The Journal of the Institute of Hospital Engineering August 1980

HOSPITAL ENGINEERING

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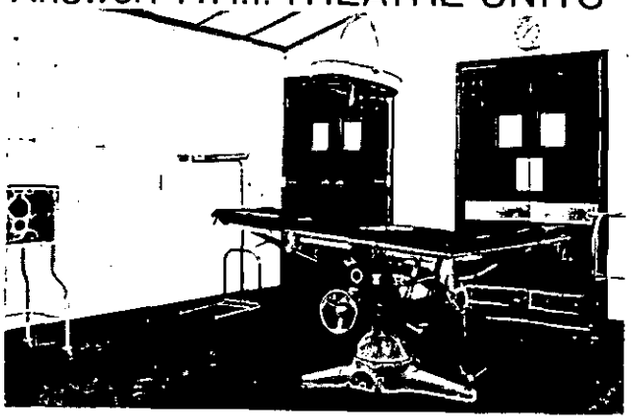

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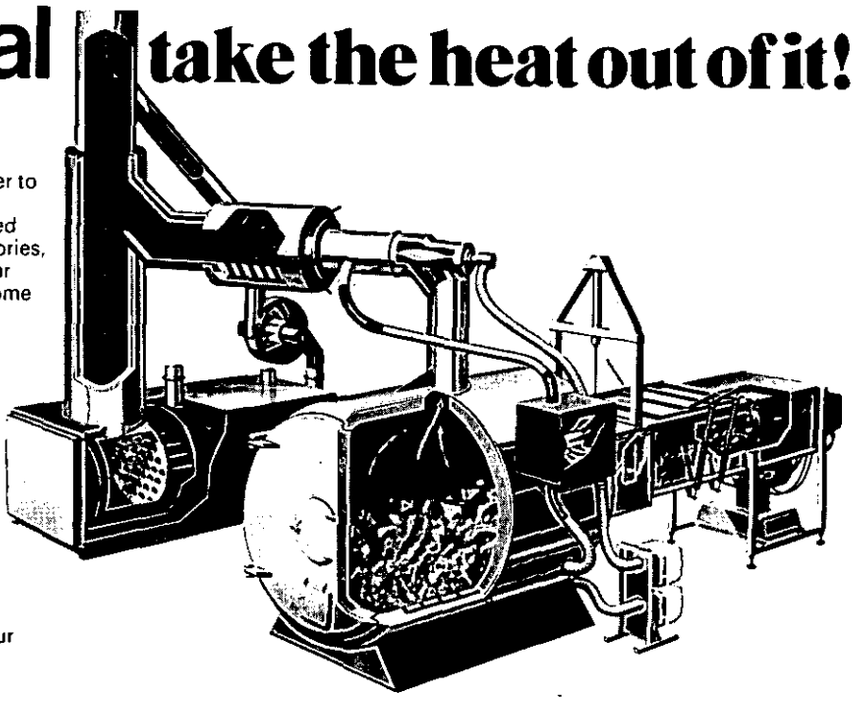

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'Hospital Engineering' is published monthly, except in January and July, by Mallard Publications

Individual copies cost
£2.45 UK postage paid

The annual subscription is UK: £21.00
Overseas: £25.00 Americas: $56

Average circulation per issue
(January-December 1978): 2,347
ABC

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Advertisement Manager
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All correspondence relating to the Journal should be addressed to:

'Hospital Engineering'
Mallard Publications
17 St Swithin's Lane
London EC4, England
Telephone: 01-623 2235

UK ISSN 0309-7498

Printed by JB Offset Printers
(Marks Tey) Ltd
Station Approach, North Lane
Marks Tey, Colchester, Essex

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HOSPITAL ENGINEERING

The Journal of the Institute of Hospital Engineering

Contents

August 1980

Volume 34 No. 6

Front Cover: Completed Installation of New Electrical Switchboard at Glasgow Royal Infirmary

Institute News

The Committee of Enquiry into the Engineering Profession

The Institute was invited to offer comment on this Report. The Report is in fact very long (250 pages of closely printed material) and it was appreciated that perforce a detailed submission relating to the total contents would itself be very extended.

Furthermore whilst believing that the Institute's comments would carry some influence (particularly having regard to its position as an Affiliate of CEI) it was felt that a long and detailed submission would not have the desired impact which might better be achieved by restricting comments to the aspect of the Report considered most significant and having regard also to the evidence given by the Institute to the Committee of Enquiry (as appeared in the April 1978 issue of this Journal).

Accordingly the Institute offered only the following brief comments on the Report of the Committee of Enquiry.

The Institute welcomes and supports the recommendation for the establishing of a British Engineering Authority and that such Authority should be charged with the responsibility for operating a statutory registration system.

The Institute supports, also, the recommendation that the licensing, and necessity/desirability of licensing, of engineers be the responsibility of the new British Engineering Authority. The Institute supports the view that licensing might be held desirable in areas where Health and Safety are involved.

In the field of training and further education the Institute wishes to reiterate its emphatic view that it is imperative that provision be made for courses of the Open University, or other, type to facilitate 'bridging' between categories of registration.

14th Annual General Meeting

Report of the 14th Annual General Meeting held at the Holiday Inn, Seaton Burn, on May 8, 1980.

The President, Mr L. F. Turner, presided.

The President opened the meeting by calling on the Secretary to read the Notice of the Meeting.

The President proposed, with the consent of the meeting, W. N. Bewick seconded, that the Report of the Auditors be taken as read. Agreed unanimously.

The President proposed "that the Report of Council and the Audited Accounts of the Institute for the year ended December 31, 1979" be received and adopted. K. J. Eatwell seconded. The President then invited question on either the Report or the Accounts. There being none forthcoming the President called for a vote on his motion which was passed unanimously.

Elections of Council Members for the ensuing year: The President reported that in accordance with the Articles of Association the following

Hospital Energy Conservation Year 1980 Third Symposium — Automatic Controls Wednesday October 1, 1980

at The Royal Festival Hall, Belvedere Road, London SE1

PROGRAMME

10.00 Coffee

10.30 OFFICIAL OPENING by
LAWRENCE F. TURNER Esq BSc CEng FIEE FIHospE FRSA President, Institute of Hospital Engineering

CHAIRMAN for the day
D. F. ROSBOROUGH Esq BSc CEng FInstE
President, The Institute of Energy

10.40 TRADITIONAL CONTROLS
Speaker: P. B. LOVERING TechEng (CEI)
Sauter Automation Limited

Mr Lovering will describe the conventional methods of controlling existing plant in hospitals.

11.05 MICRO PROCESSOR CONTROLS
Speaker: B. T. AMEY
Johnson Control Systems Limited

Mr Amey will advise on the advantages of applying micro processor techniques to the controls of existing and new plant in hospitals.

11.30 ENERGY MANAGEMENT SYSTEMS
Speakers: A. P. GRAY
Market Manager, Building Management Systems
Honeywell Control Systems Limited
R. EDWARDS TechEng (CEI) MIPlantE MIHospE
Area Engineer, Salop Area Health Authority
R. G. SCOTT-WILSON TechEng (CEI) MIHospE
Assistant Area Engineer, Salop Area Health Authority

Mr Gray will describe how centralised building control systems when applied to large hospital sites, can dramatically improve the efficient management of energy, providing payback periods typically between 1 and 3 years.

Mr Edwards and Mr Scott-Wilson will describe the problems and difficulties encountered in installing a centralised building control system on a large hospital site.

13.00 LUNCH

members of Council would retire at the conclusion of this Annual General Meeting:

K. I. Murray Nominated Member
P. C. Vedast General Member
D. L. Davies Area Member - London
K. B. Worsell Area Member - North East and Yorkshire

The President announced that the following being the sole nominee in their respective categories were elected to Council unopposed:

K. I. Murray General Member
J. B. Packer Nominated Member
P. C. Vedast Area Member - London
K. B. Worsell Area Member - North East and Yorkshire

The President expressed gratitude to Leslie Davies for his contribution during his term of office and offered a welcome to new Council member, John Packer.

The President moved "that Messrs Moore Stephens & Co be reappointed as Auditors to the Institute and that Council be authorised to fix their remuneration". W. Carr seconded.

The President then asked whether any member present wished to raise any other ordinary business but none was raised.

14.15 INDIVIDUAL SYSTEM CONTROL
Speaker: R. E. BURKE MCIBS
Manager Controls & Systems Division
Landis & Gyr Limited

Mr Burke will describe the systems available for controlling individual building/departments including Night-Set Back/ Standby, Optimum Start Control and Individual Thermostatic Control.

14.45 MICRO PROCESSOR BASED TEMPERATURE CONTROL
Speaker: I. MAHON CEng IEE
Superintending Engineer, Department of Health and Social Security

Mr Mahon will describe the work undertaken by DHSS and comment on the future development in this field.

15.15 A PRACTICAL APPROACH TO THE MAINTENANCE OF AUTOMATIC CONTROL SYSTEMS
Speaker: N. DENNIGAN
Coppas Controls Limited

Mr Dennigan will describe methods available to ensure that all control systems are maintained at optimum performance.

15.45 DISCUSSION

16.15 CLOSE

N.B. Please note that tickets are ONLY available from The Institute of Hospital Engineering.

To: The Secretary, The Institute of Hospital Engineering, 20 Landport Terrace, Southsea, PO1 2RG.

Please send to me ..... ticket(s) for the ONE-DAY Symposium on ENERGY CONSERVATION to be held on Wednesday October 1, 1980.
I enclose £..... to cover cost at £20 each (includes Morning Coffee and Lunch). No fees will be returned for cancellations (in writing please) received after midday on Thursday September 25, 1980.

NAME (in capitals please) .....

ADDRESS.....

.....

Position.....

The President's Remarks

The President commenced by suggesting that the past year had been one of excellent progress for the Institute based on the excellent foundation laid by his predecessor, Mr Richard Harrison and, indeed, previous Presidents.

The President said that perhaps the highlight of the year had been the first International Seminar organised by the Institute, in co-operation with DHSS, on behalf of IFHE. The Seminar had been attended from the four corners of the globe and the spirit had been quite remarkable.

The President then drew attention to the satisfying increase in Institute membership but, notwithstanding, called on members to do their utmost to encourage further applications, having in mind actual potential membership and the constantly increasing role and influence of the Institute. Related to this, the President reminded of the lead given by Richard Harrison at the last AGM when he had urged the Institute to consider its membership structure having regard to the developments in the emergence of "Works Services" functions. A Membership Review Group had been established whose Report has been considered by Council who were now engaged in the process of consultation with the branches and the membership.

The President then spoke of how Council had declared 1980 to be Hospital Energy Conservation Year. As part of this, four One-day Symposia were being held on various aspects of Energy Conservation/ Energy Savings. Parallel to this was the staging of the Competition and the President appealed to members to encourage entries in this Competition.

In fact, during the year, the Institute would stage Six One-day Symposia in all.

Here the President spoke of the wisdom and vision of his predecessors in working towards the application by the Institute for Affiliate membership of CEI which had been successful.

