HEALTH CARE SECTION PROGRESS
The second annual meeting of the Health Care Section of NFPA was held 14 and 15 November in Atlanta, Ga. The Section took the following action:
NFPA Standard 82 — Incinerators, Waste and Linen Handling Systems and Equipment: To a word change of, "This standard shall be applied to new construction and new equipment as determined by the authority having jurisdiction. It shall not require the alteration or replacement of existing construction or equipment currently in use provided that the owner establishes appropriate administrative, maintenance and training programs that give equivalence safety."

The rationale being, most proposed and existing standards have an “Application of the Standards” clause. It was believed that without this paragraph, many hospitals will be required to spend large sums of money to be in compliance, whereas they currently have equivalent safety.

The main body of NFPA agreed to this change. To delete paragraph 3-6.2. The rationale being that many hospitals have linen and trash chutes opening into dirty utility rooms where soiled instruments, etc., for Central Supply are accumulated. If not deleted these activities would have to be changed at a high cost. Again the membership of NFPA agreed.

The membership also voted to support a motion that sprinklers for trash chutes may be supplied from domestic water system.

NFPA 1962: Care, Use and Maintenance of Fire Hose, Including Connections and Nozzles: To retain the original wording of the code, “Unlined linen hose used in the interior building standpipe system should never be used except for the purpose of fire fighting.” The new code would call for annual testing of all hoses, thus create problems for the staff in trying to dry out and repack the hose properly. It was noted that many fire departments do not trust the hoses and prefer to use their own. It was suggested that a future recommendation would be to exclude the hoses for the standpipe system. The membership of NFPA agreed to the retention of the original wording.

NFPA 76-A: Essential Electrical Systems for Health Care Facilities: To a change in para 3.4.2.1, which stated that generator sets serving emergency load and equipment continued on page 4

SPRING SEMINAR FOCUSES ON SOLAR ENERGY

NEHES Board Secretary Paul Taylor takes notes as spring co-chairmen Ed Boyer and Jim Menadue brief Board of Directors of NEHES on the program.

This year’s Spring Seminar slogan is “Solar Energy and You.” It is to be held March 28 at the Copley Plaza, Boston, Mass. The committee has put together a very fine program. Not the usual run of the mill solar energy program that we’ve all attended, but a very interesting program. For example, how many times have you said to yourself, “I wonder if a solar unit would really work at my hospital?” or “I just don’t know where to start?” or “Where do I go for funding and what will I do?” All this while your administrator asks what is being done about solar energy? This information will be available to you at the seminar. On the program are men who have lived through it; fellow engineers who will share their experiences with us. A slide presentation will also be made followed by a question and answer period. After lunch, a bus tour of Children’s Hospital Medical Center solar energy installation, which will be nearing completion at this time. Make your reservations early! See you all there.

Ed Boyer

Seminar Speaker Frank Kuszpa, Jr. (left) Assistant Director, Hospital Engineering, Danbury Hospital, Conn. (Bill White on right demonstrates proper crushing technique.)

WATER SAVINGS

There has been lots of talk about how to save water in tank-type toilets.

Unfortunately, most hospitals today have flushometer-type toilets. I have heard of attempts to save water in this type of toilet by closing down the angle stop; however, this measure restricts only the flow of water and often prevents the toilet from clearing itself properly. At Kaiser, Redwood City, Ca., we have conducted tests and we believe we have a solution.

As you probably know the amount of water used to flush a flushometer-type toilet is determined by the pressure of the domestic cold water system and the duration of the flush. The key to the savings is in the duration of the flush, which is controlled by the length of time required for water pressure to equalize behind the diaphragm. The equalizing pressure is bled through a restricting orifice in the diaphragm — the larger this orifice the shorter the flush and the larger the water savings.

Tests were conducted using flushometers with a domestic water pressure of approximately 70 psi. In the following chart, orifice sizes are given in index drill equivalents.

