THE UNIVERSITY OF ASTON IN BIRMINGHAM

DEPARTMENT OF BUILDING

THE DETERMINATION OF A BASIC MANAGEMENT SYSTEM FOR SMALL CONSTRUCTION FIRMS WITHIN THE WESTERN REGION, WITH RECOMMENDATIONS FOR EDUCATION AND TRAINING PATTERNS

by

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SUMMARY

In terms of manpower, turnover and value to the National economy, Building is a major industry but unlike other major industries it has the distinction of being in the main fragmented into small firms.

However small the community, there are buildings to be maintained, repaired and extended, thus justifying small local units. The problem of these very small firms is one of determining the basic needs for sound, economic survival with appropriate management structures. Only too often the problems of the small firm have to be met and solved by one person and there is a need for simple well worked out procedures if this person is to meet with economic success the day to day problems that arise in building.

The purpose of this thesis is to study the small builder in the South West Region going about his daily work and to identify his problems with a view to establishing procedures and techniques which will enable him to survive in a labour intensive and cost conscious industry. As a result of this survey, the small firms' problems have been identified and solutions posed in the form of training programmes - they are little more than guide-lines but could prove to be life-lines.

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CHAPTER 1

INTRODUCTION

INTRODUCTION

New skills and methods are being introduced almost daily in the Construction Industry, sometimes at variance with the traditional way, but often supplementing old skills to meet the requirements of a modern age. This necessitates, on the part of management, openness of mind to new ideas and foresight, courage and adaptability in accepting change.

The Industry is realising more and more that to achieve increased productivity, prime importance at the present time must be placed on encouraging and developing enlightened leadership at all levels of management. The general management role in this modern industry is of major importance since this depends on the smooth running of the day to day business of a company. Their task is the co-ordination of manpower, materials, machinery and money to achieve maximum efficiency which calls for special management qualities and training.

The prime motivation for embarking on this research stems from personal involvement at all levels in the construction industry and in particular experience gained from being associated with small family building businesses. This resulted in a conviction that the small builder is of inestimable value to the community and he is not only inadequately rewarded, but is highly vulnerable to the increasing rate of change in the industry. The business must therefore be maintained in a healthy and thriving condition, and it is in the realm of management systems and techniques in particular that he needs training and education in order to safeguard his business health.

Personal involvement in further education with considerable emphasis on management training for the small firms in the construction industry has provided further evidence that there is a great need to improve

management techniques and systems in the industry overall and in particular a need to emphasise the importance among the smaller firms. Requests from employers' organisations, and from many individual employers to carry out such training and to initiate research into specific techniques needed by small builders, strengthens the belief that this project which is to examine and determine such management systems is worthwhile.

It has been recognised that the small builder is essential to the community - in other words, there is a continuous market for his services. He is involved in a stable and steadily expanding market, yet he still heads the bankruptcy lists. (See Appendix I) As a tradesman, the jobs are easily within his capability, but he is not really capable of managing and organising the activities and finances efficiently. He is not skilled enough in the paper and pencil and thought requiring areas such as administration and, in particular, in the logistics of the business. He is weak in the developed skills required when juggling with planning the use of resources particularly the use of money - financial aspect in fact. He is by nature more suited to action than planning and staff-work, but because he is in a small business he is both policy maker, executive and operative. He must become an expert in the mysteries of controlling finance, solve the intricacies of multi-discipline design, master construction techniques, understand contractual requirements which often baffle the best legal brains and by no means least, exercise the wisdom of Solomon in maintaining day to day labour relations. He cannot avoid this situation and if he is to succeed, even survive, he must acquire sufficient skill in the non-craft, non-technical fields.

The specific aim of this thesis is to carry out research into such problems and to suggest adequate systems which will provide the small builder with the answers and the means of handling such problems. The main problem concerning the project in general is the lack of co-ordinated

information, or even the availability of information in any recognisable or useful form, there are few research/relevant papers available on the subject and none which are specifically directed towards the objectives of this thesis.

In 1968 the Construction Industry Training Committee was informed by the Builders' Federation that there was a need for some form of management training for the small firm sector of the industry. In response to this requirement the Management Course for Principals of Small Firms was designed and first offered at the Construction Industry Training Board Training Centre, Bircham Newton, Norfolk in 1968, which the author was invited to attend in an advisory capacity.

It was soon established that there was a need for further investigation into small firms operating management but owing to the financial problems encountered by the Construction Industry Training Board this did not materialise. Research therefore has been an essential prerequisite to any emergent solution and, indeed, even the generally acknowledged empirical definition of a small firm is suspect.

WHAT IS A SMALL BUSINESS?

A definition of a small firm is not easy to find. Some definitions put forward are:-

1. A firm that employs not more than 200 employees (R1)
2. A firm that employs not more than 50 employees (R2)
3. A firm that employs not more than 25 employees (R3)
4. A firm that has no contracts exceeding £20,000 value (R4)
5. A firm which makes a profit not exceeding £5,000.00 per year (R5)
6. A firm having a small share of the market (R6)

The research carried out for this thesis has desclosed the fallacy of all six statements, because it has been shown that a large firm employing

a large number of staff in some cases does not make profits comparable with the numbers employed, and a small firm of four or five employees would make a five figure profit. So it is quite clear that neither the number of employees nor the amount of profit will give a clear definition of a small firm.

PROBLEMS OF THE SMALL BUILDER

The major problem areas in a small construction firm may be defined as:-

Weakness in organisation and method

Lack of information

Limited finance (capital)

Control of cash flow

Appreciation of cost, estimating for a job

Recording of works completed

Supervision and training

Organisation and Method

It has been often found that the small builder is lacking in organisation and method which becomes more necessary in an industry of changing techniques and ideas. This section of the industry is very complex, being made up of many sections, from the general builder to the specialist sub-contractor - as can be seen from (Appendix 1 Table 2) makes up 91 per cent of the industry. Most of the small works belong to general repairs, alterations and the occasional new home. The definition of the small firm is a matter of opinion, but this thesis is considering the firm not employing more than 25 men. It is found that most of these firms started up from craftsmen who had the zest and drive to be their boss, and had some knowledge of other trades. The limited size of the firms makes it necessary for the owner to work alongside his

employees as much as possible, thus causing him to neglect the importance of the management side of the business which must receive attention if the business is to run with some degree of organisation and profitability.

Finance and Cash Flow

In these days of ever-increasing costs, "finance" must be the first priority, and small businesses must ensure that there is a steady flow of liquid cash coming in to meet the day to day commitments of the business and to avoid the worry of a too-large overdraft at the bank. The main cause of financial problems is due to over trading above the business financial standing, (taking on too large a job or too much) and poor organisation which results in accounts not being sent out shortly after the job has been completed. This tends to starve the business of cash. It must be remembered that a satisfied client will usually pay up when the job is new in their mind, but as time goes by, the job is forgotten and the money allocated is used for something else. The arrival of the account comes as a shock, and the builder has to wait. By good accounting management, the business will be assured of a good "cash flow".

Estimating

Another area of poor return for the small builder can be attributed to the lack of knowledge on the definition of actual costs and how they occur, and what has to be taken into account in order to meet the business costs and job costs. Time and thought must be given to the careful consideration of any job which is to be priced. The job must be thought out right through from commencement to completion, including leaving the job clean and tidy on completion. A detailed estimate should always be built up, based on known expertise and established business yardsticks, and compared at the end of the job with actual standards achieved.

The charging of additional works presents a problem especially when instructions are given direct to the men on site from the client.

Records

Methods of recording business activities are another problem for the small man, this being mainly due to the limited time he or his wife has. If this aspect of the business is done properly, it will add much to the smooth running of the business. Preparation of accounts from properly documented papers are valuable for future reference when costing work, time sheets, materials, transport, sub-contractors' work, etc. It is essential that enough is recorded to ensure a complete picture of the job in hand. Select a simple system of book-keeping that can be easily understood and gives the least amount of work but the greatest degree of accuracy of the necessary details required for efficient control.

Supervision and Training

It is well known that the name of the industry is in need of an uplift: this could be greatly assisted if more attention were given to the problem of adequate supervision at all levels and because this is lacking, the responsibility of this is placed on to shoddy work which is found throughout the industry. Supervision may seem to cost time, but in the end good supervision saves time as it saves being called back to correct faults thereby proving beneficial to both the client and the builder. Good supervision is linked with good training, because one is complementary to the other. Small builders have little time for study but the basis of a well-run business is assured if time is found to give attention to those elements of management sufficient in depth to meet the business demands.

THE THEME OF CHANGE

Many of today's giant Builders began as very small businesses and it is recognised that change is inevitable and that to survive, the people in charge of a business must strive to keep improving its products,

methods and services. It is also widely recognised that a somewhat different management approach has to be taken on planning and decision making on strategic matters than on planning and decision making in regard to the more normal type of operating matters. It is important that the small builder accepts the fact that operating management and strategic management are inter-twined and that their inherent differences be recognised. As already stated, this thesis is primarily concerned to examine management development within a small company. Change can be considered an essential ingredient to such development and follows the following theme:-

1. The most important development affecting business in the last decade is the rapidity of change, and management response or lack of response to these environmental changes will in the end, determine the business survival as a viable and continuing contributor to the principals.
2. The principals must become more aware of their investment alternatives and be more sensitive to long-term inflationary pressure. New growth areas should be investigated to prevent the stigma of declining values relative to all other investments and the declining purchasing power of the dividends.
3. The fact of "grow" or "perish" or more aptly "grow" or "be grown" to achieve present achievements or to expand into new fields, must be the challenge to management in attracting earnings growth, in an environment of rapid change.
4. The final point is to recognise the two types of management:-
   (a) Operating management and so called (R6) 'strategic management' is perhaps the answer to this challenging problem for the small and independent company. The object of strategic management is to keep the business mix in a healthy position

by looking at new areas of opportunity and establishing a corporate policy by sorting out the weak areas of work and developing the good and profitable areas. In the past, good operating management has been the most important factor contributing to the successful development of a company. This today is no longer true. It is necessary to obtain the right "business mix" between strategic and operating management and use new techniques for a long term success of today's business.

The primary objective of management is to provide a steady attractive profit, and if necessary growth in an environment of rapid change. Two things are needed to do this:-

(i) Obtain maximum operating results from the present business resources consistent with the profit margin available to them - "Mechanics of management".

(ii) Constantly review the company policy so to keep the right "business mix" within the company, sorting out the company's strength and weaknesses, and this should apply to both new areas of work and existing areas of work - "Dynamics of management".

Strategic planning involves setting cverall corporate objectives, using information from present operations and planned development. Management should ask the questions "What are we in business for?" "Do I need to expand?" "Is it necessary to expand?" and seek answers through strategic management because we are in a climate of business change, and educational development. Opportunities for growth are as good or better than ever and some of today's small builders will surely become great enterprises within the next two decades. However, the method of growth today must be planned more

sophisticatedly than in the days when father did it this or that way and when individual capacity, energy and vision provided the motive force. The small business can use new techniques, but not to the same extent as a big business because the cost of doing so would kill the advantages gained. It can and should use new techniques in a simple form, leaving the principal to translate the benefit to the business through his close knowledge of all its procedures in the day to day activities of the business.

Research will show how an application of critical analysis to any technique may be applied before adapting it to the special conditions existing in any firm. Owing to the number of firms and multiplicity of organisation structures, there can be no one set method or technique suitable for all. Logical thinking, together with the measurement of effectiveness underline all the management developments within an organisation and self-help rather than help from outside is considered the best safeguard for the growth of a firm and will produce a better service to the community. Hence the need to determine a training pattern.

To sum up, a small business faces competition from other small businesses and from large businesses, and it will be necessary for the small businessman to take advantage of all the new techniques, methods and aids that are available to him to meet this challenge.

CHAPTER 2

RESEARCH OBJECTIVES AND PROCEDURES

PROCEDURE OF RESEARCH STUDY

The study was programmed to spread the investigation over a period of four years. This was to enable the basic field test to be carried out and was designed as follows:-

Year One - Establishment of the place of the small firm in the construction industry and the selection of a sample for further investigation from the South West Region.

Year Two - Identification of the management structure of small firms in the South West Region.

Year Three - From the information obtained, examination and establishment of working methods and procedures for small firms with particular reference to management control.

Year Four - Evaluation of the information collected from a representative group of small firms and the construction and implementation of a suitable framework for management training.

PROCEDURE OF DATA COLLECTION

Methods of operation were studied first to give the background knowledge necessary to determine the essential common care of skills necessary for the management of a small firm.

Questionnaires numbered 1 and 2, Appendix 2, were designed to establish the size, staffing, workload and financial efficiency of the small firm. In conjunction with the Construction Industry Training Board and the National Federation of Building Trades Employers, the questionnaires were sent out to 300 firms throughout the western region. An 80 per cent return was obtained from questionnaire number 1 and a 40 per cent return from questionnaire number 2.

Questionnaires numbered 3 and 4, Appendix 2, were designed to evaluate and update the content of the recommended training programme and was completed by all course members.

The most suitable way to obtain this type of research information is by personal contact with employers and principals in their work situation - by personal site visits and discussions on specific topics. This has been carried out within the South West region and represents the main source of all facts included in this thesis. Principals and senior staff from 87 small firms have attended specially designed Management Courses to establish their training needs. In addition discussion groups were set up in the region where the whole field of the small firms' operating area were considered.

Year One - The Small Firm's Place in Industry

(i) Determine the national pattern of firms in the Construction Industry.

(ii) To establish contact with the National Federation of Building Trades Employers for access to members.

(iii) Establish contact with the Federation of Master Builders for access to members.

(iv) Design and send out questionnaire to select sample of small firms.

(v) Analyse results of questionnaire (see Appendix II).

(vi) Visit Group Training Officers and arrange discussion groups with small firms.

(vii) Design and organise a course for training of management principals in the small firm.

Year Two - Management Structure of the Small Firm

(i) Analyse returns from the training course and update the course content.

(ii) Compare the national pattern from the sample collected in Year One (iv).

(iii) Visit a number of small firms to establish the management structure and working methods.

(iv) Design and organise a course for training.

Year Three - Management Control

(i) As Year Two (i).

(ii) Determine the standard procedures for the small firm.

(iii) Carry out field tests on control information and analyse results.

Year Four - The Training Programme

(i) As Year Two (i).

(ii) Offer final suggestions for a training programme.

The information compiled from the questionnaires is backed by detailed studies of four companies each of which operate in rural districts covering all aspects of the small builders' work as detailed in the Classifications of the Small Firms on Page . Three of these companies assisted greatly in the research by affording facilities so that detailed field tests could be carried out within their establishments.

FIELD TESTING ROUTINE

The standard procedures were discussed with principals and senior staff in a number of small firms within the region. The work they carried out included general house maintenance, carpentry and joinery, plumbing and the one-off speculative building. Each of the organisations were offered a number of procedures to examine, and detailed discussions were held with three companies, one of which specialised in plumbing and heating work. As a result of these meetings and discussions procedures were modified and the versions shown in Figures 1-12 on Pages 60-85 represent those that were finally agreed as being a working solution to the small firm business situation.

RESEARCH OBJECTIVES

1. To identify the current management and operating structure of small firms in the South West Region of the construction industry.

2. To establish and collate basic data and information relating to the control systems of small construction firms and to identify the problems that arise in the course of the day to day running of such firms.

3. To make recommendations on the aims and content of small firm management education and training programme.

CHAPTER 3

THE PLACE OF THE SMALL FIRM IN INDUSTRY

THE PLACE OF THE SMALL FIRM IN INDUSTRY

The Construction Industry serves every aspect of our environment and employs approximately 7 per cent of the working population and provides more than half the gross domestic fixed capital. Since 1954, the growth of the industry has risen steadily by 40 per cent with the exception of year 1969. As can be seen from the national statistics, (App 1:T 3) the labour growth shows only a marginal increase which indicates the output per operative has risen substantially.

For statistical purposes the construction industry is defined under the Standard Industrial Classification 1958 Order No XVII which reads:-

> "Erecting and repairing buildings of all types. Constructing and repairing roads and bridges; erecting steel and concrete reinforced concrete structures; other civil engineering work such as laying sewers and gas mains, erecting overhead line supports and aerial masts, opencast coalmining, etc. The building and civil engineering establishments of Defence and other Government Departments and Local Authorities are included.
>
> "Establishments specialising in demolition work or in sections of construction work, such as asphalting, electrical wiring, flooring, glazing, installing heating and ventilating apparatus, painting, plastering, plumbing, roofing. The hiring of contractors' plant and scaffolding is included."

It also includes persons other than those occupied on actual construction work, e.g. administrative, technical, electrical, transport workers and ancillary staffs, together with construction workers employed by Local Authorities.

The labour force is mainly employed by private contractors, local and public authorities, but there are many private firms outside the industry who also employ staffs of building workers on both new construction and repair work.

Contractors can be divided into two main classifications:-

(i) General building to include: building and civil engineering, and civil engineering contractors.

(ii) Specialist sub-contractors to include: electrical wiring, flooring, roofing, etc.

The overall size of the industry is difficult to measure, but the under-mentioned figures provide a rough comparison:-

Manufacturing	Output (£million)	Labour (000's)
Food (including drink and tobacco)	4,477	819
Chemical	2,692	520
Metal making	2,479	637
Engineering, etc	9,013	2,275
Textiles	3,081	1,338
Others	3,771	1,462
Non-Manufacturing		
Mining	1,031	631
Construction	3,930	1,695
Gas, electricity and water	1,593	413

Figures from the 'General Abstract of Statistics' 1970

The above short list shows that engineering represents the largest industry, but under this heading includes several industries, i.e. aircraft, electrical goods, heavy machinery and plant. This will illustrate the problem one has to face when trying to define the scope of a particular industry or group of occupations. All statistical information given in this research is based on the Standard Industrial Classification.

THE SMALL FIRM

For the Construction Industry, the size of a small firm has generally been taken as one employing up to fifty working staff in total, irrespective of its geographical location. After working in the South West Region for the last six years, experience has shown that this is a reasonable and fair assumption for the city and industrial areas, but when looking outside such areas, a firm employing fifty staff would be considered very large. It is therefore suggested that the geographical location of the firm has to be taken into account when size is being determined, i.e. a firm in Minehead employing twelve staff would be considered large when looking from Minehead, but if viewed from the national pattern, would be considered very small.

In July 1969 the Bolton Committee was set up to consider the role of small firms in the national economy, the facilities available to them and the problems confronting them, and in November 1971 the report was published. The guidance offered the Committee by the Government was that a small firm might be defined broadly as one with not more than two hundred employees, but this should not be regarded as a rigid definition. The committee found it impossible to accept the employment size criterion. It took into account the following factors:-

1. A small firm being one that has a relatively small share of its market.
2. A small firm being one that is managed by its owners.

The conclusion drawn by the committee for the Construction Industry was a firm not employing more than twenty-five employees would be classified in the report as a "small firm".

Small firms which number 66,777 account for:

91 per cent of all firms

23 per cent of net output

27 per cent of employment.

They carry out 48 per cent of all repair and maintenance work

28 per cent of all new housing work

9 per cent of all new non-housing work.

The most important section of work for the small firms is in the fields of repair and maintenance with the occasional new house in the private sector. This is the smallest area of work for the industry as a whole, representing only 10 per cent.

CLASSIFICATION OF SMALL FIRMS IN THE SOUTH WEST REGION

The small firm industry consists of a number of different faculties, but generally can be classified under the following headings:-

1. General builders doing mostly repairs and maintenance work and some new work.
2. Builders operating as managers to the industry and sub-contracting work.
3. Specialist sub-contractors, mainly craft based - i.e plumbing, flooring, tiling, carpentry, etc.
4. Plant hire firms - small plant for small builders.
5. General builders specialising in new housing.

REASONS WHY SMALL FIRMS ARE IMPORTANT

Small firms have certain characteristics which determine their importance in the industry:-

1. Flexibility - this is of particular importance in repair and maintenance work, and in speculative housing.
2. Localised demand - small towns, small social units accustomed to thinking small, strong local loyalties.
3. Good labour relations - because they are small, they have good labour relations and low labour turnover.
4. Capital requirements - low capital requirement for entry is required, particularly with a craft based firm.

5. New industries - the small firm is the traditional breeding ground for new firms, and is the seed bed from which new large companies will grow to challenge and stimulate the established leaders of the industry.

WHAT IS A SMALL BUSINESS?

As already mentioned in the introduction, the definition of a small firm is not easy to find and even the Bolton Committee after a considerable amount of discussion came to the conclusion that size could not be determined only by the number of persons employed. Other factors had to be taken into consideration. When size is determined by the annual turnover, a different picture is produced when compared against the number of persons employed. This is mainly due to small firms carrying out high value contracts with sub-contractors who are not directly in the employment of the small firm. For the first type of firm, the size would be reflected in Turnover, but only need employ very few staff; wherein the second type of firm could have a small turnover but directly employ more staff.

It is quite clear therefore that neither the number of employees nor the amount of profit or turnover will give a clear definition of a small firm. It can be seen from Appendix 1 Table 4 and 5 that the national statistics (based on number employed) show the predominance of small firms come under the two to seven employees. In Appendix 1 Table 6 the sample taken in the South Western Region follows that of the national pattern, but in Appendix 1 Table 7, when looking at salaries and wages paid, the area moves to the right. This suggests that a ratio of these two would be a reasonable solution for sizing of firms which could be a subject for further investigation.

A better way is to agree that a small firm is one that has minimal executive staff and is run by the principal who controls all the executive functions himself, delegating day to day operations to his

employees. It is not then profit, turnover, or the number of employees that decides the size, but the limit of delegated executive authority. For example, a building business run by the owner employs a foreman who will run the day to day contracts by direct delegation from the principal. When the business grows, and the delegation is limited to four executives but remaining under close supervision of the owner, the line of delegation being short, still suggests a small firm. Paper work need not be increased to a great extent as the owner will carry in his head enough facts to give him a general picture of his business. As the business grows and the range of delegation is increased, together with the number of executives to control the management functions, then the business runs out of the small firm category. A good sign of this is when the owner tends to think he is losing control, because all the functions he himself used to perform have now been delegated.

For the purposes of this research the following statement has been applied as fundamental throughout the investigation:-

STATEMENT - A small business is one when the owner has direct control over all its executive functions and retains close supervision of all activities.

All the firms visited in the South Western region generally fall into the above category and were in agreement with this premise.

THE SMALL FIRM'S PLACE IN THE INDUSTRY

The national pattern of the Construction Industry is shown in Appendix 1 Table 4, and it should be noted that there are very few large firms and a great number of small firms employing some 25 per cent of the total labour force. In all there are 43 per cent general building contractors, 3 per cent building and civil engineer contractors and 2.1 per cent of civil engineering contractors of which a small number carry out building work, and 51.9 per cent of firms which are either specialist by trade or by construction process.

The specialist firm/sub-contractor makes a significant contribution to the small firm industry, together with the labour-only contractors and investigations indicate that this pattern is on the increase, despite the Government legislation on labour-only sub-contractors. New materials, processes and new techniques of construction tend to increase specialisation and encourage the growth of sub-contracting.

The total number of firms and operatives are broken down in 22 principle trades as in Appendix 1 Table 8, with the General Builders being the most numerous, but Builders and Civil Engineers with only 2,201 firms employ the largest proportion of operatives.

When analysing the size of the firms, it can be seen that groups 2 to 7 of the General Builders dominate both numerically and comparatively. Their existence comes about because in our society, there is a need for the small firm, which performs a very valuable service and at the same time fulfils the various social and personal needs. From the sample taken in the South Western Region, Appendix 1 Table 6, this pattern is even more reflected showing a predominance in the 2 to 7 group, this being due to the geographical spread of small towns and villages throughout the area. It therefore shows that the small firm is here to stay, and that money, time and effort must be spent in making these small units efficient in the form of planned training to improve the most valuable service they provide to the community.

STATISTICS ARE AVAILABLE FROM A NUMBER OF SOURCES FOR THE NUMBER EMPLOYED IN THE CONSTRUCTION INDUSTRY

1. Census Population estimates of employees and self-employed.
2. Department of the Environment statistics of the labour force in construction based on a census of the total number of firms known.

3. Board of Trade Census of Production data on employees and working proprietors.

4. Department of the Environment estimates of employees in employment based on National Insurance cards.

The Phelps Brown Committee Report states:-

"A comparison of the figures of the Department of Environment and the 1966 Census of Population suggests that the Department of the Environment now misses over 100,000 self-employed persons, some labour-only sub-contracting." (Page 20)

The Census of Production data has a rather lower total labour force in private firms than the Department of the Environment, and is also presumably missing these persons.

LABOUR

Small Firm Employment

The following table shows the way in which the total personnel of small firms in the industry is divided by the size of firm; 23 per cent of all operatives are employed by small firms.

Great Britain — April 1970

Size of Firm	Number of Firms	Working Principals	A P T & C	Operatives	Total Employment
Nil-1	20,355	18,702	397	-	19,099
2-7	33,118	42,364	13,367	63,547	119,278
8-13	7,946	6,933	13,017	60,135	80,085
14-24	5,358	2,876	16,462	77,146	96,484
TOTAL	66,777	70,875	43,243	200,828	314,946
Per cent of the Construction Industry	91	98	19	23	3

EFFICIENCY IN THE USE OF MANPOWER

Output per head is often regarded as a measure of efficiency in the use of manpower. This is difficult to measure because of the different type of work carried out by the various types of small firms as classified. The 1958 and 1963 Census of Production statistics show that firms employing fewer than twenty-five persons have a significantly lower output per head than large firms. In both years, the nett output (R8) was 33 per cent higher in large firms than in small firms. In 1970 the value of the workload for the large firm is £0.814m/employee, and for (App 1 T 3) the small firm £0.700m/employee.

This improvement could be due to:-

(i) Small firms becoming more efficient

(ii) The cost of work done by the small firm rising more rapidly than that of the larger firm

(iii) Output being based only on a quarter of the year, and could have been taken on a good quarter, i.e. winter period

From the questionnaire in the sample taken, the average output (App II Q No 2) results compare very favourably as follows:-

Firm Size	Operative Output Per Head 1971-72
General Building and Maintenance Work	£3687-5000
New Housing	£4260-5142
Specialists work	£4500-5000
Value of overheads to turnover	5%-12%
Percentage of works sub-contracted	25%-33⅓%
Average period between completion of weeks and payment by client	10 weeks
Average credit period taken by clients	5-11 weeks
Number of times capital is turned over for the year	4-6 times

The extract from Interfirm Comparison (Appendix I Table 9) highlights the following:-

(i) House builders are more successful than general builders

(ii) General builders turn over their assets faster than house builders

(iii) House builders get paid quickest by their clients

To summarize the structure of the industry, it can be stated as:-

(i) Craft based

(ii) Mainly small firms who employ 0-24 operatives

(iii) Medium and large firms who employ 24-114 operatives

(iv) Private and local authorities

(v) Specialist sub-contractors

(vi) Labour-only sub-contractors

CHAPTER 4

MANAGEMENT IN PRINCIPLE

MANAGEMENT PRINCIPLES

The acknowledged father of scientific management is F W Taylor who was the first man to apply the methods of science to the problems of management in an effort to improve industrial efficiency. Others include Frank and Lillian Gailbrith who were responsible for the development of work study and method improvement, and Mary Parker Follett and Henri Fayol for improvements in the management arts. They all contributed literature on the subject which laid down the foundations of all management theory which is used in today's modern management practice. (R8)

PROCESS OF MANAGEMENT

Management is concerned with the following process:-

(i) Forecasting - Management 'Science'

(ii) Planning - The planning function which is the

(iii) Organising - Thinking Processes

(iv) Motivating - Management 'Art'

(v) Controlling - Executive function which is the Action

(vi) Co-ordinating - Processes dealing with people

(vii) Communication - This process provides the link between all the other functions so to create a cycle of information and feed back

To summarize, the management role is an exercise in deliberate and decisive responsibility combining all the above processes, utilizing the skill available and welding it into a working force, using people, ideas and merchandise. In practice, the processes do not stand out in so simple a form, but the discerning principal/manager is able to analyse the problems and recognise the implication of each function as shown in the following table:-

Fields / Processes	Finance	Design	Development	Marketing	Production	Maintenance	Personnel	Office	Purchasing
Forecasting	Financial policy Investments Insurances			Sales policy Estimating	Output standards Labour requirements	Buy/hire plant	Interviews Promotions Labour policy		Stockpiling Provisional orders
Planning	Cash requirements Supply of working capital Financial budget	Drawing schedule Accommodation schedule Cost analysis		Market research Advertising campaigns	Construction programme Method statement Site layout Short term plans Method study	Plant availability	Training schemes Executive development Staff availability	Wall charts Office lay-out	Delivery programme Sub-Contract time-table
Organising	Shares register	Check lists Standardisation		Check lists for site visit report	Job specification Process chart Site organisation Work measurement	Planned maintenance lists Hire rates	Organisation Chart	Forms design Office procedure	Standard procedures for inviting prices, ordering, progressing and hastening
Motivating	Dividends	Competitions	Sense of leadership in the industry	Advertising Public relations Discounts	Working conditions Site welfare 'Plan for Safety'		Incentives Company morale Company symbols Profit sharing		Penalty clauses

Continued . . .

Fields / Processes	Finance	Design	Development	Marketing	Production	Maintenance	Personnel	Office	Purchasing
Controlling	Useful ratios Accountancy Cost control Standard costing	Site reports Cost planning		Successful tenders Percentage	Progress record Plant utilisation Quality control Statistical methods	Spot inspections	Personnel reports Merit rating	Site office inspections	Stores control
Co-ordinating	Bank accounts	Comparison of drawings with bills of quantities	Seminars		Site meetings Productivity committees		Suggestion box Joint consultation		Progressing deliveries Comparison of tenders
Communicating			Published papers Lecture to Institutes						

The responsibilities of management showing the interrelation of management processes with industrial divisions or fields.

WHAT IS MANAGEMENT?

The frontiers and functions of management have never been strictly defined in the public mind. It is thus the more necessary to make one's terms clear at the outset. By management within the context of this work, is management from framing of policy to the complex of operations which, in a small business, extends from immediately below the directors when acting corporately as a board down to, and including, the lower supervisory levels after policy has been determined.

It is the task of policy to lay down strategy, to assign objectives, establish priorities and set a time scale. It is a part of policy to lay down the broad limits in many manpower and resources generally, within which a programme must be carried through.

It is the task of management to carry out policy into effect with the fullest efficiency within the limits assigned, that is with maximum success at minimum cost. It is the part of management in short, to create conditions which will bring about the optimum use of all resources available to the undertaking in men, methods and materials. Thus the scope of management is immensely wide. At one end of the scale it may be concerned with the technical details, such as the method in which to carry out a particular type of construction or the selection of the most suitable type of material for a particular job. At the other end is the concern with such intangibles as morale and 'working climate' with the administrative problems presented by the handling of experts and the co-ordination of the network of human relationships and responsibilities which go to make up the concern. Above all, it must build up the working force into a team with a working pattern, a rhythm and a balance of its own. It can be seen that management calls for a blend of two distinct skills - it is both art (R9) and science and the areas of development must be centred on the two subjects.

'ART' - the human elements DYNAMICS

'SCIENCE' - the technical elements MECHANICS

It is considered that this dual nature of management is often overlooked, the result often being confusion, particularly in the selection and training. It has been written that the British have a natural aptitude for the art of management, they have a profound and well-tested respect for the 'practical man' and a distrust for what seems to be an over-logical or 'theory only' man. Investigation into the small firm industry has shown that many of the principals at the very summit of management, with a long record of success behind them, have arrived there virtually without management training in any scientific sense and mainly originated from a craft background. The art of management turns mainly to personality and that is the possession of, and the relation between, certain qualities. Qualities of this sort do not come from training, but they can be reinforced and developed by systematic training. There can only be one valid test for the 'art' of management - the production of successful results over a given period of time. The scientific side of management does not hinge on personality but on intelligence and an orderly mind. The science of management is based on an analysis of the situation at the time and can be tested by written examination. The subject can be taught, and in the construction industry should be hinged around the seven basic principles of management.

To meet the needs of today's economic challenge, and to create the driving force industry needs, managers must seek to find a better blend of the two basic skills.

There is no unilaterally accepted all-embracing definition of management but the following are some of the observations that have been made:-

'Management proper is the function in industry concerned in the execution of policy within limits set by the administration and the employment of the organisation for the particular objects set before it.'

Sheldon in "Philosophy of Management"

'Management in its fundamental conception is the process of getting things done through the agency of a community.'

Reynolds in "The Nature of Management"

'The art and science of organising, preparing and directing human effort applied to control the forces and utilise the materials of nature for the benefit of mankind.'

The American Society of Engineers

'Management is sensible working arrangements.'

Mary Parker Follett in "Dynamic Administration"

These represent a sample of some fundamental thoughts about management. Put in its simplest form, it could be said that management is the process of getting things done through people.

SMALL FIRM MANAGEMENT PROCESS

The management process in the small firm is similar to that of a large firm in principle, and should be based on the basic management elements.

The management process in the small firm is highly personalised, and often reflects the personal qualities of the firm's principal. Its primary objective is the maximizing of the firm's resources in order to gain the best possible short term advantages with the resources available.

The main work of the small firm is largely dominated by short-term issues and concern with the day to day problems. Observations have shown very little evidence of policy making and planning activities being carried out, but they are generally evolved from the day to day

events that arise from the work in hand at the time. It must be clearly stated, however, that the small firm being operated by the owner/principal is operating successfully without any formal plans being written down - they are carried in the head of the principal. This is why the management process of a small firm is not easily identified as a visible process and is generally rather vague and abstract, rather than being a positive statement.

Observations by the author have shown that there are a number of organisational characteristics which affect the structure of the small firm management process. Duties and responsibilities are informal and the staffing structure is more often based on friendship or on birth, than on educational and technical qualifications. Organisation structures generally do not exist in a small firm; the whole organisation is developed around the principal following his own personal interests - i.e. a carpenter and joiner or plumber would concentrate on their own areas of work.

It has been clearly established that 95 per cent of the firms in the sample taken followed this pattern.

The skills and abilities which the principal possesses and enjoys will have a powerful force in determining how work is organised in the small firm and how the management structure emerges and develops.

The management process of the small firm incorporates both the business element and the entrepreneurial element. The principal has to fill this dual role, where in a large firm the principle emphasis is placed on all the elements in the management process. In the small firm the observations made by the author suggest that the entrepreneurial element comes first. The main difference between the administration in the large firm and the principal of a small firm is in fact "ownership", from which stems the different attitudes towards work and responsibility and accountability, and for the purpose of the enterprise itself.

The economic and social requirements of the small firm principal have an important effect on the rate of growth and profit margins the firm or principal wishes to achieve.

It is necessary to relate and identify the basic management processes in the day to day work of the small firm; and to examine the mixture of the two basic skills of operating management and strategic management. It is because these two factors are so variable, that it is relevant to underline the complexities of a real life situation in a systematic approach.

SYSTEMATIC APPROACH

The principal of a small firm is usually forced to draw on his own practical experience to solve the day to day management problems.

ORGANISING AND CONTROL

The principal has to organise first the work of himself and then the work of his staff. He needs to decide the areas of delegation he has to make, and the amount of control to be exercised to supervise all the activities of his organisation.

PLANNING

Planning what is specifically necessary in terms of workload pattern, what resources are available in terms of Men, Money, Materials, Method and Machines.

WORK LOAD

The management structure of the small firm will develop around the firm's workload, and this can have a great bearing on the distance travelled to obtain work.

(App II Q 1)

Information collected from questionnaire in the sample taken shows that the majority of small firms keep their work within a maximum of 30 miles for general building type work, but as the firm increases in

size, range 14/24 employees, the radius also is considerably increased, as illustrated in Appendix I Chart 10. It was interesting to note how the self-employed person was prepared to travel any distance to carry out specialist work, this mainly being accomplished by labour only sub-contracting.

CO-ORDINATING

As well as organising his own work, he has to co-ordinate the work of his own staff and other people's, including external professional parties. He is at the point of conflict at all times because he is the only person who will have a complete picture of the firm's workload, structure and position in the community.

NEGOTIATING

Negotiations are a common day to day practice in which a principal of a small firm is engaged. These are carried out between clients, suppliers, sub-contractors, unions, architects and surveyors, and not forgetting his own staff. To be successful in this area of work, a mixture of the management elements and techniques are essential. It involves persuasion and the understanding of other people's motives and attitudes, good technical information and judgement on when the best results have been achieved.

DECISION MAKING

This is the daily task of the small builder, and decisions made on policy are usually evolved from practice of a tried and tested decision of a previous situation, than from an analytical scientific approach.

PROBLEM RECOGNITION

In a large company, control mechanisms are built into the management system to predict the course of events and to provide an early warning system. It is unfortunate that problem recognition in the

small firm does not come high on the list of the day to day functions, and that problems are solved when they occur by the entrepreneur talent of the principal.

"It is in self-limitation that a master first shows himself" -

Sonnett, Natur and Kunst, Goethe

BUSINESS INFORMATION

The small firm principal has to assimilate information on production, sales, finance and accounts, purchasing, personal matters, design, transport, costing, estimating and quality control - the whole range of management functions. The personal capacity of the principal in terms of his physical fitness, ability to organise and assimilate information has a vital part to play in the successful management of a small firm. The processing skills that the principal requires have both an administrative and entrepreneurial element to them. Discussions with small firms have clearly shown that each firm has a tailor-made set of procedures for giving the business information it needs to provide control data that is required for the assessment of the firm's performance. He will use the relevant information as a basis for setting objectives, and for identifying problems and formulating solutions, and as a basis for evaluating decisions. In order that he can control the information system established, rather than be controlled by it, the system must be simple, flexible, and easy to understand. It is, therefore, necessary for the principal to develop the highly personal framework which will allow him to evaluate new pieces of information as they become available.

An American organisation concerned with systems, theory and development once defined a managements information system as "the reach of an executive is determined by the information system at his command".

International Management 1970

Large companies do not call upon one person to have the qualities of both policy making and policy execution skills, these are obtained from the top and middle management executive levels. In a small firm, management teams do not exist, but are more likely to consist of not more than three or four people including the principal. As stated in the introduction, the principal becomes the policy maker and policy translator for executive action and in many cases a first line supervisor working along side his operatives. 'There is no distinction in the small firm between the planner and the doer, between the elite and the unwashed peasantry.'

P F Drucker - The Practice of Management - 1955 - Heinemann

MOTIVATING

This is concerned with the human side of management, by getting his staff motivated to get the work done in a happy and contented way. Human relations will play an important role under this heading.

COMMUNICATION

The most important aspect of the principal's day to day tasks is communicating - face to face communications between professionals, clients, suppliers and operatives. He must have the ability to make himself understood by his team and have the ability to instill confidence and convince others of his own ability in dealing with the daily contractural problems to build up a goodwill confidence in his business with the general public and his clients.

It is suggested that the range of management skills that are required by the owner/principal of a small firm, as shown in Figure 1 Page , indicates the range of both the strategic and operating skills required and the relationships of one to the other. A number of factors will determine what skills are required for any particular firm:-

(i) The market in which the firm wishes to operate

(ii) The technical skill which the firm has to offer

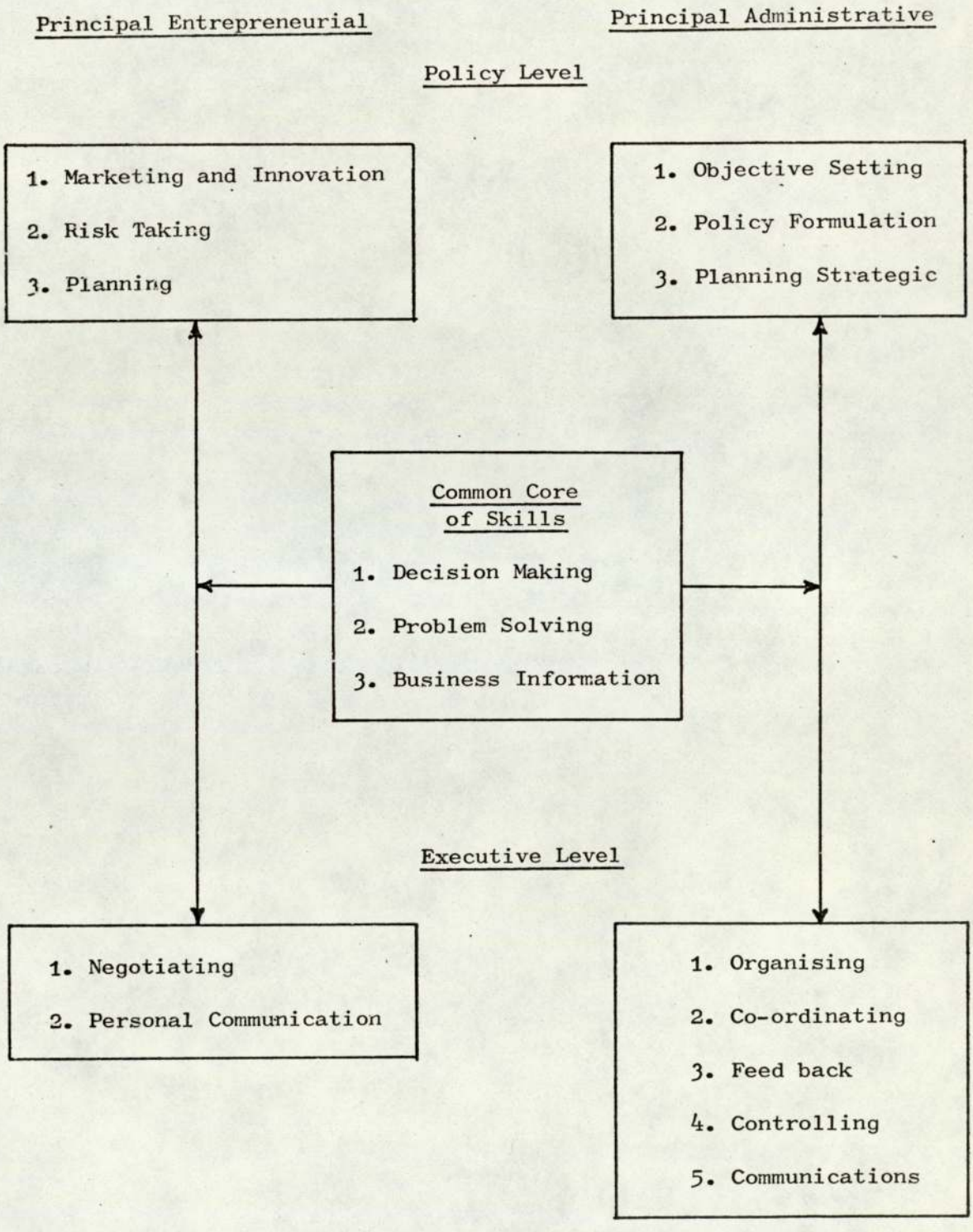
(iii) The entrepreneurial skill of the principal

(iv) The risk-taking element of the principal

(v) The quality of operative employed.

