The Journal of the Institute of Hospital Engineering May 1983

HOSPITAL ENGINEERING

Lawrence Hadley
The New President

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HOSPITAL ENGINEERING

The Journal of the Institute of Hospital Engineering

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Front Cover: The Institute's new President, Lawrence (Laurie) Hadley in his office, with a portrait of the late Donald Smith, one of the founding partners of his firm behind him. *(See page 3).*

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Institute News

The New President

Lawrence George Hadley CEng FIMechE FInstE FCIBS ACIarb MConsE FIHospE will become President of the Institute at the Annual General Meeting in Manchester later this month, in succession to Mr John Constable.

Laurie Hadley is Senior Partner of Donald Smith, Seymour & Rooley, a large partnership of consulting engineers with officers throughout the UK, and a presence in France and the Middle East. He is primarily a building services engineer, and has been involved with hospital work since his very first job for the firm, which he joined in 1946 on completing his engineering training. He is proud of the fact that the firm has already provided one President of the Institute, George Rooley CBE, now a consultant to the firm, who was the second President after the Institute changed its name, serving from 1969 to 1971.

Mr Hadley joined the Institute as soon as he was able to, when the membership was opened to engineers outside the health service. Much of his professional life has been involved with hospital work, accounting for around 30 per cent of his firm's business, which is also concerned with many other major engineering and multi-service projects, in particular airports, commercial, industrial and educational. He has also had a distinguished career of service to the engineering profession, having for 15 years been involved with promoting its interests through membership of committees and working parties sponsored both by Government and by professional bodies. These include his current membership of a team representing the Association of Consulting Engineers in its meetings with the DHSS and the Regional Engineers Association (the latter, incidentally, involved for the first time) which is engaged in consolidating a number of standard documents concerning the terms and conditions of consulting engineers working in the Health Service.

He has served on the Council of the Chartered Institute of Building Services since 1967, and was its President, again following in George Rooley's footsteps, in 1978–79.

It was through his involvement with the CIBS that he first became involved with committee work. He took an active role on behalf of building engineers when, in 1968, he became an observer on the National Joint Consultative Committee for Building, which at the time did not include a representative of the engineering profession. It was not long before he was appointed a full member of the Committee, and in 1976 became its first engineer Chairman. Later he represented engineers in the new Co-ordinating Committee for Project Information — another role in which he endeavoured, successfully, to promote and encourage the importance of the Services Engineer in the Construction Team.

It is clear that Mr Hadley is an exponent of communication in whatever field he is engaged. Talking of his views of the Institute of Hospital Engineering, and where he sees it going, he believes that one of its major achievements has been in the enhancement of the status of the engineer within the hospital field. He would like to see that achievement consolidated, although he acknowledges that the Institute's small size does make it very important for it to be completely viable, and he would like to see an increase in membership — a matter that the Institute Council has in hand. This is particularly important with the recent formation of the Engineering Council, and Mr Hadley hopes very much that it will be possible for the Institute to have its own voice in the new body, rather than having to share a representative with other bodies.

So far as member participation in Institute affairs is concerned, Mr Hadley is concerned about the low attendance at many Branch meetings, and would like to see this improved. It is possible, he believes, that Branches should follow the same philosophy that lay behind the Institute's change of name from 'Engineers' to 'Engineering', which lead to a very useful broadening of outlook. Branches could similarly widen their horizons, and hold more joint meetings with Branches of other Institutions. However, the support given to other Institute activities, and in particular to the very successful seminars held from time to time, are evidence that members do appreciate the Institute's function as a learned society disseminating technical information.

Another area that Mr Hadley supports wholeheartedly is the Institute's significant involvement with the International Federation of Hospital Engineering. He is proud of the contribution that British engineers have made to hospital development throughout the world, and of the contribution this had made to British exports, both of goods and services. With his own firm's impressive record of overseas work, he knows what he is talking about, and has good reason to be proud!

Mr Hadley lives at Ickenham, near Ruislip, just on the edge of the Green Belt. He has always lived in the area, and was educated locally. His father was employed in the aircraft industry, and as a keen handyman, may well have sowed the seed of enthusiasm for engineering. During the war Mr Hadley became apprenticed to a firm of heating and ventilating engineers, and later studied at the Regent Street Polytechnic. He is married and has one son, now 27, who took a degree in Chemistry at Cambridge, and now works as a Inspector in the Health and Safety Executive. He likes gardening, and copes quite well with around a third of an acre, which also contains a large pond, so he is knowledgeable about fish as well! In what little spare time he has he reads

mainly fiction with a historical setting, and does a little watercolour painting of landscapes, usually when on holiday.

As the Institute enters a period of change and development in the Engineering profession, it is indeed fortunate to have at the helm a man with so wide an experience of promoting the interests of engineers.

An Incinerator Flue that failed twice

The unnamed Author

We regret that the name of the co-author of the above named article, on pages 9 to 13 of the April 1983 issue of *Hospital Engineering*, was inadvertantly omitted from the article title.

He is Mr Christopher Farrant, a member of the Institute living in Guildford, who at the time the article was written was a Principal Assistant Engineer responsible to Mr K J Eatwell, whose name was given as the sole author of the article. Since publication it has been made clear to us by Mr Eatwell that Mr Farrant has considerable involvement in the preparation of the article, although this was not clear from the typescript, which merely showed both names.

Through an unfortunate printer's error when preparing the article for printing, Mr Farrant's name was omitted, and this was not noticed when the proofs were received for final checking.

We regret the omission, and any distress caused to Mr Farrant. To help avoid such problems in the future, it would be appreciated if authors could ensure that full details of the origins of papers submitted for publication are given, including brief biographical details of all concerned.

Institute Symposium on Hospital Lighting

6 July 1983

Another in the series of successful one-day Symposia will be held on *Hospital Lighting* at The City Conference Centre, 76 Mark Lane, London, EC3 on Wednesday 6 July.

It is regretted that the full programme was not available in time to be included in this issue, and it will appear next month. In the interim, any enquiries should be addressed to The Secretary of the Institute.

Word and Information Processing Exhibition and Conference

The International Word and Information Processing Exhibition and Conference will take place at the Wembley Conference Centre between May 24-27, 1983.

This is the only event in Europe to be wholly dedicated to the display of the latest development in word and information processing equipment and systems.

Entry is by ticket available from BETA Exhibitions Ltd., 8 Southampton Place, London WC1A 2ER. Tel: 01-405 6233.

New Chairman and Vice-Chairman at the CEI

The Board of the Council of Engineering Institutions — the professional organisation presently responsible for the country's 200,000 Chartered Engineers — has elected Dr Wilfred Eastwood as Chairman and Air Marshal Sir Reginald Harland as Vice-Chairman for 1983-84.

Dr W. Eastwood, FEng, a consultant Structural Engineer, will in all probability be the last CEI Chairman and will be entrusted with the task of supervising an orderly transfer of CEI's responsibilities to the Engineering Council.

27th Graham Clark Lecture

The 1983 Graham Clark Lecture entitled 'The Engineer and the Acceleration of Technological Change' was delivered on 29th March at the Institution of Civil Engineers by Dame Margaret Weston, DBE, CEng, Director of the Science Museum.

In her lecture Dame Margaret traced the process of technological change over the last 200 years in terms of Kondratiev waves, long waves of economic activity on a 50 year cycle, and speculated on the new technologies on which a new wave of economic prosperity may be founded.

Forthcoming Branch Meetings

Southern Branch *Hon Sec. R. P. Boyce Chichester (0243) 781411*

11th May — Visit to Fire Brigade Control, Leigh Road, Eastleigh

Welsh Branch *Hon Sec. T. Roche Cardiff (0222) 755944 ext 2247*

11th May — Spirax Sarco. Visit to Factory and Apprentice School

South West Branch *Hon Sec. A. J. Graver Cheltenham (0242) 21361*

24th May — History of Building Services and visit to ss Great Britain. Mr N. S. Billington. Charles Hill Dockyard, Bristol

6 Branch Meeting

Saturday 18th June — National Hospital, Queen Square, London WC1

Those wishing to attend any of the above meetings please contact the relevant Hon. Branch Secretary.

Planned Preventative Maintenance Systems

CHRIS AVISS Senior Engineer, National Heart & Chest Hospitals
PHILIP LEWIS Senior Planner Estimator, National Heart & Chest Hospitals
ADRIAN WOOD FCA ACIS MIDPM MBIM Director, Data Ware

Most Engineers strive at one time or other to design and implement Planned Preventative Maintenance procedures.