<table>
<thead>
<tr>
<th>Orifice size</th>
<th>Duration of flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard no. 77</td>
<td>9-10</td>
</tr>
<tr>
<td>Standard no. 76</td>
<td>8-9</td>
</tr>
<tr>
<td>Standard no. 75</td>
<td>8</td>
</tr>
<tr>
<td>Recommended no. 44</td>
<td>7</td>
</tr>
</tbody>
</table>

Remembering that the smaller the drill number the larger the hole, you can see that for each size larger you can cut the flushing time by approximately one second. Our tests showed that using a no. 74 drill to enlarge the orifice resulted in an approximate 25 percent water savings with no associated problems.

Another thing to consider is that a larger orifice will be less likely to be partially or completely plugged by foreign matter in the water supply. A small particle of rust in a standard orifice can extend the flush time to 20 seconds or longer and a complete restriction will result in a continuous flush.

Michael Meek
Kaiser Hospital
Redwood City, Ca.

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PRESIDENTS MESSAGE
As we begin a new year, my thoughts go back to the ideals laid out by the people who founded our society back in 1958. The ideals promoted then are still very much in style today. Namely:
To Promote better patient care through better design, maintenance and operation of physical plant.
To Promote the professional development of Hospital Engineers.
To Promote and present education programs for Hospital Engineers.
To Create a mutual exchange of information and technical assistance among Hospital Engineers.
Running through these ideals is a common thread; that thread is “getting involved.” “Getting involved” can mean many things from a little extra work to long hours grinding out solutions to complex problems. Nonetheless, the rewards can be great. By a little extra work here and a few multi-hour sessions there, we may remove many “roadblocks” not only to our own jobs but to those of our contemporaries.
Your Society has “been involved” to a great degree to make your job more productive and to provide a forum for your ideas. A good example is the positive and constructive effect that the appointment of some of our members to N.F.P.A. code-making bodies has had. We no longer need to complain about “they” and “them” because some of our fellow members make up “they” and “them.”
There are many other examples of these constructive efforts by N.E.H.E.S. but suffice to say that “getting involved” does generate positive results. I think each of us should look a little closer at how we can “get involved.”
I am sure that there are more problems to solve than there are people to solve them. However, if we all pitch in, every problem solved is one less to face.
Whether it be the New England Hospital Engineers Society, your local or state engineering group, A.S.H.E. or whatever, they all can use your help. So don’t be afraid to go that one step further and join up. “Get Involved!”

CONSTRUCTION FOR ENERGY CONSERVATION
Putnam Hospital, Bennington, Vt., new 30,000-square foot medical facility costing $1.1 million, is designed to conserve energy. Windows are smaller than usual for such a facility and do not open. The heating system is designed to save money as well as energy. The basement of the 3-story brick building houses a 4,864-gallon water tank which holds water heated during the off-peak (10 p.m.-7 a.m.) hours when rates for electricity are low.

Al Jones
Director of Engineering

DEFIBRILLATOR IDEAS
The second annual Defibrillator Conference held at Purdue University in September 1977 addressed itself to high energy defibrillators. Considerable controversy has existed over the past few years regarding the energy output that defibrillators should be capable of delivering. Research work done in the early seventies indicated that the 250 watt-second and 320 watt-second outputs were insufficient to effectively defibrillate large adults. As a result of this work, many manufacturers began producing higher energy machines.
Papers presented at this year’s conference presented evidence that high energy outputs may not be required. Two papers, based on clinical studies, showed a high success rate with energy outputs less than 250 watt-seconds.
There was general agreement that the technique used in defibrillation can seriously affect the success rate. Poor procedure with any defibrillator will produce poor results.
The present recommendations of the American Heart Association is that a defibrillator able to deliver at least 250 watt-seconds. The latest draft of the FDA Device Standard for Defibrillators also contains this energy level as a minimum requirement.
It appears that it will be a few more years before the questions regarding outputs will be definitively answered. The present fear is that the higher energy machines (up to 600 watt-seconds) may be causing cardiac damage.
Mr. Doug Cramer
Maine Hospital Association
Augusta, Maine

