The Journal of the Institute of Hospital Engineering November 1981

HOSPITAL ENGINEERING

Institute Symposium
Estate Management post-1982

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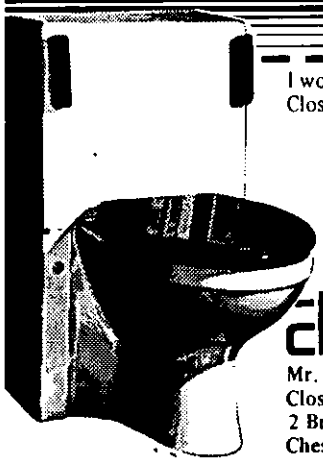

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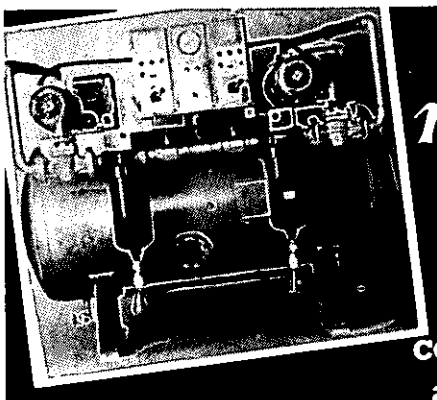

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HOSPITAL ENGINEERING

The Journal of the Institute of Hospital Engineering

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Volume 35 No. 9 **November 1981**

Front Cover: Institute Symposium — The Responsibilities of Health Authorities in Estate Management post-1982, held at the Institution of Mechanical Engineers on 30 September 1981. From left to right: Peter Tankard; W M Darling (Chairman for the Day); and Robert Maxwell — see page 10.

The Symposium was so popular it is to be held again in December — see page 3 for details.

Institute News

Yorkshire Branch

New Harrogate Conference Complex — 10th October 1981

Although this is a very controversial building, because of the supplement rate charge imposed upon local residents, enthusiastic branch members were invited to tour amidst carpenters, decorators, carpet fitters and other trades — all intent on completing the complex ready for the forthcoming programme, including the Eurovision Song Contest in 1982.

At £27 million, the building complex includes a major supermarket, exhibition halls, indoor car parking and a conference/art theatre with a seating capacity of over 2,000.

Although over 2 years behind schedule, the complex is being nominated for an architectual award.

Discussion of the commissioning of complex and integrated building services during the tour proved interesting.

A vote of thanks was given by the Branch Chairman to the Architects, Morgan, Bentley, Ferguson and Cale.

Branch Dinner and Dance

This is a prestige event at the Mercury Hotel, Garforth, Leeds, on 8th January, 1982. Tickets are available from committee members.

East Midlands Branch

November Meeting 'Combustion'

Mr. David Gunn, an acknowledged authority on the subject of combustion, and consultant to the DHSS, and the Association of Shell Boilermakers, has kindly agreed to present a paper to the November branch meeting.

Various combustion problems with common fuels will be discussed from both the chemical and physical aspects. Focus will be made on coal firing by orthodox mechanical grates, with attention to high excess air rates and the formation of deposits. Mention is to be made of certain new thermal provisions in the revision of *BS 2790* and their impact on the *Model Specification for Building Services in Health Care Buildings.* The paper is specifically related to those aspects of boiler installations of special interest to the Health Service and as such you are well advised to attend.

The meeting has been arranged for Wednesday 18th November, 1981, commencing at 5.00 p.m. in the Committee Room, Main Administration Block, Pastures Hospital, Mickleover, Derby. Light refreshments will be provided.

Dust Control and Filtration

One-day meeting

The important subject of dust control in working situations, the hazards of uncontrolled dust and how such dangerous situations can be prevented is the topic of a one-day meeting organised by the Filtration Society.

It will take place on 18 November at the Penns Hall Hotel, Sutton Coldfield and the fee for the day, including coffee, lunch and documentation is £28.

Contact: The Filtration Society, 2 Woodstock Road, Croydon CR9 1LB.

Vic Riley Retires

It is appropriate that we make reference to the retirement of Victor Riley from the post of Principal Assistant Engineer, WHTSO.

He was one of the early members of the old Institute of Hospital Engineers, and indeed was a Council member spread over a period of 25 years. He was also one of those involved in the drawing-up of the Articles of Association, which were adopted at Incorporation at 1st January 1967 when the Rules and Terms of Reference of the Institute were widened to form the basis of the Institute's continuing progress.

Victor Riley

Mr. Riley was also a founder member of the Whitley Council 'F' Committee. He has been with the National Service since its inception, being one of the early members of the staff of the Welsh Regional Hospital Board when it was formed, and remaining there throughout the various changes which have been seen in the Service over the years.

Mr. Riley's interests do not cease here because, in addition, he is a member of the Cardiff City Council and also a member of the South Glamorgan Health Authority (Teaching).

The good wishes of his many friends throughout the Institute and throughout the Health Service will go with him into his retirement.

Members Appointment to WHTSO

We are pleased to report that Mr. R G Kensett has been appointed Chief Engineer to WHTSO following the retirement of Mr. E A Johnson.

Ray Kensett will be well known to members of the Institute of which he has been a member for a number of years, and indeed it will be recalled that twice he has been the winner of the Northcroft Silver Medal Award. More particularly perhaps, his fame will rest on his participation as a tutor on the Keele Engineering Management Courses. We wish him well in his new appointment.

Extra Allocations for Wales

The Secretary of State for Wales, the Rt Hon Nicholas Edwards MP, recently announced that a further £1.7 million is to be made available to Welsh health authorities.

The largest proportion, £1.1 million is intended for use on renewal, maintenance and repair works and is distributed: Clwyd — £137,500; Dyfed — £113,300; Gwent — £172,700; Gwynedd — £78,100; Mid-Glamorgan — £195,800; Powys — £39,600; South Glamorgan — £229,900; West Glamorgan — £133,100.

A further £450,000 is allocated to health authorities to enable them to implement energy conservation measures. Equipment for special services attracts £150,000, part of which will go to providing funding for new advances in patient services.

Institute Tie

A tie, specially designed for the Institute, which bears the official insignia, is still available to members. In a choice of Navy Blue, Maroon or Grey, they cost: UK — £4.50; Overseas — £5.

The are obtainable only from the Secretary of the Institute of Hospital Engineering, 20 Landport Terrace, Southsea, Hants PO1 2RG.

CEI Diary 1982

The 1982 Engineers Diary has a leather-style cover in red, embossed in gold, and contains a 32 page year book section for engineers of all disciplines.

To obtain a copy at half the retail price (£2.75 each), send a cheque to Welbecson Ltd, Thomas Street, Hull, Humberside HU9 1EJ.

Engineers abroad must add £1.80 for surface mail, or £3 for airmail, to cover despatch and handling.

Obituary

It is with regret that we record the death on 26 May, 1981 of Mr William Runcie, District Engineer, Aberdeen.

Mr Runcie retired in May 1978 after 32 years' service with the NHS. From 1969-71 he was Chairman of the Mid-Scotland Branch of the Institute of Hospital Engineering.

The Institute of Hospital Engineering

REPEAT PERFORMANCE!

One Day Symposium

The Responsibilities of Health Authorities in Estate Management — Post 1982

A considerable number were unable, for one reason or another, to attend the Symposium held on 30th September.

Accordingly in answer to many requests it has been decided to stage the event a second time and this will be held, again, at the Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster on Thursday, 17th December 1981 commencing at 10.30 a.m. (coffee at 10.00 a.m.)

Tickets for the day, cost £24 which includes lunch and morning coffee and are obtainable ONLY from The Institute of Hospital Engineering, 20 Landport Terrace, Southsea. PO1 2RG (Tel: 0705 823186).