To set up the system requires detailed consideration of the sort of work that is to be carried out.

Master tasks need to be set up with Global (e.g. Medical Compressed air — comprising Four Compressors & Ancilliary Equipment, one Alarm System) statements and then individual instructions (e.g. Check pumps operated by reducing vessel pressure to not less that 42lb per Sq. in.) added. These instructions are given frequencies which denote how many times and when they are to be performed throughout the year.

The majority of Hospital Engineers use the DHSS Calendar which contains forty-eight weeks (numbered one to fifty-two, with weeks thirteen, twenty-six, thirty-nine and fifty-two excluded). The instruction frequencies can be weekly, three-weekly, six-weekly, quarterly (12 weeks), half-yearly (24 weeks) or annually. During the four missing weeks the normal weekly frequency of work is carried out together with any catch-up or urgent tasks.

Each Master task is referenced to a particular valid week out of the forty-eight that are available. This will be the week when any 'annual' instructions, if any, are carried out. Three-weekly, six-weekly, etc. intervals are referenced on the particular week number.

Not only those tasks due by reference to the frequency but also any instructions of a lower frequency are included in the work to be done i.e. when a quarterly frequency is due all weekly, three-weekly and six-weekly instructions will be included.

Having set up the procedures which may contain as many as 300 to 400 Master tasks and up to 2,000 instructions for a large unit, a system must be introduced to provide a smooth and efficient administration of the scheme.

There are three main ways of achieving this objective i.e. manual, electro-mechanical and computerised.

Manual

Depending on the size of unit being covered, a manual system can be both adequate and cheaper than either of the other two alternatives. The major disadvantage is information retrieval. Work to be processed each week has to be calculated manually and then the tallying of work throughout the year has to be re-calculated every time there is a change.

Electro-Mechanical

Electro-mechanical systems such as addressograph type machines are vastly superior to manual systems when large units are involved.

Whilst production of job cards is much easier the drawbacks to the system are the time taken to make alterations (some changes may entail wholesale reproduction of plates for a particular Master Task) and still the need to manually tally the work-loading for each week of the year.

Computerised

The computer provides perhaps the best option for medium to large units. Production is much quicker than either of the previous options and more flexible in operation (sequences of instructions can be changed with very little effort).

Costs are obviously higher than the manual option but may well be cheaper than the electro-mechanical method. In addition if a suitable micro-computer is purchased, multi-usage (e.g. word processing, plant power consumption, etc.) can be achieved.

Superbrain P.P.M. System

Data Ware (owned by Microprocessor Support Services Limited) have in conjunction with the Brompton Hospital, London (part of the National Heart & Chest Hospitals Group) developed a Planned Preventative Maintenance system which runs on the well-known micro-computer, the Superbrain (this package will run on most micro-computers with the CP/M operating system).

Other than the first instruction to call up the opening program, the whole package, is menu-driven, the user being prompted for the option that he requires. Therefore very little training is required for the operation. A system overview is given below.

Functions

The system consists of two distinct parts—file maintenance and reporting. Other than initiating the first run-file, all routines are menu-driven.

File Maintenance

File maintenance is the housekeeping part of the system, combining input and displaying of the various files.

The files are used to identify the tasks and jobs to be carried out and also to provide descriptions for reports and screens.

Reports

Reports can be produced on an ad-hoc basis. As well as the weekly work-sheets, summaries by week of the total years planned, preventative maintenance and file printouts are available.

Description of Record Maintenance

When option 01 is taken as the main menu, the File Maintenance menu is displayed ready for input.

The PPM application has two major files for its records, Master and Slave. The Master records show the outline of the task with the individual linked Slave records detailing the instructions.

Master Records

The Master records details of:
Task Number — this is a unique number and is used to link Master and Slave records.
Code Number — this field is used to denote a hospital/task reference e.g. Brompton Engineering/Estmancode reference.
Location — the actual location of the work to be carried out can be noted in this field.
Frequencies — up to six frequencies can be input for each Master record.
Task — this is the task outline.

Week Ref. No. — all slave records linked to a particular Master record use this field as a reference point for the frequency to be carried out.
Total Work Content (TWC) & STD Hours (SH) — the times for each frequency.

During the add record input routine three checks are carried out viz:
a) the task number is checked against the Master file and rejected if the number already exists, and
b) the week reference number is checked for range, and
c) the disk space is checked and an error message displayed and the record rejected if there is insufficient space available.

Slave Records

The Slave records contain details of:
Job No. — this is a unique number made up of three parts, Master task number, frequency code (1=—Weekly, etc.) and instruction number. e.g. the Master record 11034, could have as its first linked Slave record 11034/1/010.
Individual Instructions — maximum of eighty characters.

During the add record input routine the job number is checked against the Master file and rejected either if the Master record does not exist or if a frequency code being used has not been allocated standard hour times on the particular Master record. In addition a check is made on disk space and an error message displayed and the record rejected if there is insufficient space.

If the entry is in order, the code number, location and task fields from the Master record are displayed.

General

Options exist to amend, delete or display (and print) individual records.

In addition to the two major files, a table and a header file are maintained. The table is a matrix, containing week numbers and frequency numbers. The header file contains the name of the Hospital/Section etc. (30 characters), the current date and a count of the open Master and Slave records.

Description of Report Options

When option 02 is taken at the Main menu, the reports menu is displayed ready for input.

Weekly Worksheet Processing

At the appropriate time each week the worksheet processing is carried out.

The week number is entered via the VDU at a prompt and the routine then searches the files for tasks/jobs to be done during the following week.

A particular week can be run more than once.

The routine reads in the "week" frequency line from the table and then by reference to this record and the week reference number field in the Master record decides the frequencies to print. At this point all Slave records linked to the particular Master record being processed with a frequency equal to or less than the one due that week are printed.

After all Master and Slave records have been checked and where appropriate included in the print run, a summary of the Total Work Content and Standard Hours times for the records in the run are printed.

PPM Weekly Loading

There is an option to print out the PPM loading.

Each Master record is read in turn and by reference to its week reference number field and a table, the Total Work Content or the Standard Hours (two separate requests) is accessed and stored in a cumulative file.

After all records have been read the accumulated figures are totalled and then printed in the format shown below.

It should be noted that where a longer frequency than weekly is due in a particular week the total figures are apportioned (as shown in the Master record) between the various frequencies, e.g. A Master record with an annual job due in week 24 with a Standard Hours total of 75 hours would be split over the individual frequencies (i.e. weekly 10, three-weekly 10, six-weekly 15, quarterly 5, half-yearly 10 and annually 25).

Disk Listing

A facility exists to print out the contents of the Master and Slave record files.

The formats for the disk listings are indentical to those produced when records are added, amended, deleted or displayed (or printed) under the file maintenance options for either master or slave records.

The author, Area Works Officer with the Thameside Area Health Authority first presented this article as a paper at the Institute's Annual Conference in Stratford-upon-Avon last May.

Measured Term Contracting

R H YORKE BSc DMS CEng MIEE FCIBS

What is it?

Simply put, a measured term contract is one in which a tender is sought on the basis of percentage additions to, or deductions from, schedules of rates. The degree of variation or complexity depends entirely upon the clients wishes. For a building MTC for example, it may be desirable to establish separate rates for external work as against internal work, or for roofing work as against joinery etc. For decoration MTC's it is usual to distinguish between internal/external work, low/high rise buildings, industrial/non-industrial type buildings and occupied/unoccupied buildings. It is for the tenderer to decide whether he wishes to quote a composite rate covering all circumstances or different rates according to the work classifications.

As examples, the MTC's currently in use by Tameside and Glossop DHA are for building work and for decoration work. The format of the building MTC is quite simple in that it only requires distinction between orders costing between £500 to £2500 and £2500 to £100,000. (Orders valued below £500 are generally carried out by daywork term contract, while at the other extreme it is unlikely that a single order will approach anywhere near £100,000. The range is usually between £1000 and £5000). The decoration MTC is a little more elaborate in that it distinguishes between all the types of work mentioned already (internal/external, low/high rise etc.) and in addition it distinguishes between orders valued above and below £500.

The contracts are awarded on a three yearly basis, and the annual values vary somewhat, but since 1977 have averaged £250,000 p.a. for the building MTC and £10/20,000 for the decoration MTC.

The schedules against which the tenderers quote are:

a) Building MTC : Schedule of rates for Building Works 1980.

b) Schedule of rates for Decoration Work 1980.

