THE BTESM NATIONAL PROGRAM: PAST, PRESENT, AND FUTURE

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ABSTRACT

This paper will review some of the history of the National Program for Building Thermal Envelope Systems and Materials (BTESM)* indicating key decisions for important components of the program including such things as creation of the Building Thermal Envelope Coordinating Council (BTECC) and implementation of this series of conferences involving ASHRAE (and now BTECC) as joint sponsors with DOE. Meaningful technical research results and information dissemination to targeted audiences within the total building community are important components of the program operation. This paper also will describe both the formalized technology transfer activities, including the holding of institutes for architectural and engineering faculty members and student design competitions, and one of several informal person-to-person networks of technical information sharing within the total building community.

INTRODUCTION

The National Program for Building Thermal Envelope Systems and Materials (BTESM) was conceived by the U.S. Department of Energy (DOE), the National Bureau of Standards (NBS), and Oak Ridge National Laboratory (ORNL) and is described in two planning documents (Achenbach 1979, 1982). The basic premise of any national program is that an atmosphere of cooperation can and should operate among all public and private sector interests to increase the effectiveness and efficiency of approaches to important national causes. In the case of BTESM, the national cause is that of bringing about improvements in the energy efficiencies of buildings without negative impacts to those structures or to their occupants. The BTESM National Program" is that part of the total effort that deals primarily with the building thermal envelope. One might say that the BTESM National Program concentrates on the permanent part of the building in that few, if any, major modifications normally take place to the envelope over the useful life of the structure. Therefore, it would appear to be quite important to design and construct our buildings right initially. For example, in the 1970s energy efficiency acquired greatly increased support as a performance requirement for new buildings. However, we also need to find out how to modify existing structures to meet current energy-related demands. The whole spectrum of our society dealing with constructing or modifying buildings needs to know what "right" means and, in many cases, needs to concentrate on changing previously accepted practices into better ones. A good deal of progress has been made over the past decade and much more will be forthcoming through the combined work of many.

The BTESM National Program was initiated by a small group of researchers who met at the National Bureau of Standards in December 1977. Many of the major elements of the program already existed within activities of professional societies, private companies, trade organizations, educational institutions, governmental bodies, etc., so the principal work of the initiators was to try to understand the big picture so the pieces could be brought together into a

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national program operating under one very large umbrella. It was felt then (and still is today) that all of the pieces should be described in something called a National Program Plan (NPP) and that such a plan would have to receive wide endorsement in order for the program to operate effectively toward goals inherent in the definition of its "national cause." The BTESM team of six members drafted the first edition of the NPP on the thermal envelope with emphasis on insulating materials, took it through the review process of both DOE and NBS, and printed and distributed several hundred copies to the building community by June 1978. Then a public meeting was held at the Department of Commerce auditorium in Washington, D.C., on July 27, 1978--some seven months after that initial meeting at the NBS--to present the NPP and receive comments on it. The team reacted to those comments and published the first NPP via the Department of Energy in January 1979 (Achenbach 1979).

Subsequently, an advisory committee from the building community was formed to critique this NPP and make recommendations for its revision. That committee published its report in August 1980 (Stamper 1980), suggesting 19 actions including establishment of a council ". . . to oversee the research plan and ensure its implementation and periodic updates." Thus the idea was in place for creation of the Building Thermal Envelope Coordinating Council (BTECC). The concept of a coordinating council was strongly endorsed and further developed in the second edition of the National Program Plan (NPP-2 Achenbach), issued in March 1982. Soon thereafter, a task group comprised of representatives of about ten industry and standards organizations and government agencies provided the initiative and detailed planning for the formation of BTECC, which occurred in November 1982.

NPP-2 was prepared under the editorship of Reece Achenbach with contributing writers from industry, academic institutions, and government agencies who were knowledgeable in building research and development. NPP-2 was widely acclaimed by many in industry and government agencies as an example of how the public and private sectors should work together toward common goals.

The NPP-3 is to be prepared by BTECC with input from its various Research Coordinating Committees and others as appropriate. It is hoped that NPP-3 can be completed within a year or so without much change to the broad general objective of the BTESM National Program, started several years ago.

Within both NPP-1 and NPP-2 are words supportive of information dissemination to the right places to assist in the "cause" of improving the energy efficiencies of buildings without detrimental impacts on structure or occupants. An early DOE decision was made to provide financial support and thereby catalyze two series of major technical conferences in alternate years on the Building Envelope — one jointly with ASTM C16, emphasizing building thermal insulations, and the other with ASHRAE, emphasizing systems aspects of the program. This conference is the third of the latter series. Published proceeding of the 1978, 1979, 1981, and 1982 conferences (McElroy/Tye, 1980; Bales/Bass, 1981; Govan/Greason/McAllister, 1983; and Bales/et al., 1983) coupled with those to be published for the 1984 ASTM C16 conference in Dallas and for this 1985 ASHRAE/BTECC/DOE conference contain a wealth of technical information on research results from the multitude of projects that are part of the BTESM Program. All have been invaluable in improving communications among researchers and promoting a state of mutual cooperation especially involving different organizations — public or private — as sponsors of research.