Because of the complex size and structure of the small firm industry, it is difficult to identify all the management skills necessary, but the common core skill stated appears to be common to all.

THE FIVE POINT PLAN



Managerial Skills TAXONOMY

THE BUSINESS SITUATION

Having briefly reviewed the general criteria applicable to business organisation, it is now necessary to apply these criteria to particular circumstances of firms engaged in small works. These can be divided into three parts:-

1. Repairs and renovations to existing buildings for general maintenance work
2. Improvements, extensions and alterations which are really new works
3. Speculative housing development up to a maximum of four a year for the special customer.

The sector of work in the South Western Region for the small builder hinges around repairs and renovation work. This is a true service which the small man provides as a house doctor, mainly known in the trade as jobbing work. This work ranges from fitting tap washers, clearing drains, clearing gutters, replacing slates and tiles of roofs, repairing burst pipes to the complete renovation and redecoration of insides and exteriors of properties. Estimating for the cost of this type of work must and can only be based on experience coupled with the fundamental principles of estimating.

Information collected from discussions with small firms in the region suggests that the estimating function is carried out in a haphazard fashion resulting with the ommision of essential items within the final rate. A standard procedure should be established for this function.

In many cases, a demand for a service is urgent and it is often necessary to fit a job into the existing commitments, but care must be taken to exercise control over these situations so not to throw out the general programmed planned workload. The urgency may be genuine

where it is necessary to take immediate action to avoid further damage, for example a burst water pipe. On the other hand, it may be necessary to act quickly because a valued customer is involved and it is considered justifiable to give him special service. It must be emphasised 'justifiable' under the terms of the business and not of friendship. Much of the work in this area produces a reasonable profit, but in some cases would be undertaken at a loss, and a firm that undertakes a lot of this work, which is a profitable area, must plan with scrutiny to reduce costs.

It must be taken that basically, a firm engaged in small works, i.e. maintenance and repair work, alterations, extensions and the occasional speculative housing, has the same managerial tasks as any other kind of business. It must be realised that the small firm has to function on these principles but not necessarily to the depth of a larger concern. Ultimately, this must be expressed in money values. A business organisation in simple terms is the process of investment, namely by spending one's own or borrowed money in such a way as to secure greater receipts than expenditure, or in other words, to make a profit.

Capital investment is of two kinds:-

1. Fixed Capital: Money must be sunk into fixed capital, i.e. in terms of buildings, yards, plant, etc, and this money is not recoverable until it is decided to discontinue the business or by bad management or misfortune, the business is forced to be closed. In the latter case, insolvency also invariably means that only a proportion of the fixed capital investment is recovered. It must be remembered that the value of fixed capital investment in a successful business does not necessarily remain static. A good

example of this today would be the inflationary prices now being achieved or acquired for property. Buildings, equipment and tools wear out and have to be maintained in good condition until they are replaced. It is therefore necessary to reserve from one's funds a calculated amount to offset depreciation. This is particularly important in relation to plant i.e. lorries, etc.

2. Working Capital: When a principal decides to set up business, it is necessary for him to have capital in addition to his fixed capital and this is termed working capital. Working capital is used as spending money on wages and materials to enable the business to be carried out and this is an area where the small businessman often comes into difficulties as one has to keep a good flow of money at all times.

A business has to pay for the wages of labour involved in the undertaking of the various jobs and often for the materials and fitments too before payment is received from the customer. Any delay in payment or failure to pay can place a business with limited circulating capital resources in difficulties very quickly. Equally the importance of labour means that enough work must be found to keep it fully occupied. Labour must also be used in such a way so to avoid idle time for which the business pays money and gets nothing in return (time costs money). It must also judge skilfully the stocks of materials. Money should not be allowed to stand idle in extensive stocks of materials which are not being used, but it is essential to maintain sufficient stock to avoid time being wasted through lack of items which would otherwise have to be collected from the merchant. (It is generally accepted that the builder should limit the type of work he contracts for under the policy of his organisation.) A small builder has many hazards to

meet business-wise which a larger concern does not encounter. Even if clients and customers are paying their accounts promptly (a situation which rarely occurs), the amount of payment for a job may be less than the actual cost of carrying out the work. That is to say, it may be a small job for a regular customer for which it would not be business-wise good to charge the full cost so this job would be done as a service. Alternatively, the original estimating may have been faulty or the work may have been ineffectively carried out, or additional costs have been incurred through external and unpredictable causes. Any or all of these factors can produce a business loss to the ultimate death of the business in bankruptcy. (See Appendix I Table 1)
It must be the cardinal objective of management to be adequately trained to combat these business hazards and through improving efficiency to avoid insolvency.

The work of most small firms consists of carrying out improvements, extensions and alteration work in varying degrees to the extent of the single addition toilet at the back of a house to a complete back addition. The very small man, i.e. up to ten employees, tries to get one of this type of work going as a 'big job' going on at the same time with his normal routine work. This helps him to give stability to his organisation by keeping his men fully employed at all times. However these jobs add considerably to the administration problems since they need adequate control from beginning to end of contract. They also take up a considerable amount of time of the principal or supervisor in consultation with other parties such as architects, quantity surveyors, local authority inspectors and the linking with sub-contractors. Planning and controlling this type of work becomes very complex owing to the multiplicity of trades and specialist sub-contractors and special care must be taken. The small man must realise very quickly

that to control this type of work is far different to controlling his normal day to day house doctoring. It must be remembered that each such detached job must be properly planned and controlled so that it is profitable and gives satisfaction to the client thereby building up the goodwill of the firm. As already mentioned, firms between zero and ten employees like to take on the occasional special speculative house. Firms from zero to twenty-four tend to make this a policy statement with the organisation to include some speculative housing or large renovation work (a big job) on which they tend to hinge the organisation's resources. It can be seen that by employing more men there is more flexibility which enables firms to cope with the emergency reasonably well, but this size of organisation links up more closely with the basic management principles as defined and has a greater contribution towards supervisory efficiency to make because of the type of work being undertaken.

Excluding the estimating and accounting aspects, control and supervision will be defined as follows:-

CONTROL AND SUPERVISION

(a) Determining the sequence of events necessary to carry out the job including fitting of sub-contracting, or other ancillary services, into the job. Ensuring that the necessary instructions are given to achieve this.

(b) Planning what is specifically necessary in terms of men, materials, equipment and tools to achieve the targets, i.e. visualising the numbers and volume of each category which will be necessary and when they will be required on the location.

(c) Providing for the incorporation of any variations to the original plan.

(d) Providing adequate written or graphic instructions for carrying out the work such as plans, drawings and specifications, ensuring that they are available before each stage of the work is due to commence.

(e) Ensuring that the appropriate action is taken to provide at each location what is necessary to carry out the job.

(f) Fitting several jobs together into a sensible all-over plan so devised that progress on one job is not at the expense of progress on others.

(g) Ensuring by adequate controls that the required volume of work is being done while the job is in progress and that the work is of the right quality.

(h) Providing that all necessary written records are properly maintained.

(i) Making provision for decision making in the event of unexpected difficulties arising.

(j) Providing for any joint consultation, including site meetings which may be necessary.

(k) Planning the use of the site or location so that work can be smoothly carried out without delays to progress and yet meeting the requirements of the client. This will include determination of adequate working conditions, removal of rubbish and debris from the site or location and bringing in and properly storing materials, fitments, equipment and tools on site.

It will be necessary to provide scaffolding, ladders, hoists and other equipment necessary for working at various heights. Under this heading, it is also necessary to anticipate any aspects of the work being done which involve questions of safety both of the workers, to the client and to the general public. The appropriate conditions of the site or location are to be checked.

(l) Maintaining good relationships with the firm's clients and workers.

(m) Ensuring a proper liaison between head office and each job.

In firms of up to twenty-four operatives, all the above tasks may be defined as falling within the scope of supervision. Furthermore, payments of wages each Thursday and estimating of small jobs are thrown in for good measure.

Supervision, which must of course be provided for all but the smallest jobs, will take the following forms:-

(i) Job supervision on each location or site. In firms with very few operatives, this can be a principal acting as a 'working foreman'. Otherwise, according to the size of the job, this continuous supervision may be allocated to a leading-hand, a chargehand or a foreman according to the size and/or complexity of the job.

(ii) Overall supervision, including visits as often as may be necessary to each job. With small firms, this may be undertaken by one or more of the principals. With larger firms, one or more supervisors may be employed.

It is essential that each firm must, through its organisation, provide for the efficient discharge of each of the functions which have been outlined. In so far as this is to be secured through supervision, management must, in the interests of efficiency:-

(i) Specify the essential qualities, experience and qualifications of people to fill such posts.

(ii) Where training needs have been identified, provision is made for appropriate training in those areas, both on and off the job as may be necessary.

(iii) Ensure that in respect of each person holding a supervisory post, or likely to hold such a post, the necessary action is taken to

identify in what respects he needs training in addition to 'exposure to the job'. This can only be done through job analysis.

(iv) Determine the duties and responsibilities of each supervisory post and set them down in writing.

Unfortunately, analysis (R10) by direct observation of what a supervisor is doing is by no means indicative of what he should be doing. It must be remembered that while most men carrying out these supervisory functions are likely to be well qualified in at least one trade, and may well have a good general technical background, in the performance of much of their work as summarised above they tend to pick up the job by trial and error, and are rarely given the opportunity of finding out whether what they are doing is in accordance with sound administrative principles, or whether they are making use of labour-saving techniques which are available and which are directly applicable to the job they are doing.

As a result of discussions and observations made over a period of time the following check list emerged as a basic guide for control purposes:-

CHECK LIST FOR THE CONTROL OF SMALL WORKS

1. What aspects of training or job instruction are being inadequately carried out?
2. What aspects of training or job instructions are not being carried out?
3. Which of the following should now be removed from the job: men, materials, tools, plant, fitments, equipment?
4. What is the nature and volume of rubbish and debris on the site?
5. Which variations have not yet been, or inadequately recorded for authorisation?

6. Which variations have not yet been authorised?
7. What are the details of any of the firm's property which have been lost and the causes of loss?
8. Which written records are not being properly maintained?
9. Which variations to the plan have been or are about to be considered?
10. Which problems on the job are attributable to (a) the supervisor and/or (b) the client?
11. Which returns are not being properly made to the office?
12. What aspects of the work completed are not up to schedule?
13. What performance standards set in the plan are too low?
14. What aspects of the quality of work are not up to standard?
15. What performance standards set in the plan are too high?
16. What materials are not on the job?
17. What disputes have occurred or are likely to occur?
18. What materials are being, or have been, wastefully used?
19. What disciplinary action has been necessary or is likely to be necessary?
20. Which materials on the job are not as specified?
21. Which aspects of the work done are unsatisfactory through insufficient visits being made?
22. Which fitments needed are not on the job?
23. Which problems have arisen through causes not originally apparent or foreseen?
24. Which fitments supplied are not as specified?
25. Which trade or trades are not being co-ordinated as planned?
26. What tools needed are not on the job?
27. What aspects of accident prevention are being neglected?

28. Which tools are not being properly used?

29. What aspects of the working conditions are not as planned and arranged with the client?

30. What plant needed is not on the job?

31. What equipment in use is not being properly used?

32. What plant in use is not in good condition?

33. What equipment in use is not in good condition?

34. What plant is not being properly used?

35. What equipment needed is not on the job?

CHAPTER 5

BUSINESS PROCEDURES

THE ESTABLISHMENT OF BUSINESS PROCEDURES FOR SMALL FIRMS

Before one can establish business procedures which are clearly applicable to small firms, it is important to consider the type and extent of the market environment for which such systems are destined and in this context the client's requirements must play a very important role.

From time to time the construction industry receives criticism and abuse from our society which in many cases is due to the lack of understanding between the client and the contractor. It is essential that client/contracor relationships be established correctly at the beginning, and to this end, the contractor should ascertain the client's requirements in great detail. Since the client will not normally have the required technical knowledge, it is necessary for the firm's representative to assist him and translate his requirements into practical terms so that the client will understand and therefore appreciate the costs involved. Of course, this would only be necessary when arrangements are made direct between client and contractor. When there is an intermediary involved, i.e. surveyor or architect, drawings and specifications are usually provided from which the contractor is to work. However, it is felt that it is necessary for the contractor to establish the client/contractor goodwill relationship. The following are common factors that are likely to occur in the initial contact with the client:-

1. Establishing what the client wants done, and what cannot be done.
2. Giving an outline of what would be involved in carrying out the work.
3. Assessing when the job could be included in the work programme.

4. Establishing the client's choice as determined by the advice given to him.

5. Examining the location to translate the client's requirements into practical terms, giving, where possible, a rough estimate of possible costs or alternative methods.

6. Measuring and calculating the requirements of the job as agreed.

7. Estimating and giving a quotation.

Another market source is that originating via a third party, which in most cases is the architects, and in such cases, when the job is based on specifications and plans, the discussion with the client about his requirements and technical advice as to what is practical should have already taken place. However, a second discussion with the contractor could be useful. The Principal or Supervisor will already have the data upon which he can draw and translate into an effective scheme for carrying out the job. This normally involves:-

1. Examinations of the specification to identify any ambiguities or points needing clarification.

2. Examination of the plans to ascertain any practical problems, ambiguities or points needing clarification.

3. Analysis of specification to draw up requirements in terms of men, materials, fitments, equipment and plant.

4. Analysis of specification to ascertain time elements of job as determined by completion date.

5. Analysis of specification to establish cost limits fixed by the contract.

NECESSARY PLANNING INFORMATION WHICH SHOULD BE OBTAINED AND RECORDED

Having assembled the essential data, it is necessary to have a complete picture of the job at the outset.

Varying according to the size and type of job, the following should be ascertained and recorded to ensure that all essentials are taken into consideration before planning starts.

General

1. Names, addresses and telephone numbers of all parties concerned, e.g. client, architect, quantity surveyor, consulting engineer and local authority.
2. Brief description of work.
3. Location.

Site Details

1. Access and location.
2. Working space - storage facilities.
3. Services needed.
4. Position of concealed services.
5. Safety precautions which it will be necessary to take.
6. Conditions of existing structures (in the event of dispute as to alleged damage by contractor while work in progress).
7. Nature of ground, or of existing structure in respect of internal alterations.
8. Site clearance - removal of rubbish during and at the end of work.

Local Conditions

1. If local labour needed, where obtainable.
2. Accommodation.
3. Travelling times.
4. Access to building - keys, etc.
5. Sub-contractors in area.
6. If in occupation, special conditions affecting access.

One must however keep in mind the essential qualities of the contractor as indicated by R H Hollins in his book "Production and Planning Applied to Building" where it says "Nothing in the Architects' drawings or the Bill of Quantities or Specification will establish for the builder which method should be adopted for doing the work. Nor is any indication given whether any job can be done by machine or by hand . . . the contractor must decide the best way of performing each operation to be undertaken".

Having decided upon the best method to adopt, the contractor must make decisions on the timing, extent and application of resources in accord with his basic plan.

Having emphasised that all the management within a business must be worked around the basic principles of management, this section will apply the principles to a business working model.

The magnitude of the financial sums now involved in the development of new methods and new techniques, highlights the "decision making" aspect of a principal's duties. If this is weak or ill-conceived, it can effectively cripple a firm's growth. It is essential that within an intricate industrial climate, modern management must be well equipped with "scientific tools" if it is to remain efficiently in control.

The four prime functions of management are:-

1. Planning
2. Organising
3. Motivating
4. Controlling

In each of the four areas, an analysis of the problems confronting management has resulted in the evolution of a series of techniques aimed at providing today's principal with scientifically-based

information which will enable him to narrow the area of unknown in which "decision making" is to take place. Since "planning" is by definition the title of the function which is concerned with tomorrow, then responsibility for planning is not only inherent and fundamental in the duties of every principal, but also in the duties of all supervisory staff in the firm's structure. Thus planning is not just another particular function which can be hived off to a specialist, but is a vital aspect of any firm's activity in which management must be competent.

The basic truth of such statements as "unless you know where you want to go, you are unlikely to get there" and "unless you know what results you want to achieve, you are unlikely to achieve them" is simple, obvious and indeed fundamental to planning.

Planning is essentially the setting of some objective target or destination which is desired to reach by enumerating the steps which must be taken to achieve that end. As in project planning and business planning, this technique demands the answer to two primary questions:-

(a) What is it that has to be done?

AND (b) What resources are required to achieve this in time, manpower, money and materials?

The degree of detail, accuracy and precision with which the answers to these two basic questions will be known depends largely on the size of the organisation and the time scale involved. Obviously, in long term business planning concerning several years ahead it will not be possible to be as detailed as is the case in medium or short term planning. Nevertheless, it is essential, no matter what time scale is involved, that an attempt should be made to answer the basic questions with as much accuracy as possible consistent with the use to which the ensuing

plan is to be put. If long term planning is involved, then techniques associated with "management-by-objectives" (R11) will be useful in determining future proposals, but in short term planning, covering a period of six months, then the analytical techniques of "work study", with emphasis on finding an efficient method in estimating the work content or job juration, are invaluable. "Output" from work study and analytical techniques is truly the "Input" to planning.

A business organisation must be planning to give the business information the builder requires, and this should be just enough to give him control of his commitments and to meet the statutory requirements of the business.

PRIME INFORMATION REQUIREMENTS

From many in-company discussions held with a number of the firms completing the questionnaires the priority information requirements regarding his business appeared to be:-

1. The prime cost of each job, including labour, materials, transport sub-contractors, but not including overhead and profit.
2. The gross profit on each job.
3. The value of work in progress to a given date (i.e. control period).
4. What his overheads are for the year.
5. The financial status of the business at various times, i.e. quarterly.
6. The profit he is making each month after deducting overheads.
7. The bank balance at given times, i.e. monthly.
8. The amount of money owed and owing, who from and who to.
9. Detail for making out client's accounts.
10. Detail for building up a labour rate.

To enable the builder to produce the above information, a system of systematic control must be established to deal with the day to day functions of the business as "Standing Procedures". These procedures must be reviewed annually to meet any changing circumstances that may have arisen from external sources or from any change in the firm's policy.

Standard Procedures Required For:-

1. Overhead and budget costs, including Transport.
2. Unit labour - estimating including non-productive time.
3. Wages (labour).
4. Purchases - materials.
5. Sales accounts.
6. Store's transfer.
7. Work in progress costings.
8. Costing sheets.
9. Monthly valuation.
10. Calculation for Working Capital.
11. Monthly profit statements.
12. Financial control.

In accordance with the suggested Five Point Management Plan for small firms these standard procedures would provide the essential business information required as part of the common core in the management system, as illustrated in Figure 2 Page 58.

INTERELATION OF THE STANDARD PROCEDURES
FOR THE BUSINESS INFORMATION OF A SMALL FIRM

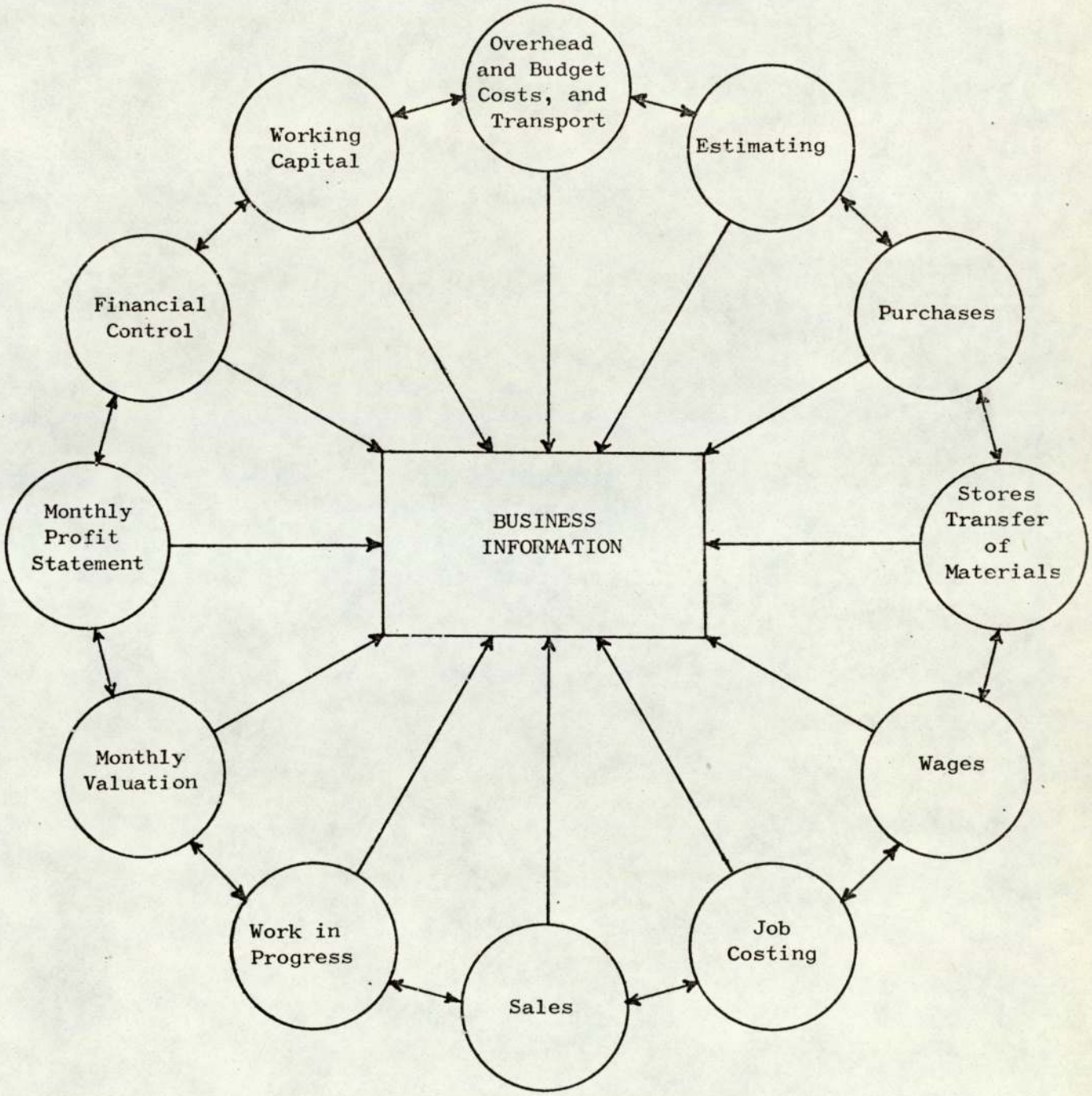


Figure 2

THE DESIGN AND DEVELOPMENT OF STANDARD PROCEDURES

Overheads and Budget Costs

In dealing with overheads, budget costs and the like a system of control is necessary in order to produce a complete forecast (FORECASTING) of how all the various sections of the business should behave over a given period of time. This period for which the forecast can reasonably be made will depend on the type and size of the business, but the best and most popular break-down budget period for the General Overhead expenses of a business is twelve months, with reviews taking place quarterly.

For control purposes, the monthly period can be treated as the "control period" and this is better taken over a four-week period than on the calendar month, so that a true comparison can be made.

The builder must calculate in conjunction with his accountant the cost of each item in the budget and then proceed to find the percentage on cost he has to make to all the estimates to recover the overheads of the business.

STANDARD PROCEDURE NO 1 FOR GENERAL OVERHEADS AND TRANSPORT

SAMPLE OF BUDGET FOR A YEAR FOR A SMALL FIRM

Overheads Budget for the Year ended 31st March 1972

	£	Total £
Personal		
Directors and staff salaries		
National insurance		
Personal insurance		
Entertainment		
Directors and Staff Motor Cars		
Petrol, oil		
Licences		
Insurance		
Maintenance (service and repairs)		
Depreciation ($\frac{1}{5}$th cost each year)		
Yard and Offices		
Rent (net annual value if premises are owned)		
Heating and lighting		
General and water rates		
Repairs and decorative upkeep		
Cleaning		
Fire insurance		

	£	Total £
Indirect Expenses		
Yard-time, holiday pay, idle time and time which cannot be charged to contracts		
Stores losses through waste, etc		
Apprentice and technician time (school) fees		
CITB levy on staff and operatives		
Small plant depreciation		
Transport		
Petrol (storeman and driver)		
Oil		
Maintenance		
Road tax		
Insurance		
Depreciation ($\frac{1}{5}$th of cost price)		
Miscellaneous Expenses		
Printing, stationery		
Advertising		
Telephone and postage		
Discounts to clients		
Bank charges		
Legal and accounting charges		
Subscriptions		
Bad debts		
Insurances - cash, burglary		
Depreciation of office machinery		
Total General Overheads for the Year		
12		
Total General Overheads for each month		

Recovery of Overheads:-

(a) Overheads expenditure = say £4,500

Annual labour costs = £31,500

$$\% \text{ Recovery} = \frac{4,500}{31,500} \times 100 = \underline{14\tfrac{1}{2}\% \text{ on labour}}$$

(b) Overheads expenditure = £4,500

Turnover of firm = £64,300

$$\% \text{ Recovery} = \frac{4,500}{64,300} \times 100 = \underline{7\% \text{ on job costs}}$$

ESTIMATING

Primary Function

The primary function of an estimate is:-

TO PROTECT THE COST OF CARRYING OUT THE WORK

All other uses of an estimate are secondary to this and must not be permitted to interfere unduly with the achievement of this aim.

As the costs produced by the estimate will subsequently be used as the basis, the tender must be set out in a manner in which they can be easily converted into selling prices in whichever way the tender requires. For example, if a bill of quantities forms part of the tender then the estimated cost must be readily convertible into selling rates against each bill item.

Secondary Functions

Secondary functions of an estimate include the following:-

(i) To record information which will assist in planning, control and material procurement.

(ii) As a means of communicating with staff.

(iii) As a selling aid.

THUS: (i) Recording

Specifically the estimate should highlight:-

(a) The items of work covered by the estimate.

(b) The quantity, type, purchase price of each of the materials necessary.

(c) The labour allowed against each item.

(d) Details of quotations submitted by suppliers and sub-contractors and subsequently used in the estimate.

(e) The method of construction envisaged.

(ii) Communicating

Specifications are complex and sometimes even obscure, and may require considerable study to identify exactly what work has to be done.

A well laid-out logical estimate, while embodying the requirements of the specifications, will express this in a way which will be more meaningful to management.

(iii) Selling

The estimate can become a selling aid when the small firm intends to submit "AN EXTENT OF OFFER" with his tender. An extent of offer is in effect a bill of quantities/specification prepared by the contractor covering the work included in his tender. This may serve as a means of describing to the client the work covered by his estimate or it may be used as a means of defining the company's commitment where there is some doubt as to the extent of work to be carried out.

An extent of offer, although presented in the format of a specification/bill of quantities, is more descriptive and unlike the normal bill of quantities would not normally be priced. The estimate can also serve as a selling aid where the contractor has submitted a lump sum price.

A well laid-out logically-presented document will also convey to a prospective client some indication of the calibre of the work that he could reasonably expect in the carrying out of the work described.

PRINCIPLES OF ESTIMATING SYSTEMS

Coupled with those functions of an estimate as stated before, certain other factors influence the approach to estimating. The time allowed to prepare estimates is often inadequate and the high incidents of unsuccessful tenders reflects very considerable expense. Consideration of those various aspects leading to the establishing of true principles which would govern any estimating system are as follows:-

The Estimating and Tender Process

The overall processes of estimating and tender can be broken down into stages:

(i) Scheduling - listing the work to be carried out.

(ii) Estimating - detailing the material required and assessing the labour involved.

(iii) Pricing - pricing the material.

(iv) Calculating - establishing the total material cost, labour required and other costs of carrying out the work.

(v) Tender - deciding the amount for which the contractor is prepared to undertake the work based on figures thrown up by the estimate.

Communication of Estimate

After the estimate has been prepared, and in order to avoid the possibility of differences arising between client and building firm, there should always be a proper estimate in writing giving details of (App I T 11) the terms and conditions upon which the estimate is based. The National Federation of Building Trades Employers issues model conditions, (R12) and it is strongly recommended that they are used as a standard for all estimates. They cover such matters as the use of sound materials, variations, defects, insurances, settlement of accounts and provision for settling any differences that may arise.

Standard Procedure for Estimating

It is essential that a standard and consistent method is used to ascertain the unit labour rate that is to be used in the business. An area which has been overlooked or has provided some difficulty is the non-productive travelling time element which has to be paid to operatives when travelling from job to job. This is particularly relevant in the South West Region as illustrated in the workload schedule in Appendix I Table 10. The cost of transport for the small firm organisation should be part of the firm's overheads and not built in to the unit labour rate.

The following is a standard procedure to be adopted for building up the unit rate for a craftsman and labourer:-

S T A N D A R D P R O C E D U R E N O 2

UNIT RATE BUILD-UP FOR A CRAFTSMAN

Based on 40 hours per week plus 9 hours productive overtime

40 hours Grade 'A' rate	27.00	
Guaranteed bonus	2.60	
Company incentive bonus (to keep labour) ..	4.00	33.60

Basic hourly rate = £33.60 ÷ 40 = 84p per hour

1 hour overtime per weekday = 5 hours @ time-and-a-quarter

= $6\frac{1}{4}$ x 84p 5.25

4 hours Saturday at time-and-a-half = 6 x 84p 5.04

Tool money 20p carpenter 10p bricklayer 0.20

6 public holidays = 48 hours @ 84p ÷ 49 productive weeks .. 0.82

National Insurance stamp 1.10.73 .. .. 1.19

Graduated pension total wage = 43.89 - £9.00 = £34.89 x 5% 1.74

Annual holiday stamp 1.80

Allow 2% for guaranteed week 2% x £43.89 .. .. 0.88

Proportion of National Insurance stamp and guaranteed pension to cover 6 no public holidays 1 1/5 weeks @ (£1.19 + £1.74) ÷ 49 productive weeks 0.07

3 weeks National Insurance to cover annual holidays

3 x £1.19 ÷ 49 productive weeks 0.09

Sick pay scheme premiums 0.15

CITB Levy 0.31

Redundancy provision 0.76

TOTAL ESTIMATED COST TO EMPLOYER PER WEEK	£51.90
DIVIDE BY 49	49)01.06
HOURLY RATE	£01.06

S T A N D A R D P R O C E D U R E N O 2 a

UNIT RATE BUILD-UP FOR A LABOURER

40 hours Grade 'A' rate	23.00	
Guaranteed bonus	2.20	
Company bonus	3.80	29.00
Basic hourly rate = £29.00 ÷ 40 = 73p		
1 hour overtime per day = 5 x $1\frac{1}{4}$ = $6\frac{1}{4}$ x 73p		4.56
4 hours overtime Saturday = 4 x $1\frac{1}{2}$ = 6 x 73p		4.38
6 no public holidays = 48 hours x 73p ÷ 49 productive weeks		0.72
National Insurance stamp 1.10.73		1.19
Graduated pension total wage £37.94 - £9.00 = £26.94 x 5%		1.35
Annual holiday stamp		1.80
Allow 2% for guaranteed week 2% x £37.94		0.76
Proportion of National Insurance stamp and guaranteed pension to cover 6 no public holidays 1 1/5 weeks @ (£1.19 + £1.35) ÷ 49		0.06
3 weeks National Insurance (to cover annual holidays) 3 x £1.19 ÷ 49		0.07
Sick pay scheme premiums		0.15
CITB Levy		0.16
Redundancy provision for disbursement		0.74
TOTAL ESTIMATED COST TO EMPLOYER PER WEEK		44.94
DIVIDED BY 49 PRODUCTIVE HOURS PER WEEK		49)0.92
HOURLY RATE		0.92

RECOVERY OF TRAVELLING COSTS WITHIN THE UNIT RATE

The cost of the lorry and driver, etc is to be included in the general business overheads (ref: Standard Procedure 1). The cost of travelling time for operatives may be calculated as follows:-

Rate for the job with no travelling time = £51.90
Total number of hours per week = 49
) = £1.05 per hour

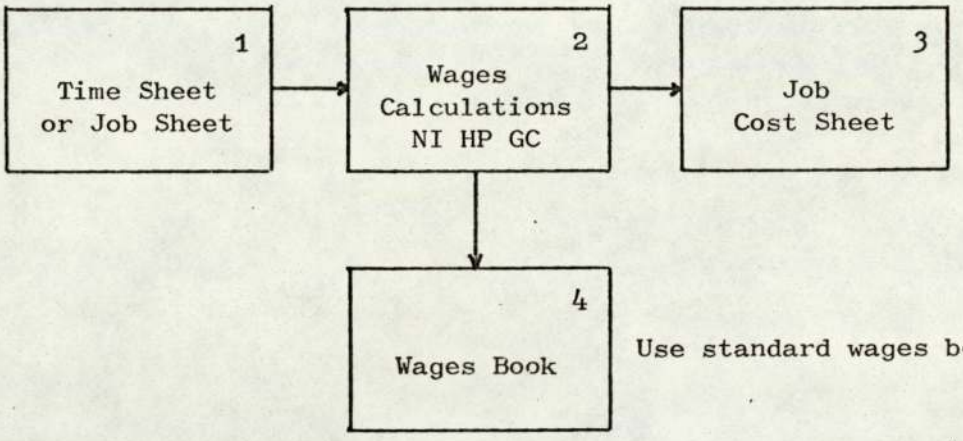
Rate for the job with 10 hours travelling time per week = $\frac{£51.90}{49-10}$ = £1.33 per hour rate including travelling time

It is essential that the recovery of this time is established because it is unproductive time which the principal has to pay and allow for in his estimates.

Weekly Travel Time in Hours	Rate Per Hour To Be Charged
$2\frac{1}{2}$	1.11
5	1.17
$7\frac{1}{2}$	1.25
10	1.33
$12\frac{1}{2}$	1.42
15	1.52
$17\frac{1}{2}$	1.64
20	1.70

S T A N D A R D P R O C E D U R E N O 3

WAGES (LABOUR)



Use standard wages book

Wage book gross wages total = £		£00.00 A
NI stamps by employer	= £00.00	
Grad stamps by employer	= £00.00	
Holiday stamps by employer	= £00.00	
TOTAL	£00.00	£00.00 B

In addition to the gross labour costs, a percentage addition should be added to account for other direct cost, i.e. NI, GC, HWP, thus:-

$\frac{£00.00\ A}{£00.00\ B} \times 100 = \%£$ to be added to job cost sheet each two weeks

1. Time sheet (if used) in the office by Monday placed in holding file.
2. Calculations of hours for wages to be done on time sheet, and allocation of hours.
3. Job hours entered on Job Cost Sheets.
4. Information from time sheets to wages book - use standard wages book.

S T A N D A R D P R O C E D U R E N O 4

MATERIALS

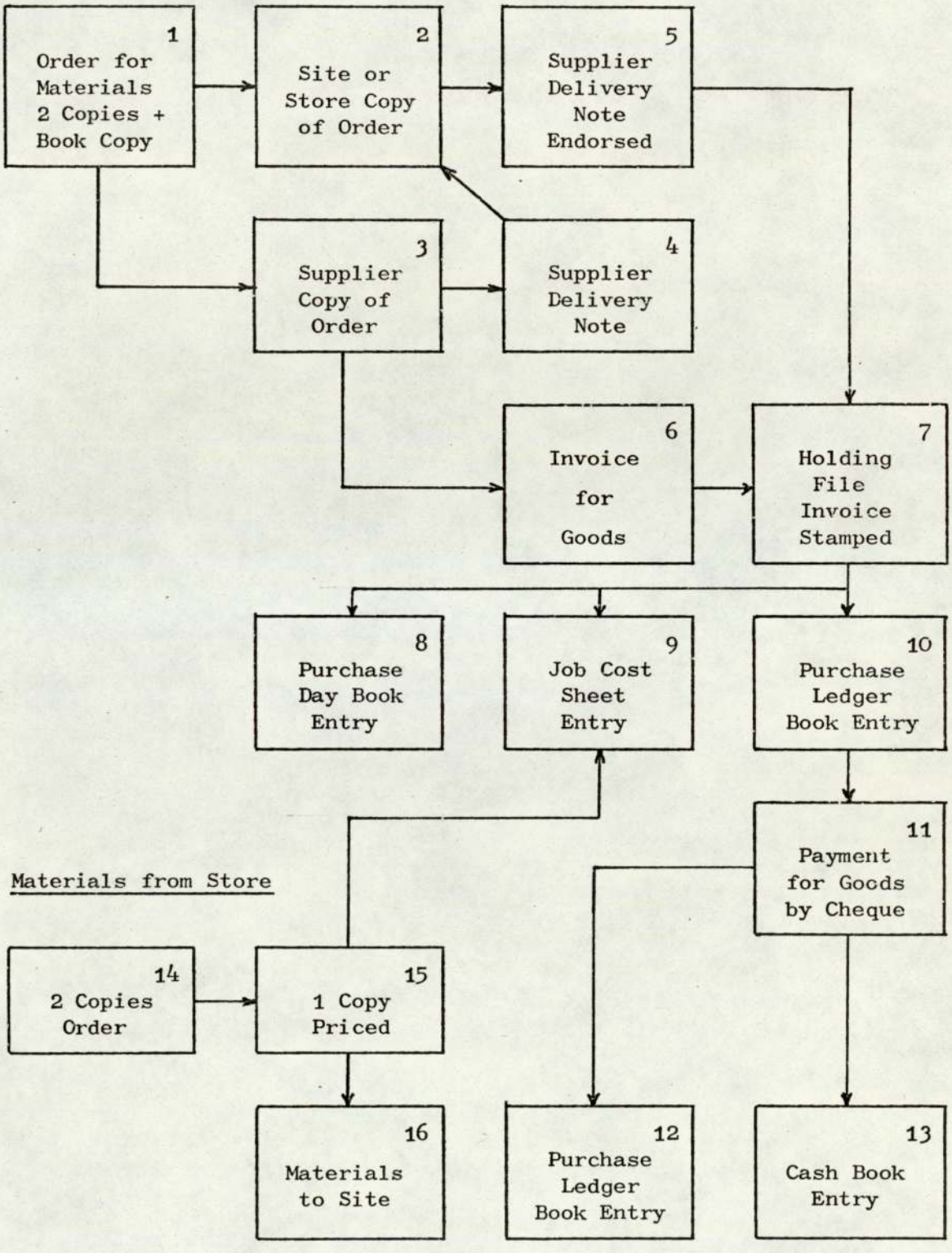
It has been calculated that approximately 60 per cent of a construction company's turnover is represented in the purchase of materials and sub-contractors' services.

Considered in terms of the high capital value of building work, such contingencies as fixed price contracts in a climate of rising costs and uncertain economic policies, delays - whether they arise from the weather or shortage of materials or manpower - and the many other risks which are expressed in the industry's unenviable failure figures, it seems that the importance of purchasing function has yet to be fully recognised among the many other specialist qualifications which the industry calls upon.

All far-sighted managements now realise that much of the profitability of a contract depends upon the skill and professional judgement employed in the buying of materials and equipment, plant hire, and the control of sub-contracting operations. Large companies have different methods of sectionalising the work, but the contract surveyor has an increasing responsibility in the overall management and co-ordination of the purchasing operation.

Detailed on the attached sheet is the suggested procedure for a small firm.

MATERIALS PROCEDURE



ORDER PROCEDURE

Stage		
1	Order issued	1 copy to remain in book
2		1 copy sent to site or stores
3		1 copy sent to supplier
4		Supplier's delivery note sent to site or stores
5		Supplier's delivery note endorsed returned to office holding file
6		Supplier's invoice for goods invoice stamped - holding file (App I T 11)
7		Invoices sorted and checked
8		Invoice purchase entered in Purchase Day Book
9		Invoice purchase entered in Job Cost Sheet
10		Invoice purchase entered in Purchase Ledger Book of Supplier
11		Payment for goods by cheque - monthly
12		Payment for goods entered in Purchase Ledger Book of Supplier
13		Payment for goods entered in Cash Book

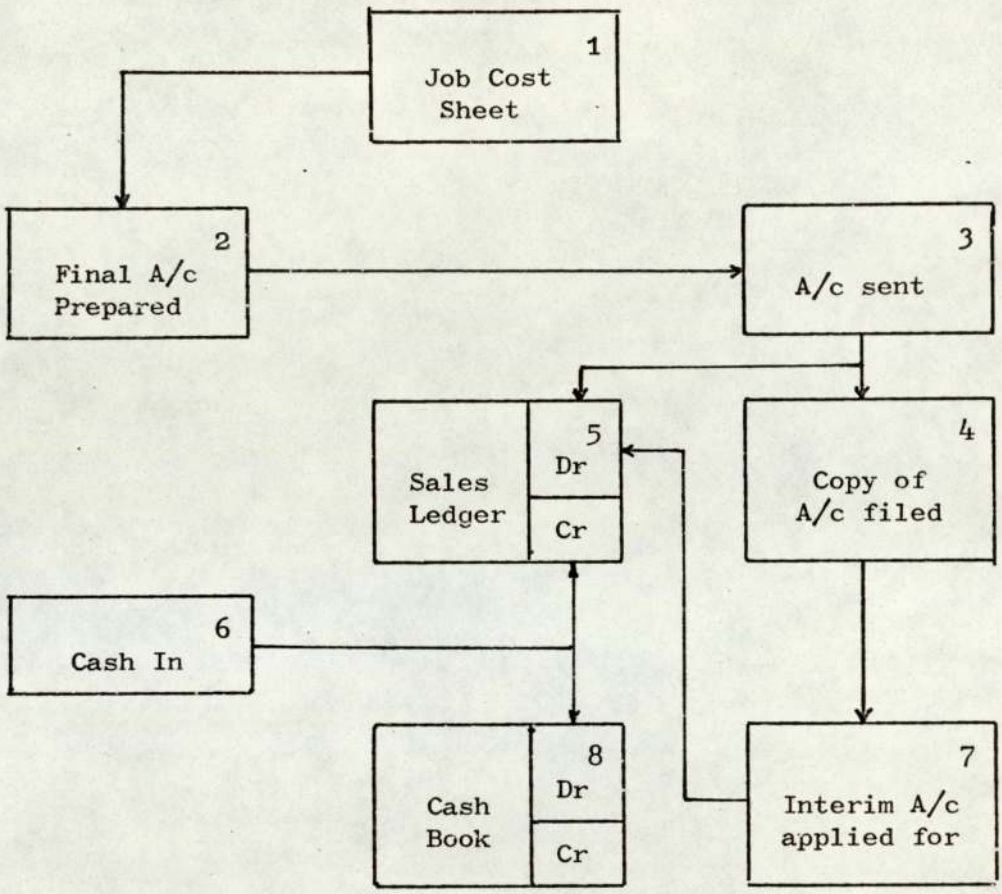
Materials from Stores to Jobs

14	Order issued	1 copy to remain in order book
15		1 copy to stores
9		Stores copy priced and entry made on Job Cost Sheet
16		Materials on site

S T A N D A R D P R O C E D U R E N O 5

SALES

No action should be taken on sales until the final account is being dealt with.