Both schedules are prepared by the Property Services Agency of the Department of the Environment, and contain very comprehensive schedules with detailed preambles and descriptions for each item showing how the rate is arrived at and, where appropriate, specifying the work method.

The rates quoted in the published schedules are, of course, fixed in time, and therefore an updating percentage to be applied to them is published regularly by the DHSS Cost Intelligence Unit. The adjusted schedule rate covers labour, materials, plant, equipment, tools, insurances, overheads and profit. It does not include VAT which obviously varies according to the type of work. A separate percentage variation is allowed for charging for the use of major plant, the schedule for this being the "Schedule of basic plant charges for use in connection with dayworks under a building contract", which is published by the R.I.C.S.

How does it operate?

I imagine that the Tameside procedure is typcial. To start off with, an order, together with any drawings and instructions extra to the schedule work description, are issued to the Term Contractor. He then programmes and executes the work in accordance with the contract, having first clarified details as necessary.

Before the work can be certified for payment it must be inspected and measured. This is achieved by a monthly valuation of all current MTC schemes and is carried out by the Contractor's Quantity Surveyor and the Authority's Q.S. Having been agreed, these valuations are submitted on an interim payment form with adjustments being made for VAT, retentions etc. For our own convenience we split the payments between Revenue Schemes, block allocation (Capital) and other special allocations which appear in one form or another.

The final accounts are prepared and agreed in a similar way to accounts rendered under the JCT form of contract, the only difference being that the schedule of rates is used instead of a Bill of Quantities.

When should (or can) an MTC be used?

To start with, if your District has a fair size D.L.O. then there seems little point in going into the MTC business. The wages of directly employed staff always have to be paid and if, in a lean year, this means starving the Term Contractor of work, then he is not going to be too delighted with the situation.

Again, if the directly employed staff are of a mind to object to the presence of outside contractors on site, then making the sorts of arrangements needed for an MTC can involve a great deal of hassle. It's not impossible to overcome, but you could be giving a hostage to fortune.

However, given a d.e.l. workforce of reasonable understanding, and the knowledge that, even in a lean year your own workforce is of insufficient

capacity to undertake the whole maintenance and minor works programme, then an MTC can be an attractive proposition.

The one thing I would not do — and this I would stress — is to sell MTC's as a universal cure-all. Local circumstances should be carefully examined before embarking upon what could be an expensive mistake, for you or the contractor. Nor should an MTC be regarded as a soft-option alternative to dealing with your own labour force. The problems might be different but they are still there and considerable commitment is required from both parties to make it work properly.

Having sounded the note of warning, I will now deal with what I see to be the advantages and disadvantages. I will take the disadvantages first and get the depressing bits out of the way.

Disadvantages

First, and this is perhaps more a statement of the obvious than a disadvantages, it is a difficult form of contracting than usual. On your side people who would otherwise be engaged in writing out Works Orders for d.e.l. or short contracts and specifications for minor works are instead engaged in issuing MTC orders, inspecting the work and dealing on a very close day-to-day basis with the term contractor. The Contractor for his part has to commit himself fully to ensuring that the contract works, and not, for example, taking men away to boost other jobs he may have on. It pays dividends to pick a good contractor and make sure your staff deal properly with him. The contractor will, in time, become identified with the Works Department, and it is to your advantage to make sure his performance is good.

You have to be able to predict in advance with a fair degree of accuracy what the MTC workload will be, so that the contractor has time to prepare his plans, workforce etc. In these days this is often easier said than done, but it is never the less from the contractor's viewpoint most important that a realistic assessment is made and that he is given fair warning of likely changes in financial situations etc.

Once the system is working then it is just as easy, if not easier, to manage as any other form of contract. Undoubtedly however, the initial setting up is quite an involved procedure. To start with varying percentage variations for different types of work and order value means that even establishing which is the most beneficial tender can require a lot of arithmetic. Explaining to Authority Members who are asked to approve your recommendation just how the contract will operate and why it is different from what they are normally asked to deal with can also be a little difficult.

Finally, it is essential that a Q.S. be appointed to deal with the measurement and rate validation aspects. If, unlike my own case, this is not a service offered by the R.Q.S., than an additional member of staff or a Consultant appointment will be necessary. In either case it is an on-cost which has to be borne in mind.

Advantages

Once an MTC is fully established and working properly there is , in my mind, no doubt that the advantages of the system far outweight the disadvantages.

Firstly, the prelims, preamble and conditions of contract are superb, being in my opinion clearer, easier to apply and more client orientated than any of the alternatives we currently use in the Service. The P.S.A. and DHSS review and revise the conditions which are only issued once, at the beginning of the contract, and this alone must save several cwts of subsequent paperwork in comparison with placing many minor contracts with individual specifications and prelims.

Similarly, the Schedule of Rates preambles are very comprehensive with each item being fully described so that there is very rarely any need for a dispute to arise over work method or quality of workmanship. Even when they do, the point is invariably covered by the documentation.

An MTC is a very flexible and adaptable form of contract. A project can be commenced simply by issuing an order so that, without the wait for preparation of prelims, specifications etc., a major project can be put into execution very rapidly. Obviously, the term contractor requires some pre-warning, but personally I feel that this form of contract is particularly suited to the typical Works Department financial allocation pattern, which is best described in a word as "uncertain".

Originally MTC's were primarily thought of in connection with maintenance work. Although this still forms the majority of MTC work we issue, we have also found, with experience, that capital projects can be also unsuccessfully executed under MTC arrangements, even to the extent, for example, of having the building work carried out by MTC and separate fixed price contracts for the mechanical and electrical engineering content of the scheme. In this situation the M & E contractors become sub-contractors to the MTC Contractor — all covered within the conditions of the MTC Contract. They can, in fact, be adapted to meet many different kinds of situation.

One other advantage worth recording is that within our term contract "package" is incorporated a small building *daywork* term contract which in effect gives us 24 hours emergency call-out service for all our community sector buildings, plus the execution of orders of less than £500. Negotiating such a contract in isolation would undoubtedly prove very expensive in terms of hourly rates, but we have found a willingness from our term contractors to incorporate this service in combination with the main MTC, although it is doubtful that it is for them a profitable part of the contract.

Costs

Before I finish with advantages and disadvantages, I'm sure that if I don't raise the question of costs then someone else will. I have looked at the question of comparative costs on a number of occasions — as have indeed the NHS Audit team, who carried out a full audit on our MTC last year. Without going into details, I can state that the costs of carrying out work under this system are as low, if not lower, than other forms of contract. There is, of course, considerable pressure on the Contractor to quote competitive rates which, in my experience, has led to very favourable deals for the Authority. I also understand that a comparative cost study set up by the DHSS indicated a saving of between 10% and 40% over normal contract methods for a wide range of painting schemes.

Conclusion

In conclusion, I reiterate that measured term contract is an efficient and flexible form of contracting. It doesn't simply happen that way and there is a great deal more to it than simply letting a contract. It requires full commitment on both sides, the maintenance of good relations between client and contractor throughout the contract, and an effective system of formal communication to ensure that the contract runs smoothly.

The Author, who is District Works Officer at the Barnsley Health Authority, first presented this article as a paper at the Annual Conference in Stratford upon Avon in May 1982.

Direct Labour in Competition

M SMITH CEng MIERE MCIBS

Introduction

The title of this paper implies that direct labour in the National Health Service works discipline should be competitive with outside contractors' labour and that comparison should be made at all times by the Estate Manager or District Works Officer to ensure that the National Health Service is getting the best value for money that is to be spent on estate management work. The paper attempts to highlight that, with some aspects of estate management work, direct labour is necessary to maintain the NHS estate in a sound condition and also that some areas of work that could be undertaken by contractors can be successfully and economically undertaken by a properly planned, managed and motivated direct labour workforce.

There is some obvious benefit, particularly in the operation and maintenance areas, in having people who are permanently on site and who know the difficulties that can be experienced in undertaking normal maintenance and high penalty maintenance work on any particular site. I am sure it will be acknowledged by most people who are responsible for maintaining the NHS estate that there is no substitute for people virtually living with the job and being available on site for virtually 24 hours a day, 365 days a year. Estate management work generally falls into two categories: capital work and maintenance work.