PROGRAMME

10.40 Estate Management and NHS Planning
Speaker: Cyril Battye Esq. BA FMS MBIM
Head of Research Centre for Health Services Management, Leicester Polytechnic

11.15 Getting the Best Value from Existing Building Stock
Speaker: Robert J. Maxwell Esq. JP PhD
Secretary of The King Edward's Hospital Fund for London

11.50 DHA Liabilities — Legislation, Codes of Practice and Guidance
Speaker: Peter Tankard Esq. CEng MIMechE AMBIM FIHospE
Area Works Officer, Berkshire Area Health Authority

12.25 Organising Maintenance
Speaker: Douglas Robertson Esq., FRICS FBIM
Principal — The Surveyors Collaborative also Executive Director, Building Maintenance Cost Information Centre

13.00 Lunch

14.30 Estate Management and Industrial Relations
Speaker: Nick Bosanquet Esq., BA MA MSC
Lecturer in Economics at the City University
Editor of "Industrial Relations in the NHS — The Search for a System" published by the King Edward's Hospital Fund in 1979

15.10 Realising the Estate Potential
Speaker: Brian Drake Esq. FRICS
Drake and Kannemeyer

15.40 Finding a Better Way of Funding the Development and Maintenance of the Estate
Speaker: Gordon Brooke Esq. MSC CEng FICE FBIM FIHospE
Regional Works Officer
Mersey Regional Health Authority

16.15 Close

This one-day symposium at the Institute of Mechanical Engineers was designed to present, in lay terms, only some of the implications of Circular HC(80)8, *and the main responsibilities and problems to be considered. Here we summarise the seven papers, which will be published in full in future issues of this journal.*

Institute Symposium

The Responsibilities of Health Authorities in Estate Management post-1982

30 September 1981

Estate Management and NHS Planning

CYRIL BATTYE BA FMS MBIM

Cyril Battye reported on five years of research and presented his subject in two parts:

NHS Planning Arrangements;

The Potential Contribution of the Estate to Planning and General Management.

Planning was the main argument in the debate which culminated in the creation of the NHS in 1948. Hospital planning was to have produced a coherent, coordinated pattern of service from the existing hospitals which had grown like Topsy.

Experience during the 1939-45 war pointed to the value of hospital planning on a Regional basis. This was confirmed by the hospital surveys, with results published by the Nuffield Trust in 1946. This was clearly right for the time and the problems to be solved, but this emphasis explains why the first 25 years of the NHS were the years of capital-led, or institution-led planning.

Planning in the 1950s meant rationalising the existing hospital stock and, following the 1962 Hospital Plan, the provision of bigger and supposedly better new hospitals — £500 million to be spent in a decade, 90 new hospitals, the birth of the District General Hospital — this was the high water mark of capital-led planning. The new building boom faded out in the 1970s for a number of reasons: there was a reaction against large hospitals, a financial crisis, the rapid escalation of building costs, lack of success of attempts to achieve savings through standardisation, and other pressures on money, such as the needs of medical technology — which continues to apply pressure.

With the 1974 Reorganisation came a new Planning System, but this only came into operation in 1976. Its key feature, from the estate point of view, was a departure from the belief that most of the problems would be solved by building more and better hospitals — it was a fundamental change from capital-led planning. Planning in future was to be based on measured need for the provision of services — the care group approach.

The Planning Approach was still embryonic when in 1979, with the publication of *Patients First*, a review of its operation was promised. The discipline of planning had proved its value both in the DHSS and the NHS, but the detailed arrangements were over-complicated and bureaucratic. The review is now almost complete, and there is to be a revised set of planning arrangements before the end of this year.

The objectives of these arrangements, which will be in use when the new DHAs take office are:

to enable local services to be reviewed in the light of national policies and priorities;

to provide a basis for monitoring the implementation of national priorities;

to secure value for money from the co-ordinated use of NHS resources at District level.

The Speaker then dealt with the planning process in detail, outlining the responsibilities at all levels. He referred to the need for consultation with CHCs and staff, and for effective joint planning with local authorities. Planning was to include a strategic component looking up to 10 or more years ahead and annual programmes of action for the next 2 years, prepared by each DHA. Planning was to be seen as part of the

management function; a continuing process rather than something which takes place only once a year or every 5 years. He then went on to deal with the estate contribution to service planning and general management.

The creative manipulation of the estate in the interests of improved patient care includes:

Rationalisation of the use of existing land and building stock.

Disposal of surplus assets at the best attainable, commercial price.

Improvement of functional efficiency, suitability and quality of the physical environment for patients and staff.

Design of the environment to minimise on-going running costs, including challenging the provision of over-complex capital stock.

Ensuring that the potential for savings through the standardisation is fully exploited.

The achievement of revenue savings through energy conservation.

The design and implementation of cost effective procedures for the maintenance of buildings and engineering services.

Contributing the estate component to multi-disciplinary planning proposals, including the economic appraisal of options.

The provision of up-to-date information about the present condition, and future potential of the estate as a factor in planning decisions.

The design and implementation of control procedures and performance indicators to achieve value for money from the use of the estate resource.

Contributing to the equalisation of capital stock between health districts — capital RAWP.

Researches have shown that the Estate Manager/Works Officer should have both a substantial and valuable professional contribution to make both planning and management in the new DHAs. His potential contribution has been greatly enhanced since the Government shifted its policy on land disposal. In order to do this effectively, two prerequisites are probably essential. Firstly, the estate contribution must be represented appropriately throughout the processes of multi-disciplinary planning, including membership of planning teams. Secondly, now that the emphasis has changed from the provision of new major capital works to the rationalisation of the existing estate, there is a need for detailed professional knowledge of the estate and its potential at District level, on a continuing basis.

Finally, if the substantial potential of the Estate is to be fully exploited, DHA Members should ensure that the estate viewpoint is fully represented at the conference table. The Estate Manager is the responsible and accountable officer and Members should see that this role is effectively discharged.

DHA Liabilities — Legislation, Codes of Practice and Guidance

P. J. TANKARD CEng MIMechE AMBIM FIHospE

Mr Tankard began by giving a typical example of the kind of crises which existed back in the days when the hospital used to manage its own affairs, without professional support and with only a minimum of staff. Those days, and that standard of staff have now gone. Public expectations are higher, and Parliament has reflected that desire for higher standard in the legislation it has passed in recent years.

As Statutory Authorities, the new DHAs will be legally responsible for the consequences of all actions carried out in the name of the Authority by its employees. Authorities will have responsibility for a large estate of hospitals, health centres, clinics, ambulance stations and residential properties. There are over 63 engineering services in a District General Hospital, many of which are very sophisticated in support of medical technology.

The Works role covers maintaining the built environment, providing 24-hour, 365-day operational services, emergency services and property management, including the acquisition, renewal and disposal of land, buildings and plant.

Mr Tankard then spoke briefly about the most important of the 16 Acts of Parliament, and various Directives, Regulations, Guidance Material and Codes of Practice, which the Works Officers/Estate Managers are expected to understand and comply with on behalf of Authorities. These nearly all relate to safety and cover design of building structures, operation of lifts, explosive risks in operating theatres, discharge from chimneys, electrical safety of patients connected to equipment, storage and distribution of water, production of sterile medicines, operation of laundry equipment and cross infection.

The speaker then referred to some of the detailed provisions of the *Town and Country Planning Act 1971*, *Building Regulations 1976*, *The Factories Act 1961*, *Fire Precautions Act 1971*, *Health & Safety at Work Etc. Act 1974*, the *Electricity Act 1971*, and the *Regulations of the Institution of Electrical Engineers*. He also made reference to the *Code of Practice for the Prevention of Infection in Clinical Laboratories and Post Mortem Rooms*, and the *Technical Memoranda* and *Codes of Practice* dealing with sterilisers, operating theatres and piped medical gases. The problems of handling electrical services and equipment operating at 11,000 volts were emphasised, as was the need for operating permit-to-work systems. The management of all this complex engineering, and its legislation, requires good quality professional and technical staff at management level. The work is challenging and exciting: even for experienced staff, it is sometimes frightening in the sense of some of the statutory implications.

Authorities will need to give careful consideration, in setting up management structures, as to how the conflicting requirements of *HC(80)8 'that as far as practicable all unit-based staff should be managed by a unit manager'*, can be reconciled with the need for professional accountability

for the Works function. There is a guarded statement in *HC(80)8* which says:

When considering management accountability of officers, authorities should assure themselves that a manager can appropriately be held accountable for the work of a particular individual. This is especially relevant when considering whether a member of the administrative discipline can be made managerially accountable for non-administrative staff.'

These statements are contradictory in the advice given as far as the Works responsibility is concerned. Works Officers are equally concerned as others to see the highest possible standards of patient care, and recognise that the Works service at Unit must be responsive to Unit Management Team decisions. But at the same time believe that it is dangerous, in an executive function such as Works, to separate management accountability from professional accountability.

A solution could be to allow the Unit Works Officer a significant degree of delegated authority, and for him to be sufficiently integrated with the work of the Unit Team. The Unit Works staff could not be sufficiently self-supporting, and would need considerable support from specialist staff for many of the functions previously mentioned.

It would be tragic if in the move to more local decision-making, nostalgia does take over and we are tempted to drift back to the crisis situation referred to at the beginning of this paper.