ASHES LIAISON REPORT
I have contacted Marcella Holling regarding ASHE/AHA participation at NEHS Fall 1978 meeting and have received a favorable response. Some topics she suggested were: energy, 504 regulation, AHA working party; recommendations for regulations, codes and standards, or allied chapters. The fall ASHE board meeting sometimes held at the same date as fall conference will be changed.
I have been requested to write letters of recommendation for two NEHS members applying for Senior Levels of Membership in ASHE and I was most pleased to do so.
The Engineers Handbook is being completely rewritten with updates where necessary and with new material covering energy conservation, metric system, glossary.
The final draft of an Engineer Residency Program is being reviewed by the board.
William White
ASHE Region 1 Director
CLINICAL ENGINEER INTERN PROGRAM

FARMINGTON — The University of Connecticut Health Center is now helping produce a new kind of expert who has become a virtual necessity in modern medicine.

That expert is the clinical engineer — a graduate engineer who has specialized in learning the intricacies of the hundreds of pieces of sophisticated equipment used in patient care today and who knows how to baby them, fix them and get them to run their best for the least cost.

For the first time this year, the Health Center has an "intern" from a program that leads to a master's degree in clinical engineering.

The program is jointly sponsored by Trinity College and the Hartford Graduate Center and is four years old. Interns have also been placed at Hartford Hospital, which has two this year, and St. Francis Hospital and Medical Center, which has one.

The Health Center's intern is Richard Benedict, an engineering graduate of the University of New Hampshire. He worked a year after getting his degree for the University of New Hampshire/Northern New England Clinical Engineering Center, which provides services to 23 hospitals.

"My work was all in the lab," he said. "I wanted hospital contact, so I entered this program.

He'll get plenty of hospital contact at the Health Center. During his first year in the two-year program, he'll rotate through different patient services, working side by side with physicians and other care providers, taking an inventory of equipment, learning how it is used, noting problems and difficulties, seeing what engineering can do and learning how real life differs from book-learning.

In the second year he will do a thesis project, developing some equipment or technique for use in patient care.

Such projects, in addition to advancing the students, have been valuable in themselves.

One graduate of the program modified a breathing measurement technique used in adults to assess heart and lung disease. The modification would make it applicable to the "small volume systems" of newborns, thus replacing the sometimes risky insertion of tubes into the babies' bodies.

Another graduate developed a computer program that enables cardiologists to check blood pressure inside the heart's two lower chambers, the ventricles, as a measure of the ability of the ventricles to contract.

Ernest Guignon, Ph.D., director of Bio-medical engineering at the Health Center, is supervising Benedict's internship there. Guignon estimates there are at least 600 separate items of equipment at the Health Center that fall under clinical engineering.

They include heart monitors, analyzers like mass spectrometers and gas chromatography machines, anesthesia machines, x-ray equipment and a linear accelerator that kills cancer tumors with photons or electrons.

A patient, during a hospital stay, may be served by hundreds of pieces of equipment, according to Guignon, although he may have physical contact with only a dozen. The others are used behind the scenes, mostly in labs.

Guignon said that so much equipment of all kinds has made the clinical engineer much needed in big hospitals.

Hospitals used to get along with an electrician for basic maintenance, he said. But as electronics, hydraulics, pneumatics, mechanics and other engineering principles went into equipment, they had to turn to manufacturers' service people and then to clinical engineering firms such as the one Benedict worked for.

It's cheaper in the long run for a big hospital to have its own clinical engineer, Guignon said.

He cited the case of an x-ray machine failing at the Health Center as a patient was about to be x-rayed. In three minutes, a clinical engineer found that the trouble was in a microswitch. The switch was temporarily bypassed so the patient could be taken care of. It was later replaced.