Capital Work

Health authorities are required to put out all major capital works to competitive tender. All the capital work element undertaken by a District Health Authority does not, however, fall into the major capital category. There is the Schedule 'D' category defined in Estman Code as modification and improvement work and work carried out from the minor capital block allocation which is made by the Regional Health Authority to District Health Authorities. It is in these two smaller capital categories where an advantage can be gained in the use of direct labour which, in some circumstances, can be more economical, and also give a greater scope for the direct labour work force to increase its skill level and provide more interest to directly employed craftsmen within any particular district health authority. Examples are provided later in the paper to demonstrate that work, particularly in the Schedule 'D' category, has been successfully undertaken in the Barnsley health district. The Schedule 'D' element of improvement and modification work is normally included in the revenue works budget allocation and, therefore, provided the correct balance is maintained between this and other work to be funded from the revenue budget, there are advantages in using the direct labour force, particularly with the advent of bonus schemes for craftsmen within the NHS. New work can often be measured more easily than maintenance work and, therefore, the coverage effected by the bonus scheme can be improved. This is particularly useful when setting up a new bonus scheme within a District, an experience which many Health Districts have encountered over the last two years since within the early stages of a bonus scheme it is very often difficult to reach the levels of coverage required by the scheme within a prescribed period of time by measuring maintenance work only. Similarly, some minor capital schemes can be measured and included in a craftsman's bonus scheme for the direct labour workforce to produce an economical end result which can be competitive with outside contractors.

There are some obvious benefits in using direct labour in these two categories which are not always readily apparent. Work carried out can be supervised by local NHS employed supervisors, an oncost factor which is not always taken into account when local supervision is required to monitor contract labour — a subsequent operational advantage when the scheme is completed in that local NHS employed labour has an intimate knowledge of the installed services which could, in some circumstances, save operational maintenance time. Where difficulties of access etc., particularly in an existing hospital department are experienced, direct labour can be deployed elsewhere until the difficulty is resolved, whereas contractor labour may generate additional expenditure to the scheme if work is suspended and not allowed for in the programme of work.

Maintenance and Operational Work

This section of work is covered by Categories 'A', 'B' and 'C' in Estmancode and past experience has shown that in maintenance of an irregular nature, direct labour has been successfully and economically employed on schemes such as re-wiring existing hospital departments and there are many examples of such schemes around the country. Once again, the detailed local knowledge of the direct labour force and the relationships of the local direct labour force with the client department has provided on many occasions a better service to the patient. Similarly, other small schemes of boiler changes, extensions to existing heating schemes etc. have been carried out in the Barnsley Health District which are also included in this category of maintenance.

A substantial amount of money from the works revenue budget every

year is spent on breakdown maintenance and in this particular category of maintenance it is difficult to see how contractors' labour can provide a more economical or efficient and convenient service than a properly managed maintenance workforce. All the regional indices over the past five years in the Trent Region have shown that on the volumetric basis contractor labour used on breakdown and planned preventative maintenance have been considerably more expensive than the direct labour force. Leaving aside for the moment the specialist maintenance which is covered separately in this paper, there is every reason to support the use of direct labour, particularly when the emergency and recall to work aspects are considered. Later in the paper hourly pay figures have been produced based on local experience to compare direct labour costs with contractor costs. In compiling these costs, it must be stressed that the direct labour figures are made up of base pay with added oncosts for employer expenses. Where the figures for emergency or recall to work have been calculated, only the proportional increase for premium time has been added to the direct labour costs. The contractor comparison costs have been obtained from local companies who would normally be used by the Barnsley Authority in an emergency and are listed in the Barnsley manual as back-up support to the emergency works plan for the District.

Work load on maintenance, particularly in the engineering field, on both breakdown and P.P.M. can be reasonably quantified over a reference period. It is this base load maintenance commitment which in my view is the principal supporter of a direct labour workforce under the direct control of the Estate Manager. I feel that the costs presented demonstrate that direct labour is more economical and more controllable than contract labour on medium to large hospital sites. A further supporting factor must be that on sites of reasonable size, the support services such as technical supervision, liaison, stores and workshop facilities that are needed irrespective of whether direct labour or contract is used, make the direct labour force more attractive, both economically and from a service viewpoint.

Health centre maintenance

Health centre day to day maintenance produces a different set of considerations and problems. Health centres are normally widespread and the workload generated within the health centres and other outposted properties is intermittent and sporadic. Many health authorities have used term contractors on daywork contracts or measured term contract. Using contractors on such work has obvious advantages: the client can call the contractor to site on an intermittent basis without the normal cost penalties that would accrue on lump sum contracts. Difficulties of access can be often offset by the contractors' supervisor arranging the programme of work which releases Health Service supervisory time to be employed on other work. However, the monitoring of day term and measured term contracts is expensive and time consuming of Health Service supervisory time. The work needs to be inspected, and in the case of measured term contracts the accounting of such work can be inaccurate leading to penalties to an Authority. During the early years of re-organisation after 1974, all the Barnsley health centres and clinics were maintained by contractors' workforce both for engineering and building work.

The supervision, inspection and control of the work accounted for approximately 25% of P.T.B. time. As a result of the high cost in supervisory time, a cost exercise was initiated to estimate the likely costs of undertaking the clinic maintenance work with direct labour. The exercise comprised costing the maintenance executed by contractors over a twelve month reference period, including as an oncost the P.T.B. supervision time. By comparison, the price of providing direct labour over a similar period was priced, together with the provision of all necessary transport support, supplies service for materials and supervisory P.T.B. time. The result of the exercise indicated that after considering the purchase of a suitable works vehicle and fitting the vehicle as a mobile workshop, together with all craftsmen's time plus supervision, the cost of using direct labour was some 19% cheaper than using contractors for a similar workload. Since the mobile workshop together with direct labour was introduced, the speed of response of service to the client has considerably improved, the recall to site to deal with defects on work carried out has reduced by almost half, and the occupants of the clinics feel that they have their own private service network rather than a feeling of being latched on to a larger maintenance unit. Since the introduction of the service, several cost comparisons have been carried out to test the continued competitive element of it. Examples of some of the cost comparisons are reproduced in the paper which have been checked by internal audit at Barnsley. A problem that is difficult to reconcile, however, is that of speedily and cost effectively applicating such work for inclusion in the bonus incentive scheme. The problem has been partially resolved by some post application of work by planner estimators and random checks being performed on clinic maintenance work by P.T.B. staff. The random checks are undertaken on a weekly basis to ensure continuity.

Medical engineering maintenance

Undoubtedly one of the costly areas of maintenance undertaken by the Works Department in the NHS is in the medical engineering field. Exorbitant hourly costs are levelled by electro-biomedical engineering services people and these, coupled with the high travel costs that are normally involved, produce a large financial drain on the engineering maintenance budget.

Current hourly costs range from £20 to £30 per hour and the problem of supervision of contractor service is, to say the least, difficult to achieve. Outside service personnel often visit the hospital site when supervision is not available and there are many occasions when equipment needs to be removed from the site to effect a repair back at the contractors' premises which makes supervision and control almost impossible.

A medical engineering service has been established in Barnsley to cover some of the most costly and high penalty equipment in the medical engineering spectrum. The cost of setting up such a service which included technicians' salaries, workshop facilities, specialist tools and instruments was recovered during the first three years of service. The medical engineering service in

Direct Labour	
Joinery Work	
9.9 hrs. @ £3.32 per hr.	£32.86
On costs @ 36%	£11.82
	£44.68
Contract Cost	£97.75 (incl. V.A.T)
Direct Labour	
Joinery Work	
9.4 hrs. @ £3.32 per hr.	£31.20
On costs @ 36%	£11.22
	£42.42
Contract Cost	£89.70 (incl. V.A.T.)
Direct Labour	
Building maintenance	
42.5 hrs. @ £3.32 per hr.	£141.10
On costs @ 36%	£50.78
	£191.88
Contract Cost	£247.50 (incl. V.A.T.)
Direct Labour	
Plumbing maintenance	
5.7 hrs. @ £3.32 per hr.	£18.92
On costs @ 36%	£6.80
	£25.72
Contract Cost	£42.44 (incl. V.A.T.)

Figure One: Health Centre Maintenance Comparison of costs.

Barnsley covers all electronic patient connected equipment and approximately 50% of the equipment in the path lab field.

The service deals with first line maintenance and some planned preventative maintenance, although the majority of technician time is spent on first line maintenance rather than P.P.M. The division is approximately 80% first line maintenance to 20% P.P.M.