Getting the Best Value from Existing Building Stock

DR ROBERT J MAXWELL JP

The Secretary of State is among the largest property owners in Britain. In England alone there are some 2,125 NHS hospitals with 380,000 beds. The replacement cost of those beds would be roughly £16,000m — 17 times the combined NHS capital and maintenance budgets (£926m) for England, and 33 times the capital budgets (£476m) in the current financial year.

In England alone the NHS holds land totalling some 50,000 acres — taking land and buildings into account the total value of the NHS estate is probably around £20,000m.

Health Authorities, the DHSS and probably the Secretary of State give much less time and energy to this vast estate than its proper management requires. Understandably, land and buildings are remembered only when they cause problems. The building stock is very old — less than a quarter has been built since 1948; roughly a third of the floor area is in buildings erected prior to 1900, and the balance dates from 1900 to 1948.

Old buildings are not necessarily unsuitable or inflexible, but often require appreciable modification, particularly in engineering services to meet today's needs. Some require extensive repair. Unless there is a systematic programme of renewal, the cost of making good ultimately becomes uneconomic and may well exceed the price of new buildings. Some of our buildings are highly dilapidated and can suddenly become unsafe, and many of our newer buildings are being sadly neglected in upkeep — this suggests to the public an acceptance of deteriorating standards. Nobody in authority seems to care.

Just as maintenance expenditure has been whittled down at the operating level, so has capital been reduced nationally. Capital expenditure is now about 6% of total spending, whereas in 1973 it was 9½%.

Dr. Maxwell went on to describe the King's Fund Jubilee Project, in which 14 wards were renovated and remodelled at 10 London hospitals at a total cost of £1.67m. All the projects achieved a real physical improvement, particularly in lavatory and washing facilities, day space, ward kitchens, ward comfort and appearance. The average cost was £5,700 per bed, which is modest compared to the cost of new construction. Although great improvements were effected, in no case were these equivalent to the full standard of a modern newly-built ward. Where wards are badly sited or of inappropriate shapes, total rebuilding is to be preferred. Each ward presented different problems and opportunities, and planners and builders had to work fast and flexibly — most schemes were completed in 18 months from inception. The nature of the work called for pragmatism and compromise.

Dr. Maxwell concluded by saying:

Managing the NHS estate is a vast task in financial implications and potential effect on standards of morale and service.

It is a badly neglected task, the failures being not so much in technical as in general management — particularly lack of priority among all the competing pressures.

Authorities should know what they own — and the characteristics and condition of their property — and have a strategy for maintaining and improving their estate.

Part of the strategy must be for renovating and remodelling the stock, which calls for different approaches and skills from routine maintenance and new construction.

New buildings should be designed so that services can be stripped out and replaced.

From time to time there will be unspent money. Strategy should be planned to take advantage of such opportunities, and to do so skillfully and fast.

While NHS buildings have often suffered from massive neglect, it is ironic that medical, nursing and other staff have frequently put large amounts of time into plans that have never come to fruition. Authorities and their senior managers owe to all their staff that effort, once initiated, should be carried through into action with the minimum of delay and bureaucratic fuss. Technically there is no reason why that should not be possible.

Organising Maintenance

DOUGLAS ROBERTSON FRICS FBIM

The DHSS *Estate Management Practices Code for NHS* — Estmancode — underlines the importance of building maintenance, and refers to it as: *An indispensable and integral part of the vital function of providing patients with the standard of care and treatment which the NHS is proud to sustain; and ensuring that all staff enjoy working conditions which will inspire them to give of their best in the interests of the patients.*

Estmancode also puts members of NHS authorities and their officers on notice of *the gravity and extent of the problem which inevitably will confront them and the patients . . . should they fail to discharge adequately their particular task as stewards of the nation's stock of NHS property.*

The challenge to a maintenance organisation is technical and managerial. The objective is to maximise the economic life of the NHS Estate, within constraints. Premises and their services need to be restored to currently acceptable standards — taking note of patient comfort, functional efficiency and hygiene at a cost that can be afforded.

New Authorities should ensure that local expertise is not lost. All records, drawings, plans for alteration and additions, pipe runs, service contracts should be handed over to the new management. Authorities will inherit a large variety of buildings, some very old, which will create a great variety of maintenance problems.

A building-by-building survey, in broad terms, should be undertaken at an early date. It would provide an overall view of the Estate and would identity non-recurring items of maintenance which could require substantial expenditure in the next few years.

Area Works Officers should have presented annual programmes to their Authorities, giving a breakdown of the actual spend on maintenance work, along with an assessment of the actual needs and the allocation for the current year. The programmes would be costed using up-dated historical data or current price books, such as the *BMCIS Building Maintenance Price Book.*

New Authorities will inherit an existing direct labour force. Where emergency maintenance has to receive a very prompt response, a direct labour force is required. The mix of trades in the DLF, and extent to which work will be dealt with by contract, will need to be re-assessed in due course. Placing maintenance work with contractors needs careful packaging. Some Authorities issue a Schedule of Rates as the basis for contractors to tender on a percentage on the Schedule. The competitive market holds many surprises. One Local Authority went out to tender on a Schedule of Rates which produced quotations from over 60 contractors in a range from -25% to +500%. Term contracts are gaining in popularity.

In its assessment of best value for money, management would have to examine technical, administrative and managerial aspects, and see how they measure against three key questions:

How much has been achieved?

How good was it?

How much did it cost?

Mr Robertson described the Technical Audit, and listed five questions that need to be answered dealing with priority, diagnosis, comparative cost, time to deal with failures and finally, is the repair work satisfactory? He then listed eight questions which would form part of a management audit in a search for best value for money.

The maintenance management organisation should feel amply justified and capable of making a valuable contribution in the design process of new buildings. *Circular HN(80)29* deals with the relationship between planning health buildings and the cost of running them. The paper sets out nine questions for the maintenance manager to ask the designers.

Finally, do insist on 'maintenance manuals' for all significant buildings.

Estate Management and Industrial Relations

NICK BOSANQUET BA MA MSc

A good system of industrial relations is a framework of rules in which management and unions can negotiate about objectives and resolve disagreements.

It would be possible to specify various combinations of pay, non-monetary benefits and job security. There could be various means by which they could be sought, such as harnessing charging technology, to raise pay, and cooperation with management to produce a small, flexible, highly paid work force. Alternatively there could be dogged defence of the status quo, and of custom and practice.

The work force in estate management is a varied one, and its main objectives are to maintain earnings levels while reducing the amount of effort and inconvenience needed to achieve this level.

Earlier discussions dealt with the key areas of management decision which could help to get more value for the NHS from the £1bn a year spent on the Estate. Suggestions for improving the situation on the fairly limited issues which arise in industrial relations have to start from some view on these wider issues. One is that of control of the Works function. There will always be a balance to be struck between functional and general management. Mr Bosanquet expressed the view that the common arrangement in the past, by which works was managed by Area Works Officers, struck entirely the wrong balance.

A good system of industrial relations for Works should, from the management point of view, contribute to greater flexibility. Such flexibility will

be hard to achieve not only because of reasons peculiar to the NHS, but because of the traditional nature of the building industry.

The estate management world has a number of features all its own. It has its own shop stewards representing unions who have members exclusively in the Works field. Their work is affected by bonus schemes which are an important feature of industrial relations. There are also special features of Whitley Agreements, such as allowances for cross trade working. The manager has the mingled joys and sorrows of working with traditional craft unions such as the EETPTU and the AUEW.

Managers in Works departments have been fairly adept in dealing with day-to-day disciplinary problems. With a few exceptions, industrial relations in Works and estate management have been kept out of the headlines.

The test of industrial relations, and of management in the new Service, will be whether it can set in train negotiations on a number of issues of which little has been formally heard up to now. Can the system get beyond the single aim of maintaining 'peace'? The building industry is a traditional industry. The effect of bonus schemes has been to make it more difficult to change working practices.

Pressure from technology and the need for better value mean that the issues of flexibility are becoming urgent. Craft demarcations inhibit sensible approach to maintenance of newer equipment. Cross trade working is still very difficult in the NHS. Value for money would suggest a more coherent decision — as between doing things in-house and going out to contract.

In conclusion, the test for industrial relations after re-organisation will be whether management can raise new issues, and initiate discussion and experiment on them. The long-term aim would seem to be for an estate management effort with a clearer function and a more flexible work force. The engineering world in the NHS is in touch with the outside building world which under market pressures has already faced many of these problems. It is now time for management in the NHS to try to define the industrial relations steps which are needed for greater flexibility and rationality in the maintenance effort. The advantages from change will not all be one way. There could be considerable gains in pay and job satisfaction for a more flexible and more productive work force. It is time to start mapping out the high road for estate management in the NHS.

