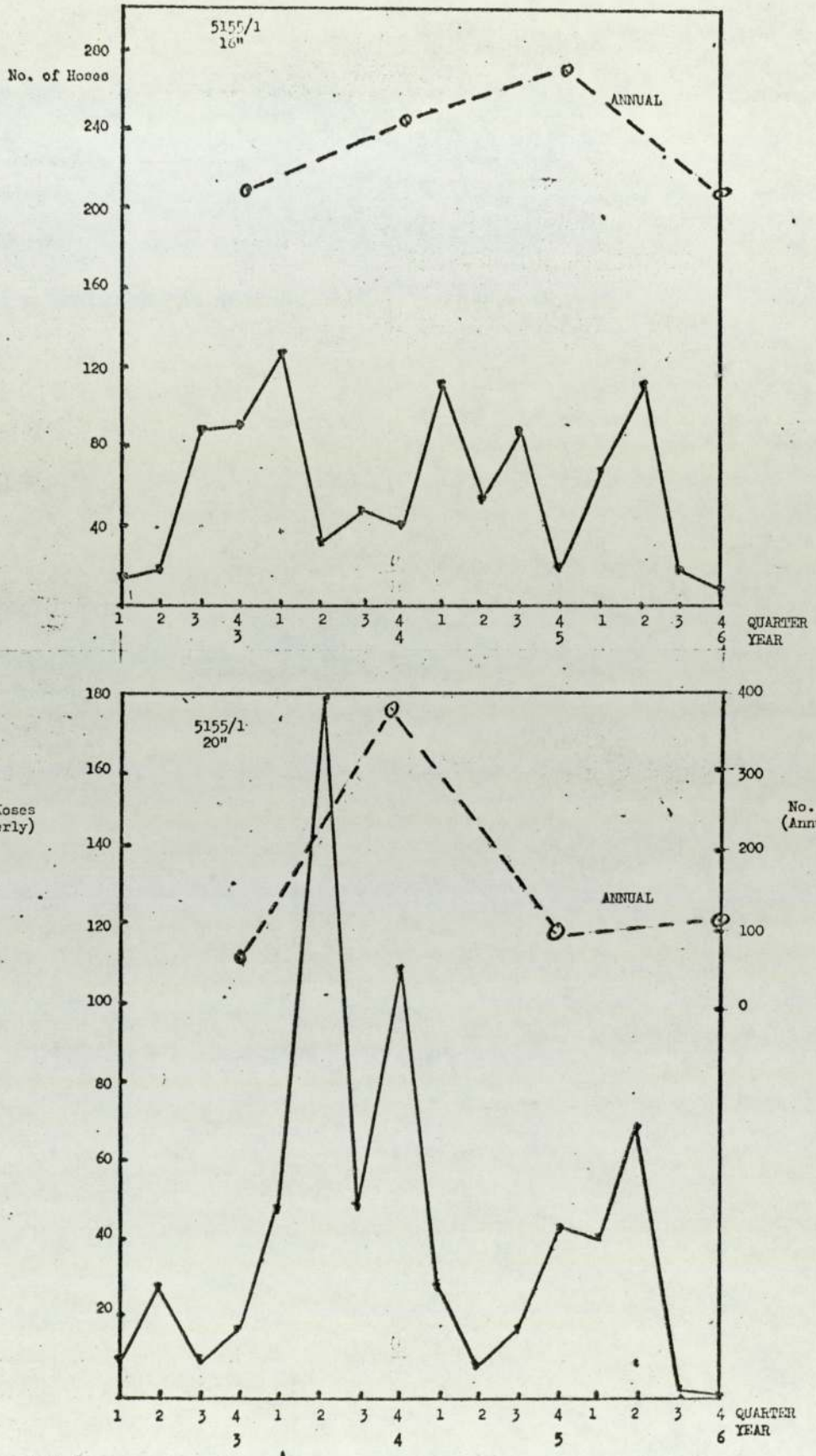


APPENDIX 5.10 ORDERS RECEIVED QUARTERLY