A more recent cost exercise has been set up and is recorded in the paper which forms the basis of a case and proposal to extend the medical engineering service in Barnsley. The report covers the cost of providing a breakdown and inspection service by contractors over a twelve month reference period. Since most of the contractors service agreements do not cover breakdown service within the agreements, the breakdown costs have been extracted from actual accounts paid during the reference period. The report is clearly in favour of "in house" maintenance and makes the case for two extra technicians to be employed in the existing department to cater for the two extra technicians along with the two existing technicians and, therefore, additional costs for accommodation are not included in the report. Other than the obvious cost benefits of having an 'in house' service, there are a number of spin-offs which are also advantageous: a fast responding service to the clinician, the production of a comprehensive inventory of equipment and continuous updated case history of equipment, a readily available initial testing facility and demonstration service for client groups, together with the opportunity to discharge fully the responsibilities contained in the latest HEI equipment advice manual recently issued to authorities. Indeed, after reading the HEI manual for equipment maintenance undertaken by an authority, it is difficult to reconcile how an authority will discharge the responsibilities contained in the manual unless at least a direct labour supervision force is in operation and employed by a health authority to monitor and control the quality, safety and standardisation requirements which are required by the document.

Medical gases maintenance

Medical gases maintenance work is often carried out by contractors and in this specialised area there are a reduced number of contractors throughout the country to undertake the work when compared with other types of maintenance work. Unfortunately, the contract costs often reflect the specialised nature of the work and with the advent of the latest HTM 10 many authorities have seen a substantial increase in the maintenance costs in this particular field. Although specialised courses are available at the Hospital Engineering Centre at Falfield, many authorities still use contractors for the work and have not undertaken medical gas maintenance as an 'in house' function. I feel that it must also be recorded here that many contractors who undertake this type of work will only do so if the client provides a properly documented and controlled "permit to work" system and very often if the contractor is

Figure Two: Rates for hourly paid craftsmen Contract and Direct Labour.

Contract Rates (Hourly)		
Skilled fitter and plumber based on National rate Feb. 1982		£2.80
Add on costs of 150%		£4.20
		£7.00
Medical engineering technician all inclusive rate per hr.	From	£17.00
	To	£28.00
Skilled lift fitter all inclusive rate per hr.		£17.00
Medical gas fitter		£15.00
Skilled electrician		£7.50
Refrigeration fitter		£11.50

required to provide authorised persons to sign and be responsible for "permit to work" then an additional oncost is levelled.

Substantial savings can be effected by using direct labour for this type of work and within the last two years the Barnsley direct labour force has taken on board work in this particular category. In order to do this, two Grade IV craftsmen from the direct labour force were trained at the Hospital Engineering Centre at Falfield and have gained experience in this field of maintenance.

Direct labour is now used for all PPM and breakdown work in this particular category and the net saving to the Authority is approximately £5,000 per annum. The cost of training the two craftsmen and the initial stock of materials which were required to successfully carry out this type of work has been amortised over the period of two years and is acccounted for in the overall cost saving expressed earlier. A further spin off of providing this specialised type of maintenance from an 'in house' direct labour force has been the production of some specialist items of equipment for the gas scavenging system installed at the District General Hospital in the main theatres. During the past 12 months an active gas scavenging system has been installed in the main eight theatres at the Barnsley District General Hospital. Very high scavenging rates were required of the system and as a result a special type of air break vessel was needed for inclusion in the patient connected circuit. Commercially available vessels proved to be unsuccessful and a special design of receiver vessel was needed. After finalising the design a number of commerical companies were asked to quote for the type of vessel required. A total number of 12 air break vessels were required together with other specialised fittings and fastenings to be included in the total system. The lowest cost tendered was approximately £6,000 and subsequently the vessels were manufactured in our direct labour force at a total cost of £4,400.

High voltage maintenance and testing

High voltage maintenance has been carried out by an 'in house' workforce in the Barnsley area for at least eight years. The current cost of training suitable candidates to undertake authorised persons' duties is considerable and the additional cost of training competent people to undertake the maintenance work together with all test equipment and instruments must also be taken into account. However, during a recent evaluation at the District General Hospital in my own Authority, the estimated cost of undertaking the standard PPM inspection and other routine work including switching on this particular service was some 60% higher with contractors' labour than with our own direct labour force. It is likely that the costs incurred on this type of work are likely to increase substantially. The latest addition of the IEE regulations are very stringent on installation testing and will certainly require more time to be spent on the important function of electrical maintenance and testing which is likely to widen the differentials between contractors' labour and direct labour. In considering the general electrical testing field it is fairly obvious that in order to carry out proper and efficient testing routines access, liaison and testing arrangements need to be made well in advance with user departments. It is more likely that a direct labour force can provide a better service to the client groups involved than ad hoc testing arrangements set up with a contractor.

All costs show are per annum costs

Item	Contract Cost
Incubators Vaporisers/Humidifiers	£2.800
Anaesthetic Equipment	£8,500
Ventilators	£1,200
General Electronic Equipment	£4,110
	£16,610

Figure Three: Medical Engineering Contract Costs.

General comments

In concluding this paper, I would like to draw attention to some of the observations that were made in the 17th Report from the Committee of Public Accounts regarding full utilisation of labour in the NHS works function. The Committee recommended that the proportions of work carried out by direct labour and by contract, including selection of different contract methods over a period of time, should be kept under instant and critical review. The information produced by such reviews could be used and recommended to examine past performances and check assumptions that have been made in plans for future works. In deciding whether to use direct labour or contract labour to execute maintenance work, the following factors should be taken into account:

Direct labour should not be used where it is more expensive than contract work, unless, in the considered opinion of district management, a combination of further factors outweigh this basic disadvantage. These were:

(i) The work demands an intimate knowledge of hospitals and other National Health Service buildings, plant, equipment and services and their functions and methods of working.

(ii) It is essential to keep to the absolute minimum any interference with National Health Service routines.

(iii) Complete flexibility in the use of labour is required.

(iv) The work can be affected by relationships between patients and staff and maintenance workers, particularly in hospitals for the mentally ill or handicapped.

(v) Continuity of employment can develop in the direct labour forces a feeling of pride and belonging in achieving the highest possible standard of maintenance in their hospitals or National Health Service buildings and installations.

(vi) Jobs of very small value or of short duration.

I feel that many of these factors have been discussed in the paper and justification for the use of direct labour is highlighted in these factors

since one or a combination of them is brough into play in nearly every topic of maintenance that has been discussed. Other observations made were:

That great care must be taken to ensure that any cost comparison between direct labour and contract work is realistic and comprehensive. The full cost of labour, materials, and administrative and other overhead expenses should be included in the case for direct labour. Administrative and other relevant overhead expenses incurred by the Authority, such as supervision, administration and accommodation should be added to the contract amount. These aspects were also discussed earlier in the paper. However, a further observation which I feel is particularly relevant was that contract work may be essential where the work required is of a specialist nature or where there is a real risk that if direct labour is employed it will be underused. I have attempted to highlight in the paper a number of areas of specialist maintenance which can be successfully undertaken by a direct labour force if that force is properly trained and managed. The main disadvantages in using direct labour appear to be that:

(i) There is a real risk of under-employment of direct labour where the deployment of labour is not properly planned, a situation which should not arise with proper use of the bonus incentive scheme.

(ii) Direct labour requires logistic support in the way of stores, tools, plant, transport and materials which must be counted as a cost or overhead. These costs have, in fact, been evaluated in the oncost figures which have been produced in the paper.

(iii) The employment of direct labour carries with it the need and responsibility to institute a comprehensive system for financial control and cost comparisons and for training. This is surely taken care of in the cost coding requirements which have now generally been adopted by most authorities. Financal control is obviously necessary if the Estate Manager is to keep within his functional budget.

(iv) It is difficult to arrive at the optimum size of direct labour force, particularly where hospitals concerned are isolated or widely separated. This would not apply to a direct engineering labour force where a full planned preventative maintenance engineering system has been prepared. Most authorities in order to operate an effective and efficient bonus incentive scheme need an element of PPM work in order to ensure that a base load of work is available in measured work terms for the craftsmen to undertake. It therefore follows that most authorities should satisfy this requirement.

All the factors that have been discussed I feel should not lead to a polarisation of policy in which either direct labour or contract labour is regarded as ideal. It is likely that each hospital will normally need some direct labour which in my view should be a compact direct labour force, together with the use of some specialised term contractors where these are competitive. This way Estate Managers can have an informed choice of labour which automatically will provide ample comparative data and considerable flexibility in adjusting the planning of works programmes.

This article was first presented as a paper at the Institute's Symposium on Information Technology at the Barbican Centre in September 1982 by the author, who is a District Works Officer with the Gateshead Health Authority.

