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Editor Christopher Tanous TD

Advertisement Manager Kate Oriel

All correspondence relating to the Journal should be addressed to:

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The Institute of Hospital Engineering 20 Landport Terrace Southsea, Hants PO1 2RG, England Telephone: Portsmouth 23186 (STD 0705'23186)

Secretary J. E. Furness MBE VRD*

Hon Librarian

R. G. Smith CEng FInstE MCIBS FIHospE Dryhill, Cold Slad Crickley Hill, Witcombe Gloucestershire

The International Federation of Hospital Engineering 126 Albert Street London NW1 7NF, England

HOSPITAL ENGINEERING

The Journal of the Institute of Hospital Engineering

International Federation Issue No. 35

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September 1980

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The Capitol, Washington. (Photos courtesy United States Travel Service).

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Institute News

International Federation of Hospital Engineering Council Meetings

Two meetings of the Council were held in Washington DC during the week of the International Congress held there on July 7 - 11, 1980. The following were the principle issues on which decisions were made:-1. The Vice President of the International Federation, Mr Vinson R. Oviatt of the USA, was unanimously elected President and the retiring president, Mr Eduardo Caetano of Portugal, with an eloquent speech, vacated the position of Chairman in Mr Oviatt's favour.

2. It was confirmed that the next International Congress would be held at Amsterdam during the week May 9-5, 1982. It was agreed for future guidance, that it was not mandatory for the host country to arrange the Congress in the capital city, and that the organising body should have discretion to take into account the availability of suitable convention and hotel facilities.

3. Mr Cor P. Sonius was unanimously elected Vice President of the International Federation.

4. The present General Secretary, Mr Bruno Massara (Italy) and Treasurer, Mr Enrico Milone (Italy) who have been in office since the formation of the International Federation, had previously expressed their intention of retiring at this time. President announced The his nominations for these offices in the persons of Mr. JOAO Galvao (Portugal) as General Secretary, and Mr Basil Hermon (UK) as Treasurer. The retiring general secretary and were thanked for treasurer the substantial contribution they had made to the Federation in its formative years and the Council elected them to honorary membership of the Federation in recognition of that contribution.

5. The General Secretary reported that correspondence had been received from Columbia, Norway and Eire enquiring about membership of the Federation and this was being pursued.

6. Applications for Associate Membership were received from representatives of Canada and the Kingdom of Jordan, and these were accepted by the Council. An application on behalf of the Pakistan Association of Hopital Engineers for full membership of the Federation was approved by the Council, and Mr Sher Mohammad, who had previously been an Associate, was accepted as a representative of that country.

7. The Council decided to ask the UK to run a second course for IHFE Senior Hospital Engineers at Falfield, either late in 1981 or in the Spring of 1982.

8. Representations were made to the Council from several countries regarding the venue for the 1984 Congress and, after considerable discussion, it was agreed by the Council that the venue would be Melbourne, Australia, early in 1984.

The question of venues for further congresses was left open, but it is probable that the 1986 congress will be held in a European country.

9. Next Council Meeting will be held in Zagreb, Yugoslavia, in May or June of 1981.

The Work of Council of the Institute

In the August issue of Hospital Engineering we published a two page article on the Council, and the work of its Committees. It is much regretted that, due to an unfortunate transposition of lines by the printer, the responsibilities of two Committees were confused. We hasten to correct any wrong impression given, and reprint the offending paragraphs below, with our apologies.

Finance and General Purposes Committee

All matters which have any financial implications whatever including the expenditure of the Institute's branches.

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

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

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

International Affairs Committee

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

Has the responsibility to watch developments within the EEC in particular and overseas generally insofar as these matters have any impact on the members of the Institute and the practice of 'Hospital Engineering'. Arranges, in consultation with DHSS, the technical programme for any International Seminars organised on behalf of IFHE.

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

Welcome to The Australian Hospital Engineer

We are delighted to see our companion journal from down under, The Australian Hospital Engineer, of which the first issue was published as long ago as September 1979. We are indebted to Mr Basil Hermon, CBE, a member of the Institute Council, whose wife Moya was revisiting her native Australia earlier this year when she met Harvey Roberts and Len Irwin, the two Australian representatives on the International Federation Council. She brought back from them the first few issues of the new journal, and we regret that pressure of space in the last international issue meant that we can only now bid a proper welcome to our new sister publication.

We wish the healthy new infant every success, and look forward to seeing further issues. HOSPITAL ENGINEERING SEPTEMBER 1980

I,

Institute of Hospital Engineering Hospital Energy Conservation Year 1980 Final Symposium — Wednesday, November 12, 1980

at Institution of Mechanical Engineers, 1 Birdcage Walk, Westminster

In the three symposia run during Hospital Energy Conservation Year 1980 delegates have reviewed savings made in the past, discussed national policies and techniques in applying insulation and automatic controls.

At this final symposium, to be opened by the Secretary of State for Energy, delegates will be able to discuss research and development which is being undertaken in the United Kingdom and in the EEC. Designers and Estate Managers will also be given the results of research into the requirements for a low energy hospital which will be the subject of a report to the DHSS in 1981.

The Institute has organised competitions during 1980 to stimulate interest in energy conservation and The Rt. Hon David Howell MP, Secretary of State for Energy, will present the prizes at this Symposium.

10.00 Coffee

10.30 OFFICIAL OPENING AND PRIZE-GIVING THE RT. HON. DAVID HOWELL, MP Secretary of State for Energy

CHAIRMAN for the day

JOHN BOLTON ESQ. LLB(LOND) CEng FICE FIMechE FInstE FCI ARB HON FCIBS HON FiphE HON FIHospE FRSA Chief Works Officer and Director General of Works Department of Health and Social Security

10.45 ENERGY CONSERVATION AND INNOVATION Speaker: Dr. F J P CLARKE, BSc PhD FInstP Research Director (Energy) UKAEA Harwell

12.15 ENERGY POLICIES – RESEARCH AND DEVELOPMENT IN THE EEC Speaker: R SHOTTON

Directorate for Energy Savings and Forecasts Commission of the European Community.

- 13.00 Lunch
- 14.30 Discussion on Mr. Shotton's Paper.
- 15.00 THE LOW ENERGY HOSPITAL Speakers: J R J ELLIS CEng MIMechE MCIBS MInstE Building Design Partnership

R BURTON ARIBA AADip(Hons) Ahrends Burton and Koralek

N TAYLOR BEcn CEng FICE FIStructE MIHospE Gifford and Partners

16.30 Close

REDUCED RATE RAIL FARES AND HOTEL ACCOMODATION - Substantial rail fare reductions are available for delegates attending this Symposium.

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, 20 Landport Terrace, Southsea, P01 2RG, for £22, including lunch and morning coffee.

Institute Meetings — Concessionary Rail Fares and Hotel Rates

In future, in connection with attendance at Conferences, Symposia and other Meetings of the Institute, specially reduced rates for rail travel will be available. These will attract considerable savings (eg Grampian Region — £36; Glamorgan — £14; Cornwall — £22; Oxfordshire — £5. These examples are second class return fare to London (for first class add 50%) and it is hoped that this will enable many to attend.

The relevant application forms will be issued with the tickets for a particular Institute meeting. British Rail draw your attention to the fact that 21 days should be allowed when applying for rail travel at the concessionary rate.

For those who are obliged to stay over night because of attendance, the Grand Metropolitan Hotels are prepared to offer accommodation at reduced rates. Application forms can be obtained from the Institute.

Eschmann Bros & Walsh Ltd.

In the list of admissions to Membership in 1979 we printed in the August issue, the above named firm was shown as being based in Bolton. In fact they are at Peter Road, Lancing, West Sussex BN15 8TJ.

Officers 1980/1 London Branch

Chairman Vice Chairman Hon. Treasurer Hon. Secretary D L Davies W A Askew W P Lawrence P C Vedast 59 Oakfield Gardens, Edmonton, London N18 1NY.

Mid Scotland Branch

Chairman: Mr A. Hunter; Vice-Chairman: Mr W. Sutherland; Hon Secretary: Mr I. Notman, 54 Deemount Gardens, Aberdeen.

East Midlands Branch

Chairman: P. H. Parker; Honorary Secretary: S. A. Lees, 7 Rothervale Close, Beighton, Sheffield S196BZ. The East Midlands Branch Programme for the next few months is:

October 1980

The MIDCON Lecture will be held at the Lecture Theatre, The Nurse Training School, Towers Hospital, Leicester (East District). The date was expected to be October 16 at time of going to press.

December 1980

A lecture on Capital Works in Sheffield.

March 1981

Lecture on coal fired boiler plant, to be held in Lincoln or Newark.

May 1981

Lecture on water treatment, to be held at Nottingham or Derby. (Provisional)

Southern Branch

Technical Programme 1980-81

Sat. Jan. 10, 1981 (3.00 pm) at Salisbury Infirmary Medical Centre. "Cytogenetics". Speaker: Dr Marina Seabright PhD Top Grade Scientific Officer.

Sat. March 14, 1981 (3.00 pm)

at Queen Alexandra Hospital Cosham. "Practical Use of Micro Processors in Hospital Works Department".

North Western Branch

The branch held a meeting at the Bolton Medical Institute on May 21, and acted as host to the local branch of the Institute of Plant Engineers. At this meeting a paper was given by Mr Highley of the National Coal Board entitled "Fluidised Bed Combustion", which was an extremely interesting paper with slides on the principle of fluidised bed combustion and its future developments and applications. The paper culminated in an interesting question time making it a very enjoyable evening for a well attended meeting.

On Tuesday evening, June 10, members of the branch were shown around the studios and complex of Granada Television. This was a most interesting visit where members were shown all the work and technical involvement that goes into a television production. Members were shown the equipment in both sound and vision control rooms, video recording studios, editing rooms, and commercial advertising preparation rooms along with the preparation of sets and their lighting layouts for future productions. All this made a most fascinating and enjoyable evening.

National Conference on Fire Safety in Health Care Buildings

Coventry Area Health Authority will be mounting a National Conference on Fire Safety in Health Care Buildings, in Coventry, on Thursday November 6, 1980. Enquiries and provisional bookings should be made to David White, Area Education & Training Officer, Coventry AHA, Christchurch House, Greyfriars Lane, Coventry CV1 2GQ (telephone (0203) 555311).

CEI Diary

Some time ago the CEI Council decided that a CEI Desk Diary would be a way of improving communications with its members and all member institutions as well as being useful in its own right.

Apart from the normal diary pages (two facing pages to one week), the

diary will contain 32 pages of information of value to engineers of all disciplines, including details of the activities of CEI and its regional Branches as well as those of its member Institutions. It will be A5 in size and will be bound in red simulated leather and will carry the CEI logo in gold block. The 1981 diary will be priced at $\pounds2.40$ per copy (including VAT and postage) which is about half the retail price of a diary of comparable standard.

Orders, with cheques/POs made payable to Welbecson Ltd, should be sent to: Welbecson Ltd, Thomas Street, Hull, Yorks, as soon as possible.

Obituary — Mr. Harry Fothergill

We are most sorry to have to report Mr Harry Fothergill died on May 17.

