The Journal of the Institute of Hospital Engineering April 1982

HOSPITAL ENGINEERING

Institute 1982 Conference
Stratford-upon-Avon 19 to 21 May.

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HOSPITAL ENGINEERING

The Journal of the Institute of Hospital Engineering

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Volume 36 No. 3 **April 1982**

Front Cover: The Royal Shakespeare Theatre at Stratford-upon-Avon, the pleasant venue for the Institute's Annual Conference in May — see page 3.
Photo by courtesy of British Tourist Authority.

Opinion

We are delighted to publish two more Opinion *articles in this issue, and thank the authors and one other reader (whose contribution will appear next month). Other members of the Institute are welcome to submit articles.*

Readers are reminded that the Institute and the Editor do not necessarily share the views expressed in the articles, which are not official announcements.

Have They Got It Right This Time?

As you all know the National Health Service was formed in 1948 and continued in the set up of Regional Health Boards and Hospital Management Committees until some bright spark (American at that) decided that it should all be changed (for the better). In 1974 we were therefore given Regional Health Authorities, Area Health Authorities and Health Districts. We were all asked for our comments, and some branches said that they would get it wrong. Having been proven right gives no satisfaction.

In 1982 comes further change, this time Regional Health Authorities and District Health Authorities (almost a full circle). However there is one major change, everything should be put down to units. At least it is not an American firm who will get it wrong once again (no satisfaction to me to say I told you so). I am sure that if Marks and Spencers found that a particular system did not work they would only change the part that was not viable, and would keep what was good. It is a pity that our masters, who work in mysterious ways, do not consider only changing the bad bits and not turn everything upside down just because HN 80/8 says so. The section who lost out in 1974 (Administration) have made up and overtaken in 1982. Perhaps in five or six years they will change again and for the better I hope. How does this affect Hospital Engineering in its widest context? I would like to put forward my thoughts.

Private Enterprise is beautiful, good, makes no mistakes and is cheaper than in-house staff, therefore they do not make a profit either. How do they manage to stay in business? We have to prove once again to the new District Health Authorities that we are cost effective, efficient and do a good job.

We have done it before so we can do it again — time consuming it may be but it has to be done.

We are obviously going to lose some very good and knowledgeable staff through early retirement (the same happened in 1974) and it will take us some time to recover. Chartership is required for the top Works Posts. But we cannot get Chartership through the National Health Service. Never mind, obtain them from outside the service, they only have to be trained by those people who are not good enough for the job, but that does not matter, they will do it because they are dedicated people (just like the nurses).

I have just heard of another senior works person who has died with a heart attack, no doubt caused by overwork and the stress of yet another re-organisation. I speak from experience as I too had a heart attack through overwork and stress except I was lucky, I am still here. How many more must die before our masters have decided enough is enough.

'Do away with all these functional departments and call in private enterprise they do it so much cheaper!' is the cry. As Dick Bowie said in the February issue 'be enthusiastic!' Come on you works people, stand up for yourselves and show them we are efficient and a force to be reckoned with, because Hospital Engineerng is here to stay!

This is your Journal, let's have some response to this article, disagree if you wish, after all this is still a free country, moan if you like, but let's hear from you.

Leonard Cottage

NHS Reorganisation — A Qualified Success

The most discussed topic at the present time in the NHS must surely be the imminent reorganisation of the Service. For the benefit of non-NHS readers I should point out that the existing Health Districts and Area Health Authorities have ceased operation and were replaced by new District Health Authorities on the 1st April, 1982.

The new streamlined Service will, according to its creators, be able to respond more rapidly to the local needs and will bring about significant cost savings primarily due to manpower reductions. The engineering discipline in the NHS will not escape the planned streamlining and may well find itself at the crossroads and have no control over the direction in which it will be led. The engineers surviving the period of change will be charged with the task of re-establishing the engineering discipline in the new

Service and to improve or maintain the standard of engineering services.

However, many engineers with wide experience in hospital engineering, including Institute members, will be encouraged to retire prematurely, as early as 50 years of age, by enticement of attractive redundancy and retirement benefits. Can the Service afford to lose such experienced engineers? It is likely that the number of engineers leaving the Service will be in excess of the planned wastage. Where then will the Service find the engineers with sufficient technical and managerial competence to take on the responsibilities on behalf of the new District Health Authorities.

The reader will probably be thinking that there will be great promotional opportunities for engineers in the NHS and also that such job creation at a time of industrial recession should be welcome. But wait awhile for there is one small matter I have not mentioned, the engineers for most senior posts of District Engineer and District Works Officer will now be required to be not only Chartered Engineers but also to be Corporate Members of a select list of engineering institutions — this Institute is not on the selected list but I understand that moves are afoot to correct this anomaly since the recent conception of the Chartered Hospital Engineer.

Some non-chartered engineers in certain senior posts prior to re-organisation will be offered limited dispensation on qualification requirements for a period of perhaps five years, but the vast majority of engineers in the NHS work in hospitals, and the more ambitious engineers will be expected to aspire to the senior posts in the re-organised Service. But will they find their promotion prospects blocked if they lack Chartered Engineer status? These are generally the HNC qualified engineers having a wealth of operational experience and many may be ideal candidates for promotion, they may not remain in the NHS if the opportunities are curtailed. Perhaps the NHS should be looking into ways of educating its engineer to the required standard, it is obvious that many mature engineers will find it an almost impossible task to commence academic studies after a long break since their HNC studies and to combine such study with their day-to-day work responsibilities would be difficult. In any case time is not on our side for we will not be able to respond to the recruitment and promotional needs of the Service in the short term and the only source of Chartered Engineers will be graduates direct from university or from industry but without the operational experience at hospital level. Can such engineers be entrusted with the responsibilities which face them? How will they respond to being called to a boiler room emergency, or total loss of electricity supply to a large hospital site, at three in the morning? Even Sir Monty Finneston in his report admitted this difficulty "Concern was repeatedly expressed to us from all sides" he said "that the remaining body of graduate engineers lacked the qualities of practical completion and understanding of industry associated with those who came through the old part time route". There we have it, the old part time route was the ground over which the HNC engineer studied and sweated, and these are the men who today grapple with the harsh earthy problems in hospital engineering management.

Hospital engineering is going through a profound change due to technological developments and it is my view that we are more likely to be able to respond to these new developments with HNC type engineers who have a real feel for engineering than university educated engineers. I am not knocking either university education or engineering graduates as such. The profession needs them as long as they have feet that touch the ground but it looks as though we need even more the man whose feet start from the ground up, who walks with his head held high to command the respect of staff and other disciplines, and who has the skills of practical application and the understanding of industry instilled by the part time route.

Michael Beck

Institute News

Annual Conference Bookings

Registrations for the Institute's Annual Conference at Stratford-upon-Avon are already quite heavy, so that any members who have it in mind to apply should not wait too much longer!

The Conference is being held at the Hilton International Hotel, from 19 to 21 May, and includes interesting papers on Telecommunications and Computers, Alternative Forms of Contract in the NHS, and a Review of Progress in System Hospital building.

Full details and application forms have been sent to members, or are to be found on pages 4 and 5 of the last issue of *Hospital Engineering*.

Institute Members' News — A Personal Column

Council of the Institute — through its Publications Committee and Publishers — are keen constantly to improve the "personal" nature of the *Institute News* section of the Journal.

We like to think of the Institute as a family (as indeed, is the wider NHS) and information on the moves and promitions of members and any other news of a personal nature is always of very real interest.

However, we must look to the Institute's members, themselves for items of this sort for inclusion in the Journal.

Similarly, a lively correspondence column — letters to the Editor — is a sign of a healthy publication. But we must rely on members, and other readers to write these letters.

The *Opinion* page has been introduced this year precisely to try to increase the personal nature of the Institute News section and to encourage comment and correspondence. There is a 'standing invitation' to members, and readers to avail themselves ot the *Opinion* page if they wish to air a particular topic.

So, perhaps the message is — "over to you".

District Works Officers West Midlands

The twenty-two new District Health Authorities within the West Midlands Regional Health Authority each determined to appoint a District Works Officer — a decision which, surely, will earn universal commendation.

Interviews for the District Works Officer posts were held during the period 3rd to 25th March with the matching exercise being carried out on 26th March and the successful candidates were to be informed on that same day.

Unfortunately, news of these appointments was not known in time for inclusion in this Issue, but is hoped to include full details in the May 'Hospital Engineering'.

EPIC Award Scheme

On 16 December, the Secretary of State for Industry, the Rt. Hon Patrick Jenkin MP announced to the Press a new Government award scheme for encouraging closer co-operation between institutions of higher education and industry or commerce.

Called the EPIC (Education in Partnership with Industry or Commerce) Award Scheme, it has been established to reward and encourage successful partnerships between universities or polytechnics and companies or firms, with the aim of stimulating improvement in the competitive performance of UK industry and commerce.

It is intended that the Award should create a recognition for these joint activities comparable to that given in higher education to published academic work. It will emphasise the importance of building bridges between the industrial and academic worlds and the demonstrable benefits that can result from a close association between them such as in a process, a product or a service, or in the development of the organisation and its personnel.

Two grants of £25,000 each will be awarded to the most successful university or polytechnic teams who best satisfy the aims of the EPIC Award. In both cases the grant will be made to assist the further development of the educational side of the partnership. It is envisaged that the industrial partner will benefit

(Continued on Page 5).

The Institute of Hospital Engineering

A One-Day Symposium

Hospital Linen Services

at

The Institution of Mechanical Engineers
1 Birdcage Walk, Westminster, London

Wednesday 16th June, 1982.

This symposium is intended for all engineers involved in laundry planning. It will include the operational aspects which have a major influence on the design of laundry services, choice of equipment, production layout and comparative assessment of options, including the use of commercial laundry contract services.

PROGRAMME

10.00 Coffee

10.30 OFFICIAL OPENING by
E. L. DAVIES Esq BSc MSc FCGL
Director of Research, The Fabric Care Research Association.

Chairman for the day
K J EATWELL Esq OBE CEng FIMechE FCIBS CIHospE

10.40 PLANNING LAUNDRY SERVICES
Speaker: R R SPOONER Esq MIWM AMBIM AGCL
Laundry Engineer, DHSS

11.30 DESIGN LAYOUT
Speaker: W G FUELL Esq CEng MIMechE
Laundry Engineer, DHSS

11.45 DISCUSSION
12.00 ENERGY CONSERVATION
Speaker: V E SKEGG Esq CEng MIMechE MIMarE MCIBS MInstR
Superintending Engineer, DHSS

12.30 DISCUSSION
12.45 LUNCH
14.00 EFFECTIVE MANAGEMENT
Speaker: R H LAW Esq
Laundry Adviser to the Central Services Agency for DHSS — NI

14.30 DISTRIBUTION
Speaker: H W TAYLOR Esq MBIM
Joint District Linen Services Manager, South East and Mid. Staffs Health District

15.00 MAINTENANCE OF PLANT
Speaker: H W TAYLOR Esq MBIM
Joint District Linen Services Manager, South East and Mid. Staffs Health District

15.00 MAINTENANCE OF PLANT
Speaker: N. LONGSTAFF Esq CEng MIMech FIMarE
District Works Officer, Northampton Health District

15.30 GENERAL FORUM
15.50 SUMMARY
16.00 CLOSE

Reduced Rate Rail Fares and Hotel Accommodation — Substantial rail fare reductions are available for delegates attending this Symposium. The following are examples of second class return fares to London (for first class add 50%) Grampian Region — £43; Glamorgan — £17; Cornwall — £26; Oxfordshire £6. Grand Metropolitan Hotels in London are prepared to offer delegates a reduction on their normal rates.
Application forms to obtain these reductions may be obtained ONLY from The Institute of Hospital Engineering.