The President then turned with considerable pleasure to the election of K. J. Eatwell and B. A. Hermon to be Companions of the Institute, and spoke of tremendous contributions in the counsel and development of the Institute. The President took

the opportunity, also, to congratulate B. A. Hermon on his award of the CBE, and Mr F. H. Howorth Past President, on his OBE.

Finally, the President paid tribute to the Institute's hardworking Council — until he became President, he had no idea of the extent and breadth of the labours and responsibilities of Council and he suspected that many Institute members were unaware of the immense contribution of members of Council.

There being no further business the President closed the meeting.

MBE for Institute Secretary

We are very specially pleased to report that Mr J. E. Furness, Secretary, The Institute of Hospital Engineering, was appointed a Member of the Order of the British Empire in the recent Birthday Honours List.

John Furness became Secretary of the Institute on September 1, 1966, just four months prior to the Grant of Incorporation which saw the Institute 'change its shape' somewhat, widen the basis of its membership and embark on a programme wherein, ever since, the Council of the Institute has endeavoured to give the lead in an ever-increasing and broadening of the field of the Institute's activities.

During that brief fourteen years, the membership of the Institute has more than doubled and the Institute's finances have assumed a sound base.

1971 saw the formation of the International Federation of Hospital Engineering in which the Institute played a leading role.

Two other major landmarks in the Institute's progress were becoming members of the various Section Boards of the Engineers Registration Board and, later the election of the Institute to be an affiliate of the Council of Engineering Institutions.

As many members will know, through the 'Keele Courses' in particular but in many other ways the Secretary's wife, Beryl, was closely involved in the day-to-day affairs of the Institute until ill-health restricted her activities. Her great interest in the progress of the Institute and its members remains entirely undiminished.

They have two offspring. Their son, Peter, a doctor, is married and in general practice in North Yorkshire. Their daughter, Linda, is married and lives in Derbyshire. There are two grandchildren — the apples of their eyes. They are too young for any talk about 'engineering inclinations' but the three-year old grand-daughter, Hannah, has an incredibly enquiring mind. She possesses, also, a most determined — even cussed — streak so that the Secretary suggests that the two essential pre-requisites are there.

Weekend School, Cardiff October 24–26, 1980

The Weekend School will be held at the Royal Hotel, St Mary Street, Cardiff.

Membership and Registration

The Weekend School is arranged primarily, for members of the Institute of Hospital Engineering although visitors from other Societies, and organisations, and from the hospital service will be warmly welcomed. There will be a Registration Fee of £22 which will include all coffee/tea and also Lunch for delegates and their ladies on Saturday.

In accordance with the authority given in Circular HM(54)55, officers may be granted special leave with pay to attend conferences on work with which they are concerned.

PROGRAMME

Friday, October 24

14.30 Official Opening and Address by L. F. Turner BSc CEng FIEE FIHospE FRSA President The Institute of Hospital Engineering

Introduced by

R. R. Morgan BEng(Tech) CEng MIEE MIHospE Chairman Welsh Branch Institute of Hospital Engineering

16.00 Tea/Biscuits

Saturday, October 25

09.45 Coffee

10.00 Speaker: John Eynon DipArch(Wales) FRIBA FSA
Re-Furbishing our Heritage — new life for old buildings

Chairman: Peter A. H. Grey RIBA Area Works Officer South Glamorgan Health Authority

11.00 Travel and visit to South Glamorgan Area Health Authority Communications Centre, Ty Bronna, Cardiff

13.00 Lunch

14.30 Bill(s) of Quantity for Engineering Services
Speaker: G. H. Brown FRICS FRIQS Associate MDA (Monk & Dunstone Mahon & Scears) Associates
Chairman: D. Hackett CEng FIMechE MCIBS FIHospE Regional Associate W. S. Atkins and Partners Cardiff

16.00 Tea/Biscuits

19.30 for 20.00 Mediaeval Banquet Cardiff Castle

Sunday, October 26

10.00 Coffee

10.15 Telecommunications Now — And The Future
Speaker: J. W. Folds, Marketing Manager, Cardiff Telephones
Chairman: E. A. Johnson CEng MIEE FIHospE Chief Engineer, Welsh Health Technical Services Organisation, Cardiff

11.45 Conference Closure by The President of the Institute of Hospital Engineering

12.15 Lunch

Travelling and Subsistence allowances at the usual rates may be paid to officers, provided that approval to attend has been obtained from the employing Authority.

Mediaeval Banquet
This will be held at Cardiff Castle on the evening of Satuday, October 25, at 7.30 pm. Seats are strictly limited and will be reserved on a first come first served basis through the registration form. It is understood that the cost will be in the order of £8.50 per head.

Hotel Accommodation
Special arrangements have been made with the Royal Hotel in regard to accommodation for delegates and their wives. Delegates will be responsible for making their own bookings.

Tickets
Tickets for the Weekend School, Mediaeval Banquet and Registration for accommodation at the Royal Hotel should be obtained by application on the appropriate form.

Ladies Programme
Whilst no specific Programme has been planned many of the sessions will be of interest to them.

The session and tour on Saturday morning, however, is designed to cater for delegates and their wives.* There is no separate registration fee for Ladies.

For further information on registration, hotel accommodation and the Mediaeval Banquet to be held on Saturday evening, please apply to: Mr D. Griffiths, 107 Beatty Avenue, Roath Park, Cardiff CF2 5QS.

*The session on Sunday morning will also be of interest as the Post Office Prestel System will be available for demonstration and use.

Northcroft Silver Medal Award

During the Annual Conference held at the Holiday Inn, Seaton Burn in May a very pleasant ceremony was held, when, privately, the President of the Institute of Hospital Engineering, Mr Lawrence Turner, presented the Northcroft Silver Medal for 1979 to Mrs Mary Fletcher, who was accompanied by her three sons.

The Award was made in respect of the Paper entitled "Guidance to Good Boilerhouse Practice and Management" by her late husband, J. R. Fletcher, which appeared in the May 1979 issue of *Hospital Engineering*.

Our photograph shows the President with Mark, Mrs Mary Fletcher, Kevin and Stephen who accepted the Medal on his mother's behalf. Kevin had managed to break his arm 'just before the day' but did not allow this to spoil for him what was a most happy family occasion.

Also present were Mr W. W. Murray, Chairman North East branch and Mr J. E. Furness, Institute Secretary, and Mrs. Furness.

1980 Five Branch Meeting

The Five Branch meeting of the London, East Anglia, Southern, South West and Midlands branches of the Institute held a joint meeting in the Lecture Theatre at the John Radcliffe Hospital, Headington, Oxford, on Saturday May 3, 1980.

The meeting, arranged by the Midlands Branch, attracted members from all five areas, and the President, in making his welcoming address, praised the superb facilities which had been made available to the Institute by the Oxford Area Health Authority.

The opening lecture on sun-spots and satellites was prepared and presented by Mr R. F. Turner, from the Culham Laboratories.

The second lecturer, Mr T. R. Munro, the Radiological Protection Adviser for Oxford Area Health Authority, demonstrated the X-Ray radiation protection provided by different building materials, and the problems being encountered with the trend to the use of lighter building materials.

Mrs Dixon-Brown continued the demonstration with the use of colour slides, photographs and X-Ray plates, demonstrating some of the particular practical problems encountered in the new John Radcliffe Hospital.

Lunch was taken in the Restaurant associated with the main Hospital which enabled members to inspect parts of the new Hospital during the recess.

After lunch, Lord McCarthy of the Nuffield College, Oxford, spoke on the subject of the prospects for industrial relations in the National Health Service and his vast experience in industrial relations, in industry and the National Health Service, was clearly demonstrated by his knowledge of the subject. Many members, admitted to having read some of his books. He spent some time discussing the work of the Whitley Council and its function within the National Health Service and said that he felt that the National Health Service was too fragmented, and somehow should seek a common identity, utilising more full time officials and negotiators. He pointed out that the National Health Service was represented by 42 organisations, and it would be quite impossible to give these proportional representation within the Whitley Council. A member pointed out that the Institute was at one time represented on the Whitley Council, but in forming a learned society, gave up their negotiating function. The ensuing discussion was lively and topical, demonstrating the concern of the members for the subject under discussion.

Obituaries

Ken Magee

We are extremely sorry to report the death of Ken Magee.

Ken Magee was one of the earlier members of the Institute and made a considerable contribution over the years. He was always closely involved with the activities of the London branch. In addition he served on Council of the Institute from 1967 until early 1973 during which time he acted as Chairman of both Membership Committee and Publications Committee. Prior to his retirement in 1973 Ken Magee was Group Engineer to the old Southend Group HMC and he was made MBE in 1967.

He will be greatly missed by his many friends in the Institute and throughout the NHS.

George Grieve

We are most sorry to have to record the death of George Grieve on June 23.

George Grieve was a good and loyal servant of the Institute being one of the very early members who continued to make contribution to the affairs of the West of Scotland branch throughout. Indeed he acted as Honorary Secretary of that branch for several years and maintained his deep and lively interest right to the end.

He was the possessor of the very warmest personality and he will be missed by a host of friends in the Institute and throughout the National Health Service in Scotland.

Southern Branch

September 13, 1980
200th Branch Meeting at Herrison Hospital, Dorchester. "The Laser and its Application to the Treatment of Eye Disease". Speakers: Mr J. Ogg FRCS, Consultant Ophthalmologist, Salisbury Health District; Mr D. Blakey, Sigmacon Limited.

November 11, 1980
Visit to RN Physiological Research Laboratory, Alverstoke at 2.30 pm. Guide: Mr McKenzie, Public Relations Officer.

Annual Conference

A Correction

The gremlins crept into our report of the conference dinner dance in the last issue. Mr Ken Wilson is a long-serving member of the Council, not the longest-serving as stated.

The Institute of Hospital Engineering has indicated its support for the Joint Works Response to the Consultative Paper — Patients First, prepared as a result of consultation between:
The National Association of Works Officers at District
National Association of Area Works Officers
Regional Architects' Association
Regional Engineers' Association
Regional Quantity Surveyors' Association
Regional Works Officers Association
This is of such considerable concern to all our members and readers that we think it appropriate to publish the Joint Response in the Journal in its entirety.

Patients First

Acknowledgement

The views expressed in this Paper relate to the service in England (with the exception of a brief comment on Wales) and have been jointly agreed between the Associations of Regional Works Officers, Regional Architects, Regional Engineers, Regional Quantity Surveyors and the National Associations of Area Works Officers and of Works Officers at District, and therefore represent a unified response from the senior managers of the Works function in the Health Service. It is the considered opinion of these managers that the views also have a very wide measure of support at all levels.

The Summary contains all the significant points of principle which we propose and makes reference to the relevant paragraphs set out in the Detailed Comments section which gives our views on most of the sections of Patients First. However, as the Consultative Document says very little about the Works function, (as did the Royal Commission Report before it), we find it necessary to expand on a number of important issues and attach our views on these matters as Appendices with appropriate references in the main text.