If an outside firm had been called, Guignon said, the repair job would have cost at least $100. The patient would have had to be rescheduled. And the room would have been out of service for three or four days.

The clinical engineer has become the third kind of engineer in the medical field. The others are the biological engineer, who applies engineering skills to solving problems in basic science research, and the biomedical engineer, who applies them to direct patient care.

Ivan Robinson
University of Connecticut Health Center

OVERHEAD DOOR OPENER TRANSMITTER AND RECEIVER SOLVES EMERGENCY CALL SYSTEM PROBLEM

Our Maintenance Department was asked to install an emergency call system in our psychiatric unit so the nurses could get help from another nurse's station if needed to restrain a patient. Due to the problem of not knowing what room they might need help in that the impossibility of having push-buttons all the way around a room, we experimented with the transmitter and receiver portion of a garage door opener. After some thought and experimenting we came up with the following system.

After the installation was complete the P-400 unit, as we call it, the nurses felt more secure when they were left alone in the area, as they carried the transmitter with them at all times. We check it out once a week to make sure it works and replace the batteries when we find the transmission distance down. We find it to work in all areas of our unit up to 300 feet.

After finding that it worked we installed another one for our Pediatric Unit, of course they all work on a different frequency. Each unit was made up for under a hundred dollars. A wiring schematic of the unit is shown here.

Submitted by, Percy Hanscom
Maintenance Director
Regional Memorial Hospital
Brunswick, Maine 04011

ARCHITECTURAL BARRIERS SURVEY

In December Jack Madden of the Easter Seal Society conducted a survey of architectural barriers at the Lawrence Memorial Hospital of Medford, Massachusetts. This was a voluntary survey which provided an in-depth examination of the physical plant and especially those features a handicapped person would find difficult or impossible to negotiate. Mr. Madden, a paraplegic with a keen sense of the practical, found the recent construction to have faithfully followed the new code.

Some items such as braille letters and numbers in the elevators were missing, but Mr. Madden noted that the hospital had volunteers available to accompany the blind person and that was acceptable.

The Easter Seal organization is willing to make a survey on a voluntary basis. You could call them at (617) 322-2460.

Dove Hathaway
systems shall be inspected weekly; and shall be exercised under load at proper operating temperature conditions for at least 30 minutes and at intervals of not more than 30 days. The 30-minute exercise period is an absolute minimum. The membership voted to adopt this change.

To delete Chapter 6. It should be noted that it outlines the essential and electrical systems for facilities which do not fall into the Health Care area such as hospitals and nursing homes and is necessary in order to limit the requirements which might be imposed by local authorities having jurisdiction. The general membership did not agree to delete Chapter 6. (It was the writer’s opinion that this was the proper course of action to be taken and is in the best interest of the Health Care Consumers.)

In summary, the new version of NFPA 76-A represents a complete rewrite which is beneficial to all institutions in the Health Care Field. Some of the improvements noted in a recent ASHE report are:
2. Permits authority having jurisdiction to grant exceptions.
3. Permits other than liquid fuels to power emergency generators.
4. Reduces unnecessary and sometimes impossible requirements for main circuit breaker and feeder insulation testing.
5. Changes generator testing from weekly load testing to weekly inspection and monthly load test.
6. Changes generator inspection from daily to weekly.
7. Permits use of a single transfer switch in smaller facilities.
8. No longer requires metal conduit for low-voltage systems.

In general it appears that at this time the codes and standards that are originated by NFPA which affect Health Care Facilities are well in hand due to the efforts of the members of the various Health Care organizations. In retrospect, it appears that many institutions could have saved an excessive outlay of cash for new electrical systems if the codes that had been in effect previously had been developed in the same manner as those which have been recently adopted.

John C. Deamico
NEHES Liaison to NFPA

WANTED — WANTED

When you see or hear of an engineering idea which would benefit the hospital engineers, the newsletter is the best means we have of spreading the word. You will find my address on page 2. Don’t be bashful about the publicity. If we both have an idea and we share them, we both have two ideas!