Realising the Estate Potential

B. E. DRAKE FRICS

It is very rare for the commercial potential of the health estate, or the potential for health purposes, to be taken into account by Health Authorities in formulating strategic and operational plans.

Prior to the liberalisation of the land transactions procedures in April 1980, there was little incentive for Health Authorities to release land, since so many bodies had to be consulted or were entitled to lay claim to the land on highly favourable terms. Now it is possible for Authorities to retain the proceeds from the sale of land.

Considerations of commercial development potential are most fruitful when they form part of the planning process — review the potential first then decide on disposal. Even major hospitals, where there is no possibility of closure within almost any time scale, ought to be included, as components can be moved to alternative sites, facilitating closures elsewhere. Sometimes there are larger areas of major hospitals which are unsatisfactory for health purposes, and which could be profitably released. The entire stock of the DHA must therefore be reviewed.

Mr Drake described his approach to a District land and property review: Obtain a plan of the District with the land and buildings clearly marked, study the strategic and operational plans; take copies of such data as are available on the extent and ownership of land, nature and terms of leases, condition surveys, existing uses, the forward capital and maintenance programmes, details of listed buildings etc.

Informal discussions are held with officials of the local planning authority to establish their policies and views on planning criteria. Note is also taken of other planning proposals in the vicinity. An outline survey of market prices and rentals is made of properties in the vicinity of the site, and the demand and availability are noted. Informal discussions with the District Valuer are often held.

The operational plan can be reviewed against the broad appreciation of the physical and commercial potential of the estate. Estimates of sale value of those sites which appear promising are based on the most beneficial planning use shown to be achievable. Suggestions can then be made for modifying the existing operational plan, together with estimated costs of the charges and how they might be financed.

There may be a need for urgent action, such as serving notice of objection on local planning authorities. Detailed studies of possible conversions for health care purposes, and applications for planning consent prior to disposal, may have to be undertaken.

Mr Drake described in some detail how all the procedures were applied in a District in a large metropolis which is shortly to open the first phase of a new DGH — making it possible to close some hospitals and change the function of others. He concluded by saying that the whole potential of a health estate, rather than one particular aspect, should be considered together with its potential to deliver care and its commerical potential. Timing is also important, sometimes it is possible to use disposal proceeds to effect a whole string of beneficial changes.

The process requires a combination of knowledge of health care planning, together with at least experience of commercial development, and preferably some flair in this field (which is not to be confused with the valuation process). Given access to such resources, the new District Health Authorities are well placed to realise the full potential of their estates.

Finding a Better Way of Funding the Development and Maintenance of the Estate

G. BROOKE MSc CEng FICE MBIM

The structure of Mr. Brooke's paper fell into two parts:

What is the present method and what is wrong with it?

What are the other ways and why are they better?

Chairmen must recognise a twin responsibility to the patients of this generation, and to those of the next generation. Today we would not have a Health Service if the Victorians had not recognised their responsibilities in this form.

The objective of all Health Authorities must be:

To hand over to future generations a Health Estate in no worse condition than the one they have inherited.

This policy of Trusteeship is a policy which only Authority Members can set themselves. It is no good looking anywhere else for Policy guidance. The Politicians and the Department of Health have failed over the past 30 years to set down any policy.

When looking at the present method of funding the first problem is the absence of numerate criteria to value the Estate. A commercial concern would want to know from its accountant: *What capital they have and where it is invested and how the annual incomes and expenditure are being deployed to preserve the shareholders' capital.* But the Health Service has Treasurers, not accountants. accountants.

Treasurers will give good information on where cash is being spent this year, or where capital was spent last year — but not the starting value or the value now or what should be spent to preserve the assets in the Trust.

Each Chairman will be responsible on average for about £100m of investment. Works staff can tell Chairmen the physical size and condition of their Estate but the Finance discipline has made no similar progress in valuing the Estate. It is surprising that the Public Accounts Committee questions the Accounting Officer on how the Service has spent £300m of current capital, yet never looks at what is happening to £20,000m of past investment.

Districts see Revenue as their money and Capital as the Region's money. Hence the less revenue spent on preserving the capital stock the more capital the Region will be forced to provide. Current Estate policy is in practice the policy of the Lowest Common Denominator.

Although the Works Officer may diligently draw up carefully considered programmes, (based on PPM, Departmental Guidance, and Estmancode Standards) using commandable technology and carefully priced, the non-committed work gets deferred well into the financial year, or until the Treasurer is able to see if the Authority is spending within its cash limit. Thus the rate and timing of spend has nothing to do with maintenance programmes. It is all about balancing the books. The main points made in the second part — Finding a better way — were:

First examine the objectives. There is nothing wrong with the policy objective referred to before. But all DHAs in the Region need to subscribe to the same policy. Chairmen must develop this concept of being Collective Trustees for the Estate, but to measure the performance of Districts and the extent to which they are supporting the Collective Trustee Policy, they need control information.

Control Information — The Trustees need an Asset Record to value the estate for which the Authority is responsible. Progress made by Works in computer technology now enables us to manage the data. They need Estate Management expenditure information; this should give a target maintenance cost in £/m^2. From this, a simple piece of control information can be derived — Actual Spend as percentage of Target Spend.

Every Chairman should know what the other Chairmen in his Region are spending. At present they do not look at how the other Districts are looking after the Estate — in their own interest they should do so. Those that fail to maintain the Estate will use other Chairmens' capital to put it right.

The present Parliamentary vote for Health and Social Services at Departmental level in Revenue and Capital Accounts is nonsense, because: there is no national policy on which an allocation can be determined. Capital funds are the uncommitted cash flow after Revenue commitments have been made; there is a failure to recognise that capital and current estate maintenance spend are inseparable cash flows of current resources into the Estate. They are shown in separate accounts. Capital is now a 'free good' and in any managerial and economic system free good destroys managerial and economic logic. Financial pressures are absorbed by using the 'Slush Fund' — this needs to be sorted out.

Authorities need to set up and preserve a capital fund that matches the policy identified by the Trustees. Capital is the seed corn of change. No effort is made by Authorities to replenish or support their own capital fund. The health needs of the population should not depend on some ministerial whim for their level of capital provision. The Trustees should examine ways of repaying what they consume to generate a self-financing Capital Fund in each Region. These ideas need filling out in detail by research and development.

The Health Service has to take charge of its own R & D budget in the Estates field. What we need is an Estates Council, analogous to the Supplies Council. All the logic that brought about the Supplies Council applies equally to the Estates Council. It could set these standards and identify priorities, develop management systems and control information, and carry out the Research the *Service needs,* not what the *Civil Service wants.*

Looking around the decaying hospital stock the Service has not got it right over the last 30 years.

When Chairmen end their term of office, they should be able to paraphrase Sir Christopher Wren's memorial with some pride:

If you want my epitaph — look around you.

The author is Principal Assistant Engineer (Operations & Maintenance) at the West Midlands Regional Health Authority. This paper was presented at the Institute's symposium 'Designing for Reduced Hospital Energy Consumption' *on 18 June, 1981.*

Existing Hospital Stock
Problems and Solutions
PART I

R A BRIGGS BSc(Hons) CEng MIMechE FIHospE

An Energy Programme

When one considers that by the year 2000 new designs and upgradings will only account for 10% of the NHS hospital buildings, the greatest potential for energy conservation, in the short and medium term, will depend upon conservation measures associated with the existing hospital stock. This concept was recognised when in December 1977 *HN(77)192* was issued giving details of a rolling programme of special financial allocations for energy conservation. *(Figure 1).*

Special allocations for conservation had been made prior to 1977, but for a number of reasons these had generally proved ineffective. What was unique about *HN(77)192* was that it announced a rolling programme of investment whereby each successive year the allocations would be reduced, and the balance funded by savings generated by the programme itself. In other words, the programme implied that Health Authorities could have funds for energy conservation schemes on the condition that they were prepared to make an increasing contribution themselves.

The Results

The West Midlands Region was well prepared for this conservation programme, having produced their *Energy Data Manual* in 1975, a *System of Energy Audit* in 1977 and an *Energy Monitoring Sheet* in 1978. The means to identify schemes, monitor the results and now the finance were all readily available.