N.B. Please note that tickets are available ONLY from The Institute of Hospital Engineering. (Tel. Portsmouth (0705) 823186).
To: The Secretary, The Institute of Hospital Engineering, 20 Landport Terrace, Southsea, PO1 2RG.

Please send to me . . . . . tickets(s) for the ONE DAY SYMPOSIUM entitled "Hospital Linen Services" to be held on Wednesday 16th June 1982.

I enclose £ . . . . . to cover cost at TWENTY FIVE POUNDS each (includes Morning Coffee and Lunch). No fees will be returned for cancellations (in writing please) received after midday on Thursday 10th June 1982.

NAME (in capitals please) . . . . . .
ADDRESS . . . . . .
. . . . . .
. . . . . .
Position . . . . . .

(Continued from Page 4).
through the 'profit and loss' account. Recognition will also be given to a maximum of five 'runners-up', depending on the overall standard of entries, in the form of a £2,000 grant to assist the co-operative venture.

Details and entry forms are available from the Institute's Office, 20 Landport Terrace, Southsea, Hants. PO1 2RG.

Planning better buying

Telling manufacturers more about the NHS' future intentions will help both sides plan ahead. The Government decided last year to assist home industries through public sector purchasing, and this was strongly commended to the NHS by the Supply Council last September, said Mr. Geoffery Finsberg, Parliamentary Secretary for Health at a seminar with industry sponsored by the Supply Council at the King's Fund Centre.

Mr Finsberg continued, "The initiative is a move on the part of the public

Forthcoming Branch Meetings

Southern Branch *Hon. Sec: R P Boyce 0243 781411*

11th May, 5.15pm	Branch Meeting and Film	Winchester Royal County Hospital.
13th July, 5.15pm	Branch Meeting	Southampton General Hospital

East Anglian Branch *Hon Sec: M Brooke 0493 50411*

17th July	Visit to new District General Hospital, Gt. Yarmouth	

Midlands Branch *Hon Sec: W Turnbull 021-378 2211 Ext 3590*

8th April 6pm for 6.30pm	Visit to Police Control Room	Bournville Lane Police Station, Bournville, Birmingham 30

North Western Branch *Hon Sec: J Sunderland 061-236 9456 Ext 588*

21st April	Visit	Alexanda Hospital, Cheadle nr Stockport
12th May	Talk by I M I Bailey Valves Ltd	Hope Hospital Post Graduate Centre, Salford.

Yorkshire Branch *Hon Sec: J Bate Wakefield 890111 Ext 293 (home Leeds 863743))*

26th April at 7.30pm	"Boiler Explosions and Insurance"	Holdsworth School of Science
Joint Meeting with IPlantE	B G Taylor Esq British Engine Insurance Co.	Leeds University Woodhouse Lane, Leeds.

West of Scotland Branch *Hon Sec: T M Sinclair 041 332 9696*

29th April	BOC Liquid Oxygen Tonnage	Carfin

Numbers will be limited at this meeting. Those wishing to attend should notify the Branch Secretary immediately.

6 Branch Meeting between the East Anglia, East Midlands, London, Midlands, Southern and South Western Branches. (Details next issue).

12th June 10 am	Joint Meeting	John Radcliffe Hospital, Oxford

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

sector to get closer to industry; to discuss present and future needs openly with industry so as to help firms to plan ahead; to use the influence of public purchasing to help develop the design, technology and competitiveness of industry; to be prepared to learn what factors on the purchaser's side are detrimental to firms' performance in both home and export markets and to see if some accommodation is possible; and to offer opportunities for debriefing where necessary with firms who have tendered unsuccessfully.

"So I see the message of the Government's initiative to be very much related to the efficiency and cost-effectiveness of firms and in no way to 'feather bedding'. I hope we shall see a more regular dialogue between the NHS on the one hand and the medical supplies industry on the other. If people don't talk, they are not likely to understand each other's needs and problems and they lose the opportunity of considering how best to work to their mutual advantage.

"I know there are some benefits to gain for both sides — though they may not be equal benefits — if a closer relationship is to take root. Of course, none of us will expect a regular dialogue to solve all the problems; life isn't like that. But I am confident that some progress can be made — particularly perhaps in terms of better planning and forecasting by both sides affecting levels of service, benefits and costs."

New Registrar-Secretary at The Institution of Metallurgists

The Institution of Metallurgists is pleased to announce the appointment of Dr G L J Bailey to the post of Registrar-Secretary, which has been vacant since the unexpected death of Dr Terry Marsden last October. He took up his duties on 1 March 1982.

The author is a Technical Assistant 1, in the Regional Engineer's Department at West Midland Regional Health Authority.

An alternative method of heating a laundry ironer

P E MAIN TEng MIHospE

Laundry equipment heated by steam needs a specified minimum pressure if it is to work efficiently. A restricted steam supply may be caused by inadequate boiler capacity or inadequate distribution; both of these problems can be resolved, but may incur the penalty of high cost and disturbance. It may be worthwhile considering an alternative method of heating, such as the use of thermal fluid. The following case study is based on 1980 costs.

Up to the present the West Midlands has laundries served only by steam. In the case of a laundry which has a restricted steam supply because of low steam pressure, there is a slower throughput of work, with its attendant higher operator costs. Comparisons were made with three types of heat generator; thermal fluid heat generators, steam generators and main boiler steam generators. Comparisons were also made between three ironers; a 5 roll ironer, a 4 roll ironer and a 3 roll fluid heater ironer.

The flat-work ironer in a laundry is a critical item of plant and a large percentage of the workload is processed through it. Its function is twofold; it removes the remaining moisture in the fabric after it has been dried mechanically, and by evaporation and it also provides an acceptable finish to each item of fabric.

In order to make this equipment efficient, there needs to be a basic minimum supply of heat in one form or another.

Under the conditions of fabric drying and pressing that occur in a flat-work ironer, drying time is inversely proportional to the difference in temperature between the heated drying surface and the fabric to be dried. While moisture is evaporating from damp fabric there is a 'steady-state' period, during which the temperature of the fabric remains steady at 100°c and does not rise until the fabric is bone dry.

The temperature difference is therefore governed by the surface temperature of the ironer bed, hence the requirement for the steam at a certain pressure to obtain the highest temperature required. Normally this would be from 100 psi upwards to 150 psi; pressures higher than this, say 450 psi, are not used in hospital laundries due to operating difficulties.

This leads to the consideration of a medium other than steam to be considered for heat provision, namely a heat transfer fluid. This is pumped round from a remote heat generator, the primary source of heating being gas or oil.

Fluid heated ironers have been in use as an alternative to steam for several years, and are by no means a new idea.

There are many sources of technical reference on this type of equipment but some of the advantages are listed in Appendix 'A'.

In addition to providing higher temperatures without the associated steam pressure increase, a fluid heated ironer shows an overall improvement of some 20% savings in heat, over that of a steam heated

process. (See BLRA Report H71/R/ /E/157 Appendix 5).

The BLRA investigation of 1972/73 provided the above evidence and since then there has been a prolification of fluid heated irons successfully working in hospital laundries, etc.

It is always necessary to justify the use of any item of plant. Recently in the West Midlands there has been an opportunity to consider an alternative heating medium other than that of an existing steam supply.

The particular laundry considered was supplied with steam from boilers plated at 100 psi, it was also reported that due to possible restriction in the steam distribution, pressure could fall to 80 psi. Certainly 100 psi is the manufacturers minimum norm for operating an ironer at an efficient output.

The following appendices tabulate results which will help the reader to make his own assessment:

Appendix A — Advantage & Disadvantages of fluid heating

Appendix B — Fluid heated equipment survey

Appendix C — Analysis of compared costs

Appendix D — Present values exercise and results.

Appendix A

Liquid Phase Heating Using Heat Transfer Fluid

Some advantages:

Non pressurised system ie vapour pressure much lower than operating pressure.
Temperatures up to 320°C available at atmospheric pressure.
Heat transfer fluid is non corrosive and in fact offers protection to the system. No scale formation.
Closed circuit system with little fluid loss.
Low maintenance and very high plant efficiency with long plant life.
No mandatory shut down for annual inspection, low insurance.
Small attendance required, plant operation simple.
No freezing hazard.
No special boiler house or civil work required. Equipment compact.
Easily controlled.
Fuel and energy savings over steam for example and most other systems.

Some disadvantages:

Heat transfer coefficient lower than for water.
Initially fluid more expensive than water.
Higher quality materials and workmanship required than for the average steam system.
Air must be excluded from system and open vent to atmosphere expansion tank arrangments must be kept cool.
Temperature drop across heating surface.

Appendix B

Fluid Heated Equipment Survey 13/8/80

(Users reported Comments)

SITE	Year Installed	Details of Laundry Equip.	Details of Generator	Users Response on Overall Performance	SIGNIFICANT DEFECTS Defects on Ironer	Defects on Generator	COMMENTS
Scarsdale Hospital Chesterfield	1977	Tullis Ironer	Wanson Gas Fired (costs are higher than expected)	Acceptable as a complete system	Clothing singed	None reported	*Would re-install if required*
Battle Hospital Reading	1979	2 Roll Spencer Jaxons	Wanson	" "	Tapes affected by heat. Clothing singed	None reported	*Would re-install similar system* but would *now* select a 3 roll in order to by-pass Tumblers if possible
Severalls Hospital Colchester	1974	3 Roll Manlove Tullis (2 off)	Wanson Oil Fired	" "	Clothing singed (Roll out of line now rectified	After 2 years the oil leaked from Coil (Design error)	*Would install similar system*
Ninewells Hospital Dundee	1979	3 Roll Spencer Jaxons	Gas Fired Wanson	" "	Clothing singed	Refractory breakdown (Twice)	*Would re-install similar one* but Planned Main-Maintenance essential Commissioning was difficult. Co-ordihating was a problem.
Warlingham Park Surrey	1979	Spencer Jaxons 2 Roll	Gas Heated	" "		None reported but advise care with commissioning	*Would re-install.*
Royal Victoria Blackpool	1977	Manlove Tullis *2 Roll & 3 Roll*	Oil Heated	" "		Initially there were *problems with continual* 'Lock Outs' also there was an influx of Thermal Fluid in the Burner Chamber — rectified as a design fault with attention to brickwork clearances.	*Would repeat installation more problems* encountered than with steam. No mains standby generator therefore there was a loss of production for periods.
Fluid in the Burner							

Appendix C

Comparison between Fluid Heating and Steam Heating for Ironers, on a general case basis. 1980 Figures

Plant	Capital cost £	Area Occupied M^2	Area Cost at £304,M^2	Cost £ to Generate 1000 lb Steam or Oil heat Equivalent to 344,000 BTUs	Nett Cost £ to process 643 sheets at 630,000 BTUs/Hr	Cost Savings due to non use	Estimated Life	Notes
Steam Generator	12,000	16	4864	3.00	3 x 630.000	NIL	15 yrs	
Thermal Fluid	12,000	16	4864	With BLRA Fig. of 20% saving over steam heating cost = 3 x 0.8 x 1.13 = 2.7	2.7 × 630 = 2.14 844 = 2.01	Allow additional 5% saving on Distribution costs.	15 yrs.	Cost of 3500s oil = 8.8 p/l Cost of 35s oil = 10.5 p/l Increase incosts when using 35s oil, minus cost to heat and maintain burners using 3500 oil (this assessed as approx. 5% of total cost). = 10.5 x 1 = 1.13 8.8 1.05
Mains Steam Supply	Attributed worth same as steam generator £1200	Attributed area same as generator 16	4864	3.00 = 2.14	3 x 630 844	NIL	20 yrs.	
3 Roll Thermal	38,000	10.8	3283	—	—	NIL	15 yrs.	
4 Roll Steam Ironer	39,000	14.4	4377	—	—	NIL	15 yrs.	
5 Roll Steam	46,000	18.0	5472	—	—	NIL	15 yrs.	