Our response to Patients First has, of necessity, to be brief. We are conscious that the range of subjects is limited and the depth of discussion relatively superficial. It would seem important therefore that during the period of re-organisation further consideration will need to be given in greater depth to the subjects as they arise.

To this effect the Chairmen of the six Associations which represent all the Works disciplines and all the

present levels of service would wish to make themselves available as a consultative group to advise on matters affecting or affected by Works services.

Summary

1.0 Introduction

1.1 The size of the Health Service Estate, in terms of capital investment, the resources it consumes and the fundamental role of buildings in the Service, make it essential for a full recognition of the need for a total Estate Management policy (paras 1–4 and Appendix A).

1.2 Strategic and practical aspects should be taken into account in revising the structure together with matters which are considered to be omissions from *Patients First* and on which we comment (para 6).

2.0 Foreword

2.1 The scale of a service and the resources available will affect the level at which the service is best provided and there should be flexibility in the provision of services which take account of this (para 7).

2.2 The advantages of a unified Works organisation should not be lost (para 8).

2.3 There should be basic national guidelines and a degree of Regional oversight in the formulation of new management arrangements for the Works function (para 9).

3.0 The Government's Approach

3.1 The Government's broad approach is accepted, but structure cannot be dealt with in isolation and consideration should be given at the same time to the effect on management arrangements and staffing arrangements. Changes, once agreed, should be implemented at the same pace in all disciplines (paras 10–13).

4.0 Management in the Hospital and in the Community Services

4.1 Because of its special requirements, Estate Management should be carried out on a functional basis — the new District being the lowest level of operational management. Works staff at hospital level cannot be accountable to an administrator (paras 14 and 15 and Appendix B).

4.2 The new District Works Officers and the associated second-in-line officers in future should be professionally qualified, with certain interim arrangements (para 17).

4.3 The new District Works Officer should be a member of the District management team because of the significance of Estate Management and its associated budget in the overall management of the service (paras 18–20 and Appendix C).

4.4 A common grading structure for all Works personnel throughout the Service would be of great benefit. The facilities for training, within the Service, towards the achievement of professional qualifications should be improved (para 22).

5.0 The Area and District

5.1 Care should be taken in dismantling the present multi-District Areas. Services which cannot viably be operated on a District basis should be a matter for joint consideration at District and Regional level (para 23).

5.2 Early agreement on the long term Regional role is essential (para 24).

6.0 Costs

6.1 *Management Costs may not be* reduced in the early stages. Strong Works management can make a major contribution to cost saving in the full context of Estate Management (para 30).

7.0 Planning

7.1 Estate Management considerations should play a larger part in the planning process with the full participation of the new District Works Officer (paras 31–34).

8.0 The Region

8.1 Whilst recognising Region's strategic role, the partnership in Estate Management which has successfully been developed with local management should continue and be further developed (para 37).

8.2 The overall control of capital expenditure, planning and design should remain at Region. In compiling the capital programme there should be full consultation with Districts (paras 38–40).

8.3 Region should retain a monitoring role in the Works field, rather than a separate monitoring body being set up (para 44).

8.4 *The valuable role of the Depart*ment of Health and Social Security is recognised (para 42).

8.5 An agency arrangement for the provision of Works services is not supported (para 43).

8.6 Regional services should be funded by Region and be subject to independent audit (para 44).

9.0 London

9.1 Arrangements for London should be in step with the rest of the country (para 46).

10.0 Wales

10.1 The arguments in favour of Team membership of the new District Works Officer and of the functional management of Works apply equally to Wales (para 47).

11.0 In Conclusion

11.1 There is little in Patients First which of itself will have any impact in improving the Health Service estate. Opportunity should be taken to recognise Health Authorities' trusteeship role in the care and management of the estate. A future service is envisaged with sound Estate Management policies with the objective of presenting future generations with a healthy and safe environment in which services to patients can come first (paras 48–50).

Introduction

1. The replacement value of the capital stock of the NHS in England at current prices is not less than £16,000 million. The land value at current prices is approximately £2,000 million. The estate is about eighty square miles in area comprising some 2,300 hospitals, of an average age of over sixty years and 4,000 health centres, clinics, ambulance stations, offices and residential properties. Capital expenditure for 1979/80 was in excess of £420 million, annual revenue expenditure on estate maintenance is currently estimated at £400 million and energy consumption accounts approximately for an additional £150 million.

2. The Secretary of State is accountable to Parliament for the investment in the Estate. Regional and Area Health Authorities on his behalf perform the role of trustees for this estate and thus carry responsibility for its care and maintenance and necessary replacement of plant and buildings for the benefit of present and future generations. Works staff are the instruments of this trustee-

ship and in the interest of putting patients first, we have prepared this joint paper in response to the Government's consultative paper.

3. Works staff are engaged in all aspects of Estate Management in the Health Service and number approximately 31,000. Of this number, some 5,400 are professional staff comprising architects, engineers, surveyors and associated Works disciplines. In addition, the professional staff have a responsibility for the briefing (jointly with other client professions) and control of some 1,500 consultant practices, who are commissioned to carry out work mainly related to capital development.

4. We fully recognise the multidisciplinary nature of the Health Service and its management and that the structure and management arrangements of the Service should be geared primarily to the best method of delivering medical, nursing and ancillary health care services to the patient. Nevertheless, the opening paragraph of the Introduction illustrates that account must also be taken of the best method of providing a built environment of an acceptable standard to house these services within an enlightened concept of Estate Management. Modern health buildings are complex technological machines for delivering health care and require a high level of professional and technical expertise in their design, operation and maintenance.

5. *Appendix A* sets out what is meant by Estate Management as used throughout this paper.

6. We recognise that Patients First is a document dealing primarily with structure and management arrangements with a view to improving the day-to-day decision making process for the patients' benefit and we comment on these aspects. It would, however, be a superficial discourse if we restricted ourselves solely to these matters and we take the opportunity to comment also on longer term strategic considerations, on aspects of practical application which we consider cannot be divorced from discussion of structure and on aspects which we consider to be omissions from the document.

Detailed Comment

Foreword

7. We consider that the reference to decisions being taken at the unit level, should relate mainly to management decisions of a day-to-day nature. There are many aspects of health care management which need the broader view from District, Region or at National level, from considerations of viability and as a protection against sectional interests seeking unfair advantage. The most economic and viable level for providing any particular service will depend upon its scale and the resources, particularly of skilled manpower, needed to provide that service.

8. We support the concept of not making change for change's sake. The unification of the Works function in 1974 has had very considerable advantages which should not be lost.

9. We agree with the need for flexibility in introducing change to take account of variations in geography, demography and inherited assets of building stock. Sound adaptations in management arrangements have been developed in the Works field since 1974 and this facility should remain. In connection with the formulation of new management arrangements, for the Works function there should be basic national guidelines laid down and a degree of Regional oversight in ensuring effective local management, particularly as during this period Area and District Works Officers are not members of the local management team and in this situation may not have an equal opportunity to influence the shape of the new management arrangements.

The Government's Approach

10. We agree with the summary of criticisms of the 1974 changes in paragraph 3 of Patients First and with the basic approach set out in paragraph 7 (a)–(d). In carrying out these proposals, care should be taken in strengthening local management that Area/District does not become District/Unit and a three tier system thereby perpetuated.

11. As holders and/or managers of substantial budgets, we strongly endorse the need for proper financial control during change as set out in paragraph 8 of Patients First. We support our Treasurer colleagues in that identified budget holders should have relevant professional competence to manage the defined budget.

12. We agree with the concept of minimal change, preferring a process of evolution to one of revolution. We strongly advocate that when the changes are agreed, they are implemented as quickly and as fairly as possible and at an equal pace in Works and all other disciplines to minimise the adverse effect on staff morale.

13. We feel that the key sentence in this section of Patients First however, indeed the key to responding to the document as a whole, is in paragraph 5: "Changes in the structure alone will not be sufficient; the Service must be managed in a way that enables those with prime responsibility for providing the services to patients to get on with the job". We agree that the structure must be right and the consultative paper concentrates on this but we also firmly believe that structure cannot be considered in isolation from management arrangements which in turn must take account of staffing arrangements. In effecting changes arising from the paper therefore we consider it is vital that these three elements — structure/management arrangements/staffing arrangements — be considered at the same time. It is for this reason that we comment in subsequent sections of this submission on the management and staffing aspects which are omitted from the consultative paper in any detail.

Management in the Hospital and in the Community Services

14. Whilst the philosophy of Patients First seems not to favour functional management, it can be demonstrated that this form of management has achieved considerable success in the Health Service. It is indeed the most appropriate form of management where highly technical services are concerned and where professional and skilled expertise is scarce. It is the basis on which the Works function should be managed. Due to the complex and varied nature of Estate Management at District level, it would be uneconomical and impractical for the overall management and control of Works services to be below the level of District.

15. A Works service has of course to be provided at unit and community level and we are confident that Works staff at unit level can fully support the practice of good unit management properly co-ordinated by an administrator whilst retaining a direct pro-

fessional and managerial line relationship with the new District Works Officer. We recognise the co-ordinating role of the unit administrator which should be similar, in relation to Works matters, to that with medical and nursing matters. It is imperative that the Works service at unit level is not one of those in paragraph 12(c) of Patients First where staff would be accountable to the hospital administrator.

16. *Appendix B* sets out the arguments to support the need for the functional management of Works.

17. The new District Works Officers and the associated second-in-line officers in future should be professionally qualified. The degree of complexity of the service and the wide level of knowledge needed and the level of advice which an Authority ought to be able to expect, demand this. Nevertheless those first and second-in-line officers who are technically but not professionally qualified at Area and District level now, who have considerable practical experience will expect equality of opportunity to compete for the new posts.

18. We agree with the concept of team management which has been shown to work very successfully since 1974. The new District Works Officer, being a major budget holder, the professional adviser to the District Authority on Estate Management matters, whose work is affected by and affects almost every fundamental policy decision taken, should be a full member of the management team at District level. The contribution to be made by the Works Officer has been acknowledged in a number of Areas where his full membership of the management team has been established by resolution of the Authority, and in many more instances, where the Works Officer is a welcome and regular participant. A parallel can be drawn here with the present Regional Works Officer's membership of the Regional Team of Officers in recognition of the significance of Estate Management matters in the management of the Service as a whole. It should also be said that the absence of the Area Works Officer as a full team member at present puts the Regional Works Officer at a disadvantage compared with his RTO colleagues at RTO/ATO meetings.

19. The proportion of the revenue allocation spent on health building maintenance has steadily fallen over the past three decades. Without the efforts and skill of the Works organisation, the condition of the health buildings would have deteriorated in direct proportion. There is however a limit to the extent to which effort and skill can maintain a decaying building stock. Provision of health services depends as much on its buildings as on other resources, and we believe that the best balance between maintenance expenditure and the remainder of the District budget will only be obtained if the Works Officer is a full member of the new District management team. His membership is also needed for the protection and proper control of the maintenance budget. Without proper attention to maintenance secured in this way, the drain on capital funds will accelerate as expediency replaces planning. Past experience demonstrates this.