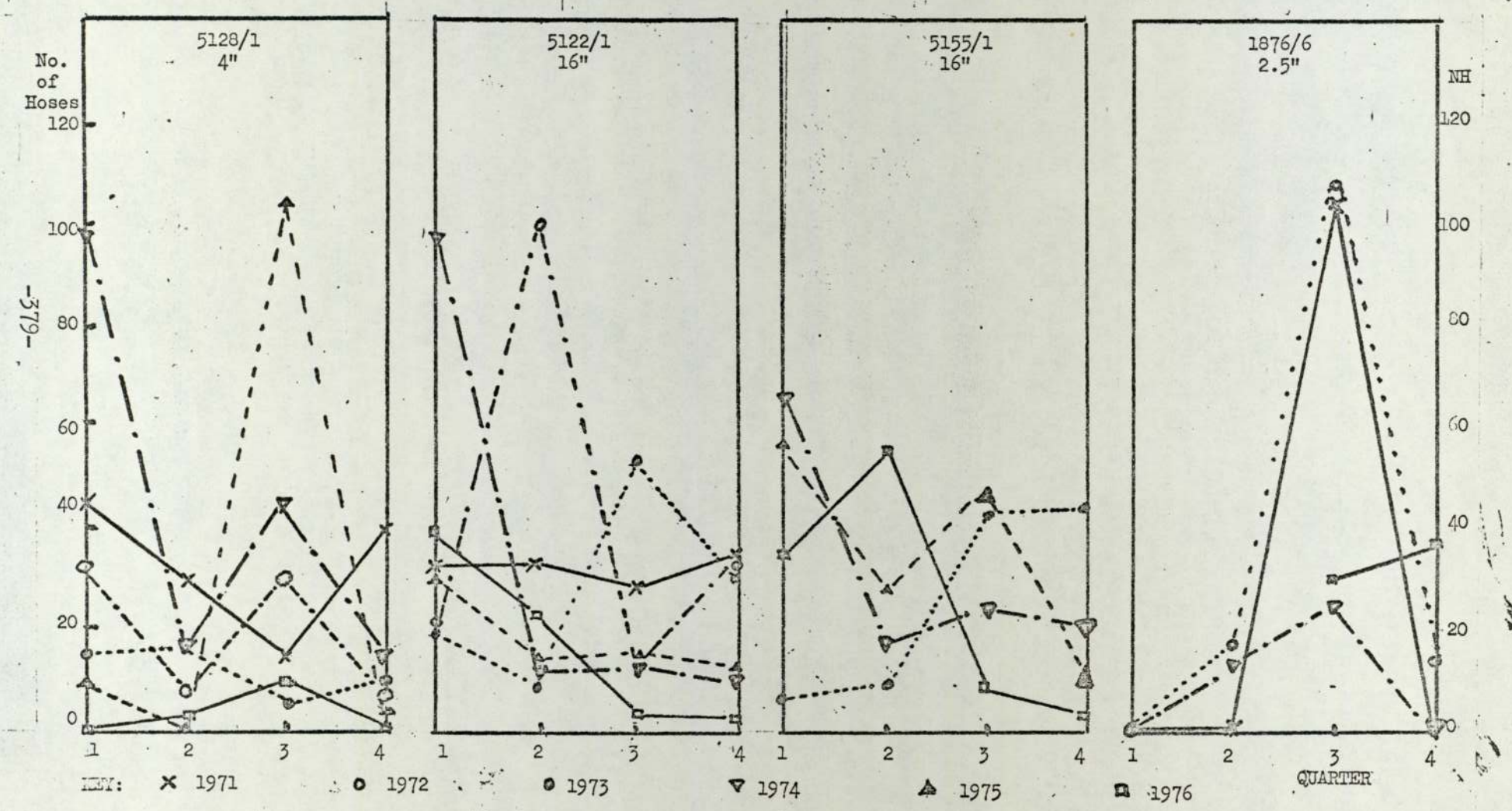


APPENDIX 5.10 (Cont.)

APPENDIX 5.10 (Cont.)