Appendix D

Present value exercise on heat generation with interest of 7%

Cost Item	Steam Generator		Thermal Fluid Heat Generator		Equivalent main Steam System	
Capital Cost		£12,000		£12,000		£12,000
Annual cost of heat to process 643 sheets/ For 260 days (in perp)	260 x 8 x 2.14 x 14.3	= £63,652	260 x 8 x 2.01 x 14.3	= £59.785	260 x 8 x 2.14 x 14.3	= £63,652
Replacement cost every 15 yrs.	10,000 x .568	= £ 5,680	12,000 x .568	= £ 6,816	10,000 x .348	= £ 3,480
			Capital Cost of Fluid	= £ 220		
		TOTAL £81,332	550 x 40p			TOTAL £79,132
			Every 4 yrs. 220 x 3.22	= £ 708		
			Deduct distribution Savings over Steam say 5% of 10,000	= £ 500		
TOTAL £80,029						

Present value exercise on ironer plant with interest of 7%

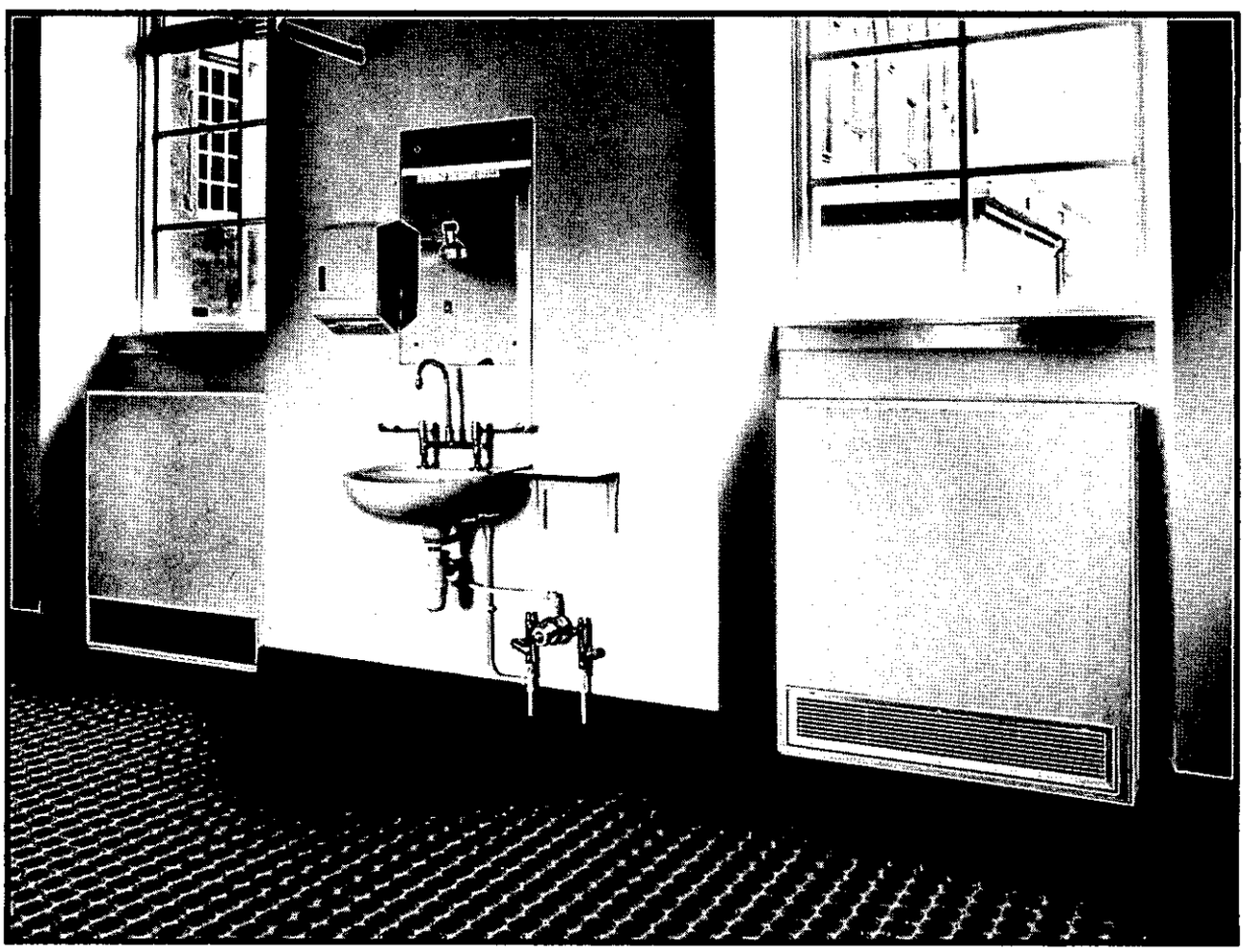
Cost Item	3 Roll Fluid Ironer (3 rolls considered for use rather than 2 rolls offered by manufacturers)		4 Roll Steam Ironer		5 Roll Ironer	
Capital Cost		£38,000		£39,000		46,000
Replacement cost every 15 yrs.	38000 x .568	= £21,584	39,000 x .568	= £22,152	46,000 x .568	£26,128
		£59,584		£61,152	£72,128	
Occupied Bld. Capital		£ 3,283		£ 4,377		£ 5,472
Replacement Bld. cost every 30 yrs.	3283 x .151	= £ 495	4,377 x .151	= £ 661	5,472 x .151	= £ 826
		£63,362		£66,190		£78,426

Case without capital cost of building	General Case	General Case	Case without capital cost of building
		Cost Comparison	
(1) Steam generator with a 5 roll ironer		£159,758	£154,286
(2) Main steam supply with a 5 roll ironer		£157,558	£152,086
(3) Steam generator with a 4 roll ironer		£147,522	£143,145
(4) Main steam supply with a 4 roll ironer		£145,322	£140,945
(5) Thermal fluid heat generator with 3 roll fluid ironer		£143,391	£140,108

Conclusion:
Lowest in both cases is item (5)

Recommendation:
Thermal Fluid Heat Generator
3 Roll Fluid Heater Ironer

Warm - **and Safe** - with Hudevad, of course



Hudevad LST/CF radiators installed in Sunnyside Royal Hospital, Montrose.

Hudevad low surface temperature radiators combine safe touch temperatures with high heat output. Models have been developed to meet a variety of applications; illustrated is the new LST/CF with forward facing inlet grille.

Hudevad hot water radiators are superbly efficient, finely designed and built, safe, robust and easy to clean. They are made to measure. Normal delivery is 5-8 weeks, **whatever the specification.**

Write or telephone for further details.

HUDEVAD BRITAIN

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Getting the best value from existing building stock

Robert J Maxwell JP PhD

Perspective

When most people in the NHS think about estate management they concentrate on the capital programme (roughly £476 million for England in the current financial year at 1980 survey prices (*See reference one*) or capital plus maintenance (maintenance expenditure — at five to six per cent of NHS revenue expenditure — would add some £450 million to the previous figure). That is only the tip of the iceberg. The Secretary of State is among the largest property owners in Britain. For example, in England alone there are some 2,125 NHS hospitals with 380,000 beds. On a very rough estimate the replacement cost of those beds (excluding site values) would be £16,000 million — 17 times the combined NHS capital and maintenance budgets for England, and 33 times the capital budget. (*See reference two*).

In addition, in England alone, the NHS holds land totalling 50,000 acres, making the Secretary of State and the health authorities landowners on a vast scale. (*See reference three*). Overall (taking account of land and buildings) the value on the NHS estate must approach £20,000 millions.

The health authorities, the DHSS and, I suspect, the Secretary of State himself give much less time and energy to this vast estate than its proper management requires. Understandably land and buildings are remembered only when they cause problems. There are several reasons for thinking that this degree of attention is insufficient; compared with most other countries our hospital building stock is very old. Data used by the Resource Allocation Working Party in 1976 suggest that at that date less than a quarter (by floor area) of our hospitals had been built since 1948. Roughly a third of the floor area was in buildings erected prior to 1900, and the balance (excluding a small proportion of unstated age) dated from 1900 to 1948.

Secondly, old buildings are not necessarily unsuitable or inflexible. Indeed they can sometimes be more flexible, much more solidly built and less expensive to run than new buildings. But old buildings often require appreciable modification, particularly in mechanical, electrical and other services, to bring them into line with today's needs, and they can constrain new approaches to care. Moreover some of them (particularly those from the period 1919–1948) require extensive repair. Unless there is a systematic programme of renewel, the cost of making good ultimately becomes uneconomic and may well exceed the price of new buildings.

The proper exploitation of older buildings has all too often been frustrated by trying to raise the standards too high — seldom is it possible to replan spaces to conform to standard sizes or provide the quality of facilities specified in DHSS guidance information, but nevertheless great improvements can be achieved by ensuring that the *basic* facilities for patient, doctor and nurse are provided. I will be referring to this point again later.

From my own experience, which I expect can be underlined from yours, maintenance expenditure is the first item to be reduced when budgets are under pressure. As a result planned preventive maintenance is the exception in the NHS rather than the rule. Some of our oldest buildings are in a highly dilapidated state, and can suddenly become unsafe. And many of our newer buildings are being sadly neglected in upkeep. Quite apart from shortsightedness, this and acceptance of deteriorating standards. Nobody in authority seems to care.

Although there are examples of disposal of surplus NHS land and buildings, procedures are slow and cumbersome, and our expertise is still more limited than it should be to maximise the overall financial return from the NHS estate, let alone maximising social benefits.

Just as maintenance expenditure has been whittled down at the operating level, so has capital expenditure been reduced nationally. "People before buildings" as Barbara Castle put it. Thus in the current financial year, for the NHS as a whole, capital expenditure represents 6 per cent of total spending. In 1973 the comparable ratio was 9½ per cent. (*See reference four*).