Mr Fothergill's name will be known to many members of the Institute, for he was a member of Council of the old Institution and continued to serve on Council of the new Institute

Mr Fothergill served at the Queen Alexandra Hospital, Cosham, Portsmouth for a number of years prior to his retirement and he will be missed by his many friends in the Portsmouth area and throughout the Institute.

A Summary of CEI Policy on Education and Training

See also the Open Letter from the CEI Chairman on page 6.

Introduction

This statement outlines the position of the Council of Engineering Institutions on the main issues of policy which arise from recommendations of the Finniston Committee in the field of Education and Training. The Council has already published its views on the Finniston proposal for the establishment of an Engineering Authority.

Registration of Engineers

The Finniston Committee gave insufficient attention to the machinery of registration; for example, it failed to appreciate what would be involved for an untried and inexperienced organisation in the massive (and unnecessary) task of re-registering the existing stock of engineers. The CEI strongly argues that the experience which the present ERB has built-up in the qualification, accreditation and registration of engineers should not be cast aside but should form the basis of an Engineers

Registration Council. It also believes that any new body should continue to deal with Chartered Engineers, Technician Engineers and Engineering Technicians.

Changing Attitudes

If conventional attitudes are to be changed and the country to become more properly aware of the

importance of engineering and engineers to the national economy. the new Registration Council must have recognition and strong backing from the Government. Action should begin in the schools and cover the whole spectrum of engineering education and the deployment of engineers, with the objective that the fully qualified professional engineer should at least command the status and level of remuneration which he merits. Only the Government can create the environment stable. progressive without which long-term plans and reforms cannot be undertaken.

Teacher Shortages

DES must remedy the most serious and increasing shortage of teachers of mathematics and physics in secondary education, if necessary by giving preference to specialist skills.

This shortage is increasingly limiting the extent to which pupils can keep open their options for careers in engineering and may be seen as the factor most likely to affect the quality and supply of future engineers.

Careers Advice

There is also a great shortage of teachers with any sort of engineering experience and ways must be found of attracting more people from industry although it would be counter-productive to recruit any but good engineers into teaching. Such an "engineering presence" would help schools in organising careers advice but much more support is also required for the work of SATROs and for the provision of schoolsindustry links. At the same time, links between further and higher education establishments and schools must be improved.

Secondary Education to 16+

There must be greater cohesion and better continuity throughout the whole educational system while to improve the educational basis of entry to the engineering -

and other — professions, a better defined and perhaps broader compulsory core of secondary education to 16+ is required. Along with this should go a new school-leaving certificate system with a uniform national currency across a wide 16+ intelligence range. A group of subjects (including Mathematics, English, a Science — preferably Physics or Chemistry — and a foreign language) should be taken at one sitting and at one of three levels.

First Degrees in Engineering

In recent years it has become increasingly clear that the present pattern of degree course with its ever-expanding syllabuses can no longer be contained in a three year CEI does not span. support Finniston's concept of an Meng/BEng model because of its restrictive structure and unrealistic selection point. Instead, CEI believes that a properly designed 4 year course with in built flexibility should be available to meet the intellectual demands of technology in the future and also to ensure that the engineering applications which are regarded as so vital can be adequately covered. Provision should be made for high quality students to complete the academic course in three years.

Training Places in Industry

Education and Training go hand inhand and must be properly co-ordinated. Facilities offered in industry for both training and experience fall far short of the requirement; if there not enough well-structured are training places then new "formation" arrangements with industrial involvement as a basis would inevitably founder. Government should provide incentives to industry, possibly a workable levy/grant system backed by a statutory requirement, to provide training places to an agreed level. The proposed ERC would be a powerful influence in promoting training of the right kind.

"Bridges" and "Ladders"

Firm and clear provision should be made for able and motivated engineers to progress from one level of registration to the next. It is particularly important that ascending standards academic are made compatible if not directly related; an ambitious person should never be forced to go right to the bottom and start again in the quest for advancement. A separate examination should be provided for those unable to undergo full-time education and also a route for people to prove themselves in mature years.

Chartered Engineer Status

It is most strongly held that the Finniston proposals are no basis for the registration of engineers. Demonstrated professional competence built upon education, training *and* responsible experience should be the only yardstick for registration at whatever level. The accolade of CEng already exists for this purpose and any change will cause confusion at home and overseas.

Continuing 'Formation'

It is important that the individual engineer is brought to understand and accept the requirement to keep up-to-date. CEI agrees that there should be a right to paid leave for continuing 'formation' hut its introduction should be gradual and carefully phased. The need and form of any specific "updating" course is acknowledged generally to lie between the individual and his employer. Institution Membership can provide one of the best means for up-dating individuals' knowledge through learned society activities.

International Recognition

There is a need to provide means whereby British Engineers may have their qualifications recognised internationally so that they may work freely abroad.

In the same way it is necessary to make provision for foreign engineers who may wish to be registered in this country. Continued co-operation with international engineering bodies, as CEI is doing at present, is an essential means of disseminating the British way of life, correcting past misunderstandings and stimulating trade. We ignore the influence of international connections on our exporting capability at our peril.

Funding of New Formation Proposals

New formation proposals cannot be established without proper resources and Government must ensure that adequate finance is provided.

Letters to the Editor

An Open Letter

From The Chairman of The Council of Engineering Institutions

Dear Member,

The Council of Engineering Institutions has no means of direct communication with the 195,000 Chartered Engineers who are its Individual Members nor the 73,000 Technician Engineers and Technicians registered with its Engineers Registration Board. I am therefore grateful for the hospitality of Hospital Engineering to explain briefly CEI's policy towards the Finniston Report. From the outset, CEI has taken a distinctive line which differs in some important respects from that adopted by many member institutions. although there is much common ground.

Leaving aside the educational aspects of the Finniston Report which are yet to be debated, the keystone of the eighty recommendations was the establishment of a statutory "Engineering Authority" which would have two main roles:

- To .regulate the engineering profession;

- To act as "the engine for change" in shifting public attitudes and priorities.

The first role is well understood and there are a variety of models to choose from. The essential element in all of them is that professions in this country and throughout the free world are allowed to regulate their own affairs in the public interest. In this role, CEI is the existing "regulating authority" set up by Royal Charter.

The second role of the "engine for change" is novel and difficult to get to grips with. Few people doubt the need for a major change in public attitudes towards productive industry in general and technology in particular, but changing attitudes is notoriously difficult, and we doubt the ability of the engineering profession to do it unaided. Certainly, we are convinced that a body suitably constituted to act effectively as the "engine for change" would be unsuitable for the totally different role of regulating the engineering

profession. It was for this reason that CEI proposed two separate, but closely associated, bodies to carry out these two distinct roles. We have deliberately avoided crossing every 't' and dotting every 'i' and much of what we have proposed is negotiable. Our only aim is to secure a solution which enables the engineering profession to contribute more effectively to the national interest. However, there is one point on which I do feel very strongly and on which I know I can speak for the great majority of a very large profession. The profession must be allowed to retain the right, enjoyed by every other major profession, to manage its own affairs. The essence of self-regulation is that a large majority of members of the professional governing body should be elected or appointed by members of the profession and should themselves be members of that profession. One has only to look for example to the General Medical Council. There are nearly 100 members and all but seven are doctors. All but ten are elected or nominated by the profession itself

Of course, the representatives of Industry have a vital role in all this but they should not be involved in the regulation of the profession. They should form a partnership with Government, the engineering profession and the academic world in the agency set up to act as "the engine for change."

CEI also sees the likely need for a body to act as the voice of the profession, comparable in some respects to the British Medical Association. The exact requirement for this body, which we have labelled "The Society," and the best way of meeting it, will become apparent only when final decisions on the Finniston Report have been made.

CEI has developed in detail its idea for an Engineers Registration Council to regulate the profession in conjunction with the Institutions on lines similar to the well-tried procedures of the existing Engineers Registration Board. We see the new Council being a free-standing body with its own Charter and fully supported by Government. Our ideas on this and the other two elements in the package have been explained both in writing and in person to Sir Keith Joseph, who will soon be announcing Government decisions on the Finniston Report. I know the engineering profession in general will co-operate wholeheartedly in any new system which seems to engineers to be sensible and a significant improvement on what we have at present, provided the all important principle of self-regulation is preserved.

Any engineer or technician on the ERB register who would like more detail of CEI's response to the Finniston Report should write to the Executive Secretary at 2 Little Smith Street, London SW1P 3DL.

Yours sincerely,

P A ALLAWAY Chairman of Council, Council of Engineering Institutions. August 1980.

The Future of the NHS Engineering Professions Or What Future?

Sir:- During these last few weeks, since the announcement and publication of the White Paper Health Service Development — Structure and Management, it is becoming apparently clear that once again the Engieering Profession has been sold down the river in an image of cloth cap and overalls.

Despite constructive submissions of concern by the Area and District Works Officers Associations at the objectives set out in the Patients First document, it appears that the management of the Health Service Estate has not been given the consideration it deserves. When one considers that the anticipated £30m savings through the restructuring, amounts to around 6% (from my calculations) of the cost of maintaining the NHS estate, and a £30m saving in fuel costs alone is possible, according to Sir George Young MP, Under Secretary of State for Health and Social Security at an Energy Symposium held in London during March this year, then it is abundantly clear that the professional level of both Engineering and Building Officers should be treated with the same respect as both the Medical and (bringing a lump to my throat) the Administration. The level and intensity of training required for today's engineering posts, both technical and in management skills,

to some extent surpasses that of the latter mentioned profession. I admit that every ship must have a Captain along with the responsible officers, but are we heading for a situation where the Captain, not having worked up through the ranks, shouts down to the boiler room for more steam?

We have already seen a symposium on the Patients First document, perhaps the IHE should take the initiative to hold a debate on the Future of the Engineering Profession with the NHS re-structuring.

After all, it is our professional future and that of the Institute at stake.

Yours sincerely

J R Fielding Assistant Area Engineer Leeds Area Health Authority (Teaching)

Cheaper changeover to Generator supply

Dear Sir,

I read with interest the article in the August edition of the *Hospital Engineering* on the new switchboard at Glasgow Royal Infirmary.

In my experience it has been possible for the changeover from mains supply to generator to be

achieved by the use of four pole Air Circuit Breakers, as shown in the illustration. Changeover contactors of the current rating for the switchboard in question are expensive and physically large items of equipment. The overall cost of the changeover arrangement may possibly be reduced by limiting the number of switching units in the circuit.

The use of four pole ACB's to switch the electrical mains and generator supplies could give an alternative compact, economic solution to the problem.

Yours faithfully

K W Sutton

Ewbank Design Partnership.

Interstitial spaces

Dear Sir,

We read with interest Mr Rahat's article (Hospital Engineering, June 1980) on the "Interstitial Space System" of hospital construction, having been involved in a study of this system jointly with the Canadian Government. We should support most of the advantages claimed for the system, but must point out that it is only likely to be restricted to large buildings on small urban sites (as at Greenwich, Leeds and Nottingham) or where traffic or aircraft noise or atmospheric pollution are severe.