1. Job cost sheet finalised
2. Final account prepared
3. Final account sent to client
4. Final account filed
5. Entry made in Sales Ledger of client
6. Cash in from client
7. Entry made in Sales Ledger of client
8. Entry made in Cash Book

Information from Sales Ledger - Balances - outstanding against orders
invoices submitted
interim applications outstanding

Information from Cost Ledger - Value of work in progress - less payments made.

S T A N D A R D P R O C E D U R E N O 6

INTERNAL TRANSFER OF PLANT/MATERIALS

The site or job requiring the Materials/Plant makes out a requisition in the normal manner.

The supplying site or foreman uses his requisition book but endorses it at the top "TRANSFER" and gives the following information:-

1. Date
2. Details of materials/plant
3. Site supplying
4. Site receiving
5. Signature of Authority

The top copy is to be sent with the load, and is to be treated by the receiving site/foreman as a normal delivery note.

The second copy is to be returned to the office invoice-holding file.

Notes

(a) It is the responsibility of the supply site/foreman to provide the information to ensure that the site is credited for goods supplied to others.

(b) This procedure should also be used when plant/materials are returned to yard.

S T A N D A R D P R O C E D U R E N O 7

Work in progress - gross profit calculations

Month - June 1974

Gross Profits on the last three months on completed works from the sales journal or costsheets £8,000.00

Wages Total wages included on costsheets or wages book for the above completed works £20,000.00

Average Percentage Gross Profit Earned

on labour for the past three months = $\frac{£8,00 \times 100}{£20,000}$ = 40%

Amount of labour costs included in the costsheets = £4,020

Estimated gross profit on work in progress = £4,020 x 40%

= £1,608.00

TANDARD PROCEDURE NO 8 — COSTING SHEET

S Brown, 6 South Road, Taunton, Somerset — Job No 214

HOUSE EXTENSION - TO ENLARGE KITCHEN — Sheet No

ESTIMATE	TOTAL		PROFIT										COST	
	1295	13	250	25	247	75	141	70	631	06	24	37	1044	8
VAT	129	51			Sub-Contract		Labour		Materials		Direct Expenses		Balance	
Date	Ref No	Details												
ar 15	R69	Bricks, Sand, Cement							324	30			324	30
ar 20	TS	Bricklayer					38	30					380	60
ar 21	171	Window/Door frames							175	65			556	25
ar 22	TS	Carpenters					26	14					582	39
ar 23	1174	Kitchen Units							156	17			738	56
ar 23	R74	Transport									24	37	762	93
ar 30	TS	Electricians					27	45					790	38
ar 30	1176	Roofing and Flooring			247	75							1038	13
pr 5	TS	Labourers					20	56					1058	69
		CHARGE		PROFIT										
pr 6	214	1424	64	236	44	247	75	112	45	674	12	24	37	1058	6

S T A N D A R D P R O C E D U R E N O 9

MONTHLY VALUATION SHEET

Date _____

		Value of Work	Value of Work Not Yet Done	Value of Work Done
	SECTION A	£	£	£
1	Total value of own work in hand	8,000.00	3,500.00	4,500.00
2	Extras i.e. day work etc	100.00		100.00
3	TOTAL FOR OWN WORK	8,100.00	3,500.00	4,600.00
4	Total value of sub-contractors' work Nominated supplies at cost	800.00	400.00	400.00
5	Profit on SCINS	50.00	25.00	25.00
6	TOTAL VALUATION	8,950.00	3,925.00	5,025.00
	SECTION B Cost of Own Work	From the Cost Sheet	Not Yet on Cost Sheet	Total
7	Cost of labour including labour only sub-contractors	1,560.00	560.00	2,120.00
8	Materials purchased; invoiced	800.00	200.00	1,000.00
9	Materials purchased; not invoiced	NIL	10.00	10.00
10	Materials from stores	NIL	NIL	NIL
11	Hire plant charges	5.00	NIL	5.00
12	TOTAL COST OF OWN WORK	2,365.00	770.00	3,135.00
	SECTION C Gross Profits			
13	Gross profit on own work - Line 3-11			1,465.00
14	Gross profit on sub-contractors - Line 5			25.00
15	Gross profit on nominated suppliers - Line 5			NIL
16	TOTAL GROSS PROFIT TO DATE			1,490.00
17	Percentage Gross Profit on Turnover = $\frac{£1,490 \times 100}{£5,025}$ = 9.7%			

S T A N D A R D P R O C E D U R E N O 1 0

TO CALCULATE THE WORKING CAPITAL ON A MONTHLY BASIS

		January	February	March	April
	SECTION A	£	£	£	£
	Current Assets				
1	Cash at Bank Balances				
2	Total Debtors				
3	Value of work completed and not invoiced				
4	Value of work in progress				
5	Value of material stock				
6	Any other cash assets				
	TOTAL CURRENT ASSETS	£	£	£	£
	SECTION B				
	Current Liabilities				
7	Bank overdraft owing				
8	Owing to Suppliers				
9	Owing to Sub-contractors				
10	Any other Creditirs including TAX				
	TOTAL CURRENT LIABILITIES	£	£	£	£
	Working Capital				
	= The difference between totals of Sections A and B	£	£	£	£
	Working Ratio to be 2:1				

Notes

Lines 1 and 7 taken from Bank Statements
" 2 " 8 " " Purchase Ledger
" 3 " 4 " " Cost Sheets and Journal
" 5 " " Stock Record

S T A N D A R D P R O C E D U R E N O 1 1

PROFIT STATEMENT FOR THE MONTH OF _____

		£
1.	Gross profit on jobs invoiced for the month (from the cost sheets or sales journal)	1,000.00
2.	Estimated profit on work in progress at the end of the month	200.00
		1,200.00
3.	Less profit on work done but not invoiced at the end of last month b/fwd	500.00
4.	Balance = Gross profit on work for the month	700.00
5.	Less overheads for a month (from budget)	70.00
6.	Approximate nett profit for the month	£630.00

Notes

1. Taken from the Cost Sheets and Sales Journal
2. Use Standard Procedure No 7 Page 75
3. Taken from Standard Procedure No 1 Page 60 Overhead Budget

FINANCIAL CONTROL

1. The Use of Financial Ratios

Management ratios provide a useful tool for a quick assessment of the health and progress of a business. Just as a doctor can make an examination of a patient by taking the temperature, rate of pulse, etc, so the principal/owner can make a series of tests of the business by using ratios.

Management ratios are not a complete check in themselves, but they will give a clear indication of the business trends and as to whether a further and closer examination is required. With the correct application they are very useful for measuring the effective use of funds and the extent to which the business is progressing along the predetermined policy. It must be remembered that, with all the variations in management ratios, it is the trends that count and not the figures in themselves. Therefore if management ratios have not been used before, the business previous two years' figures must be consulted and compared with the current figures if the ratio is to mean anything positive.

2. Standards of Performance

For effective control and provision of meaningful information financial ratios must compare actual results against some form of standard. Suggested standards are:-

(a) Planned Performance

A company budget sets out the policy and targets expected to be achieved during the period of one year. Comparison of actual and budgeted results indicate the extent to which the aims have been achieved. These should be reviewed quarterly

(b) Past Results

The comparison will reveal what progress has been attained over previous periods. The extent of this progress must be viewed in the light of economic circumstances, increased capital investment and any other relevant factors.

(c) Other Companies in the same Industry

This will show how the company is faring as compared with its competitors and provides an external check on performance.

3. Application of Ratios - Standard Procedure No 12

The following are some of the most significant ratios. They are not intended to be a complete list and all apply to the accounts of Small Builder Ltd, Appendix I Table 13.

(a) Return on Investment

= Nett Profit : Capital Invested

= £4500 : £24000 = 18.75%

The nett profit is usually taken before tax but is equally valid if taken after tax, provided a consistent formula is applied. Calculation for RO1 is best shown by Figure 3 Page

(b) = Nett Profit : Total Capital Employed

= £4500 : £38500 = 11.7%

Nett profit should exclude income from investments. Capital and Total assets employed should include funds invested outside the business in order to ascertain the actual earnings achieved by the efforts of the organisation.

This ratio reveals how effectively the capital employed has been used and measures the profitability achieved. Thus for every £100,00 of capital employed there will be an earning of £X.

(c) Number of Times Assets One Turnover/Year

= Sales : Fixed Assets

= £70,000 : £25,000 = 2.8 times

The activity ratio showing the vitality of the assets and the number of times they are 'turned over' in the course of the year.

By comparing the figure with the previous periods a measure of progress can be ascertained. Also if compared with other companies in the same industry, the ralative efficiency in the use of assets can be seen.

(d) Current Ratio

Current Assets : Current Liabilities

= £13,300 : £6,000

This reveals the amount of Working Capital is £7,300 thereby showing that the company has the ability to meet the immediate cash demands. The ratio measures the safety margin against unforeseen events and a rule of thumb measure is in the order of 2:1. Much will depend on the quality of the current assets and the ability to raise new capital.

Current Assets include:-

Stocks

Work in progress

Debtors accounts

Prepaid expenses

Marketable securities

Cash

Current Liabilities include:-

Trade creditors

Accrued expenses

Current Tax liability

Bank overdraft

(e) Liquidity Ratio

Liquid Assets : Current Liabilities

£4,402.00 : £6,000 = 0.75%

Liquid Assets are all of those items represented by cash or which can be quickly converted into cash. This ratio highlights the company's ability to meet immediate cash demands; note the exclusion of stock.

(f) (i) Business Efficiency

Gross Profit : Nett Sales

= £12,000 : £70,000 = 17.1%

This ratio will reveal the gross profit made on each £100.00 of sales. Against this must be weighted the amounts found necessary for Marketing Administration and financing the business.

(ii) Nett Profit : Nett Sales

= £4,500 : 70 000 = 6.46%

In this instance profit is taken nett before tax and indicates the amount left after all payments have been made. In both 6(i) and (ii) ratios analyse the efficiency of business operations and the effect of preceding policies and the volume of sales. They must be viewed in ralation to past results, current profit objectives and compared, where possible, with other companies of the same or similar structure and size.

(g) Debtors to Sales

Debtors : Sales

= £3,704.00 : £70,000

This ratio shows the proportion of debtors to nett sales for the period. By using the following equation we calculate the average debt collection period:-

$\frac{\text{Debtors}}{\text{Sales}}$ x 365 days = collection period

$= \frac{£3,704}{£70,000}$ x 365 = say 20 days

By observing the collection period management can measure the effectiveness of their invoicing and cash collection procedures and, in addition, see the effect of the credit policies.

(h) Rate of Stock Turnover

$\frac{\text{Cost of Goods Sold}}{\text{Average Stock}} = \text{Rate of Stock Turnover}$

Cost of goods sold = opening stock + purchases - closing stock

£7,102.00 + £19,962.00 - £8,898.00

Average Stock = opening stock + closing stock ÷ 2

£7,102.00 + £8,898.00 ÷ 2

$= \frac{£7,102.00 + £19,962.00 - £8,898.00}{£7,102.00 + £8,898.00 \div 2} = \frac{18166.00}{8000} = 2.27$

say 3 times a year

(j) Credit Periods

Creditors : Purchases

£6,000.00 : £19,962.00

$= \frac{6,000.00}{19962.00} \times \frac{365}{1} = 110$ days

The one ratio which sums up all the activities of the business is the "Return on Investment" ROI. Are you getting more or less for your money than you were last year?

(k) Nett Profit percentage which is Nett Profit over Turnover x 100

$= \frac{£4,500.00}{70,000} \times 100 = 64\%$

(l) Fixed Capital - which is fixed assets, i.e.

	£		
Premises	7,400	)	
		)	
Machinery	14,000	)	£25,200.00
		)	
Vehicles	3,800	)	

(m) Circulating Capital = £13,300.00

Capital employed — Fixed Assets

£38,500.00 - £25,200.00 = £13,300.00

(n) Liquid Capital = £4,402.00

Debtors + Bank + Cash

£3,704.00 + £650.00 + £48.00 = £4,402.00

(o) Working Capital = £7,300.00

Current Assets - Creditors

£13,300.00 - £6,000.00 = £7,300.00

(p) Capital owned by the Principal = £22,500.00

Capital + Nett Profit - Drawings

£24,000 + £4,500.00 - £6,000.00 £22,500.00

(q) Capital employed = total assets = £38,500.00

This business is quite solvent but there is a slight tendency to overtrading. The accepted ratios are

Working Capital 2:1

Liquidity 1:1

The ROI is 18.75% which represents a good average for the general small building firm

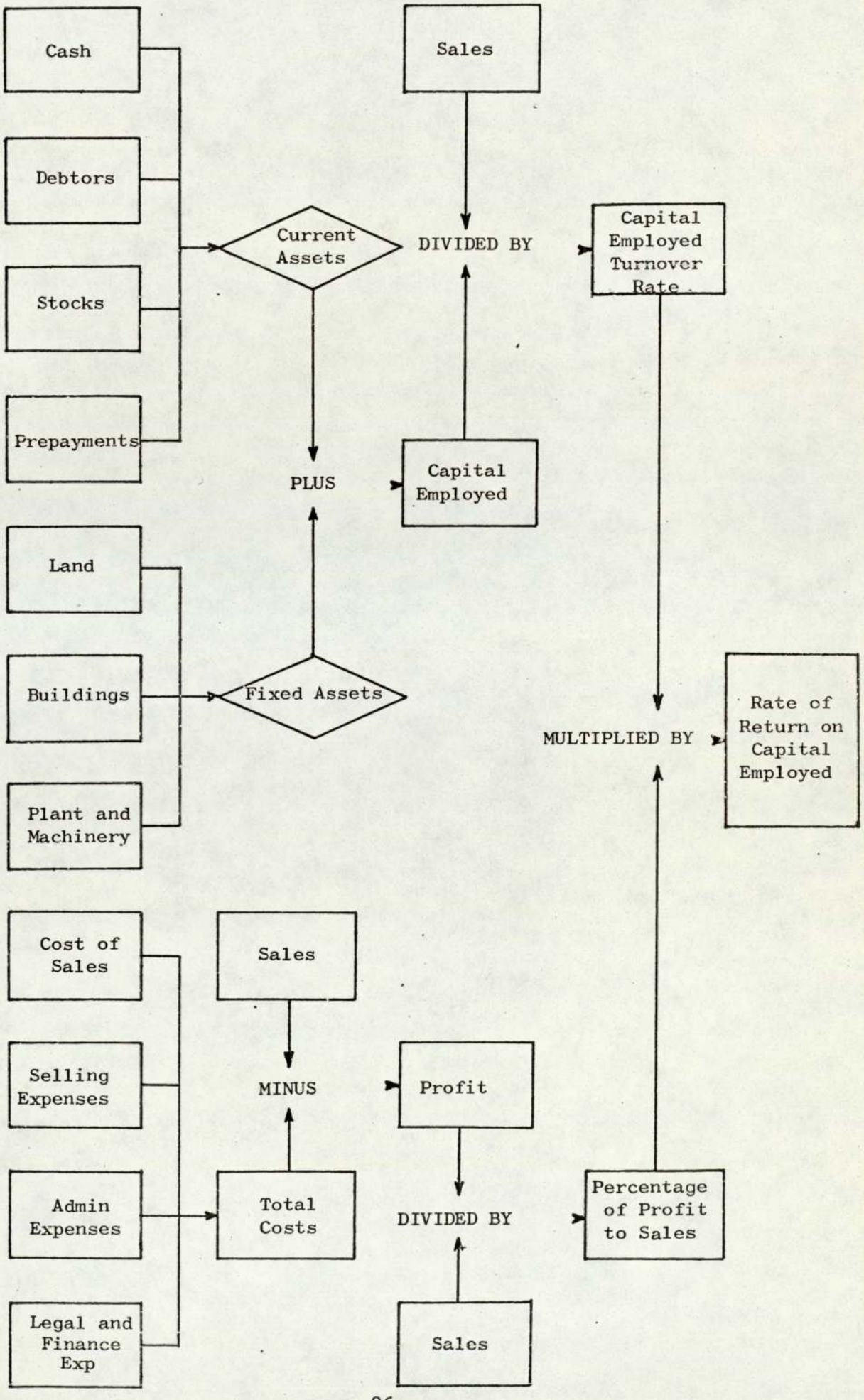
(r) Capital turnover or rate of asset - this shows the number of times the asset value is turned over each year by Sales and is the Sales divided by the Capital employed.

$$\frac{\text{Sales}}{\text{Capital Employed}} = \frac{£70,000}{£38,500} = \text{say } 2$$

= cost of goods sold + labour/month = £5,833.00

This section on Financial Control is not intended to make the principal an accountant, but to enable him to identify and understand the business accounts and be able to make checks to see if the business is progressing along the lines of policy laid down.

RELATIONSHIPS OF FACTORS AFFECTING THE RETURN ON CAPITAL EMPLOYED



CHAPTER 6

EDUCATION AND TRAINING

THE TRAINING PROGRAMME

The more that can be done to keep people informed in the management fields the better it must be for the industry as a whole. Because it can be rather an intangible thing, difficult to evaluate in terms of finance, many firms regretfully neglect to include management in their training policy. In building, not like other industries, there has been a tendency to give management training a low priority - this may be due to the shortage of skilled manpower. The upsurge in management training followed the establishment of the Training Boards in 1964 and in the late sixties many courses were designed in management training for the small firm but had little practical application of such problems and subsequently brought about an air of disillusionment on the whole subject.

The research of the author among small firms clearly shows that some form of management training must be taken out of training centres and be taken back into the firms themselves. This is because the firms in the industry are too varied in size structure and type, with (App I T 8) each facing different external and internal pressures to make it possible for all management training to be carried out outside the work situation. Training must be tailor made to suit the industrial company and be part of the company's normal business operations rather than a company trying to mould itself to the general form of management training given on courses.

This new approach to training within the firms' own environment does not eliminate the need for the external management course. They will still have a very important part to play in management training in the small firm in subject areas as been shown in the return obtained from the builders in the South West region - see Appendix II. One of

the most difficult problems to overcome is to get the small firm principal to appreciate the need for management training particularly as a continuous process which has to be fitted into their normal programme of work. It has been the recognised normal practice over the last decade that, to obtain good craftsmen, they need to be properly training, yet the principal himself is not training, and the whole success of the company will depend on the ability of its management.

The author has been looking at the small firm training problem for the last four years and has come to the conclusion that there is a need for the training of the personnel not only within their own environment but also outside and away from their own business. They can then have time to look back and examine their own problems in isolation, together with other principals and managers of firms similar in size and structure to their own.

In the very near future we will see the establishment of the National Training Agency who have the responsibility for the development of management training within the construction industry - see Figure 1. It is recommended that the Training Services Agency should set up a special section for co-ordinating the efforts of the Industrial Training Boards to deal with the management training and development needs of the small firm backed by selective grants from the Agency. The advantages gained by the small firm and to the community as a whole in raising the standards of management in the small firm would more than offset the cost of such grants.

The Agency and the Industrial Training Boards should try to ensure that the emphasis on the training and development of small firm principals is moved away from the more general management training courses towards a more active in-company involvement of training staff who know the background and problems of the firms and who are able to

give practical help as well as advice. The Agency should assist the boards in the training of suitably qualified management development advisers for this work in small companies.

Training boards should be encouraged to extend the range of their training and development services to cover all aspects of manpower utilisation with particular attention to the managerial manpower resources of the small firm.

Small firms generally resent any kind of outside interference in their affairs and yet, at the same time, they want help and complain of being neglected. Most small companies are very much aware of the management problems they face and do want relevant help with their problems, but they frequently find that management education and training programmes available externally to the firm are too sophisticated for their particular needs and so they look upon them as irrelevant and a waste of time.

Appendix I Figure 14 illustrates a three-tier structure in which a National Training Agency, independent of the Department of Employment and the Industrial Training Boards, is recommended as the principal agency for ensuring that the training and development needs of small firms are met.

1. The National Training Agency would have a central role.
2. The Industrial Training Boards would have a regional and local role as well as providing advice on policy proposals.
3. A company would be controlled through the Industrial Training Boards' Group Training Association.

PROBLEMS OF TRAINING WITHIN THE SMALL FIRM

There is a wide variation in the number of supervisors employed per firm and no pattern emerges except possibly that too few supervisors were employed per firm. Management in the small firm group 1:10 operatives is invariably carried out by the owner/principal himself and in the majority of cases acts as supervisor as well.

My investigations have shown that when the firm reaches a size of approximately 15/25 operatives the principal will tend to employ a supervisor and then this is usually a partner or a member of the principal's family. Technical staff do not emerge until the firm reaches a stage of 20 operatives plus, even then not in great numbers. Up to this point in a firm's size the work function of the technician is carried out by the owner/principal.

FIRMS HIGHLY DIVERSIFIED

It is a common practice in the South West Region to find small construction firms with a high diversification of activity, for example, do-it-yourself shops, builders' merchants to the undertaker.

SMALL FIRM INHIBITED FROM TRAINING

The small firm as defined is not in the normal situation able to employ economically or practically a training officer or undertake training on a plan programme within the firm. The unit size is not viable when considered from a training situation.

The management training programme or process for a small firm principal is a fluctuating process because it is impossible to design a programme on a once-and-for-all basis. The job of the small firm principal is open-ended and is constantly adjusting to meet the marked demands of his business. The management development process therefore has to be very closely linked with the development of the business.

When considering what type and level of training that should be developed for the small firm it should be remembered that essentially the small firms' principals stem from practical craftsmen and usually their educational assessment is limited. The starting point for management training or development for these firms must be geared to their existing level of understanding and take into account the different educational and occupational experiences. Methods of instruction must be carefully selected and the difficulties recognised that when the principal is returned to a classroom situation for training he will not feel he is wasting his time.

For the training to be effective it must reflect the needs of the small firm and follow a pattern that can be recognised by the principal in his day to day work. The programme must be tailor-made to suit the requirements of the individual or groups of small firms' management processes. They should, as freely as possible, call upon the experience of the principal himself and not be mixed up with formally-designed management programmes which mainly cater for the larger companies.

There is a need to develop a more professional kind of principal who will be able to conduct his business in a professional manner. A small firm is not short of the entrepreneurial and innovating skills associated with the successful conduct of the business, but he is short of the administrative skills in management. There is a clear need for training but designed in the context of a small firm. It is essential that any training methods adopted must be such that the minimum demand is made on the working time of the small firm principal. The recommended content under the training programme has been derived from the analysis made of the Questionnaire Number 3 Appendix II, analysis of which is shown in the following table:-

RECOMMENDED TRAINING PATTERN FOR SMALL FIRMS

Management Area of Operation	Job Relevance and Size of Firm				Training Required and Size of Firm			
	0-10			11-24			0-10			11-24		
	A	B	C	A	B	C	A	B	C	A	B	C
1. Management Principles												
The integration of management principles into the functions of management		*		*			*			*		
2. General Finance												
Sources of capital	*			*				*				*
Short term finance	*			*			*				*	
Long term finance		*		*					*		*	
Methods of borrowing	*			*			*				*	
Interpretation of balance sheets	*			*				*		*		
3. Cash Flow												
Definitions and misuse	*			*			*			*		
Calculation of each requirement	*			*			*			*		
Dangers of restricted capital	*			*			*			*		
Movement of money in and out	*			*			*			*		
4. Financial Control												
Control systems	*			*			*				*	
Budgetory control		*		*				*			*	
Financial policy	*			*			*			*		
Accounting methods	*			*				*				*
Links between -												
Estimating	*			*			*			*		
Costing	*			*			*			*		
Management functions		*		*			*			*		
5. Sales and Marketing												
The Building Market			*	*			*			*		
Economic price	*			*			*			*		
How to obtain business	*				*				*			*
Speculative building			*		*				*	*		
Package deals			*		*				*	*		
Negotiated contracts			*	*					*	*		
Links between purchasing and estimating	*			*			*			*		

Key: Please see Page 95

Management Area of Operation	Job Relevance and Size of Firm						Training Required and Size of Firm					
	0-10			11-24			0-10			11-24		
	A	B	C	A	B	C	A	B	C	A	B	C
6. Estimating & Costing												
The basic rate and cost to employer	*			*			*			*		
Material and plant costs	*			*			*			*		
Information for cost control	*			*			*			*		
Time and costs	*			*			*			*		
Costing applied to estimating	*			*			*			*		
7. Planning and Contract Techniques												
Method study and work measurement		*			*			*			*	
Gant Charts		*			*			*			*	
Labour allocation methods	*			*			*			*		
Schedules of resources		*		*				*		*		
Link between estimating and planning	*			*			*			*		
8. Safety in Construction												
Statutory requirements	*			*			*			*		
Operation of regulations	*			*			*			*		
Cost of accidents	*			*			*			*		
Accident prevention	*			*			*			*		
9. Law: Legal Aspects												
Employers	*			*			*			*		
Client and contractor	*			*			*			*		
Contractor and third parties	*			*			*			*		
Suppliers	*			*			*			*		
Trade unions: Labour relations		*		*			*			*		
Insurance	*			*			*			*		
10. Communications												
Methods of communications		*		*			*			*		
Recording informations	*			*			*			*		
The link in the management process		*		*			*			*		
Time and communication	*			*			*			*		
Failure in communications	*			*			*			*		

Management Area of Operation	Job Relevance and Size of Firm						Training Required and Size of Firm					
	0-10			11-24			0-10			11-24		
	A	B	C	A	B	C	A	B	C	A	B	C
11. Personnel Management												
Entrepreneurial skills in:												
Innovation	*			*				*				*
Risk taking	*				*		*			*		
Planning		*			*			*		*		
Decision making	*			*			*			*		
Problem solving	*			*			*				*	
Information processing	*			*			*				*	
Communicating	*			*			*			*		
12. Purchasing												
Legal requirements	*				*		*			*		
Comparison of quotations		*		*					*			*
Placing of orders	*			*				*				*
Stock control		*		*			*			*		
Costing and Accounting	*			*			*			*		
Purchasing policy			*	*					*	*		

Key:

A = High - Good Knowledge Of
B = Medium - Knowledge Of
C = Low - Be made aware of

After analysing the information collected on the requirements of management training for small firm principals and deciding on the recommended training pattern for them, a series of courses have been organised and the following course represents a final validity plan for this type of training.

It must be remembered that the depth of study in each topic must be as practical as possible and only go as far as detailed in Appendix III with the course notes that all members received. This course represents the final programme of work that was started at the commencement of this research thesis and reflects the views and opinions of principals and staff employed in small firms.

The following analysis shows the development of the training course in relation to the relevance of the subject matter:-

QUESTIONS 1 AND 2

ANALYSIS OF QUESTIONNAIRE NO 4 APPENDIX II SHOWING THE RELEVANCE OF SUBJECT MATTER IN COURSES RUN

COURSE SUBJECT	1970		1971		1972		1973		1974	
	A	B	A	B	A	B	A	B	A	B
Management Principles	2	40	2	46	1	70	1	82	1	90
General Finance	2	70	2	80	2	84	2	87	2	95
Cash Flow	3	94	3	90	3	87	3	100	3	100
Office and Site Organisation	2	10	1	12	-	-	-	-	-	-
Methods of Purchasing	1	30	1	36	1	47	1	60	2	40
Marketing	1	50	1	40	1	*60	1	72	1	81
Estimating	2	90	2	86	3	100	3	96	3	98
Work Study	2	10	1	12	1	°60	1	51	1	73
Contract Planning	3	100	3	100	3	94	3	96	3	92
Financial Control	2	90	2	87	2	80	2	90	2	77
Economies of Plant	1	20	1	18	-	-	-	-	-	-
Safety in Construction	1	40	1	60	1	70	1	67	1	70
Law	2	60	2	75	2	73	2	80	3	100
Metric	1	10	-	-	-	-	-	-	-	-
Insurance	-	-	-	-	1	90	1	100	1	100
Site to Office Organisation	-	-	-	-	1	65	2	69	2	71

A = Number of sessions allocated in course - $1\frac{3}{4}$ hours per session

B = Relevance of subject matter shown as a percentage of course members

* Change of Lecturer - a marketing man not employed to deal with Marketing Principles only

° An introduction to Work Study only, concentrated on Method Study

3. Work Study (Method Study only)

   Insurance

   Site Office Organisation (Feed Back)

4/5. Cash Flow by Case Study

   Planning by Case Study

   Work Study by Case Study

6. Yes

7. 1969 60% years - 1974 92% years

8. March or November

9. As presented course members expressed a wish that they required to use all the time to their advantage

10. Yes

11. Yes, too much

12. (a) Yes (b) Yes, lighting was expressed as a result of the Questionnaire

13. Yes

14. Yes

C O N C L U S I O N

There are three levels of knowledge useful to the principal/manager in determining the need for, and the choice of a management course. They are:-

(i) Knowledge of methods and techniques available and useful in devising answers to specific problems

(ii) Knowledge of important realities, conditions, trends affecting the nature of a business situation, which helps in understanding the needs for action

(iii) Knowledge of what goals, policies and procedures are desirable for the organisation.

To come to such a knowledge demands a clear statement of objectives by the company. The expectations of management training/education must be clearly agreed and communicated to principal/manager, otherwise their new found "education" may serve only to increase their sensitivity to their problems in the company and compound their frustrations if left bereft of the opportunity to develop capabilities and skills by tackling the insistent challenges of change. There alone lies a man's growth.

A C K N O W L E D G E M E N T S

The author acknowledges the assistance of Professor A W Prat and Mr A H Wootton of the University of Aston in Birmingham; Mr R A Pomeroy, Principal of the Somerset College of Arts and Technology; the Construction Industry Training Board and the National Federation of Building Trades Employers South West Region in the preparation of material for this thesis; and the large number of individuals and firms in the region who gave willing and detailed help.

SPECIAL ACKNOWLEDGEMENTS have to be made to all the lecturing staff who assisted with the running of the management courses from which the recommended training programme has derived.

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APPENDIX I

CONTENTS

BANKRUPTCY IN THE CONSTRUCTION INDUSTRY

The number of firms in the Construction Industry that have been removed from the Department's statistical register in each of the last ten years is shown below. Separate information on those which are known to have ceased trading is available only for 1969 and 1970.

Year	Removed from the Register	Ceased Trading
1961	5336	
1962	6294	
1963	6197	
1964	5216	
1965	5888	
1966	5868	
1967	6953	
1968	7148	
1969	6748	5918
1970	6643	5198

TABLE 1

NATIONAL PATTERN OF INDUSTRY

SMALL FIRMS - 0-24 SIZE - 1970

Year	No of Firms	% Industry	Thousand Employees	Value of Work £m	Value of £m Work/Employee
1965	75,070	89.618	389.4	173.60	0.446
1966	74,090	90.044	368.4	175.70	0.477
1967	73,680	90.351	360.3	186.10	0.517
1968	72,191	90.172	247.1	202.00	0.582
1969	69,714	90.330	320.5	214.30	0.669
1970	66,777	90.952	309.5	216.80	0.700
1971	64,780	90.932	311.2	284.90	0.915
1972	64,335	90.333	320.5	338.70	1.057

= Fall of 10,672 = 14.228% Increase of 51.3 £m

TABLE 2

Extract from Bulletin of Construction Statistics 1970

NATIONAL PATTERN OF INDUSTRY

TOTAL NUMBER OF FIRMS		VALUE OF WORK DONE		
Year	No of Firms	Thousand Employees	Value of Work £m	Value of £m Work Done Employee
1965	83,696	1,453.6	785.8	0.541
1966	82,282	1,409.5	806.0	0.572
1967	81,549	1,383.2	850.6	0.615
1968	80,059	1,352.3	927.2	0.686
1969	77,177	1,266.5	942.2	0.744
1970	73,420	1,167.0	949.8	0.814
1971	71,240	1,120.2	1,219.1	1.088
1972	71,220	1,147.3	1,356.0	1.182

Difference between 1965 and 1972 = 15% less firms

= 21.07% less employees

fall of 306.3

= 42% increase in output

TABLE 3

Extract from Bulletin of Construction Statistics 1970

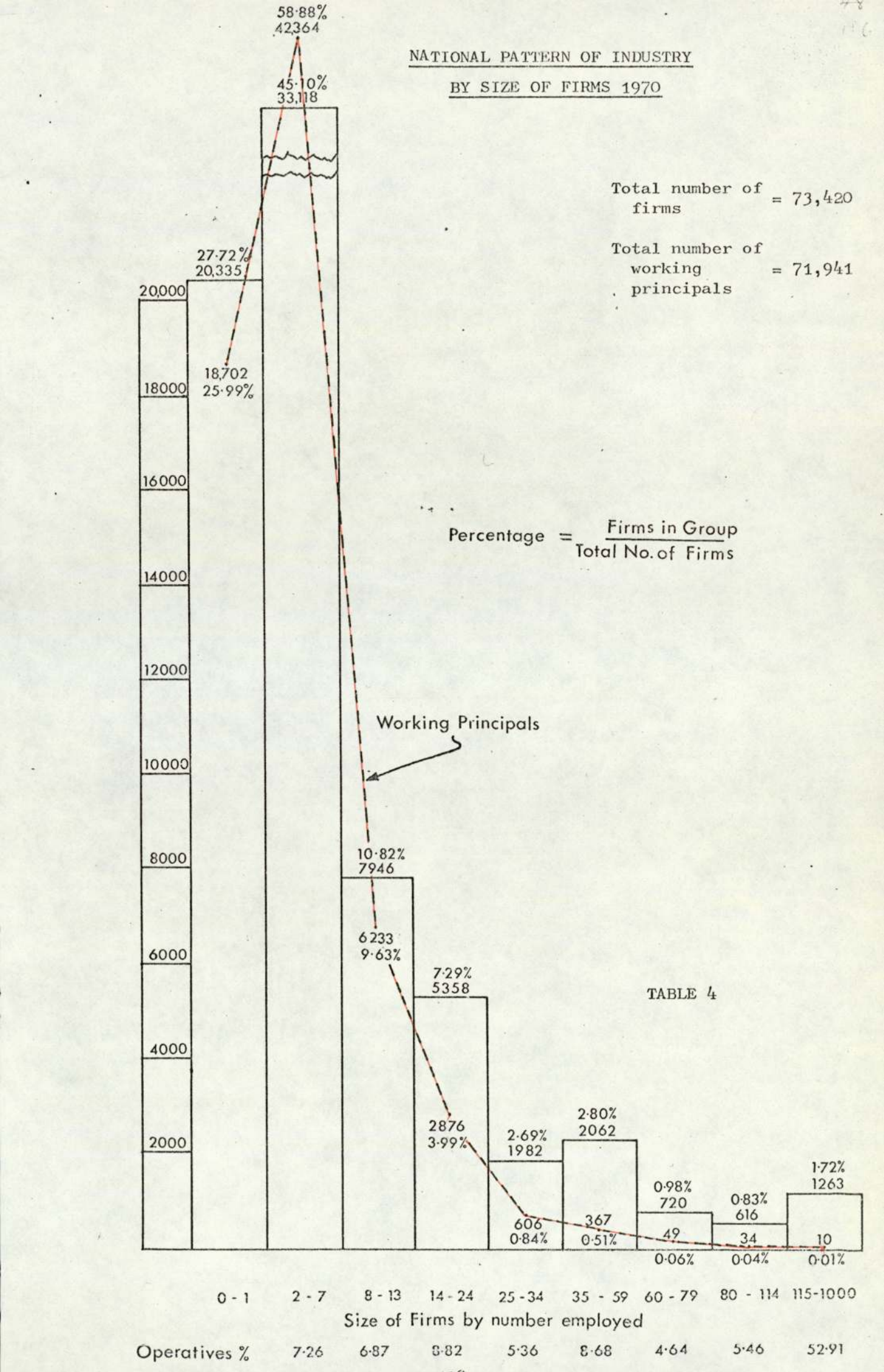

NATIONAL PATTERN OF INDUSTRY
BY SIZE OF FIRMS 1970
Total number of firms = 73,420
Total number of working principals = 71,941
Percentage = Firms in Group / Total No. of Firms
Working Principals
58·88% 42,364
45·10% 33,118
27·72% 20,335
18,702 25·99%
10·82% 7946
6233 9·63%
7·29% 5358
2876 3·99%
2·69% 1982
606 0·84%
2·80% 2062
367 0·51%
0·98% 720
49 0·06%
0·83% 616
34 0·04%
1·72% 1263
10 0·01%
20,000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0 - 1
2 - 7
8 - 13
14 - 24
25 - 34
35 - 59
60 - 79
80 - 114
115-1000
Size of Firms by number employed
Operatives %
7·26
6·87
8·82
5·36
8·68
4·64
5·46
52·91

TABLE 4

SIZE FIRMS BY TOTAL NUMBER OF STAFF

IN FIRMS IN SOMERSET, DEVON AND CORNWALL

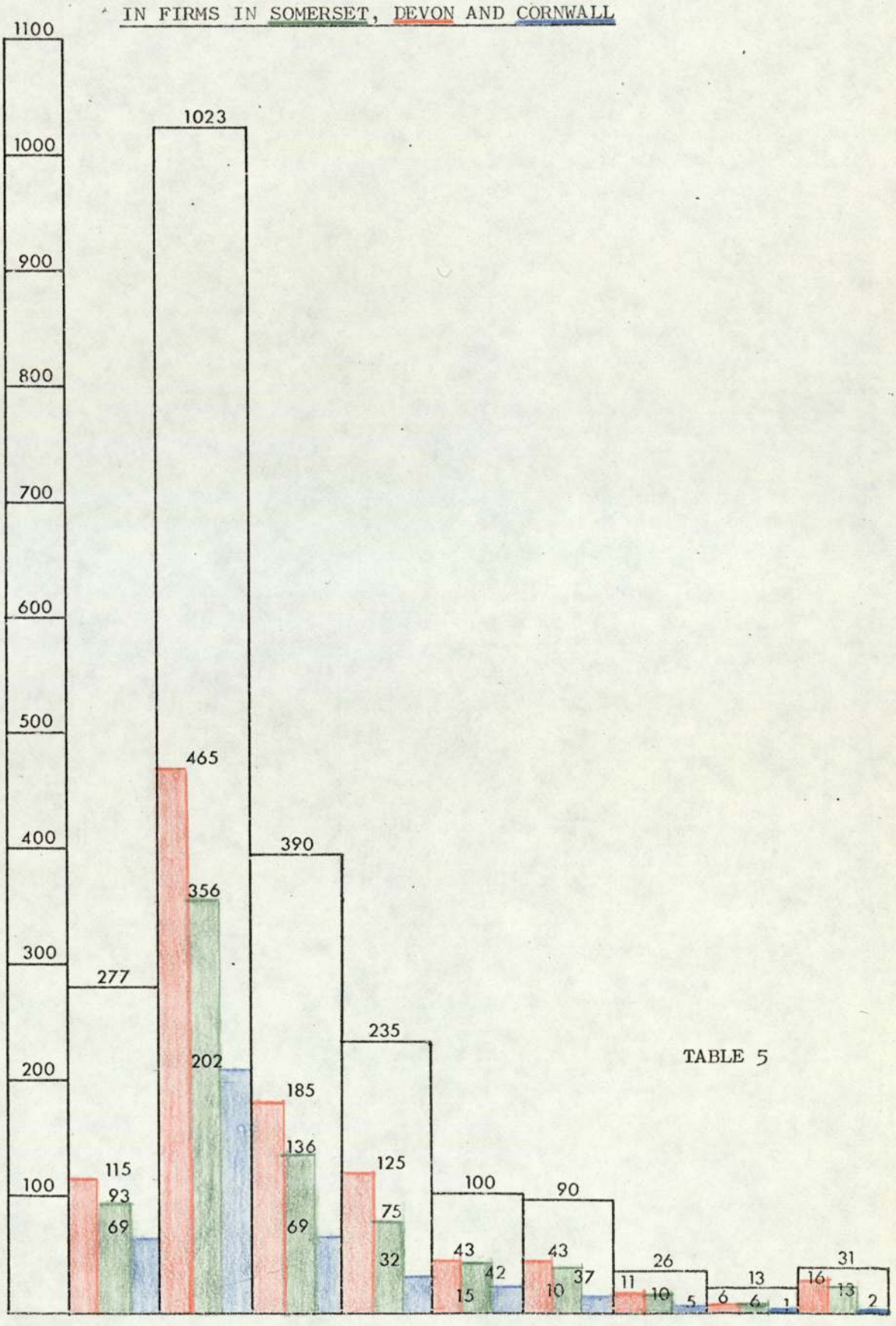
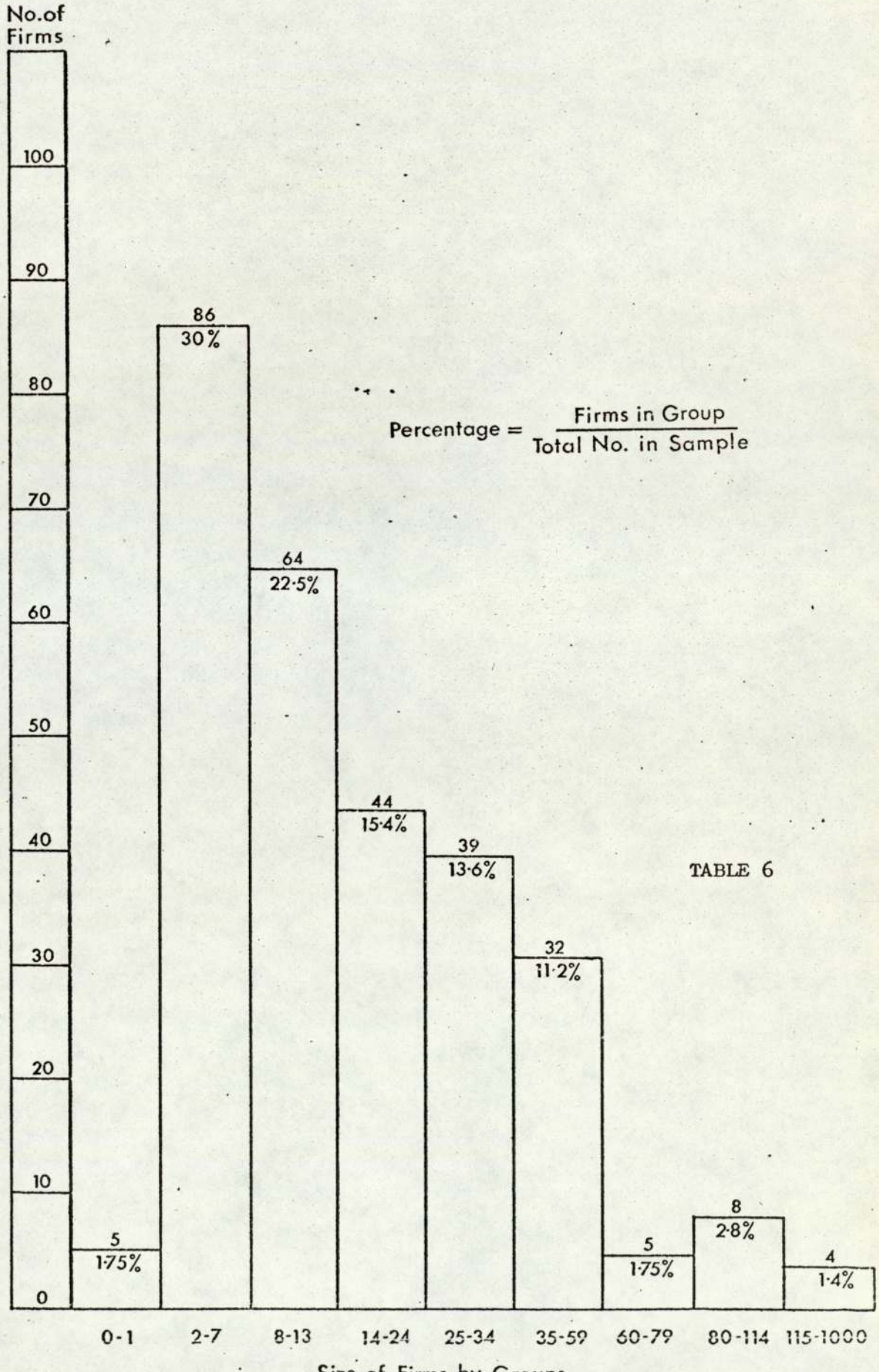