20. No other District budget is as complex as that of Works which can contain over eighty cost elements other than salaries and wages which itself often contains in excess of thirty separately costed elements. There can be around 4,000 separate permutations of coded elements (other than salaries and wages) in a Large District Works budget which can total over £4 million. Although, in overall terms, the nurse staffing budget is the largest, the Works budget is the largest complex budget. Functional budgeting requires the costing of services accurately to express the cost of any specific function. This is particularly important in adjusting to the effects of inflation on already scarce financial resources. The provision of cost information to the cost accountant demands a high level of budgetary management.

21. *Appendix C* puts forward the arguments in support of full team membership of the new District Works Officer.

22. Paragraph 13 of Patients First refers to changes in Whitley agreements and it is appropriate to mention here an aspect which we think could have the single most beneficial result for the Works function. We would strongly support a common grading structure which would operate throughout the Service. In terms of career development, training opportunities and deployment of staff for operational and experience purposes, the benefits would be considerable. We also believe the Service should improve the training facilities it offers in encouraging the acquisition of professional qualifications particularly in respect of junior technical staff recruited into the lower levels. These are clearly matters, in the first instance, for the National Staff Committee for Works Staff.

The Area and District

23. We agree with the pattern of service needing to be similar to that provided by the present single-District Areas. However, the dismantling of the multi-District Areas should be handled with care. Consideration will need to be given to circumstances where the scale of a service prevents its viable operation on a District basis. Such services should be a matter for joint consideration at District and Regional level.

24. In connection with paragraph 16 of Patients First, in addition to repeating the need to consider together structural, managerial and staffing changes, we would also comment on the necessity to take proper account of the position of Regional staff. Patients First says that Region's role may change (foreword paragraph 8). Whilst accepting this, Regional staff should have assurances on the role of Region and that this is considered to be a long-term arrangement. If Ministers wish to win support from staff organisations, they should not isolate the major grouping of Regional staff by allowing uncertainty to continue.

Membership of the New District Health Authorities

25. We confine ourselves on the question of membership to endorsing the consultative paper's view that members appointed by Regional Health Authorities and the Consultant, General Practitioner and Nurse nominees should be appointed for their personal qualities and for the individual contributions they can be expected to make.

Family Practitioner Committees

26. We restrict ourselves here to drawing attention to the difficulties encountered in the planning of health centres brought about by the independent contractor status of general practitioners. This results in uncertainty of commitment and a lack of desire to conform to national standards of design and cost.

Community Health Councils

27. There is a view that the increased numbers of members resulting from the increased numbers of health authorities will, by ensuring a higher degree of public representation, remove the need for Community Health Councils. There is little evidence for this view but considerable evidence that the public at large has been far more vocal in recent years and is likely to take action on issues on which there is strong local feeling. The Health Service has always engendered such feeling and we suggest that Community Health Councils have fulfilled a very useful role since 1974. One of the comments of the joint Works submission in evidence to the Royal Commission was concerned with the number of bodies requiring to be consulted for one reason or another during the process of managing the Health Service and in suggesting that a good case can be made for retention of Community Health Councils we would, however, also draw attention to the difficulties and delays caused by an over elaborate consultation process.

The Implementation of Changes

28. We accept that the implementation of structural changes is distinct from that of management changes, but repeat that the consideration of these aspects and staffing arrangements should be taken together. We agree that the momentum of change must be maintained once started and changes executed as quickly as possible but from past experience consider that the time scales laid down in the consultative paper may be optimistic.

29. With these reservations we wholeheartedly endorse paragraphs 30–32 particularly in relation to staff consultation.

Costs

30. We have reservations about the management costs savings envisaged particularly in the first few years following re-structuring. Savings may be possible later through simpler management and communication systems but in the public service there is always a financial price to be paid for democracy and public accountability and it is unrealistic to think otherwise. On the question of saving costs generally, strong Works management can make a major contribution in the full context of Estate Management eg energy savings etc.

Planning

31. We welcome the intention to produce a simpler planning system for the NHS. However, we consider that strategic plans are of limited value unless they take into account Estate Management factors. We look forward to the time when the quality as well as the quantity of the health estate can be measured effectively and norms of maintenance established so that improvements can be measured. In times of financial stringency when it might be necessary to cut back expenditure. Authorities will then at least know in quantifiable terms what will be necessary in future years to redress the balance.

32. Considerable work has been done on this subject both within Regions and nationally and particular reference is made to the work of the Advisory Group on Estate Management.

33. Only when the condition of the estate is taken into consideration in the planning system can Authorities be held truly accountable for the state of their building assets so that they can properly fulfil their trusteeship role referred to in the Introduction.

34. The case made here for greater Works input to the planning system provides further support for the District Works Officer to be a member of the District management team, particularly with regard to the make up of the capital programme for the District referred to later (paragraph 40).

The Region

35. Concentrating as it does on the local level of health care provision, Patients First says little about Region's role. We see this role as very significant, especially in the field of Estate Management.

36. We have stressed the need for Region's role to be stated categorically as soon as possible (paragraph 24). We agree that broadly Regions should be concerned with strategy, leaving operational activities generally to the Districts. We also agree that Region's monitoring role should be clarified. It is necessary however to elaborate on these views because, from a Works point of view, there are significant omissions in the consultative paper.

37. Whilst there is agreement on the broad divisions between strategy and operations matters being respectively the main concerns of Region and District, in the Works field we would strongly object to any artificial barriers being established. The danger in a simplistic approach is that in terms of Estate Management, District might be seen as being exclusively concerned with maintenance and Region only concerned with capital. Such a result would fail to recognise the inter-relationship between revenue expenditure on maintenance and capital expenditure on replacement and development. We wish to see a continuation of the partnership in Estate Management which has been built up between the tiers since 1974. This partnership recognises the professional nature of the Works service and the need for professional relationships between the two future tiers. The most common mistake in Estate Management is to regard maintenance simply as a day-to-day activity. Sound operation and maintenance of its estate is vital to the long term success of any enterprise. It should conform to appropriate standards and must have regard to the whole life cycle of the estate. These are strategic matters which should be dealt with at Regional level. As well as the strategic function, Region can continue to offer a number of Estate Management services which cannot be undertaken economically at District level but we do not see these as major resource consuming services nor as detracting from Region's main strategic role. There should be flexibility built into any definition of roles to allow these relationships and services to develop according to circumstances in each Region.

38. We agree that the overall control of capital expenditure, planning and design should remain at Region. Capital developments require medical, nursing, administrative and Works skills which should be provided economically on a Regional basis. Past criticism by the Committee of Public Accounts demands firm direction and control in the appointment of Professional Practices and in capital expenditure. Former Boards of Governors have been singled out for special criticism. Planning of major teaching hospitals suffered from lack of professional Works input. Also, the impact of capital development would be lost if expenditure were to be dissipated in relatively small amounts by delegating capital

on a large scale. The key to successful scheme planning and the elimination of time and cost overruns is a well prepared brief which reduces to a minimum the need for client variations during construction, and firm cost control throughout the planning, design and construction stages. At present, and for the foreseeable future large scale delegation cannot be justified because there is numerically insufficient expertise locally, to ensure proper attention to these matters.

39. In considering the level of devolution or delegation of capital to Districts, care must be taken to see that their capacity for managing the work is appropriate. This highlights the need for flexibility in arrangements between and within Regions. Local Works organisations should not be diverted from their main role of operation and maintenance by having too much responsibility for capital works.

40. In the formulation of the capital programme the Region should fully consult the District authority in order to demonstrate the equitable distribution of capital resources and to recognise and take account of District priorities arising from the agreed Strategic Plan. As stressed earlier (paragraphs 31–34) the District Works Officer should be fully involved in District strategic planning and hence, as set out here, in formulating the capital programme for the District. Capital developments carry significant revenue consequences and must also be taken into account in the formulation of future expenditure planning by the District.

41. We believe the Region should retain a monitoring role to the extent that this recognises the close working relationship required between Regional and District Works departments so that technical and management standards may be continually reviewed and agreed with Districts. We do not, therefore, see any purpose being served by the appointment of a separate monitoring body in the Works field.

42. Partnership in Estate Management should include the Department of Health and Social Security. In the highly complex field of hospital building and engineering, there is a need for research and special investigations into problems and advice on issues which are common throughout the country. These are carried out most economically on a national scale. Similar considerations apply to special services and the setting of national standards. In providing these services, the Department should be responsive to NHS needs.

43. Suggestions have been made that Estate Management might be provided on a common services agency basis. We do not support this concept. Where such arrangements have been made, they have met with limited success. Management of the estate is an essential part of management of the whole enterprise. An agency would be divorced from service planning and the invaluable feedback in the formulation of advice which results from the service and operational activities of Regional officers would be lost. An agency arrangement could lead, also, to a duplication of staff within a Region, where Authorities would still require professional advisers in addition to the agency.

44. As far as Works services are concerned, we have reservations about the payment for Regional services suggested in paragraph 39 of Patients First, it would be an unnecessary administrative complication which would itself cost money. Cost effectiveness could be more cheaply secured by independent audit. These services must be planned by Regional Health Authorities as part of their overall strategy and once established have to be fully economic and viable. For this purpose a continuous programme of work is required. This base load will vary between Regions as staff and capital loads fluctuate.

45. We agree with paragraph 40 of the consultative paper that it is inappropriate to consider the composition of RHAs whilst re-structuring is being carried out. We would not wish to make further comment at this stage.

London

46. We agree with the first sentence of paragraph 43 of Patients First. The London Regions cannot afford to be out of step with the rest of the country. We recognise the special problems in London and are aware of the working party currently considering these problems. We would expect there to be national consultation when proposals for London are made.

Wales

47. We consider that the management arrangements proposed in this response in connection with the Team membership of the new District Works Officer and the need to continue the functional management of Works apply equally to the future arrangements in Wales.

In Conclusion

48. Our comments are offered as a positive and specific response to the proposals in Patients First related to the Health Service estate and the built environment in which patient care is provided. Whilst accepting its general philosophy, it must be said that there is little in the consultative paper which of itself will have any impact in improving the Health Service estate. In this regard, there is a lack of vision, first to perceive that society looks to a better quality of health environment and secondly to recognise the problems of a deteriorating health care estate.

49. Whilst we wholeheartedly support the Royal Commission in their views on the need for a higher level of capital funding, this will not be sufficient by itself. There is in the current re-structuring an opportunity to introduce, at the inception of the District Health Authorities, a new concept recognising the responsibility which all Health Authorities have for the trusteeship of the estate. This role, which is entirely compatible with the thinking in Patients First, would allow for the local formulation of policy within overall guidelines, the provision of resources to match that policy and effective management arrangements to direct resources to achieve the chosen objectives.

50. There is a need to link conceptually revenue and capital spending in a life cycle approach to health care buildings. We look to a future service with sound Estate Management policies with the objective of presenting future generations with a healthy and safe environment in which services to patients can come first.