APPENDIX 5.11 TIER CHARTS



APPENDIX 5.12 MARKET RESEARCH DATA-ANALYSES

MONOBUOY ANALYSIS

AREA: MIDDLE EAST (30 MONOBUOYS)
INSTALLATION: EGPC, SUEZ NO.1, EGYPT
DATE INSTALLED: 1976
TYPE OF SYSTEM: CALM
BUOY INSTALLED BY: IMODCO
MAX. TANKER SIZE (DWT): 250,000
MAIN HOSE SUPPLIERS: PIRELLI
FLOATING STRING(S): 2 x 24" (EACH 2x16"TAIL)
SUBMARINE STRING(S): 2 x 24"

FLOATING HOSES

TYPE AND SIZE	HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Super Sampson 12"						
16"						
20"						
24"	2	2	2	2	2	2
Selflote 12"						
16"	8	2	3	3	2	3
20"						
24"	42	14	14	14	14	14
Taper 24/20"						
20/16"						
16/12"						
W/W Tail 12"						
16"						
Barbell 12"						
16"	4	4	4	4	4	4
Estimated Hose Life: 3 Years						
TOTAL	56	22	23	23	22	23

SUBMARINE HOSES

TYPE AND SIZE	HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Sampson 12"						
16"						
20"						
24"	6	1	2	3	1	2
Standard 12"						
16"						
20"						
24"	4	1	1	2	1	1
Estimated Hose Life: 3 Years						
TOTAL	10	2	3	5	2	3

APPENDIX 5.12 (Cont.)

MONOBUOY ANALYSIS

AREA: EUROPE (13 MONOBUOYS - EXCLUDING NORTH SEA)
INSTALLATION: SHELL, ANGLESEY NO.1, U.K.
DATE INSTALLED: 1976
TYPE OF SYSTEM: CAIM
BUOY INSTALLED BY: SBM
MAX. TANKER SIZE (DWT): ?
MAIN HOSE SUPPLIERS: APG, DUNLOP
FLOATING STRING(S): 1 x 24" (15"TAIL)
SUBMARINE STRING(S): 1 x 24"

FLOATING HOSES

TYPE AND SIZE		HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Super Sampson	12"						
	16"						
	20"						
	24"	1	1	1	1	1	1
Selflote	12"						
	16"						
	20"						
	24"	20	3	6	7	7	7
Taper	24/20"	1	-	1	-	1	-
	20/16"	1	-	1	-	1	-
	16/12"						
W/W Tail	12"						
	16"	2	2	2	2	2	2
Barbell	12"						
	16"	1	1	1	1	1	1
Estimated Hose Life: 3 Years							
TOTAL		26	7	12	11	13	11

SUBMARINE HOSES

TYPE AND SIZE		HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Sampson	12"						
	16"						
	20"						
	24"	2	1	1	1	1	1
Standard	12"						
	16"						
	20"						
	24"	2	1	1	1	1	1
Estimated Hose Life: 2 Years							
TOTAL		4	2	2	2	2	2

APPENDIX 5.12 (Cont.)

AREA HOSE ANALYSIS

AREA: SOUTH AMERICA SUMMARY
(16 MONOBUOYS)

FLOATING HOSES

TYPE AND SIZE		HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Super Sampson	10"	2	2	2	2	2	2
	12"	3	3	3	3	3	3
	16"	8	8	8	8	8	8
	20"	8	8	8	8	8	8
	24"	6	6	6	6	6	6
Selflote	10"	42	28	28	28	28	28
	12"	63	21	22	23	22	21
	16"	164	78	77	79	78	77
	20"	180	67	69	64	67	69
	24"	117	41	40	38	41	40
Taper	24/20"	2	1		1	1	
	20/16"	11	4	3	4	4	3
	16/12"						
W/W Tail	12"	6	6	6	6	6	6
	16"	48	48	48	48	48	48
Barbell	12"	5	5	5	5	5	5
	16"	24	24	24	24	24	24
TOTAL		689	350	349	347	350	348

SUBMARINE HOSES

TYPE AND SIZE		HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Sampson	10"	4	2	4	2	2	4
	12"	6	3	2	2	3	2
	16"	20	10	9	10	9	10
	20"	16	7	6	7	7	6
	24"	14	6	7	8	7	5
Standard	10"	5	4	4	4	4	4
	12"	7	4	2	3	3	3
	16"	28	14	14	14	15	14
	20"	19	8	8	8	9	7
	24"	16	8	7	8	9	6
TOTAL		135	66	63	66	68	61

APPENDIX 5.12 (Cont.)