The additional capital cost quoted by Mr Rahat as 12-15% is, however, much higher than the English or Canadian studies indicated. The former gave an estimate of $2\frac{1}{2}\%$, and the latter recommended that "public funding agencies should support a modest (say 5%) cost premium if required to incorporate Interstitial Space design for major projects, to encourage maximum effective life utilization". (This technique was estimated to reduce the cost of change by 4-14%). The contractor of the Loma Linda Veterans' Administration Hospital is quoted as saying that if faced with a similar project, their tender would be lower, as result of their experience of the merits of the system.

The Canadian report "Interstitial Space in Health facilities" (1979) by Mathers and Haldenby, is obtainable from Health and Welfare, Ottawa; the British reports, "Interstitial Space: hospitals outside Britain and N America" (1979), by BDP and DHSS, are obtainable from BDP, Moor Street, Vernon Lane, Preston (£7 and £4 respectively).

Yours sincerely

John Harrison (Engineer) Tony Noakes (Architect)



Mr De Vries is well known to regular readers of Hospital Engineering. He won the Northcroft Silver Medal for 1978, and is a member of Council of the Dutch Association.

Hospital Maintenance

Consequences of Costs and Safety Aspects

JAN De VRIES Ing FIHospE (Holland)

As a consequence of the economic situation and the ever growing costs of health-care it is our duty to go into the matter of expenditures very carefully.

To obtain the maximum advantage from expenditure on maintenance this money should be spent in such a manner that buildings, installations and equipment to be used by medical and nursing staffs are kept in good conditions.

A systematic approach is necessary to achieve this. In terms of the architectural aspects however, it is very hard to assess the aesthetic aspects of the matter. Because of the variety in engineering facilities and instrumentation we may state that hospital maintenance is complex, especially if we take into consideration the developement in hospital engineering and technology during the last 25 years.

I believe that preventive maintenance also stands for a planned system of safety-measures for those departments which may be expected to pay particular attention to those hygienic considerations, as for example the prevention of hospital infection, and to the safety aspects of electrical devices. The operating theatre, intensive-care units and the central sterilisation departments, for instance, are closely concerned in smoothly functioning air-conditioning plants, electrical installations, and sterilizing equipment as well as in electro-medical instruments.

Although this aspect comes up for attention many times, the special maintenance and safety precautions for hospitals differ in some respects from those which are characteristic for industrial maintenance, whereby specific emphasis is put on a regular check of indicator devices. The special aspect I want to accentuate is the need for additional safety checks on diagnostic and therapeutic instruments.

Such checks should be employed in order to ascertain that the medical and nursing staffs receive the correct information from these instruments, on which to base the correct diagnosis for the right treatment.



HOSPITAL ENGINEERING SEPTEMBER 1980

These procedures are especially important to departments of nuclear medicine. Next to the required knowledge of medicine and physics, such a department should also have at its disposal expert technical knowledge, with which to make certain of the utmost precision in the functioning of the instruments and physical aids.

The increasing complexity of technical and physical aids may also lead to the question of whether medical and nursing personnel can be held responsible for the proper functioning of bio-medical and electro-medical instruments. I am of the opinion that engineers and bio-medical technicians must be aware of these problems affecting safety in hospitals, and they should be able and willing to accept part of that responsibility.

To some extent maintenance in hospitals in the Netherlands takes place on a selective basis. This is the consequence of the underlying fact that 83% of all hospitals in the Netherlands are privately owned. Last year the Association of Hospital Engineers requested the National Hospital Institute to investigate and try to solve the problems of maintenance.

The aim of this investigation was stated as the development of means with which to promote the control of maintenance. One of the problems that came up for discussion was that so-called maintenance work in hospitals is often confused with work that upon closer consideration will be <image>

found to be either renovation or new construction work.

Clearer division of work into categories, and the correct interpre-



tation of the real significance of maintenance seems desirable. It might prove practicable to classify those duties which do not exceed a certain level of expense. For example, as far as I know Great Britain has set the limit of 'maintenance' at £500, and above this calls it 'minor capital additions'.

In order to plan further investigation it is necessary to start from the beginning, namely from the introduction of a uniform code and registration system for all building parts, engineering plants and equipment.

In some countries, as for instance Great Britain, this kind of work started as early as 1964. In Holland we have the advantage however of making a fresh start. We can learn from others and we can - right from the beginning - make our system adaptable for computerisation.

We think the process of investigation should be developed as follows:

- introduction of an identification system and the registration of all building parts, engineering plants and equipment;
- □ introduction of a maintenance accounting scheme for building—

engineering and instrumentation works, in accordance with functional classification;

- evaluation of both systems to be introduced;
- establishment of parameters with which to express maintenance costs;
- realisation of cost-comparisons on basis of cost components from the accounting system;
- development of maintenance cost guide-numbers.

The parameter with which to express maintenance costs in a functional accounting system, should be, wherever possible, in agreement with the usual systems such as square or cubic meters.

The maintenance costs of instruments may perhaps be best expressed in investment costs.

In the long term we shall try to find a system which can give us an indication of maintenance costs for any given hospital, pre-supposing that such a hospital will be kept in optimum condition.

This system will be further developed together with a plan to divide hospitals into categories in relation to their energy consumption. To give an example of this approach in its entirety, the illustrations show four hospitals of varying architectural design, as well as of varying engineering facilities. We expect that the data, which we hope to produce within a reasonable period of time, will indicate remarkable differences in maintenance costs as well as in energy consumption.

Important in this respect could be those data suitable as to feed-back to designers and manufacturers. This procedure is also in accordance with the concept known as tero-technology.

The measure of tero-technology stands for a combination of management, financial, engineering and other practices as applied to physical equipment in pursuit of economical life-cycle costs.

Last but not least I want to say something about the education of hospital engineers. It is absolutely desirable in my opinion that hospital engineers receive special training, in order to acquire the sense of responsibility and the knowledge necessary to obtain

□ a good working system of preventive maintenance;

- correct safety precautions, especially as regards electrical safety;
- hygenic technical measures in order to prevent danger of infection.

An inventory has been made in the Netherlands by the technical personnel of hospitals (by technicians as well as by leading personnel) of the various sorts of training they require.

To start education will of course present more difficulties and will only meet with success if organised centrally.

The Hospital Engineering Centre at Falfield, Great Britain, is a very good example of such a central organisation; this training centre was founded as early as 1969.

To inform oneself of the specific characteristic of buildings, installations and instrumentation as far as maintenance is concerned, will require much time and attention.

As has in the past been stated by Mr Caetano -I believe it was in 1975—international co-operation in the mutual exchange of information and data will be exceedingly important, and the IFHE can play an important part in this co-operation.

The author is a member of the Danish Association, and gave this paper at the IFHE Congress in Oslo, Norway last year.

Staff Influence on Design and Purchase of Technical Equipment

AAGE OLESEN

For many years there has been discussion about the influence of staff on hospital building, planning and design, and also on the buying of technical equipment and apparatus. A great deal of energy has been employed, but there have been too few results from these efforts. It is not however that the ideas have not been good, but there are two fundamental reasons as to why these problems have not yet been solved.

First it is extremely time-consuming for many of the staff representatives to gain adequate knowledge of all that is necessary in order to be able to discuss it at a building meeting.

It is also difficult for them if they are at all capable of participating, as there are so many experienced architects and engineers involved, who have built many hospitals or departments like ours. Here most staff will not come out with ideas.... they would rather keep mum. It is regrettable that this reaction is mistakenly thought of as being negative.

Second, the other important reason that there has been no positive result of employees' influence is that architects and engineers up to date have not been interested in their point of view.

This influence is on many occasions at cross-purposes with that of the 'elite' who have already taken the decisions, and it can result in extra work to make changes, just as much as it can spoil the architect's vision of the design.

How can we solve this problem, so that in the future we can work together and try to understand one another as much as possible? I believe we can. For each building project we should elect a broad, generally qualified 'building committee' which is made up of staff representatives.

The reason for the general qualification is to ensure as large a breadth of general knowledge as possible.

I believe that it is very important that the generally qualified staff building committee takes an active part during all stages of the building, so that in both the planning and building stage it can advise and control, as well as solve problems, thus giving the employees a share in the responsibility for the finished project.

How to Select the Staff Representative?

It must be a matter of course that the members of this committee are elected according to their function rather than their status. There are far too many examples where they have been elected only for their status, and the committee's effectiveness has suffered accordingly. Let us consider, for example, that the nursing staff is the largest personnel group in our hospital, but that they do not always have a chance to voice their opinion, or have the opportunity to make themselves heard by sitting on a building committee.

This inequality can be the cause of many misunderstandings both during the construction and later during the use of the building.

Although during such a selection extensive attention is paid to the different personnel groups, a number of other views must be taken into consideration.

What Qualifications Should the Staff Members Have?

- relevant function;

- interest and commitment;

 good scope of technical knowledge on the subject;

- good general outlook;
- able to express him/herself;

- actively involved in hospital planning.

One can now discuss whether there should only be local participants on these building committees, or if one should have participants from a possible 'staff centre' under the local council. There are several advantages in both methods, but the local building committee could be inclined to pay too much attention to the hospital superiors, whereas the 'outsiders' could be accused of lack of involvement.

What direct requirements should be placed on staff representatives?

With a kind of staff guide at hand, the staff representative can now really begin his/her work on the building committee. However there will still be several requirements for the representative that could perhaps be difficult for him/her to solve in order to be of full use. He/She must be able:

- to understand drawings and technical jargon;

- to express him/herself clearly and precisely;

 to understand obstacles as well as regulations, time and economic limitations, and political decisions;

to criticise in a positive way;
to help in planning by giving a

relevant background;

- to pass on information both to the committee and other staff groups;

— to give enough time;

— to resist pressure from politicians, administrators and professionals;

- to withstand any criticism with professionals when necessary.

The above mentioned are of course a great number of requirements for the staff member, but if a committee is to work and have results from a social point of view then there really has to be an effort from the staff side.

In as much as these requirements are made for the ideal staff representative, it must also be assumed that they give the right possibility of having good working relations.

Here one must first and foremost mention:

— time:

possibility of studying at other institutions;

- backing of other staff.

I believe we need a recognised and standardised form of staff representative.

I believe that it is necessary to divide our resources equally. I believe it is necessary to improve our working atmosphere.

Belgian Association 1980

The President of Belgian Association has sent us details of their 1980 programme. Although some of the events occured before this edition reaches readers, brief details of them are given for interest.

First meeting:

On March 27, 1980

In co-operation with the firm SIKKENS, TERNAT – BRUSSELS

1) Dye accommodations and applications in hospitals

2) Energy reports from our members

Second meeting:

On June 26, 1980 Place: AZ VUB — University Hospital (Jette — Brussels)

In co-operation with the firm HONEYWELL - BRUSSELS

1) Reports in connection with energy recuperation in hospitals

2) Central processing in relation to alarm and safety controls

Third meeting:

In September 1980 in Ghent In co-operation with the firm SARCO Energy recuperation with steam

Fourth meeting:

In December 1980 in AALST

With the co-operation of the firm MERLIN - GERIN

Energy recuperation and control with electricity

At every meeting we still discuss energy management in our hospitals. A complete report will be made.