APPENDIX A Estate Management

(a) Since both the Royal Commission Report and Patients First have not made any proposals for Works apart from recognising that it needs to be considered as a separate case, we feel it necessary to define the Works role in terms of Estate Management.

(b) As used throughout this paper Estate Management relates to the land and capital assets of the Health Service and involves the acquisition, maintenance and operation, develop-

ment, exploitation and ultimate disposal of those assets. This requires professional management throughout. It accepts a level of funding which will permit buildings to be maintained on a life-cycle basis. Elements of a building wear out and need to be replaced at varying intervals throughout its life, and finally the carcass itself will require to be replaced in due course by a completely new building. In Estate Management, there is, therefore, a continuous and inevitable demand for both revenue and capital funds, to maintain the total quality of the stock. These funds have to be provided in sufficient quantities and in the right balance and their use requires professional management.

(c) The definition in Estmancode explains its significance in terms of patient care:

"Estate Management is not an isolated optional activity of a purely technical nature; it is an important, indispensable and integral part of the vital function of providing patients with the standard of care and treatment which the National Health Service 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."

(d) Estmancode also defines the Authorities' responsibilities:

"Members of the National Health Service Authorities and their officers, together with the Department, charged with this responsibility and accountable for the management and execution of National Health Service Estate Management should fully understand the dimensions of their functions and the gravity and extent of the problem which inevitably will confront them and the patients they are aiming to serve should they fail to discharge adequately their particular task as stewards of the nation's stock of National Health Service property."

(e) It must be emphasised that Estate Management goes beyond the basic services historically considered necessary in a hospital before 1974. HMCs were largely concerned with maintenance of buildings and engineering plant and these were often managed in separate departments. At that time RHBs were providing new buildings within the Hospital Building Plan.

(f) Significant changes have taken place which now call for a more commercial approach in managing our assets and the realisation of the need for a closer relationship between capital investment and the life expectancy of buildings. Capital and revenue funds are inter-related in Estate Management terms.

(g) The objective is to achieve a better service to the patient, and it is suggested that the following are what the patients and staff expect of the Works organisation:

(i) Safety and operational effectiveness of all engineering services, life support equipment and buildings.
(ii) the best environmental conditions attainable with the resources available.
(iii) Reliability of the services and an assured quick response to emergency and urgent needs.
(iv) Assurance that these are directly managed and under the control of the best qualified personnel available.
(v) The provision of sound advice based on knowledge and experience to enable the best use to be made of the estate in the interests of patient care and staff welfare.

(h) The views expressed in the body of this response are intended to enable these expectations to be realised.

APPENDIX B Functional Management of Works

Paragraph 12(c) of Patients First states:

"Wherever possible, staff working within hospitals in non-clinical support functions should be accountable to the hospital administrator rather than to district level managers. In general there should be no line management hierarchy above hospital level; there may need to be a few exceptions, and there will be discussions with the NHS to identify which these should be."

The Reason for Works to Operate on a Functional Basis

(a) The Government's intention to preserve the professional independence of certain disciplines is welcomed since it would be difficult to visualise a situation whereby a Medical officer or a Works officer who has a professional accountability, could at the same time be accountable to an administrator. An administrator would not be in a position to assess standards or be able to measure the results at any level and it would be inconceivable to have intervention without responsibility.

(b) The Works professionals' role in Functional Management is based on well-founded principles and the Royal Commission Report on the NHS saw Works as a possible exception to their proposals for returning District managed functions to Unit control.

(c) Many criticisms which have been levelled against Functional Management have little to do with the management arrangements per se; these largely arise from other factors, eg the lack of adequate funds, the availability of manpower, the national problems of deteriorating industrial relations. Many of these problems would be aggravated without a hierarchical structure in Works.

(d) The neglected assets which Works officers have inherited are not the result of the 1974 Re-organisation but a manifestation of the previous short-term approach to maintenance when little account was taken of professional Works influence. Maintenance cannot be planned, funded or managed within short time scales and requires a life cycle approach as referred to in Appendix A. This approach requires professional Works management for the District as a whole and cannot be managed by unit administration.

(e) The Works organisation is responsible for a highly complex range of activities which require direction by a small team of professionally qualified officers based at the new District. The majority of Works staff are employed at hospital level and are interchangeable between hospitals. Their successful deployment requires control by the new District Works Officer.

(f) The Works function differs from other disciplines in that it is concerned with virtually all aspects of health care in the Service and must assume a protective role both in standards of safety and the preservation of the NHS Estate.

(g) It is necessary for the Authority to be constantly aware of its responsibilities for statutory and other mandatory obligations in the Works field, particularly concerning aspects of safety. The discharge of these responsibilities should be through the new Works Officers at District.

(h) Works Officers have a multi-professional role to play in meeting the increasing demands and changing patterns resulting from the levels of high technology, statutory requirements, safety, bonus schemes, man management etc, which were less prevalent in the past and which now demand a higher level of expertise than will exist at Unit level. We consider it essential that these aspects should be managed on a District basis.

(i) The suggestion that there may be a Hospital Administrator interposed between Works staff at Unit and at District would place an unnecessary barrier between the patients' needs and the District Works organisation carrying out their professional skills necessary to manage the wide range of varied requirements of the Works staff operating at Unit level. Such a suggestion would make a nonsense of technical accountability, career progression, personnel management, including industrial relations, and would interfere with training and discourage recruitment.

(j) Taking these factors into consideration, local participation at Unit level can be achieved successfully. The Unit Administrator can be regarded as being in the tenant or client situation. He could advise on and prepare a programme for future revenue improvements, in conjunction with the senior Works staff officer at Unit who would also provide a full day-to-day maintenance service. This officer would need to be a member of any co-ordinating team which might be established at Unit level. The Unit Administrator would also be able to have available full technical support and advice direct from District. This already operates effectively in many Districts.

(k) When account is taken of Work load, manpower resources and accommodation it may not always be possible for the Works organisation to equate exactly with the administrative unit but in such circumstances a senior member of the Works staff could be nominated as liaison officer and would also need to be a member of any Unit co-ordinating team.

Team Membership of the New District Works Officer

(a) The creation of the Works organisations in 1974 resulted in the unification of the separate Works disciplines, where Works managers could influence to a greater extent the account needed to be taken of Estate Management and provide a single point of contract and responsibility in these matters.

(b) Whilst this was a very important step forward the advantage of this benefit was not fully realised in the management arrangements which followed. Whereas at Region the Regional Works Officer, in recognition of the significance of Estate Management, is a full member of the Regional Team of Officers, the advantages which this brings to the Regional Team has not been fully available at Area and District level. There are notable exceptions where, by resolution of the Authority, the Area Works Officer has been made a full Team member and in many other Areas and Districts the Works Officer is a regular and welcome participant. An arrangement whereby one of the most highly qualified officers in the Service with responsibility for a substantial and complex budget and whose work affects and is affected by almost every fundamental policy decision taken, is not a full Team member is considered to be a great disadvantage to the Service and to the patient.

(c) The new District Team will need to make the best use of all resources and planning systems if the Authority is properly to develop a more self-determining role. The resources of the estate of building, plant and land are vital and this ambition is unlikely to be achieved without taking account of Estate Management matters which requires the Team membership to include the new District Works Officer.

(d) In addition, the Regional Works Officer is at a disadvantage, compared with his RTO colleagues, at RTO/ATO meetings which are not attended by the Area Works Officer.

(e) When the National Health Service Re-organisation Act (1973) was debated in Parliament, the exclusion from the Team of the Area and District Works Officers was questioned. The matter was not resolved in favour of membership but there is now the opportunity to remedy this omission and establish a firm based management team arrangement which will provide the pattern of management for the hoped for considerable period of stability in the NHS.

(f) The present arrangements, whereby the Area Works Officer has the right to attend Team meetings when matters affecting Works are discussed, suffer defects in many instances:

(i) Without Works advice decisions can be taken which are not capable of practical implementation.
(ii) In many instances, no formal Agendas are issued.
(iii) A considerable number of decisions are reached other than in formal Team meetings.
(iv) Many matters having Works implications are only discovered during the course of Team discussions.
(v) In the absence of Works input at Team level pertinent Works questions may be posed for the first time at Authority meetings.

(g) The main reasons for Team membership of the District Works Officer which will result in the advantage of strengthening the Team may be summarised as follows:

(i) His role in Estate Management affects most aspects of patient care.
(ii) He is responsible for a substantial and complex budget and whilst significant as such this is a budget which can be adjusted to suit fluctuating allocations and it is here that the Works Officer has a vital contribution in decision making.
(iii) He is the only officer who can speak on such a wide range of professional and specialised Works issues which have a direct effect on patient care.
(iv) He is responsible for discharging many statutory and similar requirements which have a direct effect on patient and staff safety. (These include requirements relating to complex plant, bio-medical and electronic engineering.)
(v) Taking into account the importance of Estate Management, the Works Officer can make a major contribution to the planning system on strategic and operational issues.
(vi) His role is vital in relation to any devolved or delegated capital.
(vii) He can provide a better balance in the Team membership on the broadest issues.
(viii) He provides a professional and technical link with the Region in relation to the maintenance of standards, capital planning construction and commissioning and plant replacement. His membership of the new District Management Team would also effect a better balance with the Regional Team of Officers.

The Work of Council of the Institute

Council of the Institute of Hospital Engineering comprises the President and 15 members. There are nine Area Members, three General Members and three Nominated Members.

The Area Members represent Institute branches as follows:

East Anglia
East Midlands
London
Midlands
North East
Yorkshire
North West
Southern
South West
Northern Ireland
Scotland
Wales

Area Members are elected only by members resident within the areas which they are to represent. General Members and Nominated Members are elected by a ballot of the entire membership whereby each member has one vote for each vacant seat.

Members of Council are elected for a term of three years and retire by rotation. Area Members and Nominated Members may only be re-elected for one further consecutive term. In this way a regular 'turn-over' of members of Council and a regular infusion of 'new-blood' is ensured and this, and the Rules covering voting, prevent any possibility whatever of Council being 'self-perpetuating'.

All elections to Council are supervised by the Institute's Auditors who actually open the returned ballot envelopes, carry out the count and report the results to the Institute's office in a sealed envelope which is not opened until the appropriate time during the Annual General Meeting of the Institute.

Since Incorporation on January 1, 1967, when the 'new-style Institute' commenced to conduct its affairs in accordance with its Memorandum and Articles of Association and, indeed, in accord with the relevant Companies' legislation, the practice has grown up for Council to hold four main meetings spread evenly over the calendar year although, of course, extra meetings can be called as the situation demands.

A Council Committee structure was introduced at the time of Incorporation (1.1.67) and this has been built upon during the intervening years so that, now, there are the following Council Committees in operation:

Finance and General Purposes Committee;
Bursary Committee;
Education Committee;
International Affairs Committee;
Membership Committee;
Publications and Information Committee.

