New England HOSPITAL ENGINEERS SOCIETY Newsletter

FIRST QUARTER 1992

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Vermont Engineer Assists Nicaraguan Hospitals

The American Medical Resource Foundation (AMRF) donates free medical equipment and supplies to hospitals serving the poor in Third World and developing nations. In 1990-1, AMRF had provided equipment valued at nearly $20 million to nineteen countries. Most of these medical supplies have been donated by New England hospitals who have replaced the items with newer equipment. Inspection and repair facilities insure these items are functional prior to shipment.

In addition to supplying equipment to developing nations, AMRF also offers the services of highly qualified engineers from the U.S. to instruct personnel in these countries in equipment maintenance (AMRF, continued on page 2)

IMPLEMENTING PL - 4 OF THE JCAHO STANDARDS

Implementing PL - 4 of the new JCAHO Standards can be easily accomplished if we establish criteria and risk assessments similar to what has been done for equipment management. At first it seems like an impossible task to try and identify every item of our utility system and then ensure that training and documentation are completed as required.

What we had to do at our hospital was to define individual components of each utility system included in our program based on risk assessments. We first identified the utilities systems that would be included in our program, and they were as follows:

- a) Electrical distribution system;
- b) Emergency power system;
- c) Vertical transport system;
- d) Heating, ventilation and air conditioning system;
- e) Plumbing system;
- f) Boiler and steam system;
- g) Medical gas system;
- h) Communication system and
- i) Fire alarm system.

Next we identified the critical components of each of these systems and analyzed the impact to patient care if these components should fail. Risk assessments were assigned based on the following criteria.

1) The function or area the utility system supports.
2) The risk involved if the utility component failed.
3) The maintenance requirements for the utility component.
4) The past incident history of the utility component.

(JCAHO, continued on page 7)

WATER CONSERVATION AT LAHEY CLINIC

When you turn your faucet on you expect to get quality water. The days for quality water are decreasing due to pollutants being introduced into the earth, which are as follows:

- 19,000 hazardous waste sites
- 93,000 landfills
- 180,000 pits and ponds of liquid waste
- 10 million underground storage tanks
- 30 million septic tanks

The earth is made up of 80% water, 97% of which is salt water. The remaining 3% of fresh water is about 98% locked up in the polar caps. It is a fact that the water we drink today is the same water that was used by George Washington and will be used by future generations.

The process for having pure water naturally, goes through a hydrological cycle, which works on the principle of water evaporating from earth to the sky and comes back as rain or snow.

(WATER, continued on page 5)

DO NOT MISS THE . . .
1992 NEHES SPRING SEMINAR
Americans with Disabilities Act (ADA)
March 31, 1992
Hynes Auditorium, Boston,
Presenter: Doug Erikson, AHA
Get your application in by March 20th. Contact Terry Ringer for more information (617) 273-8052
It seems that a day does not go by that someone or something isn’t reminding me about the new ADA legislation. We could not have picked a better topic for our Spring-92 Seminar. I was able to attend the monthly meeting of the Connecticut group and ADA was their theme. The program and the attendance was excellent.

Can our member state hospital engineer chapters and our regional society (NEHES) modify the organizational structure so that being a member in the local (state) group entitles you for membership in NEHES - providing the eligibility requirements are met? This question is being presented to our Steering Committee for consideration and review. If it is acceptable, a formal proposal would be made to our membership as a recommended change to our By-Laws as appropriate at the annual meeting. One major advantage of this restructuring would be closer working relationship with the states and greater benefits for the individual members.

Jack Berger, President

DON'T BE AFRAID TO FAIL

You've failed many times, although you may not remember.
You fell down the first time you tried to walk.
You almost drowned the first time you tried to swim, didn't you?
Did you hit the ball the first time you swung the bat?
Heavy hitters, the ones who hit the most home runs, also strike out a lot.
R.H. Macy failed seven times before his store in New York caught on.
English novelist John Creasey got 753 rejection slips before he published 564 books.
Babe Ruth struck out 1330 times, but he also hit 714 home runs.
Dont worry about failure. Worry about the chances you miss when you don't even try.
Submitted by Ken Boyer

(AMRF, continued from page 1) and management. AMRF arranged for my presentation of a week of technical classes at the Nicaraguan health ministry offices in Managua.