Newsletter Editor

ONE WAY TO PULL MASS. ENGINEERS TOGETHER

For years, much concentrated effort has been put into the consolidation of Massachusetts Hospital Engineers as a group. However, for one reason or another it has never been realized.

Presently State Hospital Engineering groups are small splinter groups; Boston, Middlemac and South Shore. The majority of Engineers I have spoken with feel this is a very effective system and are not willing to change it. Personally, I couldn’t agree more.

These splinter groups meet regularly, elect officers and many good things come from them.

Sometimes, however, there is a need for one voice to speak out for the entire State’s Hospital Engineer groups. It would also be advantageous in letting all groups know what is going on in a statewide basis.

For these reasons I shall be attempting to form a group within our state to meet on a quarterly basis at a central location. It would be represented by not less than one member from each splinter group and the Mass. representative. The group could discuss problems affecting the entire state.

I have talked over this plan with Mr. George Caros of the Mass. Hospital Association. He has agreed to serve on the panel. He further offered to place each hospital engineer’s name on the association mailing list and offered association facilities as a meeting place.

Here is an example of how the panel could work for all of us. I recently received a letter from Jacqueline M. Rosenthal of the Department of Public Health, Director of Hospital and Ambulatory Care. She explained that currently the division is in the process of defining the term, “Qualified Medical Engineering Consultant,” as required under the Licensure Rules and Regulations. She further stated that it would be profitable for the Hospital Engineers Society to comment on required qualifications. I totally agree, since I feel that we must take this opportunity to have a say in the rules that govern us. As a result of this letter each splinter group president was contacted and asked to get a consensus of opinion within his group and report back to me. With this information in hand a committee consisting of Bill White, Adm. Engr., Framingham Union Hosp.; John Crowley, Adm. Engr., St. John’s Hosp., Lowell, and I will meet with Jacqueline Rosenthal and discuss the issue.

Ed Bauer
Massachusetts Rep.

SOUTH SHORE ENGINEERS NEWS

At the October meeting of the South Shore Hospital Engineers Society, Mr. Kenneth Kiley, Union Truesdale, was elected President for the year 1977-78 and Paul Taylor, Boston Hospital for Women, was elected Secretary-Treasurer for the same term.

REPORT FROM WESTERN VERMONT

As cold weather approaches, Chief Engineer, M. J. Noswalt reported to the Administrator that he had things pretty well buttoned up for the winter. We hope we met the hospital as well as his red flannel. It looks like a cold winter, so we’ve cut 2 extra cords of wood and put extra anti-freeze in the well. Ambulance driver Calvin Weatherly has put the snow treads on the sleigh and put the bells on the horse, so I guess we’re set till spring.

At the Nursing School graduation, here at the Grubbe Medical Center, the Administrator presented the graduating nurses with their distinctive blue jeans, turtle neck sweaters and hair curlers, reminding them of the hospital’s dress code. The doctors have set a fine example of uniformity in professional attire and are easily recognized in their distinctive scrub clothing, on the football field, shoveling snow and in the barn where we keep the ambulance. It gives a man a warm feeling to know there’s a doctor around.

Well, so much for chit-chat. It’s time to go light the lamps in the parking lot.

Yours humbly,
Josh Soil
Grubbe Medical Center

FALL CONFERENCE PLANNERS

Bill White, Dick Popham and Al Bender want to beat all past programs.

Connecticut is the host for the 1978 fall conference and we can say that plans are well ahead of schedule to make the event worth placing on your calendar right now! Starting at noon 18 October, at the Sheraton-Hartford, in Hartford, Connecticut, co-chairmen Dick Popham and Al Bender, together with committeeman Bill White, are fixing up a program they hope will beat all programs. We hope that ASHE will be an active participant in this seminar, so start planning on that date — 18, 19 and 20 October.