OPPORTUNITY FOR ADVANCED EDUCATION AND TRAINING IN “HOSPITAL ENGINEERING”

Most hospital engineers attain that position by going up through the ranks in a hospital. Many others go into hospital engineering after a facilities engineering career in industry or the military. Very few, if any, hospital engineers are educated and trained in that specific field before entering it.

The dramatic changes which are taking place today in the hospital and health care industry are placing increasing demands on the traditionally trained hospital engineer. Most of these new demands stem from the reorganization of hospitals from the non-profit, non-competitive cottage care type institutions where all costs were met by third-party payments, to, for profit, highly competitive, high technology, fixed payment, corporate structures. This type of corporation is looking for executive level facilities management positions to be filled by persons with advanced education and training in their particular field of expertise.

The University of Connecticut Health Center has a very exclusive, two-year hospital engineering internship program which provides this in-depth education and training to a limited number of candidates. The internship at this modern major medical institution includes participation in state of the art facilities management practices, including administration, management, supervision, budgeting and the latest in clinical care and technologies.

This program’s academic affiliation is with Trinity College and the Hartford Graduate Center. Students applying for this program should have a B.S. Degree with an interest in clinical care and health care facilities. Students who participate and complete this program will earn a M.S. Degree in Biomedical Engineering from the Hartford Graduate Center. Stipends of $5,000 for each academic year and tuition expenses are available for selected interns.

For details on this program, contact: Dr. J. D. Bronzino Engineering and Computer Science Dept. Trinity College Hartford, CT 06106 Richard E. Popham, Director Facilities Management and Operation University of Connecticut Health Center

EXCESS CARBON

The 1967 installation of a large Stanley elevator was our largest elevator. It is nearest the E.R. and ICU. Granted other elevators are available when this goes down for repair — and we have 5 of them for a 200-bed hospital — the non-availability of the largest and most used elevator has a serious impact.

When I noticed, during zone inspections over the past years, that this elevator machinery room was always the dirtiest, I didn’t realize that all that carbon dust might be coming from improperly sized brushes on the 50 h.p. motor driving the DC generator for the elevator. Then it failed. The unfortunate part for our elevator contractor was that he had recently assumed the annual service for 53 elevators for six hospitals in the Boston area.

We were saving a bundle by this single maintenance contract. The contractor, on the other hand, by failing to notice all that carbon dust all over the floor in the machine room, wasn’t making much of a profit on our share of elevators.

So three months into the contract the field shorted out. What a job to move that motor generator down 5 levels. The contractor did a super job of removal and reinstallation and it was out only 2 weeks. Overtime wasn’t realistic with 5 other elevators. I was about to write the contractor and praise him for his work when the generator field shorted a second time.

So the lesson the motor repair shop learned was to do a better job cleaning out all the carbon dust. Needless to say a letter of praise quickly turned into a forceful oral complaint.

David Hathaway, President

HAZARDOUS WASTE CO-OP

A group of Hospital Engineers in Rhode Island are looking into the feasibility of forming a cooperative for the incineration of hazardous waste. The plan is very similar to the State’s program of consolidating their burnable waste.

We have a hospital with an incinerator that meets all criteria already in place. We hope that this hospital, which is not now running its incinerator at capacity, will be able to handle the waste from several other hospitals at a good cost saving. In return the incinerating hospital will be able to operate more efficiently and also receive the benefits of the added BTU’s. In theory the plan looks good and should benefit all hospitals involved.

At present we are comparing the cost of transporting the waste individually versus having a central transport authority. We are only in the investigative stage, with cost effectiveness to be addressed next. The most exciting thing about this venture is the thinking that is taking place within our Hospital Engineers’ group.

Lee K. Kissinger
R. I. State Representative
Woonsocket Hospital

EDITOR’S NOTE

Ted Rademacher, Director of Maintenance at Bon Secours Hospital in Methuen, Mass. has been appointed Membership Chairman of N.E.H.E.S. Ted has accepted this challenging role and any questions pertaining to membership should be addressed to him:

Ted Rademacher
Director of Maintenance
Bon Secours Hospital
70 East Street
Methuen, MA 01844
DRG's — THE MOTIVATION FOR BETTER ENGINEERING

Reprinted from Texas Hospitals — Jan. '85

Texas hospitals are facing the prospect of reduced demand for services with the implementation of Diagnostic Related Groups (DRGs) as the basis for prospective payment by Medicare and other insurers. These federal limits can increase a hospital's risk of payment loss through the shift of payment responsibility more fully to the patient. Hospitals could experience a significant drop in profit unless administrators implement techniques for managing operations that are responsive to shifts in revenue sources.

But where does the administrative staff begin to look into its operations for the best opportunities to reduce major expense categories while maintaining a comparable level of patient care? How does it organize the effort and take those important steps without drowning in the possible frustrations that come with delving into areas that have not been top priorities in the past?