Nicaragua is confronted with the consequences of a decade of war during which hospital infrastructure was not maintained adequately. A country wide attempt is being made at present to correct for the deficiencies of that period. In the mean time, electrical power and gas supply problems continue to contribute to clinical equipment failures.

Eight clinical engineers and technicians from across Nicaragua took advantage of didactic and laboratory sessions focusing on respiratory and anesthesia ventilators.

A wide spectrum of clinical apparatus, ranging from suction pumps to ultrasound imaging equipment is in use without adequate support. Inadequate user and service manuals, user training and replacement parts all contribute to a low level of efficiency as well as the existence of a multitude of dangerous situations. Well intentioned hospitals in the U.S. often contribute to this situation by donating outdated technology without also providing the related literature.

The experience was eye opening in a number of ways, not the least of which was to observe first hand how bad the situation can get when maintenance and other technology support requirements are ignored. Students involved in the program related a variety of disastrous consequences of equipment failure. The desire demonstrated by Nicaraguan engineers and clinicians to improve the situation produced hope.

AMRF intends for this program, including projects in numerous other Latin American countries, to alleviate problems resulting from a lack of understanding as to how to support clinical technology. I hope to do more volunteer work with AMRF. This experience has stimulated interest in other staff in working in this program.

Hospitals interested in donating medical equipment or supplies may contact AMRF at (617) 863-2363.

Wally Elliott,
TSP/University of Vermont

NEW NEHES MEMBERS

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ROBERT MONTGOMERY
MICHALE PANKIEVICH
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THOMAS PROUDLOS
ARTHUR OROURKE
RICHARD MASSE
ROBERT SPELLMAN
DAVID HARRINGTON
CAM BIENVENUE
JACK KELLY
NEW ENGLAND STATES REPORTS

CONNECTICUT REPORT

The CT Hospital Engineers Society conducted their last general meeting of 1991 on November 21 at Waterbury Hospital. The meeting was well attended by the membership. A presentation by Applied Thermodynamics was made on various replacement strategies for underground storage tanks.

One of the societies goals for the upcoming year is the increase in membership. Discussed at this meeting as well as recent board meetings was the possibility of developing an Associate Membership category that would be offered to consultants and vendors involved in the healthcare field. It is felt that if properly controlled this could be a source of new revenue for the society. I would be pleased to hear from anyone in NEHES who might have some input or experience with this issue.

The first meeting of 1992 is scheduled for January 16, 1992 at the Hospital of Saint Raphaels, New Haven, CT. The presentation will be made by partner in the architectural firm of Stacker, LaBau, Arneill, McManus on the Americans with Disabilities Act.

Several hospitals in Connecticut are scheduled for JCAHO inspections in February including my own. The theme of our March general meeting will be How I survived the JCAHO. A panel discussion led by engineers from the hospitals that were surveyed will be held at Stamford Hospital. I will be pleased to share these insights the NEHES board members at one of our subsequent meetings.

Edward Browne, Connecticut Representative

MAINE REPORT

Meeting was held in Augusta at the Rustler Steak House. About a dozen members attended and time was available for discussions on the following items:

a) Discussion of the January meeting of the NEHES group. Members were informed that several positions are available on several committees if anyone is interested. It was mentioned that the president of NEHES would be selecting some articles from the newsletter for awards of at least $100.00. It was mentioned there would be a NEHES meeting and seminar on March 31st in Boston. The subject would be the new Americans with Disabilities Act, charges are $65.00 for non-members and $40.00 for members.

b) Memberships in both the Maine engineers group and the New England Engineers group was encouraged.

c) There was some discussion on Ergonomics, carpal tunnel syndrome, everyone seems to be into the education process at their hospital. This is now required by Maine Law.

d) There was some discussion about the new reporting requirements for medical equipment failures.

e) There was a suggestion that we put together a program on air quality in buildings closed building syndrome.

The next meeting was scheduled for February 20th. The program will be Fire Fighting Tactics at Healthcare Facilities and will feature a video tape and slides of an actual fire in a hospital.

Meeting was adjourned at 1:20 pm and we proceeded to Central Maine Power Company where we were taken on a very informative tour of their central dispatching area. Here

CMP controls the monitoring and operation of 27 generating facilities. The tour was well received by those attending.