TABLE 5

SIZE OF FIRMS IN SAMPLE TAKEN

IN THE WESTERN REGION 287



Percentage = $\frac{\text{Firms in Group}}{\text{Total No. in Sample}}$

TABLE 6

SIZE OF FIRM IN THE SOUTH WESTERN REGION

BY REMUNERATION 1970/71

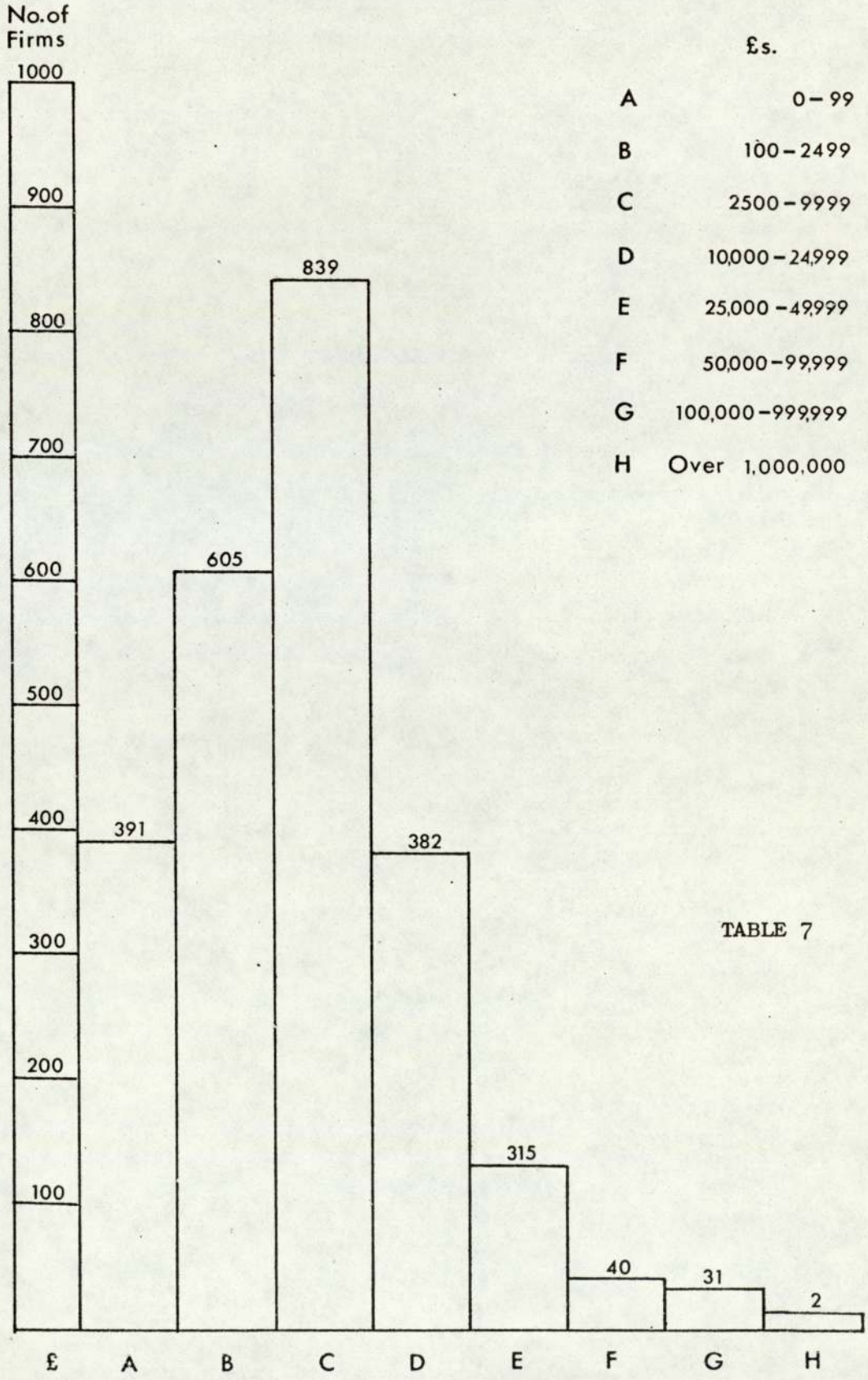


TABLE 7

STRUCTURE OF INDUSTRY BY PRINCIPAL TRADES

No	Type of Firm	No of Firms	No of Operatives in 000's
1	General Builders	31,546	246.2
2	Building and Civil Engineering	2,201	260.4
3	Civil Engineers	1,567	71.1
4	Plumbers	6,718	23.2
5	Carpenters and Joiners	4,572	16.5
6	Painters	12,258	41.5
7	Roofers	1,349	12.1
8	Plasterers	2,615	15.0
9	Glaziers	281	3.2
10	Demolition	284	3.1
11	Scaffolding	96	6.5
12	R C Specialists	240	7.2
13	H and V Engineers	2,211	41.7
14	Electrical	4,095	54.9
15	Asphalt and Tar	303	11.4
16	Plant Hire	1,475	22.5
17	Flooring	438	4.8
18	Constructional Engineers	363	18.2
19	Insulating Engineers	84	6.0
20	Suspended CLGS	76	1.5
21	Floor and Wall Tile	298	2.3
22	Miscellaneous	350	4.9
	TOTALS	73,420	874.3

INFORMATION FROM DIRECTORATE OF STATISTICS, DEPARTMENT OF THE ENVIRONMENT 1973

TABLE 8

RANGE AND AVERAGE RESULTS FOR SELECTED RATIOS - INTERFIRM COMPARISON FOR BUILDING FIRMS 1970

RATIO		HOUSE BUILDERS			GENERAL BUILDERS		
		Upper Quartile	Median	Lower Quartile	Upper Quartile	Median	Lower Quartile
Operating profit/operating assets	%	15.2	11.1	5.9	15.4	8.0	0.3
Operating profit/total revenue	%	7.6	4.3	1.2	5.0	2.1	0.1
Total revenue/operating assets	times	4.91	3.49	1.47	4.86	3.95	2.96
Site costs/total revenue	%	99.3	88.6	66.9	91.1	89.0	87.2
General overheads/total revenue	%	11.4	8.1	5.9	9.6	8.0	6.5
Gross margin on own work	%	23.6	15.3	11.5	16.4	13.9	10.4
Gross margin on work subcontracted	%	13.9	4.8	2.0	7.0	4.8	3.5
Average current assets outstanding in £'s per £1,000 of total revenue		352	236	151	279	220	168
Investment in faxed assets at 1970 prices in £'s per £1,000 of value of own work		63	49	41	92	60	44
Average frequency of applying for payment	weeks	16.5	5.6	1.3	4.8	2.3	1.1
Average credit period taken by clients	weeks	4.3	2.0	0.6	7.9	5.5	4.0
Average period between completion of work and payment by client	weeks	17.2	7.9	4.0	11.0	8.7	6.1
Value of own construction, per employee	£	3,610	3,370	2,640	3,615	2,955	2,645
Gross profit on own construction per site employee	£	809	560	449	645	492	313
Undepreciated value of all fixed assets (including hired) at 1970 prices per site employee	£	635	475	340	1,100	720	360

TABLE 9

Extract from Interfirm Comparison

WORK LOAD CHART
FOR THE AVERAGE SMALL FIRM

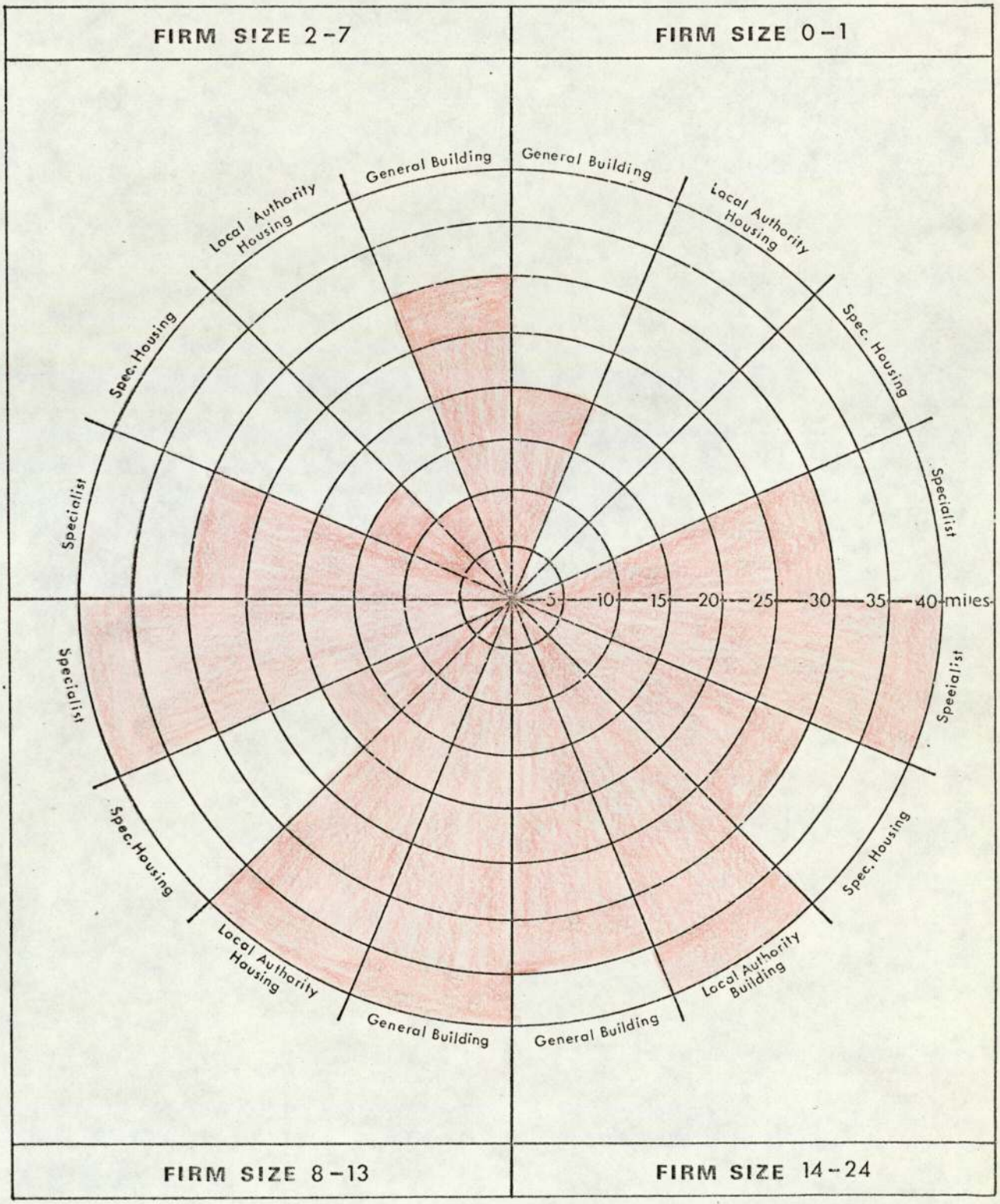


TABLE 10

S M A L L B U I L D E R S L T D

Directors - D R Small, A L Smith

LONG ROAD, LITTLEHAMPTON, SUSSEX

Telephone: Littlehampton 3252

BUILDERS & DECORATORS HEATING ENGINEERS

To: Ref:

Dated: 19

Dear Sir/Madam

We offer to carry out in good and workmanlike manner the work described in the Estimate below dated ..... 19 ..... (and in any drawings and specification annexed hereto) for the price of £ .....; subject to the Conditions set out overleaf, to which attention is called.

Yours faithfully

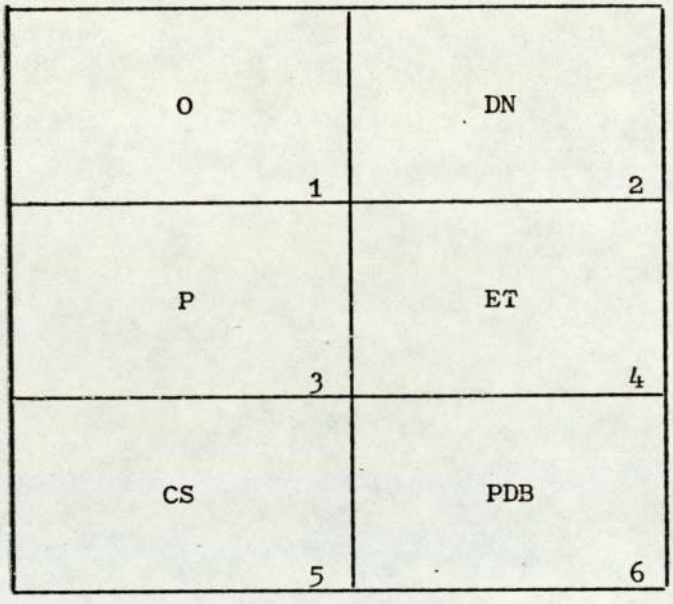
SMALL BUILDERS LTD

DESCRIPTION OF THE WORK INCLUDED IN THE ESTIMATE

The standard conditions to be set out overleaf and these conditions should generally be in accordance with those issued by the National Federation of Building Trade Employers for the use of members' firms.

TABLE 11

INVOICE STAMP



KEY:

O = Order Number

DN = Delivery Note Checked

P = Price Correct as Order

ET = Extension on Order Correct

CS = Enter on to Cost Sheet

PDB = Enter into Purchase Day Book

By stamping each invoice it enables the principal to determine at any time how far he has progressed in the administrative system.

This to be produced as a rubber stamp.

TABLE 12

ACCOUNTS FOR SMALL BUILDER LTD

December 31st 1973 Balance Sheet

Dr Liabilities	£	£		£	Cr Assets
Capital Jan 1	24000		Fixed		
+ Nett Profit	4500		Premises	7400	
	28500		Machinery	14000	
			Vehicles	3800	
Less Drawings	6000	22500			25200
Long Term			Current Assets		
Secured Bank Loan		10000	Stock	8898	
			Debtors	3704	
Current			Bank	650	
			Cash	48	13300
Creditors		6000			
		38500			38500

SMALL BUILDER LTD

Trading Account Year Ended December 31st 1973

Dr	£		Cr
Opening Stock	7102	Sales	70000
Purchases	19962	Closing Stock	8898
Labour Wages NHI etc	39834		
Gross profit	12000		
	78898		78898

SMALL BUILDER LTD

Profit and Loss Account for the Year Ended December 31st 1973

	£		£
Salaries NHI etc	2080	Gross Profit	12000
Advertising	1416		
Administration Expenses	3484		
Bank Interest and Charges	520		
Nett Profit	4500		
	12000		12000

TABLE 13

FRAMEWORK OF TRAINING AGENCIES

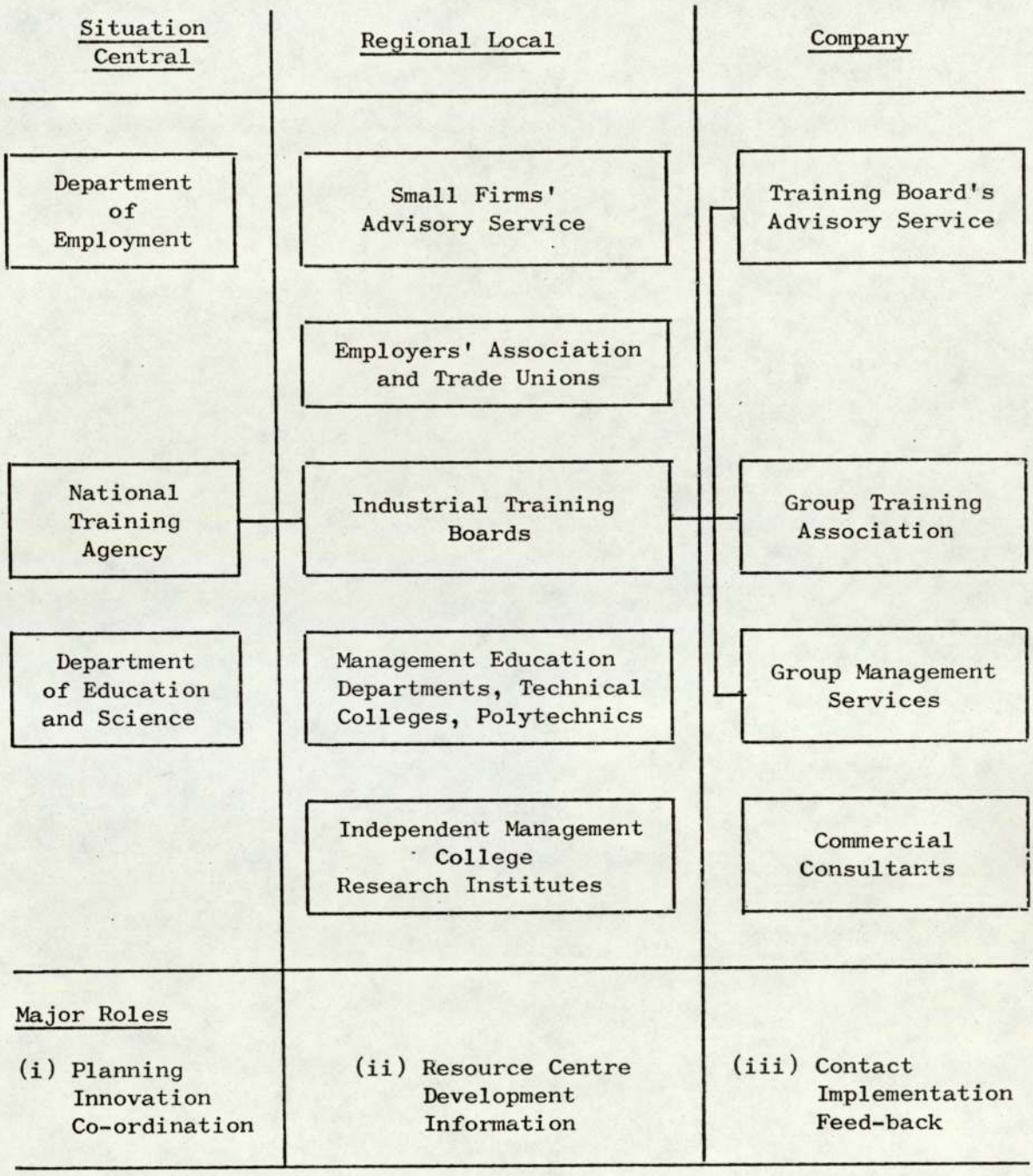


Figure 1

TABLE 14

APPENDIX II

CONTENTS

ASHTON UNIVERSITY, BIRMINGHAM

RESEARCH PROJECT IN MANAGEMENT DEVELOPMENT

SPONSORED BY THE NATIONAL FEDERATION OF BUILDING TRADES EMPLOYERS, WESTERN REGION

1971

PLEASE READ THIS CAREFULLY

Your co-operation will be greatly appreciated if you can spare the time to complete the attached questionnaire in connection with the Research Project. All information given will be treated as CONFIDENTIAL.

Please answer all questions that apply to you. You are not asked to give your name or address of your Company.

When you have finished, place the questionnaire in the envelope provided, seal and return to me.

Thank you for your assistance.

C H TUCKER

1. Total number employed in Company .....

2. Total number of Management Staff (Office) .....

3. Total number of Site Supervision Staff .....

4. Number of craftsmen:

Skilled	No	Number of Apprentices
Bricklayers		
Carpenters and Joiners		
Plumbers		
Plumbers' Mates		
Plasterers		
Painters and Decorators		
Others		

5. Number of Labourers .....

6. Sub-contractors: Employed

Trade	Number

7. Sub-contractors: Labour only

Trade	Number

AREA OF WORK

Please tick as necessary

8. Type of Work

(a) General Building Maintenance	....
(b) General Building Improvements	....
(c) General Building Alteration	....
(d) Contract Building Housing Local Authority	....
(e) Contract Building Housing Speculative	....
(f) Heating of other specialist work	....
(g) Form Building Maintenance	....

9. Area (Geographical) of work from the main office or sub offices (DELETE MILEAGE WITH CONNECTION TO TYPE OF WORK CARRIED OUT)

(a) up to 5 miles 10 20 30 40 50 60 70 80 90 100

(b) up to 5 miles 10 20 30 40 50 60 70 80 90 100

(c) up to 5 miles 10 20 30 40 50 60 70 80 90 100

(d) up to 5 miles 10 20 30 40 50 60 70 80 90 100

(e) up to 5 miles 10 20 30 40 50 60 70 80 90 100

(f) up to 5 miles 10 20 30 40 50 60 70 80 90 100

(g) up to 5 miles 10 20 30 40 50 60 70 80 90 100

10. Where did the work come from:

	%
(a) Architect private	....
(b) Architect Local Authority	....
(c) Councils Department	....
(d) General Public	....
(e) Factories (Industries)	....
(f) Personal contacts	....

11. Annual Turnover .....

SOMERSET COUNTY COUNCIL

Taunton Technical College

Principal: R. A. Pomeroy, B.Sc., Hons.

WELLINGTON ROAD,
TAUNTON, Somerset.
TA1 5AX.

Telephone: Taunton 83403

Our ref.: CHT//CH

Your ref.:

5th May 1971

Dear Sir

Over the past 2 years my Department has been responsible for the development and running of courses for the principals of small firms in the construction industry.

I am continuing this research and development work under the auspices of Aston University, Birmingham for the award of a Masters' Degree, and the purpose of this letter is to see if you will co-operate with me in this research by completing the enclosed questionnaire and returning it to me in the enclosed envelope by the first week in June.

This research work is in no way connected with the CITB and is sponsored by the National Federation of Building Trades Employers, and the information given will be completely confidential.

After completing the questionnaire, if there are any other comments you wish to make in connection with this work, I shall be very pleased to receive them.

Thanking you in anticipation.

Yours faithfully

C H TUCKER
Head of Department of Building and Surveying

Encs

RESEARCH QUESTIONNAIRE

1. Firm Turnover (Annual £

2. Size of firm by number of: operatives .....

other staff .....

Total .....

3. Value of general overheads to turnover in %

4. Gross percentage of work subcontracted

5. Value of work for employee for year on:

(a) General Maintenance work £

(b) New Housing £

(c) Local Authority £

(d) Private Clients £

6. Average period between completion of work and payment by client for Question 5 (a) ..... weeks

(b) ..... weeks

(c) ..... weeks

(d) ..... weeks

7. Average credit period taken by clients ..... weeks

8. Nett average profit margins on Question 5 (a) £

(b) £

(c) £

(d) £

9. Nett overall profit for the Company £

10. Number of times capital is turnover for year .....

All information contained in this questionnaire is strictly confidential and will only be used for statistical purposes.

Please do not sign this or put the name of your firm.

RECOMMENDED TRAINING PATTERN FOR SMALL FIRMS

Management Area of Operation	Job Relevance and Size of Firm				Training Required and Size of Firm			
	0-10			11-24			0-10			11-24		
	A	B	C	A	B	C	A	B	C	A	B	C
1. Management Principles												
The integration of management principles into the functions of management												
2. General Finance												
Sources of capital												
Short term finance												
Long term finance												
Methods of borrowing												
Interpretation of balance sheets												
3. Cash Flow												
Definitions and misuse												
Calculation of each requirement												
Dangers of restricted capital												
Movement of money in and out												
4. Financial Control												
Control systems												
Budgetory control												
Financial policy												
Accounting methods												
Links between - Estimating Costing Management functions												
5. Sales and Marketing												
The Building Market												
Economic price												
How to obtain business												
Speculative building												
Package deals												
Negotiated contracts												
Links between purchasing and estimating												

Key: Please see page 127

Management Area of Operation	Job Relevance and Size of Firm				Training Required and Size of Firm			
	0-10			11-24			0-10			11-24		
	A	B	C	A	B	C	A	B	C	A	B	C
6. Estimating and Costing												
The basic rate and cost to employer												
Material and plant costs												
Information for cost control												
Time and costs												
Costing applied to estimating												
7. Planning and Contract Techniques												
Method study and work measurement												
Gant Charts												
Labour allocation methods												
Schedules of resources												
Link between estimating and planning												
8. Safety in Construction												
Statutory requirements												
Operation of regulations												
Cost of accidents												
Accident prevention												
9. Law: Legal Aspects												
Employers												
Client and contractor												
Contractor and third parties												
Suppliers												
Trade unions: Labour relations												
Insurance												
10. Communications												
Methods of communications												
Recording informations												
The link in the management process												
Time and communication												
Failure in communications												

Management Area of Operation	Job Relevance and Size of Firm				Training Required and Size of Firm			
	0-10			11-24			0-10			11-24		
	A	B	C	A	B	C	A	B	C	A	B	C
11. Personnel Management												
Entrepreneurial skills in:												
Innovation												
Risk taking												
Planning												
Decision making												
Problem solving												
Information processing												
Communicating												
12. Purchasing												
Legal requirements												
Comparison of quotations												
Placing of orders												
Stock control												
Costing and Accounting												
Purchasing policy												

Key:

A = High - Good Knowledge Of
B = Medium - Knowledge of
C = Low - Be made aware of

MANAGEMENT COURSE FOR THE PRINCIPALS OF SMALL FIRMS

APPRAISAL OF SESSIONS AND COURSE REVIEW

Any development course is by its very nature experimental. It is also exceedingly difficult to measure its real effectiveness. This can only be truly meaningful in relation to the improved performance of course members when they return to their firms after the course. Even then, time needs to elapse for the ideas and techniques considered on the course to be developed in use, and reflected in the improved performance of the individual.

Nevertheless, it is helpful for the directing staff to have an early intimation of the reaction of course members to (a) each session, and (b) the course as a whole.

In each case, the major criterion should be: to what extent has the session, or the course, contributed to the achievement of the course objective, which is:-

"To provide a comprehensive introduction and systematic review of up-to-date effective practice appropriate to the Construction Industry and associated professions, and to provide an opportunity for the exchange of experience and ideas between the several specialists concerned."

(a) Appraisal of Sessions

You are asked to appraise each session having regard to:-

(a) Value and relevance of content,

(b) Presentation

It should be remembered that what is required is your immediate personal reaction to the session in relation to the course objective. Forms for this purpose will be provided and collected at each session.

(b) Course Review

Towards the end of the course you will be asked to complete another form. This will give you the opportunity of commenting on the course as a whole, and the administrative and other arrangements. You will have the opportunity of re-assessing individual sessions, and more particularly, commenting on the balance between subject matter. You will be asked for your views on how the course could be improved, either by re-arrangement, or by the inclusion of other topics.

(c) General

Course members are requested to complete the appraisal forms in a spirit of free constructive criticism. These appraisals, which should be ready for collection after the final period of the course, will be of the greatest value and interest to the directing staff when formulating proposals for further courses.

Please do not hesitate to approach the directing staff at any time during the course if you have any comment or criticism to make, or if you find yourself in any difficulty either with the course content or with the administrative arrangements.

COURSE REVIEW

You have had the opportunity of appraising individual sessions and now you can further help in the development of future courses by completing the general review form. This is in two parts; the first dealing with the appropriateness of the content, and more especially, the balance between subject matter; and the second part dealing with the administrative and other arrangements.

A COURSE CONTENT AND BALANCE

Please assume that the length of the course is fixed at one week. This means that if you wish to suggest other topics, some presently included must go, or be curtailed.

1. Name the sessions you regard as MOST valuable:-

(a) .....

(b) .....

(c) .....

(d) .....

(e) .....

2. Name the sessions you regard as LEAST valuable:-

(a) .....

(b) .....

(c) .....

(d) .....

(e) .....

3. Suggest any topics, not presently included, which you would wish to have included in future courses:

4. Suggest any topics in the present course for which you think more time should be allowed for a fuller treatment. (Here include sessions noted at 1 above, if appropriate.)

5. Would you like to have more cases or exercises? YES/NO

If YES, suggest which sessions would be improved by being treated in this way.

6. Generally speaking, did you feel you had enough opportunity for discussion? YES/NO

If NO, should this be by:

(a) Reducing the 'lecture' element of sessions,

OR (b) By issuing notes for prior reading?

7. On balance, would you say that the course objective was achieved? YES/NO

8. Any further comments:

B LOCATION OF COURSE

9. What is the best time of the year for this course?

What MONTH: (a) .....

(b) .....

10. Timing of the Course

In what form would you prefer the course?

(a) Start of day 09.00/09.30 hours

(b) Finish of day 17.00/17.30 hours

(c) Number of sessions per day .....

(d) Length of session .....

(e) Do you favour evening work? YES/NO

11. Are you satisfied with your accommodation? YES/NO

If NO, what are the shortcomings?

12. Are you satisfied with the hotel food? YES/NO

Comments:

13. For a course of this duration, do you consider the Lecture Room

(a) Suitable

(b) Comfortable?

Comments:

14. Course Manual

Do you consider the Course Manual satisfactory? YES/NO

What improvements would you suggest?

15. General Comments:

Signed .....

Date .....

APPENDIX III

MANAGEMENT TRAINING COURSE NOTES AND PROGRAMME

MANAGEMENT COURSE FOR THE PRINCIPALS OF SMALL FIRMS

Introduction

The application of critical analysis to any technique before adapting it to the special conditions existing in any firm is the background to this course. Owing to the numbers of firms and the multiplicity of organisation structures, there can be no one set method and technique suitable for all. Logical thinking, together with measurement of effectiveness, underline all management training. Self help rather than that from the outside is the best safeguard for the growth of the firm and better service to the community.

Management Principles I

The basic principles of management governing the seven elements and the integration of these functions into the Five Point Management Plan.

General Finance

Sources of capital

Short term finance

Long term finance

Methods of borrowing

Measurement of profitability

Interpretation of balance sheets

Assessment of funds

Cost controls

Office and Site Organisation

Requirements of the Railways, Shops and Offices Acts

Establishment of an office

The control of information in and out of an office

Feedback information

Cost of supervision

Communications

Cash Flow

Definitions and misuse

The use of profit

Methods of calculating cash requirements to maintain a good output

Danger of restricted capital

Inward and outward movement of money

Methods of Purchasing

Responsibility and requirements

Flow of information in relation to other functions of management

Enquiries

Comparison of quotations

Suppliers' orders

Documentation Sub-contractors

Nominated suppliers and sub-contractors

Accountancy

Stores control and records

Progressing

Marketing

The building market

Economic price

Determination of policy

Reputation of service

How to obtain business

Speculative building

Estimating and Costing

The difference between basic rate and cost to employer

Material costs

Plant costs

Integration of information for cost control

Cost and time in relation to programme

Simple bonus systems

Costing applied to estimating

Work Study

Introduction only to work study

Its objectives

Method study and work measurement

Links with planning

Techniques such as string diagrams

Exercise in Method Study

Contract Planning Techniques

Contract planning techniques

Gantt charts

Introduction to CPM for small works

The allocation of labour and scheduling of resources

Practical examples

The link between estimating and planning

Financial Control

The link between estimating and costing

The use of control systems

Budgetary control

The link between management functions and general finance

Basic principles of financial policy

Safety in Construction

Requirements of the factory inspectors

Statutory requirements

Operation of regulations

The cost of accidents

Law

Contracts

Client and contractor

Contractor and third parties

Contractor and operatives

P R O G R A M M E

SESSION 1	-	MANAGEMENT PRINCIPLES
SESSION 2	-	INSURANCE
SESSION 3	-	WORK STUDY METHOD STUDY
SESSION 4	-	)
		)
SESSION 5	-	) GENERAL FINANCE
		)
SESSION 6	-	)
SESSION 7	-	)
		) ESTIMATING
SESSION 8	-	)
SESSION 9	-	)
		) LAW
SESSION 10	-	)
SESSION 11	-	PURCHASING
SESSION 12	-	SAFETY
SESSION 13	-	)
		)
SESSION 14	-	) CASH FLOW
		)
SESSION 15	-	)
SESSION 16	-	)
		) FINANCIAL CONTROL
SESSION 17	-	)
SESSION 18	-	MARKETING
SESSION 19	-	)
		) SITE OFFICE ORGANISATION
SESSION 20	-	)
SESSION 21	-	)
		)
SESSION 22	-	) PLANNING
		)
SESSION 23	-	)

Each session = $1\frac{3}{4}$ hours

S E S S I O N 1

MANAGEMENT PRINCIPLES

This course is concerned with Management, with the Construction Industry as a specialised aspect of it. Having made this statement it must be pointed out that basically a firm engaged in small works i.e. alterations, extensions, repair and small new building projects, has the same managerial tasks as any other kind of business, and is finally expressed in money values. The business organisation is the process of investment by spending ones own or borrowed money in such a way so to secure greater receipts than expenditure, so to make a profit.

The capital that is invested into a business is used in many ways:-

1. Capital investment sound basis for the business
2. Capital investment fixed, land, buildings, plant
3. Capital investment circulating, wages and materials.

It is a managerial function to look after this and therefore direct and control the business so to ensure a reasonable profitability and the avoidance of insolvency. E F L Brech saw the 'principles' of management as:-

1. Formulation of policy
2. Planning and control
3. Organisation structure
4. Co-ordination and motivation

These points have been broken down into seven major processes of management (H Fayol Urwick):-

1. FORECASTING)
) Planning function: Thinking processes
2. PLANNING)
) Concerned with things
3. ORGANISING)

4. MOTIVATING)
) Executive function: Action processes
5. CONTROLLING)
) Concerned with people
6. CO-ORDINATING)

7. COMMUNICATION This process connects all the other processes together

FOND PARENTS OFTEN MOLLY CODDLE CHILDREN'S CIRCULATIONS

1 2 3 4 5 6 7

Each of the above processes are composed of two elements in varying degrees.

1. The human elements - DYNAMICS
2. The technical elements - MECHANICS

The task of management is the responsibility for welding things together into a single working force and the three constituents are:

People

Ideas

Things

The seven processes work in a cycle i.e. planning instructions outwards and feeding back the information on results obtained so to improve the next cycle - as Figure 1.

FIGURE 1

COMMUNICATION
HUMAN
TECHNICAL
CO-ORDINATE
FORECAST
CONTROL
PLAN
MOTIVATE
ORGANISE
DYNAMICS
MECHANICS
COMMUNICATION

The heart of management with the circulation of communications around the various processes conveys planning instructions outwards and feeds back results for the next planning cycle.

PLANNING PROCESSES: Forecasting, manning and organising are mainly 'thinking' concerned with ideas, objectives and the means to achieve them - the 'MECHANICS' of management.

EXECUTIVE PROCESSES: Motivating, co-ordinating and controlling are essentially 'doing' tasks concerned with people and getting the job done - the 'DYNAMICS' of management.

THOUGHT TRANSFER PROCESSES: Communicating is the flow of information of all types and by all means. It passes back and forth all other processes like alternating current.

A description of each process now follows and experiences of the industry can be related to show that the principles do apply.

FORECASTING

Forecasting is looking ahead, a job for the Principals or Board of Directors. To set out the main objectives and policy of the company. Policy is the foundation of any organisation and is based on critical review of known facts and the assessment of trends. It provides a more defined area or basis of planning. The stages for looking ahead are:-

1. The objective
2. Information
3. Factors involved
4. Possible alternatives
5. Plan selected

A good principal asks - "What is likely to happen?"

A poor principal says - "I cannot understand why that happened!"

PLANNING

As already stated, company policy is laid down by the Principal or Board of Directors (Forecasting) and this policy has to be translated into instructions for action. Planning is that aspect of of administration, a 'THINKING PROCESS', and as such involves the use of Work Study techniques and principles so that all resources are used to the best advantage. The principal resources are:-

Finance

Method — 'know how'

Labour

Plant

Material — 'mechanical labour'

Planning issues the orders as to 'how', 'when' and 'where' and to be effective it must be:

Simple

Flexible

Balanced and based upon accurate standards and performance which has been observed and recorded.

Planning is an important tool in management and requires close attention to detail and sound technical knowledge, but is always a means and not an end in itself.

ORGANISING

Organising is the stage between planning and action, and provides a framework of management upon which the supervisory functions of a company may be established, as laid down in the policy principles determined by the Directors. This is the other aspect of administration complementary to planning but is more concerned with people and the general discharge of management responsibilities. The organising processes are:-

1. The definition and distribution of responsibilities to personnel forming the framework of a company
2. The formulation and operation of standard procedures, preferred method of working and operating instructions for standard techniques.

MOTIVATING

Motivating is a 'social' process to inspire loyalty to the leaders and produce an emotional climate to the proper fulfilment of all tasks undertaken by a group or person.

Getting members of the firm to understand and carry out their respective tasks willingly to the best of their abilities and maintaining morale through effective training, staffing and leadership.

In order to achieve this desirable state of high morale it is necessary to:-

1. Arouse interest by keeping everyone informed of proposed development and progress of activities.
2. Develop harmony and a sense of participation by joint consultation.
3. Provide continuity of employment and security for the future.
4. Secure loyalty by fairness in the allocation of duties, distribution of rewards, and the administration of discipline.
5. Foster a sense of competition and group or personal achievement.
6. Encourage self-discipline by developing a sense of responsibility and enjoyment of trust.
7. Ensure acceptance of the necessary rules and regulations by inspiring a sense of duty and a responsibility for the affairs of the organisation.
8. Assist ambition by encouragement and provision of the means of opportunities for individual development.
9. Prevent frustration by providing an outlet for grievances and misunderstandings.
10. Supply incentives of financial reward and status symbols.

CONTROLLING

The obverse of planning is the process of controlling. The comparison of actual performances with planned standards.

1. Application of corrective measures
2. Recording of results obtained for future planning

Controlling involves the acceptance of a yardstick for comparison purposes which may be in a number of forms such as budgets, targets, estimates or standards, and the measurement against the chosen yardstick or performance. The difference or variance, if excessive between achievement and target, will enable the Principal to take remedial action provided he starts checking or controlling early in the process. (Feed back information.)

Control information must:-

1. Be separated according to responsibility
2. Present the facts and results in a consistent manner
3. Represent a time period
4. Be available in time for effective decisions to be made
5. Show clearly the deviations from plan or the exceptions to allow tolerance.

CO-ORDINATING

The follow-up to organising is the process of co-ordinating, which is the linking together of the various processes and balancing of resources and activities to ensure complete harmony at every performance. The major aims of co-ordination are to prevent the separation of the various processes or departments and the preservation of unity throughout the framework of a company.

This can be achieved by:-

1. Regular meetings between supervisors
2. Pictorial presentations of responsibilities to assist co-operation between individuals

3. Direct and personal contact

4. Delegation of authority (Lateral relations)

COMMUNICATING

In my opinion this is the most important process of management and is where the contractors generally fall down. The process of communicating involves imparting, sharing, transmitting and receiving information by speech, writing or action. From a management point of view it is essential that such information is relevant, clear, concise, understood and acted upon. Failures in communication are inevitably costly - window openings set out in the wrong place - excavations dug too deep, and I am sure that course members can build up a book of their own on this subject.

Basically, there are two groups - one transitory and subject to impression; the other permanent and available for reference but subject to interpretation.