Furthermore we have specific meetings on the theme of safety in our hospitals and in the Bio-medical department.

There are several study days concerning technical problems in our vital medical services.

The up-to-date number of our members is 35.



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International Congress Washington July 1980

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The Sixth International congress of the International Federation was held in Washington, USA, from July 6—11, 1980. In this issue of *Hospital Engineering* we are pleased to include a report of the Council Meeting of IFHE (on page 2) and an address by Dr Caetano of Portugal, the outgoing President, on the subject of the *Hospital Engineer's Role in Health Care Delivery* (see pages 16—24). Other more formal articles will appear in future issues on the official proceedings of the conference—in the meantime we are delighted to publish Margaret Ratcliffe's account of the atmosphere and the behind-the-scenes social activity of the conference (overleaf).

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Mrs Ratcliffe accompanied her husband, who is Assistant Chief Engineer at the DHSS, to the recent IFHE International Congress. This is her entertaining account of some of the less-expected features of the visit.

Washington — Thoughts from Home

MARGARET RATCLIFFE

"I don't mind missing school Sports Day" (July 5) "If I have to miss Wimbledon Finals for the fifth year in succession I'd rather be flying the Atlantic than being a dutiful parent.

"We must be back for Old Boys Day" (July 19).

So — we flew to Washington on July 6th — after I'd been to Sports Day — and we flew back to London on July 19-20 (and I missed Old Boys Day!)

Failure of communication yet again! We had an uneventful flight and arrived slightly early at Washington Dulles Airport, and from there drove to 'The Nation's Capital' — that is what it said on the car number plates, the tee-shirts, the picture post-cards, and is what every American calls Washington DC. We came through down-town Washington, where all the bus stops had an accompanying sign: NO STANDING (how *did* one wait for a bus?)

It was hot and sticky, we were tired and dirty, the Sheraton was cool and airy, and a bath was bliss.

In the past (having no personal knowledge thereof) I have viewed protestations of jet lag with suspicion. It can't really be as bad as he makes out, just an excuse for nonparticipation in housenold tasks and a confirmation of hotel services — but since 6 pm Washington was 11 pm London I wanted my bed, not a reception. It was worth foregoing sleep, though. I hadn't realised quite the international ramifications of IFHE — Nigerian gentlemen and their wives in full negotiation, Europeans, representatives from every state in the US all sporting their red ASHE badges, (American Society of Hospital Engineers) Canadians, Australians, South Africans and more besides. All talking nineteen to the dozen, eating, drinking and some of us yawning. We yawned our way to bed at 10 pm we woke at 3 am. Wide awake, too, for after all it was 8 am London time.

Monday was 'Paper Day', and that safely delivered and behind us, we set out to enjoy Washington.

Our first expedition was all very touristy — that was what we were after all. It started by boarding a 'Kneeling Bus'. The driver promised a demonstration at a later time — not in the traffic, because sometimes having knelt the vehicle remains in a praying posture and he was not



Opening session of the Congress at the Sheraton Washington Hotel.

seeking a confrontation with the police.

The bus obligingly knelt for us at the Capitol Hill Club. The whole front suspension lowers and the step sighs down to the level of the kerb, for all the world like an elephant taking to its knees, thus enabling wheel chairs to enter.

We found this awareness of the needs of the disabled throughout the States in various forms. Provision of such buses is mandatory in Washington DC.

We had a superb sea-food lunch and an even better after-lunch talk from Alison Lelande — a potted history of the US through the medium of White House entertaining and then a guided tour of the Capitol, a magnificent building.

On Wednesday morning we joined a sea of people outside the Sheraton the Tower of Babel must have sounded just the same. We were eventually sorted out in groups to visit various hospitals. Our visit to the Washington Hospital Centre was very well organised, very hot in the bowels of the earth and very much (to me) like any other hospital's inner workings.

In the afternoon a drove of buses took us all over to the Maryland countryside to join the ASHE on their annual outing. A barbecue, it said, chicken, ribs, corn, homemade bread and pies, free wine and beer, it said — what it didn't say was the quantity of chicken, ribs etc. Mountains of them, and having eaten our way through our own particular mountain we stretched out upon the grass to aid our digestion and somebody very unkindly took a photograph — and even more unkindly put it on full view in the Convention Centre. I don't think we were snoring!

The next social event was The. Banquet (did we spend all our time eating?) again a Babelous occasion and a bit of a free-for-all to find a table. At least we all talked different hues of the same language at ours.

Amidst the speeches of thanks for hospitality and organisation, well merited, at the end of the meal I was intrigued by the Nigerian delegate's story of his friend at a Washington pedestrian traffic-light. Remember? WALK and DON'T WALK — so he crawled. What would he have made of the NO STANDING at the bus stop? The last day in Washington, and after the end of the papers we went off to photograph some things that had caught our attention.

- NO STANDING at bus stops

- PEPCO on round dustbin lids let

into the pavement (side walks) — could it be Pepsi Cola on tap?

- the fire hydrants painted as soldiers, policemen, dwarves etc by some band of wandering Fire Hydrant artists.

kneeling buses.

We did other things as well during our stay— The Treasury, the FBI, searched the surface of the Smithsonian and that wonderful Aerospace centre, and set off on our marathon Greyhound Bus adventure to Yellowstone — 4,000 miles of it, but that's another story.

And the things we remember - the hospitality and kindness of everyone; the American ladies I met at the Welcome Session who kept popping up all over the place making sure that all was well; the cups of coffee that never emptied at breakfast time - good coffee too, and there were some who had tea - warm water with a tea bag suspended therein - there's no accounting for tastes! And Americans do say Please and Thank you — far more than we do nowadays - such a lot of preconceived ideas went by the board. And notices around the place (the Sheraton was still being built around us) Bless this Mess and Excuse this dust, but finish we must. - and on a bus:

Love Thy Neighbour Ease Thy burden of guilt, Bring back thy Library Books

and why, and how, did one check one's gas supply?

We had a wonderful time - and hopefully we'll be back.

HOSPITAL ENGINEERING SEPTEMBER 1980

Dr Caetano is the immediate Past-President of the International Federation. This paper was presented at the 6th International Congress of Hospital Engineering; held between 7 to 11 July, 1980 at Washington DC, USA.

The Hospital Engineer's Role in Health Care Delivery

Eduardo Caetano P PRES IFHE PRES APEH

The Hospital Engineer and his Principal Characteristics

Etymologically the root of 'engineer' is the Latin word *ingenium*', meaning invention or genius. To the French and British the 16th century word *engin*, meant war-machine or skill, originated *ingénieur* and *engineer*. So the engineer is related to the inventive genius and machines.

Since Antiquity, when our ancient colleagues built the pyramids in

Egypt (2,500 to 1570 BC) and the Roman aqueducts (300 BC to 400 AD), until modern times, we have had an illustrious gallery of forefathers, such as Archimedes (287-212 BC), Leonardo da Vinci (1452-1519), James Watt (1736-1819), Gustave Eiffel (1823-1932) and Thomas Edison (1847-1931). And also the unknown colleagues who built famous ancient hospitals such as those in India and Egypt, in Lyons and Paris, in Divrik, Bruges and London, in Angers, Tonerre and Beaune, in Lisbon and Milan, etc.

Today's intensive technical specialisation led to the characterisation of



'hospital engineers' who are health engineers indeed. They work specifically on hospital equipment or in hospitals but always for patients. Other colleagues, for example sanitary engineers, work for the health of the community. All help Man to survive in this world of ours as it becomes ever more ugly and putrid. In fact, all of us health engineers must accomplish an enormous and, most important task to help save our brethren from another apocalypse.

Although it is a controversial matter, specially in some countries, I believe that both the engineers who work inside hospitals and those who work in State official services or in consultants' private offices on hospital-related work only, are, or may be considered as, hospital engineers. Going beyond this I would dare to say that even those who manufacture and maintain hospital medical equipment should be regarded as hospital engineers too. If necessary some more distinctive titles could be introduced.

A hospital engineer who works in a hospital is deeply involved in its daily life since everything takes place in its buildings, uses engineering services and equipments, and consumes some products and goods that are related to him. Thus, today, he needs higher education, which is relatively not only technical and scientific but also humanistic, which is relatively easily acquired due to his training in hard matters, which compels him to do deep and logic reasoning.

One must not forget that we engineers do not like to be treated as computers, as mere machines that are supplied with data and which answer questions. We would be rather displeased with such an inadequate and unreasonable image. The richness of our humanistic life, derived from the balance of literary, technical and scientific cultures, gives us a unique position and self-rewarding intellectual happiness rather difficult to find' among other professionals. We may consider ourselves among the few privileged workers who, in spite of hard work, stress and some difficulties, are happy in their professions.

Today a hospital is no longer a house where patients are 'stored', but more and more it looks like an important enterprise integrating a highly sophisticated and complex laboratory and a luxury hotel. Tomanage so important an enterprise, a good management team is necessary where the director of hospital engineering or the hospital chief engineer takes place by his own right. The management team could not work properly without his contribution.

The activities of hospital engineers have direct implications of patients, for example, on their environmental comfort, the medical oxygen they breathe or on the nurse-call systems they use; and indirect implications due to their role in planning and programming, in making and executing building projects, in running and maintaining hospitals.

Hospital engineers are subjected to a very busy life. Everyday they have to solve problems, either material of building, equipments, ones engineering services and consumables, or of human nature-such as those regarding maintenance personnel and other professionals. To take care of that they need a good maintenance structure. If buildings, engineering services and equipments work properly, with good efficiency, then the average patient stay is reduced, the flow of patients per year increases and the result is a dynamic and progressive hospital. This very fact demonstrates the hospital engineer's important role in the hospital's daily life.

Also a hospital engineer is subjected to a permanent challenge both technical and human. That enriches his life, avoiding intellectual saturation, tiredness and apathy. We hospital engineers have won that challenge, and will continue to win it not only to satisfy our own egos but also, and most important, for the benefit of patients.

Besides a vast humanistic culture they need to be proper leaders, hospital engineers who are directors or chiefs of Maintenance Departments, Divisions or Services in important hospitals, should have an eclectic technical knowledge, be permanently professional available, exercise honesty, possess integrity of character, and practice objectivity and pragmatism. Also they should have good common sense and do adequate thinking, have an acute perception of problems, be methodical in their work,

give a good example of punctuality, and be permanently vigilant.

Eclectic technical Knowledge

Not necessarily deep, due to the difficulty of making compatible the depth and the breadth of such a wide range of knowledge, but adequate to allow an opinion, establish an evaluation or make a decision, for example over the immense range of equipment which spreads from a needle to a ct scanner or a boiler house.

For that a hospital engineer must study continuously and update his knowledge carefully, since technical innovations appear daily and obsolescence is very quick.

Permanent availability

At any time, day and night, hospital engineers should come or run to hospitals when their presence in needed. They should sacrifice their freedom in order to be always available, and to assume some responsibility, although indirectly, in alleviating their brethren's sufferings. Their work has something of a priesthood. A heavy burden indeed.