Don Garrison, Maine Representative

MASSACHUSETTS

REPORT

The following hospitals went through JCAHO inspection for January:

Brigham & Womens Boston Lowell General
Melrose/Wakefield Hospital recently contracted Sielflers to manage its maintenance Department.

Presidents for the four organized clubs for 1992 are:

Boston Hospital Plant Engineers - Greg Doyle, Mass. General Hospital
Middlesex - Gus Basque, Haverhill Municipal Hospital
South Shore - Not assigned
Western Group - Not assigned

Boston Hospital Plant Engineers Club is sponsoring the 1992 Spring Seminar which is to be held on March 31, 1992 at the Hynes Auditorium in Boston. I encourage all members to promote the seminar which is on Americans With Disabilities Act.

TRANSITIONS/MILESTONES

William Flynn left Melrose/Wakefield Hospital.

David Martin left Emerson Hospital.

This year, Ernie Margeison, Massachusetts Alternate Representative, and I have set goals to hopefully improve the Massachusetts representation to the organization. The following is a list of proposed goals:
Enlist more members by showing them the importance of the organization.

Concentrate on improving the activities of the other clubs, especially the western group.

Make at least one visit to each of the 4 organized clubs.

Send out a questionnaire to all members for their ideas on how to improve the society.

Promote the upcoming Spring Seminar that is being sponsored by the Boston Hospital Plant Engineere Club.

Later in the year, promote the Fall Seminar.

TRANSITIONS/MILESTONES

Mr. Robert Loranger, Physical Plant Manager of the New England Medical Center, recently received a promotion. His new title is Director of Facilities.

Mr. Michael Morpew, Director of Engineering Services of Brigham and Women's Hospital, was unanimously accepted as a member to the Boston Hospital Plant Engineers Club.

Lahey Clinic Medical Center started off this year with a new C.E.O., Dr. Steinhauser, who has replaced Dr. Wise who retired as of December 31, 1991.

Mr. Robert H. Minton, Associate Administrator of Lahey Clinic and past NEHES member, also retired as of December 31, 1991.

John McCabe, of Norwood Hospital, has resigned.

Leonard Morse and Framingham Union Hospital are now one and the new name is Metro West Medical Center. Mr. Barry Movitz, formally of Framingham Union, is now the Director of Facilities under the new merger.

NEW HAMPSHIRE REPORT

The NH Society held meetings on January 16, 1992 at the NH Hospital Association in Concord, NH.

It was a lightly attended meeting the following items were the body of the meeting:

1. The secretary distributed updated lists of the membership and the video library tapes.

2. Discussion was held on whether the group should attempt to publish a newsletter, no decision was made.

3. The guest speaker was David May, his position is regional director for OSHA. David spoke about the areas in health-care that make up the most common citations.

4. The group is presently looking for someone to represent us on the NH Safety Council. Presently there are no volunteers.

5. The February meeting is scheduled to be held in Concord at the New Hampshire Hospital Assoc. The educational component is undecided.

Stephen Shaw,
New Hampshire Representative

RHODE ISLAND REPORT

The last meeting of the Rhode Island Hospital Engineers took place on Friday, January 17, 1992 at Womens and Infants Hospital, 101 Dudley St., Providence, RI. The guest speaker was Mr. Larry Joslyn of the Joslyn Sterilizer Corp. His topic of discussion was the The Future of EO Sterilization.

His discussion began with current alternatives for EO sterilization, including their features and benefits as well as their limitations. Then the historic problems with EO sterilization was discussed. Finally, options for resolving EO problems was discussed. A good question and answer period followed.

At this meeting, I asked the attending members to participate as a Board Member to the New England Hospital Engineers Society.

Prior to the presentation was the business meeting. The following was our agenda:

1. We must always seek to enlist more members; but, first, we have to show them the importance of our group.

2. Improving the activities and presentations at our meetings.

3. Consider holding meetings at facilities other than at Women & Infants Hospital, (but, I need volunteers).

4. Put together a questionnaire to our membership asking their involvement on how to improve our group.

5. Promote a flow of educational programs to assist us in our dealings with Authority Having Jurisdiction (Codes and JCAHO).