Speech is obviously transitory and any verbal instructions from client or architects should be transferred to permanent records by way of a written confirmation. This transferring temporary to permanent can give rise to mis-interpretation and sound recording is one method of removing some dangers. The Ansophone is given as an example of making partially permanent records of transitory communications. Advantage of the machine are:-

Messages taken when office is empty

Telephone conversations recorded for future reference

Messages can be collected by telephone from outside the office

S E S S I O N 2

INSURANCE

1. Its place in industry

2. Specific Insurances for Builders

ITS PLACE IN INDUSTRY

£120,000,000 was the total of fire losses in Great Britain and Ireland in 1971. This is merely the financial loss and does not take into account the inconvenience and interruption to trade.

Insurance premiums are an increasing overhead which you may feel are not directly necessary to the success of your business. What value are you getting from your insurance? We are giving you financial protection whenever and wherever you need it and without insurance you would need large reserves of capital to pay for liability and other claims which may be made against you. We employ surveyors who co-operate with builders and architects in incorporating fire prevention methods in new buildings and the Joint Fire Research Organisation at Elstree, which was originally established by Fire Insurance Companies, guides architects and builders in minimising fire risks. The formation of private fire brigades by Insurance Companies after the Great Fire of London in 1666 was our first attempt at loss prevention.

We also invest in trading companies and many of the building contracts in which you are engaged are probably made possible only because money has been invested in the project by an insurance company.

Choice of an insurance company is a personal matter but it is always advisable to insure with a company who is a member of the British Insurance Association. An insurance broker can give you independent advice.

The difficulty in arranging insurances for builders is the very wide nature of your trade, Contractual Conditions such as the RIBA and the difficulty in defining "what is a Builder?".

SPECIFIC INSURANCE FOR BUILDERS

The two main types of risks which occur in the building trade are risks of injury to persons and risk of damage to property.

The risk of injury arises:-

1. The contractors' liability to visitors to the contract site, the duty being one of reasonable care
2. The contractors' liability towards neighbours or passers by, the duty being one of at least reasonable care with, where dangerous operations are in progress, an increased standard of care.
3. The liability of any contractor to his employees.

The risk of damage to property is:-

1. Damage to property in general arising out of the building works i.e. neighbouring and other property
2. Damage to the contract works itself.

EMPLOYER'S LIABILITY

The first essential is to cover your liability for the risk of injury to your employees. This is now a compulsory insurance because the Employers' Liability (Compulsory Insurance) Act came into force on the 1st January 1972 and failure to have this cover may mean a fine of £200 per day. As from the 1st January 1973 you must display copies of an Insurance Certificate and failure to do this may mean a fine of £50. The Act defines employee as "one who has entered into or works under a Contract of Service or Apprenticeship with an employer whether by way of manual labour, clerical work or otherwise, whether such contract is expressed or implied, oral or in writing".

Your Common Law Liability is that you must take all reasonable care to provide a safe place of work, adequate plant, machinery and appliances and maintain them in proper order and a safe system of working which includes the engagement of competent employees. For

example, if an employee is injured because the rung of a ladder breaks and it is proved that the cause was that you did not check and maintain that ladder, damages may be awarded against you. The essential point is that negligence must be proved against you or your employees and our policy indemnifies you for this responsibility which exists at Common Law.

In additon to this Common Law Liabiability for negligence, you also have to consider your statutory responsibility such as the Factories Act 1961, Building Regulations 1948 which have now largely been replaced by the Construction (General Provisions) Regulations 1961 and the Construction (Working Places) Regulations 1966 and the Woodworking Machinery Regulations 1922. These Acts and Regulations put a very heavy responsibility on you because they lay down very stringent requirements regarding scaffolding, roof work, opening in roofs, floors, walls, supervision etc. and guarding of machinery. If you fail to comply with these Regulations you are liable to prosecution and if the prosectuion is successful and you are convicted your failure to comply with the Act may form the basis of a Civil Action by an employee who has been injured. For example, if a workman fell more than 6' 6" from a working platform which, contrary to the Construction (Working Places) Regulations 1966, is not provided with a suitable guard rail, there is a clear breach of Statute and we, as Insurers, would have very little defence on your behalf. Many claims arise because a young person i.e. under 18 is allowed to work on a dangerous machine without full instruction or adequate supervision. The Policy we issue covers your Common Law Liability, your Statutory Liability and in addition, the legal costs of defending you in a Court of Law such as a prosecution under the Factories Act or one of the other Regulations. Unfortunately if you are found guilty we cannot undertake to pay your fine.

The premium is based on wages adjusted to each renewal, and there is a Condition in the Policy which calls for prompt notification of claims. Cover is normally restricted to Great Britain, Northern Ireland, Ilse of Man or the Channel Islands.

The Compulsory Insurance Act requires a £2,000,000 limit but most Policies are unlimited in amount i.e. there is no maximum amount payable for any one claim or for any one year of insurance.

You should check whether your Policy is endorsed to exclude work above stated heights or below stated depths or excluding certain types of plant and equipment. This is important if you tender for or accept a contract which is outside the scope of your normal trade activity.

Most Policies include contractual liability and Indemnity to Principals which is important in view of the RIBA Conditions.

A current problem is that of labour gangs and self-employed tradesmen, because strictly speaking there is no contract of service but a contract for services. I suggest you advise your Insurers and arrange with them that the Policy covers your liability to these people and fees paid to them are declared with your wages and salaries. The Labour Master must insure his liability to the members of his labour gang if they work under a Contract of Service to him, to meet the requirements of the Employers' Liability Compulsory Insurance Act.

The Employers' Liability (Defective Equipment) Act 1969 states that an employee injured through a defect in equipment provided by his employer shall be deemed to be negligence on the part of the employer even though the defect may be wholly or partially the fault of the third party. This liability would be covered by your Employers' Liability Policy.

The Administration of Justice Act 1969 provides for interest to be paid on damages where they exceed £200 for personal injury or death. This is covered by your Employers' Liability Policy although from the Insurer's point of view it has meant a considerable increase in the cost of claims.

PUBLIC LIABILITY

The Policy covers your legal liability for injuries to members of the public and damage to their property. Most Policies are restricted to accidental damage or injury and it is usual to stipulate an agreed maximum amount to be paid in respect of any one accident. This should always be set at a realistic figure in terms of £50,000, £100,000 or higher. I referred to fire losses totalling £120,000,000 - part of this huge amount is passed on to the Public Liability Policies when the fire has been caused by the negligence of a Contractor. For example, employees laying floor tiles found damp patches in the woodwork which they tried to dry by using a blow lamp. The resulting fire was costly! In a similar case the dampness was caused by paraffin and the result was spectacular!!

You should therefore make sure that your Policy includes fire and explosion - most Policies do.

One or two of the main exclusions are:-

1. Weakening or removal of support, subsidence or vibration - excluded because the risk can vary from negligible to extremely hazardous i.e. in altering a shop front you may remove the load bearing pillars and the collapse risk is heavy. At similar premises you may be fitting internal partitions and racks where the callapse risk is non existent.

Insurers are willing to quote to provide this cover for specific contracts when they know all the details or may be prepared to give an annual extension restricted to a low indemnity limit.

2. Contractual Liability. In your trade it is important to have this extension particularly if you work under RIBA Contracts or if you hire plant or equipment or scaffolding.

Under the Hire Contract terms, you probably agree to be responsible if a member of the public is killed because the scaffolding collapses due to faulty erection. This is not your Legal Liability but liability you have assumed under Contract.

3. Defective workmanship or defective products. Most Policies can be extended to cover injury or damage arising from defective workmanship or defective products but not to cover the cost of repairing or replacing the goods which are defective. It is advisable to have this cover because, for instance, the boom in central heating has led to claims in the best furnished rooms arising from leaking radiators.

4. Property in your custody or control. It is reasonable that we should not pay the damage to the materials on which you are working.

5. Mechanically propelled vehicles - should be covered under a Motor Policy but the site risk or tool of trade risk may be covered under the Public Liability Policy.

6. Claims by employees, covered by Employers Liability Policy.

7. Delay or time penalties.

Labour gangs and self-employed tradesmen. For the same reasons mentioned under the Employers Liability Policy, advise your Insurers, as cover under both Policies is advisable.

Clause 19(2)(a). If the Architect invokes this clause in the Bills of Quantity of Specification you have to insure in the joint names of yourself and the employer cover against certain specified perils.

Generally this means that such risks as collapse, weakening of support, which are normally excluded, will need to be covered, and a claim may be made without having to establish negligence. If this clause is invoked, in your Contract, you should tell your Insurers as special insurance arrangements must be made.

CONTRACTORS ALL RISKS INSURANCE

Policies vary but generally they cover "loss and/or damage" from whatsoever cause arising to the contract works and materials. Under Contract Conditions you may not have to arrange such wide cover but it is advisable because of the heavy risk of accidental damage and theft. For example an Insured was erecting fabricated steelwork and owing to a failure of holding down bolts, the beam sagged and pulled in the rest of the structure - claim cost £1,612. In another case involving a contract for the erection of a Secondary Modern School, scaffolding value £1,130, was stolen from the site. Theft of plumbing materials and frost damage have produced many claims.

The Policy includes your tools and plant and temporary buildings such as site huts but ensure the sum insured is sufficient particularly if you use cranes.

The Policy covers the maintenance period although this is usually restricted to your Common Law Liability.

There is usually an excess as by this means we can avoid small breakage and petty thefts and keep our premium reasonable.

The Policy usually includes the transit risk to and from the contract site although it is not usual to cover the contract works and materials at your own premises.

It is usual to exclude the consequences of defective design because this is the responsibility of the Architect. The consequence of defective workmanship is covered but not the cost of replacing the defective material.

Damage to tools and plant by their own electrical or mechanical breakdown - this is excluded because otherwise we would be giving you a maintenance contract.

Policies can be issued for a specific Contract or on an annual basis and at least one Insurer will offer a combined Contractors All Risks and Third Party Policy.

In my opinion Employers Liability, Public Liability and Contractors All Risks are the essential Policies that a builder must have because they cover the risks which can produce the most expensive claims. Other Insurances are:-

ENGINEERING

The Construction (Lifting Operations) Regulations 1961 stipulate that lifts, hoists, cranes, chain blocks, slings, rings, hooks, shackles and other lifting tackle should be inspected every six months and a Certificate issued to confirm this has been carried out by a competent person. The term competent person has never been defined but it is recommended that it should be someone who is independent of the owner of the equipment. Certificates are issued by Engineers employed by Insurance Companies, many of whom specialise solely with lifting equipment. If one of your employees or a member of the public is injured or killed because of a failure in a piece of lifting equipment and you are unable to prove that the equipment has been regularly tested, you are liable to prosectuion and we may have to pay a large claim on your behalf. Policies can also be issued to cover damage to cranes or repairs following breakdown.

An Engineering Policy can be extended to include your liability to the public arising out of the use of cranes etc. although it is more usual to include this cover under your main Public Liability Policy. There was a claim involving a mobile crane with 70ft jib working on a building site which toppled into an excavation killing the driver. The damage to the crane was considerable and there was an Employers Liability

FIRE

The Contractors All Risks Policy is normally restricted to the Contract Site and you will therefore need Fire Insurance on your premises and contents such as Offices, Stores and Work Shops. It is advisable to extend this Policy to include perils such as storm, tempest, flood, explosion etc. Fire Policies nowadays are subject to Average and it is therefore essential that your sum insured is adequate otherwise you will have to bear a proportion of the loss yourself.

Check any restrictions on your Policy. If you have a woodworking shop your Fire Policy may be endorsed stipulating that wood shavings must be cleared daily. If so, you must ensure that this is done otherwise your claim may be turned down.

BURGLARY

You should similarly protect your premises and contents against the risk of Burglary because the theft risk is increasing and thieves are particularly attracted to plumbing and electrical material.

MONEY

Another popular pastime is that of attacking cashiers and other people who are carrying money. You have an additional risk in that your wages have to be taken out to Contract sites. This insurance covers loss of money, not only whilst in transit but also whilst left in a safe at your premises overnight, and for a restricted amount whilst in your premises overnight but not in a locked safe. The Policy can be extended to include money kept in a private dwellinghouse of employees. The premium is based on the amount of money handled in the course of a year and it is usual to impose a limit of the maximum amount in the safe at any one time and sometimes to limit any one loss.

A useful addition to this Policy is to provide Personal Accident cover for the people who are carrying the money because of the increasing

risks of injury by thugs. Whilst the person or persons can be named in the Policy it is more usual to provide for 2 or 3 unnamed persons so that you do not have to tell us every time you change your staff. Benefits can be varied according to your own particular needs and the premium is cheap.

PERSONAL ACCIDENT

It is not usual to provide this cover for all employees but some firms arrange insurance to cover Directors, Surveyors, and other senior men who may go to contract sites although not engaged in manual work. In the event of a serious injury you may feel obliged to pay their salary and this could be an expensive overhead. If injury is caused by negligence the claim can be dealt with by the Employers Liability Policy but a Personal Accident Policy will pay irrespective of negligence.

MOTOR INSURANCE

You are all familiar with the Road Traffic Act Regulations which insist on compulsory insurance for your cars or lorries and it is your choice whether you arrange comprehensive or third party risks only. You should however check that your Policies provide cover for legal liability to all passengers on road vehicles. Most companies are providing this now in anticipation of the Motor Vehicles (Passenger Insurance) Act 1971 which will become effective on the 1st December 1972. I will therefore only comment on mobile plant. Unlicenced plant can be covered under the tools and plant section of your Constractors All Risks Policy and Third Party Liability under your Public Liability Policy. However, you may have mobile cranes, and other equipment which has to be used on the road and if so a motor policy with an Insurance Certificate must be issued. It is advisable to ensure that the Policy includes hire, driving by hirers' driver and indemnity to hirer as you may loan this machine to another Contractor. The Policy can be extended to include Accidental damage caused by over turning during operational use as a tool of trade.

CONSEQUENTIAL LOSS

This class of insurance is designed to cover the profit which you might have made had your business not been interrupted as a result of a fire or some other peril. Damaged or destroyed property represents a loss of capital, interrupted trading causes loss of earnings. In effect this is a business interruption Insurance Policy which has saved many a Builder by meeting overheads after a fire has stopped production because you can suffer from a fire not only at your own premises but also at your Contract Sites. This insurance pays wages, rent, rates and other repayment committments as well as the normal net profit on the loss of business turnover. For instance a fire on a Contract Site may mean that until the debris has been cleared and the building re-started, your electricians or your plumbers may not be employed unless you can transfer them to another contract site. This menas that you either have to dismiss them or pay their wages from your capital. Similarly if your carpenters' shop were destroyed you may have to arrange for another firm to do this work for you and this increased cost of working can be claimed under a Loss of Profits Policy. The Policy can also be extended to include the effects of a major fire on the premises of your main supplier as this could stop you completing a contract. The premium is based on the fire rate and can be extended to include the same perils as the Fire Policy.

ALL RISKS

Some builders arrange All Risks cover on equipment such as theodolites, which are liable to be forgotten, stolen or damaged. There may be some cover for these items under the tools and plant section of the All Risks Policy but a man using a theodolite may lose or damage it some place other than a contract site.

FIDELITY GUARANTEE

This insurance protects you against dishonesty by employees who handle cash.

PENSION SCHEMES

Employers generally are becoming increasingly to recognise a moral responsibility to provide a comfortable old age for long service employees such as office staff, site foremen and other senior men. Each scheme has to be tailor made to suit your individual requirements but the usual basis is that of contributions shared between the employer and the employee. The employers contributions are regarded as a normal trading expense.

To try and cover the insurance requirements of builders in one session is almost an impossible task because the type of your work and the size of your firms varies so much. I have tried to show you that insurance is a necessary trading expense to provide you with financial protection whenever and wherever you need it in order to allow you to expand your business without the worry of damages being awarded against you, damages which could well make you bankrupt. Provided you give your insurance company or your insurance broker all the facts about your business they should be able to produce policies expecially designed to meet your particular needs.

S E S S I O N 3

WORK STUDY - ITS APPLICATION TO BUILDING

Why Work Study?

Before we can answer the question we must clearly establish what is meant by this term. BS 3138; 1969 defines Work Study as 'A management service based on those techniques, particularly method study and work measurement, which are used in the examination of human work in all its contexts, and which leed to systematic investigation of all resources and factors which affect the efficiency and economy of the situation being reviewed, in order to effect improvement'.

The two main techniques of work study are method study and work measurement. Method study is the techniques of investigating the 'What, how, where, when and why's' of any situation in order to find the best method.

"I keep six honest serving men
They taught me all I know
Their names are what and where and when
And how and why and who?"

Rudyard Kipling

Work Measurement is the technique of measuring how much time is required to carry out any activity. A trained work study practicioner is able to study all forms of work, whether in the office, factory, workshop or site environment.

Why is Work Study Required Today?

Work study has been practised for a number of years and such pioneers as Taylor and Gilbreth were well known, although perhaps in an infamous way, in the late nineteenth, early twentieth centures. Broadly the reason for work study's importance today is:-

(i) Working conditions and situation has become more complex and various sections of an enterprise more closely integrated and dependant upon one another.

(ii) There is also a difference in the labour situation as it exists today and as it used to be.

In these complex circumstances hunches and bright ideas are no longer a reliable source of increased production as they might have been a few years ago.

The DISCIPLINED APPROACH of work study has developed to cope with these complexities and helps to provide an answer.

The Benefits of Work Study

Work study is in the interests of all and can be shown to be so. What are these benefits?

(a) To the Organisation:

(i) the reducing of cost resulting in bigger profits

(ii) more competitive tendering

(iii) better use of resources

(iv) better control by management

(v) collectively a better service to the client

(b) To the Supervisor:

(i) more efficient planning

(ii) better control

(iii) fewer bonus target disagreements

(iv) easier overall supervision

(v) a more rewarding job

(c) To the Operative:

(i) better working conditions

(ii) satisfactory bonus targets - a steadily higher income

(iii) less fatigue

(iv) happier atmosphere and site relationship with foreman

(v) more security - company successful.

These things will result through the aims of Work Study which basically are:-

(i) to increase productivity

(ii) to reduce costs

(iii) to increase profit margins

(iv) to make tasks fair and easier

(v) to ensure security for operatives

(vi) to lay down standards and controls of estimates against actual costs

(vii) to reduce wastage

(viii) to cut out delays

(ix) to produce a more efficient organisation.

Productivity:

This is the difference between the inputs and outputs of our organisation. In the construction industry these may be considered to be:-

(a) Inputs - Men
Machines
Materials
Money

(b) Outputs - Units of construction (product)
Units of service

Productivity can be lost in several ways - always blamed on the builder. However, assuming that a perfect situation prevailed where 'everything and everybody is perfect' work could be performed in a minimum number of hours. Designs can be imperfect and executed in such a way as to prevent the use of the most economical processes in construtionn. Working methods may not be planned at all but happen by accident. Both these points in design and planning can create added work content and productivity lost before site work starts. When work does start,

managers and supervisors together with operatives can cause work (in terms of extra hours) to be added to the planned output. This extra work is called ineffective time and can be reduced by work study.

In the construction industry in particular, the design problem is even more evident where designers and constructors work is in isolation. Both architects and engineers are considered to be 'the other side' and often fail to realise the implications of their designs from an economic point of view. This has been overcome in many cases by the contractor employing the architect on his staff and offering a package deal to prospective clients (design and build schemes). Further improvement could be made by the integrated training of architects, builders and engineers in their early studies. Work study is by many considered to automatically involve 'stop watches' and 'time and motion' - considered to be the main aspect of the technique. This is an entirely incorrect assumption as many of the methods used to analyse work are simple to both understand and master. It is true that Work Measurement involves the accurate assessment by time standards often - but not always by stop watch - of small elements of a cycle of operation. It is also true that this work can only be carried out over such a prolonged period of survey by specially training staff and can be expensive. Furthermore it is often considered that work study has little place in the construction industry because of the nature of our work location and loading varying so often.

I hope to demonstrate that these assumptions are ill founded and the relevance of Work Study generally and Method Study in particular to the industry is immense.

Its Application to Building:

The application of work study to the construction processes are broadly as follows:-

(i) planning

(ii) motivating

(iii) controlling

Planning

Within the sphere of planning we need to be able to analyse both:

(a) methods to be adopted, and

(b) the times that these or alternative methods will take.

As both these factors will affect the price of our service to the client it is important to remember that the planning, method study and estimation of cost must be inter-related if we are to achieve an economic price.

Motivating

As most men are motivated to a greater or lesser degree by monetary gain the realistic assessment of work tasks set against time is most important. We are able to motivate most employees by the pay packet and all well designed financial incentive schemes are founded upon work measurement.

Controlling

The purpose of planning is to forecast future requirements, highlight possible snags beforehand and where possible solve these snags. In order that we are aware of our actual position relative to that planned we use our programmes to control our progress. Accurate planning in the first place coupled with data often produced by work study methods will enable us to control our position.

Method Study

BS 3138; 1969 defines 'The systematic recording and critical examination of the factors and resources involved in existing and proposed ways of doing work, as a means of developing and applying easier and more effective methods and reducing costs'. Method study is concerned with finding a better way of doing the job. THERE IS ALWAYS A BETTER METHOD.

PROCEDURE

Method Study follows a well defined pattern:-

(a) select the problem to be studied and define the boundaries

(b) record and present procedure using whatever charting method is appropriate

(c) examine critically the existing procedures, identifying the faults

(d) develp a new method from the critical examination

(e) instal the new method

(f) maintain the new method by periodic inspection.

(a) Selection

The first choice should be the job most likely to affect the overall productivity of the total enterprise:

e.g. (i) bottlenecks which hold up production

(ii) operations involving the transport of materials and plant over long distances

(iii) operations involving a large labour or plant content

(iv) repetitive work like house building.

(b) Recording

The techniques used for method study recording vary according to the information we require and the uses to which we intend to put it. In order that we may easily identify the activities, they are charted using standard symbols - Figure 1, Page 166.

These symbols can be used to show what is happening to the operative, machine or materials; therefore three charts prepared for one study (i.e. man type, machine type or material type). No two every appear on the same chart.

Techniques of Recording

The recognised recording techniques are as follows:-

(a) process charts

(b) process diagrams

(c) string diagrams

(d) multiple activity charts

(e) scale models.

Process Charts

The Outline Process Chart (OPC)

This chart shows only the broad outline of the procedure; it is expecially useful for showing the collection of materials and procedures to make up a whole unit.

The Flow Process Chart (FPC)

This is used to expand on the problems with the aid of the other symbols: transport, storage and delays.

Flow Process Diagrams

Drawn to scale on a plan these use the FPC symbols showing the paths of movement by joining the symbols together with a line. One can see what is happening where and measure the distances involved in transport.

String Diagrams

Again using a scale diagram or drawing fixed to a suitable board, and with the aid of some pins and string, movements of men, materials and plant can be traced. The total movement can then be ascertained by unwinding the string and measuring against the scale. Comparative layouts of site and workshop can be considered; it will also show the crossings of paths and bottlenecks. A number of paths can be plotted using different coloured threads.

Multiple Activity Charts

This is an efficient way of recording information where it is necessary to relate one subject or activity with others. It has proved to be a very useful aid to work study in the construction industry due

to the many operations that are performed by teams of men in gangs. The chart itself is produced in bar form against a time scale and generally the use of an ordinary wristwatch is sufficient to record times.

Scale Models

These can be applied to various situations in the building industry - a typical application would be the positioning of site huts and plant on a large construction project and often combined with a string diagram.

Work Study is not 'a cure for all ills' but it can be easily applied with great benefit. My intention today was to attempt to demonstrate that the words 'Work Study' do not automatically entail vastly expensive scientific applications but just organised common sense.

Note

A practical example demonstrating the use of each type of chart is to be carried out by each course member.

Further Reading

Work Study - R M CURRIE - Pitman

Introduction to Building Management - R E CALVERT - Newnes

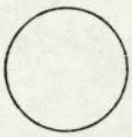
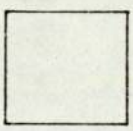
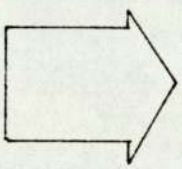
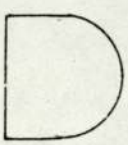
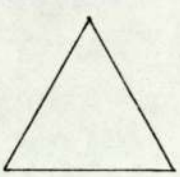
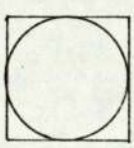
Elements of Administration for Building Students - J T BUTLER - Hutchinson

Work Study (A Practical Primer) - A RAE - Odhams

Production and Planning Applied to Building - R J HOLLINS - Builder

Bricks and Efficiency - CECIL FRANCIS - The National Federation of Clay Industries

FIGURE 1

RECORDING		
SYMBOL	ACTIVITY	MEANING
	OPERATION	A PRODUCTIVE ACTIVITY THAT WILL BRING COMPLETION NEARER E.G. LAYING A BRICK
	INSPECTION	EXAMINING - CHECKING QUALITY AND QUANTITY E.G. MEASURING AN OPENING PLUMBING UP
	TRANSPORT	A MOVEMENT OF PLANT, LABOUR OR MATERIAL E.G. PUSHING A BARROW HOIST BY CRANE
	DELAY	A DELAY OR TEMPORARY STOPAGE WHEN NEXT OPERATION CANNOT TAKE PLACE E.G. HOIST WAITING TO BE LOADED
	STORAGE	MATERIAL KEPT OR PROTECTED UNTIL WANTED FOR USE E.G. CEMENT IN SILO BRICKS IN STACK
	COMBINED OPERATION INSPECTION	TWO ACTIVITIES PERFORMED AT THE SAME TIME BY THE SAME OPERATOR E.G. LOADING AGGREGATE INTO WEIGHT BATCHER

SESSION 4 5 AND 6

PROFIT AND PRODUCTIVITY

The purpose of industry is to fulfil a human need. No unit within an industry can survive long without profit. Profit offers security of employment, promotional prospects, job opportunity and the very fine but intense personal motivation that comes from being connected and associated with sucess. Mankind's desire for material possession is insatiable thus it is industry's job to search for markets.

Efficiency and productivity are synonymous because each relates to the output resulting from a given input of:

LABOUR - WAGES AND SALARIES

FINANCE - INTEREST

NATURAL RESOURCES - RENT

ENTREPRENEURSHIP - PROFIT

These resources or factors form the integral components of successful operation and it is obvious that the basis of any cost reduction programme is that it should reduce the content of the factor relative to the finished product so that, for a given selling price, the profit will increase.

Here is the fundamental operation:-

Any business only has a certain net income available to it, thus, if it allocates from that net income too much to a given factor, then too little will remain for profit. The chain then starts:-

TOO LITTLE PROFIT PRODUCES AN UNSATISFACTORY FLOW OF CASH -

AN UNSATISFACTORY CASH FLOW MEANS TOO LITTLE WORKING CAPITAL -

TOO LITTLE WORKING CAPITAL MEANS NO EXPANSION -

NO EXPANSION MEANS NO REPLACEMENT OF PLANT, ETC OR NO NEW EQUIPMENT -

AND THE CIRCLE STARTS ALL OVER AGAIN -

WITH THE INEVITABLE RESULT -

How do we calculate the net income of a unit as suggested above; what is the fund mentioned?

It is quite simple obtained:-

FROM THE VALUE OF SALES one must deduct the value of all raw materials and purchases bought in which leaves THE VALUE ADDED.

It is a tool of management which is well worth considering carefully.

Your task is to create the greatest possible value added because it is from that operating expenses have to be met, any decision which you might have to make should be made with the idea in mind of maximising "value added".

Generally profits are "volume conscious" - they are effected by changes on output, by and large the higher the output, the higher the profit and the lower the output, the lower the profit. This is because the lower the output the higher the fixed cost per unit.

Profits derive from wise decision making. Today it is not possible to assess the true profit potential of a business by looking at the accounts for one year - it is much more meaningful to analyse results for several years - to see if any trends have been established. Let us start with a relatively simple concept:-

VALUE OF SALES = COST OF EXTERNAL PURCHASES + LABOUR COSTS + FIXED COSTS + PROFIT MARGIN.

Now if we were to take the raw materials and purchases from the Values of Sales we can obtain Value Added, i.e.

PROFIT = VALUE ADDED - (LABOUR COSTS + FIXED COSTS)

Therefore PROFIT = NET INCOME - OPERATING EXPENSES - Productive

Administrative

Selling

Legal/Financial

Directorate

Thus from this idea and its derivations can be seen that Value Added is the net income of the company after it has paid its external suppliers.

Before we proceed with finance pure then let us consider our responsibilities:

TO THE EMPLOYEE - Fair wages, security, status, comradeship, opportunity for self development and self fulfilment, a pride in skill and a sense of belonging

TO THE OWNER - A fair and reasonable return on capital invested

TO THE CONSUMER - A good quality product at a fair price

TO THE COMMUNITY - A good neighbour taking a constructive interest in local affairs

TO THE STATE - Proper productive use of human and material resources

As managers you are accepted as having the ability to control the five M's:-

Men

Machines

Money

Materials

Methods

For men, which is not our concern today, the eight most important elements are:

(a) prospects and promotion

(b) good wages

(c) good working conditions

(d) sympathy and understanding with personal problems

(e) tactful and reasoned discipline

(f) job security

(g) being informed as to the business' affairs

(h) interesting work

The aspects of machines as to hiring, buying, sharing, maintenance, etc is again out of the scope of my paper, but money - that is different.

Look at these statements:-

A nation can increase its National Income by:

(a) increasing the percentage of its population going out to work, or

(b) by increasing the productivity of the factor, labour.

No look at the UK's increases per annum:

Year	% Increase in Output per Head	% Increase in Income from Employment
1963	3.3	5.1
1964	4.9	8.3
1965	1.6	7.9
1966	2.0	7.0
1967	3.2	3.8
1968	4.7	7.0

Statistics verified by The London and Cambridge Economic Bulletin.

And the Growth Rates of Industrial Production:

Nation	% Per Annum 1951 - 1956	% Per Annum 1957 - 1960	% Per Annum 1961 - 1966
Japan	15.0	14.0	12.4
Western Germany	11.2	6.3	5.7
Italy	8.3	7.7	8.1
France	5.7	5.2	5.2
United States	4.7	2.2	5.8
United Kingdom	3.2	2.4	3.5

Statistics verified by Econtel Research

It is estimated that the UK's growth over the 20 years' period 1950-1970 is almost exactly 3% per annum.

How does one measure the productivity of a business? The golden rule is to select the most meaningful unit, for coal say the number of physical tons weight, for motor vehicles the number of vehicles expressed in thousands, electricity in kilowatt hours, observe that there is not a constant denomination - it is often considered too difficult a concept - but what about annual sales per employee?

Have a look at these figures:-

	Annual Sales Per Employee	Capital Employed Per Employee	
Caterpillar	£8,300	£6,000	Top three of a table
Hoover	£6,400	£4,400	produced by The Times
British Ropes	£4,650	£3,650	in 1970
The Dowty Group	£3,150	£2,250	Bottom three of the table
Joseph Lucas	£3,100	£1,540	
Associated Engineering	£2,700	£2,100	

Is there some relationship between the Sales per Employee and Capital Employed, and is it significant that the top two organisations are American?

There are seven prime methods of assessing financial performance, seven ratios:-

1. PROFIT: SALES
2. PROFIT: CAPITAL EMPLOYED
3. PROFIT: PER EMPLOYEE
4. SALES: CAPITAL EMPLOYED
5. SALES: STOCKS
6. SALES: FIXED ASSETS
7. SALES: EMPLOYEES

Capital employed being calculated as Total Tangible Assets less Current Liabilities.

Thus any ratio which involves profit must relate to activity levels, which as we have already seen is volume conscious - this then applies to ratios 1, 2 and 3.

Ratios 4-7 are productivity ratios, specifically for measuring the productivity of capital etc.

Profit is the final output, allowing for social consequences, every action is aimed at maximising profit, certainly in a capitalistic society the stock of capital can only be increased from profits. We can only increase our stock of capital by ploughing back OR raising more money through a share issue of other similar flotation.

In 1969 - 1970 the average return on Capital Employed by the 500 largest firms in the UK was 17.10%, consider this in the light of the following figures:-

Returns on Capital Employed

	Turnover £'s Per Annum	Pre Tax Profit as a % of Capital Employed
Dunlop	450 m	14.2
Hawker Siddeley	382 m	9.2
Joseph Lucas	213 m	19.9

Selected from The Times during 1970.

Whatever the motives of the founders of the small firm, they all have a number of built-in strengths and weaknesses. The small firm has the basic lively grasp of the tactical and strategic advantage of simply being small - it can out-manoeuvre bigger units, but often these advantages and the ability to exploit them deprives the small firm principal of the aces up his sleeve.

S E S S I O N 7 A N D 8

ESTIMATING

1. Preparation of Estimate. Formulating the Tender

   (a) Estimating is preparation from documents available probable cost of project

   (b) Probable cost not affected by considerations as to Tendering

   (c) Tender is an offer to carry out project for a financial consideration

2. Tender

   (a) Decision whether to tender by Managing Director based on:

      (i) Overall plan

      (ii) Work load

      (iii) Suitability of Contract

      (iv) Available finance

   (b) Decision on addition to be made to cost for Net Profit by MD based on:

      (i) Work load

      (ii) Probable competition

   (c) Number of Tenders

      (i) All available jobs

      (ii) Particular jobs

3. Documents

   (a) Bills of Quantities

      (i) SMM

      (ii) Small Code

   (b) Specification and Drawing

   (c) Schedule of Rates

   (d) Clients Verbal Brief

   (e) Fee Basis

   (f) Bill of Approximate Quantities

4. Preparation of own Bills of Quantities

(a) Time consuming

(b) Reduced competition

(c) Keep to SMM

(d) Use composite items

5. Estimating at Cost

(i) Accurate calculation of Net Profit

(ii) Information for Cost Control

6. Information required by Estimator

(a) Labour Costs

(i) Current

(ii) Anticipated

(b) Labour Constants

(i) Regular feed-back of results

(c) Materials

(i) Current costs of principal general materials

(ii) Trends in material costs

(d) Plant

(i) Hire and operating costs

(ii) Outputs

7. Estimator - Principal Duties

(a) Calculate all-in rate for labour for contract period

(b) Build up unit rate for all items

(c) Calculate overheads

(d) Calculate site on-costs and Preliminary Items

(e) Decide with Contracts Manager method on construction and provisional programme

8. Estimate - Overlapping Duties

(a) Site Surveyor

(b) Buyer

(c) Bonus Surveyor

9. Pricing the Bill

(a) Aids to speed and accuracy

(i) Calculators

(ii) Net price lists

(iii) Standard costings

(b) Fluctuations/Fixed Prices

(c) Site Visit

10. Presenting the Estimate

(a) Analysis of Bills of Quantities

(b) Contract Particulars

11. Cost Control

(a) Object - to ensure that actual costs conform with planned costs

(b) Method

(i) Prepare plan of costs

(ii) Compare actual costs with planned costs

(iii) Investigate differences and take action where necessary

(c) How much to control

(i) All jobs at intervals

(ii) Jobs in trouble

(iii) Particular sections and trades

(iv) Use of Plant

(v) Own labour

(vi) Materials

(d) How often

(i) Generally monthly

(ii) Special cases

(e) Control a means to an end

(f) Labour control by Bonus Incentive Schemes

(g) Control Information available quickly

ALL-IN RATE FOR LABOURER AT MARCH 1973

Flat Rate	49w (40Hr) @ £22.20		1087.80
Overtime	49w x 5hr @ $1\frac{1}{4}$ Time = 49w x $6\frac{1}{4}$hr x £0.56	171.50	
	49w x 4hr x $1\frac{1}{2}$ Time 49w x 6hr x £0.56	164.64	336.14
NI Stamp (Employer)	52w x £2.25		117.00
Grad Contrib (Employer)	49w x £0.97 (Based on £29.00 Gross)	47.53	
	3w x £0.64 (Based on £22.20 Gross)	1.92	49.45
Annual Holiday Stamp	52w x £1.60		83.20
CITB Levy (Average)	52w x £0.48		24.96
Tools	Nil		-
Redundancy Fund	52w x £0.30		15.60
	TOTAL COST FOR YEAR		1714.15

Productive Time 49 weeks

Public Holidays 4/5

$48\frac{1}{5}$

Sick Pay $1\frac{1}{5}$

47

$\frac{£1.714.15}{47w \times 49h}$ = £0.75 (NB Based on Flat Rate)

ALL-IN RATE FOR TRADESMAN AT MARCH 1973

Flat Rate	49 week (40hr) @ £26.00		1274.00
Overtime	49w x 5hr @ $1\frac{1}{4}$ Time = 49w x $6\frac{1}{4}$hrs x £0.65	199.06	
	49w x 4hr @ $1\frac{1}{2}$ Time = 49w x 6hr x £0.65	191.10	390.16
NI Stamp (Employer)	52w x £2.25		117.00
Graduated Cont (Employer)	49w x £1.21 (Based on £34.00 Gross)	59.29	
	3w x £0.83 (Based on £26.00)	2.49	61.78
Annual Holiday Stamp	52w x £1.60		83.20
CITB Levy (Average)	52w x £0.48		24.96
Tools	52w x £0.20		10.40
Redundancy Fund	52w x £0.30		15.60
	TOTAL COST FOR YEAR		1977.10

Productive Time 49 weeks

Public Holidays $4/5$

$48\,1/5$

Sick pay $1\,1/5$

47

$\frac{£1977.10}{47w \times 48h}$ = £0.87 (NB Based on Flat Rate)

ALL-IN RATE FOR LABOURER AT 25/6/73

Flat Rate	49 weeks (40hr) @ £25.20		1234.80
Overtime	49w x 5hr x $1\frac{1}{4}$ Time = 49w x $6\frac{1}{4}$hr x £0.63	193.00	
	49w x 4hr x $1\frac{1}{2}$ Time = 49w x 6hr x £0.63	185.22	378.22
NI Stamp (Employer)	52w x £1.05 (£2.25 - £1.20 SET)		54.60
Grad Contrib (Employer)	49w x £1.16 (Based on £33.00 Gross)	56.84	
	3w x £0.78 (Based on £25.20 Gross)	2.34	59.18
Annual Holiday Stamp	52w x £1.80		93.60
CITB Levy (Average)	52w x £0.48		24.96
Tools	Nil		-
Redundancy Fund	52w x £0.30		15.60
	TOTAL COST FOR YEAR		1860.96
	$\frac{£1860.96}{47w \times 49h}$ = £0.81 (NB Based on Flat Rate)		

ALL-IN RATE FOR TRADESMAN AT 25/6/73

Flat Rate	49 weeks (40hr) @ £29.60		1450.40
Overtime	49w x 5hr x $1\frac{1}{4}$ = 49w x $6\frac{1}{4}$hr x £0.675	206.72	
	49w x 4hr x $1\frac{1}{2}$ = 49w x 6hr x £0.675	198.45	404.17
NI Stamp (Employer)	52w x £1.05 (£2.25-1.20 SET)		54.60
Grad Contrib (Employer)	49w x £1.40 (Based on £38.00)	68.60	
	3w x 1.02 (Based on £30.00)	3.06	71.66
Annual Holiday Stamp	52w x £1.80		93.60
CITB Levy (Average)	52w x £0.48		24.96
Tools	52w x £0.20		10.40
Redundancy Fund	52w x £0.30		15.60
	TOTAL COST FOR YEAR		2125.39
	$\frac{£2125.39}{47w \times 49h}$ = £0.93 (NB Based on Flat Rate)		

CALCULATING AVERAGE HOURLY RATE FOR TRADESMAN FOR FIXED PRICE TENDER

Date of Possession - March 1973

Date of Completion - October 1974

March 1973 - June 1973 = 4 months

*July 1973 - May 1974 = 11 months

°June 1974 - October 1974 = 5 months

(NB *New wage rate 25/6/73; °New wage rate 10/6/74)

4 months	@ £0.87 =	3.48
11 months	@ £0.93 =	10.23
5 months	@ £1.02 =	5.10
		18.81

∴ Average for period of Contract = $\frac{18.81}{20}$ = £0.94

BUILD-UP OF PRELIMINARY COSTS FOR CONTRACT

Contract Duration - 15 months

Tender Figure - £150,000

Own Labour Cost - £40,000

General Foreman	15 months @ £175.00		2,625.00
Contracts Manager	15 months @ £200.00 x $\frac{1}{4}$		750.00
Site Surveyor	15 months @ £200 x $^{1}/_{6}$		500.00
Labourer	15 months @ £140 x $\frac{3}{4}$		1,575.00
Office & Furniture	Erect and Repair	25.00	
	15 months @ £5.00	75.00	
	Remove	5.00	105.00
Sheds - 2 No	Erect and repair	15.00	
	15 months @ £3.00	45.00	
	Remove	5.00	
		65.00	
	Add 1 similar	65.00	130.00
Telephone	Installation	25.00	
	Rent and calls 5 x £20.00	100.00	125.00
Lighting & Heating	15 months @ £3.00		45.00
Clerk of Works Office	As GF Office		105.00
Insurance - Fire	£0.10% of £150,000		150.00
Insurance - TP etc	£0.65% of £40,000		260.00
Hoarding	Say		100.00
Scaffolding	External - 1,100 MS @ £0.40 =	440.00	
	Internal say	160.00	600.00
Testing	(If no Prov Sum)say		30.00
Drying Out	(If no Prov Sum)say		150.00
Clearing Rubbish	say		100.00
Water	(Depending on local practise		180.00
			£7,530.00

Other items: Transporting labour, special plant, making good defects, fixed price - Risk (If not in build up)

CALCULATING OVERHEADS

Typical Overheads:

1. Rent and rates
2. Heating and lighting
3. Stationery, printing, depreciation of office equipment
4. Advertising
5. Telephone
6. Postage
7. Office salaries including NI and Graduated Contribution
8. Storekeeper, yard labour
9. Professional fees (audit, legal)
10. Interest on borrowed capital
11. Company cars - depreciation and running costs

Recovery of Overheads

1. As a percentage of labour cost

   Overhead expenditure = £9,000

   Annual labour cost = £40,000

   % Recovery Rate = $\frac{£9,000}{£40,000} \times 100 = 22.5\%$ or labour

2. As a percentage of turnover at cost

   Overhead expenditure = £9,000

   Annual turnover at cost £100,000

   % Recovery rate = $\frac{9,000}{100,000} \times 100 = 9\%$ or cost

ANALYSIS OF PRICED BILL

DISCOUNT	ITEM	BILL OF QUANTITIES	PROFIT REQUIRED
-	Preliminaries	7,530	
-	Provisional Sums	1,200	
200	PC Sums - Suppliers	4,000	
1,750	PC Sums - Subcontractors	35,000	
500	Own Subcontractors	20,000	
-	Own Work	60,000	
2,450		127,730	
	TENDER		
	Preliminaries		
	Priced Bill of Quantities	127,730	
	% for Overheads		
	% for Profit		
	Tender Figure		

TENDER PARTICULARS

Description of Contract

Locality of Contract

Employing Client/Authority

Architect

Quantity Surveyor

Form of Contract

Basis of Tender

Special Conditions

Time for Complication

Liquidated Damages

Special Remarks

S E S S I O N 9 A N D 1 0

LAW

Objective:

To show the contractor legal pitfalls in the building process, and to emphasise his rights and obligations.