AREA HOSE ANALYSIS

AREA: WEST AFRICA SUMMARY
(16 MONOBUOYS)

FLOATING HOSES

TYPE AND SIZE		HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Super Sampson	12"	1	1	1	1	1	1
	16"	9	9	9	9	9	9
	20"	8	8	8	8	8	8
	24"	9	9	9	9	9	9
Selflote	12"	13	5	4	6	5	4
	16"	188	71	70	71	71	70
	20"	161	63	62	67	63	62
	24"	205	82	81	85	82	81
Taper	24/20"						
	20/16"	3	1	2	-	2	1
	16/12"	4	3	2	2	2	2
W/W Tail	12"	8	8	8	8	8	8
	16"	40	40	40	40	40	40
Barbell	12"	5	5	5	5	5	5
	16"	24	24	24	24	24	24
TOTAL		678	329	325	335	329	324

SUBMARINE HOSES

TYPE AND SIZE		HOSE LENS. IN USE	Projected Replacements 1977	1978	1979	1980	1981
Sampson	12"	2	1	2	1	2	1
	16"	18	11	10	10	10	11
	20"	36	22	25	22	25	22
	24"	4	2	3	2	3	2
Standard	12"	1	1	-	1	1	-
	16"	25	14	14	14	14	14
	20"	34	23	21	22	23	21
	24"	4	2	3	2	3	2
TOTAL		124	76	78	74	81	73

APPENDIX 6.1 APPRAISAL BY MARKET PLANNING MANAGER

DUNLOP

OIL AND MARINE DIVISION
Moody Lane
Pyewipe
GRIMSBY
South Humberside
DN31 2SP
Phone 0472 59781
Telex 52184

DW/JJ

13th July, 1979

Mr. A. Dufty,
22 Bramley Close,
Southgate,
LONDON. N14

Dear Alan,

Just a line to let you know how we are getting on with the computerised Management Information System after going "live" in January, 1977.

As you know, the manual system in existence prior to 1977 was somewhat disjointed and unreliable with great amounts of time, effort and patience necessary to get at the information. Although the computerised MIS at first appeared to baffle and confuse many of the people operating and using the system, I am very pleased to report that after great effort, initially by yourself of course, and individual education of all concerned that the system has now become extremely efficient and effective.

The analysis reports, based upon order, sales and marketing information, are now being used by management to good advantage. Perhaps the most dramatic improvement has been in the accessibility of information held on file via the Quest facility. This has certainly helped my own particular department a great deal.

Since you left the division, several changes and additions have been made to the system in order to keep it in line with reorganisation within the division and its requirements. Firstly, a new market, 07 - Europe has been introduced to enable its separation from the export market. This was brought about by the European market now coming under the direct responsibility of the U.K. (now European) Sales Department. Several changes were necessary to the entire system and the results have certainly justified the work done.

Secondly, a Forward Forecasting System is presently being introduced which is designed to forecast production (and hence turnover and gross contribution) on a monthly basis. This is based upon columns 46 - 48 of the order input form and I would anticipate accurate data from the system within a year.

From some experience now, I feel that the only problem is one of keeping "on top of" the system and ensuring that all is kept running smoothly. The major problem has probably been of keeping the Outstanding Order File "tidy" as residual values, usually due to changes in currency values have a habit of building up quickly and distorting certain reports. However, we are working on this and we seem to be winning.

Cont'd. . .

1976
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All in all Alan, the system is now working smoothly, the results justify all the work put in by all concerned and I would personally like to thank you for all the very hard work and long hours I know you put in on the project.

With best wishes for the future.

Yours sincerely,

D. Wyse
Marketing Services Manager

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REFERENCES

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