Professional honesty

It is essential to decide unhesitatingly whatever is more advisable both for the patient and for the hospital. Also, to make or ask for all tests, controls, and calibrations they believe in, engineers' must search their consciences without any inhibitions at all. Hospital engineers should never be satisfied if they have doubts, or even think of a remote probability of failure, for example, about the oxygen flow indicated in an oxygen flowmeter, a radiotherapy dose, or the quality of a sterilization. Either it is right or not. If not, it can not be approved or accepted.

Patient's safety comes first and above all. Hospital engineers should be rigid and inflexible about this matter.

Integrity of character

All their actions in hospitals should be marked by the integrity of character due to their kind of work and responsibility.

Objectivity and pragmatism

Although philosophical and poetic thoughts are highly desirable, hospital engineers cannot lose time



with these interesting intellectual exercises in their daily life in hospitals. There, they should be objective and pragmatic technicians in order to increase their efficiency. Out of working hours and study time they can engage themselves in the most gratifying and delicious classic readings. These will complete their technical and scientific education.

Common sense and adequate pondering

These qualities solve many problems and complicated systems. Hospital engineers should know how to select the most adequate solution according to the principle parameter involved; how to analyse; how to decide and judge; and how to yield when (and only) it is appropriate.

Perception of problems

They should have a long-range perception of problems and not a narrow and short vision. It is evident that only experience allows the longer view of problems, and so it cannot be expected of a beginner.

Methodical work and example of punctuality

In order to obtain efficiency in their work and give a good example to those in their command they should be methodical and punctual always. Of course this item does not apply to all countries but in some it is badly needed.

Permanent vigilance

Hospital engineers should be permanently vigilant both through the control systems they use, and individually. They should be vigilant always either of what is done and how it is done, or about what is happening around them. Thus they will get an extra feeling for what they are directly in charge of, and of the hospital as a whole.

Beyond all these characteristics, a hospital engineer should work with love, always feeling the need in his work of a human touch.

The Evolution of the Hospital Engineer's Role

The evolution of the hospital engineer's role has been in parallel with the evolution of the hospital. Early in the 20th century, the total



value of engineering services and equipment was less than 5% of the hospital capital cost, according to British experts. Then, from the point of view of engineering technology, a hospital was practically just a building with some electricity, gas and water supplies, a rudimentary sewage system and heating. Then the engineer's role was neither relevant nor significant. Its importance increased slowly and with more or less difficulty.

In 1960, 40% to 50% of the capital cost of a new Central Hospital was absorbed by engineering services and equipment; in 1970 those percentages increased from 50% to 60%; and nowadays they climbed from 60% to 70%. I believe that before the end of this century about 80% of the total capital cost of a highly sophisticated Central Hospital will be needed to cover the expenses of all equipment and engineering services. There will be ever more frequent technical advances to help more patients to be healed and quicker; more comfort for patients and personnel; more safety; and services will be performed more rapidly. Today a hospital is a small world, technologically very advanced. parallel Accompanying in the evolution of this advancement, the hospital engineer's role has become more and more important and so his responsibility has increased also. Lately the technological evolution has been spectacular, advancing at a very rapid pace, due to the use of ct scanners, computerised ultrasonography and monitoring, the introduction of micro-processors and

analogical systems, etc. That is why today hospital engineers are absolutely essential, and their presence is eagerly sought for in good hospitals. Their status is climbing firmly and rapidly. Today their role is most important indeed.

What a difference between hospital engineers today and odd-job men from 50 years ago! However we must recognise that they have always performed valuable services, and even now in remote small rural hospitals they do a fine job, in some countries. The odd-job man did and does have an eclectic mind, works in his hospital with love, without set hours, and is always available at any time! He deserves our respect and friendship, and not our contempt.

Today a hospital engineer is asked a lot, from needing a very wide spectrum of technical knowledge, that obliges him to continuous study to keep up-to-date, to a permanent availability, and to great responsibility for very important material and human values. One must not forget the importance and seriousness of malpractice claims that lately have been increasing considerably. As the hospital engineer's role increases so his responsibility increases. These are perhaps the principal reasons why many engineers, specially young engineers, feel a bit scared to go to work along (at their level) in District Hospitals. As indeed most of the pioneers who took on Central Hospitals a few decades ago were, quite naturally, scared.

It is evident that hospital engineers should be duly rewarded because of all this, plus the permanant stress they are subjected to. In many countries, hospital engineers do not get fair compensation for their work, unfortunately! However I am optimistic and do believe that our strengthen will be recognised soon.

It is true that more and more patients depend upon costly and complex equipment, and so, implicity, the engineer's role is more and more relevant. Beyond the materialistic aspect, we shall never forget the human side. And here the engineer's role is truly unchangeable and beyond value. In fact, if a critical item of equipment is not working due to lack of maintenance, one may calculate the value of the lost time as a function of the capital cost or running cost, etc. But what is not quantified, and, if so, just in a very subjective way, is the patient's sufferings because of lack of utilisation of such equipment. And if a patient dies? Can one quantify the value of a patient's life?

For many years the evolution of the hospital engineer's role was very slow; after the Second World War it increased substantially, and today it is developing very fast - I would dare to say, in his favour.

How Hospital Engineers can improve Health Care Delivery

Hospital engineers contribute decisively to improve health care delivery, either indirectly in most cases, or sometimes, as with environmental comfort and some engineering services, in a way that may be considered a direct link between patients and hospital engineers.

The following hospital engineers' actions correspond to better health care delivery to patients:

Better safety

It is a duty of hospital engineers to improve such safety conditions such as those regarding electric shocks, fires, ionising radiations and crossinfection. Also they can improve safety by fighting against poor design.

Better environmental comfort

Hospital engineers should improve environmental comfort, principally in what concerns the binomial temperature-relative humidity, concentration of carbon dioxide, cleanness of air, noises and smells. Also they should select adequately the quality and colour of finishings.

Better working conditions for staff

To improve working conditions for staff means better care delivered to patients, so that hospital engineers should improve those conditions namely better communications and leisure facilities.

Adequate selection of equipment

When hospital engineers select good and appropriate equipment, specially medical equipment, both in quantity



and quality, then they are improving the health care delivered to patients, as well as improving the economic health of the hospital.

Continuity of work

If hospital engineers are able to maintain engineering services and equipment working continuously (or so much as possible) and efficiently, then they are contributing also to ameliorate health care delivery.

Equipment efficiency

Hospital engineers can and should teach other professionals, such as doctors, auxiliary technicians and nurses, to get the best out of the apparatus they use. Patients will be the final beneficiaries.

Permanent vigilance

When hospital engineers watch permanently and attentively what happens in the hospital where they work, they are inherently improving health care delivery.

Collaboration in Master Plans, etc.

Master plans, remodellings, extensions and their inherent programmes get an active collaboration from hospital engineers. So, indirectly, they participate in improving health care delivery.

Collaboration with Planner, Designers and Manufacturers

The hospital engineers' technical skills acquired in their intensively vivid daily experiences, can and should be of service to planners, designers and manufacturers of medical and sanitary equipment. With that rich contribution, planners and manufacturers will be able to improve their projects and equipments and so, indirectly, are contributing to benefit patients.

Good maintenance

When a hospital gets good planned preventive maintenance and repair (or curative) maintenance, then its patients will benefit firm better health care also.

In order that a hospital can cope with its own problems instead of depending on outside assistance (except perhaps for some preventive maintenance and a few very sophisticated equipments) it is necessary

INTERNATIONAL FEDERATION ISSUE No. 35

HOSPITAL ENGINEERING SEPTEMBER 1980

TO IMPROVE HEALTH CARE DELIVERY HOSPITAL ENGINEERS PROVIDE 1. BETTER SAFETY 2. BETTER ENVIRONMENTAL COMFORT 3. BETTER WORKING CONDITIONS FOR PERSONNEL 4. ADEQUATE SELECTION OF EQUIPMENT 5. CONTINUITY: OF WORK 6. EQUIPMENT EFFICIENCY 7. PERMANENT VIGILANCE 8. COLLABORATION IN MASTER PLANS, etc. 9. COLLABORATION WITH PLANNERS, DESIGNERS AND MANUFACTURERS 10. GOOD MAINTENANCE

that there is a good maintenance structure.

A hospital engineer is always subjected to a real challenge in his daily work: to maintain efficiency buildings, engineering services and equipments within the narrow limits of a tight budget. Again, I am optimistic. He will win because he knows that, if his department or service works well, there will be a complete range of benefits for patients, the hospital and the community.

In reality, to improve health care, delivery is essentially the hospital engineer's final goal.

Hospital Engineers and other Health Professionals

It is assumed that hospital engineers are both those who work in hospitals and those who work for hospitals, either in their planning, programming, project and construction, assembly and maintenance of hospital equipment.

Generally speaking, hospital engineers are on very good terms with other health professionals — in hospitals with doctors, auxiliary technicians, nurses, administrators and other personnel, and in public services and private firms with architects, quantity surveyors, other engineers and equipment manufacturers. As a good barometer we might say that venomous gossip or even sour gossip seldom bites hospital engineers. In fact we are relatively well spared!

Sometimes hospital engineers have different ideas and concepts from those of other hospital professionals, namely doctors and administrators. It is simply because we use more pragmatic and realistic points of view. It happens, for example, when purchasing new equipments, or when remodelling or rearranging some hospital services. Usually doctors are not realistic and do not care a straw for the economic implications, while administrators are too realistic, in closing too much the purse that they keep very tight. In the middle are hospital engineers, with solutions based in technology and common sense

Also, sometimes, friendly (it is evident) conflicts arise between engineers and architects. We must be patient because our friends, the architects, are somewhat poetic due to their artistic background while we, the engineers, do not dream as much as they do and want things done pragmatically.

Nevertherless this pluralism of ideas has advantages.

In fact other technicians' ideas may not necessarily be negative. Technical and scientific progress have taught us that it has been done with the ideas and the help of all.

In hospitals, engineers collaborate actively, sometimes in multidisciplinary teams, with: administrators (in many ways, although not always, pacifically ...); medical doctors (in medical acts such as open heart surgery, in biomedical research and to obtain the best efficiency from equipments); auxiliary technicians (to withdraw all potencialities of the equipments and improve their efficiencies); helping nurses technically; and participating in hospital management.

In State official services, hospital engineers participate in planning and programming of hospitals; the design of hospital master plans and remodellings; they study and produce standards; select equipment often in close collaboration with other health professionals; they co-ordinate and produce guidelines for hospital engineering maintenance services; they control and evaluate; they train and up-date maintenance personnel.

The private sector, usually represented by consultants, planners, designers, and equipment manufacturers, also include hospital or health engineers when its field of activity is actually hospitals or the Health Service. These colleagues collaborate with State official services, or directly with hospitals, usually offering work or equipment and seeking data from the daily activity of several hospital or different health professionals. From this symbiosis all gain, and so there results progress and benefit for patients, our final objective.

Due to its singularity and importance, the relationship between hospital engineers and administrators deserves a more detailed analysis.