To make a realistic start, the administrative staff must first review the most important dollar-consumed areas of hospital operations and see what benefits can be gained through actions already underway.

Hospital operating costs are absorbed through five major areas: (1) salaries, (2) supplies, (3) payments on indebtedness, (4) maintenance, and (5) utility costs. Some facilities already have established procedures or policies to reduce operating costs in those areas, such as reducing staff size, fewer and more selective diagnostic testing, cost-consciousness when ordering supplies, cost accounting computer programs, and energy management programs.

ENGINEERING PERSPECTIVE

Unlike the other actions taken by administrators to reduce the cost of service, energy management in existing facilities has no perceived effect on the level of patient care. Hospital engineers are seldom provided the training or incentive to make effective energy management programs possible. Since energy and maintenance costs have not been a major consideration, little attention has been given to those factors during the design phase of new hospitals.

Value engineering is an analytical approach that combines practical criteria with financial success. Facilities meet shorter payback periods, provide quicker break-even framework and produce lower operating costs. Value engineering and life-cycle costing should be top considerations in the decision-making process of designing a new facility or in renovating an existing one.

VALUE ENGINEERING DESIGN

New building designs require value engineering studies to assess the trade-offs that impact construction, maintenance and utility costs. The objective is to invest the hospital's financial resources at the most favorable rate. For existing buildings, except in cases where renovation projects already are anticipated, improving operation efficiency usually means repairing existing equipment and modifying its operation.

The factors most affecting operating costs and most studied by value engineering, include the selection of building materials, wall and floor coverages, kitchen and laundry equipment, air conditioning and heating equipment, lighting design, incinerator design, plus energy management and preventative maintenance systems.

WHERE TO BEGIN

Considering the above as factors affecting operating costs, two major areas exist where a hospital administrator can take actions to produce noticeable results. These areas fall under the category of "utility cost management", lighting and air conditioning (A/C).

Lighting a hospital for safe and efficient operation accounts for almost 40 percent of the monthly utility cost. Below are some initial steps that management can take to lower utility costs without compromising the quality of patient care:

- Replace incandescent lighting inside with high efficiency, fluorescent fixtures;
- Use natural lighting as much as possible;
- Use dual-light switching to turn on half of an area's lights;
- And practice using "task lighting" in areas such as labs and administration.

With the A/C system functioning properly, the hospital administrator can expect to target energy savings in the neighborhood of 20 percent from current levels.

Selective reductions in the operation of the A/C system can produce substantial savings as well. Results can show up very quickly by turning off the A/C system in those areas that do not ordinarily operate during the second and third shifts. Administrative offices, purchasing, central supply, clinics, and special laboratories are just some functions that deserve close scrutiny for possible A/C shutdown. The operating suite is another candidate for A/C reductions during off-peak periods. Since Friday is ordinarily a light day for the OR, it can be programmed for an early shutdown after the morning cases are finished and can be mostly shutdown during the second and third shifts, plus weekend.

Reviewing energy consumption by the various systems in a typical hospital is very helpful. Recently, Harris County Hospital District in Houston had a study conducted on both Ben Taub General Hospital and Jefferson Davis Hospital. Using Jefferson Davis as an example, studies show that A/C is the single largest, energy consumer at 68 percent. Lighting follows at 14 percent.

At this facility, approximately 50 percent of the A/C usage was the unfortunate result of outdated A/C design, which required air to be fully cooled and then heated so rooms would not become too cold. Also, the systems used large percentages of fresh air that chased the system to work harder. Through a program of replacing inefficient equipment and improving control strategies for existing systems, annual A/C energy usage at this facility was reduced approximately 50 percent.

Lighting is another area that should be carefully reviewed during an energy study. Efficient lighting and the use of natural lighting reduces direct energy consumption and the amount of heat that must be removed by the A/C system. Task lighting concepts and the use of multiple lighting levels through dual switching also can be very effective. A 35 percent reduction in lighting energy consumption often is achieved, using little more than common sense approaches.

THE POTENTIAL OF COMPUTER-BASED MANAGEMENT SYSTEMS

One of the main points to keep in mind regarding centralized computer-based, energy management systems is that almost everything they can accomplish also can be accomplished with analog (non-computer-based) control systems. Since most physical plant engineers are familiar with analog controls and know very little about computer control, their tendency is to downplay the value of the computer-based systems.

The major functions performed by most energy management systems are relatively unsophisticated. Energy management systems are used as time clocks to turn equipment off when the areas are unoccupied for extended periods of time. Secondly, the computers are used to load shed (turn-off) non-essential equipment during times of high electrical demand. All of these functions have merit and can reduce energy consumption.