HN(77)192 (£ Millions)				
	Total Investment	**Sums Allocated**	**Savings Re-Invested**	**Potential Savings**
1978-79	4.0	4.0	—	1.0
1979-80	8.0	6.3	1.7	4.0
1980-81	8.0	3.0	5.0	7.5
Onwards	8.0	—	8.0	—

Figure 1: HN(77)192 — financial allocations for energy conservation.

Birmingham AHA(T) (£000s)				
	Total Investment	**Sums Allocated**	**Savings Re-invested**	**Potential Savings**
1978-79	134	134	—	34
1979-80	319	252	67	167
1980-81	505	287	218	378
1981-82	—	—	349	—

Figure 2: The first 3 years of the Birmingham AHA(T) energy conservation programme.

Figure 2 shows the level of allocations and reinvested savings for the first 3 years of the Birmingham AHA(T) energy conservation programme. This represents a total expenditure of just under £1m, which has resulted in a recurring annual saving of around £350,000 for reinvestment.

A sample survey of the hospital sites within the West Midlands Region, covering one third of the regional total expenditure for the first 2 years of the programme, indicated that the schemes implemented had resulted in a reduction in coal and oil consumption of some 15% with a payback period of 4.3 years.

Nationally, *Figure 3* indicates that energy consumption within the NHS is continuing to fall at an encouraging rate — particularly when compared to the projected growth from the

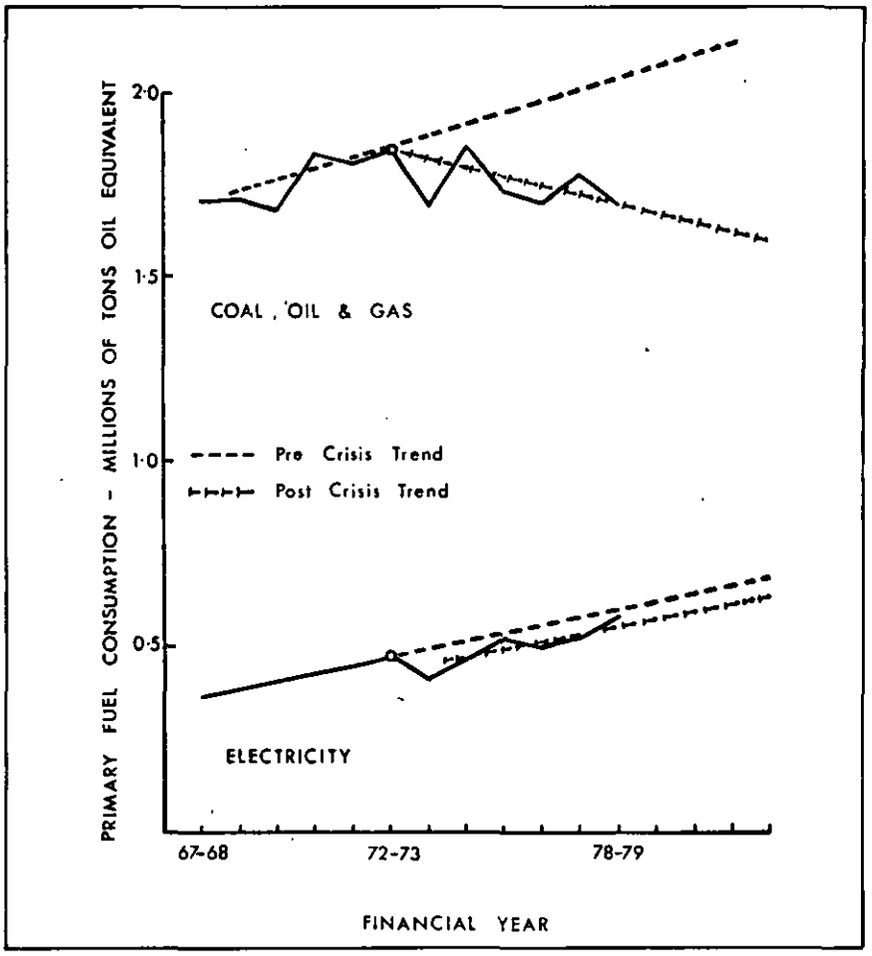

Figure 3: Hospital energy consumption — England & Wales.

consumption levels of the late sixties and early seventies.

Unfortunately, it is unlikely that the initial success of the energy conservation programme will continue, because:

It can be deduced from *HN(77)192* that the original programme was based on payback periods of 2 years extending to $2^{2}/_{3}$ years, whereas in practice schemes implemented have been based on payback periods of 4 to 5 years. Consequently, the resulting savings have been lower than intended and self-financing status, at a constant level of investment, has not been achieved; and from 1981/2 onwards, Health Authorities are expected to make a 100% contribution to the programme, with the result that conservation schemes will have to compete with other schemes and health care needs as before.

Despite this somewhat gloomy prediction, all of the available evidence for the past 3 years indicates that considerable energy, and consequently financial savings, have been achieved as a direct result of the *energy programme.*

Method

Having defined the programme and established that savings have been made, the next question is how?

Boiler Plant

With regard to the problem of excessive boiler fuel and steam consumption, it was a well-established fact that Lancashire, Cornish and Vertical cross-tube boilers were less efficient; they had higher standing losses, and could not respond quickly to falls in load when compared with modern packaged boilers. The accumulative effect of these differences on the overall fuel consumption was something of a mystery. However, with the development of energy audit techniques, analysis of monthly consumption profiles, particularly for sites with around 2:1 Winter:Summer fuel consumption ratios, revealed that a potential 20 to 30% fuel saving by boiler replacement or improvement was available.

Figure 4 shows monthly fuel consumption profiles for East Birmingham General Hospital. The scheme to replace the 4 Lancashire boilers and economiser with 3 new packaged boilers began in the Summer of 1978, and resulted in a 20% reduction in the annual fuel consumption and a payback period of less than 4 years.

Figure 4: East Birmingham General Hospital — monthly fuel consumption profiles.

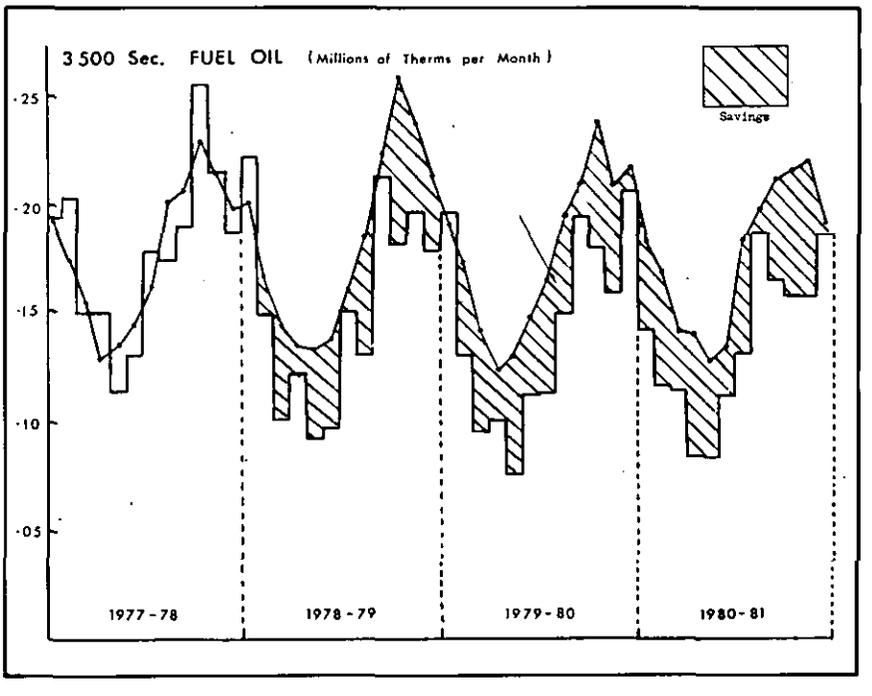

Figure 5 gives a summary of 63 obsolete boiler replacement schemes across the country, incorporating changes in fuel, changes in distribution system and conversion from steam to LPHW. The results of this limited survey indicate that:

The replacement of obsolete steam or LPHW boilers has produced average fuel savings of 23 to 24%;

the use of premium fuels on LPHW plant can save a further 8% in energy terms;

conversion from steam to LPHW boiler plant, thus eliminating condensate losses, blowdown losses and certain mains losses, has produced a 14 to 20% fuel saving;

decentralisation of LPHW boiler plant thus eliminating distribution mains losses, can save a further 8%.

Generally speaking, the results of the boiler replacement schemes have proved the theoretical savings to be correct — or even a little conservative — which implies that a number of NHS sites still operate with heat generation and primary distribution losses alone, accounting for more than half of the total boiler house fuel consumption.