Problems — Maintenance and Operations

M H SMITH CEng MIMechE MBIM FIHospE

Introduction

Within the context of maintenance and operations, the six management problems which I will be discussing all have a common aid when it comes to solving the problems — that is information.

Four of the problems lie within the heading of maintenance, namely: Maintenance; Planned Preventative Maintenance; Lack of Finance and the correct and most efficient use of the Finance available.

The problems which lie within the field of operations are Energy Management and Medical Engineering.

Maintenance

What is Maintenance? Maintenance is something which everyone needs but no one is willing to pay for.

The term 'Maintenance' throws up the first problem. It is difficult to convince lay people that it is necessary. The reason for this is that one does not see any tangible benefit from spending money on maintenance. As an example we just have to think of the non-technical person being convinced that changing the oil in one's car is really necessary and will in fact extend the life of the engine. It is easy, therefore, to see that this problem is a very real one within the National Health Service.

However, there has been a great deal of activity since the 1974 reorganisation in bringing this problem to the notice of Authorities. We have all had the problems of convincing our chief officer colleagues and Authorities of the need for maintenance. The management tools are now available which can demonstrate, in a more meaningful way, this problem. One of the most important developments within this context is the condition survey system which is now in Estmancode. It is valuable to management in helping to highlight deficiencies in the maintenance of the Estate; this information is also valuable as an aid to planning. This is just one example of a dynamic information system (by that I mean information collected for one purpose which can be used for other purposes).

Maintenance within total Health Care

There is a need for the maintenance problem to be considered along with other health care problems. Maintenance is not an isolated independent activity which is the sole preserve of the Works Officer, it has a major bearing on the present and future use of resources. In turn, it obviously has a more than significant part to play in health care. Until recently it has usually been too easy to look for capital for replacement of buildings, plant and equipment, when lack of maintenance eventually catches up. Like buying a new car, it is easier to see something tangible for your money.

Now that both capital for new buildings and plant and revenue funds are tight, it is even more important that everyone is made more aware of the need for maintenance.

Planned Preventative Maintenance

The second problem arises when we look at the two main elements of maintenance, namely:

1. Breakdown
2. Planned Preventative Maintenance.

Breakdown maintenance can be very expensive, both in terms of cash and continuity of service, as well as possible human suffering. A good example of this is in the care of our own teeth. There are two ways of dealing with this: either to have regular check ups and if there is a problem it can usually be easily dealt with in terms of a minor filling, is relatively cheap and causes little pain, or:

to leave well alone until one gets toothache, which may require a large filling or fillings, or may even require an extraction, which in turn can be very expensive and can cause considerable suffering.

This situation applies equally well to the National Health Service, but could have more serious consequences. It is therefore obvious that the introduction of Planned Preventative Maintenance can reduce the overall maintenance required, keep the service running, reduce possible suffering and reduce overall costs. In addition a planned preventative maintenance system will assist the Works Officer to establish the correct level of finance required for maintenance of the Estate. The main problem, of course, is lack of finance.

History of Works

If we trace the history of Works within the National Health Service

we will see that there have been systems developed which, although they may not provide the full solution, do go a long way to solving these first three problems.

From the inception of the Health Service in 1948 until the early '60's very little, if anything, was done to introduce planned preventative maintenance. However, the early 60's saw a few Works Officers looking at proprietry P.P.M. systems developed for industry. Unfortunately these systems relied upon a great deal of clerical input, a commodity which some of you may well remember was in very short supply within Works Departments. It was obvious, therefore, that any system which relied to a great degree upon clerical input would be short lived. The general level of thinking at the time was that Works Staff, particularly engineers, should wear cloth caps and carry an 18 inch stillson, whereas clerical or paperwork was the preserve of administration.

Ministry PPM Systems

At about this time the then Ministry of Health introduced a system of Planned Preventative Maintenance which eliminated to a great extent the need for clerical assistance. It also provided pre-printed job specifications covering each job, as well as giving estimated times for the job to be carried out. As a result of this information it was relatively easy to implement planned preventative maintenance for the engineering discipline. There is no doubt that at that time this system did a great deal to establish a better budget for the engineering aspects of the Works function. There were however still problems, because the times allocated were not accurate.

Bonus Schemes

By the early '70's the next stage of Works development came with the introduction of Bonus Schemes. Unfortunately many saw them as only providing a means of enhancing craft wages. This was unfortunate because in fact a great deal of management information became available from a well run Bonus Scheme. Probably the most important of these was a more realistic time for each job and, of course, it provided the much needed information on the building aspect of the Works function. In addition it made Works Officers think very carefully about introducing planned preventative maintenance systems because this raised the level of measured work. As a result of this, and for the first time, we had sufficient information to accurately build up an acceptable set of estimates, covering building and engineering maintenance.

The Correct Use of Finance

The fourth problem, that of making certain that scarce resources are efficiently used, requires more accurate and detailed information about the operation and maintenance of the Estate. It also throws up more problems as follows:

1. Are we over- or under-maintaining the Estate?
2. Is the Estate, in terms of property, plant and equipment, too large for the services provided?
3. When should replacement of buildings, building elements, plant and equipment take place?
4. Is the correct building element, plant, or equipment being used? Is it reliable and is it maintainable?

These problems are not insoluble, but because of the many variables the solutions require more information, which in turn needs greater manipulation, thus leading to the need for computers.

Operational Field

The operational aspects of the Works Depts. has not been such a major problem as that of maintenance. In general boilerhouse and subsidiary plant have been well run and a great deal of detailed information has always been maintained in the form of boiler logs etc.

Energy Management

One of the major problems in the operational field has been that of energy management, but there have been great strides made in the last few years and everyone is now very much more conscious of the need for it. However, most of the effort has gone into economy schemes of an individual nature with short pay back periods. The problems to be solved now is in establishing the correct base load for each site, investigating energy consumption figures, degree days, correct tariffs and future target setting. This involves the collection of a great deal of information, which in turn requires manipulation, thus once again leading to the need for computers.

Medical Engineering

The other major problem is the operation of a Medical Engineering Service. We all have a responsibility in this area, whether we carry out the maintenance by Direct Labour (Works or Medical Physics) or contract. There is no doubt that the Works Officer has a responsibility for the safety aspects of this function. This leads to the need for permits to work and training of personnel who will be operating this equipment. In addition we need costing data to make comparisons between Contract and Direct Labour. Again the solution to these problems requires a good system for the storing and manipulation of information.

E.M.I.S.

My own experience with regard to the need for computers as an aid to Estate Management covers the period from the early '70's, the time when the Northern Region developed a computer system for Estate Management. Having used this system since its inception, and particularly in my present district for the last seven years, I am convinced that many, if not all of these questions, can be answered. It is probably unfortunate that more Works Officers did not take up this system because if they had the problems outlined here would have been virtually solved. We would also be better informed and ready to move into the field of mini/micro computers. I am also convinced that if the system had been developed by the DHSS rather that the Northern Region, then it would have been more acceptable to the country as a whole.

W.I.M.S.

However, that is history and we are lucky that the Department saw fit to take up the challenge and look at the development of mini/micro computers. In addition, Working Group 6 of AGEM are looking at the complete integration of the Works information and will eventually provide you with a complete system which should answer all your problems, not only for operations and maintenance but in the total Estate Management field.

Conclusion

Before I conclude may I once again reiterate that Estate Management, of which maintenance and operations is a part, is not an isolated activity. It is an extremely important part of total health care and we need to work hard at making certain that it is fully integrated as such.

Having look briefly at the problems, I would suggest that the common factor which will either solve, or go a long way to solving the problem, is a system of data collection and manipulation. With information we have knowledge, and with knowledge we can solve our problems.

Book Reviews

Drainage and Sanitation

ROLF PAYNE
Construction Press £13.95

This book has been written to provide guidance information for those intersted in the design, installation and management of drainage systems.

The text contains a general examination of the problems involved with old and new systems and their avoidance, together with advice on specific areas.

There is a section on various types of sanitary appliances, special attention being given to those used in Health Care buildings.

Various types of drainage systems, materials and components all have their own chapter.

Practical hydraulics and venting are covered in some depth in a non-theoretical manner that will enable designers to plan and install trouble-free systems and to understand the reasons behind the statutory requirements and regulations they have to meet.

Design and installation are given detailed coverage, with a useful breakdown of the duties of project team members. Other chapters deal with testing, maintenance and a comprehensive list of trade references and general information.

Throughout the book numerous diagrams and photographs provide clarification and illustration text.