For unsophisticated, residential-type A/C systems, a computer-based microprocessor, time-clock system can pay for itself through energy savings in a few years. Unfortunately, most large hospitals have complex A/C systems, the proper
control of which greatly affects the efficiency of operation. This is especially true for new facilities, which have a multitude of variable volume air handling and pumping systems. The problem with such systems is that the space they serve can be comfortable even though the controls are out of calibration and the system operating relatively ineffectively. Therefore, it is advantageous to have a control system along with a monitoring system that alarms when the control system is out of calibration. The advantage of a computer-based system is that it can perform time clock functions, equipment control functions and system performance monitoring very cost-effectively. The energy management systems can even allocate utility costs to the various departments and profit centers within the facility.

Energy management systems, like all other equipment, must have a regular preventative maintenance program. Without such a program, the system will become unreliable. Most physical plant departments do not have an electronic technician on staff, and crisis repairs become the responsibility of an outside, third party. Consider the following when planning for such a system: whether current staff will be properly trained to repair; whether a qualified technician will be added to the staff; or whether an outside technician will be brought in during a systems failure.

In the ever increasing struggle to stay on top of costs while providing optimum patient care, hospital administrators now face more potential limits with the DRGs. Energy conservation and cost efficiency can be achieved at many levels and at varying cost savings—from something as easy as changing the type of lighting to something as comprehensive as analyzing total systems. How much you do will determine the savings you will achieve, and you can not put it off until tomorrow for much longer. It’s more a question of survival than economics.

**CERTIFICATION UPDATE**

The Connecticut Hospital Engineers Society (CHES) Certification Committee has been progressing with further development work, and updating the appropriate exam questions. Part of the “dog-work” in this phase has been putting the questions (and answers) in the proper format on the National Institute for Certification of Engineering Technologies (NICET)’s forms.

The Committee Chairman, Jim Prio, has retired from his position as Director of Engineering at Newington Children’s Hospital, and Tom Ricco; (Current President of CHES), Les Lewandowski, and Rod Cameron have been performing the Chairman position duties. Jim’s leadership will be missed!

Discussions have been held between the Certification Committee, NICET, and the National Education Corporation (Formerly ICS) relative to implementing the testing, certification, and education programs. NEC has offered to do the entire program on a National basis. Therefore, there are now two organizations willing to perform the program. As a result, the Certification Committee is going to meet in April with both organizations individually to establish our course of further action.

A presentation was made to the CHES members present at the March 20, 1986 meeting at the Connecticut Hospital Association in Wallingford, CT to update them on the Certification Program status.

Roderick A. Cameron
Chairman, Research Committee

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**NFPA LIAISON**

As the newly appointed Institutional Representative to N.F.P.A. Electrical Safety Committee for N.E.H.E.S., I let me introduce myself. I am the Director of Engineering for Danbury Hospital, Danbury, Connecticut and am a member of N.F.P.A.

I am also a member of N.F.P.A. — Health Care Facilities Section which provides me with up-to-date information of current and proposed changes to the various N.F.P.A. Standards affecting our industry.

My Hospital is a 475-bed facility of about 940,000 square feet with a number of buildings dating from 1908 to 1985. We have a program of constantly reviewing the services provided by the hospital. This frequently involves renovation and remodeling projects. These projects provide ideal opportunities to bring older buildings and facilities up to current requirements and it is essential for all of us to be aware of the changes which are occurring in building codes, regulatory requirements and N.F.P.A. Standards. I know it sometimes seems impossible to keep pace with all the regulatory requirements which are placed on us, but it is essential for us to maintain a program which will keep our facilities in compliance.

My responsibility as a N.F.P.A. Liaison will include advising N.E.H.E.S. and its members of proposed changes in standards and the potential effects to our facilities and systems. An example would be the revision to N.F.P.A. 99 due to the published in 1986. I have made contact with technical representatives within N.F.P.A. who have agreed to provide assistance in answering any questions related to their standards and will permit us to publish extracts of modified standards and comment in our N.E.H.E.S. Newsletter. I will be attending seminars and other meetings related to N.F.P.A. matter whenever possible, or at least obtaining relevant information. Like all members of N.E.H.E.S. my responsibility in my own facility limit my available time and none of us have an unlimited budget. I will, however, be pleased to address any questions or problems related to me either directly or through your state representative.

P. Favorge
Director of Engineering
Danbury Hospital

**INFORMATION ON HAZARDOUS WASTE MANAGEMENT REQUESTED**

As hazardous waste and its management becomes a key component in the hospital engineer’s area of responsibility, many institutions have approached solutions in various ways.

The N.E.H.E.S. Board of Directors would like to receive information from its members describing their individual approaches to hazardous waste management. The Board hopes to formulate a guideline for the New England States to simplify and standardize the industry’s effort in the area.

Please forward any policies, procedures and in-house programs related to hazardous waste management to the Editor.

Jack Gosselin
Director of Facilities
North Country Hospital
Newport, Vermont 05665
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1985/86

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