In view of the 2nd and 4th point above, it is likely that the most economic solution for boiler replacement within the NHS is central, low/medium pressure hot water boiler plant, fired by coal or heavy fuel oil — providing that the price differential between these fuels and the premium gas and light oil fuels remains in excess of 16%.

Fuel Conditioning

My comments on fuel conditioning to save fuel will be brief. I have been shown fuel/water emulsifiers and plastic pyramids that work by magic, and additives that claim to cure everything from low boiler efficiency to lumbago.

Having conducted comprehensive scientifically based tests on two different general purpose fuel additives, which revealed negligible improvements, I still await a convincing justification to use these potions and devices.

Heating Systems and Controls

Any heating system consisting of a heat source, a distribution system and heat emitters is analogous to a central boiler plant and site distribution system, which suggests that there is a considerable standing or base load loss, that may or may not be sensed by the heating control system. A recent investigation undertaken by the DHSS, at 8 hospitals, indicated that a staggering 64% of the useful heat output from DHWS calorifiers was lost by the distribution system. Although it is unlikely that a space heating system would have losses of this order, a similar investigation would indicate substantial losses; thus emphasising the need for correct sizing, effective insulation and tight control on any new or upgraded system.

Schemes involving the installation of Optimum Start, Outside Compensation and Time controls are too numerous to mention individually. As a generalisation, on older buildings, when combined with improved building insulation, these schemes have elevated space temperatures to correct levels and/or saved up to 35% of the original space-heating fuel consumption. A problem on new buildings with improved insulation and moderate air change rates, is that the thermal lag of the structure has made the use of these simple controls extremely difficult, and a more sophisticated control system, based on a microprocessor, is required.

In recent years, there has been considerable growth in the applications of microprocessors and the dedicated microprocessor-based Energy Management System in particular. At least 10 systems are operational in the NHS; a further 10 are being installed and many more are being evaluated. Early indications show that these machines are cost-effective for large site units, and that further development and tailoring to NHS requirements is inevitable. Operation experience has highlighted two problems:

The benefits of a system on a new site are immediate, and the lack of evidence of consumption levels or control decay without a system make the resulting savings very difficult to quantify;

to achieve the maximum potential savings requires both the system and the dedicated attention of a keen operator or controller.

Figure 6 shows the progressive reduction in monthly fuel consumption at Burton Andressey Hospital — achieved by both the investment on new equipment, and the determination of Mr Ken Lee, District Engineer, to make the site as energy efficient as possible.

Heat Recovery

I do not intend, in this paper, to elaborate on heat recovery schemes associated with steam and boiler plant in the form of economisers, recouperators, blowdown systems and flash steam vessels. The technology and equipment required is readily available and there are many examples within the NHS.

Many areas of hospitals with mechanical ventilation have considerable potential for heat recovery, particularly where high temperatures, and/or air change rates and/or humidity exist. There are at least 20

Figure 5: Summary of 63 obsolete boiler schemes.

Boiler Replacement Schemes	No. in Sample	% Fuel Saving
1 Central Steam to Central Steam:		
A	11	22
B	9	23
2 LPHW to LPHW:		
A	6	32
B	7	24
3 Central Steam to Central LPHW:		
A With steam generators	4	34
A	12	42
B	4	37
4 Central Steam to Local LPHW		
A	10	53
A—Fuel Change		
B—Same Fuel		

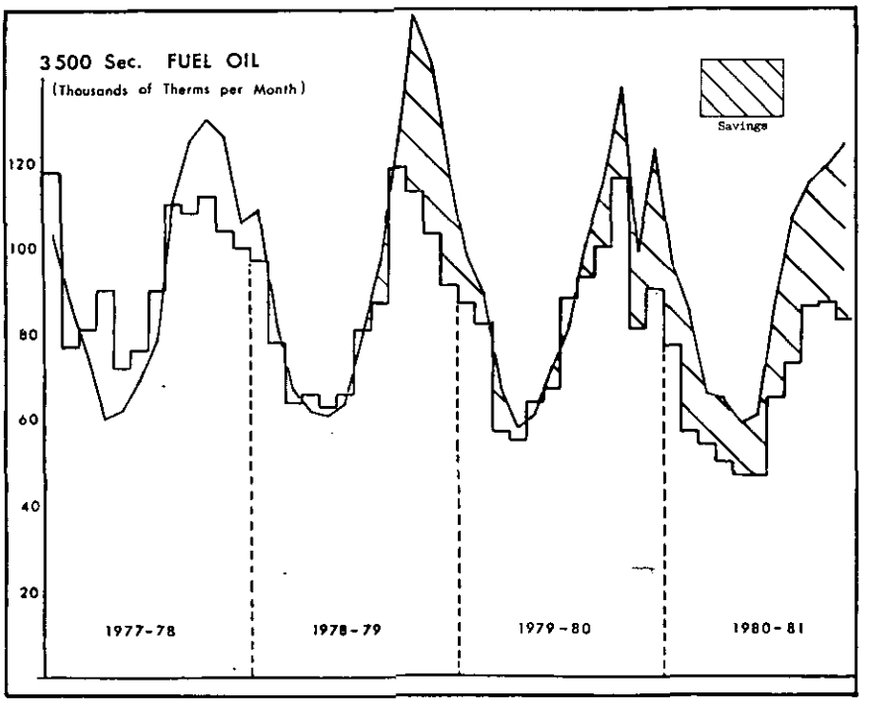

Figure 6: Burton Andressey Hospital — progressive reduction in monthly fuel consumption.

installations where Thermal Wheels, Plate Exchanges, Run-around Coils and Heat Pumps are being used to recover heat — mainly on Operating Theatre and Hydrotherapy Pool ventilation plant. To date, insufficient operational data or metering is available for these installations, to generalise on percentage fuel savings. Although the early indications do suggest that a 70% recovery rate is attainable.

With regard to Kitchens and Laundries, it is somewhat disappointing that, since the energy crisis, very few manufacturers have produced equipment with built-in heat recovery, (Passat and Ortex tumblers and Stierlen dishwashers being notable exceptions). Consequently, the majority of heat recovery schemes have been one-off, purpose designed, bolt-on heat exchangers which may have proved effective, but can only be a second best in terms of overall efficiency and capital cost to a standard manufacturers option.

Unlike manufacturers of Kitchen and Laundry equipment, most Incinerator manufacturers have been quick to offer heat recovery equipment that is compatible with their machines. A few schemes have been completed, and many more are to the design or construction stages. However, despite the considerable experience in burning waste at hospitals, a serious problem is that there is very little specialised knowledge of recovering heat from the particularly hostile flue gases from incinerators, and great care and control must be exercised. A better solution for the NHS may be an improved design incinerator that uses recovered heat to preheat its own combustion air, thus making the incinerator a stand-alone item of equipment that consumes less fuel than the present versions.

The Future

Experience gained from the implementation and success of the energy programme, has provided a number of managerial and technical lessons, which should be helpful to both operational managers and designers in the future.

Funding Arrangements

The principle of financial contributions embodied in *HN(77)192* has been, without doubt, most effective. In view of the new grants being offered to industry, to replace oil-fired boiler plant with coal-fired plant, and the remaining potential schemes in hospitals, a similar programme for plant replacement in the NHS, based on financial allocations supplemented by energy and/or revenue savings, would be most effective.

Design Considerations

The provision of adequate insulation and the correct plant configuration, having considered the site topography and the nature of the site load, are fundamental to design and are beyond the scope of this paper. However, by identifying some of the factors which led to the deterioration in energy efficiency on existing sites, it should be possible to take the necessary steps to prevent both upgraded existing hospitals and new hospital developments from suffering the same fate.

Heating Systems

There is a natural incentive for designers to oversize heating systems, as this requires less detailed design work, results in fewer complaints from the user or client, and attracts higher fees.

While it is accepted that a reasonable margin has to be included in the design, a grossly oversized system with a 24hr/day occupancy can have serious turndown problems, and inevitably leads to overconsumption of energy — particularly when the output of the whole system is elevated to compensate for an inadequately sized or blocked radiator at the end of the system. Correct sizing of a system does not eliminate operational problems or complaints; but it does prevent overheating, and hence energy wastage, from being used as an easy solution.

Heating Controls

An accurate and responsive heating control system, properly matched to the heating system and building construction, will only work effectively if the initial settings are correct, the performance frequently monitored and adjustments made when necessary.