Drain Maintenance: Estate Management

by Rolf Payne
Construction Press £11.95

Designed as a reference book for estate managers and others responsible for health and safety on estates, e.g. hospitals and health care buildings, Rolf Payne's book, *Drain Maintenance Estate Management* emphasises that good design and safety is of vital importance, and, if neglected, can lead to structural damage in buildings, discomfort, and even disease.

Instructions on the organisation and operation of various aspects of planned drain maintenance are clearly set out and illustrated in an easily followed 'step by step' format.

Checklists are provided for specific items such as external manholes, internal manholes, gullies and rainwater goods, etc., and work tasks are given to identify the sequence of work to be carried out by the maintenance operators at each type of maintenance point.

Of particular interest are chapters on:

1. The maintenance of sanitary appliances and cleaning methods highlighting the need for a close working relationship between estate maintenance manager and domestic manager.
2. The causes of drain failure, e.g. design faults, poor installation, misuse, inappropriate materials.
3. The maintenance of old drains which includes a concise section on tools and equipment available.

The remainder and major part of the book deals with case studies highlighting essential points in each. Among the 73 studies given are a bedpan disposal unit, a kitchen gully, metal exchange silver recovery unit, and a blockage that rodding could not clear. Each case study is well illustrated and dealt with under headings of: symptom, cause, cure, design, maintenance, safety (where applicable) and further information.

The book is a valuable contribution to the literature on building maintenance.

Product News

LIF Publications

The Lighting Industry Federation announces the publication of two new titles in its Factfinder series:
No. 4 — Lighting & Energy
No. 6 — Hazardous Area Lighting

No. 4: Lighting & Energy (A5, 12pp, £0.75) This booklet highlights the need for a professional approach to energy management in regard to lighting as a major building service. All aspects contributing to the efficiency of a lighting installation are covered — lamps, luminaires, installation design, controls and maintenance — and examples of energy and cost savings are explained. The LIF stresses that these savings can be obtained with no reduction in lighting standards.

No. 6: Hazardous Area Lighting (A5, 22pp, £1) This survey of the hazardous area lighting scene is an up-to-date guide to an area of specialist lighting that can appear to be difficult to understand.

Launched at the recent IEE Conference on Electrical Safety in Hazardous Environments, Factfinder 6 identifies what constitutes a hazardous area and explains what lighting equipment may be suitable. It also deals with relevant legislation, codes of practice, standards and associated certification schemes.

Copies of FF4 and 6 are obtainable from LIF at Swan House, 207 Balham High Road, London, SW17 7BQ. Tel: 01 675 5432.

Circuit protection range additions

MK Electric Limited is adding two new products to their Sentry range of circuit protection devices — a 40A

miniature circuit breaker (MCB) and a compact double pole residual current-operated circuit breaker (RCB) in two versions.

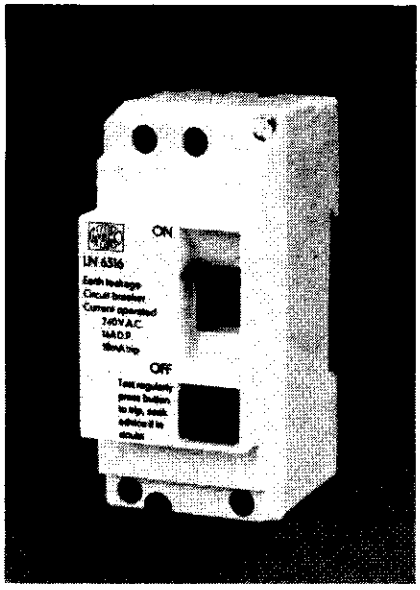
The new RCB units offer 10mA and 30mA fault sensitivity on individual radial or ring circuits, are rated at 16A and 30A respectively and should be used in conjunction with MCBs of the appropriate rating. These two module RCBs are particularly useful when there is a need for the smaller enclosure.

The RCBs (List Nos 6316 and 6730) after additional protection against electrical shock or fire by disconnecting the circuit as soon as a fault, such as current leaking to earth, is sensed. The units are suitable for providing additional protection on single circuits, for split load applications, and will be valuable not only in domestic situations but also in work places such as hospitals, laboratories and offices.

To describe their Sentry circuit protection system MK have published a new 20-page full colour brochure including diagrams, graphs, photographs and full technical details of the range.

Further details from MK Electric Ltd, Shrubbery Road, Edmonton, London N9 0PB Tel: 01-803 3355.

New double pole RCB.



Audiology Suite updated

Ten years ago the building of audiology suites to predictable, repeatable levels of performance was very much in its infancy. Two audiology rooms designed and built by Industrial Acoustics Company then for the new Harrogate District Hospital were at the time considered to represent state-of-the-art technology and indeed provided useful data on which the subsequent DHSS specification for this type of medical facility was partly based.

Times and technology change, however. After a decade of use IAC was approached by the North Yorkshire Regional Health Authority with a view to up-dating the suite. Following a full acoustic survey a number of options were considered by the Health Authority which eventually accepted a full package with four principle aims: (1) to achieve acoustic performance to the current DHSS specification, (2) to restore the smaller of the two original audiology rooms to full operational use which increasing its overall size, (3) to raise the roof of the larger room and (4) to improve the overall appearance of the facility.

The original IAC Moduline acoustic panels were almost entirely reuseable, a major cost saving factor in the rennovation programme. Since IAC systems were based on a modular concept the addition of extra panels where necessary made it possible to increase the size of the smaller chamber to 1400 mm x 2700 mm although this did involve some minor modifications to the masonry wall of the flanking corridor.

The front walls of both chambers are now level and patients in either room can be observed from the common audiology office, through the new aluminium framed, double glazed windows. The larger of the two chambers is now 2.3m to the new false ceiling and both rooms feature full modern safety precautions, including fully enclosed mains lighting plus fire alarm and emergency lighting units.

Testing of the revitalised audiology suite a Harrogate has now been carried out and a full DHSS certificate has been awarded.

Further information is available from Industrial Acoustics Company Ltd., Walton House, Central Trading Estate Staines, Middx. Tel: 81 56251.

Battery Hydrometer

Available from Silver Fox Limited is a new battery hydrometer which the makers claim is virtually indestructible. As well as being accurate and quick and easy to use.

It only requires one fl. oz. of electrolyte so it can be used on anything from small to very large batteries.

For further information on this new hydrometer contact Nicholas Michaelson, Silver Fox Limited, Electrical Components Division, 39 - 41 North Road, London N7 9DP. Telephone 01-607 3917 & 8.

New battery hydrometer

New Transparent Canopies brochure

A four page full-colour brochure is available from Transplastix Ltd. describing their custom-made Transparent PVC Canopies. Designed individually, and fully complying with Building Regulations, the Canopies give maximum natural light plus weather protection.

Typical arrangements are illustrated, and Transplastix offer working drawings, steelwork calculations, etc, to assist with planning permission. Erection teams are available if required.

Further information: Transplastix Ltd, 21 Dean Street, Newcastle-upon-Tyne NE1 1PQ. Tel: 063 612448-9.

Cistermiser automatic flush control valve

Cistermiser has long been recognised as the leader in automatic cistern control and is regarded by the trade as the most efficient and simplest way to save water in mens urinals.

They have now developed a new Low Pressure version of the Cistermiser. This new valve does not replace their existing type but adds a

wider coverage with regard to low pressure situations. The new **Low Pressure** valve will operate on tank supplies down to 0.5 metre and up to 5 metre head.

The Cistermiser is non-electric and is operated by means of sensing pressure drops which occur when other facilities such as hand wash basins and WC's are being used.

Further information from Mr N. P. Austin, Cistermiser Ltd., 176 Perimeter Road, Woodley, Reading, RG5 4SN. Tel: (0734) 691611/691681.

Circular fluorescent emergency luminaire

The Type RF, competitively-priced 4W fluorescent circular emergency luminaire just introduced by the Standby Power Systems Division of Mawdsley's Ltd, is designed for non-maintained 1 or 3 hour operation. It incorporates its own hermetically-sealed rechargeable battery, static switch and charger, all mounted on a single gear tray, to ease maintenance.

All plastics components are made from flame-retarding materials including the black polycarbonate base and opal polycarbonate diffuser. The luminaire is suitable for operating within a temperature range of -10°C to +40°C.

A monitoring LED is fitted to indicate the operational state of the battery charger. The unit is 250mm diameter by 100mm deep and is suitable for wall or ceiling mounting.