The King's Fund Jubilee Project

The recent King's Fund project commemorated the Queen's Silver Jubilee and involved the renovation and remodelling of 14 wards at ten London hospitals at a total cost of

£1.67 million. Behind the project lay a concern for the state of the fabric of many London hospitals and for the morale of the staff working in them. Several factors had combined to make the project timely; The Resource Allocation Working Party had recommended switching resources away from London, national policies had urged higher priority for community care and long-stay services, as opposed to acute care, and the sharp reduction in the NHS capital programme (noted above) meant that many schemes for rebuilding London's hospitals were vanishing over the planning horizon.

The Fund wanted to mark the Queen's Jubilee with a project which its own founder, Edward VII, would have understood and supported. At a minimum, the project would improve 14 wards in ten London hospitals and thereby help the staff working in these wards and the patients treated there. If that was all it did, we would have been satisfied. As a secondary, but broader objective, we hoped that it might shed some limited light on the problems involved in modernising older wards, illustrate the advantages and disadvantages of doing so, and indicate some possible approaches to tackling the problems.

All the projects achieved a real physical improvement, particularly in lavatory and washing facilities, day space, ward kitchens, ward comfort and appearance. The average cost per bed was £5,700, which is substantial but modest relative to the cost of new construction. Virtually all the schemes entailed a reduction in beds to provide space for the improvement of facilities. Although great improvements were effected, in no case were these equivalent to the full standard of a modern newly built ward. Where the latter is the objective, or where wards are badly sited or of inappropriate shapes, total rebuilding is to be preferred.

Each ward presented different problems and opportunities, depending on its characteristics and the clinical requirements. Solutions had to be specific, tailored to the individual situation. Planners and builders had to be prepared to work fast and flexibly. When they did so, schemes could be completed quickly (in most cases within 18 months) with a high degree of client satisfaction. The nature of the work is somewhat different to new construction, calling for greater pragmatism and compromise.

It is only honest to say that we experienced some disappointments. It proved quite difficult initially to find enough Authorities to put forward schemes, perhaps because the latent enthusiasm lay at ward level where most people were unaware of the offer of a grant. At times we seemed to be fighting through bureaucratic layers to reach that level. There was an innate tendency for schemes to become increasingly elaborate and expensive, the more that experts were involved, and the longer the planning phase. The exhibition resulting from the project seemed to arouse relatively little interest and there was a tendency for NHS technical staff to emphasise (perfectly correctly) the modesty of the results. We were, however, gratified by the DHSS decision to continue to use some of the project material after the exhibition closed: someone somewhere perceived relevance and value in it.

Conclusions

It will be manifest that I am in no sense an expert in works matters. To experts my conclusions may seem so obvious as to be barely worth stating. Possibly they are a little less obvious to Chairmen, members of Authorities and senior managers. In summary my conclusions are:

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

ii. It is a badly neglected task and the failures are managerial rather than technical — lack of priority among all the competing pressures, and of managerial awareness, attention, insight and imagination.

iii. Each authority should know what it owns, the state, characteristics and, in certain cases, value of its property, and should have a strategy for maintaining and improving its estate.

iv. Part of that strategy must, in the foreseeable economic climate, be for renovating and remodelling existing building stock. There is no realistic alternative. Renovation and remodelling call for different approaches and, to some extent, different skills, from routine maintenance on the one hand and new construction on the other. There is also an implication for new building — it should be designed so that services can be stripped out and replaced, since this is the most essential renovation task and can be enormously eased if foreseen and planned for.

v. Although the financial climate is likely to be bleak, it will not be uniformly so. From time to time there will be unspent money, which can achieve material improvement in buildings and services without generating higher running costs. One must plan one's strategy to take advantage of such opportunities when they come, and to do so skillfully and fast. However, we must take care that everyone who contributes to such contingency plans understands the status of the plans — that action will only follow when the necessary funds become available, and that people's time is used economically.

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

References

The Government's Expenditure Plans 1981-82 to 1983-84. Command 8175 Table 2.11 page 111.

The estimate assumes (from *Health and Personal Social Services Statistics for England, 1978* table 4.6 page 78) that roughly 180,000 beds are acute and 200,000 are long-stay. A replacement cost of £50,000 per acute bed and £35,000 per long-stay bed was used.

The estimate of land-holdings and of the age of hospital buildings is based on working papers used by the Resource Allocation Working Party in 1976. The land holdings figure was adjusted to exclude Wales and to allow for the fact that it represented roughly an 86 per cent sample of total hospitals and hospital beds.

From Command 8175 (reference (1) above) and *National Income and Expenditure, 1980 Edition Table 9.4 page 64.*

For a fuller description and plans of the wards see *The Jubilee Project* published by King Edward's Hospital Fund for London, January 1981.

This paper was first given at the Symposium on Designing for Reduced Hospital Energy Consumption in June 1981. The Author is Superintending Engineer for the Development Division at The Department of Health and Social Security.

Designing for Reduced Hospital Energy Consumption

Design Implications and Possible Solutions

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Introduction

The subject of this paper is the implications for design of hospitals when the need for energy conservation measures is put into the design brief.

I propose to deal first with the effect on the design process of introducing this requirement and then to consider the practical effects on hospital buildings.

Views on Energy Consumption

Firstly, what is meant by reducing the energy consumption? There are several ways of looking at this, to take the examples:

a) a building may be said to have a reduced energy consumption if the demand in total has been diminished without regard for energy sources ie without distinguishing the energy savings in terms of coal, gas, oil or electricity.

b) the aim may be to reduce the total cost of energy used at the building to a minimum.

c) energy substitution may be achieved ie a low grade energy source may replace one of a higher grade.

Each of the approaches represent a way of achieving some objective in terms of energy economy. By minimising the total cost of energy used at the building there is the implication that fuel is not the only scarce commodity to be considered; money is hardly abundant and if we assume that price is a reflection of resource content, by minimising the total cost we will ensure a better allocation of all resources and put energy use into its right perspective. This may be true from the National point of view since pricing is subject to political and economic influences. If we are to put the effective use of NHS resources as the paramount objective it will be the cost of combinations of fuels as delivered at the hospital which will influence our thinking and the decisions which are taken. I propose to discuss energy conservation from whatever standpoint seems appropriate and will cheerfully accept the charge of inconsistency if it is levelled against me.

My justification for this high-handed approach is that in practice the decision on fuel selection and the adoption of energy use strategies for any particular project will be restricted by availability and suitability.

Because of the uncertainty of future supplies of fuel and the relative prices, the shrewd designer will keep in mind the need for flexibility in the energy source mix which he adopts and although he will limit his ambitions to achievements possible in light of present circumstances he will keep an eye on future possibilities if he is to avoid being caught unawares.

The Prize — and the Caution

When energy was cheap and abundant there was little incentive for designers to put energy consumption high on the list of factors to be considered when designing the building. The recent increases in fuel prices and the future uncertainty of supply or price has introduced new and complicated

issues to affect the design process. It is clear that by careful attention to design the cost of the fuel bill for new hospitals — as with other buildings — can be drastically reduced. Even at present prices the fuel bill for a new 300 bed DGH might be reduced by as much as £200,000 per annum. Whilst this is only a fraction of the total annual costs of running such a hospital, as fuel prices rise in real terms — that is without considering the effects of general inflation — to double or triple the present figure in the next 20/25 years prize is a valuable one and worth seeking. So much for the prize; now for the caution.

What I am considering is applicable directly to hospitals; it may be more or less true for other types of building but the energy demand and consumption patterns for hospitals are different from other buildings.

Indeed, the pattern will differ for the various types and sizes of hospital but one has to start somewhere and then diversify. The general methods and approach suggested here would be relevant to other buildings but very different answers would be produced depending upon the energy consumption pattern which is followed.

Energy Consumption and the Design Process

Turning to the design process and considering how attention to energy conservation affects each in turn.

Planning: The most profound influence in the energy consumption in a building is exerted at the earliest conceptual stage. It is important that client/users in a multi-disciplinary team inject considerations of the effect of planning decisions on energy requirements. The effect on energy consumption will continue to be felt year by year throughout the life of the building and its installations and therefore justify very careful consideration. The specification for environmental conditions eg temperatures need critical examination so that the minimum consistant with acceptable standards are set down.

Planning decisions will establish the way in which buildings are used and energy consumption should be kept in mind since whilst good design may assist in the development of economic and sensible operational policies, poor operational control may devalue or undermine the effects of good design.

Certain relationships and grouping of departments in a hospital are, of course, necessary on functional grounds but where there is some flexibility in arrangement it may be possible to group departments which are high energy users eg catering, HSDU etc close to the energy input points or energy conservation centre and so facilitate reclaim and re-use as well as minimise distribution losses. The location of nine to five departments in relation to 24 hour departments; the use of shared spaces such as waiting areas; and the avoidance of unnecessary space provision all may contribute to an overall reduction in energy consumption.

The building form development will be very influential in deciding the extent and pattern of energy requirements. For example deep planning leads to the need for mechanical ventilation, probably incorporating refrigeration plant and more extensive use of electric lighting; tall buildings will increase the energy demand of lifts and pumps, linear buildings may give rise to high distribution losses and generate problems of effective and economic reclaim of energy for further use.

Preliminary design stage: At the preliminary design stage, when more extensive information is available on the building form and development it should be possible to develop design options in more detail and to examine then for energy implications. A site energy strategy including the approach to energy conversion on site need to be established by considering the various possibilities.

The energy conservation strategy may follow the following lines;

a) reduce the loads by specifying minimum acceptable standards of provision.

b) reduce losses through building envelope.

c) reclaim energy where this can be done effectively and economically.

d) consider reclaim methods which may be adopted and whether there is need to change the grade of energy, e.g. by increasing the temperature or by conversion to another form of energy.

e) match the pattern of energy use to the pattern of energy reclaim.

f) consider the extent of the need to meet any mis-match from prime energy sources.

g) review prime energy sources available.

In practice there may be specific external influences eg the existence of a boiler house with surplus capacity which will modify or effect the decisions. Each project will provide the designer with intriguing possibilities but the essential ingredient at this stage of the design is an insight into the pattern of energy usage and the effects of reclaiming energy for further use.

Detailed Design Stage: At the design stage the designer will proceed to study the various options open to him. The energy economy and cost effectiveness of such things as LPHW and air heating installations will have to be examined. The attractions of low temperature systems, which may be supplied from low grade reclaimed heat without the use of energy consuming intermediate plant may be attractive but the advantages will have to be balanced against the space constraints for the services.

Decisions will be needed as to how the building is to be effected and controlled. In some cases such as lighting only one solution may be acceptable but in others such as ventilation, the extent and type of installations which may be provided will provide scope for imaginative and ingenious design solutions. The disposition and extent of automatic controls so as to limit wasteful energy consumption will have to be reviewed against the operational practices which may be acceptable to staff. These examinations will eventually lead to the selection of preferred options. Unfortunately, energy conservation measures have an interactive effect and once a selection has been made on an individual basis, the interaction must be examined to test the validity of the overall solution. Clearly, the yield of recovered heat from an exhaust air system will be considerably modified if extensive zonal control systems are also provided.

There will also be an interaction with the building design and as in all design work a series of compromise decisions will be needed. In particular, the building fabric insulation might well be restricted so that there is no more energy retained in the building than can be reclaimed or some cooling provision will be required.