In the Sixties, as the hospital engineer's role became more important, in hospitals of many European countries, as Portugal, the chief hospital engineer tried to avoid the direct control of the administrator. This caused or aggravated a certain conflict of interests and positions. Indeed the administrators, either by cult of personality or by inertia, showed a certain reluctance to lose their role as direct bosses of maintenance departments, divisions or services. Even today in small hospitals they are the real masters. But this, in certain circumstances, can be acceptable.

At first, due to the relatively small small importance of maintenance staff and the modest level of education of the chief maintenance officer, there were no problems. Then, when polytechnic—qualified engineers came in, a few problems developed

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HOSPITAL ENGINEERING SEPTEMBER 1980

although not very important since the administrators, having a university training, were automatically placed in a higher level. But when degree-level engineers took some posts as directors or chief engineers, then problems and sometimes conflicts showed up. And, because of the increasing importance of hospital engineering, more and more university engineers will come into hospitals— where they are very much indeed. I am optimistic because there is always disturbance in such cases. Today the overall panorama is clearer, and the areas of conflict are disappearing although slower than our wishes. Today, in Portugal for example, the principle issues to be solved are supplies (mainly those medical-engineering regarding equipment), the nature of works to be done by the Hospital Maintenance Service (HMS) directly (either totally or partially) or by others, and the structure and dimension of the HMS -which depends partially on the other two. Actually, some adminis-trators in central hospitals do not favour a structure able to cover the hospital needs in maintenance, preferring some works to be done outside or by outsiders, although, many times, these are slower and dearer. Normally, hospital engineers support a structure adequately dimensioned to take care of all maintenance problems, with the exception of very sophisticated brand new equipment,



usually represented by a very few apparatuses. This thesis is now becoming the trend in some European countries. A new central hospital is a very important enterprise, both materialistically and humanly, that justifies a selfsufficient maintenance structure.

I believe that collective management in hospitals, as exists in Portugal and other countries, is the right solution. It favours or helps the elimination of conflicting areas. Indeed, the Management Council, as it is called in Portugal, is the top executive organ in a hospital. The director of engineering (or chief engineer) belongs to that Council by his own right and merit.

Hospital Engineers and Hospital Management

The director of a hospital maintenance department (or the hospital of chief engineer) has a very active and important role in hospital management. For example in Portugal, his principle tasks are: management of his own maintenance department (or service). and management of some supplies hospital and the management (Hospital Management Council). He belongs to that Council by right. The other members are the administrator, also ex-officio, and a doctor and a nurse, these two being elected by the respective professions. Thus the Council is composed of representatives of the four professions that participate in a more important way in the hospital's daily life.

Hospital engineers deal with all the four basic sectors of active hospital life. Out of the four, two are under their almost exclusive direct management (buildings, and engineering services and equipment), a small part of one also depends upon their management (maintenance personnel) and they manage a sizeable part of the fourth consumeables such as water, electricity, fuel, materials, etc.)

An important percentage of the annual budget, excluding wages, is related directly to building, engineering services, equipment and consumeables under the direct supervision of hospital chief engineers.

PRINCIPAL ISSUES TO BE SOLVED

-SUPPLIES

-WORKS TO BE DONE BY H.M.S.

-H.M.S. STRUCTURE AND DIMENSION

HOSPITAL MANAGEMENT COUNCIL (PORTUGAL) - ADMINISTRATOR - CHIEF ENGINEER - MEDICAL DOCTOR (ELECTED)

-NURSE (ELECTED)

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Hospital engineers are constantly challenged to decide between function and economy: in one side doctors whose appetite for new plants equipments is, generally, and insatiable and difficult to restrain; in the other side administrators whose aim to balance budgets compels them to impose restrictions to curb that appetite. In the middle, as judges, hospital engineers usually decide well using their pragmatism and common sense. Of course this applies not only to a sole hospital but also to a Hospital Centre or Group. Sometimes the solution is rather difficult, as in the case of the purchase of a ct scanner (or a special auto-analyser or a laundry tunnel) that may be used for one or several hospitals, either belonging to the same Group/Centre, or to more than one. Only careful study of all options permits finding the right solution, if one wants equipment to work with efficiency and not for show. It is sometimes external that true pressures compel engineers to decide in favour of utilised equipments. Nevertheless, what is essential is that hospital engineers should set their guidelines in order to find the truth, ie to avoid under or over utilised buildings and equipments.

Hospital engineers should have a fundamental role in preserving old buildings and equipments, with historic value, because they belong to us all. We should do all in our power to avoid their needless destruction, as we all have seen. The heritage of peoples and civilisations becomes poorer, and so does the overall heritage of our world. Let us fight this. Hospital engineers should re-use and reconstruct, when functionally advisable and economically possible, everything they can. They should preserve some buildings, eventually for other uses, in order to avoid irreplaceable losses of good representative samples of hospital architecture.

The steep rise in costs of public hospitals (19% to 22% per year — *Hospitals*, March 1979) has been acting in favour of salvaging old hospital buildings.

Hospital engineers should collaborate with architects to establish master plans in such a way that one of the goals is to preserve valuable

old buildings as much as possible. Some people find it quite gratifying to destroy and build new, leaving their own personal 'monument' for posterity. Usually this will gratify different egos of different persons (namely directors and architects); it simplifies the technical work they must do; it is technically and functionally more rewarding; generally it is quicker; and sometimes it is cheaper. However we hospital engineers should fight against the destruction of what is usable, specially when beautiful old buildings are replaced by an ostentation of luxury, power and bad taste. These features are absolutely unnecessary, and sometimes ridiculous in places intended to care for the health of man. This is why hospital engineers, always in vigilance, must not let others do wrong, at least not without stating their position clearly.

The Hospital engineer's Career, Training and Keeping up-to-date

The Hospital Engineer's Career

This subject is controversial, delicate and somewhat difficult in some countries. Actually there are grey overlapping areas constituting a problem not easy to solve. Lately this problem became more acute in some countries. In Portugal, for example, the personnel pyramid of the Hospital Maintenance Service



has four different levels, according to the following hierarchical basis education:

- university level
- poyltechnic level
- technical school level
- trade union level

That differentiation does not allow a sole career as those of doctors and nurses, since, in Portugal, a professional from one level can not pass to a higher one unless he gets the necessary education. Of course this does not mean that a professional from technical schools or even from trade unions will not be able to go to University. Yes, he can, but he must pass his examinations on the way up. Consequently in Portugal there are four different careers in hospital maintenance services and two (or three) in State services. It is evident that the career problem is complicated, and this diminishes the relative power of the Hospital Maintenance Service.

An adequate structure for a Hospital Maintenance Department (Division or Service) has to take into consideration: preventive (or curative) maintenance and repairs; remodellings and extensions; purchases; and the Department's role in management. So it must be sufficiently flexible in order that those tasks are well done. Furthermore its Chief represents a bridge to hospital management at higher level.

It is rather difficult to establish sharply defined limits of competence between one level and the next one. So, using as an example a new 600-bed District Hospital in Portugal, the principle competences of its chief engineer (who is the boss of the HMS) are:

- to manage the Hospital Maintenance Service;

- to participate in the Hospital

Management Council;

-to establish the planning of

preventive maintenance;

- to participate in and co-ordinate studies for alterations, remodellings

or extensions in the Hospital; — to write periodical reports and

the annual report;

- to evaluate the HMS personnel work.

Who will be competent to do that? A polytechnic engineer? Or is it necessary to have a university level engineer?

Immediately under his direct command that chief engineer will have three or four heads of depart-

WHY HOSPITAL ENGINEERING TRAINING SCHOOLS ?

 ENORMOUSLY HIGH HOSPITAL CAPITAL COSTS
 GREAT ABUNDANCE OF HOSPITAL EQUIPMENT
 PERMANENT INCREASE OF HOSPITAL EQUIPMENT COMPLEXITY
 INCREASE OF MALPRACTICE CLAIMS

ment: mechanical engineering, electrical engineering, medical equipment (and, eventually, civil engineering). What will be the level of these heads, specially the head of medical equipment who has to collaborate directly with doctors in work of great responsibility? This example shows the difficulties we have in Portugal.

Although the problem is different from country to country, and solutions will vary according to the different parameters that condition it. I think that it might be interesting to try to find a basic common philosophy and, eventually, to some guide-lines. For establish we hospital engineers example. should be very strict with ourselves because we are dealing with, more or less directly, a very special product: Man! So we should not favour mediocrity. We should require competence, and demand good knowledge and adequate basic training besides the principle characteristics indicated in my first section above. We should not be soft neither permissive because faults can be translated into suffering and even death.

We cannot run away from difficulties. We must face them with our pragmatism, objectivity and good commonsense.

The Hospital Engineer's Training

If one takes into consideration:

- the enormous amount of hospital capital costs (a few months ago I

visited the works of the new general Central Hospital in Augsberg, Germany. The 1,400 — bed hospital will cost 500 million DM (£125m or \$280 million!);

- the abundance and technological complexity of hospital equipments ever more sophisticated;

- the constant increase of malpractice claims;

there is a well-based justification for the accelerated growth, or the founding of schools to train hospital engineers.

Some countries as the USA, UK and Canada have found to be necessary one clinical engineer (or medical equipment engineer) per 250bed hospital.

Once accepted, solutions to the need to train hospital engineers, will depend upon the country. Actually, the USA and Indonesia, Canada and Columbia or Western Germany and Nigeria, will probably not have identical solutions, because their existing conditions and requirements are different. However I think that our IFHE could and should help to set up a few strategically located schools.

As far as the Portuguese-speaking countries are concerned, or even the Portuguese and Spanish speaking peoples, I am pleased to announce the candidature of Portugal as a site for a Hospital Engineering School.

Early in 1980, starting on the 14th of January, a one month course entitled First Intensive Course on Hospital Engineering, was held in Lisbon. It was attended by 18 young university engineers, during 120 hours at the Public Health National School. I organised this Course to persuade young engineers to go to work in hospitals. The results were excellent Most probably a second course will be held next year.

Keeping up-to-date

Nowadays, in many countries, it may be as important to consider how upto-date hospital engineers are, even if they have worked in hospitals.

A great deal of hospital equipment especially medical equipment, grows obsolete very rapidly; there is a constant flow of new equipment; new models of existing equipment bring substantial improvements; and new technology evolves continuously. Adding new management methods and new ideas on hospital planning and programming, it can easily be seen that hospital engineers need to attend refresher courses frequently.

Keeping hospital engineers up-todate should be planned with enough time.

Schools can be used for hospital engineers in thier own countries, or for countries using the same language or the the same linguistic root. This is for example the case of a future two to three week refresher course for hospital engineers speaking Portuguese from Portugal, Brazil, Angola, Mozambique, Guinea, Cabo Verde and São Tomé e Principe.

It could be the case of refresher courses in both Portuguese and Spanish; or in French; or in English, as was, for example, the First International Course at Falfield, England, for senior hospital engineers sponsored by the IFHE, last September.

I believe that seminars, journeys, conferences, meetings, etc, for two or more countries with linguistic affinity should be encouraged. I think that they would do no harm to our IFHE. On the contrary, they would help to expand the Federation.