The first named of these is recognised as the senior Council Committee. Early each year Council determines who of its members shall serve on each of these Committees. Needless to say, the President, automatically, is a Member of each Council Committee. Notwithstanding this, each Committee has a separate Chairman who, again, is determined by Council in general meeting when the actual composition of Committees is agreed. However, to provide the desirable linkage and liaison, the Committee Chairmen, and one or two other selected members of Council, form the Finance and General Purposes Committee.

It may be of interest to look at the broad areas of responsibility of the Committees:

Finance and General Purposes Committee

All matters which have any financial implications whatever including the expenditure of the Institute's particular and overseas generally insofar as these matters have any impact on the members of the Institute and the practice of 'Hospital Engineering'.

Arranges, in consultation with DHSS, the technical programme for any International Seminars organised on behalf of IFHE.

Arranges tours/visits to hospitals for overseas visitors to UK who wish to see engineering and other installations/services.

Bursary Committee

Deals, solely, with the Annual Bursary Competition which is staged with the support of the King Edward's Hospital Fund for London.

Education Committee

Draws up the technical programme (including choosing Session Chairmen and *all* Speakers) for the Annual Conference and all the One-day Symposia held by the Institute on a 'national' basis.

Gives preliminary consideration to any matters of an educational/training nature raised by branches or individual members.

Has the responsibility for the Institute Library.

International Affairs Committee

Deals with all matters relating to the International Federation of Hospital Engineering and the Institute's role therein.

Has the responsibility to watch developments within the EEC in branches.

To consult with the Auditors on the presentation of the Annual Accounts of the Institute.

To act for the Council in investing any surplus funds of the Institute and to review the portfolio of investments from time to time.

Any subject which may be construed as bearing on the Institute's present and future policy.

Membership Committee

Considers, and rules on, all applications for membership (and upgrading/regrading) of the Institute.

Processes applications for registration as TEng(CEI) and Tech(CEI) with the Engineers Registration Board.

Considers the Institute's role in relation to the Engineers Registration Board and how this relates to the Clauses in the Articles of Association relating to the grades of membership.

Considers how it may be deemed desirable to amend these Clauses in the light of developing circumstances.

Publications Committee

Has responsibility for the obtaining of sufficient editorial material and the refereeing thereof for the Institute Journal and for the regular liaison with the Institute's Publishers in all matters pertaining to the magazine *Hospital Engineering*.

Has responsibility for any/all Institute publications and literature. Supervises and adjudicates on, the annual Northcroft Silver Medal Papers competition.

Has this year had the additional responsibility of organising, and running, the Hospital Energy Conservation Year Competition.

In addition to these Committees, Council has established, now, an 'Assessing Panel' to consider applications from members who seek to be sponsored for registration as a Chartered Engineer (consequent on the Institute's election as an Affiliate of CEI).

Over and above this structure Council does, from time to time, appoint a special 'Working Party' or 'Study Group' to consider certain subjects as they arise — for instance when the Institute is invited by a Government Department, or other organisation, to offer comment on some Report or other matter.

As was said much earlier in this article, Council, as a rule, meets four times each year. At these meetings it receives a report from, and considers in detail, the deliberations of each of these Committees and endorses, or rejects, any recommendations or decisions of the various Committees.

At these meetings of Council, also, are tabled any Resolutions received from the Institute branches, and any other matters which it is considered warrant the attention of Council as a whole in the first instance. Over any period of 12 months, Council and the Council Committee will meet on a total of about thirty occasions and the volume of business tabled is very considerable.

The rate of attendance at these meetings is high: it is usual, for instance, for meetings of Council to attract 100% attendance and it is rare, indeed, for more than one member of Council to miss any one Committee meeting. It will come as no surprise, perhaps, to Institute members to read that the present President is likely to attend almost every one of these thirty meetings in a year. Clearly a case of "he who needs time makes time".

Indeed it might be appropriate to say here that present and past members of Council would be entirely unanimous in expressing the extreme good fortune of the Institute in its Presidents over the years and in paying tribute to the leadership and guidance they have given — each leaving his own indelible mark upon the Institute.

And, again it is surely entirely appropriate to end by quoting from the remarks of the President at the recent Annual General Meeting of the Institute when he said: "Until I became President, I had no idea of the extent and breadth of the labours and responsibilities of Council and I suspect that many Institute members are unaware of the immense contribution of members of Council".

The Institute does owe much, indeed — very much — to members of Council, past and present.

Members of Council

President

L. F. Turner Esq BSc CEng FIEE FIHospE FRSA
Chairman and Managing Director Static Switching Ltd

Members

W. N. Bewick Esq FCIBS FIHospE MConsE MASHRAE
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Plastics The Energy Savers

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Introduction

When it comes to thumbing through manufacturers' catalogues, there are those of us who may search for that alternative product whose manufacturers boast "all steel construction, traditional materials used throughout", etc.

Generally, Engineers have been brought up to respect the various qualities of that material which was first wrought from the ore by our Iron Age forebearers.

It may be a reflection on our training, recognising that we were tutored in the structure of metals, their machining characteristics, their behaviour under stresses and heat variations. An Engineer may be forgiven when asked about plastics in engineering if he replies "they're useful for insulation, boats and screwdriver handles". We are apt to forget that, unlike a silversmith who only works in silver, an engineer has unlimited scope when choosing the materials he is to work with, or utilise.

If, on the other hand, we recognise that engineers are adventurous (yet cautious) then some of us may have already accepted plastics replacing metals in some 'traditional' fields of application.

But we can't win because the common belief is that plastics are high in energy content, and, in the present energy conscious climate, we may feel we are "doing our bit" in shunning the plastic product in favour of the traditional metal, wood or glass.

A recent leaflet entitled "Plastics in an Energy Expensive World" has recently been published by the British Plastics Federation and argues that plastics are maintaining their low consumption of energy compared with that of competing materials.

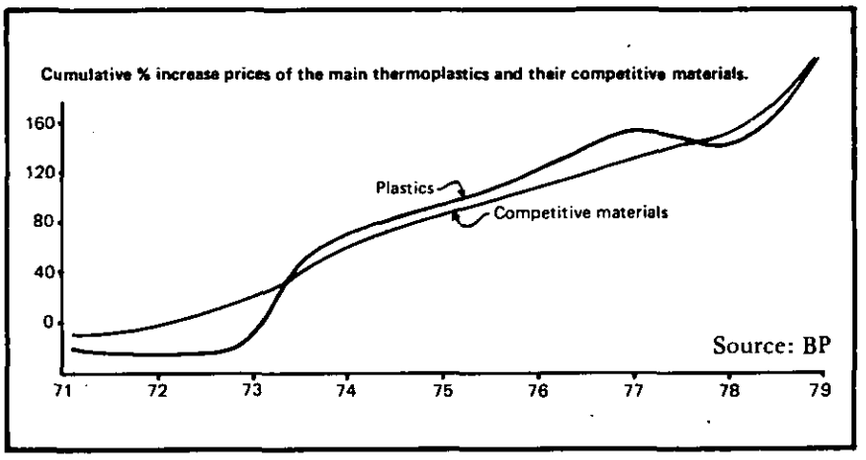
Although the subject is not directly related to the Health Estate's fuel bill, it does serve to illustrate that revenue monies, other than those specifically earmarked for boiler fuel, electricity, etc, are spent on energy indirectly and that plastic products may prove to be a 'best buy'.

Since this is Hospital Energy Conservation Year and its object is to consider energy in all its forms and involve all disciplines, it is thought that the text of this leaflet, published by The British Plastics Federation is deserving of publication in *Hospital Engineering*.

Plastics in an Energy Expensive World

Over the last few decades plastics materials have steadily increased their range of applications based on competitive costs and unique properties. The industrial world enters the 1980s very much aware of the major effects caused by the massive rise in oil prices through the 1970s. Since most plastics materials are derived from oil the forward uncertainties on oil availability and price have raised a number of questions including:

Are future supplies of plastics secure? What is likely to happen to the price competitiveness of plastics?



Are Future Supplies of Plastics Materials Secure?

Although it is impossible to give any absolute assurance on future supply, it is important to remember that plastics only account for 3–4% of the total oil usage in the UK. Most oil is used for power generation and transportation. If the oil supply tightens then the economics will dictate that the high added-value uses, such as plastics are given priority. In addition the technology exists today in the oil industry to convert a higher proportion of crude oil into the naphtha fraction from which many plastics are derived. In the longer term there are firm prospects of using the plentiful supplies of coal available and other sources such as natural gas and sugar are also real possibilities.

What is Likely to Happen to the Price Competitiveness of Plastics?

It is important to remember what has happened to plastics prices through the 1970s when crude oil prices escalated. The following graph shows that despite the massive increase in the oil prices the main thermoplastics have remained totally competitive with a basket of competitive 'traditional' materials, including metals, timber, paper and board, glass.

Percentage Price Increases of Selected Plastics and Finished Products 1973–79

A comparison of fabricated products over the period 1973–79 again shows that plastics products have not generally suffered significantly in terms of price competitiveness compared to traditional materials. An extract of this data is shown in the following Table.

Material/Product	% Increase
Low Density Polyethylene Film General Packaging	205
Wrapping Paper	254
Low Density Polyethylene Heavy Duty Sacks	205
Paper Sacks (coated)	254
Polypropylene Film	111
Cellulose Film	112
Plastics Bottles	183
Glass Containers (Returnable)	254
Packaging Products of Plastics	164
Aluminium Plate, Sheet, Strip	174

Source: DOI

Energy Content of Some End-Products Made from Various Materials

(In tonnes of oil equivalent required both for manufacturing the raw material and for converting it to end-product).

These calculations ignore any subsequent benefits in energy terms derived from using plastics in the final application such as using less fuel by replacing metal components with lighter plastic parts.

Although these facts at first glance seem somewhat surprising they derive in part from the lower relative energy content of plastics compared to the traditional materials. In general the plastics raw materials are lower in energy terms to produce than the 'traditionals'. In addition the fabrication processes used for plastics products are low energy consumers, and a reduction in the number of manufacturing operations is usually possible with good design.

	Tonnes of Oil Equivalent
1 One million fertiliser sacks:	
Polyethylene sacks	360
Paper sacks* (coated)	350
2 100 km of 1 in. diameter service pipe:	
Polyethylene Pipe	90
Copper Pipe	96
Galvanised Steel Pipe	500
3 One million 1-litre bottles:	
Polyester bottles (PET)	150–175
PVC bottles	100
†Glass bottles (returnable)	460–600
4 One million trays for packaging meat:	
Expanded polystyrene	16.3
Paperboard	19.3–21
5 One Car Bonnet:	
Steel	7.3
Aluminium	13.8
Fibre Glass Reinforced Plastic	6.6

* Coated or PE lined — Plain paper unsuitable!
† Non-returnable bottles ½ x this amount.

The Future

The data shows that plastics have an inherent advantage in energy terms, and that despite the major escalation in oil prices they have maintained their competitiveness. There is every indication that this will continue in future.