The site energy strategy, taking into account the requirements for 'top-up' from primary energy sources will need to be based on the provision

of minimum energy conversion facilities to suit the year round requirements.

Boilers should be as small as possible and steam boiler installation avoided where possible — indeed they may not be needed except where steam is required for process purposes. We may look for the elimination of cooling towers which testify to wasted heat energy and to the possibility of some form of combined: heat and power installation where electricity production and heat production may be combined: although here the problem of matching the CHP output to energy consumption patterns is a formidable obstacle to cost effective solutions. Perhaps engine-driven standby generator plant with facilities for use as heat pump prime movers might be a fruitful area for study.

Conclusion

To sum up, the need to conserve energy is now generally recognised and it is essential to design buildings which are not wasteful and to use them so as to manage the energy demand effectively. Designers of buildings will have to pay more attention than before to this subject and the effect of this will be to involve project teams, designers and users in a systematic assessment of the consequences of decisions in energy usage terms.

In order to design to high standards, better information on energy consumption patterns is required, and this need has been realised — information is gradually coming forward. Simulation and model studies may be helpful. The potential for reclaiming energy is considerable in most hospitals, but it does not match the energy demand pattern — implying storage or supplementary supplies from prime energy sources, or both — and it will probably be largely of a low grade heat for which demand is not unlimited. It may be cost effective to transform limited amounts of energy from a low grade to a higher grade of heat by heat-pumps and the use-of engine-driven plant should be kept under consideration.

What has been presented is a challenge to designers and users of buildings to reduce energy consumption by careful attention at each stage of development. There is no doubt that the objective is attainable.

This paper was presented recently to Works Officers in the South East Thames Region by the author, the District Works Officer for the Brighton Health District.

Estate Management in the Reorganised Service.

J K HINDLE CEng MIMechE

How best can the Works Officer help the new District Health Authorities following restructuring, with the emphasis now being placed on Unit management? He must perhaps in the first instance examine his existing role carefully and distinguish between professional advice and management policy.

The National Health Service was formed with the aim of providing comprehensive health care to the people of the British Isles. It is still the aim of the organisation, and reorganisation is about providing an improved care. Estate Management is a secondary function, a means to an end, and Works Officers should pay due attention to this fact when considering their future role.

On 1st April 1982 the new Authorities assume responsibility for providing this improved health care for local areas. Their activities will be numerous and Estate Management may well be lost amongst those considered to be more pressing and directly related to the patient.

It is important, that Works Officers are able to assist their new Authorities in identifying those responsibilities related to the management of the Estate in which the health care services are provided. These are detailed in Appendix I to this paper, but may be summarised as:-

1. To maintain and operate the Estate in such a manner that it can meet the short and long-term needs of existing health care services at an acceptable cost.

2. To change the Estate in such a manner that it can also meet the short and long-term needs of future

health care services at an acceptable cost.

The new authorities must, therefore, in the first instance seek to identify their existing health care services and the expected life of these without major change. They must then identify areas of change — growth, reduction, innovation, etc.

This is the 'brief' concept, which Architects use. Identify the intended activities, and the Architect with his specialist skill and training will provide the bricks and mortar best suited to these. With this information the new Authorities can turn their attention to two areas of management;
That concerned with maintaining the 'status quo' situation and that concerned with developing the health care services.

In Estate Management terms the activities of these two areas can be simply stated. Firstly there is the 'Status Quo' situation; 'What have we got?' and 'How long do we need it?' The answers to these questions are two 'Management Statements'; 'What needs doing to it?' and 'How often?'. The answer to these questions is 'Professional Advice.'

Secondly there is the Development situation; 'What have we got?' 'How long do we need it?' 'What would we like to have?' 'When would we like to have it?' The answer to these latter two questions is also 'Management Statements'. How do we get them? Again the answer is 'Professional Advice'.

This simplified approach is not to say that the professional adviser has no role to play in the formulation of Management statements. The system is dynamic and statements may be modified in the light of advice. Failure to separate activities in respect of the management of the 'status quo' situation and that of development will and does lead to role confusion. It leads to neglect of valuable capital assets and ill-conceived capital development.

Roles are further confused, if there is a failure to recognise the need for management statements against which professional advice can be given. This leads to Works Officers creating their own management statements and consequently assuming a more general management role than some of their colleagues consider appropriate.

The new Authorities are urged in HC(80) 8, paragraphs 28 and 29, to create "units (of management) that are smaller than existing sectors" and "to achieve maximum delegation to (these) units". These requirements are conflicting for as more units are created, the more favourable becomes the argument for centralisation, particularly in the light of the management cost reductions also sought.

Certainly one cannot envisage Unit Management leading the development areas of management referred to earlier. In Estate Management terms this will mean that professional advice and the resources to implement this will have to be centralised.

This then leaves the maintenance of the 'status quo' situation to be managed at Unit level. One could argue that in Estate Management terms the management statement will come from a central source — 'what have we got and how long do we need it?'. Indeed, dependent upon the size of units eventually created, one could argue that on purely economic grounds the 'what needs doing to it and how often?' — the professional advice — should also come from a central source.

If such arguments are valid, then the implementation of advice is the sole remaining activity to be delegated. This comprises:-

1. The operation of engineering services.
2. The operation of routine PPM in respect of building and engineering work and equipment.
3. The operation of an effective response to breakdown maintenance.
4. The preparation and implementation of minor schemes of maintenance renewal and replacement, and works of a minor improvement nature.

The question we must now turn to is 'to whom is responsibility delegated and to whom is the delegated person accountable?' The options are:-

1. District Health Authority—District Administrator (Advised by a District Works Officer)—Unit Administrator—Unit Works Officer.
2a. District Health Authority—District Administrator—District Works Officer—Unit Works Officer.
2b. District Health Authority—District Administrator—District Works Officer—Unit Works Officer (Reporting to a Unit Administrator).
3a. District Health Authority—District Works Officer—Unit Works Officer.
3b. District Health Authority—District Works Officer—Unit Works Officer (Reporting to a Unit Administrator).
3c. District Health Authority—District Works Officer (Reporting to District Administrator) — Unit Works Officer.

When considering these options, Authorities must recognise that responsibility for the Estate remains with them. Duties and tasks may be delegated, but not the responsibility. With this in mind, the chain of delegation should be kept as short as possible and each link be joined by indentified Authority policies such as financial/technical limits, heating levels/seasons, PPM priorities response times, task routines, etc.

Standards achieved can only be measured against policies. For example, most hotel chains have company policies. These may be to have guests accompanied to their rooms from reception, to provide a working TV in each room, to provide clean linen on a daily basis. Such company policies are backed by company money and the hotel manager is assessed against his compliance.

Deletion of those items previously identified for delegation to Unit level from the list of Estate Management activities referred to earlier, will leave those tasks requiring to be carried out on a District basis.

Referring back to my earlier concept of managerial and professional responsibilities, it should be accepted by Works Officers that professional responsibilities can be quite adequately discharged without involvement in the general management areas of 'what have we got' and the implementation of professional advice.

Those Estate Management tasks, which are carried out at District, must be on a service basis to the Authority itself or to Unit Management. Management arrangements for dealing with these tasks can be considered on the same basis as those at Unit level. The options will be:-

1. District Health Authority — District Administrator — District Works Officer.
2a. District Health Authority—District Works Officer.
2b. District Health Authority—District Works Officer (Reporting to a District Administrator).

Having decided the general principles of what is to be done in respect of Estate Management and the levels of the organisation at which the various activities are to take place, we can now consider structural arrangements in greater detail.

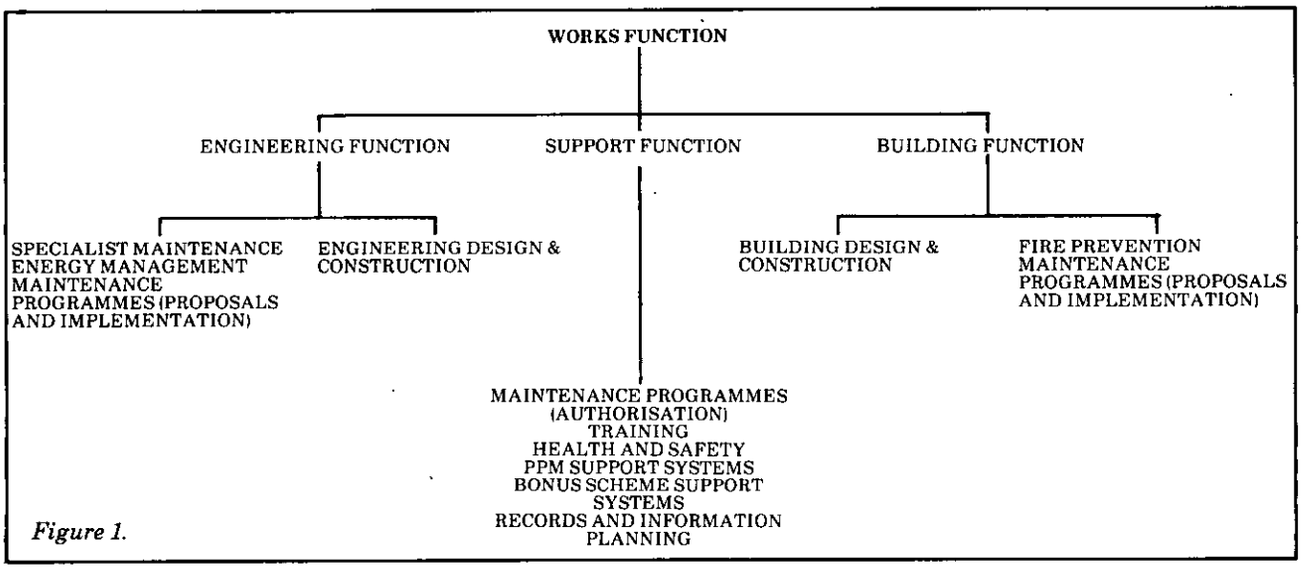


Figure 1.

Districts will be divided into Units of management, each Unit requiring some or all of the Estate Management services referred to in this paper. In particular they will require those services identified to be delegated. Following the policy of simplified management arrangements, these latter services should be provided through a single point of contact based at Unit level. The Works Officer providing this contact must be seen as a member of the management team with his boundaries of responsibility coinciding with those of other members of that team. If the team concept is to succeed, this may be cost penalty Authorities will have to accept.

All other Estate Management services should be provided through a District-based organisation headed by a District Works Officer with accountability as previously discussed. In determining the structure of the organisation, let us first consider the tasks it will carry out. These are:-

Preparation and implementation of Maintenance Programmes
Provision of Planned Preventive Maintenance Support Systems
Provision of Bonus Scheme Support Systems
Provision of Specialist Maintenance through Directly Employed Labour or Maintenance Contracts.
Provision of Fire Prevention Advice and Services
Provision of Energy Management Services
Provision of Training Services
Provision of Health and Safety Advice and Services
Provision of Records and Information Systems
Provision of Planning Support Services
Provision of Architectural Design and Construction Services
Provision of Engineering Design and Construction Services.

These tasks have been purposely grouped into what the writer considers to be naturally related activities. If these groups are now distributed through an organisational structure *(See Figure 1)*, we can begin to form some ideas of the options available for Works Department structures in the reorganised service.