I do think that it would be beneficial for hospital engineers to increase ties, to have a greater interchange between the IFHE and the International Hospital Federation, the World Health Organisation and the Schools of Hospital Engineering, Biomedical Engineering or Clinical Engineering.

In particular, a stronger collaboration with WHO could bring a good profit to less developed countries.

I believe that closer ties, without any financial involvement of course, with manufacturers of hospital equipment would also be useful for hospital engineers.

Our Federation is and should be absolutely independent. Always.

The Hospital Engineer's Role in the Future

What a marvellous machine is the human body and how happy we can be for taking care of machines that care for it!

We engineers are making machines and parts to replace human organs or perform their tasks, such as dialysers, heart valves and pumps, and artificial legs and arms. We are getting more and more inside the human machine.

WHY HOSPITAL ENGINEERS' UP-TO-DATENESS?

- MEDICAL EQUIPMENT BECOMES OBSOLETE RAPIDLY
- CONTINUOUS FLOW OF NEW, EQUIPMENT
- NEW MODELS OF EXISTING EQUIPMENT BRING SUBSTANCIAL IMPROVEMENTS
- NEW TECHNOLOGIES COME OUT PERMANENTLY
- NEW IDEAS ON HOSPITAL PLANNING AND PROGRAMMING
- NEW MANAGEMENT METHODS

A doctor is a human engineer, and an engineer is a human doctor in the grey area of biomedical or clinical engineering.

In the human machine engineers can observe problems of stability structures. resistance and of materials, thermodynamics, elasticity, mechanics, dynamics of fluids, electricity, cybernetics, etc. What a wonderful machine indeed! Only recently did these sectors begin to be explored as deeply as they should. In a hundred years, or even in fifty years from today, where are the frontiers of the medical doctor and the health engineer in most parts of the human body both morphologically and physiologically?

Both professions, medical doctors and engineers, should work together for the benefit of patients. There will be no conflict of competence between the engineer and the medical doctor regarding the human machine. Their work will be complementary, although doctors will have the final responsibility.

In the future, hospitals will work more efficiently, possibly with an average turnover of eighty to one hundred patients per bed per year. For that it will be necessary to have a tremendous amount of highly sophisticated equipment demanding more hospital engineers with higher training.

Our colleagues in the future must create a good image of themselves, so they are respected and trusted both as technical experts and as persons. As their ever increasing 'status' continues to climb, they must work very hard to match their parallel responsibilities.

I believe firmly that we should never be depressed to the point of feeling sorry about being hospital engineers. On the contrary. If we make a deep introspective analysis, we will see that we have good reason to be happy and rewarded both professionally and humanly. We are useful to other men. They want us. They need us to survive, to reduce their pain and to improve their physical capabilities. We make them happier.

If, in our worst moments, we have courage to stop awhile and think, then we will feel well, because we work to save lives, and to reduce or eliminate patient's sufferings in a materialistic, egoistical and rotton world. Our crusade is really good. It gives beauty to our work.

News of the Spanish Association

The Spanish Association of Hospital Engineering and Architecture (Asociacion Española de Ingenieria y Arquitectura Hospitalaria) is primarily a grouping of Engineers and Architects, and its principle activity is specialisation in Hospital Technology.

Members come mainly from Engineering Services in public and private hospitals, from consulting hospital architects and engineers. Some Members come from electromedical companies and hospital equipment manufacturers.

It has a close relationship with Spanish Universities, and therefore research and education in Hospital specialisation. The Spanish Association had a busy year in 1979, which we will sum up in a telegraphic style:

- January 16. A "Round Table" in Madrid in collaboration with AEAH on the Future of Hospital Communications of patients and their particular environment.

Developments

We reprint below the

President's Editorial from a recent issue of the Association's excellent magazine, Hospital 80.

The Directing Council of the Spanish Association since its Session held last September, has been looking at ways in which it will shape the style of the Association in the immediate future.

This began with a deep study of the Reorganisation of Technical — Sections. Its conclusions aim to improve performance, and we hope they will provide better participation of a large number of members in every one of them, since that technical work is one of our objectives. This subject is so important that we will return to it in future Editorials.

An important subject is the relationship and collaboration with Latin-American technical experts and with Associations in those countries, and the establishment of Associations in countries where they do not exist.

All this is a possible first step to the formation of a Regional Group within the IFHE, according to the Federation's new Statutes, and

- April 9/10. First Annual Meeting of the Association in Corunna, on the theme Maintenance in the Surgical Block.
- June 8. Session of work with the Organising Committee of the Third European Congress of Hospital Directors, with the participation of Mr Graf and Professor Torner.
- September 26. Some members of the Council met the Secretary of State for Health and Social Security, Sr Segovia de Arana, and the General Director of INSALUD, Sr Cudós.
- October 2. The President, Professor Bonnin and the Vice-President Professor Gil Nebot had an audience with H M The King D Juan Carlos I.
- October 26. Elections are held in Corunna for the constitution of local Council of Galicia. Delegation by the President, Professor Bonnin.

November 19/22. Fourth National Congress of Hospitals, in Barcelona.

 Likewise, during the period The Association has been collaborating with the Government in editing several National Standards.

Within the teaching plan a course on "Energy Systems in the Hospital" was programmed to be included in the programme of Postgraduate studies in ETSIIB Barcelona.

We have to pay special attention to the Association's determined purpose to get together with the Spanish-American Association, and with Hospital technical experts in countries in which that Association doesn't exist, to offer them our help, and to invite them to take part of IFHE and so to increase and strengthen the Federation—which all members of IFHE wish eagerly.

Until now we have been concentrating all our international efforts on three countries: Brazil, Colombia, Venezuala, but we have been making initial contacts to other South-American countries as well, hoping for succesful results.

without forgetting the fraternal relationship with The Portuguese. Association.

We shall comment in later articles on several other subjects in order to expose our way of thinking, so that the members can think over it, and make their criticism and analysis.

Section (e) of Article 2 of the Spanish Association Statutes determines as its objective "to promote trainings of all kind in Hospital Engineering — and Architecture".

Last November, the Council approached this interesting theme at its meeting, identifying a plan of action on training as one of the main elements of the Association's objectives, since we fully accept that training Hospital Technical staff particularly in Maintenance, is essential to produce the best use of installations.

The plan has three different aspects: a) Collaboration with Universities in order to incorporate our specialities subjects in programmes and study plans at higher and medium levels;

b) Organisation of Postgraduate courses at any level, with short courses of lectures of specific areas of technology or practical matters; c) Collaboration in the training of Hospital Technology experts, in specific aspects at the middlemanagement level by helping to improve the knowledge of these already in post, or joining.

Realisation of the Plan has begun, with agreements with the Senior Technical Schools of Architecture and with the Technical University School of Architecture, both in Corunna. To them we aim to add other Centres at Barcelona, Pamplona, Madrid and other Spanish Universities.

We expect the start to be quite slow, as one might expect with so ambitious a plan as this, because we cannot cope with all the aspects at once. It will only happen if all the members are interested in the proposals.

When this article is published, we shall have issued a circular letter with detailed information about this subject and with a questionnaire. The answers will be of fundamental importance to its development. The effectiveness of the Plan partly depends on the intensity of collaboration. We are relying on it, and in the meantime, send best greetings to all members.

A BONNIN, President

Study days on Saving Energy in Hospitals

The Study Days were held in Madrid in May, during the Second Annual Meeting of AEDIAH.

This interesting subject is of special importance, principally in Hospitals built a long time ago, when energy saving did not feature in the planning of the project.

Technical and Scientific contributions were very high, so that the 140 participants had a pleasant surprise!

There were interesting working days, where papers concerning Energy Saving in the Design and Maintenance of Hospitals were discussed.

An Open Forum was held, presided over by Mr Juan Temboury Villarejo, Director of the Energy Studies Centre, under the title *Public Administration and Energy Saving in Hospitals*, they came to the following conclusions:

- To persuade consumers to consume less — with an almost nil investment you get big savings of energy;
- To give reasons for consuming less, and how to organise to achieve that objective;

- □ To leave always open the possibility of change in the type of energy supply, including Coal, Gas, Oil, and other sources;
- □ Maintenance can give equal or better savings than those from technology;
- □ The concept of Investment Rentability is not sufficient to be the full answer to saving energy. There is also the duty of contributing to a national saving *before* a serious energy shortage;
- □ Consider the possibility of Solar Energy as something to bear in mind today and in the future;
- □ Take into account the criterions of orientation, still very valid today when planning a hospital building;
- □ Think over the potential of internal energy in hospitals, and its necessary conservation and recovery by air-to-air heat exchangers, heat reclaim machines, and about the rest of techniques exposed and discussed at the study days;

- □ In short, to restrict energy consumption to the necessary place, and only during the necessary time, to the minimum possible.
- □ It is important to point out that a proposed law now awaiting approval looks into different types of help from the Government to investment in energy saving;
- Regulation is essential for saving energy;
- □ A centralised Control to look at optimisation and running of energy saving programmes, etc which is useful in achieving greater energy savings.

Apart from the formal proceedings, the social events made it easy to make contact with other colleagues attending. This is one of the secondary objectives of every meeting, and especially of the Official Lunch closed by the President with the beautiful words of Armand, "We introduce the man at the beginning of the task; we will find him at the finishing once again, improved and enlarged."

Product News

Tor — A new name in Air Filtration

A new company, Tor Filters, has been established, in association with Envair (UK) Limited, for the marketting of a range of primary to absolute air filters. The Tor range includes disposable primary panels, primary and secondary bag filters and highefficiency particulate air (HEPA) filters for clinically clean air.

Tor is being directed by Stan Rose and Jim Burke, both well-known in the air filtration industry. Between them, they have more than 40 years' experience of specialised air filtration.

There will be a range of HEPA filter sizes, from 12 inches by 12 inches (30.5 cm by 30.5 cm) up to 72 inches (183 cm by 91.5 cm), in four efficiency ratings from 95 per cent to 99.997 per cent arrest of particles of 0.5 micron or larger. Further information is available from Tor Filters, PO Box 3, Rawtenstall, Rossendale, Lancashire, BB4 7LU, telephone Rossendale (07062) 28416 or 061-724 9800.

Automatic Proportional Dosing Plant

Continuous, automatic, proportional chemical dosing is a frequent requirement in the treatment of industrial and potable water supply. A new plant available from Precision Dosing Pumps Ltd. of Ropsley, Lincolnshire, provides this service very simply and reliably.

The PDP Automatic Proportioning Plant comprises a PDP variable diaphragm proportioning pump which is mounted on a chemical mixing tank, a contacting head water meter, and an electronic control unit. In operation the water to be treated flows through the water meter which issues pulses proportional to the water volume flow rate. The pulses feed to the electronic control unit, which in turn switches on the proportioning pump. The pulse duration is pre-set so the pump completes one stroke per pulse.

This PDP Automatic Proportioning Plant ensures that the additive being dosed automatically mixes consistently and continuously, even when the volume of water being treated varies.

A range of equipment is available to enable the Automatic Proportioning Plant to treat up to 70,000 gph (350,000 1/hr) and provide for multiple installation, mixers and minimum level tank switches. Whilst provision is made for manual override control, the complete plant is designed for integration with water treatment automatic control.