6. Seek greater involvement and attendance to the Spring and Fall Seminars as well as becoming members of the New England Hospital Engineers Society.

With attendance what it is, maybe our group would be interested in allowing vendors to join as Associated Members. Of course, this would be a bold move!

We are always in need of articles for our newsletter. Very little has been printed about Rhode Island hospitals. We all know of interesting events, construction, and changes worth mentioning that are occurring all of the time. Wouldn't you like to

Terry Ringer,
Massachusetts Representative
see an article appear written by you or one of our peers? We could even highlight a hospital once in a while about its beginning, specialties offered, etc.

In early 1992, several Connecticut hospitals will be surveyed by JCAHO. I will be receiving the results (citations and recommendations) and I will pass these on to you at future meetings. When is your survey due?

It is extremely important that a representative of your hospital attend either or both of the above.

Our next meeting is scheduled for March 27, 1992.

Ken Boyer,
Rhode Island Representative

VERMONT REPORT

The last meeting of the Vermont Hospital Engineers Society (VHES) was held at Gifford Memorial Hospital in Randolph, Vermont on Wednesday 1/29/92. Theron Manning was a great host and demonstrated why Gifford Memorial has such a fine reputation for wonderful institutional cooking. Theron arranged an informative automated energy management presentation (which he conned Temperature Controls of Vermont into sponsoring). An entertaining guest speaker from Automated Logic out of Marietta, Georgia (with a real slick dog and pony show) highlighted the program. A total of nineteen hospital engineers attended.

A business meeting followed the Automated Logic presentation. Topics of discussion included: the 1993 NEHES fall seminar and the appointment of a seminar planning committee; differences of opinion regarding the interpretation of NFPA 70, 99 and 101; the NEHES spring seminar; solicitation of NEHES newsletter articles; solicitation for participation on NEHES board committees; and a plug for membership in NEHES. The meeting concluded with a round table discussion of various recent problems experienced by engineers at member hospitals.

The last item of business on our agenda was to discuss a letter that VHES received from the states Health Policy Council. The letter was an open invitation (to all of the 16 organizations that make up a group of professional societies collectively called the Allied Health Professionals) to participate in the election of three candidates to be presented to the governor for an appointment to the states Health Policy Council. Since in Vermont this group carries a lot of weight and gets a lot of free lunches, the VHES membership decided that we should try to get somebody elected. It was reasoned that if we were able to accomplish this, then maybe somebody would listen to us.

The members present at the meeting decided that Jack Gosselin would be the VHES contender because he really knew how to throw around the B.S.. Jack promised to buy anyone a beer who came to the caucus in Waterbury to support him. Ten foolhardy individuals (myself included) showed up and managed to get Jack elected to one of the candidate positions (despite the fact that we were unable to get any of the other groups to cast any votes in support of him). After the vote, we retired to the nearest drinking establishment to take Jack up on his previously mentioned promise. After we had run up a bar tab that read a lot like an invoice for an aircraft carrier, Jack announced that he only had about $24.00. As we completed the dishes, we all reflected on what a wise choice we had made and what a good politician Jack would be. The governor will now select one of the three candidates that were presented to him and appoint that person to represent Allied Health on the Health Policy Council. With a little luck, Jack may be launching a new career. Well keep you posted.

The next VHES meeting is scheduled for Wednesday, February 26, at Copley Hospital. A presentation is planned that will continue the energy conservation theme. It is my hope that the material covered will dovetail nicely with the subjects presented during our January meeting at Gifford Hospital. Landis & Gyr Powers and Eaton Controls will collaborate. Additionally, Tobey Clark is planning to hold the Technical Services Programs (T.S.P.) Spring Seminar on April 29, 1992 at the Lake Morey Inn in Fairlee. Topics include Safe Medical Devices Update and Basic Equipment Maintenance and Management.

Mark Cappello,
Vermont Representative

(WATER, continued from page 1)

With man made pollutants the evaporation process does not totally purify the water. For example: rain being the last cycle before coming back to the earth passes through a layer of sulphur emitted by smoke stacks causing acidity in the water, more commonly called acid rain.

Lahey Clinic has over the past several years, instituted a program of water conservation which is important considering that water is becoming a scarce commodity. Lahey cannot solve the worlds water problems but, can set an example for other institutions to follow.