Be Selective

What this article shows is that despite 'energy crises' plastics remain competitive and attractive materials to specify. Taking a broad view, the diverse family of plastics materials which are currently available offer a whole range of options for the manufacturer concerned with economic material usage, not only attractive design, ease of fabrication and reliable product performance but also an expectation that it will remain price competitive if the cost of energy and labour escalates.

The valuable physical properties which are achieved in a product or component made from plastics range from lightness, flexibility, transparency, strength, insulation, corrosion resistance, visual appeal to ease of fabrication. It is through concentration on these 'plus' factors, rather than thinking of plastics merely as substitutes, that they can best be utilised. The era of high energy costs, does not change this logic: it reinforces it.

Free copies of the leaflet are available from: The British Plastics Federation, 5 Belgrave Square, London SW1X 8PH, to whom we are indebted for allowing us to reprint its text.

New Main Switchboard incorporating automatic switching to provide maximum use of Available Supplies Installed at Glasgow Royal Infirmary.

New Switchboard at Glasgow Royal Infirmary

A. ADGENT MIHospE

Sector Engineer, Glasgow Royal Infirmary

Background

With the ever increasing requirement for a stable electricity supply in major hospitals to complement the high technology equipment and life support systems now in constant use, the GGHB has at Glasgow Royal Infirmary over the past few years embarked on a programme to reduce to a minimum any loss of supply.

Initially, in 1974, the loads were appraised, and this resulted in the uprating of each of the two SSEB transformers supplying the hospital to 1000 kVA, these transformers being supplied from separate sources. The main switchboard was designed such that half of the hospital was connected to one supply, and the other half connected to the second supply, with a manual busbar coupler complete with a mechanical key interlocking system which, in the event of a supply failure, allowed the entire hospital to be fed from one supply.

As a back-up to this, two auto-start standby generators were available and connected one to each half of the switchboard complete with mechanical

key interlocks integrated with the main incoming switches and the bus coupler which therefore necessitated manual switching in order to obtain electrical supplies. The only exception to this was the Cardiothoracic Surgical Unit, which had an independent emergency supply from a small no-break generator system.

Subsequently, essential services circuits were segregated from non-essential services circuits throughout the hospital, and a drop out contactor system installed to shed non-essential loads in the event of a supply failure. At this stage it was realised that the delay in the restoration of essential supplies by manual switching was unacceptable for such items as life support equipment, monitoring equipment and computer suites etc.

To alleviate this problem, the SSEB were consulted with a view to incorporating automatic changeover contactors into the existing switchboard, and the utilisation of the automatic start facilities which were available in both generator control circuits. This posed great difficulties due to the physical size of the two 200 amp changeover contactors and the space available at the main switchboard, and it was envisaged that a four-day shutdown of the main switchboard would be necessary during which time the hospital would require to be supplied by mobile generators situated at various points in the hospital network, and this was unacceptable, for numerous reasons. Alternatives were considered, and it was finally decided to provide a new main switchboard and switchroom adjacent to the existing switchroom, and BEMCO and the SSEB were contracted to supply and install the new switchboard respectively.

During discussions to ensure maximum utilisation of available supplies, it was decided that the addition of an automatic busbar coupler would provide a more comprehensive system.

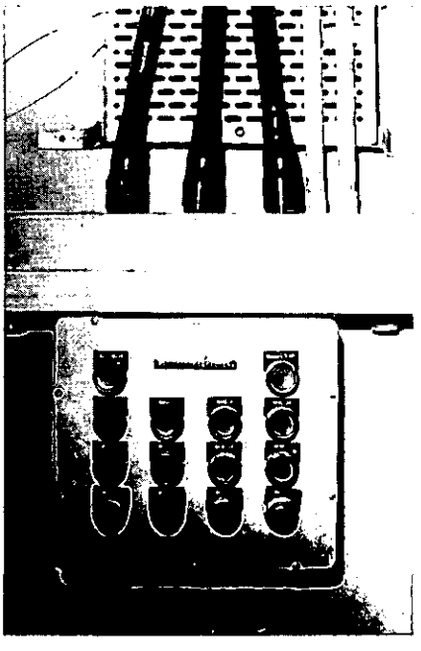
Installation of New Switchboard

As the precise route of the first 10 metres of the cable run from the old switchboard was not known, excavation was carried out, and the cable ducts exposed. Due to the position of these ducts, the new switchroom and its foundations could only be partially built, although the necessary alterations to the adjoining SSEB supply station were undertaken and completed at this stage. In preperation for the installation of the new switchboard, the cable ducts were broken back to a point from where the cables could be easily re-routed from the old switchboard to the new.

Cable ducts broken back to expose cables.

The new switchboard was installed with half resting on the finished floor, and the remainder supported on jacks to facilitate the re-routing of the cables. The supply from one transformer was then transferred from the old switchboard to the new switchboard, and with both switchboards live, the outgoing cables were transferred one by one in accordance with a programme previously agreed to by the senior consultants of all departments concerned. Most departments were on a ring main system or parallel feeder system, so they were transferred without interruption of supply, but for the few departments supplied radially, special shutdowns were arranged, and none exceeded four hours. All this work was carried out at weekends during mid summer, this being the lowest load period. On completion, the cable ducts underneath the switchboard were built, the jacks removed and the finished floor extended throughout the switchroom.

Drop-out contactors re-set buttons.



In conjunction with this, the remote control push button reset units for the non-essential services drop out contactors were installed in the new switchroom, where, in the event of a supply failure the available supply or supplies could be utilised easily and quickly to their maximum capacity.

The automatic start circuits of both standby generator units were modified to suit the new switchboard's system, and a new audio/visual alarm system was installed in the hospital control room to ensure that any supply failure would be noted and action initiated.

New Main Switchboard

The new switchboard consists of two outgoing fuse switch sections, with a

purpose-built centre section for incoming switches, contactors etc. The outgoing sections are GEC System 4, rear access switchboards with 100, 200, 400 and 600 A fuse switches and the front of the purpose-built section is System 4 front access cubicles with 1600 A Merlin Gerlin SelpactACBs for incoming supplies and bus coupler, 630 A MG generator protection MCCBs, 1600 A GEC on load busbar/contactor isolating switches and compartments for automatic controls. At the rear of the centre cubicles, two specially fabricated enclosures contain the 2000 A 4-pole changeover contractors, access to which is only available when the associated busbar/contactor switch has been isolated to free a key interlock for the rear doors.

Under normal supply conditions, the switchboard operates as before with one transformer supplying one half of the board and the second transformer supplying the remaining half, with the busbar coupler open. Each supply to the busbars is controlled by a thermal/magnetic draw-out ACB, mains contactor, and busbar isolator. The ACB is fitted with a no volt/no close under voltage relay, the circuit of which incorporates interlocks to ensure that the ACB cannot be closed if the bus coupler and other incoming ACB are closed and contacts on voltage sensing relays on each phase of the supply on the 'dead' side of ACB. An override push button is provided to short out the voltage sensing contacts during breaker closing, with an additional contact on this button in the bus coupler shunt trip circuit to trip same, should an attempt be made to close both the incoming and bus coupler breakers. A key operated undervoltage test switch is also provided.

Contactor closing is by means of a reset push button which operates a timer, which instantly opens the generator contactor circuit, and after a two second delay, completes the contactor coil circuit. A mechanical and electrical interlock with the generator contactor is fitted.

In the event of either supply failing, the associated incoming ACB and contactor will drop out and a circuit will be made to close the bus coupler after a delay of two seconds. This means that the healthy incomer will now be supplying its own half of the board completely and the essential supplies on the other half of the board, since the drop out contactors will have operated on the latter during the two-second supply interruption. Since resetting push buttons for all the drop out contactors are located in the switchroom, selected re-closing can efficiently utilise any spare capacity available on the healthy supply.

An interlocking system is included in the bus coupler ACB controls, which are on a 24 V DC battery supply, to initiate the appropriate generator start circuit should the coupler fail to close after four seconds. The hospital would then be operating with one half of the board healthy and the other half on emergency generator supply only, the generator contactor closing instantaneously whenever voltage is attained. In the unlikely event of loss of both supplies, either instantaneously, during the period, with one supplying the entire hospital, or when one half was on a generator, interlocks would ensure that the bus coupler was open, or opened, and both generators would be started to supply each section of the board independently.

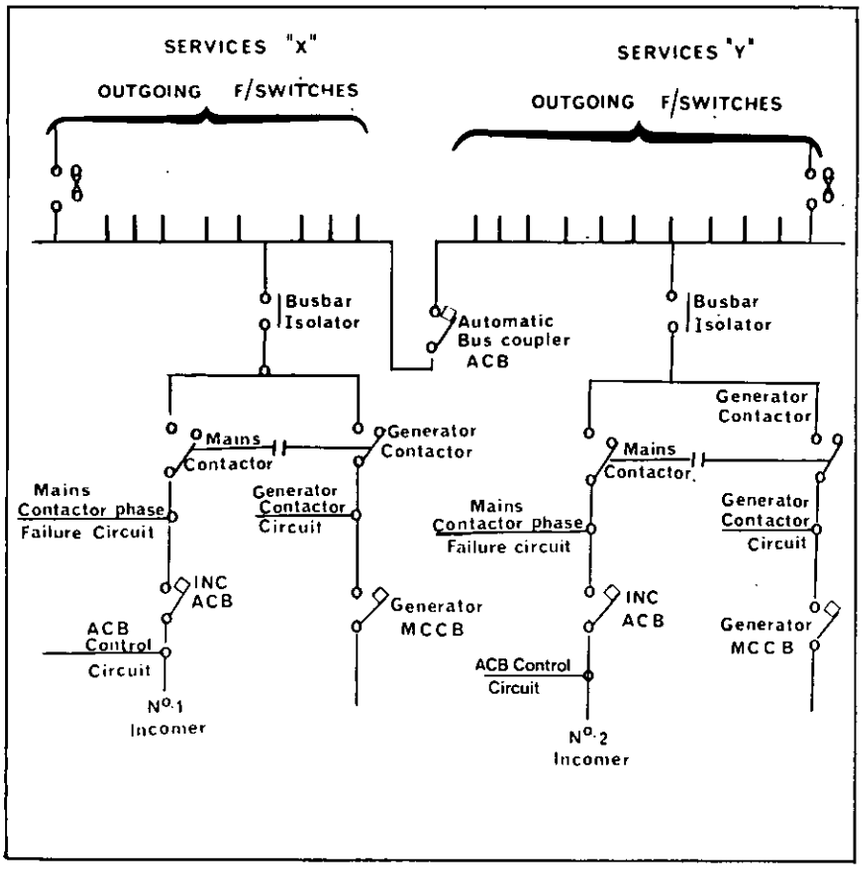
Irrespective of the nature of the supply failure, if necessary, generator supplies could be in operation in four seconds plus generator start-up time of approximately seven seconds, a delay which is generally acceptable.

Re-closing of main incoming breakers and associated contactors after a supply failure is entirely manual.