For further information contact: PDP Ropsley, Grantham, Lincolnshire, 0476-85339.

CFB — New Boiler

Following the introduction of the SP500 boiler last year three further models are now available. They are: SP188 - 188 lb/hr steam (85 kg/hr); SP253 - 253 lb/hr steam (115/hr) and SP350 - 350 lb/hr steam (159/hr). These units continue the long proven tradition of a vertical construction, but the tubes are spaced in a square configuration rather than the previously used circular pitch formation. The result is claimed to be even better heat transfer from the burner at the base of the cylinder and easier access between the tubes for maintenance or inspection.

Steam can be raised within $\frac{1}{2}$ hour which permits complete shutdown of the boilder outside working hours.

Controlled Flame Boilers, including the SP range, are designed and manufactured in the UK. The high quality boiler plate and steel tubes into expanded endplates are constructed in accordance with BS 2790 and AOTC requirements and the boiler shell is insulated against heat loss by a layer of mineral wood. A green finish and simple fluing requirements further contribute towards acceptability of the boilers at the point of use rather than in specially prepared rooms or boiler houses.

The Company

Traditionally, and CFB along with its forerunners, W H Spencer and Spencer-Bonecourt, have been producing steam boilers since the turn of the century.

For more information: John D Fawke, Marketing Manager, Controlled Flame Boilers Ltd., Suite 1, The Sanctuary, 23 Oakhill Grove. Surbiton, Surrey. Tel: 01-390 2202.

Health and Safety at Work Exhibition November 10 - 13

A strongly growing market has justified the organisation of the first UK exhibition devoted exclusively to industrial health and safety equipment and services - being held from November 10 to 13 at the Wembley Conference Centre, London. The Health and Safety at Work Exhibition will bring together some 80 suppliers to the UK's £1,000 million market and, if growth projections are correct, will be the first of a regular series of annual exhibitions.

'Oildraulic' Goods dispenses with conventional lifting ropes, sheaves and counter-balance weights in favour of the highly efficient low pressure cylinder and

Goods Lift

H & C 'Oildraulic'

bottom of the lift shaft in a bore hole. No overhead motor room or load bearing lift well are therefore required and the absence of gear boxes, ropes, wheel bearings and brake linings cuts maintenance downtime and component replacement costs.

ram unit which is positioned at the

lift

Particularly suitable for carrying heavy loads in situations where accurate floor loading is required to facilitate the use of trucks, the H & C range of goods lifts have carrying capacities from 1000 kg upwards.

For information contact: Hammond & Champness Ltd, 159-173 St. John Street, London EC1V 4JQ. Tel: 01-253 4818.



One of the new CFB range of boilers.

Classified Advertisements

Brunei Hospital Project

Commissioning Engineer

Tax free salary circa £20,000

Applications are invited from suitably qualified Hospital Engineers with commissioning experience to complete the team which is commissioning a 550 bed General Hospital opening in 1983.

The successful candidate will be required to be in post by 1 January 1981 and the contract will be for an initial period of 24 months.

Benefits include free married accommodation, free transport tax free gratuity, and a generous leave entitlement together with an annual UK passage.

For full details and application form telephone Glenys Smith 01-222 7730 Ext: 3395 or write sending a Curriculum Vitae quoting HS/0109/HD.



design

Classified Advertisements

WINCHESTER AND CENTRAL HAMPSHIRE HEALTH DISTRICT ROYAL HAMPSHIRE COUNTY HOSPITAL— WINCHESTER

Senior Engineer

Salary: £6015 to £6963 pa plus 15% bonus.

Based at the Royal Hampshire County Hospital, you will be responsible to the District Engineer for the operation and maintenance of all mechanical and electrical plant and services of all Hospitals and their associated Buildings of the District outside the Royal Hampshire County Hospital.

Applicants should have served an engineering apprenticeship; held a position of Plant Engineer, responsible for the supervision and control of engineering trades, preferably in hospitals, hold an HNC or HND (Mech/ Electrical) with industrial management endorsements, proven management skills or equivalent qualifications.

Application form and job description from: The District Personnel Department, Royal Hampshire County Hospital, Romsey Road, Winchester, Tel: 63535 Ext. 350/352.

Closing date September 30, 1980.

Directorate of Community Services

Maintenance Manager (Baths)

$f_{7362}-f_{7802}$

We need a competent Maintenance Manager to be responsible for the technical maintenance of all plant and equipment within the Council's Baths Service, ensuring that a system of planned preventive maintenance is carried out.

The successful applicant should have a recognised qualification and have some relevant experience including supervision of staff.

Application forms from Personnel Services, Town Hall, Patriot Square, London E2 or telephone 01-981 0077. Please quote reference B 38.

Closing date September 22.



SOUTH WEST THAMES REGIONAL HEALTH AUTHORITY

Site Engineer

To work on the Crawley Hospital project and other works in the West Sussex and Surrey Region.

Applicant (male/female) must have served a Mechanical or Electrical Engineering apprenticeship, and hold an ONC or approved equivalent qualification as well as having five years or more experience as a Clerk of Works or Site Supervisor. Alternatively, you should have a minimum of ten years experience as a Clerk of Works or Site Supervisor.

Salary Scale: £6,900 – £8,601 per annum.

Application form and job description from Headquarters Personnel Officer, South West Thames Regional Health Authority, 40 Eastbourne Terrace, London W2 3QR.

Completed forms to be returned by September 19.

SOUTHERN DISTRICT OF THE HIGHLAND HEALTH BOARD

Engineers (2)

The above posts will be based at Raigmore Hospital, Inverness and Belford Hospital, Fort William and the holders will be responsible to the Senior Engineers at Raigmore Hospital and the Royal Northern Infirmary, Inverness respectively for the operation and maintenance, of all mechanical and electrical plant and equipment at these and other hospitals and associated properties.

Applicants must hold an ONC in Engineering, a higher qualification or an alternative qualification acceptable to the Secretary of State and have completed an apprenticeship in mechanical or electrical engineering, have acquired a thorough practical training as appropriate to the duties and responsibilities of the post and have five years practical experience.

A.current driving licence is desirable for the Inverness post and essential for the Fort William post.

Salary scale £5475 rising by five annual increments to £6177 maximum (increase pending as from April 1, 1980). An incentive bonus scheme is in operation and bonus allowances of 10 and 5% respectively will be paid to the holders of the posts.

Further information may be obtained from the District Engineering Officer, 28 Queensgate, Inverness. Tel No (0463) 221771.

Application forms and job description from the District Personnel Officer, Southern District — Highland Health Board, 14 Ardross Street, Inverness, 1V3 5NT. Scotland. Tel No (0463) 32401 Ext 44.

Closing date for receipt of completed application forms is September 30, 1980.

St. Andrew's Hospital, Northampton

ASSISTANT WORKS OFFICER

This is a new post and the precise nature and scope of responsibility will depend upon the background of the person appointed. Applicants should be experienced engineers or building officers; they should have completed a recognised apprenticeship and preferably be qualified to HNC standard or hold an approved alternative qualification with management endorsement.

Salary negotiable, circa £6500. St. Andrew's operates its own superannuation scheme which has transfer rights with the National Health Service.

Informal enquiries will be welcomed by Mr G. McVeigh, Chief Engineer and Works Officer (telephone Northampton (0604) 21311). Applications in writing, giving details of age qualifications and experience, and the names and addresses of two referees, should be sent to the Administrative Officer, St. Andrew's Hospital, Billing Road, Northampton. NN1 5DG, by September 30, 1980.

COMMISSIONING

CROYDON AREA

SENIOR ENGINEER – to undertake duties as Commissioning Engineer working as part of the Commissioning Team based at Mayday Hospital, which is now being extensively developed as the District General Hospital. We are a Single District Area serving a population of approx. 330,000

Salary Scale (now under review): £6015 p.a./£6963 p.a. plus London Weighting £398 p.a.

Applicants (male/female) must hold HNC Engineering or similar qualification; have completed an apprenticeship in mechanical or electrical engineering and have had 5 years relevant experience.

Mr A. Jones, Area Engineer (tel: 01-689-2211) will welcome informal enquiries.

Application Form and Job Description from:- The Area Personnel Department, General Hospital, London Road, Croydon CR9 2RH. Tel: 01-688 7755 ext. 29/31.

Closing date for applications: September 30, 1980.

CROYDON AREA HEALTH AUTHORITY

ENGINEER

To work within the Engineering section of the Works Department at Queen's Hospital, but Engineers are expected to work throughout the Area.

Previous hospital experience, whilst an advantage, is not a requirement. Technical competence, a professional attitude and an enthusiastic approach to the job are the main qualities needed.

Day release may be available for the appointed man or woman to continue studies. There are facilities for training within the service in specialised subjects. Every opportunity will be given to the person appointed to develop their career within the Health Service. The successful candidate should hold ONC Engineering or similar qualification and have completed an apprenticeship in mechanical or electrical engineering. Salary: £5.475 pa rising by increments to £6,177 pa plus £398 pa London Weighting. Additional payments of approximately 15% may be available when the Craftsmans Bonus Scheme is installed.

Promotion within the Service is possible in excess of £14000.

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Conference Theme

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The National Building Maintenance Conference, which takes place at the Royal Lancaster Hotel in London on October 1 and 2, has as its emphasise the needs and methods of a) "Getting the design right in b) // Retaining vital maintenance standards on a reduced budget". theme the subject of the management of the building. It will the first place", and eliminating future costs and labour, and

they will be discussing, will show how feedback, energy conservation have experienced and, to some extent, resolved the problems which Speakers from the industrial and Government sectors, all of whom and the effective use of modern maintenance and management techniques can result in overall improvements in both the management and maintenance of the building.

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The conference is sponsored by The Department of the Environment fee down. The two-day conference will cost £98.00 plus VAT, and is and every effort has been made to keep the price of the registration both days. Delegates attending the conference will be able to meet inclusive of documentation, lunches and interval refreshments on and discuss common problems and their solutions with other managers facing the same difficulties each day.

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complete set of conference papers, lunch and interval refreshments The conference fee of £98.00 plus £14.70 VAT is inclusive of a

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Hotel accommodation is not included in the conference fee.

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These will be issued upon request. CANCELLATIONS

In the event of delegates cancelling acknowledged registration prior to September, a cancellation fee of 20% is payable. Thereafter the full registration fee is forfeit. 5

ALL CORRESPONDENCE TO THE ORGANISERS:

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Other (specify)

Day One

Page Internation and Coffee Session 3 COTTING COSTS AND UTILISION File Lood Blaiwin, Per Jamentary Utilds Session 2011 Session 20	10.30 - 17.23	Paper 6 16 30 - 17 35	Paper 5 15.35 - 16.30	15.20 - 15.35	14.30 - 15.20	Session Chairman: Paper 4	SESSION 2	13.00 14.30	Paper 3 12.05 - 13.00	Paper 2 11.15 - 12.05	11.00 - 11.15	Paper 1 10.10 - 11.00	Session Chairman:	SESSION 1	09.30 - 10.00 Opening Address: 10.00 - 10.10	Day On
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