This structure can be extended *(See Figure 2)* to include Unit tasks as a fourth branch of the Works Function should these be considered as a delegated part of a District Works Officer's function.

It is but a short step to transpose from this type of structure to a personnel structure using the grading levels for Works staff currently under national discussion. If we look at the task structure again, we can identify options for budget allocation, financial control and inter-disciplinary relationships against each of the task headings. Examples are given below.

Specialist Maintenance: The budget to be held at Unit level with the service to be provided by the District Works Officer in the first instance and charges raised accordingly. The Authority's policy might be in the case of directly-employed labour to use the 'in-house' service provided by the District Works Officer as a first choice, but for this to be assessed by the users and the Authority on a competitive basis.

Energy Management: A monitoring and advisory service to Unit management and the Authority itself. Budget to be held at Unit level.

Maintenance Programmes: Budget to be held by the District Works Officer. Programmes would be agreed with Unit management and the Authority.

Design: Budget to be held by the Authority. Project Officers would be appointed from the Works Department and briefing would be through a Project Team.

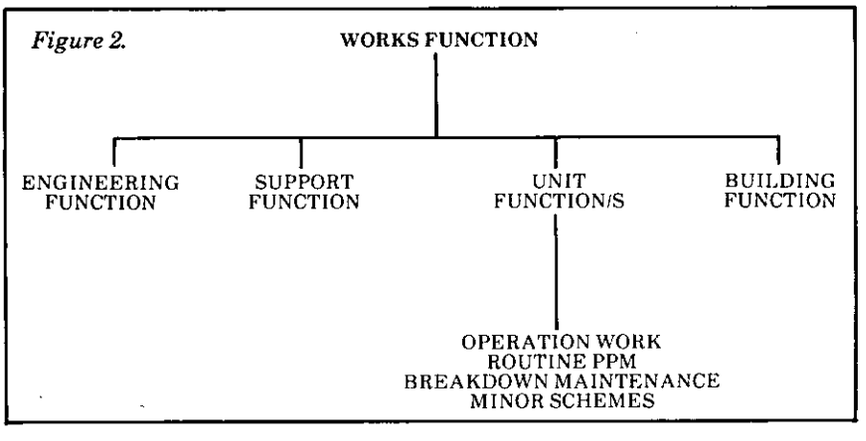


Figure 2.

Support Services: Budget to be held by District Works Officer. Levels of support would be agreed with Unit management and the Authority.
Fire Prevention: A monitoring and advisory service to Unit management and the Authority itself. Budget to be held at Unit level.

Using this approach to structural planning will ensure that proposals are based on organisational need and the effective provision of a service to patients rather than professional career aspirations and progressions. Works Officers must accept that the responsibility for the Estate will rest with the new Authorities.

Works structures, when proposed, must be capable of providing the professional advice to complement the management statements produced at the various levels of the organisation at which it is decided by the Authority these shall be made. The acceptance of that advice and the implementation of it is the ultimate prerogative of the Authority. Whatever structures are finally decided upon, they must grow from the policy and decision levels of the organisation. Let us not create structures and expect the organisation to operate around them, there lies frustration for everyone.

Appendix I The Responsibilities of Estate Management

The new District Health Authorities will be charged with Estate Management responsibilities relating to the land and capital assets of the Health Service and involving the acquisition, maintenance and operation, exploitation and ultimate disposal of these assets.

The functional activities to be undertaken to accord with the above responsibilities will include:-

Management of Resources
Formulation of maintenance programmes and the allocation of resources under the various headings of maintenance expenditure.
Manpower Management
Engagement and deployment of staff including:
Supervision of professional and technical staff.
Management of trade staff and other labour.
Union liaison.
Bonus systems.
Staff training and career development.
Safe working practices.
Estate Maintenance Service
Organisation and provision of an effective response to breakdown maintenance.
Provision of an effective system of programmed maintenance covering buildings, engineering plant, equipment and services, and grounds and gardens.
Preparation and implementation of schemes of maintenance, renewal and replacement and works of minor improvement.
Specialist Maintenance
The provision of a service, as necessary, for specialised aspects of maintenance and operation, and deployment and supervision of directly employed and contract maintenance staff, e.g.
Mechanical/Electro Bio-Medical equipment.
Communications and alarms.
Sterilizers.
Medical gas systems.
High voltage electricity.
Lifts.
X-ray equipment.
Pressure vessels.
Operational Services
Satisfactory operation of engineerng plant and services, e.g.:
Steam generation.
Heating services.
Hot and cold water services.
Electrical services.
Nurse call systems.
Telecommunication systems.
Catering, domestic and laundry equipment.
Waste disposal (incineration, maceration and compaction).
Air conditioning.
Standby generators.
Medical, para-medical and other specialised equipment.
Emergency Services
Provision for dealing with unforeseen work resulting from emergencies by the adoption of pre-planned contingency procedures and the availability of a 24-hour on-call service.
Maintenance Contracts
Arrangements of suitable maintenance contracts, including term contracts and arrangements for collaboration with Local Authorities or other agencies where appropriate.
Fire Precautions
Liaison with Fire Authorities in ensuring that proper provision is provided for fire safety in buildings and provision of staff training where appropriate.
Public Utility Services
Liaison with appropriate Local Authorities and Public Utilities for the safe and efficient provision of gas, water, electricity and drainage.
Energy Management
Selection of fuels.
Negotiation of contrasts for energy supply not provided centrally.
Monitoring and ensuring efficient use of energy.
Energy conservation.
Land and Property Management — To keep under review the efficient use and utilisation of land and property and to identify opportunities for rationalisation of assets.
Capital Works
Feasibility studies and estimates.
Preparation of briefs.
Contract management and control.
Preparation of drawings, specifications and bills of quantities.
Preparations of tender and contract documentation.
Certification of accounts.
Settlement of claims.
Appointment of and liaison with private consultants.
Supervision of construction.
Commissioning of major projects.
Support Functions
Tendering/contract procedures.
Works stores control/materials procurement.
Financial control/invoice and claims processing.
Management information systems/plant and equipment inventory.
Research and development/liaison with professional and technical agencies.
Secretariat.
Strategic and Operational Planning
Provision of a professional input into the planning function in terms of identifying existing building condition, utilisation factors and alternative usage of buildings and the preparation of initial feasibility studies to determine optimum solutions to accord with an Authority's strategic aims.
Provision of a professional input into District Operational Plans by the indentification of associated works costs and building needs.
Transport Maintenance
Provision of arrangements for an economic transport maintenance service and advising on a planned programme of replacement.
Statutes and Regulations
Monitoring the discharge of responsibilities in respect of the safe construc-

tion, installation, commissioning, operation, inspection and testing of buildings, plant, services and equipment as laid down in the following, many of which carry statutory obligations:-

Building Regulations and Bye-laws.
Town and Country Planning Act.
Fire Precautions Act.
British Standards and Codes of Practice.
Technical Guidance issued by DHSS.
Regulations issued by Public Utilities.
Clean Air Act.
Regulations for the Electrical Equipping of Buildings.
Asbestos Regulations.
Construction Industry Regulations.
Woodworking and Machinery Regulations.
Abrasive Wheel Regulations.
Health and Safety at Work Act, which subsumes some of those listed and currently embraces 33 Acts and 500 Regulations directly related to building and engineering operations.
Petroleum Regulations.
Medicines Act.

Chester's New Nucleus Hospital

Cheshire Area Health Authority

An £11.6 million phase of Britain's first full Nucleus Hospital has been officially handed over by Mersey Regional Health Authority to Cheshire Area Health Authority.

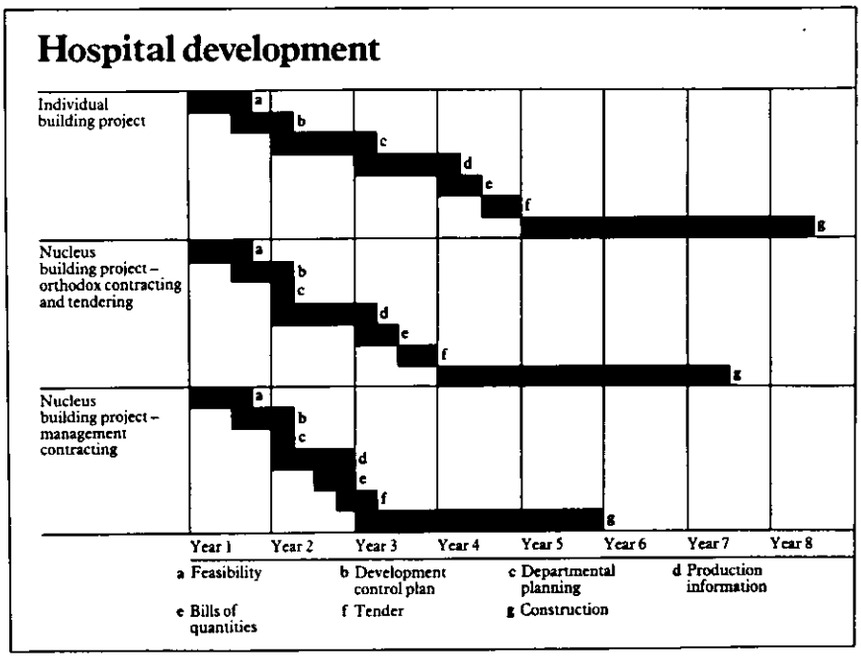
Completion of the first phase of the New Chester Hospital marks the introduction of a new philosophy in hospital design. In this new generation of hospitals the concept is to plan a small, intensive use hospital, viable in itself as a first phase, but designed to take expansion later.

The first phase of Chester's new hospital has been built by Bovis Construction Ltd in approximately 36 months using a management contract never tried out in the Health Service before. The Mersey RHA was the first in the country to appoint a managing contractor and under this form of contract, work was able to start a year earlier than would have been possible using the traditional design and tender processes required by the Department of Health. *(See Figure 1).*

The main contractor is paid a fixed percentage fee for which he provides key management personnel to organise and supervise construction. The actual building work is carried out as a series of sub-contracts organised by the main contractor.

At peak, some 220 operatives were working on the hospital site to carry out 53 sub-contract packages, all of which had been won by competitive

Figure 1: This illustration shows how the Bovis management form of contract, (bottom chart), compares with other methods of hospital development. Chester 'Nucleus' Hospital was in fact completed ahead of programme.



tender prior to construction work commencing on site.

Working closely on the design a joint team planned the work to provide continuity for all trades. Regular reviews were carried out by the team so that proper communication on matters of planning and cost could be appraised and necessary management options developed.

Architects : E. E. Stentiford Mersey Regional Health Authority

Engineering services : W. Bryars, Regional Engineer Mersey Regional Health Authority

Quantity surveyors : Davis, Belfield & Everest

Structural engineers : Gifford & Partners

M & E consulting engineers : Hoare, Lee & Partners

Managing contractor : Bovis Construction Limited part of the P & O Group.

The new Chester hospital has a pleasant open aspect in the grounds of the West Cheshire Hospital in Liverpool Road, Chester, and as it grows it will bring improved services to a quarter of a million population.