Where a system is under the control of the building occupant or user, (who has no incentive to save energy) a sustained good-housekeeping publicity campaign is required, to ensure that space temperatures are kept anywhere near the intended design level. A remote facility, accessible only to the site engineer, provides a far more reliable and effective means of ensuring consistent comfort conditions, and minimising energy wastage.

However, it is psychologically desirable and results in less complaints if users have control over their own environment. In certain

applications a trimming control, which operates up to design conditions can be made available to the user, thus keeping all parties happy and offering further energy saving potential.

It is reasonable to assume that microprocessor-based energy management systems will be considered for all future major hospital developments, and that many more will be installed on existing sites. On both new building projects and upgradings, it is essential to provide adequate zoning of the heating system — or at least a mains distribution layout that lends itself to the zoning of specific areas — so that an existing or future energy management system can be utilised to maximum effect.

Heat Recovery

With regard to heat recovery, there are three questions that should be considered for every item of plant or equipment at the design stage:

Is there scope for heat recovery?

Is there a practical use, in terms of quantity, quality and cycle diversity for the potential heat available for recovery? Relocation of the heat source and/or sink may be necessary to make the transport of heat between them an economic proposition.

Where heat recovery equipment is not included in the initial design due to cash limits, the design brief or extended payback at current energy costs, then is there sufficient space for the necessary heat recovery equipment to be accommodated at a later date?

Boiler Plant

As with heating systems, there is every incentive for the oversizing and over-provision of boiler plant on new schemes. Over-provision of boiler plant inevitably results in turndown and smutting problems. This leads to delays in plant replacement by providing spare capacity that can accommodate lower efficiency, deterioration in controls and poorly engineered extensions, such that given time a hospital steam requirement will expand to match the installed boiler capacity.

Hence the selection of boiler plant for any scheme will have a major influence on the resulting energy usage. For replacement boiler plants in particular, it is essential that:

The boiler size is correctly matched to the hospital load, i.e. the boiler MRC equates to the true hospital hourly peak load and not the sum of individual peak loads.

Sufficient standby facility exists, considering the nature of the load, the type of site and the load priority.

An agreed or stated operation policy, on which the design has been based, should be prepared covering Winter/Summer, day/night and standby/operational modes.

A full documented efficiency test, across the modulating range of each boiler, is carried out to provide operational staff with details of the plant capabilities and to set target efficiencies.

Conclusions

The conservation measures described above have included:

Replacement of obsolete boiler with fuel change: savings up to 32%;

recouperators/economisers/additives: up to 7%;

oxygen trimming controls: up to 5%;

decentralisation of boiler plant: up to 11%;

elimination of steam generation: up to 20%;

improved control and energy management system: up to 35%.

Of course, it does not follow that if all these measures are applied to an old site with obsolete plant and equipment the overall saving would be 110%. We must beware of generalisations: the energy saving potential that exists is an accumulation of specific types of energy wastage on individual sites, which must be individually identified by an energy audit.

The experience of the energy programme has emphasised that considerable further scope for energy conservation exists within the NHS, and substantial investment is justified.

While operational staff have the responsibility to utilise existing plant and equipment as efficiently as possible, the long-term success of energy conservation within the NHS will depend, to a large extent, on the energy consciousness and applied conservation technology of today's designers.

Acknowledgements

Mr V Skegg, Superintending Engineer, DHSS; Mr W Howarth, AWO, Birmingham AHA(T); Mr S Lane, DE East Birmingham Health District; Mr K Lee, DE, SE Staffordshire Health District.

PART I

The author is District Building Officer of the North Staffordshire Health District and he gave this paper at the Institute's symposium on 18 June, 1981, as a companion to the preceding paper.

P P FARROW

Introduction

At District level, energy conservation does not stop at satisfying the thermal conditions referred to in *Part FF of the Building Regulations* for alterations, extensions and new works of a minor capital nature — but takes a serious look at the existing stock of properties within it's responsibility.

It is the District's policy to allocate, as part of the works budget, an annual sum for energy conservation to improve existing buildings which fall well below current standards. The hospital stock in North Staffs ranges from former workhouse properties to modern present-day hospitals with an average age of 50 years. A considerable amount of money has been spent across the District over the past 3/5 years, in an attempt to uplift the thermal insulation standards of the older buildings by means of:

Roof insulation;

cavity wall insulation;

window replacement;

secondary glazing;
insulated false ceilings;
reconstructed glazed verandahs.
insulated false ceilings; and,
reconstructed glazed verandahs.

Since 1977, a sum in excess of £200,000 has been allocated for energy conservation on existing buildings, spread over 21 hospitals, 56 health centres and clinics, residencies and the like.

Usually, one finds that with the workhouse and pre-war type of building, the construction may well be acceptable and termed as 'solid' — but falls well below the standards required for conserving energy. There are many such buildings within the Health Service that fall within this category, not only appertaining to the building elements, but also to inefficient heating services. Efforts are made to improve the thermal resistance of such a building; but without a substantial injection of capital, satisfactory conditions cannot be achieved.

It is not surprising, therefore, that units of lesser years (e.g. Ward Blocks and Departments) take precedence, because they lend themselves more readily for insulation purposes. The City General Hospital at Stoke-on-Trent, which I shall take as an example, has a range of buildings varying between 70 years and present or recent developments; which in turn have each presented numerous problems by way of low temperatures — affecting patients and staff alike.

Study I: City General Hospital Nurses Home

This is a four-storey, traditionally-constructed building, situated at the North East Corner of The City General site. It was designed to accommodate the residential nursing staff in the 1930s. The construction is of 16'' thick brickwork in two skins, — the outer skin being 4½''. The home has a pitched tile roof, the windows consisting of single glazed steel frames.

In 1976/77, it became apparent that maintenance to all the windows on each elevation was uneconomic and, therefore, a total window replacement was recommended. The metal had become distorted and corroded, thus creating considerable draughts. This lead to concerted complaints from residents, via their consultative committees, because of the low temperatures and water penetration.

The replacement programme was spread over a three-year period, at a cost of £44,500, using steel window frames (hot dipped galvanised coated), single glazed as existing. Double glazing was ruled out due to financial restraints.

The thermal calculation for the building, prior to the upgrading programme, was evaluated at 4.7 w/m²°C for the roof, and 1.59 w/m²°C for the walls. This was well below current standards as laid down in *Part FF of the Building Regulations.* The revised calculations, following the work, were evaluated at 0.317 w/m²°C for the roof, and 0.600 w/m²°C for the walls. This result satisfied the Regulation, and brought this particular building up to an acceptable standard from an energy saving aspect.

Following this, the building was cavity-wall insulated with *UFOAM Plus,* a product developed by *ICI* and installed exclusively by *Cape Insulation Services Ltd.* 19mm holes were drilled in the external skin at 1m centres, and the *Urec-formaldehyde* injected under pressure. The cost of this work was £2,374.

In 1979, the pitched roof space throughout the building was insulated with 100mm glass fibre quilt — 1000m² at a cost of £1,600. This made a total expenditure of £48,474 in energy conservation works.

The resultant cost, broken down over the total floor area of the Nurses Home, equates to £12/m².

Results

The environmental conditions were improved; general maintenance of the windows was practically eliminated; and the risk of fire (created by residents supplementing the heating by using their own appliances — unofficially) was removed.

Study II: North Staffordshire Maternity Hospital

This is a +200-bed maternity unit built in 1968, and is sited within the curtilage of the City General Hospital. The problem with this multi-storey building is that it is totally exposed on all elevations, and has a considerable surface area of single glazing. The unit is heated by means of coils, sandwiched between ceiling and structural floor slab. The wards are situated along the South side of the building, and during the Winter months they are subjected to adverse conditions through a drop in temperature. This is due to draughts from the aluminium sash windows and from under window cills. In addition the building suffers from wind noise. On the Northern side of the building are located nursery and ancillary areas. Problems existed here throughout the year because this elevation lacked direct sunlight and solar gain. It was necessary, therefore, to supplement the heating in these particular areas with electric convector heaters. In the last quarter of the 1977/78 financial year, a sum of money was allocated for energy conservation: this hospital was selected as an immediate priority. As is usual in the Health Service, decisions had to be made quickly, in order that the money could be expanded in this particular financial year. A secondary system of glazing was selected in this instance at a cost of £24,000. The glass was a lift-out system and operated horizontally on smooth-running rollers. It was supplied and fixed all within a period of 8 weeks, and consisted of secondary glazed units to all the Nurseries on the Northern side, and Ward areas on the Southern elevation (approx. 150 windows). The work was carried out without any inconvenience or disruption to patients and staff, and eliminated the problems which previously existed.