The Lahey Clinic moved from its original location in Boston to its new facility in Burlington opening on November 22, 1980. Within the next few years the clinic experienced growth that exceeded all expectations. The average daily ambulatory patient census of 700 patients per day in 1980 has grown to 1,800 patients per day in 1987, while maintaining a 200 bed hospital facility, inpatient average daily census is approximately 97%. With this growth, utility use has soared and by the year 2000 MWRA predicts that water cost will quadruple.
I would like to discuss the specific measures implemented here at Leahy to conserve water, which as you all know, is a necessary utility for proper facility operation.

In 1984 it became apparent that the Lahey Clinic was the largest water user in the town of Burlington, with an annual consumption of about 60 million gallons. With the services of Camp Dresser and McKee an environmental engineering firm whose expertise is in water conservation, R.W. Sullivan a plumbing engineering firm and with the approval of the board of trustees and the backing of administration, ways were recommended to conserve water. A list was established and presented to administration for consideration and approval.

Early in 1985, the approved list was implemented.

1. Water awareness signs were posted in all public and employee toilets.
   Cost: $1,300.00

2. Existing aerators in all lavatories and patient bathrooms were changed from a flow of 1.50 gallons per minute to .75 gallons per minute.
   Cost: $5,000.00

3. Flow restrictors were installed in all showers.

4. Educate Lab personnel, in particular they were in the habit of tying off the distilled water faucet allowing the water to flow freely. (The faucet has a spring loaded handle so its meant to be used and retract when let go). This is important because to make one gallon of distilled water requires nine gallons to be wasted.

5. Flow restrictors were installed on all patient and clinic air vacuum pumps. This reduced the flow from 5 to 2.5 gallons per minute. Cost: $2,000.00

6. A glass dishwasher was installed in the pathology department. Previously, pathology personnel were rinsing slides by continuously running water over them.
   Cost: $11,000.00

7. Vacuum diaphragms assembly on all flushometers were changed to allow only 2.5 gallons per flush instead of 4 gallons.

8. Waste water reclaim system was installed. The 2 - 5,000 gallon tanks collect all non-contaminated waste water used to operate lasers, compressors, distilled water, R.O. water, and mechanical equipment for cooling purposes. This water (3 - 5k gallons per day) is then used for boilerfeed (average of 3,000 gallons per day use) and/or cooling tower makeup water. (Cooling tower consumes approximately 30 - 40 gallons per day during the peak of summer).
   Cost: $128,000.00

9. The installation of an on site artesian well that will yield in excess of 80 gallons per minute, 24 hours a day at a pressure of 75 lbs. The well water is used to supplement the supply to the reclaim tank, feed the boilers directly, and to cool surgical air and vacuum pumps.
   Cost: $65,000.00 for installation.

Some sort of contingency plan must be enforced in the event of public water supply failure. Therefore, we have available a 2 1/2' fire hose connection that will connect to our fire protection system and will maintain water pressure in the sprinkler system. Each month, the well water is tested for quality. Although we do not directly connect to the potable service, we do have a policy that in the event of a public water failure, emergency connections could be made to the potable water system. (This decision would require the approval of administration after review of the water quality reports).

10. The purpose of our strainer cycle is primarily to utilize the cold water from the cooling towers and distribute it through the chill water system during the spring and fall seasons, thus saving electrical energy by not operating the 2 - 900 ton mechanical chillers. As a bonus to this, is a savings in water consumption, since the evaporation rate is minimal with the strainer cycle. Finally, all of our water meters are checked for accuracy on an annual basis. As the bar graphs clearly illustrate, between 1984 to 1988 we have drastically reduced our consumption by 26 million gallons, while the patient census has increased. This coming year, with the well in full operation, we anticipate saving an additional 1 - 3 million gallons of water per year. ($12,500.) The MWRA anticipates that sewer rates will be increased by 49% in 1989 and 40% in 1990, which make the Clinics conservation efforts even more attractive from a financial point of view.

According to the latest statistics from the town of Burlington, we are now the # 2 user and trying harder to become #3 by next year. Lahey Clinic has spent in excess of $400,000 on water conservation projects and our goals could not have been met without the full support of administration, the Board of Trustees, consulting engineering firms and the engineering department.