A second phase is being planned and a third will be added at some later date, both linked in with the first phase. (By exploiting the flexibility of the design a supplementary Phase 1A has now been brought forward to provide four acute wards for 112 additional beds — 94 for general medical patients and 18 for ophthalmic patients. Building of Phase 1A has recently started and will be completed next year).

The Regional Health Authority is building a second Nucleus Hospital in Macclesfield, Cheshire, and a third is at an advanced stage of design for Southport in the north of the Region.

The hospitals are built to a design which in simple terms means that cross-shaped sections are linked together on either side of the main 'hospital street' (central corridor). The design was evolved in the mid-1970's for a period of restricted capital spending and it has an advantage in shortening planning and design time by anything up to 18 months on a 300-bed scheme.

Chester's first phase will have 161 beds for inpatients and an accident and emergency unit receiving all the casualties and emergencies from the whole of the Health District.

It has four operating suites, an X-ray department, central treatment and day ward, an intensive therapy department and also a Pathology department which will cater for the whole of the District.

The hospital is mainly a two-storey building with an extra floor in places to house mechanical plant.

Conventional materials have been used externally — brickwork to first floor level and tile hanging above, giving a general impression of warm browns. Together with the traditional pitched roofs in most areas, this helps to promote an intimate 'domestic' scale which blends in with the local surroundings.

Internally, cheerful colour schemes and furniture finishes avoid the clinical appearance of much traditional hospital decor. Suspended ceilings hide the many pipes and services which a modern hospital requires.

The hospital stands between the Maternity Wing and a Nurse Training Centre. An access road which loops in a circle at the main entrance also serves the accident and emergency unit at the side of the building. A periphery road leads to the rear service block.

Both the main and the accident and emergency entrances have large outside canopies for protection from the weather, and are lit by recessed lights.

The main entrance is overlooked by a seminar room with oriel windows and opens on to the ground floor 'hospital street' which runs straight for 80 metres, showing at a glance the depth of the first phase, and then turns left for another 30 metres to serve the pathology department and future sections. The first floor has an identical central corridor.

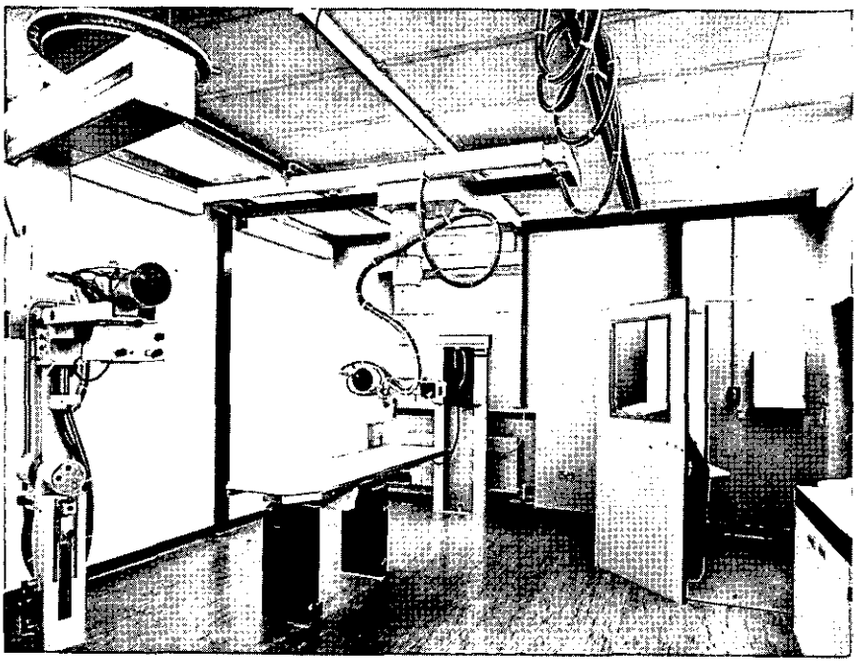
Homely Wards

The 161 beds for acute patients in the first phase comprise 100 for general surgery, 12 for ear, nose and throat surgery, 28 for orthopaedic patients, and a ward of 21 beds for children awaiting operations.

Each adult ward has four 6-bed bays and four single rooms, with their nursing stations. For safety, there are thermostatically controlled water mixers in the patients' baths, and double action doors which a device allows to be opened outwards if by chance a patient should fall against one. In certain areas, fire doors can be left open because sensors will close them automatically if smoke is detected.

The children's ward has two 6-bed bays, three single rooms, and three mother and child rooms. Use of rooms has been sensitively designed; hence, an adult ward dayroom is papered with floral look whilst a children's dayroom — a mirror image of the adult ward in design — goes for the Kipling theme with jungle animals. A formica topped nurses' desk is finished in bright red. Being on the ground floor, the children's ward opens on to an outdoor play area, one of three enclosed hospital courtyards.

Figure 2: The X-ray Department at Chester Nucleus Hospital.



Accident Facilities

The accident and emergency department will cater for the diagnosis, primary treatment and resuscitation of patients. It is designed to serve a population of 200,000 around the clock, and up to 60,000 new patients a year.

The department has four treatment cubicles for ambulant patients, one with blackout facilities for eye injury cases. There are also four cubicles for stretcher patients and three sound-proofed ones, including one for drug and alcohol recovery and one for children. Two major treatment rooms are also included.

This phase of the hospital has four general operating suites and there is a post operative recovery area with six beds.

The Accident and Emergency Department leads directly into the X-ray Department. This has four radiodiagnostic rooms — comprising two screening rooms, a twin tabled intravenous pyelography room for kidney examinations, and an accident room containing an orbix stand for cranial work. Two film processing areas cater for the loading and unloading of films into a processor in ordinary lighting conditions. *(See Figure 2).*

An adult day care section has 15 beds and 20 spaces for sitting and recovery and is linked with a treatment suite of four rooms for both day and inpatients. Two cater for minor operations which do not need the full facilities of an operating theatre, provision of local or general anaesthesia, and endoscopy. The other two are for dressings, and such clinical procedures as lumbar puncture, chest aspiration and catheterisation. A room for ECG is also included.

The intensive therapy unit can be expanded to eight beds and has two 3-bed bays and two single bedrooms with all the modern equipment to help critically ill patients. A doctors' bedroom is available if a doctor needs to be on hand overnight.

Five rooms in an on-call/overnight stay suite can be used, as required, for staff on call or relatives staying overnight.

Other Departments

The new two-storey pathology block at the rear of Phase One will cater for the whole of the Chester Health District, replacing those departments in use at the City Hospital and the Royal Infirmary. *(See Figure 3).*

A rehabilitation department provides for physiotherapy, occupational therapy and speech therapy, with wax treatment facility, exercise area, workshops and other features. This department shares the same hospital section as the pharmacy.

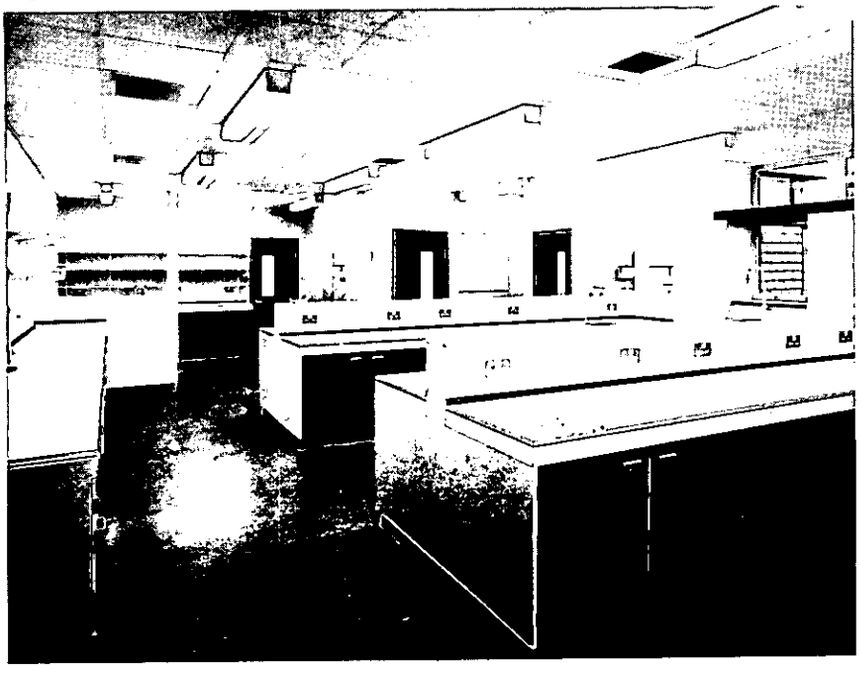
The catering department is in a service centre at the back of the hospital and its staff restaurant gives a view towards the Welsh hills. The kitchen can provide over 400 meals and has non-skid floors and white ceramic tiled walls.

Between the pathology department and service centre is a library and meeting suite with a committee and seminar room, patients' and staff library, and reading areas.

Other rooms include doctors' accommodation — with two single offices, a large open office for consultants and a junior doctors' common room — administration with its L-shaped reception desk, medical records department, sterilising and disinfection unit, stores, works department, mortuary and post mortem suite. There are ancillary buildings on the service bay road.

A children's isolation unit with eight beds has been built separately and a ward in the Maternity Wing converted to bring all paediatric inpatients in the Health District together on one site. The converted ward accommodates children needing medical treatment.

Figure 3: Chester Nucleus Hospital's Pathology Department.



Impact of the new hospital on Chester health services

Chester Royal Infirmary will continue to provide acute services and the main outpatient facilities for the Health District — with its accident and emergency service transferred to the new hospital.

Gynaecology inpatient and operating facilities will, however, remain at the Infirmary. It is planned that Barrowmore Hospital will close. Patients will be transferred to the Nucleus Hospital.

Chester City Hospital will take all medical inpatients, until 1983 when the patient activity moves towards being provided in Phase 1A, and an increasing number of geriatric patients.

During the 1980's Ellesmere Port Hospital will serve as a community hospital to give a more adequate range of secondary health care to a growing community.

When the first phase has been absorbed into the service and the patient care is provided in this place, planning will start on the second phase of the Nucleus development — aiming to provide all acute surgical and medical services on the Nucleus site, and resulting in the closure of the Royal Infirmary.

The maternity unit on the site was opened nine years ago and forms part of the hospital complex.

Product News

New Subsurface Leak Detector

Subtronic Limited of Rugby have launched an electronic underground water leak detector, the WL 200.

The detection and curing of underground water leaks has over the past five years become an urgent priority for industry and the institutions. These commercial users of water are paying millions of pounds for their supplies, yet it has been estimated that 20 per cent of all purchased water is lost via underground leaks.

Surprisingly, in the majority of cases, responsibility for such losses is with the purchaser and not as is often thought, the water authorities. Water is metered and subsequently charged for, as it enters the perimeter of a factory, process plant, school or hospital. Any losses that occur after that point are the sole responsibility of the water user.

The WL200 water leak detector now makes the accurate location of leaks a comparatively simple operation. Water pouring from a crack or hole in a pressurised mains pipe emits a sound. The sound is at a pitch and frequency which varies by leak size, pipe size and the material of the pipe. The WL200 detects and analyses these sounds. However the method used to analyse the sound is fundamentally different and, claims Subtronic, superior to detectors previously available. The analysis is done based on the material of the pipe from which the water is leaking.