But we all must recognize that researchers and program managers talking among themselves, though valuable, does not in and of itself accomplish the purpose of the national program. Designers, builders, retrofitters, and operators must use the best available technical information to accomplish that purpose.

The Office of Building Energy Research and Development of DOE recognized this industry need by establishing a technology transfer and research utilization program in its Building Systems Division in FY 1984. A building industry roundtable on Technology Transfer and Research Utilization was held in December 1984 under the sponsorship of the American Society of Heating, Refrigerating, and Air-Conditioning Engineers and Pacific Northwest Laboratories to identify the constraints, discontinuities, limitations, and inadequacies of the present processes and procedures and to recommend new or improved procedures and the means for carrying them out (Achenbach/Seaton, 1984).

Much of this conference is devoted to reporting results of research, development, and demonstration activities on the building envelope. The rest of this paper will indicate some of the key ongoing DOE-sponsored thrusts for education, training, and other information sharing as parts of the technology transfer process.

EDUCATION AND TRAINING

An Institute for Design and Energy was initiated in 1979 with DOE funding to the Association of Collegiate Schools of Architecture (ACSA) to interface with the architectural faculty of the nation on energy matters. Each year since 1979 about fifty architectural faculty members from schools throughout the USA and Canada have met together in a working environment for one week to learn the latest about energy in buildings. Those participants carry energy information back to their schools and to their students so that energy awareness will be present in the minds of the great majority of future practicing architects. In parallel with this institute is an architectural student design competition, also led by ACSA with both DOE and private sector financing, which gives the students practical experience in energy matters related to the design of buildings and rewards them for outstanding work.

During the 1979 institute for architects, it was suggested that engineering faculty who deal with buildings should have a similar activity. Subsequently, the American Consulting Engineers Council (ACEC) agreed to start and has continued to hold an annual institute for engineering faculty interested in energy efficiencies of buildings. I have felt for some time that an engineering student competition, perhaps even jointly with architectural students, could be and should be put in place, but funding levels to date have been inadequate to support this idea.

Some of the other activities in this area have included

- Training for home builders (NAHB/DOE)
- Sweet's Catalog Materials
  - -Daylighting
  - -Windows
- Workshops on use of DOE slide rules on energy in buildings
- Preparation and distribution of the DOE Insulation Fact Sheet

The effectiveness of the formalized technology transfer activities are being examined currently by ORNL staff to try to determine what works and what doesn't work and how to continue to build on the positive.

NETWORKS OF INFORMATION SHARING

Several years ago, a Task Force on Information Dissemination was created which was thought might assist the BTESM National Program in this area. The concept of an "Information Center" was developed, but after one or two meetings information experts advised that it would cost approximately one million dollars per year to operate and maintain a "National Information Center" on building technology after the initial expense of establishing the system. The operation would include, for example, interception and handling of routine inquiries to the DOE Program Manager on building insulations but non-routine inquiries would stil have to involve the program manager and/or other individual experts. The true value of an "expert" or the value of a "true expert" is amazingly high. We quickly abandoned any thinking in that direction and concentrated on the notion of informal networking among building experts as a doable and very inexpensive alternative. These experts would serve as the focus for a network of people who want to know about and put to use the latest technical information on physical properties of thermal insulations for buildings and certain specialized applications. This network has been implemented and involves a wide spectrum of people including DOE program managers, laboratory principal investigators, other researchers, state officials, federal regulators, private businesses, and average citizens asking questions and sharing information about their experiences with insulation. It is difficult to measure the effectiveness of informal networking in comparison with formalized projects that are part of a structured technology transfer program. I suspect it would go about as the ratio of the $1M to the fractional part of a principal investigator's salary spent on technology transfer. During a recent month, 17 contacts were active in the materials area that could be considered part of this informal network — each involving sharing of technical information and each an important element of the technology transfer process. In my judgment, effective technology transfer must include some element of access to the experts on the subject of interest. High level groups within organizations can assist the process by encouragement, organization, and finances, but the "grass roots" is essential for its success.

SUMMARY

I want to summarize this paper by stating that much progress has been made toward improvements in energy efficiencies of our national stock of buildings. The "cause" stated herein is a worthy one for now and for the future as we strive to diminish our national dependence on non-renewable fuels. Through the diligent work of organizations represented here we should be able to accomplish more in the future. I hope that the technology transfer process will not be stifled by those who might not recognize the irreplaceable importance of the technical expert as the key to its success.

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