Submitted by
Terry Ringer,
Lahey Clinic

(JCAHO, continued from page 1)

Numerical values were then assigned based on our criteria as follows:

Utility Component Function or Area
1. OR/SCU/Recovery - 10 points
2. Dialysis/Minor Surgery/Dental Surgery/Radiology/Medical Surgical Wards/Blood Bank - 8 points
3. Diagnostic Services (Lab, Nuclear Medicine, etc) - 6 points
4. Support and Therapeutic Services - 4 points
5. Dietetics/Pharmacy/Mental Health and Psych Wards - 2 points
6. Administrative Areas/Other - 1 point
Risks Associated With a Failure or Malfunction of the Utility Components

Patient death - 4 points
Patient or staff injury - 3 points
Discomfort or inconvenience - 2 points
No Significant risk - 1 point

Maintenance Requirements

Extensive - 3 points
Average - 2 points
Minimal - 1 point

The sum of the risk factors were totaled for each utility component and anything that achieved a numerical value of 12 or above was assigned to our unique inventory for special attention as required by the PL-4 standard. Of course this does not mean that you forget about all the other components of the utility systems it only means that you now can establish an unique inventory for special consideration in training and documentation as is required by JCAHO.

Once your unique utility component inventory is established written operational plans can be prepared to include:

a) Intervals for testing and maintenance,

b) Test methods,

c) Training of maintenance personnel and users on the utility components included in your unique inventory;

d) any component failure procedures.

In addition to testing, maintenance and training of the items in your unique inventory, procedures must also be established to report problems with operator errors or failures to the safety committee for tracking.

An almost impossible task of trying to comply with the new standards for utility system management has now been reduced to a much smaller and now manageable unique inventory once our written criteria and risk assessment values have been assigned.

Don Garrison
Dept. of Veterans Affairs Hospitals
Togus, ME

SERVICE CONTRACTS VERSUS IN-HOUSE MAINTENANCE

One of the most often heard complaints from hospital engineers is I can not get funding to pay for training, so I am forced to get a maintenance contract. Hospital administrators are always concerned about bottom line costs. So unless you can prove convincingly that you can save them money by training your people then you will not be successful in getting the needed training funds.

Our hospital engineering program has been very successful in obtaining the training funds needed by using a service contract cost analysis document to show our hospital administration that it would be unwise (cost more) not to train our people. Basically what we do is compare the life cycle costs of a vendors service contract with the costs (including training) of providing the maintenance in house.

We begin by listing the fixed price of the vendors service agreement or the man hours and rate per hour plus the price of parts used over a one year period. We then multiply this annual cost times the life expectancy of the piece of equipment to get a bottom line cost. Next we list the cost of providing the maintenance in-house. The preventative maintenance and the needed repairs are broken down by the rate per hour we pay our employees times the number of hours we will be working on the piece of equipment over a one year time. Next we itemize the cost for any parts we might use for all the times we are doing preventative maintenance or repairs. We next list any parts inventory items that will be necessary for our inventory if we are going to do the maintenance in-house. The final item we need to analyze is the cost of training. This will include tuition, travel, food, and hotel costs.

To summarize our in-house costs we multiply our labor and parts cost per year times the life expectancy of the piece of equipment. To this we can add the one time training costs and the one time inventory cost to purchase the parts we will need to keep on hand.

We now have all the numbers we will need to provide an evaluation to our hospital administration. We can compare the life cycle costs of doing the maintenance in house with the life cycle costs of a vendors service contract. In most cases there will be a significant difference in the two costs and should provide all the information we will need to convince our hospital management they should pay for the needed training.

Our hospital has been very successful using this method of analyzing contract costs verses in-house maintenance costs. We have been able to get training for fire alarm systems, energy management systems, and many pieces of medical equipment. It is very hard for hospital administration to say NO when you can show them in writing how the cost would be less to train your in-house people. If you would like a copy of the documents we use for our analysis we would be happy to send them to you. Just give me a call at 207-623-5720.

Don Garrison
Dept. of Veterans Affairs Hospitals
Togus, Maine

REWARD !!!

$100 award for best article submitted to the NEHES newsletter! $50 each for second and third prize articles. Send all articles to the newsletter editor (see back cover) for consideration.
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