The advantages of this sytem of glazing are:

The glass can be readily fitted to any window configuration;
there is reduction of heat loss through combined existing and secondary windows;
sound transmission is reduced;
it does not alter the asthetic external appearance of the building;
the system is easily cleaned and is a manageable unit enabling maintenance staff to remove it for this purpose;
the insulation is clean and the existing windows are retained;
the anadised aluminium frames are maintenance free; and
the whole system is draught-proof, not only through the external windows, but below the cill itself since the frame has a built-in projected cover mould.

Results

The system has now been in operation for three years and has been com-

pletely trouble free. Supplementary heating in the form of appliances have been removed from the Nursery areas — which in itself is cost-saving.

Study III: Surgical Block and Psychiatric Block

These ward blocks were built in the early part of this century and are two-storey buildings of Nightingale design with bed heads abutting the external walls and adjacent to windows. The wards and annexes are heated by LPHW and are very lofty in their construction. The walls are solid brick with wooden sash windows — single glazed.

Although the temperatures within the buildings are adequate, the environmental conditions during the Winter months are most unpleasant for patients due to the ever-present draughts created by the notorious sash windows — which through age alone have become ill-fitting, thus presenting a building maintenance problem.

Each year, the Works Department staffs are employed during the Autumn period in masking-up and sealing, in an attempt to temporarily eliminate the problem. There are ten wards involved, and it requires 2 men per day to service each ward.

The resultant cost of draught-proofing hovers around £700. The expenditure does not stop at this point, since the operation requires to be reversed in the Summer months, thus creating an overall annual expenditure on this hospital alone of £1,400 — £1,500.

Alternative methods of draught-proofing are available in the form of extruded aluminium with rubber inserts, copper strips, and plastic with brush nylon pads. All these claim to satisfy the requirement, but at a considerable initial cost. Consideration has to be given, as in this particular instance, into the projected life of such buildings and as to whether or not investment in total replacement or permanent draught-proofing is justified.

The patent systems have not been tried out in the North Staffs District, but it is proposed to complete one ward out of the current energy conservation funding, in order that comparisons can be made.

Result

This particular problem exists in many hospitals throughout the country, and becomes an annual function of the direct works staff, who have the flexibility to attend at short notice and temporarily resolve the situation.

Since the specific allocation of monies for energy conservation was made, available buildings with serious heat loss problems through windows, doors etc. can now be programmed for more permanent modification or replacement — without having to compete for funds alongside schemes of greater priority.

Conclusion

It must always be remembered that in the majority of schemes involving the thermal improvement of structures, the building affected requires to be kept operational at all times. Close liaison and planning with the users is required to reduce any inconvenience to an absolute minimum. It is most essential that all safety codes and regulations are observed, and that each contract needs to be closely supervised.

The financial savings in the fuel bill cannot be quantified in this particular District, though we know theoretically that savings have been made. With the installation of a micro-computer (now being commissioned), and hopefully the funding of an Engineer to operate it, a clearer and more accurate picture will emerge in the future.

Having made reference to three specific studies relating to types of problems and solutions, together with their cost implications, the general aspect of energy conservation does not solely rest with the Works Department but with hospital staff in general. Informative articles by technical staff in local hospital magazines goes a long way in educating all disciplines, so that they themselves can play a major part in reducing the energy bill.

Product News

New Boiler Cleaning System Saves Time and Money

A new system for cleaning boilers has been designed which eliminates the need to shut down the boilers or employ expensive cleaning contractors.

Trent Regional Health Authority is using the system for the Nottingham City Hospital. The vacuum cleaners have been designed to remove flyash, (fine soot), and grit at a temperature of up to 1400°C while the boiler is in operation. Special ceramic filters are used which can withstand the heat and the waste material is then removed by a vacuum conveyor to a sealed waste skip.

Further details from: Bivac Division, D. D. Lamson Limited, Harbour Road, Gosport, Hants. Tel: 07017 842710.

Cable Glands

There is now available a new and most comprehensive range of Bopla cable glands, moulded from the highest quality glass-filled nylon. This series of cable glands have optimum chemical and impact resistance, and suit a wide range of cable diameters from 4mm to 24mm. All except the basic type feature the unique Bopla Strain Relief Mechanism.

The glands are normally supplied complete with PVC sealing ring and locknut, although large quantities can be supplied without the locknut for those customers who prefer to tap a hole in the housing wall.

Please contact: Chris Long, West Hyde Developments Ltd., Unit 9, Park Street Industrial Estate, Aylesbury, Bucks. HP20 1ET. Telephone: Aylesbury (0296) 20441.

STOP PRESS

The School of Water Sciences

Courses for Hospital Engineers

Great Britain is to have the world's first academic institution devoted entirely to the study of waterupgrading. The School of Water Sciences opens on 16th November, and will run courses for all those water users who need a higher quality product than is available from public or private raw water sources.

The new school is run by The Lorch Foundation, at Lane End, High Wycombe, Buckinghamshire. Telephone: High Wycombe (0494) 888 390, Telex: 83516.

The December issue of *Hospital Engineering* will contain full details — in the meantime readers may like to note that the first course aimed specifically at Hospital Engineers, entitled *Purified Water for Hospitals,* will be run on 3rd and 4th December 1981, and in March and June next year.

Classified Advertisements

APPOINTMENTS AND SITUATIONS VACANT

The Prince of Wales' and St. Ann's General Hospitals

Senior Engineer

to be responsible for all major engineering services at the above hospitals. The post involves the maintenance and control of electrical and mechanical services for the hospitals and the management services for the hospitals and the management and co-ordination of support staff. Minimum qualifications are an apprenticeship in electrical or mechanical engineering and H.N.C. or equivalent. National Health Service experience would be helpful.

Salary Scale: £7231 to £8370 plus £557 London Weighting and bonus.

Application forms and job description available from: District Works Officer, Mountford House, The Green, Tottenham, London N15 4AN. Or telephone 808 1081 ext. 109.

Closing Date: 17.11.81

LANCASHIRE AREA HEALTH AUTHORITY — BLACKBURN DISTRICT
QUEENS PARK HOSPITAL
DISTRICT WORKS DEPARTMENT

ELECTRONICS TECHNICIAN

(MPT Grade III)

To be accountable to the District Engineer to start up and run efficiently a specialist equipment maintenance unit to include electronic systems in both engineering and health care equipment.

Qualifications HNC/HND or Degree in Electronic Engineering. Previous employment as MPT Grade desirable.

Salary £5536 to £7155 p.a. Accommodation is available.

Application forms and job description available from the District Personnel Department, District Offices, Queen's Park Hospital, Blackburn. Tel: 0254 661311 ext. 281/223.

Closing date 16th November, 1981.

BOILER TUBE CLEANING EQUIPMENT

IF YOU CAN find a better tube cleaner — backed by a better service —

BUY IT!

A **ROTATOOL** machine is easy to operate, will drill out blocked tubes, takes hard scale in its stride, leaving nothing to chance and pays for itself in no time at all by fuel savings alone.

ROTATOOLS (UK) LTD
Brookfield Drive Liverpool L9 7EG
Phone: 051-525 8611 Grams: Scalewell Liverpool
Telex: 667325 COMCAB G ROTATOOLS

Dudley Area Health Authority

Senior Engineer

RUSSELLS HALL HOSPITAL

In 1982 a new district general hospital will be opening in Dudley and we are looking for the Senior Engineer (M/F) to manage the Works Department there. The Hospital will initially comprise 401 beds, Accident and Emergency Department, industrial zone and residential accommodation. Plans for future developments are currently under discussion.

This post is ideal for the career minded Engineer as it initially offers experience in being involved in the commissioning of the Engineering Plant and Services and in Scheduling for the setting up of Planned Preventive Maintenance. After handover you will then take responsibility for the management of the Works Section at the Hospital.

Salary scale £7231 — £8370 per annum plus bonus scheme allowance currently 15%.

Applicants must hold an appropriate HNC or City and Guilds qualification, having completed an apprenticeship or other practical training and have had five years relevant experience, part of which should be in a Health Service or related environment.

Application forms and job descriptions are available from the Area Personnel Officer, Dudley Area Health Authority, Falcon House, The Minories, Dudley, West Midlands DY2 8PG, telephone Dudley 56911 exts. 204/219.

For an informal discussion on the duties of the post please contact Mr. J. Harding, Area Engineer, on the above telephone number ext. 265.

Closing date for return of applications 20 November 1981.