The new Type RF 4W fluorescent circular emergency luminaire from the Standby Power Systems Division of Mawdsley's Ltd is designed for non-maintained operation.

Further enquiries: Mawdsley's Ltd, Zone Works, Dursley, Glos. Tel: 0453 4131 Telex: 43128.

Stuart Turner better, cheaper pumps

Industrial pump manufacturers Stuart Turner have adopted a long term policy of improvement across their current range of models in order to maintain a competitive relationship with imported alternatives. Subject of the most recent development project has been Stuarts' general industrial units RG150 and RG2000 models which now become RG152 and RG202.

The new RG models are part of Stuarts' range of high performance regenerative pumps for pumping non-abrasive liquids on a continuous basis. Design improvements and a commonality of parts policy have enabled Stuarts to reduce the cost of their new RG152 and RG202 by between £75 and £95 per unit — more than 25% off previous list prices.

In addition to cost and performance improvements, Stuart Turner have also reduced the weight of the current generation of RG pumps enhancing the model's suitability to specific industrial applications. Motors are capacitor start-and-run types housed in a drip-proof enclosure, and offer a maximum operating speed of 2,800 rpm.

RG152 and RG202 pumps are mounted to the end plates of 1.5hp and 2hp motors respectively, each 220/240 volt, 50Hz, single phase motors; three phase motors are also available to special order. The motor shaft and key of both new RG models are of stainless steel and a carbon/ceramic mechanical seal is fitted. All pump parts coming into contact with liquid pumped are in non-ferrous metals and suction and delivery branches are screwed ' inch BSP internally.

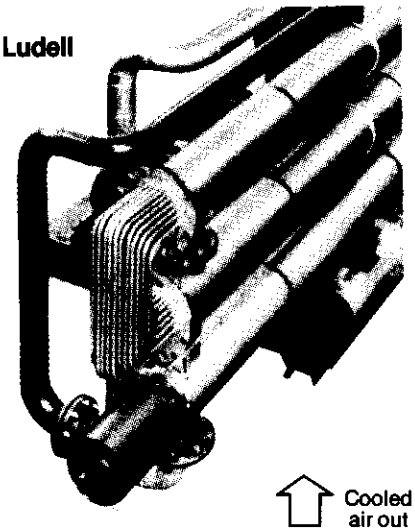
Pressure sets now designated RGP152 and RGP202 are also available, as they were with the superseded models.

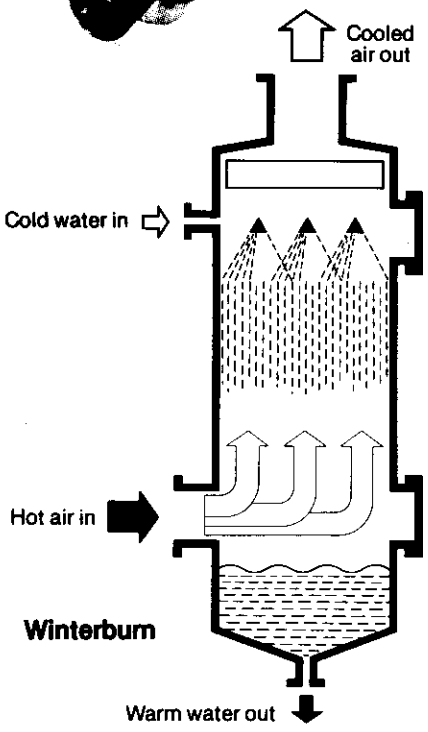
Further information from: Stuart Turner Ltd., Market Place, Henley-on-Thames, Oxon.

Your first major step in cutting energy costs

Now, more than ever before, saving energy in your laundry is a top priority. Efficient Heat Recovery can cut your energy bill by 40 to 50% – considerably reducing the cost of each piece laundered.

Ludell

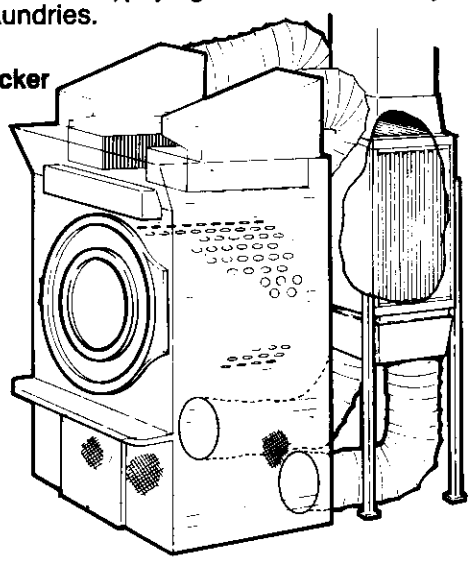




FLS Ludell Waste Water Heat Recovery Systems

- Over 1500 proven installations to date recovering up to 90% of the energy previously going to waste down wash house drains.
- Guaranteed for life against effects of lint and chemicals.
- Self-cleaning twice every hour ensuring maximum efficiency.
- Acknowledged to be the most cost-effective and reliable system available, paying for itself within 1-2 years in most laundries.

Ducker



FLS Ducker Tumbler Heat Recuperators

- Saving up to 40% of steam used by Drying Tumblers and at the same time reducing drying times by 1/3 or more!
- No uprating of fans required due to wide plate spacing.
- Cleaning and maintenance actually reduced compared with unconverted machines.

FLS Winterburn Ironer Economisers

- At last, a low cost and highly efficient spray recuperator recovering around 70% of heat otherwise lost to the atmosphere from the ironer exhaust.

For further details or free computer analysis showing your existing costs and how they can be reduced, simply write, telephone or telex

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Classified Advertisements

APPOINTMENTS AND SITUATIONS VACANT

To place a classified or display advertisement in this journal contact:

Kate Trombley
(By 20th May, 1983)

Hospital Engineering,
48 Southwark Street,
London,SE1 1UN.

Tel: 01-403 6166

District Works Officer

Salary on scale (DT3):
£18,698 – £22,570 per annum inclusive.

Applications are invited from senior works professionals for this challenging and rewarding post, based at the Royal Free Hospital in this London Teaching District.

The successful man or woman will be responsible to the Authority for the management of an integrated, professional service including all building and engineering work and estate management. The ability to demonstrate good managerial and professional experience is essential, particularly the maintenance of building/engineering operations in the NHS.

In addition to possessing the necessary qualifications and experience, applicants should be employed in the NHS under the purview of the PTB Whitley Council.

Candidates wishing to discuss the post are welcome to telephone the District Administrator, Mr. N. Walton or the District Works Officer, Mr. J. Sancroft on 01-794 0500.

Application form and job descriptions are available from the District Personnel department, Hampstead Health Authority, Royal Free Hospital, Pond Street, London NW3. 01-794 0500 ext. 4286. Closing date for returned applications: 20th May, 1983.

HAMPSTEAD
HEALTH AUTHORITY

WEST GLAMORGAN HEALTH AUTHORITY **WG**

North Unit — Morriston Hospital

ENGINEER

Salary £7,260 – £8,201
(plus bonus scheme, currently 15%)

The successful candidate will gain experience in Operational and design functions, much of the work will centre on the Nucleus Hospital on the Morriston Hospital site which is scheduled for completion in 1984.

Applicants should have served an apprenticeship in Mechanical or Electrical Engineering, and will hold a minimum qualification of ONC in Mechanical or Electrical Engineering or equivalent.

Further details may be obtained by contacting Mr. R. A. Richards, Unit Works Officer, telephone (0792) 793232. Application form available from the Personnel Department, Morriston Hospital, Swansea to be returned by 20th May, 1983.

General Accident

New Head Office Complex, Perth

Mechanical Supervisor

A knowledge of heating and ventilation plant, humidity controls, pneumatic controls and systems, gas fired boiler plant, refrigeration plant (large capacity), generators, LPHW pumps and energy management computer systems is desirable.

Qualifications: ONC Mech. or Equivalent.

Electrical Supervisor — Maintenance

A knowledge of H.V. regulations and switching, alternators, electric motors, M.V. switchgear, refrigeration plant (large capacity), gas fired boiler controls and energy management computer systems is desirable.

Qualifications: ONC or Equivalent.

Applicants must have served a recognised apprenticeship, and have at least 5 years experience in a supervisory position. Both supervisors will be responsible to a Chief Engineer.

In each position the salary will be around £8,500 p.a. with opportunities for overtime, generous fringe benefits, including non-contributory pension scheme and assisted house purchase scheme.

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The Staff Manager (Head Office)
General Accident
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