1. Introduction

The lawyer's approach to a problem

Where law is found

The Case Law method

Legal terms

2. Contracts

Stages in creating a contract:-

Contracts may be informal - the need for care in correspondence

Standard Forms of Contract

The Sub-Contractor's position

The need for standard terms

Plant hire

3. Client and Contractor

The builder's common law obligations - exemption clauses

Damage to client's property

4. Contractor and Third Parties

Negligence

Nuisance

Trespass - Rights of access - boundary problems

Occupier's liability

Other statutory provisions

5. Contractor and Operative

Common law duties:-

Injuries at work

Defective tools

Competent staff of men

General obligations

Statutory duties

S E S S I O N 1 1

PURCHASING

1. Need to recognise importance of duties of Buyer

   (i) Up to 60% of total value of building contract in cost of materials and subcontractors service.

2. Duties of Buyer

   (i) Provide estimator with accurate information as to cost at Tender stage.

   (ii) Provide materials and services of correct quality and quantity at most competitive price and at the right time.

3. Enquiries for materials and Tender stage

   (i) Number to send out

      (a) Dependent on value

   (ii) Include newcomer

   (iii) Information to send to supplier

      (a) Name and address of contract

      (b) Name of Employer

      (c) Approximate delivery dates

      (d) Fixed price or fluctuating

      (e) Abstract from relevant specification

      (f) Details of relevant BSS

      (g) Date by which quotations required

      (h) Indication of total quantity

      (i) Minimum loads

      (j) Particular restriction as to lorry sizes; outside normal hours of delivery, special packaging.

4. Checking quotations

(i) Check compliance with specification

(ii) Check for gross error leading to subsequent withdrawal

(iii) Where reference to discounts on and off 'list' check list. Net down when necessary

(iv) Prepare schedule for Estimator showing order of competitiveness of suppliers for various materials

5. Enquiries to Subcontractors at Tender stage

(i) Consider which trades to sublet

(ii) Which of these you will price yourself at tender stage

(iii) Information to send out basically as for materials plus:

(a) Photo-copy relevant sections of Bills of Quantities

(b) Photo-copy Preliminaries giving Conditions of Main Contract; Method of Measurement etc.

6. Post Contract Duties

(i) Obtain decision on construction methods to be adopted:

eg Ready-mix

Packaged bricks

(ii) Obtain from planners, dates for various sections

(iii) Check through contract documents to pin-point items with particular delivery problems eg:

(a) Items for casting in to substructure concrete

(b) Specials requiring preparation and approval of drawing

(c) Items requiring testing of samples

(iv) Formulate schedule of priorities for ordering

(v) Prepare detailed schedules giving location, sizes, finish etc. eg:

(a) Precast concrete goods

(b) Door and window frames

(c) Doors and joinery fitments

(d) Ironmongery

(e) Sanitaryware and fittings

(vi) Obtain decision on which trades to sublet and whether on labour and material or labour only basis

7. Ordering Materials

(i) Enquiries to supplies not asked to quote at tender stage

(ii) Place orders using standard form setting out delivery dates, discounts and any special conditions

(iii) Send copies of orders to:

(a) Site Foreman

(b) Surveyor

(c) Accounts Department

8. Placing Subcontracts

(i) Check validity of rates submitted especially where sub-contractors not known

(ii) Decide whether to invite tenders from additional subcontractors

(iii) Use approved form of subcontract

(iv) Do not impose unreasonable conditions

(v) Check exemption certificate where applicable

9. Labour Only Subcontracts

(i) Get estimator to price relevant sections of Bills of Quantities at net cost of labour including insurances

(ii) Decide percentage reserve for

(a) Extra supervision

(b) Clearing up after

(c) Making good inferior work

(iii) Find basis most familiar to subcontractor, eg:

(a) Price per 1,000 No

(b) Price per sq m/sq yd

(c) All-in lump sum

(iv) Do not accept offer which is too low

(v) Use standard form of subcontract

(vi) Check exemption certificate

10. Bulk Orders

(i) Materials such as: Cement; Sand; Aggregates; Bricks; Blocks; Drainage Goods; Plaster; Carcassing Timber

(ii) Obtain quotations on basis of approximate quantities from Bills of Quantities

(iii) Place bulk orders leaving site to call forward as required

(iv) Have alternative suppliers for times of shortage

11. Scaffolding and Plant

(i) Obtain policy decision to:

(a) Use own

(b) Supplement own by hire

(c) Sublet whole on measured basis

(ii) In anticipation of 1(b) obtain quotation for hiring on time basis

(iii) If 1(c) above deal with as with Subcontractor

(iv) When subletting excavation agree a schedule of rates and re-measure on completion

(v) Where scaffolding sublet ensure that liability for erection in accordance with safety regulation, rests with subcontractor

12. Fixed price or current price

(i) Insistence on fixed price can inflate buying price

(ii) Individual consideration to each order/subcontract

13. Nominated Suppliers

(i) Architects choice

(ii) Check before accepting

(a) Discount as contract

(b) Guarantees and Contingent Liability

(c) Satisfactory delivery offered

(iii) Accept using standard form setting out clearly conditions

14. Nominated Subcontractor

(i) Generally as for Nominated Suppliers

(ii) Insist on approved form of subcontract

15. Circulating Information

(i) Copy orders to:

(a) Site Foreman with relevant schedule

(b) Accounts Department

(c) Contracts Manager/Surveyor

(ii) Colour code blank Bill of Quantities for quick reference

16. Final Account

(i) Pass notes to Quantity Surveyor of discrepancies revealed during preparation of material schedules

(ii) Look out for less favourable buying rates as result of VO.

S E S S I O N 1 2

SAFETY IN CONSTRUCTION

During the past thirty years many technical problems have been solved in our industry. New methods of construction have been involved and as a result we are able to build faster, higher and use materials, many of which are completely new to us. This has meant that much research and careful thought has been given to design etc.

We are living in a machine age and after a very conservative start the construction industry is now using more machines from large cranes and excavators down to comparatively small fixing tools than was thought possible before the war.

One problem, however, has remained with us for thousands of years, and it is an indictment to us all that the problem is a human one.

It concerns people!

If machines continually break down causing delays and loss of production then expert designers are set to work to study causes and remedy the faults.

Very few directors and managers, however, seem to worry about the causes of accidents and no chairs have been awarded to any university in this country, no degrees given for a close examination and thesis on "Accidents and their prevention".

Every year the fatal accident rate in the construction industry is around 250. The number of reportable accidents - ie accidents which prevent a man working for three days - has increased since 1952 until 1968 by over 400% from 11,000 to 47,000.

This then is the measure of the problem.

The three main motives, I would suggest, of any construction company, be it large or small, should be:-

1. To satisfy the client
2. To ensure that all jobs come out at cost; in other words be profitable
3. To ensure the safety, health and welfare of its workers.

No doubt the first two points are being very well dealt with on this course. It is my purpose to deal with the third and in so doing relate them to the other two.

It is true to say that no client is happy if he considers that, in building his house, factory, office or whatever it may be, has been erected for him; is satisfied if in doing the work no regard has been given to safety, and as a direct result some one has been killed or a number of workers have been injured. This is so elemental that I intend to spend no more time on this aspect.

Points 2 and 3, however, are so closely connected that they are difficult to separate.

Before delving too deeply into costs of accidents let us look at question 3.

All employers have two sorts of responsibility to their workers:

A Statutory duties - ie to conform to the Factories Acts and all the statutory orders, Construction Regulations, Electricity Regulations, Woodworking Machinery Regulations, etc, etc.

B Common Law duties - ie to ensure a safe system of work for all their employees.

Statutory Duties

The Factories Act 1961 - Part XII, Clause 5, states:

"Where an offence under this Act committed by a company is proved to have been committed with the consent or connivance of, or to have been facilitated by any neglect on the part of, any director, manager, secretary or other officer of the company, he, as weel as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly."

So that whereas most of you have been aware to a greater or lesser degree of your company's obligations under the Acts, it is now more apparent that you on your own account may be more deeply involved than you realised.

The proceedings under Statute Law are dealt with in the Criminal Courts and yet there are many employers, directors, and managers who fail to read the regulations. They all, however, seem to know fairly well the "Law of Contracts" and read very carefully the "Bills" and "Specifications". This surely is an anomaly.

Each order gives very clearly the responsibilities of employers. For example:-

"The Construction (General Provisions) Regulations 1961".

Regulation 3 - Obligations under Regulations - states: "It shall be the duty of every contractor and every employer of workmen, who is undertaking any of the operations or work to which these Regulations apply -

(a) To comply with such of the requirements of the Regulations as affect him (b) or any workman employed by him; (c) that is to say Regulations 8 to 11, 11, 13, 15 to 17, etc etc.

(b) To comply with such requirements of Regulations . . . as relate to any work, act or operation performed or about to be performed by any such contractor or employer of workmen."

Time does not permit me to deal with the regulations at length but attention must be brought to Part II - Supervision of Safe Conduct of Work.

This deals with the appointment of a Safety Supervisor by every contractor who employs more than 20 persons.

This regulation is not even yet fully understood. All safety supervisors must be appointed in writing and be suitably qualified for the purpose. It must be his priority job.

It is in order for a group of small contractors to get together and agree to appoint one safety supervisor to act on all their behalfs.

I would now like to deal with costs of accidents and their prevention. Experience has shown that very little study of this aspect has so far been undertaken. In a book issued by the International Labour Office under the heading "Accident Prevention" it is stated that the total monthly casualties during the last war - ie 1939 to 1945 - for the United Kingdom was 8,126. For the same period in manufacturing industry the figure was 22,109. In other words two and half times more people killed and injured at work than were casualties in making war. Yet Armies, Navies and Air Forces set out to kill, wound, or capture their opponents whereas industry, properly organised, should be striving to keep casualties down to the lowest possible figure.

It has been estimated that industrial accidents cost Great Britain £300 million during 1966. These figures are based on figures which may be had from the Ministry of Labour and the Ministry of Social Services. They relate only to reportable accidents. It is know, however, that there are at least thirty minor accidents to every reportable accident, and so far it has been found impossible to evaluate these on anything like a national basis.

I would, however, like to give you one or two examples of various types of accidents which have been properly costed by a large construction firm. These costs were drawn up not by the Safety Department but by the Costing Department of that organisation, and I think you will agree when you hear them that they are minimum rather than maximum figures which are quoted.

Whilst the costs you have been given are monetary, the most important costs, you will agree, are those of human suffering. The wife who is made a widow, the children who become fatherless; the human suffering resulting from a man's severe injuries, which, though they may not be fatal, may incapacitate him so that he is unable to work for the rest of his life, or, as often happens, has to take some other type of job.

The accident was a fatal one. Briefly a crane was overloaded and as a consequence it overturned, falling into an excavation. The driver was killed and the crane itself was a complete write-off.

Now let us begin to assess the costs. The site was very large with something like 300 work people on it. At the time the accident occurred the whole job revolved around, and was dependent upon, the crane.

With the crane out of action virtually the whole job stood still until such time as it could be replaced. This meant that all the men's time at, say £15 per week (which I think is a very low figure) was lost to the firm concerned. I say "lost" very advisedly because under such circumstances it is not now possible to stand the operatives off for two weeks; so they are literally paid for being on the job although producing nothing.

In addition a number of machines were on the job with a hire charge on each, which I have broken down as shown in Table No 1. These costs are very easy to work out.

The man who was killed was married and his wife was sent for. She had to travel some hundreds of miles and she brought her father with her. This meant that there were two lots of travelling and hotel expenses until after the inquest was held.

A full-scale enquiry had to be made on all the circumstances which led up to the accident. This meant such people as Plant Managers, Plant Supervisors, etc all had to travel many miles and attend the job and

help in the investigation. In addition the Chief Safety Officer of the firm concerned also had to travel immediately after the accident occurred to the site - which was some 250 miles from his home. His travel and hotel expenses obviously had to be met.

Time spent by various witnesses with the police investigators, insurance investigators and investigators from the Company concerned also had to be met. The cost of compiling a full report and distributing this was also something which had to be allowed for and - if we also count the Secretarial time spent on these reports - it comes to a considerable sum. At the subsequent inquiry which was attended by Costing Surveyors and the General Foreman, the costs of this accident alone were put within the region of £23,377.20 made up as follows:-

	£ p
2 weeks, £15 per week, 300 men	9000.00
Fares, Wife and Father(£3.85 each)	7.70
Hotel Bill	22.00
Fare: Plant Manager	8.00
Fare: Plant Supervisor	8.00
Hotel: Plant Manager	10.50
Hotel: Plant Supervisor	10.50
Chief SO Fares	10.50
Chief SO Hotel	15.00
Hire charge of machines not in use	1035.00
Cost of new crane	13000.00
Telephone calls (Trunk)	15.00
Incidental head office and regional office expenses	235.00
	£23377.20

This did not include any damages which had to be paid to the widow for the loss of her husband - these, in fact, were put at just over £8,000. In other words the costs of this accident were no less than £31,377. This is a lot of money by anyone's reckoning.

If anyone suggests that many of these items are covered by insurance, it should be pointed out that insurance premiums are based on claims experience, that each year's premiums are based on the previous year's claims. Insurance companies are in business to make a profit in the same way as builders.

It was found that the accident could quite easily have been prevented by just levelling up the crane when it was doing its lifting. This would have meant the use of two railway sleepers. If we assess the cost of two sleepers at 50p each then it could be argued that the cost of preventing this fatal accident would have been about £1.

Table No 1

Item	Hire Rate Per Week £
14/10 Concrete Mixer	12.75
Dalli H/Scraper	4.00
Sykes 5 in Pump	19.00
S/Hopwood Boiler	9.00
A and M Generator 2.5 KW	4.50
No 6 MeKT Hammer	12.00
Cpt Compressor: 6 tool	28.50
Murex Weld Set	4.00
Liner Sawbench	6.00
20 ton cement silo	10.00
12/30 Benford dumper	12.00
18/12 Benford mixer	25.00
Ace Midget Hoist	3.00
43 RB Excavator	2.50
43 RB Excavator	2.50
BTD6 Tractor	1.25
Smiths 21 crane	1.50

In the last article, the costs of a fatal accident on a large job were shown. In this I will give lists of the actual costs of four accidents which occurred during one month on a fairly large construction site. The four are made up of three day "reportable" accidents and one incident which was not reportable, according to the definition as laid down under the Regulations.

At the time of these occurrences an actual study was being made with the co-operation of the Agent and the Costing Department. It is important to remember this fact and understand that there were other accidents and incidents during the same period but these three were taken at random from the report, submitted by the Safety Officer on the site. The figures in each case are not guessed in any way, but are actual costs.

The report was from a standard one devised especially for the costing of accidents and had been used both before and since the one-month period covered by this article.

The first accident was to a joiner who was nailing soffits. He knelt on the side edge of a nail, which was one of a number he had placed on the platform. The injury sustained resulted in a septic knee.

1. Cost of lost time of injured employee .. .. .. - -

   Cost of lost time of witness (during investigation) .. 35p

2. Cost of time lost by supervisory staff investigating the accident; chargehand joiner 62½p

3. First Aid

   3/1 Cost of time spent by first-aid attendant 5p

   3/2 Cost of first-aid dressing etc 12½p

4. Cost of transporting injured man to hospital .. .. - -

5. Plant

   5/1 Cost of hire charges idle plant due to accident .. - -

   5/2 Cost of damage and/or replacements .. .. .. - -

6. Costs due to interference with production and bonus targets 1.00

7. Incidentals

7/1 Cost of telephone calls .. .. - -

7/2 Cost of stationery, postages, etc 1.00

7/3 Cost of travelling expenses of Safety Officer, use of car to assist injured person 6p

£3.21

The second accident was to a ganger who stepped on to a loose piece of timber. This caused him to stumble and fall backwards on to a scaffold tube. As a result he fractured a rib.

1. Cost of lost time of injured employee .. .. .. - -
(Worked until end of day, reported to camp sick bay at 7 pm panel doctor called)

2. Cost of time lost by supervisory staff investigating the accident; general foreman and ganger 1.80

3. First Aid

3/1 Cost of time spent by first-aid attendant 50p

3/2 Cost of first-aid dressings etc .. .. - -

4. Cost of transporting injured man to hospital 2.10

5. Plant

5/1 Cost of hire charges of idle plant due to accident - -

5/2 Cost of damage and/or replacement of plant .. .. - -

6. Cost due to interference with production and bonus targets 5.00

7. Incidentals

7/1 Cost of telephone calls 42½p

7/2 Cost of stationery, postage, etc 1.00

7/3 Cost of travelling expenses of Safety Officer .. - -

£10.82½

A bricklayer used the point of his trowel to ease a brick into line. A piece of brick broke off and flew into his eye. The injury, as a result, was an abrasion to left eye.

1.	Cost of lost time of injured employee, first treatment visit, hospital visit, followed by treatment visits based on 38½p per hour	3.50
2.	Cost of time lost by supervisory staff investigating the accident: chargehand bricklayer	1.50
3.	First Aid	
	3/1 Cost of time spent by first-aid attendant	10p
	3/2 Cost of first-aid dressings etc	5p
4.	Cost of transporting injured man to hospital	2.10
5.	Plant	
	5/1 Cost of hire charges of plant due to accident ..	- -
	5/2 Cost of damage and/or replacement of plant	- -
6.	Cost due to interference with production and bonus targets	2.00
7.	Incidentals	
	7/1 Cost of telephone calls	- -
	7/2 Cost of stationery, postage, etc	1.00
	7/3 Cost of travelling expenses of Safety Officer. Use of car during investigation	22½p
		£10.47½

It will be seen that the total cost of these three accidents is £24.51, an average of £8.17 which excludes damages or other compensation paid to the men involved.

The fourth study was on a machine incident when a toggle bolt in a pitching hole failed on a pile frame. The accident caused damage to building under construction, but no injury (non-reportable).

Damage involved two 75 ft x 14 in sq concrete piles broken: 272 ft hammer - rope broken; lifting eye on hammer guard rail to gears broken; 254 ft pile rope broken; trolley fractured and a 2 in steam hose broken.

1.	Cost of supervisory staff investigating accident; agents; construction agent; section manager; senior engineer; deputy senior engineer; plant manager; section engineer; general foreman; foreman fitter	37.00
2.	Costs of investigation into bolt failure	39.90
3.	Costs of damage (not recoverable by insurance)	512.00
4.	Cost of Plant Replacement	3.00
	4/1 Cost of transport during replacement operations ..	3.00
	4/2 Time spent by foreman fitter and driver	1.00
5.	Estimated cost due to interference with production and bonus targets	150.00
6.	Incidentals	
	6/1 Cost of telephone calls	1.00
	6/2 Cost of stationery, report 43B insurance, etc .. (typing included)	3.05
	6/3 Cost of use of car; Safety Officer	50
		£750.45

In the case of Nos 1 and 2, these accidents could have been prevented, without any additional costs, by keeping a tidy site.

Accident No 3 could have been prevented by a little forethought, without any additional costs.

Incident No 4 could have been prevented had the laid down procedure on plant inspection and maintenance been properly carried out.

In other words, a total of £774.96 could have been saved in one month alone by exercising proper care and attention.

COST OF ACCIDENTS

In the two previous inquiries into accident costs we dealt with a fatal accident, three lost-time accidents and a machine accident. In this article it is intended to deal with minor accidents which are often not even known to top management on sites. These accidents often constitute nothing more than an entry in the first-aid book, which is seldom examined by Agents. It is logical to argue, then, that the cost of this type of accident is very rarely, if ever, considered.

During 1964, according to figures given by the Ministry of Labour, over 40,000 reportable accidents occurred in the construction industry. It is estimated that anywhere between 25 and 40 non-reportable accidents occur to every reportable accident. If we take the near-middle figure of 30, this means there is at least one accident to every operative employed. The total costs must then be colossal.

Most accidents are caused by simple errors of omission or commission and could so easily be prevented. Let us first examine three simple examples which occurred on a site in one day. These were simply due to men treading on nails, and we will agree this is a very common type of accident. In the company concerned there is a rule that any puncture would must receive an anti-tetanus injection. A chain-man trod on a nail, and this is how the bill totalled up:-

1. Cost of time of injured employee; 1 hour 35p
2. Cost of supervisory staff; engineer unable to continue on own 75p
3. First Aid
   (a) Cost of time spent by first-aid attendant .. .. $7\frac{1}{2}$p
   (b) Cost of first-aid dressings, etc .. .. $12\frac{1}{2}$p
4. Cost of transporting man to hospital; hire charge, dormobile, 1 hour 75p

5. Plant

(a) Cost of hire charges of idle plant due to accident .. .. - -

(b) Cost of damage and/or replacement of plant .. .. - -

6. Cost due to interference with production and bonus targets .. .. - -

7. Incidentals

(a) Cost of telephone calls 1p

(b) Cost of stationery, postage, etc .. .. - -

(c) Travelling expenses of Safety Officer .. .. .. - -

£2.06

This only covers the cost on the actual day of occurrence and subsequent visits to first-aid are not included.

The next case involved a tractor driver who also trod on a nail:

1. Cost of lost time of injured employee: $2\frac{1}{2}$ hr at $37\frac{1}{2}$p 94p

2. Cost of time lost by supervisory staff investigating the accident 50

3. First Aid

(a) Cost of time spent by first aid attendant .. .. $7\frac{1}{2}$

(b) Cost of first aid dressing, etc $1\frac{1}{2}$

4. Cost of transporting man to hospital by Dormobile 1.87$\frac{1}{2}$

5. Plant

(a) Cost of hire charges of idle plant; tractor at £1.50 per hour 3.75

(b) Cost of damage and/or replacement of plant .. .. - -

6. Cost due to interference with production and bonus targets 5.25

7. Incidentals

(a) Cost of telephone calls	1p
(b) Cost of stationery, postage, etc	7½p
(c) Travelling expenses of Safety Officer	- -
	£12.49

No account of further visits to first aid shown. A carpenter trod on a nail. His costs are analysed as follows:

1. Cost of lost time of injured employee: 1 hr at 37½p ..	37½p
2. Cost of time lost by supervisory staff investigating the accident	25p
3. First Aid	
(a) Cost of time spent by first aid attendant	7½p
(b) Cost of first aid dressings, etc	1½p
4. Cost of transporting injured man to hospital	75p
5. Plant	
(a) Cost of hire charges of idle plant due to accident	- -
(b) Cost of damage and/or replacement of plant	- -
6. Cost due to interference with production and bonus targets: doing double-handed job; mate's time ..	37½p
7. Incidentals	
(a) Cost of telephone calls	- -
(b) Cost of stationery, postages, etc	- -
(c) Travelling expenses of Safety Officer	- -
	£1.84

This does not include further visits to first-aid station. The fourth example is another simple but common type of accident. A joiner knocked his finger on an exposed reinforcing rod and suffered an abrasion to index finger. This cost:-

1.	Cost of lost time of injured employee (visit for treatment) ½ hr from job back to job ..	19p
2.	Cost of time lost by supervisory staff investigating the accident	- -
3.	First Aid	
	(a) Cost of time spent by first aid attendant	4
	(b) Cost of first aid dressings, etc	1
4.	Cost of transporting injured man to hospital	- -
5.	Plant	
	(a) Cost of hire charges of idle plant due to accident	- -
	(b) Cost of damage and/or replacement of plant	- -
6.	Cost due to interference with production and bonus targets included in (1) above	- -
7.	Incidentals	
	(a) Cost of telephone calls	- -
	(b) Cost of stationery, postage etc	- -
	(c) Travelling expenses of Safety Officer	- -
		£0.24

These examples are of commonplace and typical things which are within everyone's knowledge. Despite this the total cost was £16.53½, an average of £4.16. If this is multiplied by 1,250,000 (taking this as the approximate number of minor accidents each year and not including those which are reportable in our industry) we get a colossal figure of £5,166,700. This is sufficient to pay for the cost of Coventry Cathedral four times, or the cost of building approximately five miles of three lane dual track motorway, complete with bridges, etc. The cost of prevention would probably have been a little forethought and planning - mostly in tidiness.

I have dealt at some length with the cost of accidents and shown quite clearly how closely they are bound up with costs generally in a way which you may not have appreciated.

All accidents are caused! They do not just happen! If we study causes then most accidents could be prevented.

The main causes in our industry of long standing are:-

FAULTS OF PEOPLE leading to -

UNSAFE ACTS AND CONDITIONS, which in their turn cause -

ACCIDENTS, followed by -

INJURIES TO PEOPLE

DAMAGE TO PLANT, ETC, and as a result we have -

INCREASED COSTS,

LOWER PRODUCTIVITY,

HUMAN SUFFERING

Thus a chain is formed. Proper training and a real inspection of sites will remove the hazards and prevent the accidents.

SESSION 13 14 AND 15

CASH FLOW

Development of a business and expansion is based on retained profits producing an increase in net assets.

Expansion will take place not so much by the retention of profits and the corresponding increase in net assets but more likely as the result of a management decision to invest the increased holding in some form or manner likely to prove profitable;

an increase in plant - the decision of management

an increase in stock levels - the decision of management

The larger the amount the higher in the management hierarchy will the decider dwell. In both, and indeed in every case, potential danger lurks in that involuntary increases may be made unless control is fully maintained e.g. minimum and maximum stock levels, credit control for debtors, in general it is acknowledged that a long term asset may be more closely scrutinised than say a short term increase.

However, the decision is made the first criterion is that of profitability and the second criterion is the availability of cash in a sufficient quantity as and when it is needed.

This will not necessarily be at the time the decision to invest is made, delivery of plant may take months - what is necessary is that there is a reasonable assurance at the time that the decision is made that cash/credit will be available THE EMPHASIS IS ON THE CASH AVAILABILITY AT AN APPROPRIATE TIME IN THE FUTURE if two or more developments are taking place concurrently management must be sure that cash is available to cover both, normally expansion is in more than one direction.

The development of forecasting, budgetary control etc. includes the cash budget, many claim it is the most important part because the absence of cash to make whatever payments are requisite will undermine the business and produce a situation known as overtrading.

The phrase CASH FLOW indicates an assessment of the rate at which cash will become available to management, the rate at which it will flow through management's hands and the rate at which it will be available to implement new investment decisions.

The calculation must of necessity be made with reference to time, the amount likely to be available during a particular period, and the nature of the projected investment.

Demand factors cannot be ignored, the sum to be committed, period of completion and/or delivery, the period of credit - these and others decide the amount needed and the date by which it must be provided.

Cash accumulated too early and in quantity will present the problem of an unproductive asset, funds lying idle produce no income, a declining profits/capital employed relationship - it may be alleviated by say a short term investment provided liquidity and ease of return to cash are visible - generally near liquidity produces low yields.

The commitment to a large scale, long term investment may call for the build up of cash which will be ultimately needed in liquid, this being the case might justify investment in a semi-permanent investment with the possibility of difficult realisation and potential losses.

Generally there is a reasonably constant ebb and flow of cash, it becomes available as the results of sales or realisations and it is used to satisfy payments from current investment decisions THE IMPORTANT POINT FROM MANAGEMENT'S ANGLE IS TO KEEP PAYMENTS AND RECEIPTS IN REASONABLE BALANCE, the ultimate test of the theory is the ability to do this over a long period of time.

Thus the theory of CASH FLOW is MANAGEMENT'S NEED TO KEEP TOTAL RECEIPTS AND TOTAL PAYMENTS IN BALANCE, accepted, it is but one more management technique but it is a very important one.

The concept is very similar to the Statement of Funds which can be shown clearly with simple comparative Balance Sheets:

NOTNUAT CONSTRUCTIONS LIMITED

Share Capital	10,000	Building	7,000
Balance P & L	2,000	Plant and Machinery	3,500
Current Liabilities	3,500	Stock	2,800
		Trade Debtors	1,000
		Bank	1,200
	15,500		15,500

The company has made a reasonable estimated profit - £1,600 on £10,000 invested for three months. It appears that the range of operations has been extended. But is everything satisfactory?

The significant factor is the disappearance of liquidity - a flow change of £5,900 - what has happened?

There has been an inflow of capital, the estimated profit	1,600
There has been an inflow of current liabilities	2,400
Bank inflow	5,900
TOTAL	9,900

Where has the cash inflow been used?

Buildings	4,200
Plant and Machinery	3,900
Stock	1,300
Trade Debtors	500
	9,900

Thus long term assets have been bought with short term funds, even allowing for the £1,600 profit as an offset against say plant, there is an excess of £6,500. Other danger signals are a weak liquidity ratio, a seemingly bad FA/CA gearing and the unit appears overstocked.

This system presents an easy way to understand cash flow and it does, practically, if done reasonably persistently, draw attention to the financial policy which is being pursued.

The essential of the statement is that by concentrating on the changes in the sources and application of funds, the investment in various assets and the financial policy which is being pursued by management is tested severely.

Finance in the sense of cash flow may emanate from two sources, internal and external - you know the external sources, short term, medium term and long term; the two main internal sources are, as stated, net profit and depreciation, depreciation only provided there is a net profit, otherwise if there is a loss then the cash flow is negative if the loss exceeds the depreciation charge, and positive (adjusted) if depreciation exceeds the loss.

Obviously what cannot be provided internally must be provided externally.

The decision areas are vital:-

1. The availability of work
2. The competition for that work
3. The availability to the small unit of financial resources
4. The unit's level of technical competence
5. The unit's ability to recruit competent staff
6. Management's ability to organise and control available resources
7. The execution of a good job, within a reasonable time at a competitive price
8. Obtaining an adequate return

Let us take two cases to illustrate the interaction of CASH FLOW. EMORF BUILDERS LIMITED, management has to make a decision on one of the following alternatives relative to the construction of four houses.

BASIC DATA

Approximate cost of land for 4 houses	£6,000
Building costs per house, cheapest methods	As stated
Sales value per house	£9,500
Cash available	£7,500

Finance is available at say 10%, security is against the land and the work completed, the arrangement is that it is taken up at the beginning of the month against the costs of work completed during the previous month.

ALTERNATIVE 'A'

To complete all the houses simultaneously at an approximate cost of £2,000 per month for twelve months, total building cost would be £24,000. It is expected that payment for the houses would be made at the end of month No 13.

ALTERNATIVE 'B'

Complete these houses one at a time

House No 1 would be completed at the end of month No 4 and would be paid for at the end of month No 5

House No 2 would be completed at the end of month No 7 and would be paid for at the end of month No 8

House No 3 would be completed at the end of month No 10, and would be paid for at the end of month No 11

House No 4 would be completed at the end of month No 13 and would be paid for at the end of month No 14

Building costs, £2,000 per month for the twelve months and a final £500 in the thirteenth month

You are asked to prepare CASH FLOW STATEMENTS and STATEMENTS OF PROFIT for each alternative.

The last exercise in the series is the rather extensive three months CASH FLOW EXERCISE contained in your folders. If you prefer to work in syndicates of four, please do so by all means.

CASE I

Cash Flow Statement

Month	Cash In	Cash Out	Interest	Balance
1	£	£	£	£
1	7,500	6,000	-	1,500 +
1	-	2,000	5	505 -
2	-	2,000	21	2,526 -
3	-	2,000	38	4,564 -
4	-	2,000	55	6,619 -
5	-	2,000	72	8,691 -
6	-	2,000	89	10,780 -
7	-	2,000	106	12,886 -
8	-	2,000	124	15,010 -
9	-	2,000	142	17,152 -
10	-	2,000	160	19,312 -
11	-	2,000	176	21,488 -
12	-	2,000	196	23,684 -
13	38,000	-	196	14,120 +
	45,500	30,000	1,380	

Statement of Profit

Sales value		38,000
Land and Building costs	30,000	
Interest	1,380	31,380
Profit		6,620
Add: Cash at beginning		7,500
Cash at end		14,120

CASE II

Cash Flow Statement

Month	Cash In	Cash Out	Interest	Balance
	£	£	£	£
1	7,500	6,000	-	1,500 +
1	-	2,000	5	505 -
2	-	2,000	21	2,526 -
3	-	2,000	38	4,564 -
4	-	2,000	55	6,619 -
5	9,500	2,000	72	809 +
6	-	2,000	-10	1,201 -
7	-	2,000	27	3,228 -
8	9,500	2,000	43	4,229 +
9	-	2,000	-	2,229 +
10	-	2,000	-	229 +
11	9,500	2,000	-	7,729 +
12	-	2,000	-	5,729 +
13	-	500	-	5,229 +
14	9,500	-	-	14,729 +
	45,500	30,500	271	

Statement of Profit

		£
Sales value		38,000
Land and Buildings costs	30,500	
Interest	271	30,771
Profit		7,229
Add: Cash at beginning		7,500
Cash at end		14,729

A month extra is needed to earn an additional £609 profit, but the business is more financially stable throughout. There is the distinct possibility of the liquid being put to good, short-term profitable use, too.

The effectiveness of financial management depends totally on the man who runs and owns the small firm. Many may be skilled in a particular skill but may well be lost in the complexity of today's scientific management. And yet, these people are responsible for the management operations within their organisations. Even the rugged individualists, to him the price is often high, overwork, worry, neglect of home - and here we should remember the role of the wife of the small businessman - what does he know of sophisticated management techniques, OM, OR, production control, etc. Brecht states:

> "Every day experience suggests that smaller units tend to suffer from one particular weakness - their chief executive is often the owner and the technical expert in regard to output - he seldom bothers to make any study of management or realise that he has any need of it. Yet his need may be greater than that of an executive in a group organisation. If in the UK there is less effectiveness in the medium and smaller firm, it is probably traceable to this source."

Information

The smaller unit tends to find it more difficult to gain access to the industrial information which is available to the larger unit. The information is there; there are many agencies to help the small firm, many do not know of their existence and many do not know how useful their services can be.

Balance Sheet Comparisons

NOTNUAT BUILDERS LIMITED	1969	1970
Fixed assets		
Property	5,000	5,000
Plant and equipment	5,000	6,500
Lorry	4,000	3,500
Total fixed assets	14,000	15,000
Current assets		
Stocks	3,000	6,000
Trade Debtors	4,000	8,000
Cash in bank	2,000	-
Total Assets	23,000	29,000
Current Liabilities		
Trade Creditors	6,000	9,000
Bank Overdraft	-	3,000
Current Tax	1,000	1,000
	7,000	13,000
Capital	16,000	16,000
Turnover	60,000	50,000
Profit after tax	7,000	5,000
Employees	12	10

Let us now take out the management financial ratios mentioned earlier and compare 1969 and 1970:

Profit to sales	11.7%	10.0%
Profit to Capital Employed	44%	31%
Profit per employee	£580	£500
Sales to Capital Employed	3.7	3.1
Sales to Stocks (Rate of turnover)		
Sales to fixed assets	4.3	3.3
Sales per employee	£5,000	£5,000

But there are two more highly important ratios which must be extracted.

Current Ratio	1.3:1	1.06:1

the ratio of current assets to current liabilities
rule of thumb 2:1

Acid Test	0.80:1	0.60:1

the ratio of liquid assets
to current liabilities
rule of thumb 1:1

These latter ratios indicate the state of solvency of the business, making a profit and having a reasonable order book do not prevent a business from meeting a very sticky end.

These ratios are similar to a thermometer; they are used to take the temperature of a business, they are only part of the total diagnosis - many a patient goes to a doctor with a specific illness - lots go for the regular check-up - remember this, a Balance Sheet is a statement of assets and liabilities at a given time. It quickly becomes historic - thus regular checks are necessary: minimum, once a month. Ratios are not ends in themselves, they help to pose the significant questions: firstly as to current evaluations relative to the past and secondly as to current evaluations being used as the basis for future activities.

Consider too credit given and taken; in the example of A. House it will be seen that to obtain the benefits of cheap finance one should delay paying creditors and 'push' debtors for early settlement. Safety rules suggest that debtors should not exceed creditors in terms of numbers of weeks and that neither number of weeks should be excessive for the industry.

Now take a typical set of accounts, from the Trial Balance work through to the Balance Sheet and extract the accounting/financial ratios mentioned previously. Notice how A House's problems of profitability and liquidity are clearly illustrated.

GENERAL FINANCE

PRACTICAL EXERCISE B

A House

Trial Balance

December 31st, 1970

Wages, NHI, etc, TB levy, etc	11,000	
Office Expenses	100	
Purchases and Sub Contracts	13,000	
Power and Light for Workshop	160	
Trade Expenses	850	
Opening Stocks Raw Materials, etc	550	
Opening Stocks Work-in-Progress	6,000	
Transport and Haulage	800	
Administrative Salaries, NHI, etc	2,500	
Sales		38,000
Repairs to premises	120	
Capital		12,000
Rent and Rates of Sub Office	100	
Property, workshop, stores, offices etc	7,600	
Subscriptions	40	
Bad debts provision		80
Creditors		4,920
Debtors	7,000	
Bank	1,800	
Cash	200	
Plant and Machinery	3,000	
Lighting, heating and cleaning office	180	
	55,000	55,000

Machinery is to be depreciated by 10%

Closing stocks raw materials valued at £330, cost

Closing Stocks work-in-progress valued at £1,870

There are, besides House, eight productive and two administrative staff.

1.	PROFIT TO SALES	$\frac{4,500}{38,000} \times \frac{100}{1}$	= 11.8%
2.	PROFIT TO CAPITAL EMPLOYED	$\frac{4,500}{16,500} \times \frac{100}{1}$	= 28%
3.	PROFIT PER EMPLOYEE	$\frac{4,500}{11}$	= £410
4.	SALES TO CAPITAL EMPLOYED	$\frac{38,000}{16,500}$	= 2.3
5.	SALES TO STOCKS		
6.	SALES TO FIXED ASSETS	$\frac{38,000}{10,300}$	= 3.8
7.	SALES TO EMPLOYEES	$\frac{38,000}{11}$	= £3,455
8.	CURRENT RATIO	11,120:4,920	2.3:1
9.	ACID TEST	8,920:4,920	1:1
10.	CREDIT GIVEN	$\frac{7,000}{38,000} \times \frac{52}{1}$	= $9\frac{1}{2}$ weeks
11.	CREDIT TAKEN	$\frac{4,920}{13,000} \times \frac{52}{1}$	= $19\frac{1}{2}$ weeks

Where could A HOUSE find finance?

Basically with a small unit there is a lack of capital: it may be because of excess stock, over investment in fixed assets; what about trade debtors? Can they pay, do they intend to pay, what are trading conditions like, is there any particular risk attached to the debtor unit concerned? Is the unit trading unprofitably? Is the unit over-trading - i.e. excessive turnover for capital available?

Assume that HOUSE must seek finance: consider

(a) How much money is needed and when is it needed?

(b) Will it be profitable to expand?

(c) Can external financing be avoided?

(i) quicker collection from debtors

(ii) longer credit from suppliers

(iii) cutting down stock, eliminating slow movers

(iv) retaining profits, proprietors' remunerations

(d) What will be best relative to taxation?

(e) What security can be offered?

(i) adequacy to cover principal and interest

(ii) no encomberances already existing

(iii) liquid state

(iv) ascertainment of property belonging to borrower.

The risks of finance are as old as enterprise, they are related to control:

(a) full risks, full share of profits and losses, full control

(b) prior claim on a fixed return, limited risk, little control

(c) payment of a positive sum, secured, minimal risk, no control

A HOUSE

TRADING AND PROFIT AND LOSS ACCOUNT

FOR THE YEAR ENDED 31ST DECEMBER, 1970

Sales		38,000
Add Closing Stocks Raw Materials	330	
Add Closing Stocks Work-in-Progress	1,870	2,200
		40,200
Less Opening Stocks Raw Materials etc	550	
Less Opening Stocks work-in-progress	6,000	
Less Purchases and Sub Contracts	13,000	19,550
VALUE ADDED		20,650
Less Productive Overheads		
Wages and NHI etc	11,000	
Transport and Haulage	800	
Power and Light	160	
Depreciation of Machinery	300	12,260
GROSS PROFIT		8,390
Less Administrative Overheads		
Trade Expenses	850	
Repairs to premises	120	
Office Expenses	100	
Office Lighting, Heating etc	180	
Salaries	2,500	
Rent and Rates of Sub Office	100	3,890
Subscriptions	40	
NET PROFIT BEFORE TAX		4,500

A HOUSE

BALANCE SHEET

AS AT 31ST DECEMBER, 1970

FIXED ASSETS		
Property		7,600
Plant and Machinery	3,000	
Less Depreciation	300	2,700
Total fixed assets		10,300
Current Assets		
Stocks of Raw Materials etc	330	
Stocks of Work in Progress	1,870	
Trade Debtors less provision for bad debts	6,920	
Bank	1,800	
Cash	200	11,120
Total Assets - Fixed and Current		21,420
Current Liabilities		
Trade Creditors		4,920
Balance, financed by Capital	12,000	
Net Profit	4,500	
	16,500	16,500

BANK OVERDRAFT FACILITIES

It is not the function of the banks to provide permanent capital. Usually overdrafts cover matters other than the acquisition of capital assets. Where the banks are prevailed upon to provide funds they will usually insist that some repayment plan be agreed upon whereby the overdraft will be liquidated over a determined period. Careful scrutiny of projects, the likelihood of profits to ensure repayment of principal and interest are essential ingredients of the arrangements. The banks often suggest, for more permanent assets ICFC, an insurance company, or some other financial institution. The present, orthodox, use of overdrafts is for the provision of working capital to increase stocks, or work-in-progress etc, these usually arise from the healthy growth of a unit.