The majority of water pipes are made from either lead, ductile material or PVC. Considerable research has shown that the leak noise frequency from each type is different. The WL200 has switchable frequency bands which permits each type to be separately analysed. This is particularly important in the case of leaks in PVC pipes which previously were not prone to analysis due to the low frequency they emitted.

Simple to use, cheap to run — the unit requires only two nine volt batteries — the WL200 is capable of contributing to savings of thousands of pounds.

Industry, the institutions and local authorities may with the WL200 make substantial savings on their annual water rates. As the price of metered water increases, so the savings will become even greater.

Subtronic Limited are confident that the new WL200 is capable of assisting in the continuing fight against rising costs and the preservation of our natural resources.

Further information from Subtronic Limited, 1 Lucas House, Craven Road, Rugby Warwicks. Tel: Rugby (0788) 70241.

Subtronic Ltd's new subsurface Leak Detector.

'Microbe' Mini-Annunciator

A new microprocessor-based mini-annunciator has been introduced by Londex Limited.

Named the 'Microbe', the new unit has been developed from the Londalert 3 system, but is half its size. Measuring only 240 mm (9½ inches) across, the Microbe is intended to meet the need for smaller and less complex alarm annunciators.

As an integrated system, the Microbe requires only a single power connection; and this simple 'plug-in' feature makes the annunciator versatile in use and installation.

With sixteen windows on the display fascia and an audible alarm, the Microbe can monitor up to sixteen remote functions or control points.

The fascia hinges to provide access to the power pack and the logic.

The power pack is compact enough to be self-contained within the cabinet, and is available for standard ac or dc supply voltage.

The solid-state logic is mounted on three boards:

A 16-way input board, for up to sixteen alarm points;

a 16-way logic board, carrying the fast-response microcomputer;

a 16-way output board, to drive the visual and audible alarms in selected sequences.

Acceptance of alarm indication is achieved by pressing the 'Accept' button on the display fascia. The flashing visual alarm is changed to the 'accepted' mode (normally a steady light), and the audible alarm is silenced.

Further information from Londex Ltd, PO Box 79 Oakfield Road, London SE20 8EW. Tel: 01-659 2424.

New D-Pak Air Handling Unit

With the announcement of a new range of air handling units, designated D-Pak, offering adaptability, design simplicity and reliability, FH Biddle Ltd have extended their range of air handling equipment currently available to building services designers.

Designed to cater for airflow volumes in the range 0.33 to 5 m^3/s, D-Pak units are available initially in a horizontal configuration, although they will shortly be followed by vertical and 'stacked' layouts.

Available in both draw-through or blow-through forms, the range is currently capable of accommodating either up to 2 row or 6 row heating or cooling coils, respectively.

Full versatility is ensured by the availability of a wide range of fitments, which will include dampers, louvres, mixing boxes, spray coils, various humidifiers and throwaway or washable filter cells.

Also, in line with the growing emphasis on energy conservation, the D-Pak may be fitted with run-around heat recovery coils, plate type recuperators or thermal wheels according to choice.

While the standard units are built for use with 415v 50Hz 3 phase electrical supplies, other supply requirements, such as 60Hz can also be catered for.

Unit construction features heavy gauge galvanised steel components, with the panels stiffened to prevent 'drumming'. All access panels being sealed with flame retardant quality neoprene gaskets, which also ensure that the unit is completely weatherproof. Panel removal has been facilitated by the use of fixings fitted with plastic hand wheel knobs.

Isolation of the fan and drive motor from the unit's casing is achieved by the use of anti-vibration mounts and a flexible neoprene discharge connection between the fan outlet and casing. Normally drive motors having a rating suitable for use up to 40°C are fitted, but where off-coil temperatures above 40°C are anticipated, specially rated motors will be used. Variable pitch pulleys are fitted as standard to facilitate fan speed adjustment.

Single skin construction will be a feature of the standard units, although insulated or double skinned requirements are easily incorporated into the design upon request.

Noise attenuation sections, using Biddle's own S-Pak range of equipment, may also be added on models in the D-Pak range.

Currently 5 basic model styles are available in 8 unit sizes and the newly published leaflet from Biddle gives full information on dimensions, weights and performance figures.

The well known E Pak and C Pak range of air handling units will still continue to be available from Biddle for use where very large capacity sophisticated units or ceiling void applications are involved.

For further information please contact: Mr A L Satchwell, Marketing Services Assistant. Tel: Nun 384233.

Portable Energy Monitor

The system consists of a 4 GILFLO in-line flow sensors and a portable readout unit, and is suitable for measuring liquid or gas fuels, steam, high or low pressure hot water and compressed air, simple look-up conversion tables being provided for all these media.

Apart from the GILFLO wide range flow sensors, the entire system is packaged in the compact and fully portable carrying frame which contains the differential pressure and pressure transmitters and the actual readout equipment which gives flow rate indication and record and flow total.

All that is required to put the system into operation is the mounting of the correct size GILFLO in the line, placing the portable readout close to the GILFLO and connecting up the two impulse lines and running mains power to the readout.

Contact: Gervase Instruments Ltd., Brittania Works, Cranleigh, Surrey, GU6 8ND. Tel: (04866) 5566.

Manual Call Point

A new Manual Call Point which meets the British Standard BS 5364; Part 1; 1977, known as the BG 80, is for internal use on any size of fire alarm system.

It incorporates a 'Test' facility and has switch contacts making it suitable for fault-monitored and open/closed – circuit systems. Housed in a moulded ABS case, the BG 80 may be fixed to a normal BS 1363 plaster-depth box, or can be surface mounted using a matching SB 80 box.

Further information: J.J. Penny, Tann Synchrome Ltd, Becks Mill, Westbury, Leigh, Westbury, Wilts.

Communications System

This system provides up to nine separate room services for up to 127 rooms, controlled from one reception console. Easier installation and little or no maintenance is claimed for this advanced design, which uses 'plug in' modular components for simple access. The single cable connection between room units and reception also eliminates risk of interference or 'cross-talk' on radio reception, which can impair other systems.

Details from: Chris High, Room Management Services Ltd., Unit 14, Huffwood Trading Estate, Brookers Road, Billingshurst, West Sussex. Tel: (040 381) 3302.

Plymouth Hospitals Choose Computer-Controlled Telephone Systems

Two Plymouth hospitals — Derriford and Freedom Fields — are believed to be the first in the UK to install computer-controlled telephone systems.

The South West Regional Health Authority placed the order, worth £400,000, with Philips Business Systems, Communication and Control division, for the supply and installation of two EBX 8000 exchanges.

At Freedon Fields Hospital, which will eventually become the focal point of the hospital telephone system in the Plymouth area, the EBX exchange has 615 lines and will be controlled initially from four operator consoles.

At the new district general hospital in Derriford, the EBX 8000 system has 300 extensions and two operator consoles. Private tie-line will link the two hospitals to other health service premises in Plymouth.

The built-in intelligence of EBX 8000 not only offers extension users a variety of communications facilities, but also enables the Plymouth Health District to monitor and analyse usage of the telephone system and to reduce costs in areas such as operating effort.

Both systems are directly linked to paging receivers and the EBX's data transmission capability will be utilised to carry, for example, test results and reports.

The key to the wide range of features and facilities offered by EBX is stored program control (SPC) which allows an exchange to be adapted to meet specific needs. At the two Plymouth hospitals, for example, special provision has been made for an extended memory bank of 1000 important external numbers, each with only a three or four digit code, to be incorporated into both exchanges.

In addition to abbreviated dialling, direct dialling-in facilities to most departments have been included, enabling the operators to concentrate on general calls. It is also possible to change the software program from the operator consoles when necessary.

The Philips EBX 8000, which can handle up to 8000 extensions, is designed for easy installation and maintenance. The exchange equipment does not require cooling or an air-conditioned environment which means that it occupies far less space than other telephone exchanges and only requires minimal power supply.

It can also be interfaced with a variety of equipment — including word processors, computers, viewdata and message switching systems — to establish a comprehensive communications and information network.

Further information from Philips Business Systems, Communication and Control Division, Cromwell Road, Cambridge CB1 3HE. Tel: 0223 45191.

Classified Advertisements

APPOINTMENTS AND SITUATIONS VACANT

Salford Area Health Authority (Teaching)

Hope Hospital, Salford

MEDICAL EQUIPMENT MANAGER

(Senior Engineer Grade) — Salary Scale £7,231 – £8,370, Plus Productivity Allowance.

Applications are invited from Engineers with a detailed knowledge of electronics and who have experience in the preparaton and operation of a Planned Preventive Maintenance System.

Technical competence, a professional attitude and an enthusiastic approach to the job are the main qualities required. Applications are invited from suitably qualified Engineers (minimum qualification HNC in Electronic Engineering).

This is a new post and the successful applicant will be responsible to the Senior Physicist for developing a formal in-house maintenance service for medical/laboratory equipment in this expanding teaching Area. A close working relationship with the Area Engineer will be encouraged in respect of sharing support facilities and advising on the maintenance of non-medical electronic equipment.

A full job description and application form available from the Area Works Officer, Salford Area Health Authority (Teaching), Peel House, Albert Street, Eccles, Manchester M30 ONJ. Tel. 061-707 5000.

Completed forms to be returned by Friday, 28th May, 1982.

West Dorset
Health Authority

SENIOR ENGINEER

(Male/Female)

Salary scale £7,231 rising to £8,370 per annum plus 15% bonus scheme allowance, required for the Weymouth Works Section, comprising of seven hospitals and Community Services. Applicants should have completed an apprenticeship in mechanical or electrical engineering.

A minimum qualification of HNC in Engineering required or an appropriate equivalent as laid down by the Department of Health and Social Security. Candidates must have experience in management of mechanical/electrical plant, up-to-date maintenance planning, control and deployment of staff, also a flair for administration.

For further information and job description, contact the District Works Department, Damers Road, Dorchester, Dorset. Tel: (0305) 63123 Ext. 311. Closing date 14 days after the appearance of this advertisement.

CHIEF ENGINEER

whose professional standards reflect our own

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You will be responsible for the provision of a first-class service to maintain the high standard of plant and equipment, building fabric and grounds. You must possess an engineering qualification, HNC or equivalent, and have served a recognised apprenticeship. Previous experience of supervising building work and a hospital background would be an advantage, Man-management ability is, of course, vital.

In return for commitment, we offer rewards in terms of a good benefit package including private medical insurance, company pension with life cover, disability insurance and the subsidised use of our excellent restaurant.

For further details, please write, enclosing a full c.v., to:

The Clementine Churchill Hospital

**Peter Smith, Hospital Director,
The Clementine Churchill Hospital,
Sudbury Hill, Harrow, HA1 3RX.**

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In case you don't already know us, we've installed a million PAX and PABX lines over the past decade.

Many of those installations were for hospitals...so we understand your special requirements.

With offices in Luton, Bristol, Hinckley and Stockport we offer a national service too. With all the expertise you'd expect from the company that some of the world's largest organisations consult.

So if you desperately need to make your telephone system better, call Norton. We'll come to your aid immediately.

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