Refinements on the board include ammeters on each phase of all outgoing fuse switches, incoming supplies and generator supplies, earth leakage ammeters on incoming supplies, and voltmeters with phase selector switches on incoming and generator supplies.

The Audio/Visual Alarm System is operated in the hospital control room, should either incoming supply fail. Carriage switches are fitted to the ACBs to short out control functions should a breaker be withdrawn for maintenance purposes, and the busbar/contactor isolator allows contactor maintenance. A feature of the bus coupler is that although no thermal/magnetic overcurrent releases are fitted, the breaker will not close if both supplies are present at the main contactors.

Since completion of the installation, the hospital has experienced four power failures to date, and the new switchboard has functioned very satisfactorily, proving to be of great benefit to the hospital.



Admissions to Membership 1979

We apologise to the members below that the notice of their admission has only now been published.

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JONES, A. O., Lagos University Teaching Hospital.
JONES, D. A. G., Welsh Health Technical Services Organisation.
JOSEPH, A. J., Government Main Hospital, Abu Dhabi.
KHAN, M. S., Ministry of Health, Abu Dhabi.
LAM, K. C., Hong Kong Polytechnic.
MANGHANI, K. V., Ministry of Health, Muscat.
MATTHEWS, B. G., Loteryman & De Kroon, Cape Town.
MOHANKIMAN, P., Ministry of Health, Abu Dhabi.
NAKIB, K., Associated Consulting Engineers, Athens.
OSGUTHORPE, R. C., Medishield Pipelines (BOC).
PEACOCK, J. B., Multiplex Systems Ltd.
POPOOLA, R. O., University College Hospital, Ibadan.
SCANDLING, J. M., Clarke Nicholls and Marcel.
SCANDRETT, J. M. H., L'Air Liquide, S.A. Paris.
SLATER, J. H., Alistair McCowan & Associates.
STEPHENS, G. W., British Arabian Design Group, Saudi Arabia.
TOMORI, O., Ife University Teaching Hospital, Nigeria.
UWAGWU, K. C. I., Kingsway Chemists, Lagos.
VAIDYA, H. C., World Health Organisation, Dacca.

AFFILIATES

BROWN, CROZIER & WYATT, Brentford.
ESCHMANN BROS & WALSH LTD, Bolton.
FAN INSTALLATIONS LTD, Bolton.
HOSPITAL DESIGN PARTNERSHIP, London.
HOUSEMAN (BURNHAM) LTD, Slough.
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MALE, Colin, Cornwall and Isles of Scilly AHA
MARTIN, Peter Robert, Hampshire Area Health Authority
MUSA, Sikiru Adebisi, Fed Ministry of Health and Social Welfare, Lagos, Nigeria
PUDGE, David John, William Harvey Hospital
RAJA, Nazir Ahmed, Min of Health, UAE
REID, John William Enoch, Ayrshire and Arran Health Board
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ROBERTS, Stanley Rhidian David, Powys Area Health Authority
ROGERSON, Stewart John, Angus Health District
ROLLINGS, Ian George, Western Hospital, Southampton
SCHOFIELD, James Thomas, Rochdale Area Health Authority
SHAWCROSS, John Harold, Essex Area Health Authority
SINCLAIR, Stephen Michael, Essex Area Health Authority
SMITH, Kenneth, Birmingham Area Health Authority
THOMSON, Andrew, Hertfordshire Area Health Authority
WALLER, Peter James, Department of Health and Social Security
WARREN, William, Birmingham Area Health Authority
WORSLEY, Alan, Lancashire Area Health Authority

GRADUATES

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KASANA, Isaac J. Matovu, Min of Health Kampala, Uganda
MORTON, John, Hampshire Area Health Authority

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KEATING, Thomas A., J. V. Tierney and Co
PINTO, Clarence Gerald, Public Works Dept Abu Dhabi.

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APPOINTMENTS AND SITUATIONS VACANT

Barnsley Area Health Authority

Area Works Officer

Single-District Area, Population 225,000.

An 832-bed DGH opened 3 years ago: our 180-bed Geriatric Hospital is under 20 years old: and our third hospital is currently being re-built. A new MH Hospital is being planned. There is an energetic approach to renovating our 30 or so Community Clinics and to building Health Centres. The Area benefits under RAWP.

Single accommodation available temporarily (and houses in this area are not dear).

Informal visit welcomed: Telephone AWO (0226-41421) to arrange.

Salary £13,089–£15,996 (increase pending).

Applicants must be either an Architect, or a corporate member of the RICS, or of an appropriate Engineering Institution. NHS experience essential.

Further details and application form from Area Personnel Officer, 118 Gawber Road, Barnsley S75 2PS. (Telephone (0226) 82405).

Closing date: August 29, 1980.

NORFOLK A.H.A.

X-RAY TECHNICIAN

Applications are invited for the above post to be based initially at Northgate Hospital, Great Yarmouth and eventually at the new District General Hospital, Gorleston.

The successful applicant will be required to establish a maintenance service for X-Ray and associated equipment throughout the District. Previous experience in this field is essential.

Applicants should possess HNC, HND in Electrical or Electronic Engineering, City & Guilds Full Technological Certificate (telecoms or Electrical) or a Science Degree.

Salary Scale: £5,547 to £6,918.

Application forms from The District Works Officer, Gt Yarmouth & Waveney Health District, Havenbridge House, North Quay, Gt Yarmouth, Norfolk. Telephone Gt Yarmouth 50411 ext 39.

GT. YARMOUTH & WAVENEY HEALTH DISTRICT

South West Thames Regional Health Authority

Engineering Division

Engineering Clerk of Works

Salary Scale: £4,908–£6,183 per annum plus £141 per annum London Weighting. Commencing salary according to experience.

Applicants, male or female, must have served an apprenticeship in mechanical or electrical engineering and have had not less than 5 years experience supervising site installations employing trades associated mechanical or electrical building services.

The appointment will be for the supervision of engineering work at various sites within the region, which covers the following area—Surrey, West Sussex and the south-west corner of London.

Initially the officers will be based at Guildford, but this could vary depending upon the location of the particular sites for which they are responsible.

Application form from Headquarters Personnel Officer, South West Thames Regional Health Authority, 40 Eastbourne Terrace, London W2 3QR. Completed forms to be returned by August 15.

ESSEX AREA HEALTH AUTHORITY

COLCHESTER DISTRICT

SENIOR ENGINEER

A Senior Engineer is required to be responsible to the District Engineer for the operation and maintenance of Essex County, St Mary's and Colchester Maternity Hospitals and their associated properties.

Applicants should hold an HNC in Mechanical or Electrical Engineering or an acceptable equivalent, together with a recognised qualification in Industrial Management.

Salary scale £6.015 rising by five increments to £6,963 (pay increase pending). Plus Bonus as applicable.

Further details may be obtained from the District Engineer on Colchester 69244, ext 257.

Application forms and job description are available from the District Personnel Officer, Health Offices, Turner Road, Colchester. Telephone Colchester 47171, ext 57. Forms should be returned within 28 days of the appearance of this advertisement.

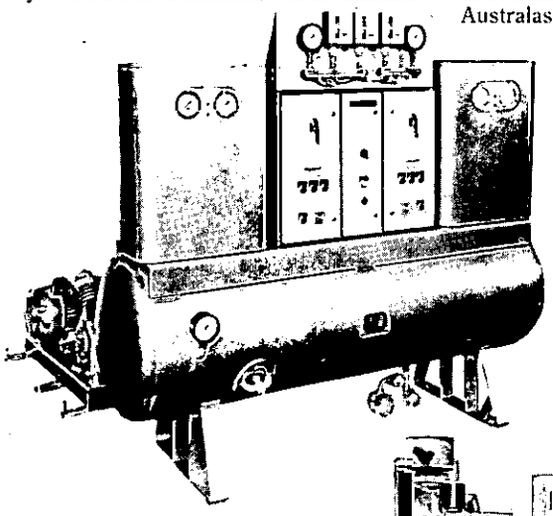
MEDICAL VACUUM AND COMPRESSED AIR PLANT. A TOTAL SERVICE.

Improving medical vacuum and compressed air plant? For a *real* improvement you need Lacy-Hulbert.

Only Lacy-Hulbert offer you a complete service, from consultancy through to contract maintenance. With Lacy-Hulbert you're sure of an efficient, well co-ordinated *total* service, without a buck passed anywhere!

And Lacy-Hulbert have the experience (over 30 years of it) to tackle virtually any medical or dental project. With equipment that's proved its worth throughout the UK and in Scandinavia, the Middle East, Africa, Australasia...

Whether you're upgrading existing plant or installing new equipment, Lacy-Hulbert is the sound choice.



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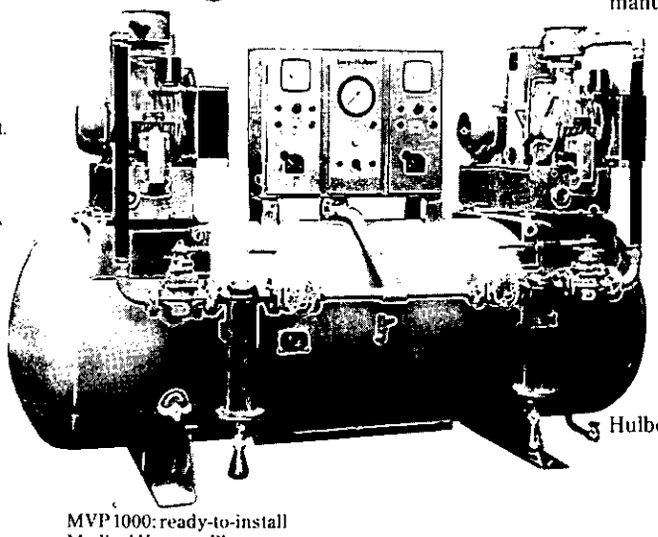

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2. Plant manufacture and supply. Lacy-Hulbert offer you a complete range of equipment – pumps, compressors, packaged medical plant. And Lacy-Hulbert actually design and manufacture their own vacuum pumps. (Other companies buy-in pumps for assembly into plant.)

3. Installation. Installation can be arranged using approved installation engineers.

4. After-sales care. Lacy-Hulbert ensure trouble-free operation with a Contract Service Scheme. In some cases the scheme can cover existing plant.

5. Expertise. Every part of the Lacy-Hulbert package is backed by unrivalled expertise. We have over 75 years' experience in the manufacture of pumps and compressors of all kinds – including over 30 years of supplying pumps to hospitals.

Lacy-Hulbert first introduced complete ready-to-install medical vacuum plant. Now, we also offer packaged medical compressed air plant.

This know-how is widely respected throughout the medical world. The Hospital Engineering Centre at Falfield actually trains engineers on Lacy-Hulbert plant.

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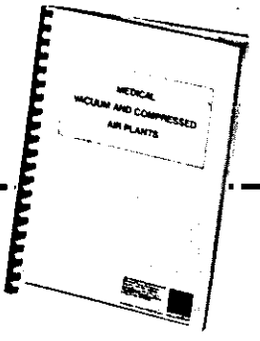

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