With the banks now in 'competition', the relation of interest rates to the Bank Rate is not quite so obvious. Today's rates relate to the creditworthiness of the client, the volume of funds passing through his account, the project, etc, in any case bank borrowing on overdraft is clearly one of the cheapest methods of borrowing.

The banks rarely interfere with the administration of the unit but the banks expect as a little more tha n common courtesy that they be kept informed as to the unit's financial position.

It is not unknown for the banks to hypothecate stocks, generally this facility is offered to units holding large quantities of stocks, possibly in bonds. Other facilities offered include loans and the 'special' bridging loans.

CAPITAL ISSUES

Provision of permanent capital by public or private companies, many specialist issuing houses, cater for the smaller unit withoug necessarily breaking the rules of private companies.

Facilities include:-

(a) Offers for Sale - issuing house buys shares and offers them to the public

(b) Issues by prospectus - issuing house undertakes to find subscribers

(c) Placings - issuing house places shares to investors public or private

(d) Introductions - issuing house makes application on behalf of shareholders for a quotation

(e) Rights Issues - privilege issues to existing shareholders

Please consult chart which shows an analysis of the different types of shares and debentures.

ICFC LIMITED

Permanent long term capital available for small and medium sized units, by and large no restrictions as to industry or trade, each case considered on its merits, facilities available include secured and unsecured loans and debentures, leasing facilities, plant purchase schemes, and share capital in the form of equity or preference securities.

Repayments often extend 10-20 years according to circumstances, instalments are normally annual.

ICFC usually carries out investigations in order to assess applicant's business prospects and as ICFC works very closely with the banks arrangements can often be made as regards security when the applicant is using overdraft facilities.

EDITH - Estate Duties Investment Trust Limited

Investment in smaller private companies where market is restricted usually, method is the acquisition of capital from existing shareholders, such factors as the trade in which the unit operates, past profits, future prospects, dividend policies, etc. are scrutinised.

INSURANCE COMPANIES

Tremendously wide differences in the attitudes of the insurance companies to investing, generally they do not seek the short term, but prefer long term liabilities with the commensurate high degree of security.

The normal trend is to secure mortgage loans, minimum around £10,000 and maximum say £25,000. Security is a first charge on freeholds or long leaseholds possibly but rarely on other floating assets. Charges are around ½%-1% more than for first class debentures. Time term is preferred at 25 years, longer and shorter terms are negotiable and the insurance companies prefer repayment in instalments over the whole term. They are not keen to finance development projects, five years' audited accounts will be expected and inspections and visits by insurance company officials are part of the arrangement.

INDUSTRIAL HIRE PURCHASE

A very convenient source of medium term capital on fixed terms for the purchase of equipment where in fact the equipment itself forms adequate security and the loan can be paid off in regular instalments. The equipment which falls admirably into this category is that which:-

(a) Is capable of easy identification

(b) Has a life span which is appreciably higher than the period of hire purchase

(c) Has reasonably free re-sale market

(d) Has a high earning potential from the beginning of its working life

Certain items are covered by the Hire Purchase Act of 1964, others the subject of private agreement and negotiation. Generally an expensive form of finance.

EQUIPMENT LEASING

Frankly, any type of capital equipment and commercial vehicle is leasable, its advantages are numerous and include:-

(a) Prevents tying up working capital

(b) Helps to preserve bank balance and alternative sources of credit

(c) Makes financially painless the acquisition of expensive equipment etc

(d) No balance sheet entries tend to preserve important balance sheet ratios

(e) Rental payments are tax deductable

(f) Gives management greater scope in investment decisions

(g) Aids budgeting tremendously

(h) Tends to combat inflationary costs of equipment

There are others and of course there are disadvantages but the facilities are available to almost any well-established business unit, under the general arrangements the client enjoys quiet possession of the equipment and is expected to arrange normal insurances and carry out reasonable maintenance, title to the equipment remains always with the lessor.

FACTORING

Once more the influence of the banks is felt as they in the main capitalise the specific factors. Generally the system of factoring works best when the unit is selling short term to a number of customers. There are a great number of specialised factors and the idea is to convert money owed into liquid, it is definitely not borrowing and it is most certainly not reflected in the balance sheet. The factor makes a study of the client's potential and probably submits a quotation which includes a service fee, normally $\frac{1}{2}$%-2% of sales to which is added a finance charge. Copies of invoices are sent to the factor, in theory he purchases them and allows the client to draw:-

(a) Cash up to an agreed amount as a percentage of the balance due from the factor, or

(b) Payment on an average anticipated date of payment, ususally this only involves the service fee.

It has many advantages such as:-

(a) Bad debts, collection difficulties, credit insurance etc are eliminated

(b) Senior executives do not spend valuable time on work involved with credit control and problems of credit sales accounting etc

(c) Help in terms of cash flows

(d) Seasonal peaks of credit sales tend not to create difficulties in accounting etc

MONEY WITHOUT BORROWING

Selling for prompt cash while selling to customers on credit? Here the interposition of the factor is not disclosed. The company invoices in the usual manner but it receives payment as agent for the finance company, the credit risk is borne by the finance company. The most widely used is revolving credit, where a unit is continuously supplying a limited number of large customers on a monthly account but in fact the debtors are taking three months to settle, a liquidity problem is created, finance is made available say weekly against invoice indebtedness for the preceding week, often termed, undisclosed factoring.

EXTENDED CREDIT FROM SUPPLIERS

Elementary method of obtaining financial relief, long term credit can often be arranged particularly when the supplier is prepared to take into account a lengthy production cycle. The loss of discounts is a problem here.

THE MERCHANT BANKERS

This term describes a number of financial institutions whose main business is clearly distinct from the joint stock banks mentioned previously. They are prepared to offer a number of facilities ranging from domestic trade, issues of new capital, general company finance, additional capital for private companies, etc.

BILLS OF EXCHANGE

This is an ancient method of finance codified under the Bills of Exchange Act 1882. It is a convenient method of bridging financial gaps, and contrary to public belief is suitable for financing inland trading. True, there are limitations upon its scope, these limitations are:-

(a) Costs of discounting may well be high relative to other terms for borrowing

(b) The drawing of bills, their acceptance etc, the dating in the future etc

(c) When discounting, taking up references, the creditworthiness of the acceptor etc

There is evidence that this form of finance is expanding.

GOVERNMENT HELP

There are facilities available to any business, large or small, for mainly:-

(a) The acquisition of premises, plant, machinery, etc and for working capital

(b) Grants towards unusual expenses

(c) Grants towards construction work

Terms are reasonable and may be spread 5-10 years provided the project will create continuing employment and the prospects of commercial or industrial success are fair. There is too a limited scope for obtaining finance from Local Authorities, they have the power to make loans to individuals or bodies corporate for the erection of buildings on land which the authority has sold or let for this purpose, particularly in these districts under development.

Whatever method of finance is required, clear thinking and decision making should follow the following lines:-

(a) What scope is offered by a particular method of finance?

(b) What are the facilities that are available?

(c) What are the repayment terms?

(d) What are the interest rates?

(e) Are there any special conditions attached to the arrangement?

(f) What security is required?

Consider too the lender, what is he seeking?

(a) Profitability

(b) Financial Stability

(c) Efficient Management

Too many businesses close down because of shortage of liquidity, regular minimum monthly checks on debtors, stocks, creditors, cash in the bank and in the office is essential. Plan ahead, get out accurate cash forecasts particularly if a period of expansion is in the offing. Without good profits cash positions must eventually deteriorate. In the long run finance can only be improved by good profits. Avoid:-

(a) Overtrading attempting too large a turnover on too small a capital

(b) Overstocking raw materials, semi and fully manufactureds and components

(c) Excessive capital commitments

(d) Unprofitable trading

A NOTE OR TWO ON BANK LENDING

When a banker is asked to examine a Balance Sheet, his prime aim is to consider the business in terms of suitability for a loan or overdraft facilities. Therefore he needs to know whether the lending will be safe and whether repayment is likely to come in a fair space in terms of time.

He has two problems - PROFITABILITY for his shareholders, and LIQUIDITY for his depositors.

Fundamentally his leading questions might be:

(a) How much money is required?

(b) Exactly what is going to be done with the money - here vague thoughts and ideas are totally insufficient

(c) What plans are there for repayment of principle and interest? Cash Flow plans are a great help here

(d) What will be the banker's position if plans for repayment go somehow awry? What is the advisability of security when issuing the loan or overdraft?

Ideally the banker will want to see a set of recent, consecutive series of Balance Sheets, and Proft and Loss Accounts. From them he will make a summary of the salient facts in simple form, which will indicate trends to him, the information he might glean:-

(a) Change in the Net Worth

(b) Variations of an unhealthy nature in terms of liquidity, distinct signs of over trading

(c) The position of prior charges on assets, should things go wrong

(d) The composition of working capital, particularly debtors, creditors, stocks etc

(e) Profits in relation to Capital employed and turnover.

In short the banker is applying the normal management ratios and trands covered within the ranges of profitability, liquidity, and turnover, but his emphasis is not the same as an investor.

With the information he has collected he may then ask some of the following questions:-

(a) What is the nature of the business?

(b) Who owns it, and how big is the proprietor's stake in it?

(c) Who runs it, and with what degree of success?

(d) What is the size of the business in relation to advance sought?

(e) What would the Balance Sheet look like after the bank has loaned money either in overdraft or loan form?

(f) Is the firm stable, well established, of good reputation?

(g) Do profits tend to be distributed or retained?

(h) Are the figures as shown on the Balance Sheet fair?

(i) Really, are the bank facilities the most suitable form of finance?

When all is considered the banker has tended to note very carefully, the three C's - CAPITAL, CHARACTER and COMPETENCE, too often he has seen his clients seeking for FAITH, HOPE and particularly CHARITY - which unfortunately is not his to give?

ACCOUNTING - CASH FLOW

As the year started Mr Jones of Notnuat Widgets Ltd was in fine shape, his company made widgets - just what the customers wanted. He made them for 75p each and sold them for £1. He kept a 30 days stock and invoiced his customers at 30 days net. Sales were right on target and his Sales Manager predicted a steady but not spectacular increase in damand. Old Jones thought that this was his lucky year.

JANUARY 01	Cash £1000	Stock £750	Debtors £1000

During the month he sold 1000 widgets shipped them at a cost of £750, collected his receivables winding up with a tidy profit of £250.

FEBRUARY 01	Cash £1250	Stock £750	Debtors £1000

This month sales jumped just as predicted to 1500, with a corresponding step up of output to maintain the 30 days inventory, he made 2000 units at a cost of £1500, receivables from January were collected, he calculated his profit so far this year at £625.

MARCH 01 Cash £750 Stock £1125 Debtors £1500

March sales were even better, 2000 units, collections were right on time, smashing. Production was adjusted to stock policy - 2500 units, iperating profit for the month £500, profit so far £1125.

APRIL 01 Cash Stock Debtors

In April sales jumped again, another 500 units to 2500, Jones patted his Sales Manager on the back, customers were paying on time, what a wonderful world, production was pushed up to 3000 units, lovely profit to date of £1750. Jones decided to take a little holiday on the French Riviera - he deserved it?

MAY 01 Cash Stock Debtors

May saw the company hit an all time high, sales were 3000 units, five months profits were £2500, production of 3500 units, THEN IT HAPPENED - poor old Jones got a telephone call, his books had caught up with him, the bankers were pushing, questions were being asked . . .

JUNE 01 Cash Stock Debtors

Jones came sadly home, had a look at his accountant's figures, reflected rather sadly, and telephoned his bank manager . . . . . what had happened.

NOTNUAT WIDGETS

CASH

January			
Opening Balance	1,000	Materials	750
Debtors	1,000	Balance	1,250
February			
Opening Balance	1,250	Materials	1,500
Debtors	1,000	Balance	750
March			
Opening Balance	750	Materials	1,875
Debtors	1,500	Balance	375
April			
Opening Balance	375	Materials	2,250
Debtors	2,000	Balance	125
May			
Balance	125	Materials	2,625
Debtors	2,500	Balance	-----

STOCK AT COST

January			
Opening Balance	750	Sales	750
Purchases	750	Balance	750
February			
Opening Balance	750	Sales	1,125
Purchases	1,500	Balance	1,125
March			
Opening Balance	1,125	Sales	1,500
Purchases	1,875	Balance	1,500
April			
Balance	1,500	Sales	1,875
Purchases	2,250	Balance	1,875
May			
Opening Balance	1,875	Sales	2,250
Purchases	2,625	Balance	2,250

TRADE DEBTORS

January			
Opening Balance	1,000	Cash	1,000
Sales	1,000	Balance	1,000

February			
Opening Balance	1,000	Cash	1,000
Sales	1,500	Balance	1,500
March			
Opening Balance	1,500	Cash	1,500
Sales	2,000	Balance	2,000
April			
Opening Balance	2,000	Cash	2,000
Sales	2,500	Balance	2,500
May			
Opening Balance	2,500	Cash	2,500
Sales	3,000	Balance	3,000

CASH FLOW EXERCISE

Standing Charges

1. Rent for yard and premises - £300 p a

   Due quarterly in arrear: 25th March; 24th June; 29th September; 25th December

2. Rates - £200 p a

   Due six monthly in advance: 1st April and 1st October

3. Tax and Insurance for Vehicles - £200 p a

   Due 1st January

4. Telephone - £60 p a

   Due quarterly: 1st January; 1st April; 1st July; 1st October

5. Electricity - £100 p a

   Due quarterly: 1st February; 1st May; 1st August; 1st November

6. Generaly Insurance - £200 p a

   Due 1st January

Regular Monthly Payments

1. PAYE and Graduated Pensions due 19th month

   Deductions - estimated £30 a week

   Employer £5 " "

   £35

2. Vehicle maintenance and petrol - £40 a month, due 31st of following month

Regular Weekly Payments

1. Wages and salaries:-

8 men at £25	£200)	
	) to the job	
2 men at £20	£ 40)	
Driver	£ 17	
Clerk	£ 15	£272

Less deductions:-

PAYE and Graduated Pensions	£ 30	
	£ 10	£ 40
Net wages		£232

NB: Check for overtime and holidays

2. NHI and SET stamps £ 33

3. Proprietors drawings £ 30

4. Miscellaneous £ 25

Payments to Suppliers and Sub-contractors

Payments for materials on receipt of monthly statement; usually on 8th of month for previous month's purchases.

Materials drawn from stock are replaced (see estimate for details).

Sub-contractors paid in week following completion of work.

There are no payments for Capital Expenditure.

Receipts from customers

Usually 4 weeks following rendering account.

Outstanding at 1st January 1968

	£
Invoices for materials	800
Telephone	15
Garage	40
Electricity	25
PAYE and Graduated Pensions (4 weeks)	140

Debtors:

		Retentions	Jobs
		£	£
Due week	1	100	1,000
	2	---	600
	3	---	1,000

4	---	100		
5	---	-----		
6	100	-----		
12	100	-----		

Week Number	Materials	Sub-Contract	Labour		Account Rendered
	£	£	£		£
CONTRACT 'A'					
1	400	---	45		
2	---	---	45		
3	---	---	45		712
	400	---	135		712
CONTRACT 'B'					
1	270	40	50		
2	---	---	50		
3	---	---	50		500
4	200	---	50		
5	---	---	50		
6	---	50	27		600
	470	90	277		1,100
CONTRACT 'C'					
1	120	---	45		
2	175	---	45		
3	---	---	50		
4	100	---	50	x	700
5	200	---	50		
6	---	---	45		
7	210	---	50		
8	---	---	50	x	700
	805	---	385		1,400

x = 5% retention for 6 months

Week Number	Materials	Sub-Contract	Labour		Account Rendered
	£	£	£		£
CONTRACT 'D'					
1	60	---	50		
2	---	---	50		
3	110	---	50		
4	---	---	100	x	500
5	---	---	100		
6	130	---	50		
7	---	---	45		
8	---	---	45	x	500
9	260	---	45		
10	200	---	100		
11	---	---	50	x	850
	760	---	685		1,850
CONTRACT 'E'					
1	200	---	50		
2	---	---	50		
3	200	---	50		
4	---	---	50	x	700
5	300	---	50		
6	---	---	100		
7	300	---	100		
8	---	---	100	x	1,000
9	300	---	50		
10	---	---	50		
11	200	---	50		
12	---	---	50	x	900
	1,500	---	750		2,600

x = 5% retention for 6 months

Week Number	Materials	Labour	Account Rendered
	£	£	£
MINOR JOBS			
6	---	18	30
7	20	45	100
8	20	45	100
9	70	145	320
10	40	90	200
11	70	140	320
12	80	190	410
	300	673	1,480

Week Number	Materials	Sub-Contract	Labour	Account Rendered
CONTRACT 'A'	£	£	£	£
1	400	---	45	
2	---	---	45	
3	---	---	45	712
	400	---	135	712
CONTRACT 'B'				
1	270	40	50	
2	---	---	50	
3	---	---	50	500
4	200	---	50	
5	---	---	50	
6	---	50	27	600
	470	90	277	1,100

Week Number	Materials	Sub-Contract	Labour		Account Rendered
	£	£	£		£
CONTRACT 'C'					
1	120	---	45		
2	175	---	45		
3	---	---	50		
4	100	---	50	x	700
5	200	---	50		
6	---	---	45		
7	210	---	50		
8	---	---	50	x	700
	805	---	385		1,400

x = 5% retention for 6 months

CASH FORECAST	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Receipts/Debtors	1,100	600	1,000	100	NIL	100	1,212	1,805	NIL	630	100	2,290	8,937
Payments: - Materials		800				2,335				1,310			4,445
Sub-contractors		40					50						90
Wages - net	232	232	237	242	242	232	232	232	232	232	232	232	2,809
NHI/SET	33	33	33	33	33	33	33	33	33	33	33	33	396
PAYE and GP			140					175				140	455
Proprietor	30	30	30	30	30	30	30	30	30	30	30	30	360
Rent													NIL
Rates													NIL
Vehicle Tax and Insurance	200												200
Telephone	15												15
Electricity					25								25
General Insurance	200												200
Vehicle Running					40				40				80
Miscellaneous	25	25	25	25	25	25	25	25	25	25	25	25	300

(Continued . . .)

CASH FORECAST	1	2	3	4	5	6	7	8	9	10	11	12	TOTAL
Capital Expenditure													NIL
	735	1,160	465	330	395	2,655	370	495	360	1,630	320	460	9,375
Surplus	365		535				842	1,310				1,830	4,882
Deficiency		560		230	395	2,555			360	1,000	220		5,320
Balance at beginning	600	965	405	940	710	315	-2,240	-1,398	-88	-448	-1,448	-1,668	
Balance at end	965	405	940	710	315	-2,240	-1,398	-88	-448	-1,448	-1,668	162	

WORK SHEET 2

SUMMARY OF PRIME COST AND SALES VALUES

	Materials	Subcontracts	Labour	Sales Value		G/P
				Total		
	£	£	£		£	
Contract A	400	-	135	435	712	177
Contract B	470	90	277	837	1100	263
Contract C	805	-	385	1190	1400	210
Contract D	760	-	685	1445	1850	405
Contract E	1500	-	750	3250	2600	350
Minor Jobs	300	-	673	973	1480	507
TOTAL	4235	90	2905	8230	9142	1912

SUMMARY OF OUTSTANDINGS AT 22/3/68

Debtors

Contract C	£35R £35R	70.00
Contract D	£25R £25R £43R £807 Balance at week No 12	800.00
Contract E	£35R £50R £45R £855 Balance at week No 12	985.00
Minor Jobs	£320 + 200 + 320 + 410 Jobs invoiced	1250.00
TOTAL		£3205.00

PREPAID EXPENSES

Rates	Oct Nov Dec Jan Feb part of March	4.00
General Insurance	$\frac{£200 \times 12 \text{ weeks}}{52}$ = 46 = 200 - 46	154.00
Vehicle Tax and Insurance	$\frac{£200 \times 12 \text{ weeks}}{52}$ = 46 = 200 - 46	154.00
		£312.00

CREDITORS FOR MATERIALS

Contract D	Week No 10	11	12 (4 week payment)	
	200	200		
Contract E	-	-	-	
Minor Jobs	40	70	80	
	£240	£270	£80	£590.00

TRADING AND PROFIT AND LOSS ACCOUNT

Profit Summary for 12 Weeks

	£	£
Sales Value of completed work		9,142
Direct Costs:		
Materials	4,235	
Sub Contracts	90	
Wages	2,905	7,230
Overheads:		
Indirect Wages and Salaries		
Driver	204	
Office	180	
Proprietor	360	
NHI etc	336	
Rent	69	
Rates	46	
Electricity	23	
Telephones	14	
General Insurance	46	
Vehicle Tax and Insurance	46	
Vehicle running expenses	111	
Miscellaneous	300	
Depreciation of Vehicles	92	
Depreciation of Equipment	23	1,850
(64% Direct wages)		9,080
PROFIT		£62

BALANCE SHEETS

	At 31.12.67	At 22.3.68	Change
	£	£	£
Fixed Assets at Cost	3,000	3,000	
Less Depreciation	1,000	1,115	115
(i)	2,000	1,885	(115)
Current Assets:-			
Stocks	300	300	---
Debtors	3,000	3,205	205
Prepaid Expenses:-			
Rates	50	4	(46)
General Insurance	-----	154	154
Vehicle Tax and Insurance	-----	154	154
Cash	600	162	(438)
	3,950	3,979	29
Less: Current Liabilities:-			
Creditors	800	590	(210)
Accrued Expenses:-			
Rent	6	75	69
Electricity	25	23	(2)
Telephone	15	14	(1)
Vehicle Expenses	40	71	31
PAYE and Graduated Pensions	140	105	(35)
	1,026	878	(148)
(ii)			
Net Current Assets	2,924	3,101	177
(i) and (ii) Net Assets Employed	4,924	4,986	62

CASH FLOW FOR 12 WEEKS

1st January to 22nd March 1968

	£
Sources of Cash:	
Profit	62
Depreciation	115
	117
Uses of Cash to finance:-	
Increase in debtors	205
Net increase in prepaid expenses	262
Reduction of Creditors	210
Less net increase	(62)
	615
Excess of uses over sources	(438)
Cash at beginning	600
CASH AT END	162

SESSIONS 16 AND 17

FINANCIAL CONTROL

PART I

Financial controls exist at least in part to remove the problem of cash shortage, but there is no one best way of controlling cash. Where they exist, systems of control vary in their nature and scope. Some small companies show remarkably effective results which can only be accounted for by the ability and business sense of their directorate.

For most small companies, however, the cash shortage problem raises its head all too often.

The heart of cash control lies in the efforts made to earn maximum profits; control of profitability determining the extent of the inflow of funds while cash control, in the narrow sense, determines the degree of liquidity of those funds.

Accounting techniques may be used to tremendous advantage in the direction of a company's resources, but financial success stems only from the adoption of a sound, financial policy - and a financial policy is nothing more or less than facing squarely, and taking stock of, the hard economic facts of business life.

When cash is acutely short the causative factors must be discovered: the immediately apparent are not always the real factors. Very often in periods of cash shortage, firms attempt to find a solution by the adoption of some form of cash budgeting before any attempt has been made to examine critically the whole financial and operating structure

of the organisation.

No budgets will pull a business out of the mire unless the budgets are built on a foundation of sound standards.

Money shortages are not always overcome by cutting back expenditure; in some cases the remedy is to spend more. Cash shortages can arise from a wide variety of causes; some of these are listed below:-

a) Excessive costs as a result of:-

(i) Too high or too low material quality

(ii) Wages being too high from employing a higher or lower skill than required by the circumstances

(iii) Significant idle time either of workers or machines

(iv) A poorly constructed labour incentive scheme or the absence of incentives

(v) Lack of method study

(vi) Failure to plan the flow of production

(vii) Faulty layout of plant and building

(viii) Absence of mechanical handling equipment

(ix) Lack of machines or use of inappropriate machines

(x) Machine breakdown as a result of inadequate maintenance

(xi) Excessive expenditure on maintenance and a failure to modernise

b) (i) Too low a level of sales as a result of uncompetitive prices

(ii) Lack of advertising

(iii) Insufficient or ineffective selling effort

(iv) Bad design or quality of product

(v) Products being outmoded by a change in market requirements

(vi) Poor delivery of products resulting from carrying insufficient stock

c) Full financial structure arising from:-

(i) Insufficient volume of, or excessive fixed costs, in relation to sales

(ii) Insufficient working capital

(iii) Too high a ratio of fixed interest loan capital to other capital

d) Poor organisation arising from:-

(i) Lack of clearly defined policies in relation to production, finance and marketing

(ii) No delegation of authority or unevenly distributed duties, responsibilities and authorities

(iii) Failure to provide the machinery of financial control

(iv) Failure to develop a team spirit as a result of giving insufficient attention to personal aspects

(v) Not providing for management succession

(vi) Failure to retract or retain the right quality of management

This list is far from exhaustive but it will indicate the generality of causes of cash shortages; it is obvious that it is often no easy task to determine in periods of cash shortages which factor or combination of factors have led to that state of affairs. Difficulty in diagnosing the trouble increases as the period over which cash shortages have been experienced lengthen.

If the cause had been a temporary feature arising from the need to replace a medium cost machine, or having to finance increased material stocks, the remedy could be easily applied.

Chronic conditions of cash shortages usually demonstrate that diagnosis cannot easily be made by the management of the concern, and in such situations the assistance of an impartial observer may be required.

The organisation which finds itself in these dire straights can be no better advised than to seek the help of its auditor or the assistance of a management consultant.

The main causes of cash shortage which we are going to look at are:-

1. Inadequate credit management
2. The benefits of value analyses at estimating stage
3. Costing

1. Credit Management

One important loophole which needs tightening up as much as possible is the business of credit management. The day is not so far away, whether we like it or not, where each one of us will be on record somewhere on a central computer and a grade or mark on our record will indicate just what sort of a credit risk we are - are we prompt payers, are we slow but steady, are we unreliable, do we promise to pay next week and then not pay until 6 weeks later, do we need a court summons to make us pay or will a solicitor's letter do.

This certainly exists now for companies and there is no excuse for businessmen not knowing exactly what sort of payers their potential customers are and the ways by which you can find out the credit rating

of your customer are as follows:-

Bankers References

A service which banks offer is to give status references for their customers. A written enquiry to a bank will produce a reply as to whether they consider their customer a good risk for the sum of money you mention.

The disadvantage of the bankers reference is the very formality of banks. The banks will give only the barest information about the subject of your enquiry, i.e. whether or not he is a good risk for the amount of money you state and they discourage the telephone enquiry preferring rather to receive a written enquiry in an effort to discourage the unscrupulous enquirer about their customer.

Personal Contact

Where your customers come from your area, the value of your own local knowledge should not be underestimated; for by making judicious enquiries of local companies and traders with whom you deal and to whom you are known you can very often find out a great deal about your customer.

The value of personal contact cannot be over-emphasised in this context, the frank opinion of a fellow businessman is worth many opinions expressed in writing.

Trade References

Before an account is opened for a customer or before you do any work for a new customer you can ask them for the names and addresses of other companies with whom they have recently dealt and to whom you could refer.

By writing to these companies you should receive a reply which will

inform you whether the prospective customer is a good risk or not. The trouble with written replies, however, is that most people, ourselves included, probably are a little wary of putting anything in writing which might be considered libellous or defamatory so that the written replies tend to be on the cautious side.

The value of personal contact should not be under-rated in this situation and one five-minute telephone call to the referee will be quicker and probably much more informative than a written enquiry - the tone in which the customer is spoken of very often speaks volumes for his credit status with that firm.

Companies House, London

Where the prospective contract warrants it a trip to Companies House in London can be informative, for upon payment of a search fee of 5p or 10p you may inspect the accounts of your prospective customer so that you can make up your own mind as to the state of profitability of the company, the ratio of debtors to creditors, etc.

Credit Status Companies

If a trip to Companies House is out of the question then by using the services of these companies the same end will be achieved.

The largest of these organisations is a non-profit seeking Association owned by its members whose objects are to promote and protect the interests of its members in the credit granting and accounts collection field by the following means:-

(i) The National Credit Register comprising two points:

(a) THE TRADE REGISTER registers all new company registrations,

all charges and mortgages on limited company registrations, all charges and mortgages on limited companies, liquidations, bankruptcies, judgements, unsatisfied or slow paying accounts, newspaper reports, etc - all related to persons in business, to firms or to companies.

(b) THE CONSUMER CREDIT REGISTER - this notes all county court judgements (over £10.00) and all the unsatisfactory information as far as relevant.

More importantly it registers information on both satisfactory and unsatisfactory customers - the information being provided from the practical experience of members. The system is intended not just to eliminate the occurrence of bad or slow accounts but just as usefully by the building up of adequate credit records of positive information to enable the credit-worthy customer to obtain the credit to which his record plainly entitles him.

(ii) Commercial Status Reports

A complete range of status reports upon commercial undertakings, sole traders, partnerships and limited companies - the sort of information given concerns directors' names, capital and a report on their file.

Special arrangements are made to provide service for a number of trade groups like the National Association of Plumbing, Heating and Mechanical Services contractors.

(iii) Debt Collection

Every business has to collect money due with the attendant risks

of upsetting established connections or embarking on costly legal proceedings.

The Association provides an invaluable intermediate stage between personal collection and legal action; it can exert more pressure than the individual member without upsetting personal relationships and keeping open the door to future business where legal action often closes it for good.

The method of recovery is:-

(a) Polite letters

(b) Advice on whether, in the event of the letters failing, the debtor is worth suing

(c) To see through the court procedure as instructed by their member

The cost of these services varies according to what is required - here are some of the standard charges:-

Annual Subscription = £2.10

National Credit Register Search Service

Prepaid postal search forms in books of 25 = £2.75

Prepaid telephone search forms in books of 25 = £4.13

Status Reports

10 enquiry forms prepaid = £16.50

Debt Collection Services

Upon money paid or invoiced value of goods returned (whether through the Association, through solicitors or direct to members)

15% commission on the first £5.00
10% commission on the next £45.00
2½% commission on the balance
PLUS 10% VAT

These charges do not include solicitor's costs or other legal fees whether recoverable from the debtor or not.

Slow Payers

If despite careful checking on credit status slow payers and bad debtors still arise, as they will, then what can be done about this without involving Credit Status Companies?

Firstly, if any part of the delay is caused by a dispute as to work carried out or by non-completion of work on your part, then obviously it is necessary to resolve the dispute by yourself if possible. If this is not possible then perhaps resort to arbitration or litigation, but it is useful to remember that usually the only people to benefit from litigation are the lawyers themselves.

However, assuming that the only reason for slow or non-payment is the reluctance or the inability of the customer to pay then the steps to take are, I suggest, as follows:-

(i) Do not let accounts become badly overdue before starting to chase. As soon as your terms of payment are being exceeded take action

(ii) Compose some standard chasing letters, perhaps two or three. The first could draw the customer's attention to the fact that payment was overdue and that you would expect to receive payment in say 14 days.
The second, to be sent if no reply received to the first, could be rather stronger and say that if payment is not received within 7 days further action will be taken.
These letters will probably have the desired effect upon most of the problem payers leaving you with only the hard

core of bad payers.

(iii) When this stage is reached it is probably worth making a personal call on the customer; this will sometimes have the effect of producing the outstanding money particularly if a firm, unemotional attitude is maintained.

If none of the foregoing produces a result then a more legalistic approach has to be taken.

(iv) Solicitors letters

A solicitor's letter will often have the effect of persuading the customer to pay up, because of the belief that this is one step away from being taken to court, and the cost of such a letter is often rewarded by settlement of the outstanding account for this intervention by a third party, an outsider, is taken as a sign that you mean business and that their reputation might begin to suffer in their local business community.

(v) County Court

Many people do not realise that court procedure has now been simplified so that ordinary people and businessmen can bring small claims before the courts without any legal knowledge or professional assistance.

The courts which deal with claims like this are the County Courts and these courts have offices where you can make enquiries and issue a summons at the counter.

The sort of claims which fall into this category include:-

Claims for payments of debts, whether for goods sold, work done or money lent

Claims arising out of the sale of goods, including the repair of damaged goods, failure to supply goods ordered or supplying the wrong article or a defective one

Claims for damages caused by negligence, such as a claim arising out of a road accident.

The county court can deal with claims of up to £750.00; for claims involving not more than £75.00 solicitors' fees will not be allowed in most circumstances unless the case was very complicated; for claims over £75.00 legal costs may be allowed.

However, should you decide to go ahead the steps to be taken for recovery of a debt are as follows:-

Courts are sometimes reluctant to award costs unless the aggrieved person has been given an opportunity to reach an amicable settlement so it is therefore important to set about the matter in the right way from the start.

a) Write a letter, and keep a copy, setting out the facts and asking for settlement. Allow a week or so for a reply but if your letter is ignored -

b) Write a second letter, and keep a copy, threatening legal action.

If this letter is ignored you would now be justified in starting an action.

c) Particulars of claim:

When you start an action you must supply the court with written particulars of what you are claiming

d) The request:

A form of request to start an action can be obtained from any county court office and the court staff will help you to complete it. The court needs the information in the form of a request in order to prepare the summons.

e) The Plaint Note:

The court will now prepare the summons for service and you will be given a plaint note which is a receipt for the court fee (approx £5.00) and the court reference number of the action.

f) The Summons:

This will be issued by the court and served by the bailiff.

g) The Pre-Trial Review:

This is a discussion between an official of the court and the parties concerned as to how the action is to be dealt with. This review sometimes results in the matter being dealt with there and then.

h) Attendance at Court:

You will probably have to give evidence but again the court officials will be helpful and generally unofficious.

A useful booklet on this subject is "Small Claims in the County Court" published by Her Majesty's Stationery Office and issued by the Lord Chancellor's Office.

To sum up on credit control, what bad payers tend to rely on is the reluctance of many companies to be seen to chase for money in case -

(a) They lose their customer

(b) They are seen to demean themselves by chasing for money.

Customers should not be allowed to add to their balances beyond the normal terms of credit which it may be determined from time to time is sufficient to enable the business to attract custom and which in normal circumstances will be in accordance with the usual terms of credit existing in the industry.

The prime purpose of a company is to produce and sell at a profit, not benevolently to provide funds for the direct financing of customers' businesses by extended credit or the indirect financing of other businesses through the intermediancy services of the bank.

PART II

"An estimate is an opinion, price is a policy, and cost is a fact".

Financial control is something which all too often is only applied in retrospect by management when its usefulness can be increased two or threefold by its use in ascertaining costs on current projects and to provide guidelines for future projects.

Financial control can be said to be in part the application of costing and cost accounting principles, methods and techniques to the science, art and practice of cost control and the ascertainment of profitability. It includes the presentation of information derived from it for the purpose of managerial decision making.

Costing enables a business not only to find out what various jobs have cost but also what they should have cost; it indicates where losses and waste are occurring before the work is finished, therefore, immediate action may be taken, if possible, to avoid such loss or waste.

Business policy may require the consideration of the use of alternative methods and procedures and this is facilitated by cost information correctly presented, e.g. with the aid of cost reports management can decide whether the undertaking of certain types of work increases overhead expenditure disproportionately; whether your plant and machinery could be used more advantageously by concentrating on particular types of contract.

Probably the greatest scope for increasing efficiency and cutting costs is when a tender is being built up - can unnecessary parts or features

be eliminated; can cheaper but equally suitable materials be used - this is where costing can help the estimator at the pricing stage.

(a) VALUE ANALYSIS

A useful technique which has crossed the Atlantic to this country is Value analysis which questions the use of particular items and components in the following way:

(a) Does its use contribute value?

(b) Is its cost proportionate to its usefulness?

(c) Does it need all of its features?

(d) Is there anything better?

(e) Can it be made by a better method?

(f) Can a standard item replace it?

(g) Will another supplier make it for less?

(h) Is anyone buying it for less?

(b) COSTING IN THE CURRENT ECONOMIC CLIMATE

When business is good, many contractors are able to show a profit notwithstanding the leakages which pass unchecked, but in periods of trade competition when the economic climate is cold any inefficiencies which had hitherto been concealed or unnoticed have to be tracked down and rigorous controls must be exercised to ensure even modest margins of profit.

Failure to maintain normal output results in overhead expenses not being recovered in full (particularly fixed overheads) but an efficient costing system can show where economies may be sought, waste eliminated and efficiency increased. Some of the loss caused by reduced turnover and falling prices may be avoided.

On top of this, once a contractor knows what his fixed costs are, he can, when tendering, fix the lowest price which will enable him to get his share of the reduced market.

Assuming, then, that the desirability of a costing scheme is acknowledged, let us now look at the general principles to be observed when a costing scheme is being considered.

1. Don't try and change the business to suit the costing system rather adapt the costing system to your general way of organisation.
2. The staff both productive and non-productive should be consulted as far as possible and their assistance and support obtained.
3. The minimum amount of detail in which records are to be compiled should be arranged. Complete analyses are preferable but basically the system has to be tailored according to what you are able to give it. So avoid over-elaboration and undue clerical work.
4. The records to be made by foreman and operatives should involve as little clerical work as possible. Provide printed forms if possible.
5. Arrange to obtain the necessary figures at regular intervals, i.e. monthly or weekly.

Analysis and classification of cost

Before we can begin to obtain the data required for cost control it is necessary to analyse and classify costs as follows:

Direct materials is the material which can be measured and charged directly to the cost of the contract.

Direct labour is all the labour expended in altering the construction, composition, conformation or condition of the product.

Direct expenses includes any expenditure other than direct material or direct labour incurred on a contract, e.g. hire of special or single purpose tools, or plant on a contract.

The three items above make up the Prime Cost and all expenses over and

above Prime Cost are:-

Overhead which is those expenses incurred in connection with the general organisation of the whole or part of the undertaking, including the maintenance of capital assets.

Indirect material is that material which cannot be traced as part of the product, e.g. lubricants, cotton waste.

Indirect labour delivery drivers, non-productive time, storekeepers etc.

There are two main groupings of costing methods:

(a) job or contract costing

(b) unit or process costing

The method most commonly used in the building industry is contract costing.

The procedure for contract costing is as follows:

Materials

Stores material

From your stores on a requisition form which can double as a material received sheet for the site.

In larger companies a summary can be made of stores requisitions on, say, a monthly basis with a material issue analysis so that all material issued can be debited to the appropriate cost account.

Direct material

Where materials are bought in for the job they are debited to the contract cost account.

Cost of labour

The cost of labour is usually taken from the operatives' time sheets and transferred to a wages analysis sheet itemised under each job number.

Sub-contracts

When a sub-contractor is engaged for a special job the accounts received are dealt with as direct materials even though the cost may consist largely of labour.

Jobbing work

Any extra work picked up on a contract for which payment is received is treated as income to the contract.

Certification of work done

These amounts are credited to the contract.

Profit on uncompleted contracts

In view of the hazards involved in contract work like finding a spring of water in the middle of a site and in view of the liability to make good any defects in the work which might develop in the retention period it is a generally accepted principle that no profit should be taken from uncompleted contracts, except in case of very long contracts when a conservative sum may be credited.

The formula used is $\frac{2}{3}$ x notional profit x $\frac{\text{cash received}}{\text{work certified}}$

In order to illustrate the way in which contract cost accounts may be kept, look at the following example.

Short and Co. are in business as builders and decorators and they undertake small contracts and jobs for local residents most of which are below £100.00 in value. They employ bricklayers, joiners, painters, and paperhangers. In the three months ending 31st March the results of their business are as follows:

Materials	£
In store 1st January	860.00
Purchases	
January	710.00
February	760.00
March	970.00
Issues to contracts	
January	410.00
February	270.00
March	350.00
Issues to jobbing account	
January	300.00
February	520.00
March	460.00
Issued to joiners shop	
March	300.00
Wages	
Gross wages paid	
January	1590.00
February	1630.00
March	1720.00
Allocated direct to contracts	2460.00
Apportioned to:	
Joiners' shop	1070.00
Jobbing account (joinery)	790.00
Overhead	
Rent and rates	900.00
Haulage	300.00
Office expenses	600.00
Lighting and heating	125.00
Repairs	170.00
Depreciation	235.00
Overhead applied as follows:	
to contracts	2049.00
to joiners shop	375.00
to jobbing account	520.00

Work done on contracts completed	£
To 31st March	8160.00

N.B. A loss of £130.00 was sustained on one contract.

Work in progress

On contracts	
1st January	1200.00
31st March	1400.00
On jobbing accounts	
1st January	200.00
31st March	300.00
In joiners' shop	
1st January	-
31st March	145.00
Jobbing sales for quarter	4140.00

Work done in the Joiners shop

Charged to:	
Contracts	600.00
Jobbing	1000.00

We are showing only the main contract accounts in the ledger, for this type of work individual contract accounts are kept only on a card index, subsidiary to the book-keeping system.

STORES ACCOUNT

Balance b/f	860.00	Issues	410.00
Purchases	710.00		300.00
	760.00		270.00
	970.00		520.00
			350.00
			460.00
			300.00
		Balance	690.00
	3300.00		3300.00
Balance	690.00		

WAGES ACCOUNT

Gross wages	1590.00	Contracts	2460.00
	1630.00	Joiners	1070.00
	1720.00	Jobbing	790.00
		Overhead	620.00
	4940.00		4940.00

WORK IN PROGRESS - CONTRACTS

Balance b/f	1200.00	Completed work	8160.00
Stores	410.00	Loss on contract	130.00
	270.00	Balance c/d	1400.00
	350.00		
Wages	2460.00		
Overhead	2049.00		
Joiners	600.00		
Profit to date	2351.00		
	9690.00		9690.00

JOINERS SHOP ACCOUNT

Wages	1070.00	Contracts	600.00
Stores	300.00	Jobbing	1000.00
Overhead	375.00	Balance c/d	145.00
	1745.00		1745.00
Balance b/d	145.00		

JOBBING ACCOUNT

Balance b/f	200.00	Sales	4140.00
Stores	300.00	Balance c/d	300.00
	520.00		
	460.00		
Wages - Joiners	790.00		
Work done in Joiners Shop	1000.00		
Overhead	520.00		
Profit	650.00		
	4440.00		4440.00

OVERHEAD ACCOUNT

Wages	620.00	Applied overhead a/c	2950.00
Rent and rates	900.00		
Haulage	300.00		
Expenses	600.00		
Heating	125.00		
Repairs	170.00		
Depreciation	235.00		
	2950.00		2950.00

APPLIED OVERHEAD ACCOUNT

Transfer to overhead a/c	2950.00	Contracts	2049.00
		Joiners Shop	375.00
		Jobbing a/c	520.00
		Balance, overhead under absorbed to P & L a/c	6.00
	2950.00		2950.00

CONTRACT SUMMARY ACCOUNT

Loss on contract	130.00	Profit on contracts	2351.00
Balance to P & L a/c	2221.00		
	2351.00		2351.00

PROFIT AND LOSS ACCOUNT

Under absorbed overheads	6.00	Contracts	2221.00
Net profit	2865.00	Jobbing	650.00
	2871.00		2871.00

The Beeches Construction Co. is engaged on two contracts during the year. The following information relates to these contracts, which were commenced on 1st January and 1st July respectively.

	J	D
Contract Price	300,000	400,000
Direct materials issued	55,000	40,000
Materials returned to store	500	1,000
Direct labour payments	48,000	32,000
Accrued wages 31st December	2,000	2,500
Plant installed at cost	30,000	45,000
Establishment charges	25,000	15,000
Direct expenses	15,000	10,000
Direct expenses accrued 31st December	1,000	500
Work certified by architect	160,000	80,000
Cost of work not yet certified	10,000	15,000
Value of plant 31st December	20,000	40,000
Materials on site 31st December	4,500	4,000
Cash received from contractors	150,000	60,000

CONTRACT D

Direct materials	40,000		Materials on site		4,000
less returns	1,000	39,000	Cost c/d		100,000
Direct wages	32,000				
Accrued	2,500	34,500			
Establishment charges		15,000			
Direct expenses	10,000				
Accrued	500	10,500			
Plant depreciation		5,000			
		104,000			104,000
Cost b/d		100,000	Value of work certified		80,000
			Cost of work not yet certified		15,000
			Loss on contract		5,000
		100,000			100,000
Balance b/d			Balance b/d		
Stores	4,000		Wages	2,500	
Work not yet certified	15,000	19,000	Expenses	500	3,000

EMPLOYER

Value of work certified	80,000	Costs	60,000
		Balance c/d	20,000
	80,000		80,000

EXTRACT FROM THE BALANCE SHEET

Profit and loss A/c			Plant at cost	7,500	
Contract J Profit	12,500		Depreciation	15,000	60,000
Contract D Loss	5,000	7,500	Stores		9,500
Sundry Creditors			Work in progress		47,500
Wages accrued	4,500				
Expenses accrued	1,500	6,000			

Work in progress calculated as follows:

J. Costal work not yet certified		10,000	
Employers balance		10,000	
		20,000	
Less profits provision		7,500	12,500

D.	Costal work not yet certified		15,000		
	Employers balance		20,000		
			35,000		
	Less profit provision		-	35,000	47,500

Calculation of profit = $\frac{2}{3}$ x notional profit x $\frac{\text{cash received}}{\text{value of work certified}}$

= $\frac{2}{3}$ x 20,000 x $\frac{150,000}{160,000}$

Alternatively

J.	Cost incurred	150,000		
	Profit taken	12,500		
		162,500		
	Less cash received	150,000	12,500	
D.	Cost incurred	100,000		
	Profit taken (loss)	- 5,000		
		95,000		
	Less cash received	60,000	35,000	47,500

S E S S I O N 1 8

MARKETING

As can be seen from the Flow Process Diagram a contractor has to look to the market to see what work is available and to decide on what his organisation is suited for, taking into account his resources and geographical location. It is therefore necessary for him to examine the market in detail to see where he is going to go. The term 'Marketing' can be very ambiguous and covers a wide spectrum. Many people have tried to define marketing and the following are some of the definitions given:-

1. The sole aim of production is consumption (Adam Smith)
2. Marketing spans and integrates the whole chain of events between the factory and the consumer/customers (J Redfern)
3. Selling focuses on the needs of the sellers; marketing on the needs of the buyer. Selling is pre-occupied with the seller's need to turn the product into cash; marketing with the idea of satisfying the needs of the customer by means of the product and the whole cluster of things associated with creating, delivering and finally consuming it. (T Levitt)
4. Marketing is a way of managing a business so that each critical business decision is made with the full and prior knowledge of the impact of that decision on the customers (Charles Thomas)
5. (a) The sales process involves a drive for volume. The marketing process involves a drive for profit
   (b) The sales process ends with the customer. The marketing process begins and ends with the customer.
   (c) Sales: customers exist for the business. Marketing: business exists for the customer.

6. Marketing is the management function which organises and directs all those business activities involved in assessing and converting purchasing power into effecting demand for a specific product or service, and in moving the product or service to the final consumer or user so as to achieve the profit target or other objectives set by a company (Institute of Marketing)

Marketing is NOT:

1. A collection of activities or a re-allocation of responsibilities or the reconstruction of personal empires.
2. New. It merely gets back to pre-industrial revolution, pre-mass production, pre-divorce of workman from customer.
3. For big companies only.

MARKETING MANAGEMENT

Marketing Management can be defined as the planning, operating and controlling of the entire marketing activity of a firm. This includes the formulation of marketing objectives, policies, programmes and strategy. It can embrace organisation and staffing to implement strategy in the areas of selling, product planning, market research and promotional activity.

Such a definition restates the principal elements of management, but relates them specifically to the particular activity of marketing. What then do we mean by marketing activity. There is one very popular misconception about marketing - it is that marketing is the same as selling. This statement needs to be looked at and discussed.

Is Marketing Selling?

It has often been said that there is no difference between marketing and selling, and that marketing is merely a modern catchword for the selling operation. There is however a fundamental difference between the two:-

Selling: is concerned with methods and strategies to persuade the consumer to exchange money for what the seller has to dispose of. In hard sell situations the salesman is doing little more than separate the consumer from his spare cash. Selling is concerned with the need to the seller to convert his product into money.

Marketing: on the other hand, has a more sophisticated aim of trying to provide what the consumer will want. Furthermore this may mean offering a product or service which the consumer did not even realise he wanted or needed.

Marketing then goes beyond selling, for it is concerned with satisfying not only the needs and wants of the consumer through the product itself but also the value satisfactions which can be associated with making, delivery, and final use of the product. Hence marketing not only provides the product or service, but also answers such questions as:-

- In what form is it available to the customer? Is it large or small, plain or coloured?
- How is it made available? Design and construction package etc.
- When is it available? Period for completion, seasonal work.
- On what terms is it available? Is it cash or credit or are deposits required?

From a marketing viewpoint, the answers to such questions are determined more by the customer than the contractor. Marketing is then much broader than selling: it concentrates on the needs of the buyer, while selling concentrates on the needs of the seller. Marketing is concerned then with the consumer, and must therefore understand his nature and his behaviour.

- Who is a potential customer?
- Where does he live?
- What does he need or desire?

- What is his income and spending pattern?
- How does he make his buying decisions?
- How will he react to different prices, promotions, selling techniques or various combinations of these?

This concentration on the consumer is the essence of what has become known as the 'marketing concept'.

The Marketing Concept

In industry the emphasis has always been on production. The way machines are designed and labour organised has been directed towards increasing production efficiency. Only in comparatively recent times have companies begun to consider consumption as well as production and to ask themselves: 'Why should people buy our service product rather than a competitor's'. Britain has tended to lag behind the United States in the recognition of the importance of the consumer. In the years following the War, with the Empire to some extent still intact, there was a captive market. Competition was limited.

Manufacturers were able to dispose of their goods with little difficulty although the products themselves were often not tailored to the needs of the consumer. In the United States internal competition between sellers was much keener and production less limited by the aftermath of War. This showed the way to industrialists to recognise the consumer much earlier.

Indeed the Marketing Concept was described as 'a way of managing a business so that each critical business decision whether made by the marketing people, engineering people, manufacturing people, financial people, or people in any other activity of business is made with the full prior knowledge of the impact of that decision on the consumer'. It is then a commercial way of life, the customer being the main justification for the company's existence. The marketing concept maintains that a company's objective should be to seek and satisfy the customer's wants at a reasonable profit.

The demand or the market for a range of products shows how much consumers will buy at different prices. The market is a structure affected by changes in population, culture, technology and business. Particularly changes in income levels, education, and the increase in leisure time. Innovations to meet such changes may stimulate growth in the market. These figures from Neilsen research in 1965 serve to illustrate this point for the manufacturers of consumer goods.

Over a period of four years:

Product groups without really successful new and improved units + 19.5%

Product groups with dynamic new and improved units + 35%

Failure to recognise this aspect of marketing has been referred to as marketing myopia.

Marketing Myopia

This is a phrase used to describe companies' failure to recognise the breadth of their market and its changing structure. Such a company defines its business too narrowly for the possible following reasons:-

- it thinks expansion depands on an increase of population
- it thinks that its current product is infallible
- it puts too great an emphasis on the cost efficiency of mass production
- it is pre-occupied with products which can be scientifically analysed and controlled (Theodore Levitt).

Companies need to make their spheres of influence broad enough to assure continuing growth and to forestall competition. This involves looking beyond directly competitive units to alternative or substitute units in apparently unrelated fields. Oil companies are not merely in the oil world, they are in the fuel or energy business. The Cunard Steamship Company is in the recreational and holiday business rather

than trans-ocean transportation. More ships are cruising than following regular routes. Competition used to come from trans-Atlantic aviation, now it comes from other Travel Companies.

Marketing Concept Limitations

The recognition of client needs and the organisation of business to satisfy them could cover everything the company does. But although the customer demand is very important, it is not necessary to adopt a strategy which is dominated by the client.

The Board Principal is responsible for selecting a corporate strategy which best meets the aims and policy of the business, taking into account future resources and future market needs.

The company's resources include:-

- marketing ability, distribution and sales channels
- production ability
- research ability, 'being able to offer something new'
- financial resources, or money-raising ability.

Once the corporate objectives have been set, marketing must select a strategy to achieve them. Within that strategy they can formulate marketing in terms of sales forecasts, market shares, operating costings, etc.

Company Policy and Objectives

Set Marketing Objectives

Analyse the Situation

Forecast the Environment

Develop Marketing Strategy

Management Review - Approval/Rejection

Formulate Derived Plans - Carry Out

Develop Control System - Control

Marketing strategies will differ. They will be determined by an individual assessment of the state of a market, its future growth and its likely reaction to marketing stimuli. This choice is assisted by good marketing research, but the interpretation and decison is largely subjective. The choice must fit the Company's resources. The sale force must be able to implement the plan. There must be enough finance for the promotional activity necessary etc.

Possible marketing strategies can be classified as follows:-

Product Innovation - improve and modify existing products and develop new products to ensure growth.

Geographical Expansion - go beyond existing markets into new regions.

New Distribution Channels - seek new outlets in addition to established channels.

Concentration - consolidate and apply the effort to specific targets.

Market Segmentation - break down markets in terms of groups of consumer needs.

Once the Board has decided upon its strategy, the Chief Executive is responsible for implementing it. Senior management will develop long range plans which fit the strategy, and then develop short term plans or budgets which amplify the first years of the long range plans. The Marketing Director thus has a number of responsibilities. He must:-

- provide the Chief Executive and the Board with his estimates of the future environment, and the present and future marketing resources.
- draw up long range marketing plans
- set up short term marketing plans and the associated budgets
- operate the day to day marketing function, operational marketing.

Operational marketing normally includes marketing research, forecasting, product planning, promotional activity and selling. The Marketing Mix uses these elements as variable and interchangeable. In this sense Marketing produces sales as production produces products, thereby being a functional activity in its own right.

Definition of Marketing

Marketing obviously can be defined in a number of different ways. The American Marketing Association's definition is probably the simplest universal one:-

"The performance of business activities that direct the flow of good and services from producer to consumer or user."

The marketing director has three main tasks:-

1. To formulate marketing strategies and plans.
2. To integrate all the specialist elements in the marketing department producing the 'marketing mix'.
3. To co-ordinate effort with other departments in the company, particularly production.

Marketing Strategy

In a large company it is the Board's responsibility to determine corporate policy and to set corporate objectives. Marketing management must see that what is being planned is in line with marketing requirements.

Increase the type and area of work: two houses in a category may bring more sales than one, especially in an expanding market.

Slogan extensions: use of an established slogan name to expand a market, ie:-

Merger and Take Over: it is difficult to establish new products and it may be cheaper to buy a company with the required market share.

SESSION 19 AND 20

SITE OFFICE ORGANISATION

It has been said by reputable people in government that our industry is one of paradox. Its output includes about half of the fixed capital investment made in the country, it constructs vast building and civil engineering projects, it employs more male labour than any other single industry, yet no other major industry is more fragmented or diverse in its structure.

The whole range of management techniques employed in our industry have been critically appraised and the problems clarified. The blame has been laid, to a large extent, on the way in which in our industry, many of the large firms have developed gradually from small enterprises and expanding capacity and more sophisticated techniques have not been matched by similar developments on the managerial side.

It is when we pay particular attention to the actual building process taking place on site that it is possible to see the full extent of the complexities of the industry.

There is no other place of production which can be likened to a building site, firstly the site itself can present a special problem but, most importantly, a complicated series of operations needs to be joined with a flow of materials and labour where direct control is not vested in one single management but in many autonomous firms. I am thinking now of the main contractor and the many sub contracting firms - each self-governing.

The very nature of the construction process implies a sporadic and casual relationship between all involved and this does not make it easy to implement a stable system of industrial relations, which will prevent conditions on site becoming likened to a 'jungle'.

In a stable industry fringe benefits can assist to keep the workers 'happy' (although to my mind the presumption that 'a happy worker is an efficient worker' bears little relation to reality, building operatives go to work to earn money to use to persue happiness in other directions of their own choice). Though quite clearly fringe benefits will not replace monetary earnings as the major deciding factor the operative considers in his employment.

This in our industry has an even greater significance because the casual nature of employment suffered by building workers makes it difficult for even the most progressive employers to provide amenities comparable to those in factory work. How can they even guarantee continuity of employment when, due to the vagaries of the tendering system and the economic climate, they themselves have no such guarantee?

However carefully the professional and managerial members of the building team organise the contract, its ultimate success depends on the operatives. By this I mean the craftsmen, semi-skilled workers, labourers, and their foremen, who comprise the great majority of the men employed in the construction industry, and it is essential that every member of staff should have a specific job to do so that they avoid doing each other's work yet do not leave anything undone.

To turn now from generalisation of organisation and managerial problems to the specific:-

THE WORKING ENVIRONMENT

Before considering organisation, three questions should be asked about the office and the site as a work place:-

(i) Does it comply with the Statutory Requirements?

You must be able to answer this positively. Offences under the Offices, Shops and Railway Premises Act 1963 can carry a fine of up to £100, or up to three months' imprisonment.

(ii) Is the Office a convenient and comfortable place to work in? This is not only a question of the well-being of yourselves and your office staff. Studies have shown that people work far more willingly and effectively in an acceptable environment. Providing well-designed equipment will result in more than the obvious benefits, as work will suffer generally if staff feel that they are operating within an inconvenient and inefficient system.

(iii) The working environment on site

Administrative buildings should be convenient for clerical work, visitors, etc, and have a good lighting and heating. Buildings required by the welfare code, messrooms etc, should be carefully sited and properly maintained.

ORGANISATION (JOB AND OFFICE)

Organisation is the framework within which the business operates to achieve a profit and to follow the policy laid down by the Management, which could mean you as Principal, and it is this aspect of Personality in Organisation, i.e. the intense personal interest of the proprietors, in which a danger arises, which is that the strong business will be one in which, while inspired by personal tradition, there are also features which make it a good business to work for and one's boss a good man to work with.

Communication has already been shown to be the prime factor in the smooth running of a business, and the permanent form is the principal method of linking site with office.

Before any system of paperwork is adopted it must be examined from the following viewpoints:-

(i) Is it the minimum possible?

(ii) Does it fulfil a need?

(iii) Has any line of communication been omitted or can any be reduced or omitted with safety?

(iv) Is the work on the site reconciled with the needs of the office? The last is possibly the one least considered. Many managements lose sight of the simple fact that the production is carried out on the job, and paper-work must assist, not hinder. If a system is shown in practice to be unwieldy or unworkable then change it, or scrap it entirely.

Cost Control

The basis for a method for handling small jobs not taking longer than, say, a week is quite simply to place as much responsibility as possible, for the recording of work, in the hands of the Manager.

Workmen are not clerks, and it is unfair and often costly to attempt to change them, or expect accurate allocation of times, or neat and erudite descriptions of their activities.

Field surveys carried out by the CITB into the operating methods of small firms, make it clear that most jobs are visited once a day by the principal and these occasions could be used to note down what extra work has been done, and how much time spent. Whether a time sheet is necessarh in addition depends upon the type of work carried out. For example, if a man is on a small job for part of the week and then on a larger job for the remainder, then an overall picture of his movements is required. However, if it is feld that a check of the man's honesty on time keeping is the object, a time sheet will not provide the answer.

Course members will form into syndicates, appoint a Chairman and examine one set of forms (forms supplied by Course Members) to see if they provide the business information required by their design guided by the Questionnaire. The Chairman will report the findings of his group to the Course.

QUESTIONNAIRE 1

PURPOSE	What is achieved?	Is it necessary? Why?	What else could be done?	What should be done?
PLACE	Where is it done?	Why there? ADVANTAGES DISADVANTAGES	Where else could it be done? ADVANTAGES DISADVANTAGES	Where should it be done?

QUESTIONNAIRE 2

	When is it done?	Why then?	When else could it be done?	When should it?
SEQUENCE	AFTER BEFORE	ADVANTAGES DISADVANTAGES	ADVANTAGES DISADVANTAGES	
PERSON	Who does it?	Why that person? ADVANTAGES DISADVANTAGES	Who else could do it? ADVANTAGES DISADVANTAGES	Who should?

QUESTIONNAIRE 3

	How is it done?	Why that way?	How else could it be done?	How should it be done?
MEANS		ADVANTAGES	ADVANTAGES	
		DISADVANTAGES	DISADVANTAGES	

The most suitable alternatives

Possible improvements: Elimination of an activity by a person

Change of activity location reducing transportation

Combination of activities

Change of sequence

Separation or redistribution of activities

Simplification

SESSIONS 21, 22 AND 23

PLANNING

The overall picture

Planning aims to lay down the direction in which a move is made forward, taking into account the resources that are available. Nothing can result without a plan as in any form of production persons and activities will go their own way.

Any plan produced can only be a forecast of what is likely to happen, but by the use and collection of all relevant data and its critical examination, this forecast becomes much more a calculated one, with a high degree of accuracy and foresight of problems and possible delays.

To venture in a strange land without a map is unthinkable, particularly if one wishes to arrive at a particular destination within a set time. To embark on any production process without a plan is equally stupid, and, as money is involved, is rather like throwing it away. Any plan, in addition to being a forecast, is also a control document enabling one to establish an exact position relative to time and, therefore, costs.

Planning is a thinking process. This is followed by programming.

Programming is a doing process, and involves communicating one's plan of campaign to others. Many good plans are frustrated in their action by a failure in communication. Many forms of communication are available and the choice will depend upon the company and the job circumstances in question. For this reason, planning used in the construction industry is varied and considerable, and I hope to outline the main methods used in the order in which they are generally met.

Policy Planning

As organisation is a living thing, in order to survive a company must look ahead to the future, to assess trends, markets and finance; this is generally the task of top management, the principal, the board of directors or in some cases a committee. This activity is formed policy planning and in most cases the success of a company will depend a great deal on its correct assessment. The policy of a company will generally cover the following topics:

(a) The objective of the business; what will the company do?

(b) Financial structure, e.g. give within specific limits the total working capital of the company and what returns are expected in profit of this capital.

(c) Time scale: Policy should be examined at regular intervals, to ensure that the forecast is going ahead as planned.

(d) The overall activities of the business; e.g. to be general contractors, to produce joinery, to take on property repairs within ten miles of the base.

(e) Purchases: A builder, being basically an investor in plant and materials, must lay down a strict policy on the purchasing of such items as plant, formwork, equipment, with reference to hire or buy as required.

(f) Organisation: The general set-up of the business, with the allocation of responsibility at the same time as stating the personnel policy, an outline of such items as training, promotions, pension schemes and the like. Great thought must be given here to keep overheads down to a minimum yet to remain efficient.

Pre-tender planning

As much of a builder's work is obtained through the process of tendering his estimates have to be competitive, and a good percentage of them successful. It therefore follows that, in the preparation of an estimate, for work, all the facts that it is possible to gather together should be collected and critically examined for this object to be achieved. Everyone's help should be sought in the various departments of the business to make sure that the risk of inaccurate decisions is reduced.

The procedure for pre-tender planning needs to be planned so that a systematic approach can be made to ensure that all information and facts are gathered on time. A typical example of this procedure is as follows:

1. The pre-tender report (Site investigation)
2. Method statement
3. Plant schedule
4. Site organisation structure and site on costs
5. Subcontracts and suppliers
6. Outline programme
7. Final estimate (board decision)

Pre-tender Report

A document compiled to show in as comprehensive a form as possible all information regarding the area and general site conditions. The completion of this report should be carried out with care to ensure that all the facts are reported and that nothing is overlooked (See Fig. 1).

Method Statement

This indicates how the project is to be built, what plant is to be used

etc. Each stage of the operation is studied to find the best way of completing it, carefully weighing the various alternative methods that could be adopted. Consideration has to be given as to whether we require the cheapest or fastest method, very often not one and the same, for it may be expedient to spend a little extra at one stage to finish early so that other operations may be started. It is therefore necessary to have the operations in rough sequence before the method statement is started. (See Fig. 2).

Plant Schedule

This is carried out on the completion of the method statement and is a detailed summary of all the plant and equipment required to build the project giving as much relevant detail as possible. (See Fig. 3).

Site Organisation and On-Costs

These are the site overheads that will have to be charged to the project. Such items as administrative staff, roads, hoardings, power, water and telephone.

In order that these may be assessed accurately it may be necessary to prepare a typical organisation chart for staffing (See Fig. 4 and 4a). Such items as site roads, temporary works, etc., will be calculated from the site organisation studies, layout and method studies of the project.

Sub-Contractors and Suppliers

On most projects today sub-contractors are to be found. It is of great importance in the pre-tender stage that a full list of required sub-contractors and suppliers is drawn up. It will then become necessary to send out an enquiry form (See Fig. 5), not only to obtain quotations

but also to ascertain whether or not subcontractors can be available on dates required and can complete the work in whatever time has been roughly allocated on the pre-tender programme. More detailed questionnaires are generally sent out to select subcontractors if the tender is successful.

For the purpose of obtaining more definite information for producing the master programme.

Enquiries must be sent out to suppliers in much the same manner as subcontractors but with more consideration as to delivery dates, manufacturing periods and prices. Care at this stage must be taken to ensure that supplies can be maintained regarding quantity and quality.

Pre-tender programme

This is an outline plan produced from estimated information. It is not detailed but outlines the main operations and subcontractors' work. The programme will enable all parties concerned in the pre-tender preparation to co-ordinate their activities and to assess times required for plant, use of site huts and supervisor's duration on site. (A typical pre-tender programme is shown in Fig. 6).

Estimate

The link between planning and pricing has already been clearly illustrated in that neither are operations which are carried out in isolation. With all the information referred to above, it is now possible to estimate realistically the correct rates and total cost of the project.

On final completion of the estimate and agreement by the principals of a tender figure, a contract figure is reached.

The estimate was successful, and the contract awarded on that basis.

From this point onwards the activities of Pre-contract planning commence. These normally take place during the short period between the signing of the documents and possession of the site. The actual period of time available for these jobs will depend upon the size and nature of the contract.

Meetings are often the order of the day during the period; meetings between architect, client and builder, between planning departments and others within the organisation, and so on. The senior site supervisor will be concerned with most of them for he is the one who will have to deal with all parties and problems on site. If he can get to grips with things before work gets under way, many of these problems may never arise.

The advantage of sound pre-tender planning will now reap rewards in so far as a sound foundation of information has been laid from which the more detailed and careful analysis of data and planning required can be ascertained.

Major items dealt with at this stage would include:

(1) Site layout and general organisation

(2) Labour and plant requirements finalised

(3) Contract programme prepared.

The use of a contract check sheet so that the possibility of items being forgotten is advantageous. A possible layout of such a document showing the many aspects of procedure that must be dealt with is illustrated in Fig. 7.

CONTRACT PROGRAMME

An essential detail of any project is to ensure completion within the time specified. The more complex the job, the more difficult this becomes as there are so many things that can go wrong. To help prevent problems arising in the form of delays and general co-ordination, a master plan is prepared to show all concerned with the project what should happen, when it should happen, and by whom it should happen, and by whom it is carried out.

This master plan can be prepared by the use of several forms of planning technique, and will result, whatever method is adopted, in the visual diagram of project activities and other related information. The outline plan worked out at pre-tender stage will be used as a foundation in the preparing of the more detailed master plan. The decisions and careful examination of all aspects of the work at this stage will result in a saving of money and time in the project period.

Preparation of Programme

The more information available to the planner at this point, the more reliable and accurate will be his forecast and resulting programme. The use of the bills of quantities to prepare a list of programme elements generally proves satisfactory.

To assess the duration of an element the itemised details produced by the estimator in the bill will be collected together under one heading. For example, under the heading 'Brickwork' would also be collected damp-proof course, reveals to openings, air bricks, lintels etc. It will be realised that these items will have an effect upon the output per hour in laying bricks and it is the planner's job to assess this output.

This will occur for all elements and is carried out on a calculation sheet.

Information

To enable the planner to make a realistic assessment of the operation he will call upon historical information and records obtained from past contracts. Having determined the element time, starting and finishing date, it is necessary to communicate this information. This is generally done by setting out the programme in the form of

1. Bar or Gantt chart or
2. Arrow diagram (Critical path network)

Whichever method is used, certain characteristics of a good plan are essential to both.

(i) Should be based upon clearly defined standards of output which are realistic.

(ii) Should be simple to understand.

(iii) Should be flexible, so that alterations and alternatives can be made.

(iv) Should be balanced both between trades and within gangs.

(v) Should use all resources to the full.

Bar Charts

These are widely used in the industry and have proved to be a successful means of communication.

Typical information that could be found on a bar chart are listed:

Contract heading
Week commencing/dates
Sequence of operations showing start and finishing dates
(progress should be able to be indicated)

Labour and plant requirement
Weekly estimated labour and plant requirement
When the building is watertight
Completion date
Percentage of work complete section, as the bar will show time spent on work, not what has been completed
Holiday periods
Sub contractors
Key of items, e.g., schedules required
drawings required
samples required, etc.

Network Diagrams (critical path analysis)

Network analysis was developed in the USA to ensure successful completion of the 'Polaris' submarine project on time. This method proved so successful in co-ordinating the hundreds of sub contractors that 'Polaris' was completed three years ahead of schedule.

It must be understood that critical path methods do not solve all the builder's problems. It does, however, help to highlight some of them so that corrective measures can be taken. The calculation of element times and resources required is basically the same as with the bar chart, using realistic and not optimistic values.

The diagram resulting from this method of planning is in the form of a 'network' or 'arrow' diagram. When the sequence or logical order of activities has been worked out, the duration times for each separate activity can be calculated and a critical path found (a path that governs the project duration).

Advantages of C.P.N. over bar chart

1. A big advantage to the programmer is that the job sequence or logic (order of things) can be completely divorced from the time

element in the preparation of the plan.

2. The critical activities are clearly shown and can be altered easily if other activities become critical because of delays.

3. The non-critical activities can, with due examination, result in the more economic use of resources.

4. Non-critical activities can be delayed or performed more slowly so that resources may be used for more critical events, provided that they are not delayed so long that they in turn become critical.

5. The interrelationship between is clearly shown by the flow of the network.

As a method of communication networks are poor, and it is quite common to find that a network is prepared and from it the final programme presented in bar chart form - critical activities being shown in red and interrelationships or thought lines shown between the activities. Operations which contain 'float' and are therefore not critical can be dotted.

Planning during the contract

In order to keep the Master Programme alive to changing circumstances during the contract period, a shorter term forecast is made. It is likely that this forecast will be more accurate than the one made possibly one or even two years earlier. Such problems as labour, delays, bad weather and alterations may seriously affect the running and completion of the job, and if we are to complete on time this short term planning is essential.

Short term planning can be considered in many ways.

1. Stage programmes covering specific stages of construction, i.e. foundations, superstructure, finishings.

2. Monthly programmes covering the next four to five week period in greater detail and involves the careful assessment of labour, plant and materials together with co-ordination of subcontractors.

3. Weekly planning used to establish realistic targets for the next week's work.

These plans are usually in the form of a simple bar chart showing the daily work load of each gang. Other types are used that incorporate either:

(a) an outline of the block plan of the building used when dealing with multi-storey construction as work load can be readily shown where it is happening

(b) similar to the block plan method but the outline shown is isometric, one floor over another and is useful to show not only what is to be done by the gangs but also the flow of work using a series of arrows.

Control

Where progress is made at the end of an allotted time, be it day, week or year, the checking of the estimated targets against actual performance must be made.

Accurate planning is therefore vital if effective control is to operate to ensure that all units can be continually checked, to ensure that any deviations can be suitably resolved, whilst still maintaining control

over original objectives. In the construction industry where due to its possible variations control is often difficult to ensure. The various sections requiring control are:

Labour
Materials
Plant
Progress
Quality
Cost
Sub-Contractors

Labour Control

Maintaining sufficient labour strength whilst ensuring that the various gangs are so balanced that the work-flow proceeds smoothly is of the utmost importance in any construction work. It is also necessary to ensure that the tasks set for operatives or gangs are carried out within the planned requirements and that the recording of operatives' hours and progress is undertaken.

Sub-Contractors

It is the builder's responsibility to ensure the progress of the sub-contractors is maintained to the requirements of the master plan. The key words to achieve success here must be co-operation and co-ordination. The sub-contractor should be kept fully aware of his obligations whilst given every assistance in the performance of his tasks.

Progress Control

The indication of how much progress has been made relies upon the degree of detail required in relation to the programme of which the work is being carried out, e.g., weekly for master programme, daily for weekly programme. Progress is usually shown in a physical manner by using a

colour to block out or underline the estimated duration or task. Another method is to show by means of a percentage column how work is progressing.

Conclusion

Sound forecasting is necessary to produce realistic programmes that can be used by site staff to control projects. Other documents and aids used to achieve this end will depend upon the size, complexity and duration of the project. These may include:

Plant schedules
Sub-contractors' schedules
Requirement schedule for drawing details
Labour requirement charts

Whatever form of document is used, it must be simple to understand, realistic, in its forecast, and above all, up to date.

Course Practical Work

Course members are to prepare a programme for building a new detached house and the house addition (supplied by the course) by using a Bar Chart and Net Work Analysis.

FIG. NO. 1

A. BUILDER LIMITED

PLANNING DEPARTMENT

SITE INVESTIGATION REPORT

Project

Prepared by Date

(a) Site

1. General description
2. Local Authority
3. Access
4. Crossovers
5. Temporary roads
6. Distance from main road
7. Walking space for siting offices etc.
8. Trespass precautions
9. Police regulations
10. Concealed services
11. Nearest bench mark
12. Photographs

(b) Sub Strata

(i) Types of soil
(ii) Stability
(iii) Anticipated water table
(iv) Source of water
(v) Pumping
(vi) Disposal of water

(c) Services

	Authority	Nearest Supply
1. Water		
2. Electricity		
3. Gas		
4. Telephone		
5. Television		

(d) Labour

1. Availability
2. Labour

(e) Tipping facilities

(f) Local subcontractors

FIG. NO. 2

METHOD STATEMENT

CONTRACT

PREPARED BY

CONTRACT NO.

SHEET NO.

DATE

ACTIVITY	METHOD	PLANT OUTPUT	REMARKS
EXCAVATION			
Site stripping	Bulldozer	$20m^3$	Soil to be moved 50m.
Foundation and Drain trenches	J.C.B. $0.25m^3$ bucket, load direct into $0.5m^3$ dumper	$10m^3/hr$	Cart to spoil heaps on North side of site.
CONCRETE			
Foundations.	7 WT mixed with loading hopper, concrete discharge direct to barrows.	$1.2m^3/hr$	Only required for the first 10 weeks

FIG. NO. 3

P L A N T S C H E D U L E

CONTRACT

PREPARED BY

CONTRACT NO.

SHEET NO.

DATE

NO.	DESCRIPTION	PERIOD	AVAILABILITY		REMARKS
			OWN	HIRED	
1	Tractor type D4 Bulldozer	1	-	✓	-
1	J.C.B. 0.25m^3 bucket	1.5	✓	-	Daily and weekly routine
1	7 W.T. Bamford	10	✓	-	- do -

FIG. NO. 4

SITE ON COSTS

CONTRACT

Contract No.

Contract Period

Site Staff Personnel

	Foreman
GENERAL FOREMAN	WEEKS
BRICKLAYER FOREMAN	WEEKS
CARPENTER FOREMAN	WEEKS
QUANTITY SURVEYOR	WEEKS
SITE CLERK	WEEKS
OFFICE/CANTEEN ASSISTANT	WEEKS

Site Huts and Accommodation

	WEEKS	SIZE	REMARKS
FOREMAN'S OFFICE	"		
CLERK OF WORKS OFFICE	"		
GENERAL OFFICE	"		
OPERATIVES HUT	"		
STORES	"		
CANTEEN	"		
LATRINES	"		
COMPOUND	"		

Sundry

NOTICE BOARDS -

HOARDING
CONCRETE HARDSTANDING

FIG. NO. 4a

TYPICAL PRE-TENDER SITE ORGANISATION STRUCTURE

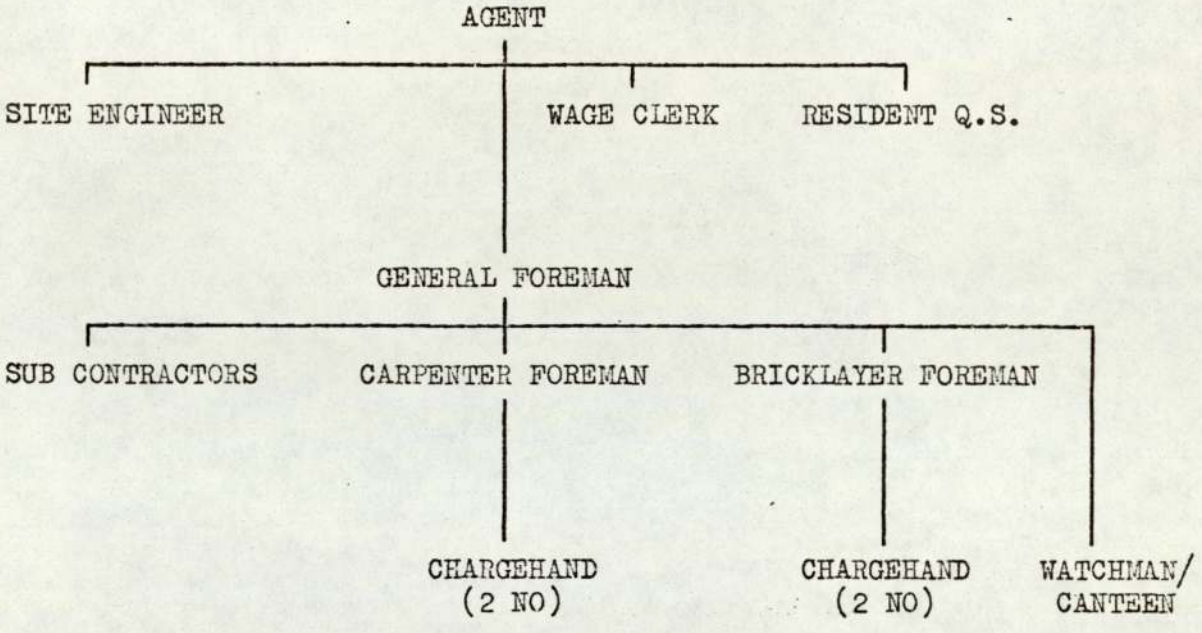


FIG. NO. 5

SUB CONTRACTOR'S QUESTIONNAIRE SHEET

JOB NO. ..... FIRM .....

TRADE ..... DATE .....

QUESTION	ANSWER
1. How long will it take to complete the whole of the work?	
2. What is your proposed sequence of work?	
3. What labour strength do you propose to employ on site?	
4. How many visits will you make to complete the work?	
5. Do you require additional information prior to commencement?	
6. What notice do you require to start work?	
7. State your storage requirements.	
8. What attendances do you require?	
9. Do you agree to comply with the conditions of the Main Contract?	
10. Do you agree to enter into a standard form of N.F.B.T.E. Contract?	

FIGURE 6

PRETENDER PROGRAMME

CONTRACT NO KB4269 — FOR A, B & C ENG CO LTD — PLANNING DEPARTMENT

SINGLE STOREY STORES BLOCK — DATE 20.3.71 — SHEET NO 1 — PREPARED BY

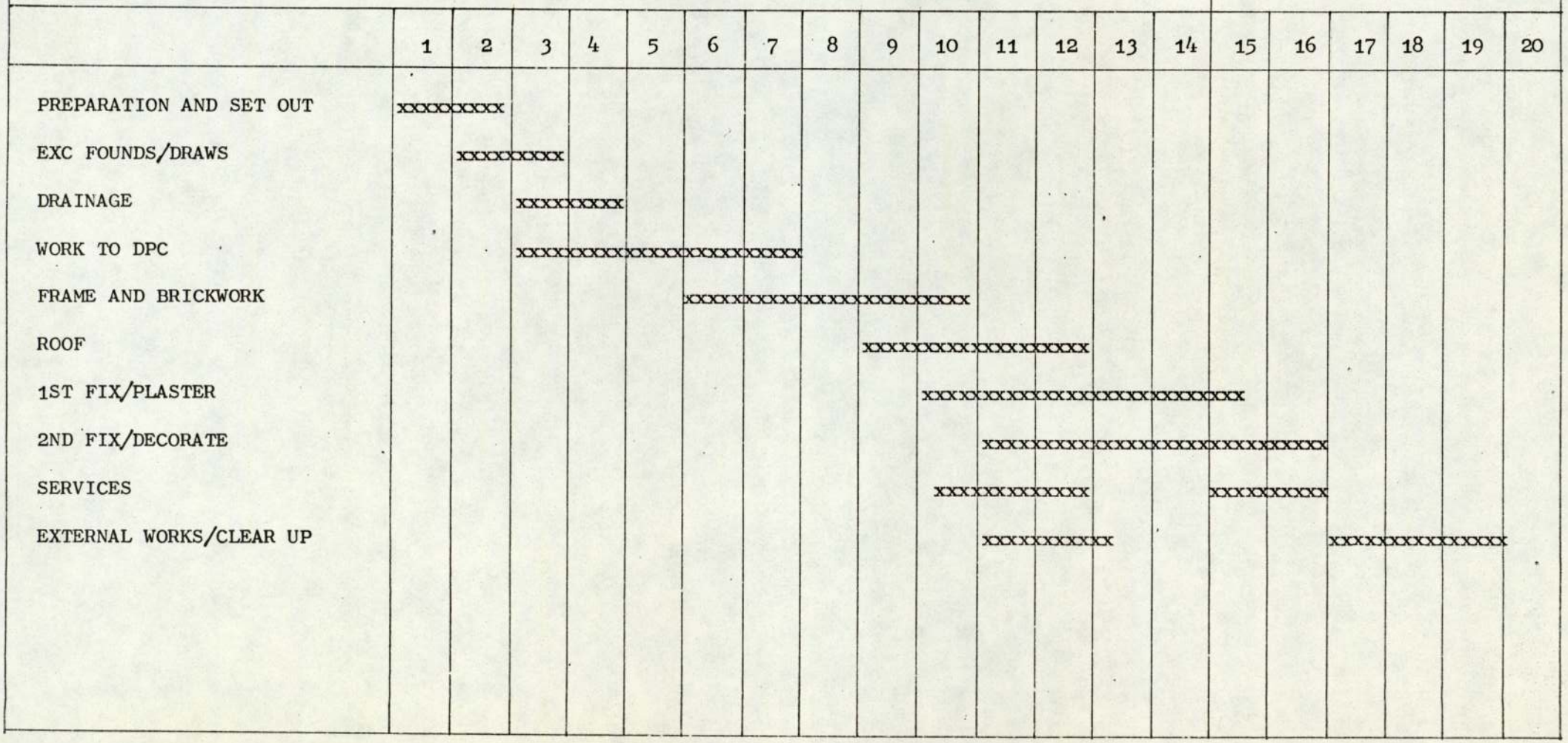


FIG. NO. 7

A. BUILDER LIMITED

PLANNING DEPARTMENT

CONTRACT CHECK LIST

DATE

JOB NO.	Responsibility	Action by	Date	Clearance
I INSURANCES	Company Secretary			
(a) Guarantee bond				
(b) All risks				
(c) Fire/third party				
Value of contract				
Period of contract				
(d) Special				
Demolition				
Difficult Excavation				
II WATER FOR WORKS				
(a) Application	Supervisor			
Value of contract				
Block plan				
Offices supply				
Information to plumber				
III TELEPHONE				
(a) Application	Supervisor			
Loud ringing bell				
IV CROSSOVERS	Supervisor			
(a) Application				
(b) Hoardings				
(c) Gantries				
V SEWER CONNECTION	Supervisor			
(a) Application or quote from L.A.				
(b) What notice is required				
(c) Sketch of drains run				

VI	NOTICES	Supervisor
(a)	Commencement notice to L.A.	
(b)	Factory Act Form 10	Safety Officer
(c)	Registration of Office Form OSRI	Company Secretary
VII	SERVICES	
1.	Electrical	Supervisor
(a)	Supply to office	
(b)	Building service	
2.	Gas	
	Services as necessary	
VIII	SIGN BOARD	Supervisor
	Sign required	
	Architect details	
	Sub-contractors' names	
IX	SAMPLES	
	Name of suppliers	Buyer
	Type required	
	Dates for approval	
X	FIRST AID	
	As Construction Regulations	Safety Officer